

# **Exploring the potential of email as a method of consultation in English general practice**

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**Statement of contribution**

I, Helen Carina Atherton confirm that the work presented in this thesis is my own. Where information or guidance has been derived from other sources, I confirm that this has been indicated in the thesis.

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## **Abstract**

### **Background**

Email is a popular and commonly used method of communication, though not widely used in the healthcare setting. In England, policy has pushed for the introduction of email as a method of consultation in general practice. However, there is very little evidence available on its use in England and professional bodies have taken a neutral or negative stance to its use. The aim of this study was to explore the potential for email as a method of consultation in English general practice, and describe the key factors that may influence its normalisation.

### **Methods**

A mixed methods approach was used. A systematic review was carried out to identify the extent of the experimental evidence base. An interview study was carried out with patient and professional (GPs, practice managers) participants who had used email for consultation, to establish their experiences and opinions, and to identify barriers and facilitators to its use. Normalisation process theory was used in interpreting the interview study results, so that the factors influencing normalisation might be identified.

### **Results**

The review found that the existing evidence base for email consultation is poor and as such it is not possible to draw conclusions as to the effect of email as an intervention. The interview study identified that email consultation largely arose as a result of patient demand, and it brought advantages for both groups. However there were problems associated with it and these related largely to the uncertainties surrounding its use.

### **Conclusions**

Email consultation is not a normalised method of consultation in English general practice despite the positive factors that patients and professionals associate with its use. It lacks a regulatory framework, which makes it difficult to use. Formal guidance on how to approach its use is required, along with methodologically rigorous research upon which policymakers and practitioners can base their decision making.

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## **Abbreviations**

BMA: British Medical Association

CBA trial: Controlled Before and After trial

CCC Group: Cochrane Consumers and Communication Group

CINAHL: Cumulative Index to Nursing and Allied Health Literature

COMET: Core Outcome Measures in Effectiveness Trials

CONSORT: Consolidated Standards of Reporting Trials

CONSORT-EHEALTH: Consolidated Standards of Reporting Trials – Electronic Health

cRCT: Cluster Randomised Controlled Trial

eHealth: Electronic Health

Email: Electronic mail

EMIS: Egton Medical Information Systems

EMAIL: Electronic Messaging, Advice and Information Link

ERIC: Education Resources Information Centre

GP: General Practitioner

GPC: General Practitioners Committee

GPPS: General Practice Patient Survey

GRADE: Grading of Recommendation, Assessment, Development, and Evaluation

HTML: Hyper Text Markup Language

ICC: Intraclass (or Intraclass) Correlation Coefficient

ICMJE: International Committee of Medical Journal Editors

IRR: Incident Rate Ratio

IT: Information Technology

ITS study: Interrupted Time Series study

ITT: Intention To Treat.

IWQOL: Impact of Weight on Quality of Life

MDU: Medical Defence Union

MPS: Medical Protection Society

MRC: Medical Research Council

NHS: National Health Service

NICE: National Institute for Health and Clinical Excellence



NHLI: National Heart and Lung Institute  
NIHR: National Institute for Health Research  
NPT: Normalisation Process Theory  
OOH: Out of hours  
PCRN: Primary Care Research Network  
QOF: Quality and Outcomes Framework  
RCGP: Royal College of General Practitioners  
RCT: Randomised Controlled Trial  
REC: Research Ethics Committee  
SD: Standard Deviation.  
SE: Standard Error  
SoF tables: Summary of Findings tables  
SPPARO: System Providing Patient Access to Records Online  
TAM: Technology Acceptance Model  
TPB: Theory of Planned Behaviour  
TRA: Theory of Reasoned Action  
US: United States  
WRSM: Weight Related Symptoms Measure

# Chapter 1: Introduction

## ***Chapter overview:***

This chapter provides a background to the wider societal context of the thesis; particularly the increasing use of the internet and email in society and how healthcare has not adopted these in the same way as other sectors. It outlines general practice as a setting; its reliance on face-to-face consultation and increasingly the telephone, but not yet email. The aim and objectives of the study are presented, followed by an outline of the thesis structure, which describes each chapter and its content.

## **1.1. Information technology & email**

Information technology (IT) and in particular internet use are now a major part of everyday life. Internet use in the UK has been continually increasing over the last decade. In 2009, 70% of households in the UK had access to the internet and 77% of people had used the internet at any one time. The general public most commonly access the internet at work and at home<sup>1</sup>.

Email is currently one of the main ways to communicate using the web; in 2009 97% of internet users sent emails, and it is especially popular with those in employment.<sup>1</sup> It is easy to use, widely available across the world and inexpensive.<sup>2</sup> Email is used in many areas of life; banking, travel and retail. The UK financial services sector has been described as having transformed their industry using technology at the consumer interface and this technology has included email.<sup>3</sup>

Despite the ubiquity of email in day-to-day life and in other sectors of the economy, its use in the healthcare sector is still not routine.<sup>4</sup> A report by the King's Fund on technology in healthcare highlighted the current perspective that healthcare lags behind other sectors where use of email communication is concerned.<sup>3</sup>

The rise of IT over the last two decades has accompanied changes in the healthcare environment, particularly in the patient population and the illnesses experienced. Life expectancy has increased in a linear fashion for the last 150 years and the number of people aged 80 or over has increased by 1.1 million since 1981.<sup>5</sup> An ageing population presents a challenge for the health service. The longer people live the more likely they are to develop long term chronic conditions such as diabetes, heart disease and dementia.<sup>6</sup> In order to combat the healthcare demand created by an ageing population and the burden of morbidity, cost-effective and high quality care is required. It has been proposed that innovative technology can assist in the addressing this challenge.<sup>7;8</sup>

## **1.2. General Practice**

General practice in the UK is the first point of contact for patients within the National Health Service. It is available to the whole population.<sup>9</sup> It deals with all health problems, providing services for the individual, their families and communities via a team consisting of General Practitioners (GPs), practice nurses and other practice staff.<sup>9;10</sup> GPs provide an interface between the patient and speciality care, taking the role of advocate where necessary. General practice has a consultation process which leads to the development of a relationship over time and provides longitudinal continuity of care. It addresses both acute and chronic conditions simultaneously.<sup>10</sup> For many patients general practice will be their only contact with the health service over the course of their lives.

## **1.3. The consultation and communication in general practice**

Communication between GP and patient in general practice occurs via the consultation. The importance of communication between doctor and patient has long been recognised and the development of communication skills now forms a part of the medical curriculum.<sup>11</sup> Good communication is said to facilitate the relationship between doctor and patient<sup>12</sup> and effective communication skills have been linked to improved health outcomes.<sup>13</sup> The consultation is described as being at the heart of general practice and is the central setting through which care is delivered. Consultation is primarily carried out face-to-face<sup>12</sup> and this face-to-face contact is regarded as a defining element of general practice.<sup>14</sup> The consultation and its characteristics are explored in more depth in Chapter 2.

Over time another communication method has become part of the consultation repertoire in general practice – the telephone. Initially, using the telephone for consultation was regarded as controversial<sup>15</sup> and general practitioners reported low levels of confidence in using it.<sup>16</sup> Telephone consultations are now routine<sup>9</sup> with many general practices offering telephone consults to patients requiring same-day appointments. Other purposes for telephone consultations include management of ongoing conditions and as follow up appointments.<sup>15</sup>

Email is the latest technology to offer an alternative way to consult with patients. As with the telephone, email is a prolific technology in routine day-to-day use around the world and it has not been adopted in healthcare in the same way as it has in other sectors. At present the status of email as a potential method of consultation in English general practice is unknown. Based on wider experience of email as a communication method, it is logical to extrapolate that email will become a 'normal' method of consultation in healthcare, just as the telephone has before it. This PhD will explore the potential of email as a method of consultation in English general practice.

## **1.4. Thesis aims and objectives**

**Aim:** To explore the potential of email as a method of consultation in English general practice and describe the key factors that may influence its normalisation.

### **Objectives**

1. Identify the extent of the experimental evidence base concerning email for clinical communication between patient and health professionals.
2. Explore experiences and opinions of patients using email consultation with clinicians in general practice with a view to understanding how email is used, and to identify barriers and facilitators to this use.
3. Explore clinician and practice manager experiences and opinions of using email or being involved in using email for consultation with patients in the general practice setting with a view to understanding how email is used, and to identify barriers and facilitators to this use.
4. Use a theoretical paradigm: normalisation process theory, to understand the potential for the normalisation of email consultation, based on the data collected in objectives 2 and 3.

## **1.5. Thesis structure**

The thesis has 9 chapters including this introduction chapter. The remaining 8 chapters are outlined here.

Chapter 2 is the background to the thesis. It begins by outlining the rationale for the thesis, before exploring email as an intervention; this involves presenting a definition of email consultation, devised for the purposes of the thesis, and outlining the intention to define email consultation as a complex intervention. The chapter then provides background to English general practice as a setting, including a summary of health service policy over the previous decade and how this might impact on the setting for the thesis. The state of guidelines for the use of email consultation is also outlined, with specific reference to the guidance provided by professional bodies representing health professionals in England. Next, the existing information available on email between clinician and patient is presented, taking a global perspective and then focusing on England and finally a summary is made of the perspectives of clinician and patient non-users of email consultation. The chapter finishes with a summary of the issues most commonly associated with email consultation in the medical literature.

Chapter 3 is the background to the methodological approach taken in the thesis. It begins by reiterating the aims and objectives of the thesis, as presented in this chapter (Chapter 1). It then describes how the objectives were developed in order to address the thesis aim. The thesis takes a mixed-methods approach to addressing the objectives, and the background to this choice is presented, along with the background to the choice of quantitative methods used (systematic review) and qualitative methods used (semi-structured interview). Finally, the decision to use theory in addressing the aim of the study is explained, and the rationale for choosing the theory, normalisation process theory (NPT), is described.

The following five chapters present the systematic review (Chapters 4 & 5) and the interview study (Chapters 6, 7 & 8).

Chapter 4 outlines the methods for the systematic review. This begins with a reminder of the study objective that the review is designed to address, and a statement of the review aims and objectives. The methods are then presented in three sections; criteria for considering studies for the review, the search methods for identification of studies, and data collection and analysis.

Chapter 5 presents the review results and discussion. The results begin with the findings of the search, including a summary of excluded studies and ongoing studies. The included studies are then presented and described, followed by the assessment of the risk of bias in these studies. Other factors of interest are then described, and these include methodological issues identified in the included studies, and missing data. The next section is the effects of the interventions, presented according to the comparisons identified in the review, and then finally the findings are summarised. The discussion section begins by reiterating the results of the review, before discussing the quality of evidence with reference to its completeness and applicability. A comparison with other studies is made, followed by the strengths and limitations of the review, and ensuing methodological considerations arising. Finally the implications of the review and suggestions for future research are presented.

Chapter 6 outlines the methods used in the interview study. This begins with a reminder of the study objective that the interview study is designed to address, and an outline of the research design. Eligibility criteria for the study are described, along with necessary revisions of the criteria required as the study was carried out. Then, the chapter outlines the number of participants, sampling strategy for identifying these and the way they were recruited. The next section concerns the interview process, both content and practicalities. The chapter finishes by explaining the approach taken to the analysis of the data.

Chapter 7 contains the results and discussion for the patient element of the interview study, and Chapter 8 contains the results and discussion for the professionals element of the interview study. Both chapters have the same structure, beginning with a summary of participant characteristics, followed by an overview of the key themes identified and a diagrammatic representation of these themes. The key themes and sub-themes are subsequently described in more detail. The second half of each chapter consists of the discussion; and this provides a summary of the findings, a comparison with other relevant studies and an outline of the methodological strengths and weaknesses. Finally, the implications of the study results are discussed.

Chapter 9 is the overall discussion and conclusions chapter for the thesis. This chapter brings together the findings of the thesis. As part of this, normalisation process theory is used to interpret the themes arising in the interview study. This allowed for an exploration of the potential for the normalisation of email consultation, as per the thesis aim. The chapter considers the methodological strengths and weaknesses of the thesis, and the implications of the findings for policymakers and regulators and on practice and future research. The chapter ends with the thesis conclusions.

## Chapter 2: Background to thesis

### *Chapter overview:*

This chapter outlines the rationale for focusing on email for consultation as the topic of the thesis. It begins with an overview of the rationale for the thesis, then goes on to explore email consultation as an intervention; this includes defining email consultation and the types of email it incorporates, and exploring the idea of email as a complex intervention.

This is followed by an exploration of English general practice as a setting for the thesis; including the policy background in England, existing guidance for using email consultation and the views of professional bodies with regard to email consultation.

After the scene has been set, there is an exploration of the evidence base concerning email, summarising what is known already in healthcare settings globally and moving on to the setting in question, England, and general practice. A summary of the main issues associated with email consultation are then described to provide context for the thesis.

Finally the content of the chapter is summarised, before the next chapter introduces the methodological approach chosen and the rationale for this choice.

### **2.1. Rationale for thesis**

Email has been proposed<sup>17;18</sup> as a potential method of consultation in general practice in England, and is already used by both individual GPs and by their practices.<sup>19-21</sup> This is unsurprising given that email is a popular and normalised method of communication in day to day life. However not much is known about this usage, and the only relevant peer-reviewed evidence for this setting comes from a case study of a web messaging service introduced by the Department of Health and registered for by just 89 patients from a pool of 30,000.<sup>22</sup> Presently, policy in England encourages the use of email consultation in general practice<sup>23</sup> and the push for this is likely to intensify. Given the increasing focus on getting GPs in England to offer email consultation,<sup>23</sup> there is a worrying lack of any regulatory framework around the use of email in this way. In relation to email consultation professional bodies are neutral at best, and often antagonistic, stating serious concerns about issues such as clinician workload and professional medico-legal responsibility.<sup>24-26</sup> These views, in conjunction with the deficiency of the empirical data to support or refute the validity of these concerns make it difficult for clinicians in general practice who may want to use or expand their use of email with patients.

Given this situation, this thesis seeks to explore email consultation further by identifying the best evidence available on email consultation, adding new evidence on how email consultation in English general practice is working and synthesising these data to provide recommendations on whether and how best to move forward with email for consultation in English general practice.

## **2.2 Exploring email consultation as an intervention**

In order to examine email as a method of consultation, in the first instance its characteristics as an intervention were considered.

### ***2.2.1. Defining email as a method of consultation in general practice***

As the aim of the thesis was to explore the potential for email as a method of consultation in English general practice it was necessary to define an email consultation for this setting. This is because before the research question can be addressed it must be clear exactly what it is that is being examined, and there is currently no commonly used explicit definition. Existing literature relies on implicit definitions which vary between studies and are open to a range of interpretations.

A working definition was devised based on evidence and information available around email use and on knowledge of the general practice consultation more widely. It was necessary to draw on literature from all healthcare settings and from all health professionals to inform the creation of the definition, because of the lack of existing knowledge about how general practice is using email. It was created with acknowledgement that it would potentially require revision as part of the research process.

#### *The consultation in general practice*

The first step was to consider the consultation in general practice. This has been variably described, but is frequently stated as being one of the defining elements of general practice. It has been described as a two-way 'meeting between a GP and a patient at which health-related issues are presented and explored and management decisions made'<sup>27</sup> Each consultation has been described as 'one episode in a continuing relationship'<sup>28</sup> It may be initiated by a patient when they are ill or by a doctor when instituting preventive medicine or screening.<sup>29</sup>

The commonest type of consultation is that for the presentation and assessment of a new patient complaint.<sup>14;27;28</sup> However consultation can come in several other forms; follow-up, preventive procedures and communicating test results amongst others.<sup>28</sup>



McWhinney<sup>28</sup> described the consultation in general practice as having certain qualities as compared to consultation in other settings, such as secondary care. In general practice the patient actively makes the decision to consult with the GP. Effective communication between GP and patient is the key to identifying and treating issues, in particular eliciting a patient history is pivotal in achieving a diagnosis. It has been said that the majority of diagnoses can be made from a patient's history alone.<sup>30</sup> The GP will use a combination of history taking, physical examination and investigation within the consultation.<sup>31</sup>

Key elements of the consultation process are verbal and non-verbal interactions between doctor and patient.<sup>27</sup> There is a relationship between doctor and patient which provides scope for 'whole-person medicine' whereby the GP has an understanding of who the patient is and can apply this in providing care. Ultimately the GP role is to play gatekeeper, controlling access to other elements of the health service. Consultation most commonly occurs face-to-face, but also commonly occurs via telephone.

### *Models of the consultation*

A range of models have been devised to reflect the different approaches to the consultation in general practice, and these also reflect the changing nature of the doctor-patient relationship over time.<sup>29</sup> Models of the consultation were developed in recognition of the complexity of the consultation and the dynamic occurring between patient and doctor.

Historically general practice followed the disease based biomedical model, which takes a reductionist approach and defines the patient according to their condition.<sup>32;33</sup> The earliest models addressed the inherent problems with the biomedical model of health in the context of the consultation and the need to take account of the psychosocial components of patients' problems.

Balint was regarded as taking a pioneering approach to the general practice consultation in the book 'the Doctor, his Patient and the Illness' published in 1957.<sup>34</sup> Balint felt that biomedical diagnosis alone was inadequate for the task of the consultation and that the doctor must work from a wider biopsychosocial perspective. Biopsychosocial models emphasise illness in the context of a patient's family, and wider society.<sup>33</sup>

Balint's approach to the consultation provided a better understanding of the emotional content of doctor-patient relationships; highlighting the importance of active listening to enhance understanding of the patient's view. The approach helps doctors become more sensitive to what is going on in the consultation. However, despite the focus on the importance of the doctor-patient relationship, the model created by Balint has been criticised

for being doctor-centred.<sup>29</sup> The doctor-centred approach to the consultation is associated with paternalism in medicine. The paternalistic approach to the doctor-patient relationship was dominant at this time. A paternalistic approach involves the doctor providing treatment that they believe to be beneficial but not allowing the patient freedom of choice or responsibility for their own illness or treatment.<sup>35</sup>

Other models from this period include 'transactional analysis,' a theory of social interchange, as developed by Berne in 1964.<sup>36</sup> Berne also applied psychoanalytical principles to the consultation, using a framework of 'transactional analysis' to provide an overview of what is happening in an interaction between doctor and patient. He thought that consultation took the form of a game with the goal of each participant to obtain as many advantages as possible from their transactions with others, and that in this game each participant (doctor or patient) adopts one of three ego states; parent, adult or child. Berne described how many GP consultations are conducted between a 'parental' doctor and a 'child-like patient.' This is a paternalistic approach that is not always in the best interest of either.<sup>29;36</sup> Transactional analysis allows the doctor to consider breaking out of the parent-child model, moving towards an adult-adult model with the adult state being logical, autonomous and the adult being in a position to make an objective appraisal of reality.

Byrne and Long, in their 1976 book 'Doctors talking to patients'<sup>37</sup> felt that the predominance of doctor-centred behaviour in medicine did not enable doctors to deal with the psychosocial components of their patients' problems, with few doctors at this time reflecting on the dynamics and process of the consultation. They subsequently derived a sequence of 'ideal' phases to the consultation (a) establish relationship with patient, b) attempt to discover the reason for the patient's attendance, c) conduct a verbal or physical examination, d) the doctor, doctor and patient or the patient consider the condition, e) doctor (and occasionally the patient) detail further treatment or investigation and f) finally the consultation is terminated, usually by the doctor) and these phases provided a foundation for the development of future models of the consultation.<sup>29;37</sup>

In 1979 Stott and Davies published 'The exceptional potential in each primary care consultation.'<sup>38</sup> This was a theoretical framework describing four areas which could be systematically explored each time a patient consults. It dealt with the following stages: presenting the problem, modifying the patient's help-seeking behaviour, review/management of long-term problems and undertaking opportunistic health promotion measures. It was devised to create mutual respect between doctor and patient, much like the adult to adult relationship in the model by Berne. This model was deemed more likely to work in the context of an on-going doctor-patient relationship, where there is continuity of care.<sup>29;38</sup>

All of these models contain elements that may be encouraged via email, for example an equal relationship as demonstrated in the adult-adult relationship described by Berne, or elements that are discouraged, for instance the active listening advocated by Balint, which would not be possible via email.

Though the models described consider the patient, they take a doctor-centred approach to doing so, thus retaining an element of paternalism. The recognition by these models of a broader perspective of healthcare, beyond the biomedical approach, has however led to the development of more patient-centred approaches. A patient-centred approach offers the patient a partnership with the doctor. It gives patients an informed choice about treatments and encourages them to take more responsibility for their health.<sup>35</sup> It requires the doctor to take a more passive role in the consultation and is directed by the patient. Empathy is a key component of this approach. It is often regarded as a holistic approach, whereby medical practice upholds all aspects of people's needs; psychological, physical and social, as a whole.<sup>29</sup>

One of the first models to take a patient-centred holistic approach was that by Helman in his book 'Culture, health and illness' in 1984.<sup>39</sup> It focused on the contribution of anthropology to understanding health problems and their management, across a variety of cultures. Helman felt that doctors and patients view ill health in very different ways, and that the success of a consultation is dependent on bridging the two positions. Helman described illness as the subjective response of an individual and those around them to being unwell, and that this response is related to an individual's social and cultural background, together with their personality. The same disease may affect different people in different ways according to how their backgrounds differ. Subjectivity applies also to doctors, who carry their own ideas, assumptions and prejudices with them. Helman felt that the doctor should consider the patient's narrative and recognise the significance of verbal, non-verbal, somatic or psychological cues within the consultation. A successful consultation may require negotiation between the patients' and doctors' models of the presenting problem.<sup>29;39</sup>

After Helman's model of culture, health and illness, models of the consultation continued to embrace a patient-centred holistic approach. Pendleton, in 1984,<sup>40</sup> devised a model comprised of seven tasks to be achieved in a consultation. The tasks are focused on the dynamic between doctor and patient in the consultation. The model supports a patient-centred partnership, emphasising that an effective consultation is one in which patient and doctor work co-operatively to define problems and their management, serving to enhance patient understanding and ability. Each consultation reinforces a cycle of care.<sup>29;40</sup> Neighbour in 1987<sup>41</sup> developed a pragmatic holistic model 'the Inner Consultation.' It provides a basis

for understanding the dynamics of the patient-doctor interchange. Neighbour identifies the importance of non-verbal cues in the consultation, as these can be key in identifying the patient's reason for attending the practice.<sup>29;41</sup>

Both Helman and Neighbour focus on the importance of verbal and non-verbal cues within the consultation. Email, in the context of the consultation, may challenge these models by removing these cues. Conversely, email may be able to support the dynamic between doctor and patient, leading to co-operation, as advocated by Helman and Pendleton.

Recent models have continued the patient-centred theme. Stewart, in 1995<sup>42</sup> described the 'patient-centred clinical method.' The framework addresses the patient's agenda and experiences of illness and the doctor's agenda. The model has six components; exploring both the disease and illness experience, understanding the whole person, finding common ground, incorporating prevention and health promotion, enhancing the doctor-patient relationship and being realistic.<sup>29;42</sup> Kurtz, Silverman and Draper in 1996<sup>43</sup> devised the Calgary-Cambridge method. It explicitly sought to move away from medical paternalism and concentrates on what doctors can do in the consultation to facilitate their patients' involvement. The model has five tasks; initiating the session, gathering information, building the relationship, explanation and planning and closing the session. The model makes the what, why and how of communication with patients explicit.<sup>29;43</sup>

All of the models described here advocate communication between doctor and patient, and it is interesting to consider what email might mean for communication in the consultation. Many of the models describe a structure that may be difficult to replicate via email due to its asynchronous nature, which would interrupt interaction between doctor and patient. However, giving patients the option to consult using their choice of medium (email, telephone or face to face) might encourage continuity of care and thus an on-going doctor-patient relationship. This fits with the notion of patient-centred care, which is currently the dominant paradigm for the consultation. The potential of email communication for carrying out a consultation, and thus aiding communication between doctor and patient in English general practice will be explored in this thesis.

It should also be noted that the changing nature of the consultation and doctor-patient relationship has been mirrored by changes in health policy in England and these are discussed in section 2.3.

### *Types of email*

After defining a consultation the next step was to consider the different types of email so that they might be considered in devising the definition of an email consultation.

Email is short for electronic mail. Electronic mail can take different forms. These can be split into three categories. All three types of email will be considered under the definition of email use in this thesis:

- Unsecured standard email to/from a standard email account

Standard unsecured email is email which is sent unencrypted. This is the type of email that is most commonly used. It is usually accessed and managed via an email client e.g. Microsoft Outlook. An email consultation service set up in a Scottish general practice used a dedicated standard email account for clinical requests.<sup>44</sup>

- Secure email which is encrypted in transit and sent to/from a standard email account which has the appropriate encryption software.

Secured email is encrypted; encryption transforms the text into an un-interpretable format as it is transferred across the Internet. Encryption protects the confidentiality of the data, however both sender and recipient must have the appropriate software for encryption and decryption.<sup>45</sup> An example is NHSmail, a secure email service for between professional communications in the NHS. Only messages sent between NHSmail users are guaranteed as secure.<sup>46</sup>

- Web messaging; whereby a message facility is accessed remotely by both sender and receiver, logging into a website using a username and password.

The website may be the practice website, or could take the form of a patient portal. Patient portals require patients to log into a website, which then offers wider services than email, often linking to electronic health records and other services such as prescription requests and appointment booking services. The message is usually entered into a pro-forma which is then forwarded onto a specific email account at the practice, the address of which is not available to the sender.

Some patient portals offer 'structured email', whereby patients complete a questionnaire as part of the email sending process. The questionnaire helps the recipient in defining the

patient's condition, by soliciting the most relevant information.<sup>47</sup> It can also aid in patient identification by asking for patient specific information e.g. date of birth.<sup>48</sup>

There are pros and cons associated with the different types of email. Due to the need to log in, web-messaging provides advantages with regard to security. However standard email is deemed more convenient because patients can use their usual email client and they do not need to log in to a specific website.<sup>47</sup> Structured email services that require patients to provide extra information before sending their email are more time consuming for the patient. However the clinician ends up with additional information, and can respond to the email using template forms that may save them time.<sup>49</sup>

There are several web messaging systems in place for electronic doctor-patient consultation. Many of these are in the US. The early adopters of these technologies have been healthcare organisations such as the Mayo Clinic,<sup>49</sup> Kaiser Permanente<sup>50</sup> and Group Health.<sup>51;52</sup> However there have been specific systems set up in other countries, including Greenland,<sup>53</sup> and England.<sup>22</sup> In England practices have the option to set up their own patient portal services<sup>20;54</sup> using commercial systems available for practices to purchase. These companies host the website for the general practice and offer online services via these websites.<sup>55</sup>

#### *Working definition of an email consultation*

After considering the nature of a consultation and the different types of email, and combining this with the available literature on email use in healthcare, a working definition of an **email consultation** was devised:

***‘Two way communication between a patient and a clinician via email, for requesting or providing patient specific information that is not of an administrative nature.’***

#### *Rationale for definition*

The definition was specific, describing the email consultation as ‘two-way,’ containing ‘patient specific information’ and excluding communication of an ‘administrative nature.’ The rationale for this is outlined:

#### Two-way communication

The definition specifies ‘two-way’ communication between a patient and a clinician. This is to exclude the use of email for sending messages to several patients at once in a one-way fashion, as has become increasingly popular for information purposes e.g. sending out

practice newsletters.<sup>56</sup> On the patient side, one-way email commonly occurs when patients request repeat prescriptions via email using request systems.

#### Patient specific information

The definition specifies email for requesting or providing patient specific information. This relates to the content of the email. Again it is to exclude emails sent en masse to groups of patients, for instance for health promotion purposes where the content is not specific to that patient, but rather a group of patients who share a characteristic.

#### Not of an administrative nature

The definition specifies communication that is not of an administrative nature. There are many administrative tasks associated with general practice; appointment scheduling and obtaining letters for personal administrative purposes amongst others. Though generally administrative tasks tend to be routinely administered outside of the consultation by non-clinical staff<sup>57</sup> they sometimes involve clinical staff and email use for dealing with these administrative tasks by clinicians would not meet the definition of a consultation.

This was a working definition of email consultation, and so there was scope to amend it iteratively as the thesis progressed, in line with the requirements of the methodologies chosen and subsequent findings. An exploration of changes and observations on the definition over the course of the thesis is presented in chapter 9; discussion and conclusions.

### ***2.2.2. Email consultation as a complex intervention***

For the purposes of the thesis email consultation will be defined as a complex intervention. A complex intervention in healthcare is an intervention that contains several interacting components, each with some dimension of complexity. These components may act independently or interdependently. As well as containing interacting components there are other factors that make an intervention complex:

- The number or difficulty of behaviours required by those delivering or receiving the intervention.
- The number of groups or organisational levels targeted by the intervention.
- The number and variability of outcomes associated with the intervention.
- The degree of flexibility or tailoring of the intervention permitted.

It is fair to say that few interventions in healthcare are simple; instead the number of components and range of effects between interventions can vary widely.<sup>58-60</sup> The definition of a complex intervention recognises that those people delivering and organising the intervention are an essential part of it. Complex interventions are highly dependent on human behaviour.<sup>61;62</sup>

Health service activities in general can be regarded as complex<sup>60</sup> and it is clear to see how email consultation might meet the definition of a complex intervention. Emails can have variable content, potentially targeting a wide range of patients and covering a very wide range of issues but also requiring tailored content depending on the recipient and their circumstances. There may be protocols and guidelines that determine how email is used for consultation. Email consultation impacts on, and interacts with existing work-flow patterns in healthcare. They must be received, read, processed and where relevant responded to, and this may happen several times over in the same communication transaction, with many transactions potentially occurring, each likely to require a different outcome. The wider practice setting in which the email consultation operates is also influential. Email consultation potentially impacts on multiple professional groups within a general practice, (i.e. reception staff, GPs and practice nurses, practice managers) each with their own perspective and agenda. The context in which complex interventions take place is a key variable because it influences and limits the range of people's choices and actions.<sup>62</sup>

There are difficulties associated with carrying out studies of complex interventions, because of their complexity e.g. issues that might be encountered around delivering the intervention or the effect of contextual setting. As a result of this the UK Medical Research Council (MRC) produced a framework for developing and evaluating complex interventions.<sup>61</sup> The framework is intended to help researchers choose and implement appropriate methods for examining a complex intervention, according to the nature of the intervention and what is already known about it.<sup>61</sup>

The framework is not prescriptive and is continually revised. It serves to aid researchers in recognising and adopting appropriate methods. It is used to guide the approach taken in this thesis, to ensure that the nature of email as complex intervention is fully considered in addressing the aim of the thesis. Its application to the choice of methodological approach for the thesis is covered in chapter 3.



## **2.3. English general practice as a setting**

This thesis seeks to explore the potential of email as a method of consultation in English general practice. The rationale for choosing to look at England, and more information on the general practice setting, is outlined here.

### ***2.3.1. English general practice***

General practice is the key primary care setting in England. It has been suggested that primary care settings are better for carrying out studies of email communication between doctors and patients because the doctor-patient relationship can extend over long periods of time and can encompass many different conditions or problems, particularly long term chronic conditions.<sup>63</sup>

General practice has long made use of information technology. The UK has led the way globally in the use of electronic healthcare records with between 95% and 100% of general practices storing administrative and medical patient data electronically. In contrast, in the US only around 13-27% of private medical practitioners use electronic healthcare records.<sup>64</sup> As well as the use of electronic records, general practice has incorporated other uses of the computer and online technologies. The providers of the most popular software for electronic records in general practice in England, EMIS, also offer an online booking system for patients, so that they can make appointments with the practice, and this is now widely used in England.<sup>65</sup> Many practices also have kiosks in the reception area so that patients can book themselves in on arrival for their appointment and complete short health related questionnaires, amongst other functions.<sup>66</sup>

In choosing English general practice as the setting, this excludes the other countries within the United Kingdom; Scotland, Wales and Northern Ireland. Each of these countries is part of the NHS. However, the NHS was devolved to the four regions to create NHS England, NHS Scotland, NHS Wales and NHS Northern Ireland in 1999.<sup>67</sup> Each constituent devolved administration has developed a different governance system and different health service policies.<sup>67</sup> Whilst it would have been interesting to explore the difference between these settings, resources did not permit this, and it was not the focus of the thesis. England as the setting for the thesis was a practical choice, and ensured that the thesis itself was focused and specific so that the findings might then be applied in the chosen setting.

Despite the structural and policy differences between the four countries, general practice has the same role in each and is represented by central bodies for the UK, including the Royal College of General Practitioners and British Medical Association.

### **2.3.2. NHS England policy**

#### *IT and a Patient-centred NHS*

The English NHS is the biggest provider of healthcare of the four countries. It has been said that NHS England has undergone more reform over the last decade than the other three nations.<sup>68</sup> Policy over the last decade has focused on a patient-centred NHS, with improved access to healthcare, increased choice for the patient and the introduction of IT into the health service.<sup>69-71</sup> This mirrored the changes occurring to the doctor-patient relationship and models of the consultation, which as described in section 2.2.1 became more patient-centred over time. The modern patient was described in the NHS Plan in 2000 as expecting fast, convenient and personalised care 24 hours a day and this is a perception that has persisted.<sup>71</sup>

One way of enabling this access and increasing choice was via IT. From 1997 onwards patient facing IT became a priority in policy terms.<sup>69</sup> Ongoing policy reports advocated an increased focus on using IT to improve patient knowledge and enable patients to make informed decisions about healthcare.<sup>70</sup> This strategy led to the introduction between 2000 and 2007 of services such NHS Direct and NHS Choices. NHS Direct was introduced to create a new gateway to the NHS for patients, offering quick and convenient access to healthcare via the telephone and web. NHS Choices, a website, was designed to provide easily accessible information on conditions, treatments and services.<sup>72-74</sup> These services were introduced to appease the 'modern' patient.

As well as a clear focus on providing patients with information (NHS Direct, NHS Choices) so that they are able to make informed choices about their healthcare, there was a push to provide patients with access to convenient care, for example via, the introduction of walk in centres<sup>75;76</sup> and the introduction of GP led health centres open for extended hours.<sup>77</sup>

Over the same time period, 'Connecting for Health' (CFH), which is a directorate of the DoH, functioned as the body for delivering computer services and systems to the National Health Service (NHS). Their primary role was to introduce the National Programme for Information Technology (NPfIT), the key aim of which was to give healthcare professionals access to patient information in a safe and convenient way, using information technology. The NPfIT included the introduction of 'Choose and Book' which is an electronic referral system for use between general practice and secondary care, and the 'Electronic Prescription Service' which enables prescribers to send prescriptions electronically to a dispenser.<sup>78</sup> CFH were also responsible for the introduction of NHSmail, which is an email and directory service provided specifically for NHS staff in all settings. It is a secure mail system which encrypts all

emails sent from and to an NHSmail account, to allow the safe transfer of confidential data between healthcare professionals.<sup>79</sup> It was introduced to facilitate communication between health professionals in the NHS. However it does not guarantee security when emailing persons who do not have NHSmail thus excluding contact with patients.

Throughout this time the patient choice agenda continued to grow and in 2008 the landmark report 'High quality care for all' set out a vision for the future of the NHS as a health service that gives patients and the public more information and more choice to make the health service more responsive to their personal needs, and to empower them to take more control over their own health and care. The nature of this choice included extended choice of GP practice, choice of treatment and provider and production of personalised care plans.<sup>75;80</sup>

In parallel, patient expectations have changed over time. Societal changes have occurred in how people view healthcare; as something they have a stake in and are encouraged to take responsibility for<sup>81;82</sup> and this may be due in part to the changes to the consultation, as described it has become more patient-centred over time. The push for increased patient choice is aligned with the consumerisation of healthcare, whereby healthcare is regarded as consumer good and patients take a consumerist attitude to engaging with it.<sup>83</sup> This view has also gained credence amongst policymakers over time.

The focus on a patient-centred NHS has continued after a change in government in 2010, the first change in 13 years. The coalition government produced a white paper 'Equity and excellence: Liberating the NHS' and the tagline for the document is 'no decision about me without me' in reference to patients.<sup>84</sup>

### *Policy changes in general practice*

As well as changes relating to the wider NHS and use of information technology, the last decade has seen the introduction of several new policy initiatives specific to general practice and these have led to significant changes in the structure and function of general practice in England.

In 2004 the quality and outcomes framework (QOF) was introduced. It is a voluntary incentive scheme for general practices in the UK, which rewards practices according to how they manage for patients with chronic conditions. It has four domains; clinical care, organisational, patient experience and additional services. Each domain contains indicators against which the practice scores points. The higher the overall score in the practice, the higher the financial reward. Though the QOF is voluntary the majority of practices

participate.<sup>85;86</sup> The data for assessing how well practices adhere to the framework is extracted from each practice electronic database and aggregated.

The main focus of the QOF was to improve the management of chronic conditions within primary care. As such the clinical domain, containing 70 percent of the total QOF points, focuses on a discreet number of conditions managed in primary care. These include coronary heart disease, diabetes, heart failure and hypertension. These disease groups consist of a series of indicators, of which there are two kinds. Process measures required the regular testing or measurement of specific disease risk factors, whilst intermediate outcomes require the control of these risk factors to be below threshold values. The required regularity (often 15 monthly) of the clinical audits, induces the regular and consistent consultations for patients with these conditions.

As a consequence QOF has changed the way that patients with certain conditions or disease profiles communicate with the general practice. It has been shown that this is to the detriment of conditions that are not covered by the QOF as these do attract financial reward for the practice in exchange for consultation and monitoring.<sup>87</sup> QOF has also been criticised for detracting from the consultation, regarded as encouraging a doctor-centred, rather than patient-centred approach to the consultation and diverting attention away from interpersonal relationships in favour of a focus on gaining QOF points.<sup>88</sup>

The patient experience domain of QOF includes indicators relating to access and in order to obtain information for this indicator, in 2009 the general practice patient survey (GPPS) was introduced. The QOF is linked to the GPPS, with practices being rewarded on the basis of responses to two of the questions in the survey. It was designed to elicit information from patients on their experiences with their general practice, for example how easy or difficult it is to make an appointment at their surgery, satisfaction with opening hours and the quality of care received. It is administered once a year to over 2 million patients. They are asked to complete it themselves either via a paper copy or online.<sup>89</sup> As practices are aware that some of their patients will be surveyed, it has driven behaviour change in relation to the factors that are measured. The results of the survey are fed back to each practice after publication. As well as some of the results being linked to QOF scores the results are published nationally, and so it is in the best interests of the practice to ensure their results are as favourable as possible.<sup>90</sup>

As well as the introduction of QOF, in 2004 the arrangement for out of hours care in general practice changed, with GPs no longer responsible for providing 24 hour care for their

population and out-of-hours urgent care becoming the responsibility of primary care trusts. Out of hours care is classed as care required after 6.30pm and before 8am Monday to Friday, and at the weekends and on bank holidays. The care is delivered by out of hours providers; some are not-for-profit organisations, others are private organisations.<sup>91</sup> This alteration reflects an overall change in how patients interact with their general practice.

Policy initiatives such as QOF have led to increased demands on GP time and changes in the way care is delivered in general practice. General practice as a service has moved from providing assistance for acute health problems at all times to providing a strategic approach to managing chronic disease via the QOF. An example of the move to chronic disease management is in the care of diabetic patients. These patients were traditionally managed in secondary care, but the inclusion in the QOF of clinical indicators relating to diabetes has led to many patients being solely or primarily managed in general practice. The general practice setting can provide on-going care in patients who do not require specialist care in the secondary or tertiary sector.<sup>92</sup>

The changes have resulted in increased demand for consultations with a GP, and so access has also been a key factor in policy relating to general practice. The NHS Plan in 2000 included a target that 'by 2004 all patients should be able to see a primary care professional within 24 hours and a GP within 48 hours.'<sup>71</sup> Practices received financial incentives for meeting these targets. In 2002, an initiative known as 'advanced access' was introduced and it was promoted as a way to help general practice in meeting these targets. It had originated in the US in the 1990s.

The UK version of the 'advanced access' strategy advocated understanding demand by measuring requests for consultations on different days of the week, matching capacity to demand. Example of initiatives were for nurse practitioners to conduct appointments where it is not necessary to see a GP, developing contingency plans to cope with issues such as staff holidays or flu epidemics and providing alternatives to face to face consultation.<sup>93</sup> In the US, the alternative to face to face-consultation included both telephone and email consultation; in the UK telephone consultation was encouraged but email consultation was not considered. Telephone consultations have grown in popularity as a consequence and many practices routinely offer these as a way to offer same day appointments.<sup>9</sup> They have provided an alternative method of consultation where it is not possible or necessary to conduct a face to face consultation. Their popularity has persisted beyond implementation of the access related policies of the last decade, and this is despite telephone consultations having initially been regarded as controversial<sup>15</sup> with general practitioners reporting low levels of confidence in using them.<sup>16</sup> If email consultation were to follow the same trajectory

it would be expected that it will become more widely used in future, eventually becoming a routine method of consultation.

### *Changing economic situation and implementation of IT in healthcare*

In the wake of the global economic crisis and with the challenges faced by an ageing population and the increased prevalence of lifelong chronic diseases, major challenges to the NHS have been identified in ensuring that healthcare is affordable. There is an identified need to make the NHS more efficient whilst maintaining quality.<sup>94</sup>

It has long been thought that IT could improve the effective use of resources in healthcare, and back in 2002 this prompted an expansion in spending on IT in the NHS.<sup>95</sup> More recently a report carried out by NHS London in 2010 found that the existing model for delivering healthcare in London was not affordable. The report suggested consultation via email as a productivity opportunity that could save millions of pounds.<sup>96</sup>

Despite the increase in funding and focus on IT in healthcare problems have been encountered with implementing information technologies into the NHS.<sup>97-99</sup> Implementation can be defined as 'active and planned efforts to mainstream an innovation' in a particular setting.<sup>100</sup> Implementation brings disruption and change.<sup>101</sup> Barriers to implementation have included resistance from health professionals and worry about the functionality of new systems.<sup>101</sup> The more barriers identified in response to the innovation the harder it is for it to become implemented.<sup>100</sup> A report by the NHS Confederation in 2008 concluded that the NHS must overcome major barriers to the adoption of new innovations. Unless health care providers are able to adapt to such innovation they may find themselves left with more expensive, less easily scheduled and more complex services,<sup>102</sup> and this would be a serious problem in the current economic climate with the NHS budget squeeze requiring £20 billion of productivity gains by 2015 if it is to avoid falls in real funding.<sup>103</sup>

### *Policy specific to email consultation*

The new government has retained a desire to make more of IT in the NHS and this has included policy directly recommending that email consultation be offered to patients. This is the first time that any proposed policy has specifically recommended email for consultation, though the Liberal Democrat party manifesto for health in 2010 stated that it would give patients the right to access their GP via email.<sup>104</sup> The consultation document 'Liberating the NHS: An Information Revolution' outlines a vision of 'an information revolution in which people have the information they need to stay healthy, to take decisions about and exercise more control of their care, and to make the right choices for themselves and their families.'

The document specifically suggests that 'people should be able to communicate securely with their health or care professionals on-line or by email wherever it is convenient, cost effective and feasible.' The consultation asked for comments from stakeholders. The consultation period closed in January 2011 and the government are currently producing an information strategy to put the information revolution<sup>23</sup> into action. In the meantime the case for email consultation has been made via press release. Professor Bruce Keogh, Medical Director of the NHS, stated in a press release in August 2011 that the Government intended to 'put levers into the system to encourage GPs to do online consultations.' The rationale being the provision of round the clock access to healthcare.<sup>18;105</sup> These levers were unspecified.

It is clear that policymakers are enthusiastic about the prospect of offering patients round the clock email access, and it gains headlines in national newspapers. A leading tabloid newspaper reported in January 2011 that 'Now you must email your GP: Patients are told not to come to surgery, instead describe symptoms online.'<sup>106</sup>

With the perceived potential for cost savings and the increasing need for cost-efficient care, the access email offers to patients and the popularity of email in everyday life means that email consultation is a panacea for policymakers.

### ***2.3.3. Guidelines for the use of email consultation***

Given the widespread use of email in day to day life, and the stance of the current Government with regards to email consultation the existence of up-to-date guidelines for email consultation use might be expected, but in fact there are no guidelines in place for a UK or English setting, and those originating in other settings are somewhat dated.

The last set of peer reviewed guidelines concerning the clinical use of email with patients was published by the American Medical Informatics Association in 1998 and these have been widely disseminated.<sup>107</sup> They were extended in 2001 to include site-specific guidelines for specific services,<sup>108</sup> however they have not been more recently updated. This is surprising given the technological and societal changes occurring in the interim period. The guidelines focus on two aspects, effective communication and medico-legal & administrative issues. They continue to be referred to in many peer reviewed publications, however their focus on a US setting makes them less applicable for a UK setting.

The US has lead the way in producing guidelines for email consultation use. The American Medical Association<sup>109</sup> have produced regularly updated guidelines for physician-patient electronic communications, as have the American Academy of Family Physicians.<sup>110</sup> In

addition, a US company providing online communication services produced recommendations in 2007. These were produced for the US health system and are often referred to in publications about email use in the US.<sup>111</sup>

There has been one set of European guidelines for email correspondence in patient care published. These were published in 2002 by the Standing Committee of European Doctors, an organisation representing the national medical associations of 27 European countries<sup>112</sup> but these were not peer-reviewed and have not been widely disseminated and so are relatively unknown.

The lack of setting specific, up to date guidelines means that health professionals may instead turn to the professional bodies representing them for the information and guidance they require.

### *Views of professional bodies*

The professional bodies representing health professionals in England take at best a neutral approach to email consultation, with many taking a wholly negative approach. They focus on whether email consultation should be used or not. Information and guidance on how to use email consultation is non-existent. The link between the evidence base and these documents is also unclear.

The British Medical Association has taken a consistently negative stance towards email for consultation in general practice. 'Consulting in the modern world: Guidance for GPs', published in 2001<sup>24</sup> advised that 'time delayed e-mail exchanges are not safe enough for consultation. A further document 'Developing general practice: Listening to patients'<sup>113</sup> published in 2009 by the general practitioners committee (GPC) of the BMA continued to advise against email for consultation due to concerns about data protection, security and confidentiality. Both reports stated that email can be used for general non-clinical communication with patients, such as for booking appointments, but only providing that various security concerns are addressed. Safety is a key concern for the BMA.

Dr Lawrence Buckman, Chair of the GPC at the BMA reiterates this negative stance in speaking on behalf of GPs. The news report from January 2011 in a tabloid newspaper featured a quote from Dr Buckman, who stated that 'the safest method of dealing with patients is seeing them. People will get worse care. Most doctors are scared of email consultation.'<sup>106</sup> This statement is less measured than the reports published by the BMA implying that email consultation leads to a poorer standard of care but giving no indication



that this view is evidence based. At no point do the BMA make recommendations for how the perceived concerns might be addressed.

The Royal College of General Practitioners (RCGP) takes a more measured approach than the BMA. In 2008 they acknowledge that some practices may wish to offer consulting via email, because patients value it, and it may avoid the need for a face to face visit, in their document 'Good Medical Practice for General Practitioners'.<sup>25</sup> However they do recommend exercising caution, stressing that GPs should be careful when assessing or giving advice via email. Again there is no indication that this view is evidence based. Another example of a measured perspective comes from the NHS practice manager network. The network represents practice managers in general practice. They have advocated the use of email for GP communication with patients who are suffering from hearing loss. They recommend that a practice would need to consider safety and confidentiality before doing so.<sup>114</sup>

It is possible that the contrast in views between organisations like the BMA and RCGP relate to their role. The BMA is the trade union and professional organisation for doctors and exists to protect their interests. The RCGP has a wider remit, being actively involved in policymaking and working to shape the healthcare agenda, thus having more incentive to take a measured approach in line with government policy objectives.

The medical indemnity organisations that represent doctors in the UK have provided guidance on using email consultation, compiled by their medico-legal advisors. The two main organisations in the UK are the Medical Defence Union (MDU) and the Medical Protection Society (MPS). The Medical Defence Union (MDU) takes a neutral approach, neither recommending nor advising against email consultation. They provide advice on how to safely use email for consultation but fall short of acknowledging that it is actually happening in practice.<sup>26</sup>

The Medical Protection Society (MPS) produced a list of 'do's and don'ts of emailing patients' in 2009. In line with policy objectives these stated that email is a useful alternate point of access for patients.<sup>115</sup> The MPS prepared a response to the Government consultation on 'Liberating the NHS: An Information Revolution' stating that they considered there to be inherent risks in giving patients on-line access to health professionals, increasing demands on clinician time and leading to unrealistic patient perceptions. They felt that it should not substitute for face to face consultations, which are a core component of medical care.<sup>116</sup> This response to the consultation implies that they think email consultation is not to

be encouraged. This is at odds with their previous advice. Again, there is no indication that the statements made are evidence based.

The cautious stance and lack of reference to the evidence exhibited by professional bodies may in part reflect the lack of peer-reviewed guidelines for email use. The bodies themselves have no single point of reference regarding email consultation. The inconsistent views exhibited create a climate of uncertainty around the use of email in English general practice. There is a clear need for further investigation into the potential for email consultation in the English general practice setting.

## **2.4. Existing information on email between clinician and patient**

Before investigating the potential of email consultation use in the chosen setting it is important to get a sense of what is known about email in the wider healthcare setting on a global scale. Email use has been described in many health and social care settings globally, including psychiatry,<sup>117</sup> surgery<sup>118</sup>, paediatrics,<sup>119</sup> primary care<sup>120</sup> and social work<sup>121</sup>. Most of the data on when and how email is used for between patient and clinician communication come from survey and retrospective cross-sectional reports of email systems.

### **2.4.1. Global perspective**

#### *Percentages of clinicians using email with their patients*

Clinicians worldwide are using email to communicate with their patients. Levels of use are low, but seem to be increasing. A survey of GPs conducted in fifteen European countries including the UK, found that those GPs classified as advanced users of eHealth technology had seen an increase in email use from 31.3% in 2002 to 50.8% in 2007. Even those GPs classed as 'laggards' had increased their email use from 0% in 2002 to 14.1% by 2007.<sup>64</sup>

A similar increase has been observed in the US. US researchers explored trends over time by comparing the results of one physician survey<sup>122</sup> (2005) with another survey carried out in 2008<sup>123</sup> in an outpatient setting. Email use amongst physicians increased from 16.9% in 2005 to 20.4% in 2008 and this difference was significant ( $P < .001$ ).

#### *Patterns of clinician email use with patients*

Where clinicians are using email to communicate with patients they do so with a small proportion of their patient population. A survey of US physicians found that a high number were emailing their patients (68%), but they were only doing this with a small percentage of their patient population; 78% of the physicians that were using email were only doing so with between 1 and 5% of patients in their practice.<sup>124</sup> Another survey reported that the majority

of physicians (86%) who used email were emailing between one and ten patients a week, to a maximum of 20 patients a week.<sup>125</sup>

### *Patterns of patient email use with clinicians*

Where patients are offered email communication with their clinician the volume of uptake and use is variable. In a US study of a secure messaging system in a medical centre patients sent a mean of 54 messages per 100 users per month.<sup>126</sup>

A content analysis of patient-professional email exchanges in a US health maintenance organisation found that physicians received a mean of 40 messages per month, with the mean from any individual patient being 1.5 messages (1 - 1.9). The physicians received on average approximately 2.6 messages per clinic day, and 85% of the time a single patient sent two or fewer messages a month.

In another study of a secure messaging system in Norway, 46% of those with access to email consultation used the service, and only 147 messages were sent by patients over the trial period of 1 year.<sup>127</sup> An email consultation service set up in a general practice in Scotland observed 36 clinical email consultation requests from patients over an eight month period. A total of 150 patients registered with the service and 20 reported having used it.<sup>44</sup>

### *Purposes for email between patients and clinicians*

Varied purposes for email communication between clinician and patient have been reported. Examples include the ongoing and close monitoring of patients with chronic diseases,<sup>128;129</sup> for patients to communicate blood pressure levels or glucose levels to their health professional for monitoring,<sup>130</sup> for follow up after an appointment with a clinician,<sup>131</sup> where clarification or added information may be required after a consultation<sup>129</sup> and to replace outpatient appointments after day surgery.<sup>132;133</sup> Email has also been used to send relevant digital images attached to the email. A paediatric burns unit reported using email to provide follow-up care for patients; with parents sending digital images to the burns team for review.

<sup>134</sup>

Content analyses of email for communication between clinician and patient have shown that the most common uses reported are for the patient to provide the clinician with an update on a health condition, for the patient to seek information about medication and for the patient to ask questions about a health concern.<sup>44;46;52;119;126;135-140</sup>

Email contact is not necessarily limited to that with patients, it has been observed between clinicians and caregivers. For example, for providing caregivers of stroke patients a nurse information service to aid their caregiving role.<sup>141</sup>

In summary there have been a wide range of articles describing how email is used for communication between patients and clinicians in varied settings and these indicate that the use of email by clinicians in this way is on the increase. However clinicians are only using email with a subsection of their patient population. This does not only apply to clinicians; patients offered the option to use email for communication send low volumes of messages. There are varied purposes for sending an email from chronic disease management to replacing outpatient appointments. Much of the literature cited here originates from the US. It should be noted that the findings from US research are not necessarily applicable to different healthcare systems, including the UK health system due to major differences in structure and funding. Additionally, the data presented here are mostly derived from relevant surveys or cross-sectional reports and these are lower quality study designs. The most relevant evidence for the English setting comes from the Scottish email consultation service.<sup>44</sup>

#### ***2.4.2. Evidence for email consultation in England***

In contrast to the varied data available on email use from the US and parts of Europe, there is scant information that is specific to English general practice and how they are using email.

A survey of 513 UK health professionals and other associated professionals carried out by Pulse (a commercial website and magazine providing general practice related news for health professionals and written by journalists) examined use of email consultation in general practice. GPs comprised the majority of the sample (459/513), the remaining respondents being other types of health professional or managers. The survey found that just 23% (126/513) of respondents had carried out an email consultation, 18% (89/513) doing so at a patient's request.<sup>19</sup> The response rate to the survey was not stated and so the number of and nature of non-responders is not known.

The only peer-reviewed evidence concerning email use between clinicians and patients in general practice in England is a case study of 'Communicator'.<sup>22</sup> Communicator is a secure email style messaging connection to a patient's general practice. It is accessible via a government led patient portal: HealthSpace and allows the patient to 'exchange email style electronic messages with their clinician'.<sup>142</sup> It was envisaged as a support service in which clinical staff were largely interchangeable. The case study was carried out in three GP

practices that were piloting the system. Interviews with patients identified that Communicator was used for both clinical and administrative purposes, often for acute illness or an acute exacerbation of a chronic illness.<sup>22</sup>

Communicator was piloted at 6 sites nationally and over the year long pilot period just 36 GPs and 89 patients from a potential pool of around 30,000 signed up to use it. It was not clear how many of the 89 patients actually used the service after signing up.<sup>143</sup> To put the study in context the survey carried out by Pulse and described in the previous paragraph found that only 1% (6/513) of respondents were using Communicator. Given that 23% (126/513) of the sample were using email consultation<sup>19</sup> evidently most participants were not using Communicator for their email consultation. Communicator as a system arose to fulfil a policy objective and was created by a small team at the Department of Health, rather than being driven by clinicians in general practice.<sup>22</sup> It did not arise in response to any perceived need expressed by clinicians. It is known that innovations that offer advantages to users in terms of effectiveness and/or cost-effectiveness are more easily adopted and implemented, especially if the advantages of the innovation is clear to users.<sup>100;144</sup> The disconnect between policymakers and the clinicians in practice may go some way to explaining the inability of Communicator to successfully implement in English general practice.

Whilst it is evident that email consultation is in use in general practice in England, levels of use appear to be low and there is still much to learn about how it is being used. If patterns observed globally are followed in England, the use of email consultation is likely to increase.

### **2.4.3 Perspectives of non-users of email consultation**

As described on page 42, global prevalence of email is low, but increasing. Much research into perspectives of email for consultation has focused on what patients think about the prospect of using email consultation where they are not currently using it. This reflects the relatively low levels of use at present.

There have been a series of surveys asking whether professionals intend to use email with their patients in the future<sup>145</sup> and whether patients wish to be able to communicate with their healthcare professional via email.<sup>146</sup> High proportions of patients report a desire to use email with their healthcare professional where this is not already available; from 65% (622/954) to 74% (182/246).<sup>128;146;147</sup> Professionals appear more reticent about this potential use, with surveys reporting from 12%<sup>145</sup> (220/1837) to 23% (14/62)<sup>128;148</sup> of healthcare professionals expressing a desire to adopt this type of communication.

Where patients did not express a desire to use email in this way they were asked why not.<sup>146</sup> In a study of secure web messaging in a paediatric chronic care clinic very few parents utilised the service (3/28) and all were asked for their opinions on it. Those parents who had not used email described barriers and these included the feeling that secure messaging is more impersonal, that they are happy with existing methods of consultation, and security and privacy concerns. The perceived advantages of a secure web messaging service were the speed of communication, the written nature of the medium, and its asynchronicity.<sup>149</sup> In contrast those parents that had actually used the email service had different views, describing their confidence that the clinician would ensure their privacy, and of being satisfied with the quick response as compared to other methods of consultation.

Parents of children attending a paediatric clinic in the US were asked about their perspectives on potentially using email to communicate with clinicians. They reported concerns about confidentiality and were asked to rate this concern on a visual analogue scale. The highest proportion of participants reported high levels of concern (between 80-100 on the visual analogue scale). They also reported privacy concerns. Physicians at the same clinic were also asked about their perspectives and 80% (38/48) believed that email would increase their workload; they also expressed concerns about confidentiality and safety.<sup>128</sup> The study did not ask parents about what they felt could be the advantages of email use.

A survey of patients using WebMD, a US based health-focused website, asked what patients thought of patient-provider email communication. Participants were mostly non-users of email (94%, 894/954). Those not using email were asked why not, and they expressed concerns about privacy and worries that if they used email they would be bothering the clinician. They were also concerned about the security of any potential interaction via email.<sup>147</sup> This study did not explore the potential advantages of email use.

Focus groups with diabetic patients in primary care in the US found that those interested in using a web portal to have email communication with their clinician did so because they were dissatisfied with their existing provider-patient relationship and felt that this kind of access would provide a means of gaining knowledge or control over their diabetes. Conversely, where patients were not interested in using email it was because they did not feel the need for an extra method of communication as they were satisfied with their doctor-patient relationship.<sup>150</sup>

In a qualitative study conducted in New Zealand with GPs both using and not using email, those GPs not using email expressed different views on the advantages and disadvantages of using email. This indicated that the reality of using email with patients differed from the

perception of using it. Those GPs not using email were concerned about it being a further demand on their time and about privacy and security. The GPs that were using email had specific rather than abstract concerns, such as the need to obtain consent from patients for receiving emails. The users of email also shared advantages, identified in their use of email with patients, and these included using it as a tool for recalling patients and as a way to disseminate information to patients.<sup>151</sup> Another qualitative study, conducted in Scotland with GPs that were not using email examined views on the prospect of offering email consultation to patients. Views expressed by participants included concerns about security, confidentiality, concerns about making a diagnosis via email, preference for face-to-face contact, and concerns about the time required to offer email; including worries about not having time to see patients and email presenting an additional burden in an already onerous role.<sup>148</sup>

As well as studies that present empirical findings, there are articles that theorise about the potential benefits and problems associated with email communication, for instance the potential for replacement of office visits with emails and describing email as a way to answer patients personalised questions. These have tended to be opinion pieces, editorials and discussion articles.<sup>63;138;152-167</sup> They have no formal methodology and several are now dated, having been published in the year 2000 or earlier. The benefits and problems they suggest are speculative and not supported by reference to the evidence base. Whilst these studies present interesting perspectives, it is difficult to qualify the perceptions of non-users, as many concerns relate to the theoretical and have no basis in experience. In order to confirm whether the concerns of non-users are valid it is necessary to investigate the experiences of patients that have had the option to use email consultation and have chosen to do so.

#### **2.4.4. Factors relating to email consultation**

To try and provide context and set the scene for the thesis a summary of the most common issues arising in relation to email consultation and the evidence addressing these was produced. The aim was to provide the reader with an understanding of the main topics addressed in the current literature via a narrative review. A systematic review of the evidence relating to email consultation in healthcare follows later in the thesis (Chapters 4 & 5).

The approach to identifying the literature was iterative and began at the beginning of the PhD where it was necessary to become familiar with what is known about email consultation and its wider context. This exploration occurred in conjunction with the main supervisor who has published articles relating to email consultation.<sup>57;168</sup> A series of medical database searches and Google Scholar searches identified many articles, and these articles then

subsequently led to more. Over this initial period of familiarisation it became apparent that there were several factors that appeared regularly in the medical literature. These factors were also a feature of the publications by professional bodies and the focus of the published guidelines (see section 2.3.4). A summary of these factors and data concerning them is presented here.

The factors arising can be loosely categorised into advantages and disadvantages associated with email consultation. For example, potential advantages of email consultation commonly cited include improved patient satisfaction<sup>169</sup> and reduced healthcare costs.<sup>170</sup> Potential disadvantages include a negative impact on clinician workload<sup>125</sup> and the potential for medico-legal liability.<sup>171</sup>

The factors presented here are grouped for clarity:

- Resource related factors
- Patient related factors
- Quality & safety related factors.

#### *Resource related factors*

Many of the factors of interest relate to the effect of email on resources, both financial and time related resources.

#### Workload

Workload is arguably the biggest concern for clinicians. A survey of general practitioners in Scotland identified that GPs perceived a need for providing an email service to patients but felt that concern about workload was a major barrier.<sup>148</sup>

There is uncertainty as to what impact email consultation has on workload. There are data suggesting it can decrease face-to-face consultations. A randomised controlled trial carried out in Norway found that access to email consultation led to a reduction in the number of face-to-face visits, but no reduction in telephone consultations.<sup>127</sup>

It has been shown that dealing with email takes less time than the telephone. A US survey of physicians using email consultation found that physicians spent a median of 10 minutes per day on emails and 60 minutes managing patient phone calls. It was suggested that this was due to the nature of the telephone; e.g. having to hold, being unable to get hold of the patient. Over half (52%) of physicians in the survey felt that email decreased their telephone



related workload. A study which examined patterns of email use in a paediatric rheumatology clinic found that the time required for a physician to read an email and type a response ranged from 4 to 714 seconds (mean: 132.1 seconds), and the time required for the physician to complete a telephone call ranged from 36 to 1392 seconds (mean: 309.2 seconds). This time difference was significantly different at the  $P < .0001$  level.<sup>172</sup> (email takes less time than telephone).

There are reports that email does not have an impact on workload. In a survey of doctors using a patient portal, over half of the sample reported that introducing a patient portal made no difference to their email and telephone workload.<sup>125</sup>

It has been suggested that email lowers the threshold at which people communicate, leading to an excess in communication of things that would not normally require an individual communication.<sup>24</sup> However it was not possible to identify data to support this concern.

#### Replacement method of consultation

It has been suggested that email might present a way to replace existing methods of consultation.

A systematic review of the acceptability and safe application of email consultation suggested that it could be used instead of telephone consultations for simple and non-urgent conditions.<sup>168</sup> A survey of doctors in Finland who were using email in a student health service were asked whether they felt that patient visits could have been substituted by other methods of consultation. The doctors estimated that 2% of patient visits and 21% of telephone calls could have been substituted with email. They estimated that 10% of patients' email messages led to a face-to-face consultation.<sup>173</sup>

Mixed views on doing this are reported by clinicians and patients. A US evaluation of a patient portal found that where email consultation was offered patients find it easy to use and prefer it to a telephone consultation. However the clinicians preferred using telephone consultations to using email consultation.<sup>174</sup> A different US survey showed that health professionals as well as patients preferred email over telephone consultations for non-urgent problems.<sup>175</sup>

The idea of email as a replacement method of consultation links with the notion that it can improve efficiency and save costs, as described next.

## Efficiency

Evidence relating to the potential for improved efficiency indicates that there is uncertainty about whether email has any impact on efficiency. Physicians using web messaging in their practice have been shown to achieve a higher level of patient visits per day.<sup>176;177</sup> It has been suggested that this may be due to increased process efficiency where email is used in a practice.<sup>176</sup> However a systematic review examining the impact of patient–physician web messaging on healthcare service provision found that although there was potential for web messaging to increase process efficiency, there was insufficient evidence to suggest that this was actually the case.<sup>47</sup>

## Cost

It has been suggested that e-mail consultations may offset the cost of telephone calls and face-to-face consultations.<sup>127</sup> This potential cost saving does not just apply to the health service. Email consultation may also save patient resources, for instance by preventing a patient from having to take time off work for a face-to-face appointment and pay ensuing travel costs.

A systematic review of the impact of electronic messaging on patient-physician interaction examined both the economic benefits and economic barriers associated with email.<sup>169</sup> They reported that economic savings had been demonstrated where electronic messaging was in place. One of the studies they describe was a US survey which showed a reduction in total healthcare spending associated with the introduction of electronic messaging. The saving exceeded the cost of the service thus providing an economic benefit.<sup>178</sup> They also found that the initial outlay required to set up an electronic messaging service was a barrier to its use, especially for smaller practices. This outlay included financial investment and investment in staff time for set-up and training.<sup>169</sup>

Much of the primary research carried out on email and web-messaging neglects to assess cost effectiveness and overall evidence about cost effectiveness of eHealth interventions more widely have been described as poor.<sup>179</sup>

### *Patient related factors*

Factors relating to the effect on patients are also commonly cited.

#### Patient satisfaction

Perceptions in the medical literature are that patients want to use email and that being able to use it for clinical communication improves satisfaction with their care.

There are several systematic reviews whose findings provide support for this perception. A systematic review examining the impact of patient–physician web messaging on healthcare service provision found that demand and support for online communication tools was strong amongst patients.<sup>47</sup> A systematic review of the scope and effectiveness of email consultation reported high levels of patient satisfaction where email services are in place.<sup>57</sup> A different review of the impact of electronic messaging on patient-physician interaction found that patients are satisfied with the use of secure physician messaging and find it convenient, time-saving and useful.<sup>169</sup> An evaluation of an email consultation service set up in a general practice in Scotland found that patient satisfaction was high amongst users of the service, with patients reporting that it meant they did not need to bother the GP, and they could avoid having a face-to-face consultation. The authors concluded that there may be an unmet need amongst patients for clinical email services.<sup>44</sup>

### Access to healthcare (digital divide)

Policymakers like email because of its supposedly positive effects on patient access to healthcare. There has however been much written about the potential for email to reduce access to healthcare for certain groups. This relates to the 'digital divide.'

The 'digital divide' describes the inequality created by the increasing level of new technology. As new technologies replace old systems, it has been suggested that certain sectors of the population are being left behind with regard to access and use of these services, for instance the elderly, non-English speakers, those in lower income groups and those with poor literacy skills.<sup>57;151</sup> Approximately 17% of adults in the UK struggle with literacy, this means their literacy levels are below the levels expected of an eleven year old.<sup>180</sup> As well as literacy there is the issue of computer literacy. Even where patients have access to a computer and the internet this does not necessarily translate into being able to use them to acquire and use information.<sup>181</sup> A lack of computer literacy is suggested as a reason not to offer email consultation, because younger age groups have incorporated computer use into their daily lives but this is not necessarily the case for older generations<sup>182</sup> and clinicians worry about them being left behind if email became a mainstream method of consulting.

Despite this outlook there are data to suggest that the situation is not all negative with regard to internet and email use. Although traditionally new and developing technologies like the internet are most popular with younger age groups the number of retired people using the internet increased between 2003 to 2009 from 22% to 34% and so patterns of use are changing.<sup>183</sup> The dividing element of introducing email consultation is only a concern if it were indeed a replacement for other methods of consultation, rather than an addition.

There is still much to learn about how email consultation might actually impact on access. Much of this ties in with data on workload, since the presumption is that saving clinician time in general practice means that clinicians can see more patients. However an alternative perspective is the suggestion that email consultation is not necessarily viewed as a replacement for more traditional methods of consultation, but instead as a supplementary method of communication<sup>112</sup> in which case existing methods of consultation would still be available to the patient. This would have more impact on clinician workload.

### *Quality and safety related factors*

- Quality related factors

#### Impact on communication

Email offers an indirect method of consultation; it is asynchronous and takes a written form. It is a different context for interaction than other methods of consultation. This change in medium has been suggested to improve communication in some circumstances. An advantage for patients relates to the removal of the face-to-face element of an 'in person' consultation, which may then encourage patients to raise issues that they feel to be sensitive or embarrassing and so may not otherwise discuss, thus addressing an unmet need.<sup>57</sup> Caregivers have been documented as raising via email issues that a patient has been reluctant to discuss with the health professional.<sup>129</sup>

Conversely, it has been suggested that because face-to-face interaction and telephone calls contain levels of communication that are lost in an email; such as the cues from vocal intonation or body language,<sup>57</sup> this makes communication more difficult for the clinician. Clinicians often rely on such vocal or physical cues for decision making purposes and these are lost in an email.

A systematic review of email in patient-provider communication found that in all of the included studies the implication was made that email has the potential to improve the quality of healthcare communication between patients and clinicians.<sup>140</sup> At present the information available on email and its effect on communication appears to be mostly speculative, with suggestions made about the potential for the effect on communication. Thus it is uncertain what effect email actually has on the quality of communication.

- Safety related factors

#### Security, privacy and confidentiality concerns

The security, privacy and confidentiality of email consultations have been shown to be concerns for both patients and clinicians. Surveys conducted in the US have shown that where email systems are being used in healthcare both clinical and non-clinical staff had security, workload and confidentiality concerns.<sup>125;174;184</sup> Another US survey showed that only 19% of physicians using email were recording the contact in the medical record and just 23% discussed confidentiality and security with their patient.<sup>185</sup> A survey of selected GPs in New Zealand found that only a very small proportion were using email with patients and this

was because they felt that workload, confidentiality, privacy and security were barriers to its use and should be addressed.<sup>151</sup> A systematic review of email in patient-provider communication reported that both physicians and patients had concerns about confidentiality and security.<sup>140</sup>

A Norwegian team carried out interviews with patients in general practice who were using a secure online communication system, so that they could assess views on privacy and security. They identified security issues as a barrier to email use.<sup>186</sup> It has been identified that patients are more likely to use email if they have access to the Internet from home, rather than from work because of privacy issues.<sup>146</sup> Family email accounts can mean a lack of privacy at home.<sup>163</sup> Much is made of potential privacy risks when using email, but these are not unique and apply also to existing methods of consultation and contact such as the telephone,<sup>187</sup> and postal mail.<sup>48</sup>

Whilst there is much written about the concerns of patients and clinicians there is little written about the potential methods for overcoming these concerns, or examples of these concerns being realised.

#### Inappropriate use of email

The potential for inappropriate use of email by patients is a concern for clinicians. Email consultations will not be suitable for every circumstance, and evidence around telephone consultations suggests that there is low concordance between patients and health professionals about which issues are appropriate,<sup>188;189</sup> suggesting that these fears may be realised. There have been reports of patients using email inappropriately. One survey reported that 53% of the 50 physicians asked had received at least one email that was inappropriate because it was urgent and 8% of these had received more than five emails of this nature.<sup>124</sup> Another survey found that 7% of the 204 physicians sampled reported receiving emails about urgent issues such as chest pain.<sup>190</sup> However in a separate study the content of emails received via a secure messaging system was examined and only one message out of 200 examined was considered urgent.<sup>126</sup>

In an attempt to lower the risk of inappropriate email use, it has been suggested that email is not recommended for messages that may be difficult to understand, information that the patient may find negative or for issues that require a personal follow-up.<sup>112</sup>

Both the potential for inappropriate use of email and security, privacy and confidentiality concerns link in with the medico-legal concerns that clinicians experience.

## Medico-legal concerns

Medico-legal concerns tie in with security, privacy and confidentiality concerns and the appropriate use of email. They are of specific concern to clinicians. Examples of medico-legal issues that could arise when using email for consultation include: potential liability for breaches in security allowing a third party to access confidential medical information; clinical incidents caused where patients provide incomplete, abstract or inappropriate information via email preventing a clinician from making a sound clinical judgement.<sup>171</sup>

Suggestions for minimising the legal implications of using email in practice have included: adherence to data protection rules; adequate infrastructure to provide encrypted secure email transit and storage; and the use of informed consent to ensure that the patient is aware of the risks and benefits associated with communicating with their health professional via email.<sup>168</sup>

One factor that may be seen as advantageous in medico-legal terms is that exchanges using email are automatically retained, whereas vocal or face-to-face communication must be documented separately. Emails can be archived in online or offline folders for indefinite periods of time<sup>57;168</sup> thus providing a long lasting and accurate record of the consultation.

## *Summary*

This section has provided a narrative overview of the main potential benefits and problems associated with email consultation as discussed in the literature, with an introduction to the type and quality of data supporting these issues. It is clear that the evidence base around email consultation is relatively large, but is skewed towards observational studies e.g. cross-sectional surveys. There is a need to take an approach which allows the issues truly of relevance to those carrying out and engaging in email consultation to be established.

## **2.5. Chapter summary**

The first stage in addressing the thesis aim was to define an email consultation. Email consultation is a complex intervention, defined as two way communication between a patient and a clinician via email, for requesting or providing patient specific information that is not of an administrative nature. This incorporates three main types of email communication; unsecured standard email, secure email and web-messaging.

The thesis setting is English general practice. English governmental policy over the last decade has focused on patient-centred care offering quick and convenient access, patient choice and information on which to base these choices. It included a focus on IT for

delivering this. Policy has more recently pushed for the introduction of email consultation in general practice. Despite this, at present there are no guidelines for the use of email consultation in this setting, and professional bodies have taken a neutral or negative stance towards email consultation. Professionals considering the use of email in this way have faced uncertainty and a lack of information. There is also a lack of empirical evidence on email consultation use in England.

Taking a broader perspective the use of email consultation globally is on the increase, and email is used in a broad range of settings and for a wide range of purposes, from general health questions to updating the clinician on a health concern, amongst others. The rising interest in email consultation has raised many potential issues around the use of email consultation. These topics are commonly raised in the published literature in relation to email consultation and include workload, access to healthcare and inappropriate use of email. There is interest, much of it speculative, in how email consultation might work. Overall there is clearly a need for exploring email consultation in relation to the setting of interest, and in relation to how it is actually working rather than how it might work.



## Chapter 3: Background to methodological approach

### ***Chapter overview:***

This chapter outlines the background to the methodological approach used in the thesis. It begins by reiterating the aims and objectives of the thesis. This is followed by a description of how the MRC framework for developing and evaluating complex interventions was used to guide the structure of the objectives for the thesis and in deciding how best to address them. An outline of the research methods used to address each objective in the thesis is outlined.

This is followed by background to the selection of the research methods. These sections cover the decision to take a mixed methods approach; utilising quantitative and qualitative methodology and using a sociological theory to guide the qualitative element of the thesis.

Finally a chapter summary reiterates the approach taken to developing and addressing the objectives before the methods themselves are described in subsequent chapters (Chapter 4, systematic review methods and Chapter 6, qualitative study methods).

### **3.1. Aim and objectives**

As outlined in the introduction, the aim and objectives of the study are:

**3.1.1. Aim:** To explore the potential of email as a method of consultation in English general practice and describe the key factors that may influence its normalisation.

#### **3.1.2. Objectives**

1. Identify the extent of the experimental evidence base concerning email for clinical communication between patient and health professionals.
2. Explore experiences and opinions of patients using email consultation with clinicians in general practice with a view to understanding how email is used, and to identify barriers and facilitators to this use.
3. Explore clinician and practice manager experiences and opinions of using email or being involved in using email for consultation with patients in the general practice setting with a view to understanding how email is used, and to identify barriers and facilitators to this use.
4. Use a theoretical paradigm: normalisation process theory, to understand the potential for the normalisation of email consultation.

### 3.2. Developing objectives for the thesis

As described in the previous chapter (chapter 2, section 2.2.2), a decision was made to define email consultation as a complex intervention, and thus the MRC framework for developing and evaluating complex interventions<sup>61</sup> could be applied to the design and implementation of the study. The framework was used to guide the structure of the objectives and in choosing the appropriate methodology for addressing these.

#### *Framework for developing and evaluating complex interventions*

The guidance provided by the MRC concerns the development, evaluation and implementation of complex interventions, providing a framework that researchers can apply to their own research. The main elements of the framework are development of the complex intervention, piloting and feasibility of the complex intervention, evaluation of the complex intervention, reporting of the evaluation and implementation of the evaluation findings. The guidance stresses that each stage in the process is equally important. The stages do not necessarily occur in linear steps and may be repeated during the process.<sup>61</sup>

The guidance relating to the 'development' stage of this process was applied to the thesis. The development stage is the earliest stage in the process and involves three elements; identifying the evidence base for the intervention, identifying and/or developing theory for understanding the intervention and the likely processes of change it will bring about, and modelling the processes and outcomes of the intervention.<sup>59-61</sup> It is important to note that the elements of the developmental phase may be interlinked rather than progressing linearly.

The development stage is especially relevant where an intervention is not yet established or is ill defined,<sup>61</sup> which is the case for email consultation. It provides a way to clarify uncertainty around an intervention, and there is much uncertainty surrounding email consultation in the English general practice setting. Using the framework to guide the thesis ensures that the exploration of email consultation is approached in a systematic and reproducible fashion, and increases the likelihood that the results of the thesis will be useful in the further development of email consultation and any future evaluation.

It was the first two of the three elements in the development stage that were of relevance to the thesis.<sup>61</sup>

1. Identifying the evidence base concerning the intervention

Preferably this is done by carrying out a systematic review.

2. Identifying/developing appropriate theory

Theory can assist in understanding the process of change brought about by an intervention especially where factors around how an intervention might achieve and bring about change may not already be clear. To develop a theoretical understanding of the likely process of change it is necessary to draw on existing evidence and theory, and where necessary use primary research, for example interviews with stakeholders (those targeted by the intervention or involved in its development or delivery).

#### *Application of framework to thesis aim*

Four objectives were devised to address the thesis aim. The aim and objectives of the study were devised according to the need for research that was outlined in the background to the thesis (chapter 2). The chapter concluded that there is a need to explore email consultation in relation to English general practice, to find out how it is actually working in situations where it is being used by clinicians and patients, rather than taking a speculative approach to its use.

The relevant elements of the 'development stage' of the framework for developing and evaluating complex interventions were applied to guide the production of the objectives, and the choice of methods used to address them.

#### *Objectives*

1. Identify the extent of the experimental evidence base concerning email for clinical communication between patient and health professionals.
2. Explore experiences and opinions of patients using email consultation with clinicians in general practice with a view to understanding how email is used, and to identify barriers and facilitators to this use.
3. Explore clinician and practice manager experiences and opinions of using email or being involved in using email for consultation with patients in the general practice setting with a view to understanding how email is used, and to identify barriers and facilitators to this use.
4. Use a theoretical paradigm: normalisation process theory, to understand the potential for the normalisation of email consultation, based on the data collected in objectives 2 and 3.

Objective 1 relates to the first element of the development process; identifying the evidence base, and was addressed using a systematic review. Objectives 2, 3 and 4 relate to the second element of the process; identifying/developing appropriate theory, and were

addressed using a qualitative interview study, with normalisation process theory used to interpret the data arising from the interview study.

More detail on the background to the choice of methods for addressing the objectives, including background to the decision to use both quantitative and qualitative methods, is outlined in the next section.

### **3.3. Background to selecting the research method**

#### **3.3.1. Using mixed methods**

Both quantitative and qualitative methods were used to address the research aim. It has become widely accepted that there is value in combining elements of quantitative and qualitative research so that they might complement each other. This is known as mixed method,<sup>191</sup> multi-method,<sup>192</sup> combined methods research<sup>193</sup> or multi-strategy designs amongst other terms.<sup>194</sup> It involves using both method types to address the same question and in doing so allows for a broader investigation of the research question.<sup>195</sup> It has been suggested that combining methodologies is an 'essential tool for the generation of knowledge relevant to primary care practice.'<sup>192;196</sup>

There are many approaches to combining research methods. One of the most common approaches is to triangulate methods. This involves combining two or more methods to address a research question so that the results can be crosschecked for consistency. The results are compared for convergence, to provide a greater insight than that achieved using a single method.<sup>193;197</sup>

Another approach is known as 'multiple methods,' whereby two different methods are used to answer different elements of a research question. In contrast to triangulation it allows the exploration of different elements of a research question, providing different perspectives on the same research question and acknowledging that each method has its own strengths and weaknesses. It does not aim to converge on a single definitive account but instead examines the topic on many different levels providing a complementary perspective.<sup>193;197</sup>

Another increasingly common approach is to combine methods sequentially. This is usually where one method is used to facilitate, inform or prepare for another method. An example might be using qualitative methods to provide insight on research settings and subjects, information that can then be used to inform the development of quantitative surveys to ensure they ask the relevant questions.<sup>193;197</sup>

It was decided that a multiple methods approach to addressing the aim would be appropriate. The use of a multiple methods approach allows examination of the topic on different levels; quantitative research used to explore the wider evidence base, and qualitative research to explore at a setting specific level.

### **3.3.2. Using quantitative methods**

Quantitative research takes a deductive approach, whereby a pre-existing theoretical idea or concept is tested, usually in the form of a hypothesis. It is an objective approach associated with the researcher taking a neutral position in carrying out the research. Its methods are characterised by measurement and quantification of 'something' and any research design is pre-specified, with a detailed description of procedure provided to allow replication of the methods by others.<sup>194</sup>

Quantitative methods focus on the accuracy and precision of the measurement. Reliability, consistency and validity of measurements are important and it usually (but not always) involves statistical analysis of the collected data. Generalisability of the findings is sought; the sample of patients upon which the research is conducted is expected to be representative of the wider population so that the results are applicable outside of a research setting.<sup>194</sup> The quantitative method used in this thesis is systematic review.

In this study Cochrane systematic review methodology was used to address the following objective:

- 1. Identify the extent of the experimental evidence base concerning email for clinical communication between patient and health professionals.*

#### *Systematic review*

Systematic reviews are used to summarise evidence relating to an individual research question. They address a clearly defined question using rigorous, standardised methods for selecting and assessing articles, applying strategies that limit bias in the assembly, critical appraisal and synthesis of all relevant studies.<sup>198</sup> Where appropriate the results of the review are quantitatively summarised using meta-analysis. This is dependent on whether the review identifies studies that are similar enough to consider combining their results.<sup>198;199</sup>

Systematic reviews are at the top of the hierarchy of evidence. The evidence hierarchy is a tool for assessing the likely quality of a particular piece of research evidence based upon its study design.<sup>200</sup> It reflects the impact of study design on the accuracy of research findings in

a simplistic fashion. The hierarchy lists study designs in the following way, with those at the top deemed to have the most reliable study designs:

- Systematic reviews of randomised controlled trials with meta-analysis.
- Systematic reviews of evidence.
- Randomised controlled trials.
- Other trial designs.
- Cohort studies.
- Case-control studies.
- Cross sectional surveys.
- Case series & case reports.
- Editorials, Expert opinion and consensus.

However, it generalises according to study design. Study design alone does not guarantee the quality of a study because it provides no information on how the study was conducted.<sup>61;201</sup>

Systematic reviews are mainly used to summarise evidence from randomised controlled trials, given their position as the most reliable study design in the hierarchy of evidence, though increasingly the remit of systematic reviews has been extended to include other types of trials, and observational studies.<sup>202;203</sup> This extension of systematic review remit has particularly been the case when complex interventions in healthcare are the subject, as their nature means that randomised controlled trials may not be appropriate and so other trial designs are used instead.<sup>204</sup>

Systematic reviews are more reliable than narrative literature reviews because the systematic and reproducible approach to their conduct reduces bias that may be present in any interpretation of the findings.<sup>199</sup> A key characteristic of a systematic review is the production of a protocol before the review commences. This is an outline of how the review will be carried out. It ensures that the review is replicable.<sup>201;205</sup> The methods section of a systematic review should explicitly state the methods and criteria employed for identifying and selecting relevant studies and extracting and analysing information.<sup>199</sup>

### *Cochrane systematic reviews*

The Cochrane Collaboration is an international organisation, established in 1993 to produce systematic reviews of medical and public health interventions so that they might enable evidence-based health care practice.<sup>199;206</sup> Cochrane systematic reviews are carried out by

researchers all over the world and take a global perspective. They are produced by teams of researchers, in conjunction with a Cochrane review group. Each review group specialises in particular areas of medicine and healthcare. Cochrane reviews use a predefined and rigorous methodology devised by the Cochrane Collaboration to ensure that each review meets the same standard internationally.<sup>206</sup> This methodology is outlined in the Cochrane Handbook for Systematic Reviews of Interventions.<sup>207</sup> The protocol for each review is peer-reviewed and published prior to the review being carried out, and the subsequent systematic reviews are also subject to peer-review prior to publication.

Cochrane systematic review methodology was used in this study. Carrying out the systematic review in conjunction with the Cochrane Collaboration allowed for the rigorous and reproducible identification of trial based evidence on email for clinical communication between patient and health professional. As already discussed in chapter 2, there is presently a proliferation of published material on email for this type of communication, but this appears to be mainly comprised of studies using low quality study designs. Systematic reviews already carried out on topics relating to email have not restricted by study design and thus have not focused on identifying the highest quality studies: those with a trial design.<sup>47;57;140;168;169</sup> This systematic review provides an assessment of the highest quality evidence available to date on email for clinical communication between patient and health professional. The methods for the review can be found in chapter 4.

The systematic review was carried out in conjunction with the Cochrane Consumers and Communication Review Group, who specialise in interventions that affect the way people interact with health professionals, services and researchers. The PhD candidate was lead author on this systematic review. The PhD candidate was also coordinator of and co-author on four other Cochrane systematic reviews that addressed the use of email in healthcare: email for communicating results of diagnostic medical investigations to patients, email for the management of healthcare appointments and attendance reminders, email for the provision of information on disease prevention and health promotion and email for clinical communication between health professionals. The five reviews together formed a suite of reviews on the use of email in healthcare (see appendix for copies of published protocols for all five reviews).<sup>208-212</sup> The other four reviews were outside of the scope of the thesis and so are not included in their entirety, but their findings are described and examined in the discussion section of the systematic review (Chapter 5). They are also considered in chapter 9 of the thesis where an appraisal of the wider evidence base relating to email is made.

### **3.3.3. Using qualitative methods**

Qualitative research takes an inductive approach, whereby the data collection leads to the emergence of ideas and concepts. It does not begin with a fixed idea or notion. It wishes to understand different perspectives of a situation. It rejects objectivity as this is seen to distance the researcher from the research. The research design is flexible throughout the research process and an iterative approach is taken to execution and analysis of the research.<sup>194</sup>

Qualitative methods usually involve verbal engagement with research participants and the presentation of data in non-numerical form, with no use of statistical analysis and little use of numerical data beyond descriptive purposes. It places a focus on meanings in context, and so the research may take place in natural settings.<sup>194</sup> The results are not generalisable, but may be transferable.<sup>213</sup>

The qualitative method used in this thesis is semi-structured interview.

Semi-structured interviews were used to address the following objectives:

2. *Explore experiences and opinions of patients using email consultation with clinicians in general practice with a view to understanding how email is used, and to identify barriers and facilitators to this use.*
3. *Explore health professional and practice staff experiences and opinions of using email or being involved in using email for consultation with patients in the general practice setting with a view to understanding how email is used, and to identify barriers and facilitators to this use.*

#### *Semi-structured interview*

The qualitative method used in this study is semi-structured face-to-face interview. This was used in conjunction with a theoretical paradigm; normalisation process theory (see section 3.3.4, use of theory).

In a semi-structured interview the researcher has a topic area of interest that they wish to discuss with the participant, and an interview guide covering areas of the topic is produced to guide the interview. The use of open-ended questions in the interview guide ensures that it is the interviewee's responses that determines the direction of the interview and not the questions devised by the researcher. Open ended questions allow for the responses to be explored in greater detail<sup>214;215</sup> and for the interview to go in a direction determined by the participant and not the researcher.



Other qualitative approaches were considered in deciding how best to approach the research question. Focus groups, a form of group interview, were considered. They capitalise on communication between participants to generate data. Participants are encouraged to talk to one another and ask questions, and comment on each other's points of view. The moderator in a focus group has a clear agenda but is non-directive in encouraging discussion.<sup>216</sup> An advantage of focus groups is the group process acting as a way for people to explore and clarify their views in a way that is less easily accessible in a one-to-one interview. They allow the researcher access to a variety of forms of communication beyond reasoned answer to direct questions, such as anecdotes and interactions between participants.<sup>217</sup>

However focus groups require a certain degree of homogeneity in participant perspectives to prevent participants from feeling inhibited from revealing their views.<sup>216</sup> As it was unknown what the perspectives of email consultation users would be, it was impossible to guarantee that there would not be differing views amongst participants and this may have discouraged honest discussion.<sup>217</sup> Focus groups can also be difficult where participants have little or no experience in a topic.<sup>216</sup> As the eligibility criteria for the study indicated that participants must have used email consultation 'at least once' there was the scope for inclusion of participants with little experience of using email alongside participants who had more extensive experience of using it and this may have made the focus groups difficult.

For topics that participants may find sensitive group discussion can be inhibiting.<sup>216;217</sup> Individual interviews provide a more confidential context for discussion. The unofficial nature of email for consultation in general practice meant that there was a likelihood that professionals would not want to discuss their use of email with patients in front of other professionals. The one-on-one nature of the semi-structured interview was therefore an advantage in obtaining candid accounts of email consultation use by professionals. This was of particular importance given that the objective of the interview study was to explore experiences and opinions of using email. Similarly the one-on-one nature of the semi-structured interview was also deemed an advantage for use with patients. In asking them about their experiences and opinions of using email it was expected that they may wish to talk about their own health conditions and their relationship with the GP, something they may be less likely to feel comfortable with doing in front of others.<sup>217</sup> Focus groups are less conducive to probing of individual statements than interviews.<sup>216</sup> If the researcher wishes to find out more about a particular individual's perspective, they must do so in a group environment. In contrast semi-structured interview offers the opportunity to freely probe individual statements.

As well as making consideration for the effect of a group setting on participant responses, there were practical considerations to be made. Without information available on how many potential participants were likely to be using email, recruiting participants and scheduling a focus group would potentially have been difficult. Recruiting GPs to participate in research can be difficult because of time constraints they face,<sup>218;219</sup> and so it may prove difficult to schedule a time and location that is convenient for all attendees at a focus group. This is especially likely to be the case for a subject where GPs are perhaps also reluctant to talk about their experiences. Recruitment of patients was from across London and identifying a location and time suitable for all potential participants may have proven difficult.

In selecting to use interviews to address the research question, it was necessary to choose between a semi-structured and depth (unstructured) approach. Semi-structured interview involves having a fixed set of topics to discuss, a depth (unstructured) interview has broad objectives but is led by respondents priorities and concerns.<sup>216;217</sup> A semi-structured approach was deemed most practical, allowing exploration within the boundaries of the research question. In a field where the extent and nature of use (of email) is unknown, it was felt that the depth approach would potentially be too unstructured to achieve the objectives of the thesis.

The qualitative study was split into two according to the two objectives; a patient interview study and professionals interview study. The methods for the qualitative interview study are outlined in chapter 6.

### **3.3.4. Use of theory**

Theory is a set of concepts used to define and/or explain a phenomenon, providing a conceptual tool useful in making sense of a complex reality.<sup>220;221</sup> Theory can be used in qualitative research to assist in designing a research question, guiding the selection of relevant data, interpreting the data and to help in proposing explanations for the observed phenomena. Theory allows the researcher to move beyond individual insights so that they might understand their wider significance.<sup>221</sup>

Psychological and sociological theory can be used to explore the level of complexity seen in health services. Theories are used to consider how new technologies or systems in health care might be implemented and how human factors can affect this.

A theoretical paradigm normalisation process theory (NPT) was used to guide the interpretation of the data collected via qualitative interview for objectives 2 and 3. This addressed objective 4

4. *Use a theoretical paradigm; normalisation process theory, to understand the potential for the normalisation of email based upon the data collected in objectives 2 and 3.*

### *Theories in healthcare*

Several theories are relevant to the introduction and implementation of new technologies in a healthcare setting. The following theories were considered for use in the thesis. These theories were identified as being relevant, having been used in studies of information technology in healthcare.<sup>99;222-228</sup> This is not a comprehensive presentation of all healthcare setting related theories available. All of the theories outlined are middle range theories. Middle range theories are the link between the general, abstract concepts of macro-theory e.g. wider observations on health and illness and grounded theory, which is the observable behavior of people in everyday settings. Middle range theories are specific enough to be directly tested by empirical research but general enough to cover a range of different phenomena.<sup>215</sup> This makes them well placed for use with real world situations.<sup>229</sup>

#### The theory of reasoned action (TRA)

The theory of reasoned action originated in the social psychology setting. It is used in healthcare with regard to individual behaviour change. It is a theory of intention, which aims 'to explain the relation between intention and action in particular contexts and in relation to specific practices'. It is comprised of three constructs: behavioural intention, attitude and subjective norms. It states that a person's behaviour is predicted by their attitude towards that behaviour and by how they think others would view them if they performed the behaviour. Attitude combined with subjective norms forms their behavioural intention.<sup>230</sup> It can be applied to explain the behaviour of health professionals in relation to new technologies in their practice.<sup>228</sup>

#### The theory of planned behaviour (TPB)

The theory of planned behaviour is an extension of the theory of reasoned action. It includes an additional construct; perceived control over performance of the behaviour.<sup>231</sup> As a revision and extension of the TRA it is more widely used in healthcare than the TRA. It is based upon an individual's attitudes and beliefs about the new behaviour, their social norms and pressures and their perception of control over the new behaviour. These three factors predict behavioural intentions, which are then linked to actual behavioural change in individuals.<sup>232</sup> It may be applied in relation to the changes in health professional behaviour required to change practices in healthcare.

### Technology acceptance model (TAM)

The technology acceptance model is also an extension of the theory of reasoned action.<sup>233</sup> It is an information systems theory that models how users come to accept and use a technology.

It was developed to specifically explain and predict user acceptance of computer based information systems. TAM replaces several of the measures relating to attitude in the TRA with two key constructs; perceived usefulness; the degree to which a person believes that using a particular system would enhance his or her job performance and perceived ease of use; the degree to which a person believes that using a particular system would be free of effort. It does not include subjective norms. TAM can be used to identify factors influencing success of information systems, information technology diffusion and determinants of whether a technology is adopted.<sup>224</sup>

### Diffusion of innovations

Diffusion of innovations is a popular adoption theory which can be used to predict how new innovations become institutionalised in a setting.<sup>225</sup> It sees innovations as being adopted by a social system over time, with each individual possessing different degrees of willingness to adopt innovations. These individuals can be split into categories from earliest to latest adopters.<sup>234</sup> In the healthcare context the potential adopters in the diffusion of innovations model are considered in terms of their concerns at different stages of adoption, and this is known as a 'concerns-based' adoption model. This model puts more emphasis on the complex and dynamic interactions in the health service and provides a framework of issues to consider when implementing a new system.<sup>225</sup>

### Normalisation process theory

Normalisation Process Theory (NPT) is a sociological theory. It was developed to assist in explaining the processes by which complex interventions become routinely implemented, integrated and embedded in health care practice, and the likelihood that this will happen. It is concerned with the embedding of a new technology or innovation as a result of the things people do (their actions).<sup>235</sup>

It proposes 'that implementation and integration should be understood by reference to the work that people do' to use the system in question. This is assessed by asking questions about the work; who does it, how they do it and how they understand it. It focuses on the

processes that lead to complex interventions becoming a routine part of day to day clinical practice. A routinely used system can be said to have normalised.<sup>236-239</sup>

The theory is based around three core propositions.<sup>236-239</sup>

- (a) *'Complex interventions become routinely embedded (implemented and integrated) in their organizational and professional contexts as the result of people working, individually and collectively, to implement them'.*

In order to understand the embedding of a complex intervention it is necessary to look at what people actually do and how they work. This leads onto the next proposition:

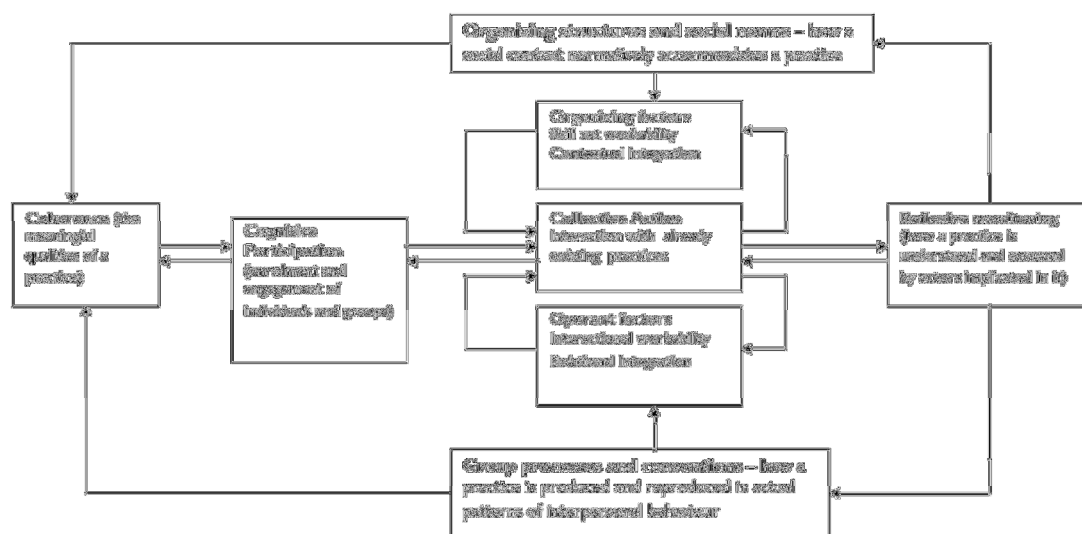
- (b) *'The work of implementation is operationalised through four generative mechanisms (coherence; cognitive participation; collective action; reflexive monitoring).'* See Figure 3.1

The final proposition explains how once a complex intervention becomes embedded it ceases to be a complex intervention and becomes a normal activity. However this requires ongoing investment, not just adoption and diffusion through a system.

- (c) *'The work of integration of a complex intervention requires continuous investment by people in ensembles of action that carry forward in time and space'.*

The four generative mechanisms in proposition (b) are used to apply the theory. These components represent the processes that are important in influencing whether a technology becomes normalised.

The link between the components of NPT is illustrated in Figure 3.1.



Box 1. Model of the components of Normalization Process Theory

Figure 3.1. Model of the components of Normalization Process Theory (Reproduced from May & Finch 2009).<sup>238</sup>

### *Choice of theory and rationale*

NPT was selected to guide the qualitative element of the thesis. It allows exploration of complex interventions in a way the other theories do not, exploring the factors that promote and inhibit the process of using a complex intervention in practice.<sup>237</sup> The importance of theory in understanding more about a complex intervention has already been described.

NPT was derived using qualitative research studies based in the UK NHS<sup>238</sup> and so it is relevant to the English general practice setting. It offers a framework for conducting qualitative studies; it can be used to inform, guide and structure the development of research questions, the research design, sampling and data collection, the coding and analysis of data and the emerging interpretations, conclusions and recommendations.<sup>236</sup>

Theories arising from social psychology (TRA, TPB) consider individuals rather than systems and organisations. They require the beliefs of the health professional to be identified before behaviour can be explained and this can be difficult where different users focus on different outcomes when using the same system.<sup>228</sup>

The TAM has not yet been widely used in a healthcare setting.<sup>224</sup> It focuses on the individual user of a technology and ignores social processes. They do not provide the same level of exploration offered by NPT, which considers both individuals and their collective actions within an organisation.<sup>236-239</sup>

Diffusion theories consider how innovations are transmitted from individual to individual or from setting to setting within a health system<sup>225</sup> rather than giving the system, or the nature of the intervention any influence. If email is thought of as a complex intervention, then diffusion theories are not explanatory enough to explain whether and how they might be implemented.

Thus NPT was applied in this study to guide data collection and in informing the emerging interpretations and conclusions. It enabled creative thought about implementation processes. It allowed for email consultation to be viewed conceptually, aiding in the understanding of email as a complex intervention and allowing for the thesis to assess the viability of email consultation, that is, to understand the potential for normalisation of email.

### **3.4. Chapter summary**

This chapter has outlined how the MRC framework for the development and evaluation of complex interventions was used to guide the structure of the objectives in the thesis. In addressing these objectives, the thesis takes a 'multiple methods' approach. A quantitative method, specifically Cochrane systematic review, was used to identify the empirical evidence base associated with email consultation. A qualitative method, semi-structured interview, was used to explore the experiences and opinions of patients using email consultation, so that an understanding of how email is used could be obtained and this was applied to patient and professional participants. Additionally, a theory, NPT, was chosen to guide the semi-structured interview study, and to aid understanding of the potential for the normalisation of email consultation in the setting of interest. Use of a theory aids the explanation of data arising from a semi-structured interview study, beyond mere description. The complementary perspectives gained in each of the studies (systematic review, patient interview study, professionals interview study) are brought together in chapter 9. The following chapters present the individual studies; chapters 4 & 5 present the systematic review methods and the systematic results and discussion respectively. Chapter 6 presents methods for the qualitative research study, chapter 7 the results and discussion for the patient interview study and chapter 8 the results and discussion for the professional interview study.



## Chapter 4: Systematic review methods

### ***Chapter overview:***

This chapter outlines the methods used in conducting the systematic review. It begins by outlining which thesis objective this review is designed to address. It then outlines the chosen research design; Cochrane systematic review, and the review aim and objectives. The review aim is to assess the extent of the evidence on email for clinical communication between patients/caregivers and health professionals. The methods used to address the aim and objectives are then described, with the methodology split into three main sections; criteria for considering studies for the review, the search methods for the identification of studies, and data collection & analysis. Finally, a chapter summary reiterates the contents of the chapter before the reader moves onto the results and discussion for this study in Chapter 5.

### **4.1 Study objective**

- *Identify the extent of the experimental evidence base concerning email for clinical communication between patient and health professionals.*

### **4.2 Research design**

This was a Cochrane systematic review carried out using the predefined methodology specified by the Cochrane Collaboration.

The review was carried out in conjunction with four co-authors: Prescilla Sawmynaden, Research Assistant; Dr Josip Car, academic supervisor; Professor Azeem Majeed, Head of Department of Primary and Public Health, Imperial College and Professor Aziz Sheikh, University of Edinburgh.

### **4.3 Review aim and objectives**

The review aim was to assess the extent of the evidence on ‘email for clinical communication between patients/caregivers and health professionals.’

The objectives of the review were to assess the effects of health professionals communicating with patients/caregivers via email; when compared to other forms of communicating clinical information, on outcomes for health professionals, patients and carers, health services and harms.

## 4.4 Criteria for considering studies for this review

### 4.4.1 Types of studies

This review included studies that met one of four study designs:

- Randomised controlled trials (RCTs) including both individual and cluster randomisation.
- Quasi-randomised trials.
- Controlled before and after studies (CBA) with at least two intervention and two control sites.
- Interrupted time series (ITS) with at least three time points before and after the intervention.

RCTS and quasi-randomised trials with economic evaluations were also considered.

In the first instance Cochrane systematic reviews consider studies with a randomised controlled trial (RCT) or clinical controlled trial design as these represent the highest level in the hierarchy of evidence. However, a randomised controlled trial design is not always possible or appropriate due to the practical difficulties associated with designing and carrying out a trial of a complex intervention such as email.<sup>240</sup> In such cases, non-randomised trial designs can be included in a Cochrane review, even though this means moving down the hierarchy of evidence away from the 'gold standard' of the RCT.<sup>206</sup>

The choice of study type to be included in the review was aided by guidance from the Cochrane Effective Practice and Organisation of Care Group.<sup>241</sup> This review group are focused on reviews of interventions designed to improve professional practice and the delivery of effective health services. They produce methodological guidance on carrying out reviews of complex interventions.

In line with their guidance, the additional study designs included in this review were quasi-randomised trials, controlled before and after studies (CBA) and interrupted time series (ITS) studies. Quasi-randomised trials and CBAs may be used where it is difficult to randomise and maintain randomisation in a study. ITS studies are valuable where there is a need to assess the ongoing merits of a new technology which may require a 'settling in' period. The design allows for monitoring the effect of organisational change, for instance when introducing an intervention into a specific healthcare setting.

#### **4.4.2 Types of participants**

- All health professionals (e.g. surgeon, nurse, doctor, allied staff).
- All patients and caregivers.

There were no restrictions by age, gender or ethnicity.

Participants originating the email communication, receiving the email communication and copied into the email communication were considered where this was relevant.

#### **4.4.3 Settings**

All healthcare settings were included:

- Primary care settings.
- Outpatients settings.
- Hospital (inpatient) settings.
- Community settings.

Cochrane reviews take an international perspective and so there were no restrictions by country or healthcare system type.

#### **4.4.4 Types of interventions**

##### *Definition of the intervention*

For the purposes of the systematic review it was necessary to define the intervention. This definition is a refined version of that devised for use in the thesis (see chapter 2, page 24), due to the broader remit of the systematic review in relation to geographical area covered and healthcare setting.

Definition for use in the Cochrane systematic review:

***‘Email used for two-way clinical communication between patients/caregivers and health professionals.’***

##### *Similarities with thesis definition*

- Both definitions consider two-way communication via email.

### *Differences from thesis definition*

- The definition used in the Cochrane systematic review specifies that communication should be 'clinical.' The definition for the thesis states that the email should be 'for requesting or providing patient specific information that is not of an administrative nature.'

The term 'clinical' was used because it was less specific than that used in the thesis definition. As the nature of the interventions used in studies of email consultation was not known prior to carrying out the review it was necessary to ensure that the interventions included were not limited by the nature of the definition.

Examples of where email is used to allow patients to communicate their clinical concerns to a health professional and receive a response include (but are not limited to) presenting with a new complaint, asking about a existing complaint, seeking advice or information on a health concern, requesting information on medications, reporting side effects of medications, seeking information or advice on treatments or asking a question relating to general health.

Examples of where email is used to allow health professionals to have clinical communication with patients/caregivers and receive a response include (but are not limited to) requesting clinical information from patients, following up a patient after a consultation, managing long term conditions and providing the patient with information.

- The definition for the Cochrane review specifies communication between patients/caregivers and health professionals rather than patients/caregivers and clinicians.

The thesis is focused on email consultation in English general practice. The term 'clinician' was used to reflect the users of email consultation in the general practice setting; general practitioners and practice nurses. The definition of a clinician as a 'health professional who provides patient care e.g. a doctor, nurse or physiotherapist' was obtained from the UK National Institute for Health and Clinical Excellence (NICE).<sup>242</sup>

The review does not restrict by healthcare setting, and takes a global approach. Thus the term 'health professional' was used to reflect the broader range of professionals that could be involved in email consultation across different settings and locations. Health professional has a broader definition than clinician. The World Health Organisation defines health professionals as those who 'study, advise on or provide preventive, curative, rehabilitative and promotional health services based on an extensive body of theoretical and factual

knowledge in diagnosis and treatment of disease and other health problems. They may conduct research on human disorders and illnesses and ways of treating them, and supervise other workers.' The definition includes generalist medical practitioners, specialist medical practitioners, nursing and midwifery professionals and dentists amongst others.<sup>243</sup>

#### **4.4.5 Exclusions**

- The definition excludes email between administrative staff and patients/caregivers, for example emails related to scheduling appointments or use of email for administrative staff to send out routine test results.
- The definition excludes non-clinical communication between patients/caregivers and health professionals e.g. emails about scheduling an appointment or for obtaining information relating to reimbursement.

Two linked reviews cover elements of these excluded factors: email for communicating the results of diagnostic medical investigations to patients<sup>212</sup> and email for the management of healthcare appointments and attendance reminders.<sup>210</sup>

- Studies that considered the use of email between health professional and patient for multiple purposes, including those purposes outside of the definition of the intervention, were excluded.
- In studies where email was one part of a wider intervention, these were only included where the effects of the email component were individually reported. Where it was not possible to separate the effects of the email from the other elements of the intervention, the study was not included.

#### **4.4.6 Form of email**

Interventions using email in any of the following three forms were included:

1. Unsecured standard email to/from a standard email account.
2. Secure email which is encrypted in transit and sent to/from a standard email account with the appropriate encryption decoding software.
3. Web messaging; whereby the message is entered into a pro-forma which is sent to a specific email account, the address of which is not available to the sender.

### *Connection type*

All methods of connection were considered. Methods of accessing email include broadband via a fixed line, broadband via a wireless connection, connecting to the 3G network and connecting to the WAP network.

### **4.4.7 Comparisons**

The review considered the following comparisons:

- Email communication versus no intervention.
- Email communication versus other modes of communication (including but not limited to face-to-face, postal letters, calls to a landline or mobile telephone, text messaging using a mobile telephone, and, automated versus personal emails).

### **4.4.8 Types of outcome measures**

A number of processes and outcomes may be affected by interventions that aim to enhance and/or facilitate the communication between patients/caregivers and health professionals using email.

Outcomes for this study were devised in collaboration with the Cochrane Consumers and Communication (CCC) Review Group. The review group have a taxonomy of relevant outcomes<sup>244</sup> which guide selection of the outcomes of interest for reviews produced with their group. The outcomes for this review were devised via discussion between review authors (HA, JC) and members of the CCC review group, using the taxonomy as a guide. It was acknowledged that producing outcome measures for an under-researched and disparate field would be difficult, hence the decision to make collective decisions on appropriate outcomes.

### *Primary outcomes*

The primary outcomes of interest was whether the email had been understood and acted upon correctly by the recipient as intended by the sender:

*Health professional* outcomes resulting from whether the email has been understood and acted upon correctly by the recipient as intended by the sender, e.g. professional knowledge and understanding, professional preferences or views, and behaviour, action or performance.

*Patient* outcomes associated with whether email has been understood and acted upon correctly by the recipient as intended by the sender, e.g. patient understanding, patient health status and well-being, patient views (such as anxiety about self-testing) and patient behaviours or actions (such as adherence to treatment advice).

*Health service* outcomes associated with whether email has been understood and acted upon correctly by the recipient as intended by the sender, e.g. rates of treatment adherence.

*Harms* e.g. effects on safety or quality of care such as missed diagnoses, breaches in privacy, technology failures.

### *Secondary outcomes*

The secondary outcomes of interest were whether the email was an appropriate method of communication:

*Professional, patient or caregiver* outcomes associated with whether email was an appropriate mode of communication, e.g. knowledge and understanding, effects on professional-patient or professional-caregiver communication or relationship, evaluations of care (convenience, timeliness, acceptability, and satisfaction).

*Health service* outcomes associated with whether email was an appropriate mode of communication, e.g. use of resources or time, costs, use of medical services, referrals, admissions.

## **4.5 Search methods for identification of studies**

### **4.5.1 Electronic database searches**

The following electronic bibliographic databases were searched:

- Cochrane Consumers and Communication Review Group Specialised Register.
- Cochrane Central Register of Controlled Trials (CENTRAL, *The Cochrane Library*, Issue 1 2010).
- MEDLINE (OVID) (1950 onwards).
- EMBASE (OVID) (1980 onwards).
- CINAHL (1982 onwards).
- ERIC (1965 onwards).
- PsycINFO (OVID) (1967 onwards).

There were no restrictions made by language or date.

As this review was one of a set of five reviews all relating to uses for email in healthcare, a common search strategy was used for all five reviews. This was to prevent excessive duplication of effort in assessing the retrieved articles from what would otherwise be five very similar searches retrieving the same or similar articles.

Search strategies were compiled by John Kis-Rigo, Trials Search Librarian for the CCC Group. John Kis-Rigo has extensive experience of producing search strategies for interventions that examine communication exchange between healthcare providers and healthcare users. Searching for studies relating to email can be problematic since an email address is attached to the abstract of most studies in the form of contact details for the corresponding author. The term email is also commonly used in studies that do not concern email as an intervention. Another issue is that of terminology. Terms relating to the internet and email are variable. Email can be written as e-mail, email or electronic mail. There are also different systems for email and these also use different terms, for instance; web messaging, patient portal and web portal amongst others.

The search strategies were refined and checked on several occasions before the search was carried out. Initially the search strategy devised for searching MEDLINE, EMBASE and PsycINFO via the OVID database included the terms 'online' and 'on-line.' The term 'on-line' had to be dropped as it retrieved any record containing the word 'line.' This was due to a major change in the database, previously in OVID there were no 'stopwords.' Stopwords are prepositions such as 'on' and these are ignored by many databases. However a change in the database meant that 'on' became a stopword and the database searched only for the term 'line', retrieving many more records than intended and many were irrelevant. John Kis-Rigo was able to confirm with OVID that this change had occurred and this prevented the retrieval of many irrelevant records.

The detailed search strategies for the electronic database searches can be found in the appendix, pages 345-348.

#### **4.5.2 Grey literature**

The grey literature was searched via theses and dissertation repositories, trials registers and Google Scholar.



The following sources were searched:

- Australasian Digital Theses Program: <http://adt.caul.edu.au/> (the Cochrane review group are based in Australia).
- Networked Digital Library of Theses and Dissertations: <http://www.ndltd.org>.
- UMI ProQuest Digital Dissertations: <http://wwwlib.umi.com/dissertations>.
- Index to Theses: <http://www.theses.com/> (Great Britain and Ireland).
- Clinical trials register: ([Clinicaltrials.gov](http://Clinicaltrials.gov)).
- WHO Clinical Trial Search Portal: ([www.who.int/trialsearch](http://www.who.int/trialsearch)).
- Current Controlled Trials: ([www.controlled-trials.com](http://www.controlled-trials.com)).
- Google Scholar: <http://scholar.google.co.uk>.

Databases were searched from their start date and there were no limitations by language.

Grey literature sources do not permit the same detailed searches possible in electronic databases. They tend to allow for short and simplified searches. For this review the researcher (HA) devised a series of simple search strategies for searching the grey literature. These are located in the appendix, page 349. The only exception was for UMI ProQuest Digital Dissertations. The CCC Review Group use formal documented strategies for this database and so John Kis-Rigo produced a strategy for use in searching this database. This can also be found in the appendix, page 350. Again a common strategy was used for all five reviews.

Online trials registers were searched for ongoing and recently completed studies and where it was unclear what the status of a registered trial was, an attempt was made to contact the person making the entry on the register to determine the status.

#### **4.5.3 Reference lists**

The reference lists of retrieved relevant studies were examined. This is known as snowballing because the reference list of an included study may lead to a potentially relevant study, the reference list of which is then checked and further useful studies may be identified. This technique provides a more comprehensive search than is offered by just searching electronic databases.<sup>245</sup>

#### **4.5.4 Correspondence**

Where it was possible the authors of all included studies were contacted via email and asked if they knew of any further studies or unpublished data. Many of the authors of included

studies were also regarded as experts in the field. It was possible to obtain contact with five authors. Three authors could not suggest any studies. One author suggested two studies and these have already been identified and included. Another author suggested nine possible studies; two had already been identified and included, one had been identified and excluded for not meeting the inclusion criteria. The remaining six studies did not have eligible study designs.

## **4.6 Data collection and analysis**

Data was organised and the review prepared using Review Manager software.<sup>246</sup> The software is provided by the Cochrane Collaboration for the purposes of preparing and maintaining Cochrane reviews.

### **4.6.1 Selection of studies**

Two review authors (Helen Atherton and Prescilla Sawmynaden) independently assessed the potential relevance of all titles and abstracts identified from electronic searches. Full text copies were retrieved of all articles judged to be potentially relevant. The full text articles were then split according to which of the five reviews they related to. Both HA and PS independently assessed these retrieved articles for inclusion in each review. Where HA and PS could not reach consensus a third author, the academic supervisor Josip Car, examined these articles.

During a meeting of all review authors, the final list of included and excluded studies was verified. Any disagreements about particular studies were resolved by discussion. Where the description of a study was insufficiently detailed to allow the review authors to judge whether it met the review's inclusion criteria, the authors were contacted to obtain more detailed information to allow a final judgement regarding inclusion or exclusion. Detailed records of these communications have been retained.

### **4.6.2 Data extraction and management**

A data extraction template was used to extract data from all included studies. The template was derived from a standard form provided by the CCC Review Group.<sup>244</sup> The standard form was piloted on two included studies by HA and PS to allow for unforeseen variations. Some minor changes were made to the template as a result of this pilot. The amended data extraction template as used can be found in the appendix, page 351.

For every included study both HA and PS independently performed the data extraction. Any discrepancies between the review authors' data extraction sheets were discussed and resolved by HA and PS. Where necessary, JC was asked to resolve discrepancies.

The following data were extracted:

- *General information:* Title, authors, source, publication status, date published, language, review author information, date reviewed.
- *Details of study:* Aim of intervention and study, study design, location and details of setting, methods of recruitment of participants, inclusion/exclusion criteria, ethical approval and informed consent, consumer involvement.
- *Assessment of study quality:* Key features of allocation, contemporaneous data collection for intervention and control groups; and for interrupted time series, number of data points collected before and after the intervention, follow-up of participants.
- *Risk of bias:* an assessment of the risk of bias was carried out using a framework adapted from the Cochrane Collaboration's tool for assessing risk of bias, found in the Cochrane Handbook and detailed below.<sup>245</sup>
- *Participants:* Description, geographical location, setting, number screened, number randomised, number completing the study, age, gender, ethnicity, socio-economic grouping and other baseline characteristics, health problem, diagnosis, treatment.
- *Health service:* description, geographical location, setting, age, gender, population served, medical setting and clinical context of patients.
- *Intervention:* Description of the intervention and control including rationale for intervention versus the comparator. Delivery of the intervention including email type (standard unsecured email, secure email, web portal or hybrid). Type of clinical information communicated. Content of communication (e.g. text, image). Purpose of communication (e.g. obtaining information, providing information). Communication protocols in place. Who delivers the intervention. How consumers of interventions are identified. Sender of first communication (professional, patient and/or caregiver). Recipients of first communication (professional, patient and/or caregiver). Whether communication is responded to (content, frequency, method of media). Any co-interventions included. Duration of intervention. Quality of intervention. Follow up period and rationale for chosen period.
- *Outcomes:* principal and secondary outcomes, methods for measuring outcomes, methods of follow-up, tools used to measure outcomes, whether the outcome is validated.

- *Results*: for outcomes and timing of outcome assessment, control and intervention groups where applicable.

#### **4.6.3 Assessment of risk of bias in included studies**

Two review authors, HA and PS, independently assessed risk of bias in included studies. The assessments were then compared, with any disagreements resolved by discussion and consensus, and by consulting a third author, JC, where necessary.

The following criteria for assessing the risk of bias were used. These are in accordance with the guidelines of the Cochrane Collaboration's tool for assessing risk of bias, found in the Cochrane Handbook of Systematic Reviews.<sup>245</sup>

- Sequence generation.
- Allocation concealment.
- Blinding (participants, personnel, outcomes assessors, data analysers).
- Intention-to-treat analysis.
- Incomplete outcome data.
- Selective outcome reporting.

Other possible sources of bias and indicators of study quality were also assessed, in accordance with the guidelines of the CCC Review Group.<sup>247</sup>

Other bias:

- Baseline comparability of groups.
- Protection against contamination between groups.
- Other possible sources of bias.
- Validation of outcome assessment tools.
- Reliability of outcome measures.

A judgement was assigned relating to the risk of bias for each item. A template (within the wider data extraction template) was used to guide the assessment of risk of bias. It was necessary to judge each item as 'yes' (indicating a low risk of bias), 'no' (indicating a high risk of bias) or 'unclear' (indicating an uncertain risk of bias).

The risk of bias in each study was illustrated using a risk of bias summary figure and a risk of bias graph. The assessment of risk of bias is also incorporated into the review through descriptive commentary about each of the criteria.

This leads to an overall assessment of the risk of bias across the included studies and a judgement about the possible effects of bias on the effect sizes of the included studies.

Blinding, incomplete outcome data and selective outcome reporting were assessed for each main outcome. Therefore an assessment of these domains was made on more than one outcome for some studies. Where the outcomes had different judgements the domain presented in the figures was 'at risk of bias' if one or more outcome was given a 'no' rating. However an explanation of the differing risks of bias between outcomes was outlined in the descriptive commentary.

For the cluster randomised trials the following checklist from the Cochrane Handbook for Systematic Reviews of Interventions was used to aid assessment of risk of bias.<sup>245</sup> This allowed the assessment to take into consideration factors that affect these types of trials.

- Recruitment bias.
- Baseline imbalance.
- Loss of clusters.
- Incorrect analysis (not accounting for the clustering).
- Comparability with individually randomised trials.

Study authors were contacted where necessary for additional information and clarification of the study methods. Where the risk of bias could not be determined for a domain and the relevant information was not available from the authors that domain was classed as 'unclear.'

#### **4.6.4 Measures of treatment effect**

Ordinarily in a Cochrane systematic review the outcomes of included studies are reported in a standard way; continuous data is reported as a mean difference and confidence interval and dichotomous data as an odds ratio/risk ratio and confidence interval. This means that data can then be combined in a meta-analysis where appropriate.<sup>245</sup> This approach to dealing with the data was outlined in the published protocol for the Cochrane review,<sup>209</sup> and is described in the appendix, page 259. However it became clear as the review was carried out that a different approach to dealing with the measures of treatment effect would need to be taken.

Standardisation of data is only possible where outcomes have been measured and reported in a standard way across studies and this was not the case for the included studies in this

review. Not all of the studies had outcomes that fell under the primary outcomes for the review. Many had missing data, selectively presented data or flawed study designs that affected the data and how it was presented.

In the first instance an attempt was made to standardise the data under each outcome. There was no single outcome for which it was possible to standardise all data for that outcome. This was because some measures for an outcome had used a dichotomous approach and others a continuous approach, both within studies and between studies. Some outcomes had measures that it was possible to standardise because the data was not complete (even after author contact) or because it was presented non-parametrically. Some outcomes only had one measure and so even if they could be standardised this was not useful.

Further steps were taken to obtain missing data from authors and where this was not possible an attempt was made to calculate missing data. This mostly involved calculating standard deviations using P values and confidence intervals, so that a standardised mean difference could be produced for continuous data. Standard deviations were calculated using a template in Microsoft Excel, the template was provided by Toby Lasserson at the Cochrane Editorial Unit. A departmental statistician was also consulted. Even after taking these steps to address missing data there were no outcomes where all of the measures could be standardised.

After deliberation with co-authors PS and JC and consultation with the review group it was decided that data from each included study would be used as per the study report (values for intervention, control and any relevant between-group comparison test). It was felt that using both standardised data (where possible) and non-standardised data mixed together under an outcome would be confusing for the reader and may introduce bias in how the results were presented and interpreted, perhaps favouring the standardised data.

A discussion of the approach taken can be found in chapter 5, results & discussion.

#### ***4.6.5 Dealing with missing data***

Where data were missing from the relevant comparisons the authors of the studies were contacted to obtain the information. All authors were contacted successfully. Studies with outcome data missing even after contact with authors are described in the results section.

#### **4.6.6 Assessment of heterogeneity**

Heterogeneity is any kind of variability occurring among studies in a systematic review. There are different types of heterogeneity.<sup>245</sup>

- Clinical heterogeneity: variability in the participants, interventions and outcomes studied.
- Methodological heterogeneity: variability in study design and risk of bias.
- Statistical heterogeneity: variability in the intervention effects being evaluated in the different studies.

Statistical heterogeneity is a consequence of clinical or methodological heterogeneity and leads to the observed intervention effects being more different from each other than would be expected due to random chance.

Clinical and methodological heterogeneity can be assessed by comparing the included studies according to participants, interventions, outcomes and study designs and by assessing the risk of bias. As these factors impact on statistical heterogeneity this should also be assessed. However it is only possible to do so where data are standardised and combined in a meta-analysis. As this was not possible statistical heterogeneity could not be assessed. At the protocol stage a strategy for assessing statistical heterogeneity was described<sup>209</sup> and this is outlined in the appendix, page 357. Clinical and methodological heterogeneity and their impact on the review were described in the results.

#### **4.6.7 Assessment of reporting biases**

Reporting bias occurs when the nature of the results impacts on whether they are disseminated. For instance, studies with statistically significant results are more likely to be published than those with negative findings. In the context of a systematic review, studies with negative results are just as important in answering the research question as those with positive results. Other types of bias may include delayed publication of results where findings are controversial, and outcome reporting bias, where outcomes are selectively reported because of their nature.

It is standard practice when conducting a Cochrane systematic review to both try to avoid, and detect reporting biases.<sup>245</sup>

In this review, measures were taken to avoid reporting biases. These included searching the grey literature, in particular trials registries. This allows for identification of trials that have

been registered and then not subsequently published. It also allowed for abstracts presented at conferences to be identified and then it could be determined whether the research was subsequently published. Assessment of the risk of bias allowed the assessment of outcome reporting bias. Where necessary, authors could be contacted to clarify whether research had been published, or whether there had been selective outcome reporting in a study.

Funnel plots can be used to detect publication bias.<sup>245</sup> These can only be produced where data has been standardised and pooled. As this was not the case it was not possible to do so in this review. A strategy for detecting publication bias using funnel plots was outlined in the protocol for the review<sup>209</sup> and this is outlined in the appendix, page 357.

#### **4.6.8 Data synthesis**

Ordinarily where data can be standardised it can then be pooled in a meta-analysis. A strategy for doing this in the review was outlined in the published protocol for the Cochrane review<sup>209</sup> and is outlined in the appendix, page 357. However it was not possible to conduct a meta-analysis on the data in the included studies. As already described, the data could not be standardised.

As well as the issue surrounding the standardisation of data, there were concerns about clinical and methodological heterogeneity of the included studies. As well as differences between the studies in the participants and interventions, the measures used under each outcome were very different and each study collected and presented their data very differently.

The measures of effect were used as per the study reports. It was decided to present this data in tables, split by comparison and outcome, and to present it in the text, also split by comparison and outcome.

- Comparison
  - Primary outcome
    - Measure A
    - Measure B
    - Measure C
- Comparison
  - Secondary outcome
    - Measure A
    - Measure B



This was the most straightforward way to deal with the varied data. It also ensured that the measures for each outcome were presented consistently. It was also felt that the reader would need to view the data in conjunction with the information on risk of bias and study quality in order to make a judgement on its worth and this way of presenting the data provided a way for this information to be clearly linked.

#### ***4.6.9 Other factors relating to data synthesis***

Where it is possible to pool the data from included studies in a meta-analysis it is usual to examine the effect of certain variables on the pooled effects of the intervention. This is a subgroup analysis, for instance examining the data according to age groups. Sensitivity analysis is a way to examine pooled data in relation to quality. Studies deemed to be of lower quality are removed from the analysis to examine the effect on the pooled effects of the intervention. This also takes into account the assessment of risk of bias in the included studies.

Both subgroup analysis and sensitivity analysis were considered in the design of the review and the outline of how these would have been applied should the data be pooled as published in the protocol<sup>209</sup> and is outlined in the appendix, page 357.

#### ***4.6.10 Summary of findings table***

Cochrane reviews recommend that a summary of findings table is produced containing key information concerning the quality of evidence, magnitude of effect of the interventions examined (where relevant) and the sum of available data on all important outcomes for a given comparison.<sup>245</sup>

Summary of findings (SoF) tables for this review were produced using GRADEpro software.<sup>248</sup> GRADEpro software is produced by the Grades of Recommendation, Assessment, Development, and Evaluation (GRADE) Working Group.<sup>249</sup> The GRADE working group have developed a system for rating the quality of evidence and determining the strength of recommendations in guidelines and reviews.<sup>250</sup> 'GRADE offers a transparent and structured process for developing and presenting summaries of evidence, including their quality, for systematic reviews.'<sup>251</sup>

The GRADE approach to assessing the quality of the evidence involves categorising each outcome according to one of four levels of quality: very low, low, moderate and high. The approach defines the quality of evidence as the extent to which we can be confident that an

estimate of effect or association is close to the true effect. Randomised controlled trials are initially regarded as high quality evidence. They are then assessed according to five factors and the quality of the evidence can be downgraded according to any of these five factors.<sup>245</sup> These five factors are:

- Limitations in design and implementation of available studies.
- Indirectness of evidence (e.g. studies addressing a restricted population).
- Unexplained heterogeneity or inconsistency of results.
- Imprecision of results (wide confidence intervals).
- High probability of publication bias.

GRADEpro software allows for a ranking to be entered for each of these factors: 'no', 'serious' (downgrade one level) or 'very serious' (downgrade two levels). For publication bias it requires the selection of 'unlikely,' 'likely' (downgrade one level) or 'very likely' (downgrade two levels).<sup>248</sup> The software is then able to produce a cumulative level of quality for that outcome based on the ratings.

In order to rate each outcome according to quality two authors (HA and PS) each independently rated the outcomes according to the five factors using guidance from the Cochrane Handbook of Systematic Reviews and the guidance provided by the GRADE working group.<sup>245;249</sup> Where ratings differed these were discussed until consensus was reached. Where consensus could not be reached a third author, JC, was consulted. The finalised ratings were then entered into the GRADEpro software.

A typical SoF table produced in GRADEpro software contains a list of all important outcomes (usually primary outcomes per the review), a measure of the typical burden of these outcomes, the absolute and relative magnitude of effect (either/or), the number of participants and studies addressing these outcomes and a GRADE score for the overall quality of evidence for each outcome (rather than by study).<sup>245</sup> For the purposes of this review it was necessary to adapt the table to account for the lack of data pooling in the review. Although there was a lack of numerical data the summary of findings table was still a useful tool in summarising the findings of the review for the reader, and allowing for the quality of the outcomes to be assessed using the GRADE quality of the evidence framework.

Assistance in designing and producing the SoF table was provided by Toby Lasserson, Senior Editor at the Cochrane Editorial Unit. The table was designed to contain the following:

- Each primary outcome (patient outcomes, health professional outcomes, health service outcomes and harms).
- Corresponding number of participants and studies.
- Quality of the evidence (GRADE score).
- Impact (via brief narrative summary).

The use of an impact statement for each outcome was to summarise the evidence available in the absence of statistical pooling. This statement was based on the measures of effect as per the study reports. Where the outcome had not been measured by any study in the review this was stated here.

The tables were produced in GRADEpro software, transferred into review manager and then edited accordingly. This involved removing the columns for the measure of the typical burden of the outcomes and the absolute and relative magnitude of effect as these were empty, and replacing them with a single column for the 'impact' part of the table. It was necessary to prepare the table in GRADEpro software to allow the GRADE score for the quality of the evidence to be produced.

The SoF tables produced serve to summarise the findings of the whole review together in an understandable format.

#### **4.7 Chapter summary**

The methodology for this review follows the Cochrane collaboration methodological framework. The review aimed to assess the extent of the evidence on email for clinical communication between patients/caregivers and health professionals. The criteria used in considering studies for the review outlined the type of studies, settings and participants that were considered. The type of interventions included was also outlined and this had involved production of a definition of the intervention. This differed from the definition of email consultation used in the thesis and this was due to the broader remit of the systematic review as compared to the thesis as a whole, in relation to geographical area covered and healthcare setting. The other criteria outlined in this section were the exclusion criteria, the comparisons of interest, the form of email and type of connection. Finally the type of outcomes to be included were described.

Next, the search methods for identification of studies were outlined and this involved devising search strategies to search the main medical databases as well as other electronic databases, and the grey literature. To ensure the breadth of the search reference lists of any

relevant studies were checked for potentially useful articles, and authors of the included studies were contacted to ask if they knew of any studies that may be of relevance to the review.

Finally the methods used in data collection and analysis were outlined. Data collection involved selecting the included studies from the articles retrieved in the search, and then extracting the data from these studies. Once the data was extracted an assessment could be made of the risk of bias in the included studies and this was done according to Cochrane Collaboration criteria. Data analysis in a systematic review would ideally involve standardising the data from included studies and pooling this in a meta-analysis, according to the outcomes of interest. Unfortunately this was not possible in this review. The data in the studies was too scant, and could not be standardised due to issues with reporting and quality. Instead an alternative approach was taken and this involved presenting data as per the included studies, split according to the outcomes that were of interest to the review. The results of the review, and subsequent discussion, which examines the decision to present the data in this way, are in the next chapter (Chapter 5).

## Chapter 5: Systematic review results & discussion

### *Chapter overview*

The chapter begins with a description of the studies in the review; the results of the search, excluded and ongoing studies and then a description of the characteristics of the included studies. Then the risk of bias in the included studies is described, and illustrated using figures. After these two sections other factors of interest relating to the included studies are described, these include methodological problems with the included studies (problems not covered by the risk of bias assessment) and information on unobtainable missing data. The effects of interventions are presented according to the two comparisons identified in the review; email as an additional method of consultation in addition to standard methods, and email compared to the telephone for delivery of counselling. As it was not possible to pool the data in a meta-analysis the results of the studies as per the published reports are described here under the outcomes of interest (this approach was outlined in chapter 4, methods). Finally a summary of the GRADE score for each outcome under the comparisons of interest is presented.

The discussion section begins with a summary of the results of the review, followed by discussion on the quality of the evidence. This covers the risk of bias, trial conduct and GRADE score, completeness of the evidence, applicability of the evidence and the linked systematic reviews carried out by the PhD candidate. A comparison with other relevant studies is presented, to place the review in the context of other similar reviews. Next the strengths and limitations of the review itself are discussed, including the approach taken to presenting the non-standardised data. This is followed by wider methodological considerations around systematic reviews and finally, the implications of the review and its impact on future research are outlined.

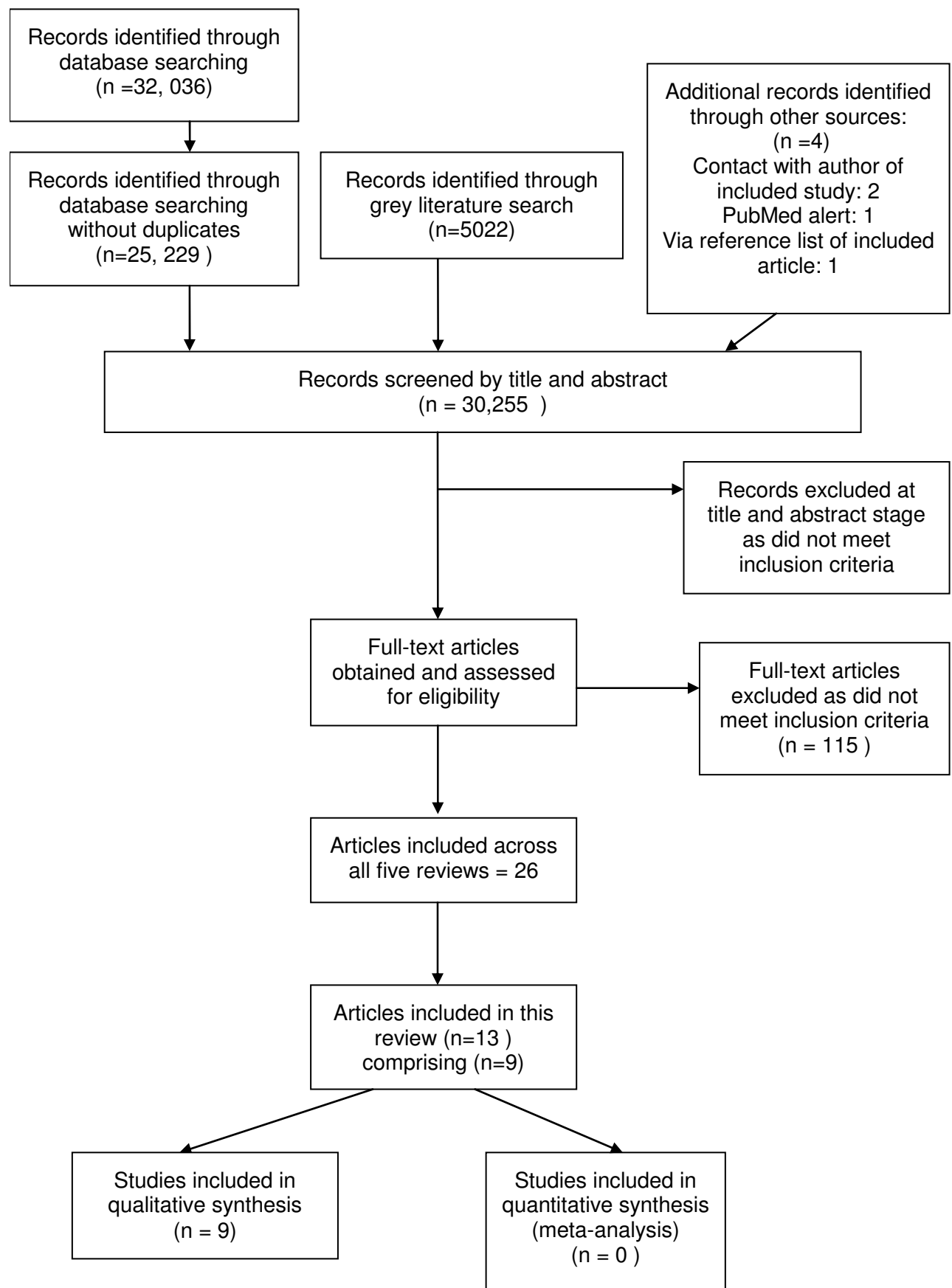
## Results

### 5.1 Results of the search

A total of 13 articles comprising 9 studies were identified. Figure 1 illustrates how the nine included studies were selected. One study was represented by one thesis and three published journal articles.<sup>127;252-254</sup> and another study was represented by one published journal article and one published abstract.<sup>131;255</sup> The remaining seven studies were represented by individual published journal articles.<sup>130;256-261</sup> Of the nine studies; several

were by the same authors or group of authors; Katz 2003 & Katz 2004,<sup>130;131</sup> Bergmo 2009 & Kummervold 2004,<sup>253;256</sup> and Lin 2005 & Ross 2004<sup>258;260</sup> all shared authors.

**Figure 5.1. Flowchart illustrating selection of studies for inclusion in the review**



## **5.2 Excluded studies**

Eleven studies were deemed potentially relevant to this review and then subsequently excluded upon further inspection (see Table 5.1, appendix page 362).

Six were multi-faceted interventions with an email component and the effects of email were not individually reported.<sup>262-267</sup> Two studies featured two-way communication for administrative rather than for clinical communication.<sup>268;269</sup> One study compared two interventions with differing frequencies of email support and these assessed the frequency of emails sent rather than the email itself.<sup>270</sup> Two studies had an inappropriate study design; one was a controlled before and after study, but with only one intervention and one control site<sup>271</sup> and the other had an intervention and a control group, but the groups were not randomly allocated.<sup>178</sup>

## **5.3 Ongoing studies**

One ongoing study of potential relevance to the review was identified. The detail of this study can be found in Table 5.2, appendix page 363. Once the study is completed further information can be obtained to assess eligibility for inclusion in any future updates of the systematic review.

## **5.4 Included studies**

Descriptions of the main features of each included study are outlined here, with description of study design, sample sizes, setting, participants, access to email, intervention purpose and type, comparator, communication protocol and outcomes. A full description of the characteristics of each study is provided in the characteristics of included studies table (see Table 5.3, appendix page 364).

### **5.4.1 Study design**

All of the included studies were randomised controlled trials (RCTs). However not all authors described their studies as such despite the studies meeting the criteria for this type of study. Digenio 2009<sup>257</sup> was described as a 'randomised 6 month open label study,' 'open label' because all participants were aware that they were receiving a weight loss drug. MacKinnon 1995<sup>259</sup> was described as a pre-test-post-test control group design with random assignment. Stalberg 2008<sup>261</sup> was described as a 'prospective randomised controlled clinical trial'.



Two studies of the nine included studies met criteria<sup>272</sup> for being cluster randomised trials (cRCTs).<sup>130;131</sup> The studies were described in the published reports as randomised controlled trials, and were analysed by the authors as parallel group randomised controlled trials. However contact with an author (an author in both studies) revealed that the method of randomisation used involved randomising individuals in groups to avoid contamination, which is a key characteristic of cRCTs.<sup>273</sup> For the purposes of the review they were classified as cRCTs.

#### **5.4.2 Sample sizes**

Three studies used power calculations.<sup>257;258;260</sup> Two used post-hoc power calculations<sup>130;131</sup> and four studies did not use a power calculation.<sup>253;256;259;261</sup>

Of the three studies using power calculations one was adequately powered.<sup>257</sup> Digenio 2009 required a minimum of 49 completers per group and this was achieved. However the sample size calculation assumed a common standard deviation (SD) of 2.6% for average percent change in body weight at 6 months and SD was not presented for this outcome and was not available from the author so it was not possible to tell if this was achieved.

Two studies were underpowered to assess the primary outcome because of their small sample sizes.<sup>258;260</sup> For the purposes of this review only the secondary outcomes in these studies are of interest.

The two cRCTs<sup>130;131</sup> calculated post-hoc power calculations and state that the study sample size may have had limited power to detect intervention effects. In a cRCT the sample size calculation has to take into account any between-cluster variation. It is presumed that the sample sizes were calculated as though these studies were parallel randomised controlled trials, without any adjustment for the cluster design. The uncertainty about how these post-hoc calculations were made mean it is not possible to draw any conclusions about sample size and power in these two studies.

Of the four studies that did not use a power calculation, one, Bergmo 2009<sup>256</sup> used an alternative method to determine sample size, they used a 'practical' approach to calculating sample size, deciding on a target of 100 participants as being the most they could expect to recruit in the study period. Despite almost reaching the projected sample size (98) the study did not have adequate statistical power to reject the null hypothesis.

Of the other three studies not using a power calculation,<sup>253;259;261</sup> MacKinnon 1995<sup>259</sup> had a very small sample size (16 participants) and as a consequence the authors presented results descriptively with no analysis. Kummervold 2004<sup>253</sup> stated that there was a risk of type II error due to a lack of power caused by the sample size being too small. Stalberg 2008<sup>261</sup> did not mention sample size or the power of the study anywhere in their report.

#### **5.4.3 Setting**

All studies were conducted in high income countries. Five studies were set in the US.<sup>130;131;257;258;260</sup> Two studies were set in Norway,<sup>253;256</sup> one was set in Canada<sup>259</sup> and one in Australia.<sup>261</sup> Studies were conducted in a variety of healthcare settings across primary, secondary and tertiary care, and in the community.

##### *Primary care*

Three studies were set in primary care settings; Katz 2003<sup>25</sup> and Katz 2004<sup>21</sup> in primary care clinics affiliated with the University of Michigan and Kummervold 2004<sup>253</sup> in a group general practice with a city office and two district practices.

##### *Secondary and tertiary care*

Three studies were set in secondary care, specifically in outpatient settings. Bergmo 2009<sup>256</sup> was set in a paediatric and dermatology outpatient clinic in a secondary care hospital, Lin 2005<sup>258</sup> was set in an ambulatory internal medical practice affiliated with the University of Colorado Hospital. Ross 2004<sup>260</sup> was also set at the University of Colorado Hospital in a speciality outpatient clinic for heart failure. Stalberg 2008<sup>261</sup> was set in tertiary care, specifically a peri-operative surgical setting for head and neck surgery at a tertiary referral centre.

##### *Community and other care*

MacKinnon 1995<sup>259</sup> was set in a rehabilitation centre providing an augmentative communication service for children/young adults with physical disability. Finally, Digenio 2009<sup>257</sup> was set in 12 research centres comprised mostly of non-academic independent clinics. This setting was different to the others in that it was a research focused healthcare setting, rather than a conventional healthcare setting.

#### **5.4.4 Participants**

Participants in all studies were adults with the exception of MacKinnon 1995.<sup>259</sup> This was a study where the participants were children and young adults with physical disabilities. The children and young adults were already clients of the augmentative communication service. Participants ranged from 7 - 25 years of age. They were suffering from a range of physical disabilities, though the majority suffered from cerebral palsy (12 of 16 participants). In Bergmo 2009<sup>256</sup> participants were the parents (caregivers) of the children attending the paediatric dermatology clinic and the intervention was aimed at the parent, however the outcomes considered were parental behaviour and child health status.

Four studies included adult patient participants.<sup>257;258;260;261</sup> In Digenio 2009<sup>257</sup> participants had to be aged 25-60 years and have a body mass index of between 30 and 40. In Lin 2005<sup>26</sup> and Ross 2004<sup>260</sup> patients had to be at least 18 years old, English speaking and attending the clinic. In Ross 2004<sup>260</sup> health professionals were excluded from the patient sample as they were deemed to not be typical users of the intervention.<sup>260</sup> In Stalberg 2008<sup>261</sup> participants were those referred for thyroid or parathyroid surgery and aged 18-65. In Kummervold 2004<sup>253</sup> participants were patients at the general practice.

In the remaining two studies the adult participants were physicians.<sup>130;131</sup> The physicians included a mixture of staff and resident physicians<sup>131</sup> and faculty and resident physicians in primary care<sup>130</sup> split into groups according to their designated half-day clinic sessions.

Sample sizes in the studies ranged from n=16<sup>259</sup> to n= 606 participants.<sup>258</sup>

#### **5.4.5 Access to email**

Six studies specified participants should have a certain level of Internet or email access.<sup>253;257-261</sup> Specifications included having access to the Internet and email<sup>257</sup> having access to the Internet and a personal cell phone<sup>253</sup> and having both home and work access to the Internet.<sup>261</sup> In MacKinnon 1995<sup>259</sup> participants in the intervention group were provided with the equipment necessary to use the email service. This was because the study was carried out in the early 1990's and the use of the Internet and email was not widespread at that time. For two studies patients had to have experience of using an Internet browser.<sup>258;260</sup>

#### **5.4.6 Interventions: purpose and type of email**

Each study featured a different type of intervention. Here the details of each intervention including the purpose of the intervention and the type of email used in the intervention are outlined.

Five studies used some form of web-messaging as their intervention.<sup>130;253;256;258;260</sup> In the remaining four studies the type of email was not specified, but in two of the studies<sup>257;261</sup> it was presumed to be standard email because of the nature of the intervention described.

Bergmo 2009<sup>256</sup> introduced a secure messaging system allowing parents of children to contact a dermatological specialist with a written description of the child's condition along with the option to attach photos of the eczema area. Parents received a reply containing treatment advice. This was the only study to utilise images. Participants were required to log in with a user name and password over an encrypted connection. Log-in was two-phased with a one-time password sent to the participant's cell phone valid for 10 minutes. This procedure was repeated for sending/retrieving messages. Participants were provided with software and a digital camera (where they did not already own one).

Three studies set in primary care examined interventions for messages with a general content (general enquiries, test results, information etc). Katz 2004<sup>130</sup> trialled a secure web-based patient provider tool, which allowed patients to communicate with clinic staff. The patient-provider tool took the form of a website with messaging function.

Kummervold 2004<sup>253</sup> used a system called 'PatientLink', an electronic messaging system for sending unstructured messages between doctors and patients. Patients used a web browser to log in and send messages to the doctor. As in Bergmo 2009, participants were required to log in with a user name and password over an encrypted connection. Log-in was two-phased with a one-time password sent to the participant's cell phone valid for 10 minutes. This procedure was repeated for sending/retrieving messages. PatientLink carried messages securely through the health network firewalls. Doctors were alerted to new messages using a flashing icon on the computer desktop and patients were notified by text message when they received a reply to their request.

Katz 2003<sup>131</sup> trialled an intervention known as EMAIL (Electronic messaging, advice and information link). It is not clear what type of email is used in the EMAIL intervention other than it being described as an 'email interface' between patients and the health system mediated by triage nurses. A nurse navigator routed messages to appropriate staff.

Physicians received copies of all messages, but responded only to those requiring physician input.

Two studies featured multi-faceted interventions and for the purposes of this review the outcomes relating to electronic messaging were of interest. My Doctor's Office, a patient portal, was trialled by Lin 2005.<sup>258</sup> This intervention allowed patients in the ambulatory internal medicine setting to request appointments, prescription refills and, specialist referrals and send secure electronic messages to their physicians. Patients were asked to register a username and password for access to the portal. Clinical messages were sent directly to the physician, who could send an electronic response to the patient or forward the message with instructions to clinic nurses. Ross 2004<sup>260</sup> trialled SPPARO (System providing patients access to records online). There were three components to SPPARO; access to the medical record, an educational guide and an electronic messaging system. The messaging system allowed patients to exchange secure messages with nursing staff in the speciality heart failure clinic. It was a secure Web interface with secure socket layer 128 bit encryption for all message transactions. All participants were given user identification and a password.

Both MacKinnon 1995 and Stalberg 2008 asked patients in the intervention group to use email as their first line of contact with their health professional. In MacKinnon 1995 participants were asked to make all of their contacts to the augmentative communication service by electronic mail. All emails were sent via the disability information service of Canada telecommunications system and described as electronic mail. The exact type of email is unknown because of the age of the study and subsequent changes in technology. In Stalberg 2008 participants were given an information sheet relating to their surgery with the surgeon's email address as the top listed method of communication, and were informed by their surgeon that email was the preferred mode of communication. The study did not specify the type of email used but it is presumed that it was standard email.

Digenio 2009 administered a lifestyle modification programme. Participants received weekly dietician contact via email during the first three months of the study and every other week during the following three months. This study also did not specify the type of email used, but it is presumed that it was standard email.

### **5.4.7 Comparator**

- *Email as an additional method of communication compared to standard methods of communication.*

Five studies compared the intervention as being additional to usual care for patients, usual care being the standard methods of communication offered in these settings.<sup>253;258-261</sup>

Stalberg 2008<sup>261</sup> gave control group participants the same typed sheet as the intervention participants but without the email address or information on how email should be the first line of contact. Lin 2005<sup>258</sup> gave participants in the control group access to a website providing general health advice. This comparator was classed as standard communication methods, despite the access to a website, as websites providing general health advice are widely available to patients in usual circumstances.

In the two studies with physician participants<sup>130;131</sup> the comparator was standard practice, the control group physicians did not have access to the intervention and continued to practice as usual.

- *Email compared to telephone for delivery of counselling*

Digenio 2009<sup>257</sup> was multi-interventional with five arms, and did not have a control group. The group of interest was high frequency email counselling. Of the other four arms of the study (high frequency face-to-face counselling, low frequency face-to-face counselling, high frequency telephone counselling and lifestyle modification information with self care), high frequency telephone counselling was chosen as the comparator for the purpose of this review. Telephone is one of the specified comparators in this review, and in the context of the study provided the most appropriate comparison. It offered a direct comparison with the email arm because the intervention was conducted in exactly the same way except for the medium of communication.

### **5.4.8 Communication protocol**

Five studies had some sort of protocol around how the intervention should and would be used.<sup>130;131;253;256;258</sup> This took the form of informal guidance and did not constitute a formal part of the trial. Three studies did not have any communication protocol at all according to the published reports.<sup>259-261</sup>

Bergmo 2009<sup>256</sup> placed no restrictions on the number of messages each family could send during the 1-year trial period and parents were informed that the specialist would respond within 24 hours or during the next working day. Katz 2003<sup>131</sup> asked patients to follow specific guidelines when emailing their physicians. The secure website in Katz 2004<sup>130</sup> contained educational content addressing appropriate message content, expected response times and message handling by clinic staff. Patients were prompted through regular email to enter the web site to read responses from the staff.

Participants in Kummervold 2004<sup>253</sup> using the PasientLink system were free to decide the content, the length, the number of messages and the time of day that they wished to send messages, however they were told not to use it for acute problems. They were informed that the General Practitioner was set a 3-day response reply deadline. Participants in Lin 2005<sup>258</sup> using 'My Doctor's Office' were warned in advance not to send urgent messages. Upon entry to the portal it stated that responses may take up to two business days.

#### **5.4.9 Outcomes**

The outcomes in each study are presented as per the outcomes of interest for the review. These do not necessarily match the primary/secondary outcomes as specified in the individual studies.

Five studies did not outline what their primary outcomes were, instead having a series of relevant outcomes for their studies.<sup>130;131;256;259;261</sup> Three of the studies outlined their primary outcomes<sup>257;258;260</sup> and Digenio 2009<sup>257</sup> also outlined secondary outcomes. Kummervold 2004,<sup>253</sup> was comprised of four different publications and the primary outcomes specified differed according to each publication.

- *Health professional outcomes*

#### *Secondary*

The only health professional outcome reported was a secondary outcome. Katz 2003<sup>131</sup> and Katz 2004<sup>130</sup> reported health professional perceptions.

- *Patient/caregiver outcomes*

### *Primary*

Four studies reported primary patient outcomes.<sup>256;257;259;261</sup> Three studies assessed both patient health and wellbeing and patient behaviour outcomes.<sup>256;257;261</sup> Additionally Stalberg 2008<sup>261</sup> assessed patient understanding and patient views. MacKinnon 1995<sup>259</sup> assessed patient views only.

### *Secondary*

Three studies reported secondary patient outcomes,<sup>253;258;260</sup> Lin 2005<sup>258</sup> and Stalberg 2008<sup>261</sup> reported the effect of email on patient-professional communication, Kummervold 2004<sup>253</sup> and Stalberg 2008<sup>261</sup> reported evaluation of care and Kummervold 2004<sup>253</sup> also reported value of service.

- *Health service outcomes*

### *Primary*

Four studies reported primary health service outcomes.<sup>130;131;253;256</sup> Two had patient participants and reported resource use outcomes.<sup>253;256</sup> Two had physician participants and also reported resource use outcomes.

### *Secondary*

Four studies reported secondary health service outcomes.<sup>258-261</sup> In all four studies these were outcomes relating to the use of medical services.

### *Harms*

There were no specific outcomes relating to harms in any of the included studies. Four studies<sup>130;257-259</sup> did report information on adverse events but this was reported in the discussion section of the text, rather than as outcome data.

Details of the outcome measures used by each study are outlined in the characteristics of included studies table (Table 5.3, appendix page 364).



## **5.5 Risk of bias in included studies**

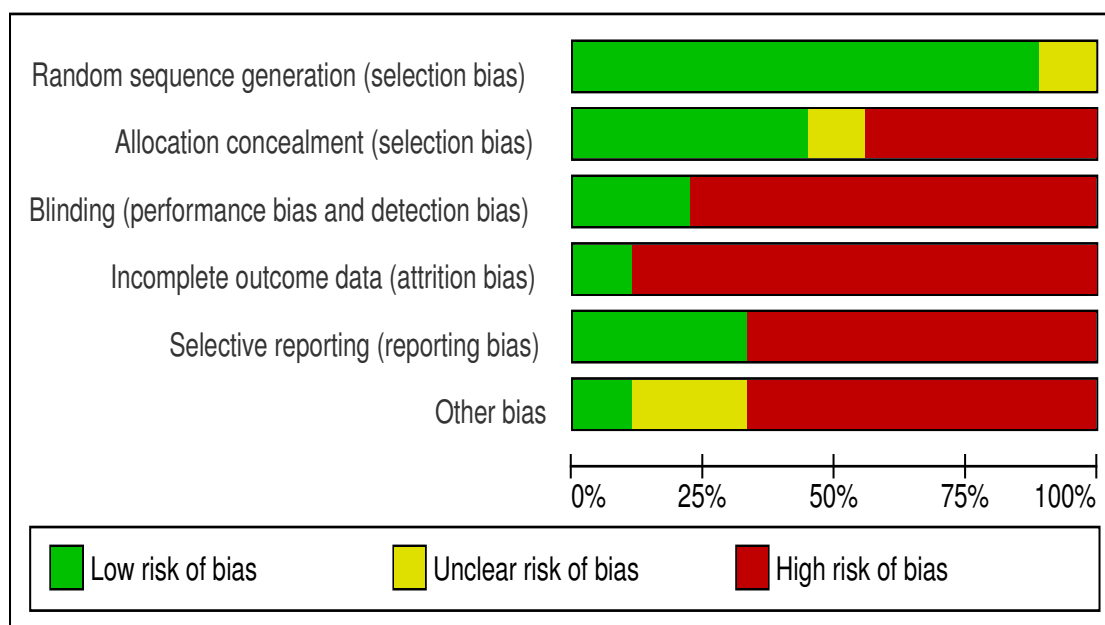
The ratings for the risk of bias were based on the published reports and further information was obtained where necessary by contacting authors. Responses to these requests were received from all authors contacted, though the responses did not always lead to clarification.

All of the studies featured a certain degree of bias. Figure 2 summarises the risk of bias for each included study and Figure 3 summarises the risk of bias for each domain for all of the included studies. For four of the studies<sup>130;131;259;261</sup> there were unclear elements to the assessment of risk of bias and these domains remained unclear even after author contact.

**Figure 5.2: Risk of bias summary: review authors' judgements about each risk of bias item for each included study.**

|                 | Random sequence generation (selection bias) | Allocation concealment (selection bias) | Blinding (performance bias and detection bias) | Incomplete outcome data (attrition bias) | Selective reporting (reporting bias) | Other bias |
|-----------------|---------------------------------------------|-----------------------------------------|------------------------------------------------|------------------------------------------|--------------------------------------|------------|
| Bergmo 2009     | +                                           | +                                       | -                                              | -                                        | -                                    | -          |
| Digenio 2009    | +                                           | +                                       | -                                              | -                                        | -                                    | -          |
| Katz 2003       | +                                           | -                                       | -                                              | -                                        | -                                    | ?          |
| Katz 2004       | +                                           | -                                       | -                                              | -                                        | +                                    | ?          |
| Kummervold 2004 | +                                           | -                                       | -                                              | -                                        | +                                    | -          |
| Lin 2005        | +                                           | -                                       | +                                              | -                                        | -                                    | -          |
| MacKinnon 1995  | +                                           | ?                                       | -                                              | -                                        | +                                    | -          |
| Ross 2004       | +                                           | +                                       | +                                              | +                                        | -                                    | +          |
| Stalberg 2008   | ?                                           | +                                       | -                                              | -                                        | -                                    | -          |

**Figure 5.3: Risk of bias graph: review authors' judgements about each risk of bias item presented as percentages across all included studies.**



A summary of the risk of bias for each domain is outlined here, with description of sequence generation and allocation concealment, blinding, incomplete outcome data, selective reporting and other types of bias. In addition a detailed description of the assessment of the risk of bias for each included study can be found in Table 5.4, appendix page 375.

### 5.5.1 Sequence generation and allocation concealment

Eight studies used adequate sequence generation. Methods used were simple randomisation using shuffled envelopes,<sup>256</sup> drawing of lots,<sup>253;259</sup> and tossing a coin.<sup>130;131</sup> Three studies used a computer generated randomisation schedule,<sup>257;258;260</sup> one used randomly permuted blocks of 5<sup>257</sup> and two used blocks of 10.<sup>258;260</sup> One study, Stalberg 2008<sup>261</sup> did not specify how their sequence was generated. The authors were unable to provide this information when contacted and this remains unclear.

Four studies reported adequate allocation concealment.<sup>256;257;260;261</sup> Methods used were sealed envelopes<sup>256;260;261</sup> and central telephone randomisation.<sup>257</sup> One study, MacKinnon 1995<sup>259</sup> did not provide information on allocation concealment and the author was unable to provide information when contacted. Four studies reported inadequate allocation concealment.<sup>130;131;253;258</sup> Kummervold 2004<sup>253</sup> selected pieces of paper out of bowls, contact with authors of Lin 2005,<sup>258</sup> Katz 2003<sup>131</sup> and Katz 2004<sup>130</sup> confirmed that the allocation sequence was not concealed from the person carrying out the randomisation.

It should be noted that in cluster randomised trials (Katz 2003,<sup>131</sup> Katz 2004<sup>130</sup>) where clusters are randomised all at once a lack of concealment would not introduce a risk of bias. It would only become a concern where participants join the study after randomisation of clusters has been determined. It is not clear whether this happened in these two studies and the authors were unable to provide this information. The risk of bias has been assessed as high on the basis that the authors conducted these studies as though they were parallel group RCTs and did not conceal allocation.

### **5.5.2 Blinding**

For many of the interventions in the review the blinding of participants (patients/caregivers, health professionals) was not feasible. Where participants were allocated to the intervention it was apparent, for instance where intervention participants had access to an email system, and control participants did not.

Therefore for the purpose of this review it was decided that the main focus in deciding the assessment of risk of bias would be whether the investigators were blind to the allocation status of their participants.

Two studies were adequately blinded;<sup>258;260</sup> in Lin 2005<sup>258</sup> a research assistant conducted the randomisation and the principal investigator was blind to patient assignment. In Ross 2004<sup>260</sup> the primary investigator and data analyst were blinded to participant assignment. In one study blinding was not complete. In Bergmo 2009<sup>256</sup> not all investigators were blinded. The dermatologist assessing the severity of eczema in participants was aware of group allocation. For all other outcomes investigators were blinded.

In six studies investigators were not blind to participant allocation.<sup>130;131;253;257;259;261</sup> Contact with the authors of Digenio 2009,<sup>257</sup> Katz 2003,<sup>131</sup> Katz 2004<sup>162</sup> and MacKinnon 1995<sup>259</sup> confirmed that investigators were not blinded. Kummervold 2004 state in one of the four publications<sup>127;252-254</sup> associated with the study that blinding was not included in the project. In Stalberg 2008<sup>261</sup> investigators had routine access to the patient notes which contained the allocation data.

### **5.5.3 Incomplete outcome data**

One study adequately addressed incomplete outcome data. Ross 2004<sup>260</sup> carried out a repeated measures analysis to account for missing participants across all relevant outcomes.

The remaining eight studies featured some level of incomplete outcome data and this was judged to introduce bias into the studies. In Bergmo 2009<sup>256</sup> the response rate to the post-intervention questionnaire was 74% with no attempt made to describe or investigate non-responders. For the assessment of severity of eczema it is not known how many participants were assessed as this information is not presented. Additionally there was insufficient information provided in the published report to assess whether an intention to treat (ITT) analysis was carried out.

Digenio 2009<sup>257</sup> describe carrying out a modified ITT analysis along with a sensitivity analysis to account for missing data, however data for measures relating to the outcomes for this study are presented for the completers in the study only.

Katz 2003<sup>131</sup> & Katz 2004<sup>130</sup> did not carry out an ITT analysis. The response rates to the physician surveys were 90.8% and 71.2% respectively and no attempt was made to describe or account for the non-responders. Both studies imputed missing values to zero for the email volume outcome stating that this was to account for incomplete data, but using zero meant that this only served to enable analysis and did not account for the missing data.

In Kummervold 2004<sup>253</sup> an intention to treat analysis was not carried out even though one intervention participant withdrew from the study post-randomisation. The response rate to the patient survey was 93% in the intervention group and 73% in the control group. For the willingness to pay element of the questionnaire<sup>252</sup> the response rate was 68% for the intervention group and 84% for the control group. There is no attempt to account for the non-responders. It is concerning that the response rate was lower for the intervention group than the control group as this may reflect on the intervention.

Lin 2005<sup>258</sup> compared overall satisfaction with care (as per the baseline survey) between participants who completed the study and those who did not (those participants lost to follow up along with those who did not complete final survey). Those not completing were less satisfied on the baseline survey, and this difference was significant. Therefore the least satisfied participants were not in the final analysis and this will have biased the final overall result.

In MacKinnon 1995<sup>259</sup> one participant withdrew from the study and an intention to treat analysis was not carried out. Additionally for the outcome 'number of independent contacts' the method of contact was recorded for only 24 of 32 contacts. Upon contact the authors stated that this was because clinicians did not specify this information on the contact forms they were required to complete for the purposes of the study.

In Stalberg 2008<sup>261</sup> the response rate to the post-operative feedback questionnaire, which addressed the patient satisfaction outcome, was 76% for the intervention group and 77% for the control group. Authors state that an ITT analysis could not be completed for this outcome as not all patients proceeded to surgery and thus could not complete the post-operative questionnaire. No attempt is made to describe or investigate non-responders.

#### **5.5.4 Selective reporting**

Only one study had a trial protocol. Digenio 2009<sup>257</sup> registered their trial protocol on ClinicalTrials.gov. Published protocols were unavailable for remaining eight included studies. Only three studies were free of selective outcome reporting.<sup>130;253;259</sup>

The remaining six studies were judged not to be free of selective outcome reporting.<sup>131;256-258;260;261</sup> In Bergmo 2009,<sup>256</sup> the results for the primary outcomes are presented as mean values for the whole sample before the intervention versus the whole sample at the end of the intervention, rather than for the intervention and control groups independently. In a trial comparing the intervention group with the control group it would be expected that data for each group would be presented and where possible compared. Selective reporting was confirmed during contact with the author: '*We would have presented the results separately for the two groups in more detail if we had found an interaction effect (between group differences). But we did not.*'

Digenio 2009<sup>257</sup> presented all outcomes outlined in their protocol; however they also present a post-hoc analysis of two measures (proportions of participants achieving 5% and 10% weight loss) that was not pre-specified. The study report also states that self-reported data collected through the website would be descriptively summarised. The collection of this descriptive data was not pre-specified in the protocol and for two measures (steps per day and calories per day) the data was not presented nor mentioned in the results section.

In Katz 2003<sup>131</sup> the authors present data on weekly email received by physicians in the intervention and control groups. For comparison between intervention and control groups the data is split into two comparisons; email received by resident physicians and email received

by staff physicians. A comparison between groups for all types of physician was not carried out. Additionally whilst the total number of each type of physicians is known, the numbers of physicians in the intervention and control groups by physician type is not reported.

Lin 2005<sup>258</sup> introduced an additional group to the study analysis: intervention non-user. This group was compared to both the intervention and control groups. This addition was not pre-specified in the methods. There were also discrepancies in the numbers used for analysis of the qualitative content analysis and the authors were unable to clarify these numbers. The content of messages was analysed according to two sub-groups; clinical phone messages and clinical portal messages and these groups constituted only around half of the originally randomised participants in each group, therefore it was not possible to use this data.

Data for the 'value to patient data' outcome is presented for the whole sample and not by group. The author of the study stated that this was because they deemed this outcome to be a peripheral part of the overall study: *'This was a peripheral part of our study and we elected not to break apart the responses for portal vs. control. Most responses were "ZERO" and those who were willing to pay varied from a few pennies to \$25, and it did not appear to be different between groups.'*

In Ross 2004<sup>260</sup> data for number of total messages per month is presented graphically, with a P value for a significant difference between groups presented in the text. Numerical data upon which the comparison is carried out (intervention versus control) are not presented, but were later provided by the author. Data for the number of total messages per patient was presented for the whole intervention period and also separately for the first six months and second six months of the intervention period. This split was not pre-specified and appeared to be a manipulation of the data used to imply differences between the intervention and control group.

In Stalberg 2008<sup>261</sup> data for participants using fax and telephone to contact the surgeon is presented for the whole group and not split by intervention and control groups. This means it is not possible to see if they differed between groups, nor is it possible to examine them in relation to the results for email use. The authors no longer have the data and so could not provide it.

### **5.5.5 Other potential sources of bias**

Six studies were assessed as having a high risk of other sources of bias. These included potential concerns about the reliability of measures<sup>253;256;257;259;261</sup> and recall bias<sup>130;131;256</sup> amongst other sources (see Table 5.4, appendix page 375).

In Digenio 2009<sup>257</sup> five interventions were compared, but all members of all groups received the drug sibutramine. The lack of control group makes it difficult to separate the effects of the drug and intervention. The authors mention this in their discussion: 'A lack of randomly assigned group without sibutramine does not allow us to properly separate the effect of the drug from the lifestyle intervention.' In addition the study authors were all employees of a pharmaceutical company that funded the research and this represents a conflict of interest in their conducting the research.

### **5.6 Other factors of interest**

Before presenting the effects of interventions, there are factors relating to the included studies that are relevant to their interpretation and these are outlined here.

#### **5.6.1 Consequences of misclassification of study design**

As outlined in the included studies section (page 96) Katz 2003<sup>131</sup> and Katz 2004<sup>130</sup> carried out a cluster randomised trial and they had analysed the two studies as though physicians were randomised individually, rather than in groups. This lead to a 'unit-of-analysis' error.

It is possible to correct for data that has been analysed as though individual randomisation has taken place, typically the information necessary is:

- the number of clusters (or groups) randomised to each intervention group; or the average (mean) size of each cluster;
- the outcome data ignoring the cluster design for the total number of individuals (for example, number or proportion of individuals with events, or means and standard deviations); and
- an estimate of the intracluster (or intraclass) correlation coefficient (ICC).

However it was not possible to do this because the required information was not available, even after contact with the authors. Therefore any outcomes presented for these studies are viewed in light of the potential unit of analysis errors. As the unit of analysis is different from the unit of allocation any resulting P values are artificially small. This does not bias the



estimate of effect but can result in false positive conclusions that the intervention had an effect.<sup>245</sup>

### **5.6.2 Study with multiple intervention groups**

As outlined previously (5.4.7 Comparator, page 102) Digenio 2009 had five groups and for the purposes of this review two of these are presented as a comparison; the intervention of interest; high frequency email counselling, and a second intervention; high frequency telephone counselling. Where the authors have carried out a statistical comparison between groups in this study it is between all five groups rather than between two individual groups. Therefore any between group comparisons presented in this review are indicative only of a difference (or lack of difference) between these groups and not specifically between the telephone and email groups.

### **5.6.3 Unobtainable missing data**

For some of the outcomes of interest to the review data was partially presented or presented in textual rather than numerical format. Where data or information was missing authors were contacted to obtain further information. For two studies there was no missing data relating to the outcomes of interest.<sup>253;259</sup> One author was able to provide the missing data.<sup>260</sup> For six studies authors were unable to provide the missing data.<sup>130;131;256-258;261</sup> The extent of the unobtainable missing data is described for each study here.

#### ***Bergmo 2009***

There were six measures in this study that were of relevance to the review. For five of the measures a P value for interaction between the intervention and control groups was presented, but the data upon which this comparison was based was not provided i.e. values for the intervention and control groups. All data for the study was presented in the text rather than being placed in tables. Instead the authors focused on presenting a pre-post intervention comparison for the whole study sample.

There were two measures; overall healthcare visits and hospital admissions (health service resource use outcomes) where the only analysis was the pre-post intervention comparison for the whole sample. There was no comparison of intervention and control groups. Therefore there was no data available that was useful to the review. The lead author of Bergmo 2009<sup>256</sup> was contacted, and was unable to provide the missing data, stating that they did not have it.

### *Digenio 2009*

For nine measures in this study a comparison between groups was not carried out. For three of these measures (waist circumference in inches, total cholesterol level and LDL-C level) the authors carried out a pre-post intervention comparison. They also carried out a pre-post intervention comparison for another seven measures. This data was not useful to the review.

Where comparisons between groups are carried out, where there is no significant difference observed between groups the authors state this in the text of the report and do not present the associated data. The author for the study was unable to provide the missing data relating to the comparisons between groups.

### *Katz 2003 & Katz 2004*

In both studies utilisation variables were constructed by the authors for the purpose of analysing email, telephone and 'no-show' volumes. The rationale presented for the creation of the variable was that the volume of communication was highly correlated with the level of clinical activity by individual physicians and the level of clinical activity varied markedly across physicians, thus a physician level variable was necessary to account for this variation.

The utilisation variable was calculated in the following way:

$$\frac{\text{Number of reported patient (emails/telephone calls/no shows)}}{\text{Average number of scheduled visits per week during study period}} \times 100$$

It produced a mean number of weekly (emails/telephone calls/no shows) per 100 scheduled visits (rate) and all data in relation to these measures was presented as this rate. As a consequence it was not possible to determine the actual volumes of email and telephone use, or of no-shows experienced in the study. Additionally there was no data on the average number of scheduled visits per week used in the calculation, which would have aided the interpretation of the rate.

There was other missing information. Katz 2003 presents results for nine measures in their physician survey using the P value for comparison only. The data upon which this comparison was based was not provided. Katz 2004 use a 'general communication' scale but do not indicate the range of the scale, other than stating that a higher score indicates more favourable attitudes. Thus it is not possible to assess where on the scale the results for the intervention and control groups fall.

One of the authors was contacted to see if it would be possible to obtain the data used to calculate the utilisation variable and to obtain the other missing information. They did not know if this data was still available, stating that the research group involved had disbanded. It was not possible to obtain contact with any of the other authors of the studies.

The situation regarding the data analysis is complicated by the unit of analysis errors occurring (see *Consequences of misclassification of study design*, page 112), which mean that P values are artificially small, potentially leading to false positive conclusions that the intervention had an effect. Despite there being data available from two studies for email rates, telephone rates, and measures of physician satisfaction it was decided not to combine the data. This was due to the potential unit of analysis errors. The results of this study should be interpreted with caution in light of this information.

## **5.7 Effects of interventions**

The effects of the interventions in the review are presented here. As outlined in the methods section it was not possible to standardise the data available from each study and so the data is presented without standardisation as values for intervention group, control group and any relevant comparison between the two.

### **5.7.1 Summary of comparisons and outcomes**

Data is presented for each comparison, and each relevant outcome under that comparison. There are two comparisons;

1. Email as additional method of communication compared to standard methods.
2. Email compared to telephone for delivery of counselling.

Comparison 1 has five primary outcomes, four are patient outcomes, and one is a health service outcome. It has five secondary outcomes, three are patient outcomes, one is a health professional outcome and one a health service outcome.

Comparison 2 has three primary outcomes, two are patient outcomes, and one is a harm outcome.

Neither comparison looks at primary health professional outcomes or harms.

Studies measured outcomes using many different types of approaches. These were a mixture of types of continuous and dichotomous measures. Five outcomes (three primary, two secondary) were represented by measures from just one study.

### ***5.7.2 Email as additional method of communication compared to standard methods of communication***

Eight studies had outcomes falling under this comparison.

#### **Primary outcomes**

See Tables 5.5, 5.6 and 5.7, appendix pages 387-393 for data relating to the primary outcomes for this comparison.

#### *Health professional outcomes*

No primary health professional outcomes were reported.

#### *Patient/caregiver outcomes*

Overall, there was not found to be any statistically significant differences between the intervention and control group for patient/caregiver outcomes, indicating that email did not have any effect on these outcomes.

- Patient understanding

Stalberg 2008<sup>261</sup> was the only study examining this outcome (see Table 5.5, appendix page 387). Email did not make any difference to patient understanding. There was no difference observed in understanding of post-operative instructions ( $P>.99$ ) between intervention and control groups.

- Patient/caregiver health status and wellbeing

Two studies examined this outcome<sup>259;261</sup> (see Table 5. 5, appendix page 387). Email did not make any difference to patient health status and wellbeing.

Stalberg 2008<sup>261</sup> found no difference in anxiety level between intervention and control groups on the day of operation ( $P=0.33$ ). Bergmo 2009<sup>256</sup> examined severity of eczema. The authors stated that there was no significant interaction between groups for severity of

asthma ( $P=0.55$ ). This implies that a web consultation intervention did not have any effect on severity of eczema.

- Patient views

Two studies examined patient views<sup>256;261</sup> (see Table 5.5, appendix page 387). Where it was possible to test for a comparison email did not have any impact on patient/caregiver views.

Stalberg 2008<sup>261</sup> did not find any difference between intervention and control groups for whether 'questions and concerns were addressed in a satisfactory manner' ( $P=0.69$ ), 'how communication with the surgeon affected sense of preparedness for the operation' ( $P=0.47$ ) and 'how communication with the surgeon affected sense that the surgeon was available to deal with any problems that might arise' ( $P=0.26$ ).

MacKinnon 1995<sup>259</sup> did not carry out any test for comparison, stating this was due to the small sample size in their study (Sample size 16, Intervention =7, Control =9). The mean satisfaction ratings for 'requests and questions dealt with in a timely manner' were 4 for the intervention group and 3.3 for the control group and for 'problems dealt with adequately' 4.3 in the intervention group and 3.3 in the control group.

- Patient/caregiver behaviours and actions

Two studies measured patient behaviours and actions<sup>256;261</sup> (see Table 5.5, appendix page 387). The intervention did not make any difference to patient behaviours or actions.

Stalberg 2008<sup>261</sup> examined Internet use by patients for 'finding information about your disease' and for 'finding information about where to seek treatment'. They found no significant difference between groups for both measures. They also examined patient 'ability to make appropriate work/family arrangements for your operation'. There was no significant difference between groups ( $P=0.21$ ). Bergmo 2009<sup>256</sup> examined mean number of skin care treatments per week performed by parents. The authors state that there is no significant interaction between groups for skin care treatments ( $P=0.48$ ). They also examined family costs and parental loss of employment during the intervention period and found no significant difference between intervention and control groups.

## *Health service outcomes*

For health service outcomes there were measures which showed a significant difference between intervention and control groups and measures that showed no significant difference, indicating that email may or may not have an impact on health service outcomes.

- Resource use
  - Patient/caregiver participants

Two studies examined health service resource use in patient participants in different healthcare settings<sup>253;256</sup> (see Table 5.6, appendix page 390). For two measures email had an effect on resource use. For three measures email did not make any difference to resource use.

Bergmo 2009<sup>256</sup> examined visits to a complementary therapist. Reduction in visits was higher in the intervention group than the control group but this difference was not significant ( $P=0.09$ ). They also examined health service resource use and again the difference between groups was not significant. Kummervold 2004<sup>253</sup> found that the mean number of contacts to the GP and front office was lower for the intervention group and this difference was significant ( $P=0.032$ ). They also found that the mean reduction from baseline for office visits per patient per year was significantly greater in the intervention group than the control ( $P=0.034$ ). However the mean reduction from baseline for phone consultations was not significantly different between groups ( $P=0.258$ ).

- Physician participants

Two studies examined health service resource use in physician participants in a primary care setting<sup>130;131</sup> (see Table 5.7, appendix page 391). Two measures indicated that email had an impact on resource use, three indicated that email made no difference.

Katz 2003<sup>131</sup> and Katz 2004<sup>130</sup> examined changes in email and phone rates over the intervention period, and Katz 2003 also examined changes in no-show rates over the intervention period. Katz 2003 presented adjusted incident rate ratios (IRR) for a difference in trends between intervention and control groups. Rates were higher in the intervention group (for all types of email) and there was a significant difference in trend over time in the intervention versus control group ( $P<.001$ ). For average telephone rates and visit no show rates no P value was presented, but the confidence intervals for the IRR crossed 1 indicating no significant difference in trend over time.

Katz 2004 also examined rates over time, presenting P values for comparison between the two groups. The intervention in this study was a web messaging system and the comparison concerning email refers to non-intervention email communication. There was no significant difference in email and telephone volume trends (controlling for physician type and clinic) between groups; email  $P=0.9$ , telephone  $P=0.18$ .

Katz 2003 examined the volume of weekly emails received, comparing this by subgroup: resident physicians and faculty physicians. Those in the intervention group received significantly more weekly emails ( $P<.001$  for both groups) than those in the control group for both types of physician.

### *Harms*

No outcomes concerning harms were reported in any of the included studies. However, three studies in this comparison reported some form of adverse event in their study report.<sup>130;258;259</sup>

Katz 2004<sup>130</sup> reported that many patients did not have sufficient web-based experience to navigate the intervention website, though they did not measure this. Lin 2005<sup>258</sup> reported that two portal messages were deemed urgent but the receiving physicians did not consider these problematic. MacKinnon 1995<sup>259</sup> reported that one participant in the intervention group dropped out because of technical difficulties. The reporting of these harms constituted a sentence in the discussion section of the published reports.

### **Secondary outcomes**

See Tables 5.8, 5.9 and 5.10, appendix pages 394-401, for data relating to the secondary outcomes in this review.

### *Health professional outcomes*

The majority of measures falling under health professional outcomes did not show any significant difference between groups, indicating that email did not have any effect on health professional outcomes.

- Health professional perceptions (acceptability and satisfaction)

Two studies examined this outcome using 22 different measures<sup>130;131</sup> (see Table 5.8, appendix page 394). Eight measures reported a significant difference between intervention and control groups.

Katz 2003 used an email benefits scale and an email bother scale to assess physician attitudes. The intervention group had higher mean scores for the email benefits scale, but the difference between groups was not significant. For the email bother scale, the intervention group reported a lower scale score for bother than the control group ( $P=0.03$ ).

Katz 2003 also examined percentage physician agreement with a series of statements. There was no significant difference between groups for percentage agreeing that they liked using email to communicate with their patients ( $P=0.11$ ). There was a significant difference between intervention and control physicians over agreement that email is a good way to answer patients' non-urgent medical questions ( $P=0.06$ ) and that email is helpful for handling patients' administrative concerns ( $P=0.05$ ) with more intervention physicians agreeing with the statements. Conversely fewer physicians in the intervention group agreed that emails from patients who had not seen them in a long time were a 'bother' ( $P<0.1$ ). There were a further eight measures for factors relating to physician perception of email where there was not a significant difference between groups (Table 5.8, appendix page 394).

Katz 2004 used a web benefits scale to examine their web-based email intervention and found that the intervention group had a higher mean score for benefit and the difference between groups was significant ( $P=0.008$ ). They also found that more physicians in the intervention group agreed/strongly agreed that they would encourage their patients to use the web ( $P=0.6$ ) but this difference was not significant. There was a significant difference between intervention and control physicians over agreement that the web email system was a good way for patients to contact them ( $P=0.04$ ), would be a good way to follow up after an appointment ( $P=0.01$ ) and whether they would like to use the web email system to communicate with patients ( $P=0.03$ ), with the intervention group more likely to agree/strongly agree.

Two measures were used in both studies; Katz 2003 and Katz 2004 both measured satisfaction with general communication and physician satisfaction with patient communication outside of clinic visits. There were no significant differences between intervention and control groups for either of these measures in both studies, as reported by the authors.



## *Patient outcomes*

The majority of measures falling under health professional outcomes did not show any significant difference between groups, indicating that email did not have any effect on health professional outcomes.

- Effect on patient -professional communication

Two studies examined this outcome using four measures<sup>258;261</sup> (see Table 5.9, appendix page 398). One measure found a significant difference between the intervention and control groups, three did not.

Lin 2005 examined participant satisfaction with communicating non-urgent messages to a doctor and/or nurse. More participants in the intervention group rated this type of communication as excellent/very good (Intervention, 55%, Control, 31%,  $P < 0.001$ ). Stalberg 2008 did not find any difference in median scale score for 'how effective was the communication with your surgeon prior to surgery' ( $P = 0.26$ ), 'how effective was the communication with your surgeon after surgery' ( $P = 0.71$ ) and 'overall how effective was communication with your surgeon' ( $P = 0.39$ ).

- Evaluation of care

Only one study examined this outcome (see Table 5.9, appendix page 398). Stalberg 2008<sup>261</sup> examined 'overall satisfaction with surgical experience.' The authors did not find any difference between groups ( $P = 0.2$ ).

- Value of service

Only one study examined this outcome (see Table 5.9, appendix page 398). Kummervold 2004<sup>253</sup> assessed willingness to pay per online consultation, in euros. The intervention group who received the online consultations were willing to pay fewer euros per consultation than the control group who had not experienced the intervention and the difference between groups was significant ( $P = 0.028$ ).

### *Health service outcomes*

- Use of medical services

Four studies measured outcomes relating to use of medical services using eleven measures<sup>258-261</sup> (see Table 5.10, appendix page 400).

Lin 2005 carried out an analysis on a subgroup of participants: those consenting for their medical record to be viewed for the purposes of information collection. This concerned the number of telephone messages sent per patient and the total number of messages (telephone plus email) sent per patient. The intervention subgroup sent fewer telephone messages per patient but more messages overall (telephone and portal), however the difference between groups was not significant for both measures.

Ross 2004<sup>260</sup> examine the number of electronic and telephone messages sent by patients. They presented data on the total numbers of messages sent during the intervention period. The total number of messages sent during the recruitment and study period was higher for the intervention group than the control group. They then examined the total number of messages sent per patient during the intervention period and found a significant difference between groups ( $P=0.02$ ) with the intervention group sending more messages. They examined the total number of messages sent per patient during the first six months and the last six months of the 12 month intervention. The total number of messages sent per patient in the first 6 months of the intervention was higher in the intervention group and this difference was significant ( $P=0.05$ ). The number sent was still higher in the second 6 months, but the difference was not significant ( $P=0.66$ ). Finally they examined the number of messages sent per month in the intervention and control groups. There was no significant difference between groups ( $P=0.70$ ).

Stalberg 2008 examined whether participants initiated any form of contact with their surgeon and subsequently whether they used email to contact their surgeon. Participants in the intervention group were more likely to initiate contact with their surgeon ( $P<0.01$ ) and to do so via email ( $P=0.02$ ).

MacKinnon 1995 did not carry out any test for comparison, stating this was due to the small sample size in their study (16, I=7, C=9). They examined mean number of contacts with the augmentative communication service and mean number of independent contacts with the augmentative communication service. The mean number of contacts was higher in the

intervention group (I=6.4, C=1) than in the control group, and the same was true of independent contacts (I=4.6, C=0.1).

### **5.7.3 Email compared to telephone for delivery of counselling**

Only one study fell under this comparison, Digenio 2009.<sup>257</sup> All of the outcomes were primary outcomes as per the review. Data for the outcomes under this comparison can be found in Tables 5.11 and 5.12 (appendix pages 402-406).

#### *Patient outcomes*

The lack of data on comparison between groups and the difficulty of examining a comparison within a five-arm study means that the data available for patient outcomes is poor (see 'other factors of interest,' page 112). However where data between the two groups is compared significant differences largely favour the telephone counselling group over the email counselling group.

- Patient health status and wellbeing

This study examined twelve different measures of patient health status and wellbeing (see Table 5.11, appendix page 402).

As outlined in 'unobtainable missing data' page 113, there is no data available for any of the following comparisons as the authors do not present it. For body weight, telephone counselling resulted in a greater percentage reduction from baseline than email and this difference was described as statistically significant. For systolic blood pressure, diastolic blood pressure and change in pulse rate there was no significant difference between groups. For triglycerides there was a greater percentage reduction from baseline seen in the telephone counselling group and for HDL-C level the telephone counselling group increased their levels of this 'good' type of cholesterol more than those in the email counselling group (telephone, 11.6% versus email, 5.7%) but no significant difference between groups was observed for either of these measures. For fasting glucose, there was a greater percentage reduction from baseline seen in the telephone counselling group and for insulin, the telephone counselling group saw a reduction from baseline (-6.6) and the email group saw an increase (2.9). No significant difference between groups was observed for either of these measures.

For the proportion of participants with weight loss of at least 5% a significant difference between groups was observed (P=0.024), with participants receiving telephone counselling

were more likely to have had weight loss of 5%. For the proportion of participants with weight loss of at least 10% there was no significant difference between groups ( $P=0.052$ ).

For four measures no test for comparison between groups was carried out. Mean absolute weight loss differed by 1.86kg between groups (email, 5.4kg , telephone, 7.26kg). For waist circumference, (email, -2.7 inches , telephone, -2.6 inches) and total cholesterol (email, -2.0%, telephone, -2.1%) the change from baseline between groups was almost the same. For LDL-C level there was a greater percentage change from baseline seen in the telephone counselling group (email 1.4%, telephone 2.9%).

- Patient behaviours and actions

This study examined six measures of patient behaviours and actions (see Table 5.11, appendix page 402).

Impact of Weight on Quality of Life-Lite (IWQOL) and Weight Related Symptoms Measure (WRSM) were measured as change from baseline at six months. There were no significant differences amongst groups for these measures. As outlined in the section ‘unobtainable missing data,’ page 113, there are no data available for these comparisons as the authors do not present them.

For adherence to dietician contact a significant difference between all groups was observed. The email group has a 3.7% higher adherence rate than the telephone group.

For three measures no test for comparison between groups was carried out. These measures were web utilisation, mean number of logins to website and mean number of days participants logged into website to enter information. Most participants used the associated website (telephone: 52/53, email: 48/52). Of those using the website, those in the telephone group had a higher mean number of logins to the website (telephone: 68, email: 57), but both groups logged into the website to enter information for a mean number of 64 days. This implies that those in the telephone counselling group were not just logging in to enter study data and were logging in on other occasions as well.

### *Harms*

- Adverse events

Adverse events leading to discontinuation of the study were reported (see Table 5.12, page 406, appendix). Five participants in the email counselling group and four in the telephone

counselling group withdrew from the study after randomisation because of adverse events. These events were attributed to the drug component of the study which all participants received, and the authors stated that 'none were serious or attributed to the intervention,' the intervention being the method of communication.

## **5.8 Summary of findings**

Tables 5.13, 5.14 and 5.15 (see appendix pages 407-411) present a summary of the results of the primary outcome measures in the review, including the GRADE score for each outcome.

Table 5.13 (see appendix page 407) presents a summary of the primary outcome measures relating to the comparison 'email as additional method of communication compared to standard methods,' in patient/caregiver participants. The GRADE score for the quality of the evidence for outcomes under this comparison and for this group of participants is 'very low'.

Table 5.14 (see appendix page 409) presents a summary of the primary outcomes measures relating to the comparison 'email as additional method of communication compared to standard methods,' in physician participants. The GRADE score also indicates that the quality of the evidence for outcomes under this comparison and for this group of participants is 'very low.'

Table 5.15 (see appendix page 410) presents a summary of the primary outcomes measures relating to the comparison 'email counselling compared with telephone counselling.' Again, the GRADE score for the quality of the evidence for outcomes under this comparison and for this group of participants is 'very low.'

A GRADE score of 'very low' indicates that there is a great deal of uncertainty about the data for these outcomes.

## Discussion

### 5.9 Summary of results

The review finds that the extent of the evidence base to date for email for clinical communication between patients/caregivers and health professionals is poor and it is not possible to draw conclusions as to the effect of email as an intervention.

Where email is compared to standard methods of communication, for many of the outcomes of interest there are no differences observed between the two groups. Where email for counselling is compared to telephone counselling, for many of the outcomes of interest telephone counselling is more effective. However for both comparisons there are outcomes where the data is missing, incomplete or where a comparison between groups has not been made. Overall given the nature of the included studies and the fact that it was not possible to standardise the data arising from them, any summary of the findings should be approached with caution.

The studies in the review have a high risk of bias for many domains, a GRADE score of 'low quality' for all outcomes, various concerns relating to missing data and apparent lack of author knowledge on how randomised trials should be presented. The individual studies themselves often describe their findings to be strongly in favour of email where there is not data to support this.

Of the types of outcome measures outlined for inclusion in the review not all were represented by the included studies, with these largely focused on patient related outcomes. For the primary outcomes of interest no health professional outcomes were measured in any of the included studies falling under either comparison.

### 5.10 Quality of the evidence

#### ***5.10.1 Risk of bias, trial conduct and GRADE score***

It has been demonstrated that the results of this review are equivocal and in interpreting the results the high risk of bias in included studies and the low quality of evidence for the outcomes of interest must be considered.

There was considerable incomplete outcome reporting, occurring in all studies except one, and introducing possible attrition bias into the results of the studies. There was also considerable selective outcome reporting. When contacting authors several admitted

selective outcome reporting, seemingly unaware that it was a problem for the study. This indicates a lack of author knowledge on how to properly report randomised controlled trials. Other types of bias were common; these included issues with the reliability of measures and how they were administered within the studies.

As outlined in the results section there were studies with multiple errors, both the studies by Katz<sup>130;131</sup> had unit of analysis errors and a high risk of selection bias, performance & detection bias and attrition bias. There was missing data in both studies which the authors could not provide. The use of an utilisation variable in both studies was questionable due to the transformation of data that was not described, but concerns could not be investigated as further information on the variable was not available. Despite this, these two studies are well known and have been highly cited, Google Scholar provides data on number of citations; 77 citations for Katz 2003 and 40 citations for Katz 2004.

The trial by MacKinnon had a very small sample size (n=16), but used a randomised controlled trial design. This raises questions about how many participants the researchers expected to recruit, and if numbers were always to be low why this study design was chosen if analysis of the data was never going to be possible. The absence of a protocol for the study means that it is not possible to find out what the rationale for the study was, and the authors were contactable but were not able to provide this information, citing the length of time since it was published.

There were two authors who decided to present the data in their study as a pre-post intervention comparison for the whole sample.<sup>256;257</sup> This serves no purpose in the context of a randomised controlled trial as it combines both the intervention and control group for the comparison, despite the intervention only being administered to the intervention group. These were just some of the anomalies in these studies, indicating the level of concern with the reports.

The GRADE system was used to examine the quality of the evidence for each outcome, but as data was assessed per the published study and not standardised and pooled, the ratings should be seen as a guide to quality and strength of evidence and not as definitive. The GRADE score for the outcomes in this review was very low quality for all outcomes. This finding reiterates that the results of this review should be viewed with caution.

### **5.10.2 Completeness of evidence**

The review does not identify a broad and comprehensive evidence base. The pool of authors in the included studies was small. Six studies were carried out by three research groups (two studies by each).<sup>130;131;253;256;258;260</sup> The low number of research groups that have produced trials to date illustrates the limited generalisability of the evidence base, with both studies by each group carried out in similar populations. Another disadvantage to the same research group having carried out more than one study was duplication of methodological problems; problems arising in one study were then often duplicated in the next because the authors had adopted similar/the same methodology. This has the effect of making the evidence base even more restricted. The number of participants in the individual studies varied, from 16 to 606. The number of participants for the individual outcomes assessed in the review ranged from 74 to 379. Overall this is not a large number of participants and again communicates the small size of the evidence base at present.

#### *Demographics*

None of the included studies measured the socioeconomic status or ethnicity of participants. Demographic information presented in these studies tended to concern age and gender, but there was no mention of potential age effects on email use and no study examined age using a subgroup analysis. Six studies<sup>253;257-261</sup> restricted participants to include only those with access to email and/or the Internet, thus selecting a population who would already favour this type of communication and be accustomed to using it, reducing the generalisability of these studies beyond these populations. The issue of connection and access to the Internet and email in a broader context was not mentioned in any of the included studies. It had been expected that information on the impact of Internet and email access would be included, along with data on socioeconomic status because of the importance of the potential for a 'digital divide'.<sup>57</sup> Overall not much is known about the participants in these studies, or of the effects of their characteristics on the interventions.

#### *Costs of email consultation*

The included trials did not consider cost-effectiveness. There is a perceived notion that email is a cost saving communications technology<sup>170</sup> and it was expected that the included studies might consider the cost of their interventions. One study considered patient willingness to pay for email,<sup>253</sup> but this information served only to put a value on an email from the view of the patient and not to investigate the actual costs involved. The scalable nature of email (the costs do not increase as rapidly with larger numbers of patients as with



other methods of communication such as telephone or letter) may mean it is more cost-effective where it appears to be an equally effective method of communication. For decisions about implementation of email the costs of using email may be the deciding factor, even where outcomes for other factors are negative. Reporting the costs of email alongside the results of a trial would add context to studies as the use of a successful email system may be prohibited on cost alone. Thus the absence of data relating to costs was surprising.

### *Outcomes*

Only one health professional outcome was reported across the included studies. This outcome was classified in the review as a secondary outcome. The low number of health professional outcomes reported perhaps reflects the priorities of researchers, who are focused on assessing patient outcomes and health service outcomes such as resource use, and neglect the role of the health professional in determining whether email as an intervention is effective. Resistance from health professionals has been identified as a barrier to the implementation of new innovations in healthcare (see chapter 2, page 38) and so an investigation of how an intervention impacts on health professionals, and what they think of it, is key for the future.

### **5.10.3 Applicability of evidence**

#### *Comparisons*

It was unsurprising that the main comparison identified was email in addition to standard communication methods. This comparison could be said to mirror any potential real world use of email, as it would likely be introduced in addition to existing methods of communication and not instead of them.

The other comparison was specific to a particular intervention and concerned only one study in the review. This limits the applicability of the evidence to wider settings. Digenio 2009 concerned a counselling intervention delivered in different ways to patients, one method being email. This type of study is more akin to intervention studies for behaviour change than to the other studies in this review which examine email for communication purposes. The factor setting this study apart from the excluded studies looking at email as a method of administering an intervention,<sup>262;264;265;267 237</sup> was that in this study the effect of email was being assessed separately from the rest of the intervention. Given the difference in this intervention as compared to the other studies in the review it is questionable as to whether the study by Digenio<sup>257</sup> should have been included at all. There were other

concerns with the study. All of the included participants were given a weight loss drug, Sibutramine, and the authors acknowledged that it might be difficult to separate the effects of the drug from the effects of the intervention. It was a multi-interventional study and the decision was made to compare email counselling with telephone counselling, but this meant omitting results for the other three arms of the study. On reflection this study may have been excluded.

### *Changes in technology over time*

The study by MacKinnon 1995 was carried out nearly 20 years ago, and major changes in technology since its publication may render the results less useful to the present day. This study measured patient views amongst other things, and it is likely that views of technology use amongst patients will have changed considerably in the interim period. Thus the applicability of the findings in the present day is questionable. More generally, developments in technology have occurred since the publication of many of the included studies. For instance the rise of smartphones has changed the way that many people access their email accounts, allowing them to do so whilst mobile. Rapid changes in technology make the outcomes from older studies difficult to interpret. They can, however, provide a historical perspective.

### *Wider settings*

All of the studies were carried out in high income countries. Kummervold 2004,<sup>253</sup> by a Norwegian group of researchers, was comprised of four publications, one of which was published only in Norwegian. All other publications in the review were published in English. With the exception of Norway, English is the predominant language of the countries where the studies were set. Culturally and ethnically these countries are similar, each having largely white populations. Thus the applicability of their data outside of these settings is questionable. Of more relevance to the thesis, there were no studies set in the UK.

Eight of the studies were set in urban areas and one in a mixed urban/rural population thus making the relevance of the results of this review to non-urban areas questionable. This was interesting because of the perception that email as a distance technology might be useful for use in rural populations where attending healthcare settings may be more difficult for the patient.<sup>117</sup> To date this has not been explored in a trial.

The countries in which the studies were set differ in relation to healthcare system. Canada, Australia and Norway have universal health care systems. The United States does not,

instead having a mixed market system with both government and insurance-based coverage schemes, and a significant number of people who are not covered by these schemes. The structure of the US health system is such that physicians expect to charge for the each item of work they carry out and for the patient to be subsequently reimbursed via insurance, be this private or Government insurance. Therefore an email may constitute an individual item of work, and the physician would expect to charge for this.<sup>63;170</sup> There have been many attempts at defining what constitutes a reimbursable email and what does not.<sup>170;274</sup> Where emails are reimbursed it might be supposed that professional views of email are different when compared to those countries where email becomes another part of practice and not a chargeable add on. Additionally differences in healthcare systems can induce differences in the care-seeking behaviour of patients. Where a patient, or their insurance company may be charged for an email it may lead to a different pattern of use as compared with health systems where email becomes an additional method of communication amongst those also available in the universal system.<sup>275</sup> These differences may impact on the applicability of the results of the US based studies to other settings.

#### **5.10.4 Linked reviews**

The two linked reviews addressing non-clinical communication between patients/caregivers and health professionals were found to be empty; there were no eligible studies identified for the review 'email for communicating the results of diagnostic medical investigations to patients'<sup>212</sup> or 'email for the management of healthcare appointments and attendance reminders.'<sup>210</sup> For the linked review 'email for clinical communication between health professionals'<sup>208</sup> only one study was included.

The remaining linked review 'email for the provision of information on health promotion and disease prevention'<sup>211</sup> included six studies. The studies in this review were also at high risk of bias for many domains. The GRADE score was 'very low quality' for all outcomes under the two comparisons in the review. It was possible in this review to standardise measures for the majority of outcomes. However as there was only one study under each outcome it was not possible to pool the data. As in this review, the summary of the findings states that the review contains relatively few studies of low quality and providing mostly inconclusive, or no evidence for the outcomes of interest.

Overall it is evident that the volume and standard of trial based evidence in relation to all types of email use in healthcare is poor, and not just for communication between health professional and patient/caregiver.



## 5.11 Comparison with other studies

Other reviews have addressed the use of email in healthcare. These reviews have taken different approaches.

Ye 2010<sup>140</sup> carried out a systematic review of 'email in patient-provider communication' addressing the role of email in patient-professional communication, focusing on e-mail content, and the perspectives of professionals and patients. They searched for empirical studies, restricting their search to those studies carried out in the US between 2000 and 2008 and written in English. They included one of the same studies as in this Cochrane systematic review.<sup>131</sup> The remaining included studies in this review were not trials in design, being mostly cross-sectional surveys. They found upon summarising the included studies narratively that personal and institutional factors were associated with the likelihood of email use between patients and providers, and that whilst benefits were expressed patients and professionals had concerns about confidentiality and security. The findings concern a restricted population and so whilst they provide a summary for a US setting the generalisability is limited because of the difference in healthcare system.

Wallwiener 2009 reviewed the literature on 'the impact of electronic messaging on the patient-physician interaction'. This non-systematically carried out review did not restrict inclusion by study design. The authors justify this by stating that 'relatively few publications deal with electronic messaging'. They included two of the same studies as in this review.<sup>258;260</sup> They state that their review found that patients are satisfied with the use of secure physician messaging and that physicians have not reported any adverse effects. They also state that the economic benefits of such systems are apparent. However, the authors reach their conclusions based upon a review that includes studies that are of low quality design, without any critical appraisal.

McGeady 2007<sup>47</sup> reviewed the literature on the 'impact of patient-physician web messaging on healthcare service provision.' This non-systematically carried out review restricted by language of publication, searching only for studies in English. They included two of the same studies as in this review.<sup>127;130</sup> One of the included articles was the same study as Kummervold 2004,<sup>253</sup> but the publication in Norwegian would have been missed as they restricted to English studies. They took a narrative approach to the review and found that demand and support for online communication tools was strong amongst patients and that increased communication can increase quality of care. They also state that there is insufficient evidence to suggest that web-messaging would increase process efficiency. This is the only review to acknowledge any lack of evidence, suggesting further quantitative

research is necessary. However the non-systematic nature of this review and the focus on 'web-messaging' limits the validity of the conclusions about quality of care and patient demand and support.

Car carried out a review of the literature, split into two publications: 'email consultations in health care: 1—scope and effectiveness'<sup>57</sup> and 'email consultations in health care: 2—acceptability and safe application.'<sup>168</sup> Systematic review methods were applied to identify original research and systematic reviews that evaluated the role of email communication in healthcare. The reviews report in a narrative style and focus on advantages and disadvantages of using email in healthcare, covering a broad range of uses for email. They report that interventions for professional to patient email communication mostly combine email and the Internet (this was identified in producing this review) and that they often target participants with specific conditions; this was also the case for five of the included studies. In addition they conclude that email communication can assist in sustaining the doctor-patient relationship and that its use increases patient choice. The aim of these reviews was much wider than this review and this is reflected in the presentation, which constitutes a useful scoping exercise and not an attempt to make definitive conclusions.

The nature of email as a common communication technology means that researchers have more scope to make bold claims about the possibilities it brings than they would for interventions that are diagnostic or relate to provision of a treatment, and are thus deemed to be about direct to patient healthcare delivery. Email for communication does concern patient care and treatment, but does not evoke the same concerns. For example, where the review by Wallwiener<sup>169</sup> states that the economic benefits of web-messaging systems are apparent, this is based on their narrative assessment of non-systematically selected studies without any critical appraisal of study conduct. It is a confidently made claim and in a field with a small and under investigated evidence base reviews such as these hold more weight than they might in other more established fields.

As outlined in chapter two, much of the evidence available relating to email takes the form of surveys and observational studies. Examples are the studies by various US health system organisations. Kaiser Permanente published an analysis of data collected via their integrated electronic health record system concerning the use of email communication between physician and patient and the impact on quality of care.<sup>139</sup> Geisinger, another US health system organisation, published the results of an online survey of patients using their patient portal for messaging their healthcare provider.<sup>174</sup> Both of these studies utilised systems already in place in the form of integrated electronic healthcare records to carry out their

research rather than conducting trials. Carrying out these studies using a more robust study design in the form of a trial or other design may improve the quality of the evidence base around email use and prevent the proliferation of low quality studies each with little reliability and external validity. Many of the studies in this field, both experimental and observational are carried out by clinicians in practice who may be time poor and lack the knowledge and resources to carry out large scale trials, this is supported by the poor conduct of trials in this review. Hence post-hoc publications of analysed data from a system are more attractive to carry out.

## **5.12 Strengths and limitations of review**

### *Use of a definition of the intervention*

The review methods used were administered to try and limit the methodological issues commonly associated with synthesising complex interventions; these include defining the intervention within the review and taking a standard approach to the selection of studies for the review.<sup>62</sup>

A problem caused when studies have the same aim but describe the intervention differently or inadequately across studies is deciding whether they should be included. This is why a clear definition was created before commencing with the review and this was a strength of the review. Contacting authors when selecting studies for inclusion in the review and asking them for further details on their interventions assisted in ensuring the definition of the intervention and the inclusion criteria were adhered to as carefully as possible.

### *Searching for evidence*

Studies of complex interventions may have been poorly indexed, and may use inconsistent terminology. Terminology is an ongoing problem with searching for evidence on new technologies, especially those used for communication.<sup>62</sup> In an attempt to account for this, broad search techniques were used. Several different terms can be used in research settings to describe email: electronic mail, electronic messaging, web messaging, and web consultation, amongst many others. The search strategy created used a wide selection of terms and truncation of terms to ensure that all variations were found. The included studies featured several different terms for email. As well as searching the main medical databases, ERIC, an education database, and CINAHL, a nursing and allied health database were searched. The grey literature search also took on a broad range of databases, including Google Scholar. For one study the published report was identified via database searching

and the thesis from which the published report originated was identified via a Google scholar search. By searching trial registers any ongoing studies were identified.

As this is a fledgling field which has only become relevant alongside the increase in email use in day to day life, it is certain that the search covered the relevant time frame. The evidence base for eHealth interventions is smaller than for other fields of medicine and so the likelihood of missing studies of this nature (RCTs etc) is lower, especially for those working in the field and familiar with the ongoing literature.

### *Scope of review*

The broad scope of the review included studies covering a wide range of settings, participants and conditions and so despite all having in common their email intervention there were many differences between them. This meant that the outcomes in the included studies varied widely and often study authors devised their own unique measures for assessing these. The differences between the studies with regard to choice and measurement of outcomes made it impossible to combine the data. It was also difficult to assess exactly what is missing from the evidence base. Clinical and methodological heterogeneity was high amongst the included studies. Clinical variability was visible in the differing participants, interventions and outcomes between studies. Methodological heterogeneity was visible in the variability in study design and risk of bias between studies. As outlined in the methods ideally the measures for each outcome would have been standardised, but this was not possible. It is also redundant if the measures are not comparable in the first place. The heterogeneity in the included studies meant that they were variable and would have remained so even when standardised.

### *Data synthesis*

As outlined in the methods section of this chapter the approach to presenting the data from included studies was different from that usually carried out in a systematic review. Changes had to be made at the review stage, away from the methods outlined in the protocol. This reflected the nature of the studies identified for the review. It is not standard practice to present values as per the included studies, including P values. However given the low quality of the studies, missing data and other concerns e.g. unit of analysis errors it was deemed the most transparent way to present the data. Without combining the data statistically, it is not possible to be sure whether any consistencies in the results are genuine, for instance where all data presented for an outcome show no difference between the email



group and the comparator. However this approach does allow the reader to fully appreciate the extent of the evidence base and the variability amongst studies and their measures.

### *Outcomes*

Study outcomes were categorised as per the outcomes outlined for use in the review (see Chapter 4, page 78) and a potential disadvantage of this is that any choice of relevant outcome category could be deemed subjective, even where more than one author is involved in making the decisions. Problems were encountered in relation to the interpretation of outcome measures used in the review. It was not necessarily clear where an outcome within a study qualified as a primary or secondary outcome as per the review (for distinction between primary and secondary outcomes see Chapter 4, page 78). Another reader may have classified the data under a different outcome according to their perspective. It is also possible that the studies in the review could have been further divided under each comparison, for instance by setting, participant or intervention. This may apply to participants where some were suffering from a particular condition e.g. heart failure<sup>260</sup> and others were part of a broader general patient population<sup>253</sup> or where parents were proxy participants for their children rather than suffering from the condition themselves.<sup>256</sup>

The long list of the types of outcome measures eligible for inclusion in the review (see Chapter 4, page 78) was due to the uncertainty concerning the evidence base and the lack of prior information on what type of outcomes may be found in the included studies, given the fledgling nature of the field. At present there are no standardised sets of outcomes for use by study authors in carrying out trials of communications technologies, potentially on patients with varied conditions.

## **5.13 Methodological considerations**

### *Randomised controlled trials*

Despite deciding to include other types of study design as well as RCTs in this review only RCTs were identified. RCTs are seen as the gold standard of evidence, being at the top of the hierarchy of evidence<sup>200;201</sup> and indeed the rationale for carrying out a systematic review focused on trials was to ensure that only the highest quality study designs were identified. More widely RCTs may be more likely to attract funding and support than the less common but more pragmatic trial designs. However it is apparent that an RCT may not be the best choice of study design for examining email as an intervention, and that they can be difficult to conduct, because of the complexity of the intervention and the involvement of contextual

factors. Researchers involved in the ongoing development of methodology for Cochrane systematic reviews have considered whether the Cochrane review, currently the dominant systematic review methodology, is less appropriate for the review and meta-analysis of complex interventions than in the review of pharmaceutical and simple medical interventions because complex interventions rely more on the context in which the intervention is administered<sup>62</sup> and this is not necessarily conducive to a trial design.

### *Unpublished data*

Studies with indeterminate or non-significant results may go unpublished because they do not have the 'right' results or they are deemed not useful. The selective reporting of the data in the studies included in this review support this notion. As it was not possible to statistically assess reporting biases it was not possible to ascertain the likelihood of publication bias for individual outcomes. Authors of studies should ideally produce a protocol outlining their intended methodology, and register their trial with a trial registry. However there seems to be a perception that trial registries are for use by pharmaceutical companies carrying out trials of drugs, or researchers testing active care-related interventions, rather than an everyday communications technology like email. Of the studies in the review the only one that was registered with a trials registry was Digenio 2009, the study which administered a drug to all of its participants.<sup>257</sup> Researchers should be encouraged to utilise trials registers. Journals that are members of the International Committee of Medical Journal Editors (ICMJE)<sup>276</sup> will only consider trials for publication where they are registered in a public trials registry and these members include major journals; The Lancet, the British Medical Journal and the Journal of the American Medical Association. Many non-member journals also report that they follow the ICMJE's uniform requirements for manuscripts submitted to Biomedical Journals.

### *Standards of reporting trials*

Much of the uncertainty concerning the included studies in this review could have been avoided if standards for the planning, execution and presentation of trials were adhered to. Use of the Consolidated Standards of Reporting Trials (CONSORT) statement for both RCTs and Cluster RCTs (evidence-based, minimum set of recommendations for reporting RCTs developed to counteract suboptimal reporting )<sup>174;273</sup> should be strongly encouraged and in fact many journals insist that all trials published be presented according to the statement, though many do not. Recently an extension to the CONSORT statement specifically for e-health interventions, CONSORT-EHEALTH, was published, and provides guidance specifically for interventions of electronic and mobile health applications.<sup>277</sup>

The complexity of interventions such as email can make trial reporting in traditional journals with strict word limits difficult. Interventions may require much explanation and methods of analysis may be detailed. Newer online journals often offer the opportunity to place more detail in the appendix section of a publication and this is useful for those wishing to read about a trial in full so that they might understand it, and where relevant replicate the intervention.

### *Outcome measures*

A lack of core outcome measures is a recognised concern in the reporting of clinical trials. The Core Outcome Measures in Effectiveness Trials (COMET) initiative<sup>278</sup> was set up to encourage the development and application of core outcome sets, these sets represent the minimum that should be measured and reported in all clinical trials of a specific condition. At present their focus is on outcomes relevant to a condition. There is a need for development of core outcome sets in relation to interventions focused on communication, which occur potentially in different patient populations and across a wide range of settings. They are likely to be focused on factors other than health, such as resource use. Creation of these would likely have a positive impact on the quality of studies and on their interpretation.

### *Ongoing changes in technology*

Presently, there is much greater penetration and use of email; email now generally appears in HTML format rather than plain text, thus offering additional functionality; and web-based technologies have also moved on allowing email to be supplemented with links to websites, online video, and social networks. Presuming that future changes in technology will follow a similar trajectory, any choice of outcomes should ensure that they remain applicable in the face of such changes. This may involve concentrating on those elements that make email different from other methods of communication (lack of vocal cues, asynchronous nature, stability of email address versus other personal details) rather than making the intervention system itself the focus as is the case in many of the included studies. Such factors do not change with time as the technology changes. Otherwise randomised controlled trials may find their intervention dated by the time of their completion, since a randomised controlled trial can take several years from initiation to completion.

## 5.14 Implications of the review and future research

The results of this review highlight the complexity of email consultation as an intervention. The included studies did not make any reference to email consultation as a complex intervention. In fact, many of the problems arising in relation to these trials occurred due to the lack of consideration for the complexity of email as an intervention. Future research should consider the complex nature of email consultation, and would benefit from drawing on the MRC framework for the development and evaluation of complex interventions (see Chapter 3, page 58 for more detail on this framework) in the design of studies.<sup>61</sup>

The main implication of this review comes from the lack of evidence relating to email consultation. It means that the scope for conducting further research is broad. However in order to improve on evidence produced to date, it must be methodologically rigorous. This may involve producing simpler but well planned studies. The two studies by Katz<sup>130;131</sup> use an RCT to examine the effect of email communication on resource use, but also examined physician satisfaction in the same physician participants and added on a patient satisfaction survey in patients of the participating physicians. The complex nature of such studies leads to much uncertainty surrounding them and their methodological approach. Planning a study which counteracts these problems may include predefining the intervention of interest, predefining the outcomes of interest and then deciding to focus on a main outcome of interest, for example, the impact of email on the workload of the health professionals using it, perhaps in a specific setting or disease area. The protocol for the study would be created prior to conducting the study and where relevant registered on a trials register. A focused approach of this nature is more likely to lead to applicable findings on a practical level, and to ensure that methodological standards can be achieved.

In reference to future systematic reviews of new communication technologies, including reviews of email, it should be considered whether it is appropriate to review the use of email in individual health conditions or settings, leading to smaller but better defined reviews, or whether to carry out overarching reviews with a large scope. Where the evidence base is sparse, it may in the first instance be more appropriate to take a broad view.

Where research takes the form of an experimental study, linked research utilising qualitative methods can be carried out to investigate additional factors in greater depth, for example patient and physician satisfaction. As outlined in chapter 3 (page 60), it is not unusual for evaluations of complex interventions to take a mixed-methods approach<sup>61</sup> and thus trials may have a qualitative study attached to them or embedded within them to help them achieve their overall aims. Two studies in this review were actually accompanied by

qualitative studies.<sup>253;256</sup> These were only identified after the review was completed as they were not clearly outlined as being linked to the published RCTs. Where studies have qualitative findings associated with them these can be included in the systematic review, as a way to enhance the quantitative findings, or they can be synthesised in a separate review of qualitative data.<sup>245</sup> This was not possible for the two qualitative studies associated with this review,<sup>253;256</sup> as they were not identified during the review process, and came to light afterwards. However, where qualitative findings are clearly linked with a trial they can be a positive addition, especially in trials of complex interventions.<sup>61</sup> Their inclusion alongside quantitative findings should be considered for any future systematic reviews.

Overall it is the quality of any future studies that is important, and good quality studies will be a positive addition to the evidence base. Given the influence that health professional perceptions have on the implementation of an intervention in practice,<sup>101</sup> such research may wish to focus on health professional outcomes, and factors that directly affect health professionals, as these are the people expected to provide email consultation as a service for patients in their practice.

### **5.15 Chapter summary**

The review identified nine studies, all randomised controlled trials. Five had web-messaging interventions and four used standard email. The included studies were at high risk of bias, especially in relation to blinding, incomplete outcome reporting and selective outcome reporting. There were also other concerns relating to the studies; two by the same author had unit of analysis errors, four studies had unobtainable missing data.

There were two comparisons identified in the review; email as an addition to standard methods of communication (eight studies) and email counselling compared to telephone counselling (one study). Where email was compared to standard methods it did not have any effect on patient outcomes, and for health service outcomes the findings were mixed, with some showing email to be significantly different to standard methods, and others showing no difference. Where email counselling was compared to telephone counselling, telephone counselling was largely found to be favoured over email for patient outcomes, though data was not available for all measures. No other outcomes were measured under this comparison. There were no primary outcomes relating to health professionals under both comparisons, and only one study reported harms. The GRADE score was 'very low' for all outcomes. In summary, the extent of the evidence base to date for email for clinical communication between patients/caregivers and health professionals is poor and it is not

possible to draw conclusions as to the effect of email as an intervention on the basis of this data.

The strengths of the systematic review were the use of a definition for email consultation, a broad and detailed approach to searching for relevant evidence and the broad scope of the review. Weaknesses were the application of outcome measures that did not necessarily fit with those in the included studies and the approach to data synthesis, which was unconventional due to the nature of the studies. The quality of the included studies and the methodological challenges faced prompted reflection on whether RCTs are always an appropriate study design for this type of intervention. There was also an obvious need for study authors to both register their trials on a clinical trials register and to adhere to reporting standards when publishing their trials. Additionally, the issues surrounding the wide range of outcome measures used in these studies indicates a need for a core outcome measure set for this type of intervention. The study authors did not take into consideration the complex nature of email consultation as an intervention. Any future research should view email consultation as a complex intervention, and should be methodologically rigorous with a clear focus.

## Chapter 6: Interview study methods

### **Chapter overview:**

This chapter outlines the methods used in the qualitative interview study. It begins by outlining the study objectives, research design and setting. The ethics and research governance approval arrangements are then described.

Details about the type of participants included in the study are described; this includes eligibility criteria, participant type and number, and sampling strategy for selecting participants. It was necessary to revise the eligibility criteria for the patients, and the reasons for this are explained.

The recruitment strategy is provided, followed by details of the interview process; location of interviews, duration of interviews, obtaining informed consent and recording data. The production of interview guides and the methods used to devise these are outlined; this included the use of NPT to guide their production. The practical elements of dealing with the data obtained in the interview are then summarised.

Next, analysis is addressed, specifically the choice of thematic analysis as an approach, and description of how NPT was used to aid the interpretation of the themes arising in the thematic analysis. Finally, a chapter summary reiterates the contents of the chapter before the reader moves onto the next two chapters; results and discussion for the patient study and the professionals study (Chapters 7 & 8).

### **6.1 Study objectives**

- *Explore experiences and opinions of patients using email consultation with clinicians in general practice with a view to understanding how email is used, and to identify barriers and facilitators to this use.*
- *Explore clinician and practice manager experiences and opinions of using email or being involved in using email for consultation with patients in the general practice setting, with a view to understanding how email is used, and to identify barriers and facilitators to this use.*
- *Use a theoretical paradigm: normalisation process theory, to understand the potential for the normalisation of email consultation (based on the data collected in the interview studies).*

## **6.2 Research design**

This was a study using semi-structured interview, carried out with patients and professionals (clinicians, practice managers) in general practice.

## **6.3 Setting**

The research was carried out with patients from across London, and with professionals in the North West London and South East London NHS areas. The research was based in the Department of Primary Care and Public Health, Imperial College London.

## **6.4 Ethics and Research Governance approval**

Ethical approval was obtained from the Brompton, Harefield & NHLI Research Ethics Committee (REC reference number 09/H0708/70) and Research Governance approval was granted by South East London NHS for the areas of NHS Lambeth and NHS Greenwich and by North West London NHS for the areas of NHS Kensington and Chelsea, NHS Hammersmith and Fulham and NHS Brent (see appendix page 412). All five of these areas are in London.

As an academic researcher working outside of the NHS, it was necessary to obtain a letter of access before interviewing patients and professionals. This included an occupational health check and a criminal records bureau check. A letter of access was issued for the South East London and North West London NHS areas (see appendix page 420).

The study was registered in the National Institute for Health Research (NIHR) Portfolio (study reference 8301). Being registered on the portfolio meant that the study could be registered with the Primary Care Research network (PCRN). The (PCRN) provide practical support to researchers carrying out studies in primary care settings.

## **6.5 Eligibility criteria**

Participants were required to be using email for communication in general practice, in a way that met the definition devised for the purposes of this study:

*‘Using email for two way communication between a patient and a clinician in a general practice setting, for requesting or providing patient specific information that is not of an administrative nature.’*

Participants had to have used email in this way at least once. There was no restriction on the type of email client or system in use.



Practice manager participants were not required to be using email consultation but were required to be working in a practice offering email communication that met the definition.

The criteria were outlined upon initiating contact with potential participants. Interviews were not scheduled until eligibility was confirmed.

#### **6.5.1 Revision of the eligibility criteria for patient interviews**

Despite checking the eligibility criteria at recruitment it transpired at interview that not all patient participants were using email in a way that met with the definition of email consultation. Specifically this related to three participants who had used email for administrative purposes (requesting prescriptions and/or making appointments) with practice reception staff rather than a clinician.

After discovering the discrepancy the participants were included in the research and the criteria were broadened at the interview stage to include use of email that was outside of the definition.

*'Patient use of email for two way communication in a general practice setting, for requesting or providing patient specific information.'*

The findings obtained in the three interviews did not differ significantly from those where patients had used email in a way that met the eligibility criteria. These misunderstandings of the criteria were in themselves a finding of the study and are presented in the results & discussion, chapter 7.

One participant revealed during the interview that they had used email with a secondary care consultant rather than in a general practice setting. The participant freely admitted that they had wilfully discounted the eligibility criteria because they wished to participate in the study. The patient had met the secondary care consultant via their work and this was how they obtained the email address. They did not use usual channels to access secondary care, and this was because of their experiences in general practice. Although an unconventional situation the participant gave an interesting account of their experiences.

As the interview had already commenced it was decided to continue and make a decision on whether to include the data after transcribing and coding the interview. The participant was included in the final analysis, because of the interesting account they provided. However the different setting and unusual circumstances were taken into account when interpreting the findings of the study.

It is the iterative nature of qualitative research methodology that allowed for the adjustment of the eligibility criteria as the interviews progressed. Rather than this taking away from the value of the study, it allowed the participants rather than the researcher to define the research agenda, preventing the findings from being restricted, and allowing the sample to better reflect the use of email in general practice.

## **6.6 Participants**

The study was designed to include a wide range of stakeholders from the general practice setting. A stakeholder in health policy and health care is 'any government entity, organisation, company or individual that has a stake or may be impacted by a given health care system or health policy approach to provisions, benefits or regulation of healthcare.'<sup>279</sup> In the case of the general practice setting this included patients (and their carers) and professionals working in general practice, professionals comprising clinical staff (GPs, nurses), and practice managers. Practice managers provide an interface between clinical staff and other practice staff. They may be responsible for IT systems, quality of services, clinical governance and practice budget amongst other activities, and in being responsible for co-ordinating practice activity may co-ordinate the uptake and implementation of new technologies in the practice.<sup>280</sup> Their potential for involvement in any email consultation occurring within the general practice setting is high; therefore they were included in the study.

The study is divided into two parts; Part 1 is comprised of interviews with patients and part 2 is comprised of interviews with professionals

### **6.6.1 Decision to interview only users of email consultation**

As outlined in the eligibility criteria, participants were those patients and professionals that had used email consultation at least once. The decision to include users and exclude non-users of email consultation was made based upon the literature presented in Chapter 2 (page 45). It was deemed that information relevant to the objectives of the thesis; exploring experiences and opinions of email consultation use, understanding how email is used and identifying barriers and facilitators to this use, would be best attained by interviewing those with some experience of using it.

In order to determine whether information would be lost by the decision to exclude non-users from the interview study it was decided to conduct a series of informal pilot interviews to see if the results cohered with those demonstrated in the literature (chapter 2, page 45).

### ***Pilot interviews***

A series of four pilot interviews were conducted with non-users of email consultation:

- One GP (also working as an academic)
- Three patients

This was a convenience sample and participants were colleagues in the Department of Primary Care and Public Health at Imperial College London.

A version of the interview guide devised for non-users of email consultation was used to carry out the pilot interviews (Boxes 6.1 and 6.2, appendix pages 440-441). For more information on interview guides and how they were devised, see page 156.

An informal approach was taken to conducting the interviews, notes were taken on responses but the interviews were not recorded. As these were the first interviews conducted with any participants they also served to allow content and delivery of the interviews to be trialled and revised if necessary.

The results of the interviews are summarised according to the key themes that arose:

#### Patients

- Patients had not considered using email consultation, it was not something they had even envisaged being available to them.
- When asked to imagine having this available to them they thought it would be a good thing. It would allow them easier access to the GP. They felt it would be convenient, in the same way email is convenient in day-to-day life.
- One patient had an on-going long term condition and said they would probably use it as part of management of their condition as they were used to having regular contact with their general practice.
- There were concerns expressed and these related overwhelmingly to security and privacy.

#### Professionals

- The one GP interviewed was wholly negative about the prospect of using email consultation.
- They were concerned about safety, particularly in relation to the lack of proximity and having to make a diagnosis without seeing the patient.

- They stated concerns about privacy and security.
- They were concerned about the potential impact on workload, speculating that it would increase.
- In the case of professionals, it was felt that it was more difficult for the non-user to envisage advantages, and easier to theorise the potential problems.

As the results cohered with those already demonstrated in the literature it was concluded that interviewing non-users of email consultation would not add substantial data beyond that available and it not warranted in the context of the time and resources required. Instead the focus was on those patients and professionals with experience of using email consultation.

### ***6.6.2 Number of participants***

The application for ethical approval required that an estimate of the number of participants to be interviewed was provided. As it was not known how many patients and professionals would be using email for consultation, how varied their views would be nor how much information they would provide, other published qualitative interview studies addressing similar interventions (communication and communications technologies) were referred to in devising an estimate. These studies were in UK settings (general practice, home-care via telemedicine) and featuring patients and/or a variety of professionals (GPs, practice managers, nurses). These studies had participant numbers ranging from 9 to 32 patients<sup>222;281-284</sup> and 11-68 professionals.<sup>222;282;283;285-287</sup> One of the studies interviewed both patients and professionals, and used NPT as an explanatory framework. They carried out interviews with 9 patients and 11 nurses<sup>222</sup> and it was these values that were used as a guide for providing an estimate of sample size in this study.

#### *Number of participants: patients*

For the purposes of the ethical approval application a sample estimate of 10 was used, though as sampling would continue until saturation point this was not a prescribed sample size. Saturation point is the point at which further interviews do not generate anything new.<sup>215</sup> Sampling and analysing data continued until this point was reached, after 14 interviews. All participants were patients. It was not possible to recruit any carers to the study, though two of the patient participants reported using the email on behalf of others as well as for themselves. One participant was attending a private general practice. They took part in the study in conjunction with their private GP. The reason to include them was to investigate whether the findings would differ because of the difference in setting.

### *Number of participants: professionals*

For this study a sample estimate of 10 professionals and 5 practice managers was used, though as sampling was intended to continue until saturation point was reached this was not a prescribed sample size. Eleven participants were interviewed, one practice manager and ten general practitioners. Saturation was not reached in the study.

### Professionals sample and lack of saturation

Only one practice manager participated in the study. Despite efforts to recruit practice managers, besides the sole practice manager participant, none of those approached during recruitment were involved in the use of email in their practice and so could not participate. The interview by the single practice manager was still included in the analysis as many of the points raised by the participant cohered with the GP interviews. However having more than one practice manager in the sample would likely have altered the findings in relation to the management perspective and this was taken into consideration during the analysis. Possible reasons for the apparent lack of practice manager involvement are presented in the discussion section of this study (chapter 8).

Ten GP interviews were carried out. Saturation was not reached in these participants. This was indicated by new topics becoming evident during analysis of the interviews - it may have been possible to explore these in greater detail if there had been more participants. However, there were several key themes arising during conduct of the interviews and analysis that comprise the results of this study. The possible reasons for not reaching saturation are outlined in the discussion section of this study (chapter 8).

It was not possible to recruit any nurses to the study despite recruitment material being available to them. This meant that in terms of clinicians only a medical perspective was obtained.

### *Matched patient and professional participants*

One GP participant had three of their patients taking part in the patient interview study. Three GP participants each had one of their patients participating in the patient interview study. In total six patients took part in the study along with their GP. This included a patient of the private GP who was interviewed for this study.

## 6.7 Sampling strategy

A sample of participants who were using or who had used email for consultation in general practice were interviewed. The sampling strategy used in the study was a convenience sample. A convenience sample involves selecting the most accessible participants. It is a quick method of sampling, but also the least rigorous.<sup>288</sup> Its use was necessary for practical reasons. There was no existing information on which clinicians and which practices were offering email consultation and so there was uncertainty surrounding how many patients would be using email consultation in the study area (London). It was deemed appropriate to recruit patients expressing an interest in participating where they were eligible, owing to this uncertainty. Convenience sampling has been described as sufficient for use in exploratory studies,<sup>215</sup> where it is not necessarily possible to obtain a broad sample of participants. As this study was exploratory because so little is known about the use of email consultation in English general practice, it was deemed appropriate to focus on recruiting enough participants to try and reach saturation in the sample.

There is an element of convenience sampling in many qualitative studies, but preferably a more involved approach is taken.<sup>288</sup> Ideally, maximum variability sampling would have been used to sample for this study. A maximum variability sample is purposefully selected to represent a wide range of experience and/or characteristics related to the phenomenon of interest. It should represent a range of experiences and is an emergent approach, whereby initial interviews inform the subsequent direction of the study.<sup>289</sup>

For this study this would have referred to factors likely to most influence how email consultation was used. These factors differed for patient and professional participants. Despite not adopting a maximum variability sampling strategy, data was collected from participants on the factors of interest, so that it could be applied in light of the findings. It was collected before the interview commenced, using a brief form (see appendix page x for patient and professional forms).

### *Patient factors*

Factors deemed most likely to influence how email consultation was used by patients included age group, highest level of education, practice registered at, approximate date of when they first used email consultation, frequency of email use and type of email used (standard, web-messaging). Though not requested information on why the patients were seeking healthcare was recorded if they offered it. Participant characteristics in relation to

these factors are outlined in the results section of chapter 7, and are explored in the discussion section of the same chapter.

Age can influence the use of healthcare technologies. As new technologies replace old systems, it has been suggested that certain sectors of the population are being left behind with regard to access and use of these services, for instance older adults.<sup>57;124;151</sup> For patients, age was collected according to three categories: 18-24 (young adult), 25-64 (adult) and 65+ (older adults). These categories are broad. Ideally specific ages would have been collected from participants, however the research ethics committee did not permit this and thus the study was restricted to using these categories.

Highest level of education provides an indication of literacy levels, since a certain level of literacy is required to complete education. As stated in chapter 2, around 17% of adults in the UK struggle with literacy,<sup>180</sup> and this can affect their ability to communicate using the written word. This may impact on their ability to use email for consultation with a clinician. The levels that participants could choose from were: secondary, A level/further, higher or postgraduate/professional.

Details of the practice that the patient was registered at were collected. The NHS Choices website could then be used to find out more information about the practice, and often a practice website was available. This allowed collection of information on practice size and practice use of email (e.g. offering email officially or unofficially) and was useful where patients were uncertain about the nature of the email consultation system in their practice. The details about practice size and how email consultation was being used may impact on how email consultation worked. For example, a small practice with only one GP offering email consultation differs as a setting to a practice where a centralised email consultation system is operated by rotating duty doctors.

Duration of email use and how frequently patients use email provides information on how experienced the patient is in using email consultation, and it was supposed that this might impact on views of email consultation and how it works. As described in chapter 2 there are different types of email. The email type in use may influence patient perspectives on email consultation. For instance web messaging usually involves a log-in which may take more time. Standard mail without encryption may raise issues relating to security.<sup>47</sup>

The condition for which the patient is seeking healthcare may impact on why they are using email consultation. Email is a distance technology and allows the patient to avoid visiting the

surgery, which may be useful for those with mobility problems and patients with chronic conditions who need to visit the surgery on a regular basis.<sup>266;290</sup>

### *Professional factors*

Factors deemed most likely to influence how email consultation was used by professionals included date of qualification, duration at practice, role in practice, approximate date of when they first used email consultation, frequency of email use and type of email used (standard, web-messaging). Participant characteristics in relation to these factors are outlined in the results section of chapter 8, and are explored in the discussion section of the same chapter.

There are mixed data in relation to the effect of length of practice on the use of technology. A UK based survey showed that clinicians more recently qualified have been shown to feel comfortable using the internet and consider health information online as reliable.<sup>291</sup> If qualification date is viewed as a proxy for the generation in which the GP trained (not necessarily a proxy for age as medicine can be studied as a postgraduate at any age) then this may impact on how email is used. Communication and information technologies were introduced into the medical education setting in the late 1990's as a way to enhance learning and teaching,<sup>292;293</sup> and by the late 2000's this had extended to teaching students how they applied in practice.<sup>294</sup>

Data on duration at and role in practice was collected because it was presumed that both could impact on the use of email consultation. General practitioners may work full or part time, they may be academic GPs working in medical schools and doing sessions as part time GPs or they may be GPs in training.<sup>295</sup> The role they have in the practice impacts on the power they have to make decisions on the running of the practice. Generally GPs that are partners in a practice will have been working there for a long period of time and will have more influence on how services are introduced than a sessional GP who works at the practice once or twice a week.<sup>280</sup> Thus the role in the practice and duration there may impact on whether and how email consultation is used.

Collection of information on the duration and frequency of email use with patients provides information on how experienced the professional is in using email consultation, and it was supposed that these factors might impact on views of email consultation and how it works.<sup>64</sup> As described in chapter 2 there are different types of email. As described for patient participants the email type in use may influence perspectives on email consultation.



## 6.8 Recruitment

### *Patients*

Several approaches were taken to identifying and recruiting patients.

- An email was sent by the researcher to the departmental mailing list in the Department of Primary Care and Public Health at Imperial College asking if anyone had used email with their GP as a patient (the email also asked if anyone had used it as a clinician).
- An advertisement was placed on the community website 'Gumtree' under the 'Community Chest' section. The advertisement provided information about the study and invited people to contact the researcher via email for more information. When potential participants got in contact the researcher telephoned them to check eligibility and arrange an interview time.
- GPs participating in the study were asked for permission to place posters and leaflets in the waiting room at their practice.
- GPs participating in the study were given hard and electronic copies of the leaflets and asked to disseminate them to patients with whom they had used email. They were free to do this via email, or by handing out the hard copies.

See appendix pages 426-428 for copies of the email sent to the Department of Primary Care and Public Health, a copy of the advertisement posted on the Gumtree website and a copy of the poster/leaflet

Patient participants were given a £20 gift voucher to reimburse their time if they participated and were eligible to claim travel expenses for travel within London.

## *Professionals*

Several approaches were taken to identifying and recruiting GPs and practice managers:

- An email was sent by the researcher to the mailing list in the Department of Primary Care and Public Health at Imperial College, asking if clinicians had used email with patients or knew of practices that did (the email also asked if people had used it as a patient).
- The PCRN provided support in identifying potential participants. They were able to assist in identifying practices where GPs were using email with patients via their network of practices.
- The websites of all practices in the area where there was ethical approval were checked, to identify those offering email for consultation.
- The academic supervisor (JC) who was at the time Medical Director of Hammersmith and Fulham primary care trust was able to identify potential participants and provide contact details.
- One professional participant was identified via a participating patient.

Once potential participants had been identified an invitation to participate was sent to them via email, or via letter. (See appendix page 429 for invitation to participate). They were invited to contact/reply to the researcher if they were interested in participating. In some cases a follow up email/letter was sent if no response to the invite was received.

## **6.9 Interview process**

### **6.9.1 Practicalities**

#### *Location of interviews*

##### Patients

For patients, the location of the interview had to be adjusted according to where would be convenient for the patient as it was not possible for all participants to come to Imperial College to be interviewed.

Seven patient interviews were conducted in meeting rooms at Imperial College. A further three participants were interviewed in the Friends Lounge, The King's Fund, Central London.

Two participants were interviewed in cafes near to participant workplaces. One participant was interviewed in their home.

One patient was unable to attend the interview in person after scheduling to take part, but still wished to participate in the study. They asked to take part via email because of their busy schedule. It was decided that rather than losing the participant the interview guide would be sent as a document attached to an email along with instructions for how to respond (see Box 6.3, appendix page 442). The nature of this interview was taken into account when analysing the data. Although relatively uncommon, email has been used as an alternative to face-to-face and telephone interview. It is often suggested by the potential interviewee rather than the interviewer for the interviewee's convenience.<sup>296</sup> As occurred here, this can take the form of a single email used to send the interview guide, along with a follow up email. Semi-structured email interviewing has been shown to be a viable alternative when there are constraints preventing other methods from being used.<sup>297</sup> The possible implications of including a patient interviewed via email are described in the discussion section of the study (chapter 7).

### Professionals

Eight of the interviews with professionals were conducted in a consulting room in the general practice where they worked. The remaining three interviews were conducted in meeting rooms at Imperial College.

### *Researcher safety*

The departmental manager was informed of the date, time and location of each interview and the researcher contacted the departmental manager before and after each interview. Where interviews were conducted outside of office hours (9am-5pm) a fellow PhD student within the department was the contact for before and after the interview.

### *Informed consent*

Each potential participant was given an information sheet which outlined what was involved in participation. They were asked to read it at the recruitment stage before deciding whether to take part in the study. At the interview they were given a consent form and another copy of the information sheet where necessary. Informed consent was then obtained before participation (see appendix page 430 for copy of information sheet and consent form).

As well as outlining the background to the study and what was involved in participating, the information sheet outlined that participants were free to withdraw from the study at any point, without giving a reason. However none did.

Each participant was informed via the recruitment materials and information sheet that the research was part of a PhD project at Imperial College London. This was reiterated verbally at the beginning of the interview and participants were informed that the researcher was a non-clinical PhD student. Each participant was also reassured that the interviews were anonymous.

#### *Digital recording and note taking*

Each interview was recorded using a digital recorder. Participants were asked as part of the informed consent process whether they were happy for their interview to be recorded. Participants potentially feel self-conscious being recorded<sup>298</sup> and so the digital recorder was placed between the interviewee and researcher in as discreet as way as possible.

Written notes were made during, and straight after each interview to record researcher observations. This allowed for any remarks made by participants before or after the digital recorder was turned on to be captured. It also allowed for comments relating to the setting or situation to be noted. These notes became part of the dataset.

#### *Interview duration*

Interview length varied. The shortest patient interview was 15 minutes and the longest 36 minutes. The average interview length was 23 minutes. The shortest professional interview was eight minutes, with a GP. This was an interview conducted before their afternoon surgery started and was the only time they could offer. The participant was a prolific user of email with patients and so getting their perspective was important, even if only for a short time. The longest interview was 57 minutes, with a GP. The average interview length was 22 minutes.

### **6.9.2 Content of interviews**

Separate interview guides for patient (Box 6.4, appendix page 443) and professional participants (Box 6.5, appendix page 444) were produced. The interview guide for professionals was adjusted slightly for the interview with the practice manager. This was to reflect the fact that the practice manager was involved in organising the email consultation and did not participate in it (Box 6.6, appendix page 445).

Questions in qualitative interviews can take several forms but usually focus on behaviours or experience, opinions or values, or on feelings. They may also consider demographic or background characteristics.<sup>214;298</sup>

The interview guides covered four main areas that addressed the objectives of the research question:

- Experiences of using email consultation.
- Opinions of using email consultation.
- Understanding how email consultation is used.
- Identifying barriers and facilitators to the use of email consultation.

These areas were developed into four open ended questions. After the main questions 1-4 the interview guides then finished with two generic questions; 'is there anything else you feel we haven't covered?' and 'is there anything else you would like to ask me?' Questions served as prompts during the interviews rather than a rigid guide. In addition there were optional prompt questions associated with the main questions and these were designed to aid the researcher in guiding the interview and to delve further into each question where relevant (see Boxes 6.4 and 6.5, appendix page 443-444).

Normalisation process theory was used to guide the data collection. The four constructs in the theory were tailored to email consultation and then applied to the interview guide. An integrative approach was taken to ensure that the main constructs of NPT were addressed in the interview guide in a flexible and dynamic way, rather than prescriptively. A focus on collecting data specific to the constructs may have led to data collection that put too much focus on NPT and detracted from other material.<sup>236</sup>

The four constructs in NPT are coherence, cognitive participation, collective action and reflexive monitoring (see Chapter 3, Figure 3.1).<sup>236</sup> For the purposes of applying these to the study, coherence relates to the degree to which people understand what the new practice (email consultation) is and how they make sense of it. Cognitive participation is about people deciding whether or not to engage with the new practice. Both constructs relate to the conceptualisation and initiation of email consultation as a method of communication with a clinician. Collective action is the work that people do to enact a new practice, thus, what is required of those involved (patients, professionals, other practice staff) in order to use and continue to use email consultation. Reflexive monitoring involves people considering the ways that a new set of practices affect them and others around them, and trying to understand these practices via reflection, such as: is email consultation worth the effort

required? Are there any changes that would make it better? Overall the four constructs aid in exploring the dynamics of email consultation use.

These four constructs were variably addressed in the interview guides:

### Patients

For the patient participants, the interview guide (Box 6.4, appendix page 443) explored how the patient had been using email consultation with their doctor and how this had changed since they first used it (coherence) and what had made them decide to use email consultation in the first place (cognitive participation). It asked how email consultation compared to other ways that they had contacted their doctor, exploring how the work involved in using it differed from other methods of consultation (collective action). Finally they were asked to reflect on their use of email consultation and what it had meant for them (reflexive monitoring).

### Professionals

For professional participants, the interview guide (Box 6.5, appendix page 444) explored how the professional had been using email consultation in their practice and how this had changed since they first used it (coherence) and what had made them decide to engage with using email consultation in the first place (cognitive participation). It asked how they feel email compared to the methods of consultation they are accustomed to using, exploring how the work involved in using it differed from other methods consultation (collective action). It also included prompt questions relating to whether email consultation affected relationships with patients and within the practice and what skills were required to use email consultation. Finally they were asked to reflect on their use of email consultation and what it had meant for them (reflexive monitoring).

This does not represent a direct translation of the constructs into the interview guide; rather they were used to aid in formulating the guide. As a result it was not expected that the specific constructs would unfold in a specific manner in the data. Rather they were used as a lens through which to view the emerging observations. As the interviews were semi-structured the interview guide was not prescriptive and participants were free to bring up other topics. Interesting topics arising were explored in more detail with the interviewee wherever this seemed relevant. The interview guide and prompts were developed iteratively as the interviews commenced.

## **6.10 Dealing with interview data**

### *Processing data*

Interviews were transcribed verbatim by a professional transcription company. Once received, each transcript was checked for accuracy against the recording and any personal information was removed, such as names of GP practices.

### *Storage of data*

All participant data was collected and stored in line with Caldicott principles. These are general principles to be followed to ensure that the confidentiality of patient information is not undermined.<sup>299</sup>

Each interview was downloaded from the digital recorder straight after the interview. Digital data was saved in a password protected file on the Imperial College network.

Participant identifiable data (consent form only) was stored securely in a locked filing cabinet within a locked office, access to which was only available to the lead researcher. The electronic participant database was a password protected Microsoft Excel document, saved on the Imperial College network which is also password protected.

All other data, both in paper and electronic form was anonymised using a participant identifier. Paper data was stored in the locked filing cabinet. Electronic data was stored on the Imperial College network which is password protected.

## **6.11 Analysis**

### *Choice of approach*

The interview transcripts were analysed using a thematic approach. A thematic approach is commonly used in healthcare research and can be used where research is exploratory as it allows for thematic groupings to be reported in a descriptive way, with the option to move beyond descriptive analysis where relationships between themes arise. It also permits both an inductive and a deductive approach to identifying themes. An inductive approach leads to themes arising out of the data. Deductive themes are those that are anticipated, for instance where the interviewer asks about something that has arisen in the course of examining the associated literature.<sup>300</sup> A mixture of inductive and deductive approaches was used.

## *Process*

The analysis of interviews was carried out concurrently with interview data collection. This allowed for findings to inform future interviews and assist in determining whether saturation was reached.

The first step was familiarisation with the data; reading the transcripts, listening to the recordings and making notes. At this stage potential codes and areas of interest were noted. The next stage was to code the transcripts. Initial codes were devised according to patterns arising in the data. Transcripts were reviewed iteratively to produce the coding framework. As coding progressed provisional broad themes were identified out of these codes. Once all of the transcripts had been coded themes were refined and developed by re-reading the coded data. These themes were then refined again, broken down into sub-themes where relevant. Connections between themes and sub-themes were identified by re-reading and mapping the themes diagrammatically to aid interpretation.

In addition, un-coded sections of transcripts were re-examined to look for disconfirming evidence. This contributed to ensuring rigour in the analysis. The analysis was iterative with transcripts, coding schemes and notes revisited throughout the process. Two academic supervisors (EM & YP) reviewed a selection of transcripts and the coding frame. Regular meetings were held to discuss the progression of the analysis and allow the researcher to discuss and explore perspectives on the data.

Initially computer assisted qualitative data analysis software Atlas Ti was used to handle the data for analysis. However the screen based nature was restrictive in relation to switching between documents and traditional methods of handling the data were used instead. This involved using hard copies of the transcripts to read, highlight and code the data, the use of Microsoft word documents for cutting and pasting the data into themes, and the use of illustrative diagrams produced by hand to aid the analysis. This approach was possible because the data set was small enough. Use of software becomes essential where researchers have large data sets.

When analysing the data the method of delivery for the interview carried out via email (see section 6.9.1) was taken into consideration. It was not as detailed as a face-to-face interview, largely because the medium meant that the participant could not be prompted. However the responses have been included in the coding and analysis where the data obtained was useful.



### *Use of NPT in interpretation*

NPT was not applied to the analysis of the data arising from the interviews. This was to prevent the elements of NPT being actively sought in the data, and on the other hand to prevent data that was not congruent with the NPT approach being ignored.<sup>236</sup> Instead NPT was used in interpreting the themes arising from the thematic analysis of the data. This involved examining where the themes mapped to the components of the NPT and using this information to explore the potential for the normalisation of email consultation. This is presented in chapter 9; discussion and conclusions. Doing this allowed the analysis of the qualitative interviews to move beyond description into interpretation.

### **6.12 Chapter summary**

This chapter outlined the methods used in carrying out the qualitative interview study. It covered practical aspects; ethics approval and research governance, recruitment, interview process and processing data. It also covered factors that required decisions to be made on how the study would be conducted; eligibility criteria, sampling strategy, content of interviews and analysis. Where the methodology was deviated from during the conduct of the study this was described and included patients not meeting the eligibility criteria, a patient being interviewed via email rather than face-to-face and the lack of saturation in the professionals sample. Elements of the methods used that may have impacted on the results of the study, along with methodological strengths and weaknesses are discussed in the next two chapters (chapters 7 & 8), along with the presentation of the study results.

## **Chapter 7: Patient interview study results & discussion**

### ***Chapter overview:***

This chapter presents the results of the patient study, with accompanying discussion of the findings. The patient interview study finds that there are certain elements of general practice that patients are unhappy with, and certain elements that they value. Email is a normal day to day communication method for patients and email for consultation arises in an ad hoc fashion where accessibility and/or convenience are required. In relation to patient experiences in general practice, email consultation acts to mediate the negative aspects, and encourage the positive. However it is not without problems, and patients are well aware of these. They apply their own attempts at dealing with the problems, but it is not enough to counteract them. The uncertainty surrounding the conduct of email consultation is a major barrier and the patient alone cannot overcome it. The discussion section of this chapter begins by reiterating the findings of the study, before comparing them with other studies, including other interview studies that have examined email consultation between clinicians and patients. The strengths and limitations of the study are discussed, in relation to the approach, the setting, the sample and the definition. Finally, the implications of the study results are outlined.

### **Results**

#### **7.1 Participant characteristics**

##### *Characteristics of participants*

Fourteen interviews were completed. Of these fourteen interviewees, nine were male. Most participants fell into the 25-64 age category; with just two in the 18-24 category and one in the 65 or over category. The majority of participants were educated to postgraduate/professional level. (Table 7.1) Participants came from twelve different general practices with three participants attending the same practice.

##### *Use of email*

Nearly all participants were using or had used email with a general practitioner; one patient had used email with a practice nurse. One patient was using email with a clinician outside of a general practice setting (secondary care consultant); three patients were using email with non-clinicians (reception staff) within general practice for administrative purposes. One patient had used email with both a general practitioner and a clinician outside of the general practice setting (secondary care consultant), this same participant was attending a private

general practice. The remaining participants were using an NHS general practice. (Table 7.1)

The patterns of use were varied. Some participants had used email on a 'one-off' basis; others were using it for ongoing contact. Four participants were using it for administrative purposes; these included requesting letters, prescriptions and appointments either from the GP or from non-clinical staff. (Table 7.1).

Patients had been using email for varying durations; this ranged from two months to four years. The frequency of use ranged from 3 – 10 emails per episode of care to 2- 10 emails per month where it was being used for ongoing contact. Only one patient was using email via a dedicated web portal, the remainder were using standard forms of email. (Table 7.1).

**Table 7.1: Contextual information about participants and their email use**

| <b>Factor</b>                                            | <b>Number of participants</b> |
|----------------------------------------------------------|-------------------------------|
| <b>Total number of participants</b>                      | 14                            |
| <b>Gender</b>                                            |                               |
| <i>Male</i>                                              | 9                             |
| <i>Female</i>                                            | 5                             |
| <b>Age</b>                                               |                               |
| <i>16-24</i>                                             | 2                             |
| <i>25-64</i>                                             | 11                            |
| <i>65 and over</i>                                       | 1                             |
| <b>Highest level of education</b>                        |                               |
| <i>Secondary level</i>                                   | 1                             |
| <i>A level/further</i>                                   | 4                             |
| <i>Graduate level</i>                                    | 0                             |
| <i>Postgraduate/professional level</i>                   | 9                             |
| <b>Using email as per original eligibility criteria*</b> |                               |

|                                                         |                            |
|---------------------------------------------------------|----------------------------|
| <b>Yes</b>                                              | 10                         |
| <b>No, using it for administrative purposes</b>         | 4                          |
| <hr/> <b>Type of professional in communication with</b> |                            |
| <b>General practitioner</b>                             | 10                         |
| <b>Practice nurse</b>                                   | 1                          |
| <b>Practice reception staff</b>                         | 3                          |
| <b>Secondary care consultant</b>                        | 2 <sup>†</sup>             |
| <hr/> <b>Type of General Practice</b>                   |                            |
| <b>NHS</b>                                              | 13                         |
| <b>Private</b>                                          | 1                          |
| <hr/> <b>Type of use (primary)</b>                      |                            |
| <b>‘One-off’ use with clinician</b>                     | 5                          |
| <b>Ongoing email contact with clinician</b>             | 5                          |
| <b>Administrative purposes - prescriptions</b>          | 2                          |
| <b>Administrative purposes – appointments</b>           | 2                          |
| <hr/> <b>Duration and frequency of use</b>              |                            |
| <b>Minimum length of use reported</b>                   | 2 months                   |
| <b>Maximum length of use reported</b>                   | 4 years                    |
| <b>Freq emails sent for one episode of care (range)</b> | 3-10 over episodes of care |
| <b>Frequency of email when using regularly (range)</b>  | 2-10 per month             |
| <hr/> <b>Type of email used</b>                         |                            |
| <b>Web portal</b>                                       | 1                          |
| <b>Standard email</b>                                   | 13                         |

*\*Using email for two way communication between a patient and a clinician in a general practice setting, for requesting or providing patient specific information that is not of an administrative nature. Must have used email at least once in this way.*

*†One participant using email with their GP had also used it with their secondary care consultant.*

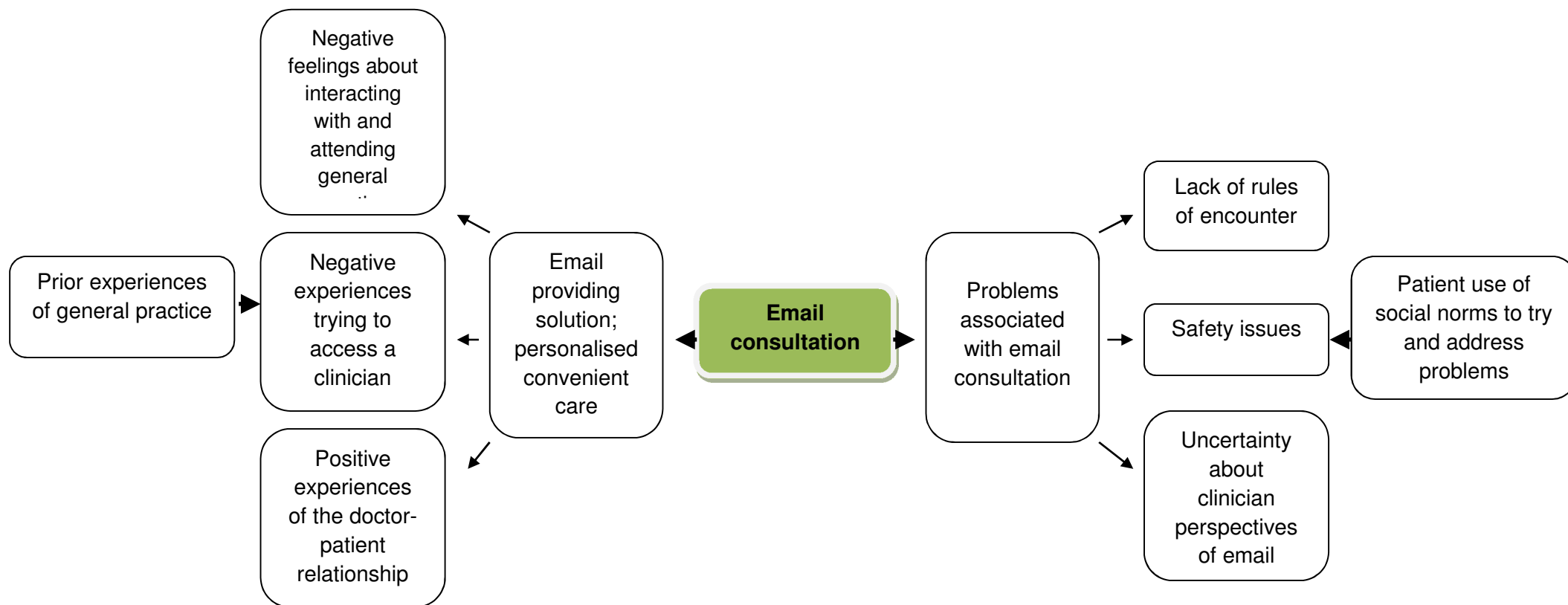
Participants were not required to disclose their reasons for seeking healthcare at the general practice; however 10 participants volunteered this information. Two had previously suffered a severe head injury, one was currently pregnant, the remaining participants suffered the following conditions respectively; lump in breast, asthma and eczema, torn knee ligament, contraception related queries, arthritis and sciatica, abscess in armpit and hypertension.

From here onwards participants will be referred to as patients to reflect their role in the study. The following sections present the themes identified in this study and how they are connected.

## **7.2 Overview of themes and their relationship**

An overview of the themes arising in this study and their relationship is presented illustratively in Figure 7.1. The results begin with an exploration of patient prior experiences of email consultation. These experiences are both positive and negative. This sets the scene for their use of email consultation. The results then go on to describe how email provides solutions to the negative aspects of general practice, and encourages the positive aspects, bringing benefit to patients. Although email consultation presents solutions, it is not perfect, and there are problems associated with its use. These are described, along with the attempts by patients to mitigate these problems. Despite these attempts, patients are not able to fully solve the problems associated with using email consultation. The following sections present these themes and their relationships in more detail.

**Figure 7.1. Themes in the patient interview study and their relationships**



### **7.3 Prior experience of general practice**

The prior experience that patients have of general practice sets the scene for their use of email consultation. Their wider experiences in and perceptions of general practice impact on their use of email consultation. The main themes arising were feelings about interacting with and attending the general practice, the experiences of and feelings about accessing a clinician in general practice and the doctor-patient relationship.

#### **7.3.1 Interacting with and attending general practice**

Patients worry about bothering the GP and wasting their time. They regard the general practice as a busy place, with clinicians being under time and workload pressures. Patients are conscious of the time restrictions placed on the consultation (limited to 10 minutes per consultation on average) and they express concern about having an appointment with a clinician as they do not want to be perceived as wasting the clinician's time. They do not know if their appointment is justified. One patient was concerned about being perceived as actively bothering the doctor.

*'And I suppose also I'm aware of the time constraints of GPs and the pressure on consulting time'*

(Participant 14, Male, 65+)

More generally, patients do not like attending general practice and would like to avoid it.

*'It's always good, when you know you don't have to go there, you know. Because you don't want to go to the GP, really.'*

(Participant 7, Male, 16-24)

Patients have concerns about their interaction with the practice, specifically relating to calling or attending the practice. One patient did not like to be kept on hold on the telephone. Other patients had concerns about being in the waiting room as they perceived it to be somewhere that they could get sick.

*'I can make a phone call if I need to, but I know... if it's, like, a busy period, I'll be on hold for a long time. It's just like... I hate being on hold, so it's just... I'm not very patient.'*

(Participant 5, Male, 25-64)

*'And the other thing is because I haven't got a spleen so I pick up anything and everything.'*

*So, you know, another thing, um, I'm concerned about when I go into doctor's surgeries is, you know, how many people are going to be in there. How much coughing they're going to do and, um, you know, am I going to pick up anything?'*

(Participant 12, Female, 25-64)

### **7.3.2 Accessing a clinician**

Patients described experiencing difficulty in obtaining a consultation with their chosen clinician in general practice. They describe many difficulties in scheduling appointments. In particular they were unhappy with the systems in place for the management of appointment scheduling.

Patients struggled to get through to the practice via the telephone, for example where there were specified timeslots during which appointments could be made via telephone and the telephone lines were busy.

*'Um, no, I only called because you usually have to call in the morning to get an appointment, so there's a, there's a bracket of time. It's after 8:30 is when they open so you have to call then pretty much every single minute just to try and get through.'*

(Participant 10, Male, 25-64)

They found it difficult to schedule an appointment within what they saw as a reasonable timeframe and sometimes struggled to schedule an appointment at all. Those doctors regarded as popular were more difficult to obtain an appointment with.

Systems in place for accessing general practice are controlled by the reception staff. They act as gatekeepers. This is with the exception of online booking services, though these were not widely used by the patients in this study and such services do not offer emergency appointments.

Patients commonly report negative experiences with reception staff, describing them as a barrier to accessing a clinician. They were unhappy with reception staff performing the gatekeeping role; deciding if and when they should have an appointment, especially where they were required to share their clinical information with the receptionist. A patient reported that sometimes reception staff would not fulfil their role by declining to arrange a consultation with a clinician.

*'But sometimes, when you call the reception in the morning, they normally like screen you to see if you should be coming in to see the doctor or not. Or they may tell you, you know,*



*they'll get the doctor to call you back if they don't think it's important. Sometimes I feel like if I am calling I want to see a doctor, I don't want someone to tell me, no, you don't need to come in. I think I only call when it's urgent. So I don't really like it when someone's telling me, no, I don't think... You know, we'll give it a couple of days or the doctor will call you back.'*

(Participant 4, Female, 25-64)

Not all patients were negative about obtaining appointments and the reception staff. One patient describes how the individual receptionist understood and appreciated the access restrictions they were facing and another described how the reception staff at their practice are understanding whenever the patient requires an emergency appointment.

*'My surgery is pretty good, if you want to see the doctor you can get an emergency appointment on the day, you don't have to call at X time to get an appointment there, they're pretty understanding.'*

(Participant 9, Female. 25-64)

The reception staff are the face of the practice and although they administer protocol for obtaining access to a clinician they are not responsible for having created it. However patients often perceive them to represent a barrier to accessing general practice. Frustration with the systems in place for accessing general practice should be viewed in the context of pressures that patients experience on their time. For those patients in employment, they report their work being important to them and they do not want to disrupt it in having to deal with their healthcare, especially where they perceive barriers in doing so. For example patients cannot necessarily miss work to attend an appointment at the practice, thus restricting the times at which they can attend. Patient priorities are not necessarily aligned with those of the practice.

*'Obviously when I'm working, I can't, uh, keep taking time off to go in there.'*

(Participant 7, Male, 16-24)

### **7.3.3 Doctor-patient relationship**

Patients were keen to talk about the doctor-patient relationship and its importance to them. They described having a good relationship with the GP, trusting them and having confidence in them.

*'No, I sort of, I sort of trust her, I sort of think that my relationship relies on me trusting her...If I don't trust her I ought to change my GP.'*

(Participant 14, Male, 65+)

The GP is their preferred source of information, reflecting the trust in the relationship. Patients mention using the web to obtain health information but speak of preferring to obtain their information or have their queries answered by a clinician they trust and with whom they have a relationship.

*'It's quite good because you can always look on line and stuff like that but you don't, like, knowing that it's coming from a GP from your practice you're quite, like, safe and you know it's like, all right to, like, trust... trust them.'*

(Participant 11, Female, 25-64)

In particular patients value continuity of care. Patients have built up relationships with the practice and GP over long periods of time. They describe having been registered with a practice for a long duration and some report seeing a specific GP over a long period of time. They prefer to see the same GP rather than others in the practice, describing how their GP knows them and their condition. Patients are loyal to their practice and their individual GP because they value this ongoing relationship.

*'But I'd still prefer to see the doctors that I've been seeing for years and years rather than the new ones'.*

(Participant 12, Female, 25-64)

Despite patients valuing it, not every patient was experiencing a doctor-patient relationship. One patient terminated their relationship with their practice, moving to a private general practice which offered longer consultations and continuity of care, which they had not been experiencing with their NHS GP. Another patient described their perception of a lack of continuity of care in general practice in the UK. This patient had used email in a secondary care setting only.

*'I mean I feel like that's a problem in the UK that GPs don't have a relationship with their patients. I mean, I feel like they don't even know who I am.'*

(Participant 4, Female, 25-64)

### **7.3.4 Summary: prior experience of general practice**

Patients have clear ideas about what they like about general practice and what they do not. Overall they would rather not have to interact with or attend the general practice. They experience difficulties in accessing general practice specifically in relation to making appointments and the systems used for doing so. Their frustrations are focused on reception staff acting as gatekeepers. However when they do have to attend the general practice they value the doctor-patient relationship and continuity of care, having built relationships with the practice and feeling that there is trust within the relationship. These experiences of general practice set the scene for the use of email consultation.

## **7.4 Email arising as a solution**

Email is a day-to-day method of communication for these patients. Email consultation arises where it can be utilised in overcoming issues associated with general practice. The doctor-patient relationship plays a major part in determining whether it is used.

### **7.4.1 Email as the norm**

Patients described existing in an environment of internet and social media use. Terms such as 'Facebook' and 'Twitter' are familiar to them even if they themselves do not use social media services. Email is an established communication method and patients report using it in day to day lives and in their work lives.

*Everyone likes to email, you know, it's just quick.'*

(Participant 9, Female, 25-64)

Email use and being 'online' is perceived as the norm. Patients report having access to email either via work and/or home computers, and via their mobile telephones.

### **7.4.2 Why and how email arises**

Most commonly patients described initiating the email contact, others reported that it was initiated by the clinician. Where email was initiated by the patient it was because they felt that attending for a face-to-face consultation was not necessary or was not possible, for example when travelling abroad or where it was not possible to schedule an appointment. Patients thought they would try emailing to see if it worked. Where the clinician was initiating

email, it was largely as a solution to accessibility challenges faced by patients, for example those relating to distance or physical mobility.

*'Yeah, yeah. I mean he's, he always says as well, because I can't manage the stairs. He always says, oh, you can always email me. So, I think, you know, that's nice when they reassure you.'*

(Participant 12, Female, 25-64)

The doctor-patient relationship acted as a facilitator for whether email was initiated. In line with their views on continuity of care, patients do not want to have email communication with just any clinician; they want to use it with a known clinician. One patient required healthcare whilst abroad and wanted to obtain this from their general practice in the UK rather than seeking healthcare overseas. Email enabled the patient to have that communication with their known GP.

*'Yeah, the first time I was ill and I was abroad and I wasn't really sure what to do. And I just wanted to speak to, um, my doctor as opposed to going somewhere. So I called up to speak to the doctor and they said they were with patients and stuff. And I was like, please can I just like email across, just some questions that I may have?'*

(Participant 6, Female, 25-64)

Patients perceive that clinicians are not offering email to just any patient and that it is their relationship that permits it to happen.

*'And, um, I called the surgery to speak to her, but every time I called, um, she was just either with a patient or they'd said she'd call me back at the end of the sort of surgery and it never happened. Um, and I asked is there another way that I can contact her, and, um, they said no. And I said, well does she have an email address. And anyway, they asked her, and because she knew me and I wasn't a nutcase, um, they gave me her email address.'*

(Participant 9, Female, 25-64)

Email for consultation is not a system that is uniformly provided to all patients in the practice. It appears to be a form of selection by the clinician and patients are aware of this. Overall, it seems that email is arising where there is a perceived need for an alternative method of communication in the general practice setting rather than being formally introduced.

### **7.4.3 Summary: email arising as a solution**

Email is an everyday method of communication for patients. Its use for communication in healthcare arises because it provides a solution where an alternative method of consultation is desired or necessary.

## **7.5 How email offers solutions**

Email consultation offers a solution to the problems patients describe facing in general practice; as outlined in section 7.3 these were negative feelings about interacting with and attending general practice and the problems encountered in accessing a clinician. Email also allowed patients to obtain what was important to them, continuity of care via the doctor-patient relationship. The reasons given by patients for using email consultation comprised two key themes; the personalising effect that email has on their healthcare, and the sense that email makes healthcare more convenient.

### **7.5.1 Personalised access to the clinician**

Email changes the way that patients access the general practice. It provides a direct contact between patient and clinician. It allows the patient to bypass reception and the associated systems in place. This is a positive thing for patients given their dissatisfaction with the existing ways of accessing a clinician via general practice. Email is providing a solution to this problem and creating a channel for access.

*'But this is a direct line with Dr X; I can just write, you know, he'll see my message, and he'll come back to me.'*

(Participant 9, Female, 25-64)

Patients report a feeling that the clinician is more accessible and 'there' because they are able to email them directly.

*'It makes it feel like she's more there for me, because it makes me feel like she's there for me even when I'm not just seeing her, because she's happy for me to email her. So it does make it feel like it's a, a better service that I'm getting from her. Um, yeah, so I think it just makes me feel more in touch with her, and more as though she's there.'*

(Participant 1, Female, 25-64, using private GP)

Email also extends access in allowing patients to address concerns that they may otherwise have not bothered to consult about if that involved using the usual channels.

*'I don't put things behind because I think, oh, God, I have to make an appointment, I have to go there, so let's forget about it.'*

(Participant 13, Female, 25-64)

Email is also able to provide access to a clinician where reception have failed to do so, or where access is not possible.

*'And telephoning... they weren't passing phone calls on to GPs, so I thought, well, there's an email address, I will email them.'*

(Participant 3, Female, 25-64)

Not all patients could make an initial contact via email. Some practices require patients in the first instance to send an email via a central email account controlled by reception staff, before routing the email to a clinician. Despite the lack of direct contact, this system had benefits for patients; allowing them to avoid telephoning reception and speaking directly to reception staff, and offering all of the other advantages of email with a clinician once the email is routed.

*'No, there is... there is an individual email account, but, I think, it's vetted. I think the practice... I think the receptionists vet the emails.'*

*Interviewer: So you emailed the surgery?*

*'I emailed... yeah, but when it comes back to me, it comes back from his personal email address.....at the surgery. So...'*

(Participant 3, Female, 25-64)

As already described one patient was using email with a secondary care consultant rather than a clinician in general practice. The patient emailed a consultant known to them personally via their work, thus avoiding the referral process in general practice. Despite the recipient of the patient email not being in general practice, the principle of the patient using email to bypass an existing system was the same.

Sometimes attending the practice was not practical for mobility or distance reasons. Email provides a way to keep in touch with the clinician. This was the case for some of the patients in this study, one example being a patient who had a physical injury to their knee, thus attending the practice became difficult for the duration of the injury. Email meant that it was not necessary for them to attend in person.

*'Obviously I don't live too far away. It's probably a 15-minute walk. Um, a 15-minute walk. But on crutches, obviously, that goes to half an hour plus. Uh, walking. So... and as well, it was really painful. So... I, I didn't really want to do that.'*

(Participant 7, Male, 16-24)

Where patients and clinician are communicating directly via email, the usual patient access pathway is disrupted. Patients bypass reception, and the systems in place designed to provide access and control the schedule of the clinician. Conversely the general practitioner may use email to contact the patient directly with for example, test results. Usually this sort of task would be left to the reception staff. Where clinician and patient enter into an exchange of emails, this may lead to the concern being resolved, or to the clinician recommending a conventional form of consultation; telephone or face-to-face.

*'Yes, she initiated an, ah, ah, an email consultation, um... well, she, we had agreed that she would e-mail me the results of some blood tests ah, just over a year ago, um, and one of them showed an abnormality and she e-mailed me the result of that and said, perhaps I'd better come in to discuss what we did next.'*

(Participant 14, Male, 65+)

Patients understand this concept, they are aware that email can be used to obtain a clinical opinion about whether they need to attend.

Where email leads to a subsequent face-to-face or telephone consultation as prompted by the clinician, it allows the patient to justify the time spent with the clinician. In recommending a face-to-face appointment the GP has validated the need for an appointment. In addition the clinician is expecting the patient and is aware in advance of their concerns; the patient will not need to explain themselves in the consultation. It removes concerns relating to 'bothering the clinician' and not knowing whether the concern they have is worthy of an appointment.

*'Yeah, before I go and see him I send him an email because I mean, you know, I do think... I get concerned about something and, uh, so I said do you think that's, you know, like, I don't know, um, um, I'm going to get backache, should I come?'*

(Participant 13, Female, 25-46)

It may also make the appointment making process easier. For example, when trying to get an appointment with a clinician via reception the patient will have justification for doing so,

having been asked to come in by the clinician. This mitigates some of the anxiety associated with having to call reception.

Where the consultation is completed via email, email has acted to replace the traditional method of consultation. Where it leads to other forms of consultation it seems to be providing an alternative way for the patient to eventually obtain the healthcare they require, or for the clinician to get their message across. Patients get to avoid attending the practice in person or telephoning the practice unless deemed necessary by the clinician during the email communication. Although email is acting as a replacement for patients, in reality it is serving as an alternative way to circumvent the usual pathway through general practice, minimising contact with reception and minimising attendance at the practice. In summary, email is allowing patients to avoid the elements of general practice they dislike, or that they are unhappy with, whilst still being able to access healthcare.

### **7.5.2 Personalised communication with the clinician**

Patients have described the importance of the doctor-patient relationship and continuity of care. Email consultation allows patients to get the most out of the relationship and achieve continuity of care because it acts as facilitator for communication, and for the transfer of information.

Email is used as a way for the patient to obtain reassurance from the clinician and as a way for the clinician to extend the consultation. It is making patients feel more secure about their health by giving them an open communication channel.

*‘Um, yes generally, as I said, because she was quite detailed in her response. And, um, the fears that I had about the pill that I was taking at the time, she allayed my fears.’*

(Participant 9, Female, 25-64)

Patients find it easier to communicate certain things via email than face-to-face, for example sensitive issues, and so email is enabling a dialogue between the patient and the doctor that may not otherwise exist. Patients use it to consult about things they would not otherwise bother to.

*‘You don’t have to leave your house; you don’t have to, you know, make an appointment and you can just pour it out and sometimes I find it easier, rather than, you know, if it is a personal problem, putting it on an email rather than, you know, face-to-face’.*

(Participant 12, Female, 25-64)



Email provides an easily retainable reference of the consultation for the patient in a way that other communication methods do not. Ordinarily if the patient wants an account of the face-to-face or telephone consultation they have to write it themselves either during or after the consultation. Any information sent in the form of an email, be it an email consultation or otherwise, can be retained, saved and printed for future reference, though not all patients deemed this necessary.

*'Yeah. You can obviously take it, copy and paste, and save it. That's what I did. Um, with the information about medicines.'*

(Participant 7, Male, 16-24)

Information is important to patients. They report having questions for their health professional, and wanting to obtain information on issues that concern them, such as side effects from medication or physical rehabilitation. Communication between patient and clinician via email often takes the form of a request for information or the transfer of information between patient and health professional.

*'Um, oh, I've sent her an update before, because I was due to be having, um, my neuropsychology tests, but they were postponed. So I sent her an email to update her on the situation and tell her why I hadn't had them, and when they would be.'*

(Participant 1, Female, 25-64, using private GP)

Overall, email seems to be strengthening the relationship between doctor and patient by extending and deepening communication and providing a channel for the continuity of care.

### **7.5.3 Convenience of email consultation**

Beside the personalisation of care, the other major advantage to its use is its convenience. This convenience allows patients to overcome their concerns about interacting with and attending general practice. It covers several elements: email is described as easier, flexible, useful, time efficient, quick and helpful. These terms reflect the positive nature of email for the patient.

*'But it was really just a query regarding, you know, the tablets that she'd given me. Um, so it was easier and it was... in a way it was more... it was quick it was efficient.'*

(Participant 9, Female, 25-64)

For the purposes of seeking healthcare email seems to be more discreet, less intrusive and personal. It is less disruptive to the day to day lives of patients than existing methods of

communicating with the general practice. Email allows patients to more easily make healthcare a part of their lives.

*'Um, it's less upsetting, because it's less intrusive, so it is good.'*

(Participant 1, Female, 25-64, using private GP)

In particular it fits in with their work lives. Email affords patients greater privacy in dealing with healthcare issues during the working day. Colleagues cannot overhear an email and where patients are working on computers they do not need to leave their desk. Patients do not have to be kept on hold on the telephone. Access to email via mobile telephones means that even those not working with computers may have access to email during the working day.

*'I still think that's more of an effort because you have to get your phone, um, because when I go to work I usually try and switch it off, um, so because, you know, you don't want to get interrupted. Um, because everybody knows you are being interrupted; it's not as if it's something, whereas email, it comes in, you don't have to open it straightaway; you can carry on, finish your work.'*

(Participant 13, Female, 25-64)

There are financial motivations for using email; the cost of taking time off work to attend the practice, the relative cost of telephone calls, and in the case of the participant who was seeing a private GP the cost of a face-to-face consultation. Email provides a more resource efficient way for patients to access healthcare.

*'Because phone calls are very expensive, and I've got free internet everywhere, you know, which is a consideration, because I am on my mobile if I am ringing. It just costs a lot of money, but I have got free internet all month, on my mobile and at work and everywhere else, so it just, it saves costs as well.'*

(Participant 8, Female, 25-64)

*'The other thing to say, actually, because she's a, um, a private GP, who charges a lot for her appointments. I don't get charged for this emailing.'*

(Interview 1, Female, 25-64)

For patients, the asynchronicity of email is the most important element of its convenience. An email can be sent at any time. The patient does not have to wait for a scheduled appointment time to be in contact with the clinician. The patient can take as long as they like to write the email, reflecting on the material they are sending/receiving. Patients considered there to be advantages afforded by the written nature of email, this included being able to write down the information they wished to send, the reflective nature of being able to write an email and the detail and structure that it allows.

*'And the beauty of e-mail is that it's, ah, you don't have to wait, you know, it... the person can answer it at their convenience, and they're not interrupted and you can send it at your convenience.'*

(Participant 14, Male, 65+)

*'I think it actually enhances communication because when something is written it can be more thought out and you can be more explicit since you have more time to think about what you're writing; and it can be more detailed.'*

(Participant 3, Female, 25-64)

Once the email is sent the patient has the sense of completing a task, assuming that the email is immediately in the 'inbox' of the clinician even though they know that they may not act upon it nor respond immediately. This is favourable for busy patients who have many things to do as well as trying to obtain healthcare. Patients want the healthcare service to be there for them when they need it, but do not regard it as the central focus of their time and efforts.

#### **7.5.4 Summary: how email offers solutions**

Email goes some way to counteracting the concerns patients have around accessing, interacting with and attending general practice and it encourages the doctor-patient relationship and continuity of care. This is achieved via personalised access to the clinician, personalised communication with the clinician and via the convenience email consultation offers.

#### **7.6 Problems associated with email consultation**

Email for consultation is not a cure all. Whilst satisfaction with email amongst these patients was high, they were also aware of potential limitations. The nature of the healthcare setting means that email does not necessarily work in the same way as it does in other settings and patients appreciated this.

### **7.6.1. Lack of rules of encounter**

Given the organic way in which email has entered general practice for these patients it is unsurprising that this has happened without any accompanying rules or protocol. For the patients in this study email has so far arisen without any agreed or negotiated rules of encounter.

The contrast between the ad hoc way in which email is used in healthcare and the more consistent ways in which patients use it in other areas of their lives creates uncertainty about how email should be used. This includes uncertainty about where the boundaries between doctor and patient lie in relation to email and how patients can keep to them. Consultation via 'normal' methods; face-to-face and telephone, are standard for patients and there are norms relating to how they are supposed to use them, but the same does not apply to email.

*'Um, well I, I, I've, speaking personally I think ah, it still feels quite tentative, um, and in a sense it hasn't been formalised or given a structure.'*

(Interview 14, Male, 65+)

Patients are conscious of being perceived to be bothering the GP when using email. They perceive that sending an email is wrong; they describe feeling guilty and feeling bad. There is a sense that they should not be using email, because it is not allowed, or not compulsory for clinicians, even though it has been invited and/or approved by the clinician. Patients are conscious of its unofficial status.

*'Yeah, so it makes me feel like, oh I shouldn't... It's something I shouldn't be doing. But when I'm doing it I feel like bad or they feel like they're obliged to respond. I don't know, I just feel... I felt reluctant to do it, whereas I don't think it should be that way.'*

(Participant 6, Female, 25-64)

They perceive that the service could be taken away if it is misused.

*'Yes, because otherwise I don't want to ruin this ability that I have with my GP to converse electronically or have this means.'*

(Participant 3, Female, 25-64)

Another example of this is where patients experience what they perceive to be a delayed response to their email. Largely, patients found that there was no protocol about when they could expect to receive a response. Even where patients were told how long they could expect to wait for a response this was not necessarily consistent or specific.

*'And, uh, he answered my question, and then he just put at the bottom, uh... Just that, I know this response has come within three to five days, but the next one could take longer. He emphasised it again.'*

(Participant 7, Male, 16-24)

Such delays make patients feel that getting a response is not guaranteed. They are unhappy with the uncertainty. Patients have individual expectations about what is a 'good' response time.

*'But then I think the disadvantage with the email is you sometimes expect to get a, a, a reply straightaway, which might not be the case, whereas with a phone call you know you're going to get an answer pretty much there and then. So I think that's just the pro and con of it, con of it, but I didn't have a problem with it.'*

(Participant 10, Male, 25-64)

When they do not receive a response they speculate about why this might be.

*'Its because I felt like a bit of a bore, and I thought, I'll just email her and I'll ask her. So when she didn't reply, I did, actually, start thinking, oh, it's because she thinks I'm imagining it.'*

(Participant 1, Female, 25-64, using private GP)

Not all patients felt that a response was delayed, some were satisfied with the response time and it was meeting their personal expectations. They tended to see a prompt response as a bonus rather than something expected.

*'Um, because Dr Wilson replies more or less immediately. So, it's probably... I don't know if he does it in between patients or whatever. Um, I mean I've had emails from him, I think when he's just started the surgery at 8 o'clock or when he'd do it, you know, before he starts the surgery which, you know, is really, you know, I really appreciate that, um.'*

(Participant 12, Female, 25-64)

There is obviously a high level of uncertainty for patients when they use email consultation and this is exacerbated by the lack of rules of encounter.

### **7.6.2 Uncertainty about clinician perspective**

Patients were conscious about how email consultation affected clinicians, and what clinicians thought of it. As a consequence they speculated about clinician perspectives and exactly how email consultation might affect clinicians.

Patients in this study considered the effect of email consultation on clinician workload and had conflicting views, reflecting the uncertainty around what clinicians actually think. Some patients felt that it may impact negatively, others that it may have positive effects, for example, by reducing the number of face-to-face consultations. One patient felt that in terms of clinician workload, an email was equivalent to a face-to-face consultation.

*'And then if you email him, it's the same as, uh, having, uh, an appointment with the GP. I don't know whether he gets the calculation that he's... because he's dealing with the same thing.'*

(Participant 12, Female, 25-64)

Another patient felt that given the time restrictions in face-to-face appointments email gives the clinician more time and freedom in dealing with patients.

*'And, I think... I feel like it gives them more freedom to address my query than when I call and they're frantic and they've got patients that are checking in.'*

(Participant 3, Female, 25-64)

The differing perceptions arising reflect the uncertainty that patients have around what professionals actually think of email. They do not know what professionals think unless the professional tells them. Patients had varying views about what clinicians thought of email consultation, some felt that they were comfortable with email.

*'Yeah, yeah He, yeah, he, he said so to me, I don't have a problem with it at all so, it was okay.'*

(Participant 10, Male, 25-64)

One patient perceived that email was occurring because it was mutually beneficial.

*'Yes, definitely, yes; that wasn't the convenience for me saying she didn't want to see me in the same week again [laughter]; no, that was definitely convenient for her, so; well, it was convenient for me too.'*

(Participant 8, Female, 25-64)

Patients report that they feel that professionals are reluctant to use email consultation.

*'It just doesn't seem like it's the norm yet. So I'm just a bit reluctant. I don't think GPs really want to be doing that, either, spend their time emailing or getting someone to email. So...'*

(Participant 6, Female, 25-64)

They speculate that clinicians may not be happy about being taken outside of their appropriate role, as these roles exist to safeguard them.

*'Um, it was... it was a short sort of standard response in that. I think... I believe he wrote that he couldn't... um, he still needed to see me. That he was happy to refill my prescription, but only after we had seen one another face-to-face, and that's when I realised that, um, that there... there were certain things that even though I thought, oh okay, I might push the envelope and see if, um, see if, you know, we can just avoid having... me having to come in and say the exact same things I was going to say to him in the email; but it still wasn't okay.'*

(Participant 3, Female, 25-64)

In summary, patients are largely uninformed as to what their clinicians actually think about email consultation and so are forced into speculation.

### **7.6.3 Safety issues**

Patients have considered the potential safety issues around email. They feel that email is not always appropriate or suitable; for instance for urgent or sensitive conditions or where physical contact is necessary. They appreciate the possibility that something could go wrong if it is not used appropriately. These safety issues included factors such as privacy, security and confidentiality.

*'If there's, um, communication by email and something goes wrong, that could be potentially really serious as well, you know, if a doctor gives advice via an email and it's the wrong advice without seeing the patient, I think that's quite dangerous ground.'*

(Participant 9, Female, 25-64)

Interestingly, patients considered their own personal attitudes about these factors, in relation to the healthcare content of the email, rather than appraising email as a technology. Some patients describe not being concerned about security, privacy and confidentiality, others expressed worries and concerns, but these did not stop them from using email.

*'Um, I don't save them so it doesn't really matter and I'm not worried about, um, security or anything like that because I really don't think anybody would be interested to see, you know, my Dr X's patient conversation.'*

(Participant 12, Female, 25-64)

*'Yeah, as well, so, if I knew that everything was like super, super secure then I'd be fine, but I'm just a bit of a worrier on those sorts of things, so [laughs]...'*

(Participant 10, Male, 25-64)

Patients have also considered the negative elements of asynchronicity. These include uncertainty about whether an email has been received, and the fact that the recipient may not read the email immediately. Patients also acknowledge potential problems with obtaining access to email, for instance the potential problems if internet access is interrupted, or unavailable.

*'Um, and also, of course, I didn't know she'd actually got the message at all, because, had it been a phone, I would have known. But because I didn't actually know she'd got it or not...'*

(Participant 1, Female, 25-64, using private GP)

Patients consider the wider context for the use of email; specifically the differences between how people view email use, be these generational differences or personal preference for existing methods of consultation. They realise that email is not for everyone.

*'It would suit certain age groups and I think like my parents or my mother or my father; I don't think they would be comfortable with like emailing. I don't think they would ever do that.'*

(Participant 11, Female, 16-24)

Patients have weighed up the potential safety issues and considered their personal view on these. They have also considered the wider societal context in which email sits.

#### **7.6.4 Summary: problems associated with email consultation**

Patients are aware that email has disadvantages. The lack of rules for encounter prove problematic for the practicalities of using email. Uncertainty about how to use email, combined with uncertainty about what their clinicians think of email consultation are all challenges of using email. Patients have also considered the more practical concerns arising around safety. They have made an informed decision to proceed with using email consultation in light of these concerns.

### **7.7 Social norms to address the problems**

In order to create some sort of structure around their email use, patients utilise the resources they have available to them and this involves applying the social norms associated with day-



to-day life and the ways they have previously interacted with the healthcare service to email consultation.

### **7.7.1 Use of social norms**

Some patients drew on their experiences in the work setting. For instance, a patient expected to receive an out of office message where a clinician was not available to answer an email. One patient felt that because this is standard practice in the workplace it should be standard in the general practice setting.

*'Also, there have been times when a receptionist was off sick so no-one read the email - it should be something that we use as Business as Usual that everyone has access to in the surgery.'*

(Participant 2, Male, 25-64)

Patients are aware that they should use the same social 'rules' that they are accustomed to in other areas of their lives.

*'Because he was, like, obviously, you know, as I've said, oh, you can e-mail me if you've got a problem. You know, just e-mail me. It's like a bit when people say, like, you know, um... Make yourself at home. It doesn't really mean... it as much as, yeah. [Laughs] It doesn't mean kick off your shoes. So when he's saying, like, just e-mail me if you've got a problem, it doesn't mean e-mail me every three days, you know.'*

(Participant 7, Male, 16-24)

Some patients express reservations about whether to email in the first instance, whereby they do not want to approach a clinician via email without having had some form of prior contact relating to their condition in the form of a face-to-face consultation. This is further evidence of patients applying social norms to the use of email.

*'I wouldn't want to just fire out an email to him because I'd... I'm sure he would have to go through some sort of, ah, process to do it, and I just don't think it would be appropriate. I would rather speak to him first, or let him know that you're probably going to be expecting an email from me.'*

(Participant 10, Male, 25-64)

Patients talked about keeping a professional relationship with the clinician when using email and avoiding any negative perception of their behaviour. They speak of not taking advantage of having email as a communication method and not abusing it.

*'But no, I just keep it very professional and just, um, you know, stick to the, the symptoms and what can...'*

(Participant 12, Female, 25-64)

*'And obviously he, he was always okay with the idea of, of me e-mailing him. But I had to spread it out. I didn't like to... I, I couldn't do that every day, or, or like every two days.'*

(Participant 7, Male, 16-24)

These patients stress that they would not abuse email and some patients in the study are actively modifying their use of email, seeking not to be perceived as abusing the email contact. Patients perceive that any abuse of email would come from other patients and not themselves.

*'Um, in the context that I used it in, absolutely fine, but I just think that people abuse the system.'*

(Participant 9, Female, 25-64)

In addition the experiences that patients have of other methods of consultation (face-to-face, telephone) provide guidance on when email may or may not be appropriate. For example, patients talk about appropriate uses for email being for non-urgent, non-serious or minor conditions.

*'So, non-urgent issues... so, yes. Non-urgent issues... something where I don't need a direct response, really.'*

(Participant 5, Male, 25-64)

### **7.7.2 Summary: social norms to address the problems**

There is uncertainty associated with the use of email consultation. Patients attempt to counter this by applying social norms and their experience of other forms of consultation to their behaviours when using email consultation with the GP. However this is not enough to address the uncertainty. Social norms cannot prevent a privacy breach, or tell the patient what the clinician thinks of email consultation.

## **7.8 Definition of email consultation**

As outlined in the methods section, chapter 6, the definition of email consultation had to be broadened. This was because patients did not distinguish between using email with clinicians and non-clinicians in the practice as expected. They did not delineate between

having contact with the GP and having contact with the practice in general. Many patients in the study used the term 'doctors' or 'GPs' to refer to the practice as a whole.

The inclusion in the study of three participants who had only used email with non-clinical staff for administrative purposes, raises the question of whether the definition of email consultation used in the thesis is relevant to patients and because of this the results presented should be viewed in light of the patient interpretation of an email consultation. Patients regard their healthcare as being a spectrum, e.g. everything from small administrative tasks with a non-clinical member of staff through to email with a clinician about a clinical matter. It seems that contrary to this study, which focuses on email consultation with clinicians, patients do not think in terms of consultations with the clinician, rather in encounters with the practice and this is a key finding.

## **7.9 Summary of results**

Email consultation has developed in an organic fashion, in response to practice issues of access and attendance occurring in general practice and a patient desire for continuity of care. Where email works it is providing patients with personalised, convenient care. However it does come with problems, of which patients are fully aware. These problems are largely caused by the lack of official framework surrounding email consultation. This has led to much uncertainty. Patients have tried to mitigate this, using social norms, trying to ensure that their behaviour in relation to email consultation is appropriate. Yet arguably, mitigating these problems should not be the concern of the patient. They are the concern of those delivering care using this method. These factors illustrate how email has potential as a method of consultation, but successfully implementing it into general practice faces many challenges.

## **Discussion**

### **7.10 Summary of main findings**

The patient interview study found that the prior experience patients have of general practice sets the scene for their use of email consultation. Patients report both positive and negative experiences with general practice. They would rather not attend the general practice, feeling conscious about wasting clinician time. They experience problems in accessing a clinician, specifically in relation to scheduling appointments, as they find it difficult to do this via reception staff. Positively, patients value the relationship they have with their GP and the practice, having trust and confidence in the GP. Patients are loyal to their practice and the individual GP and appreciate the continuity of care this brings.

Email consultation is arising because it offers a solution to the problems patients describe facing in general practice and encourages the aspects they appreciate. Patients already see email as a day-to-day method of communication, and hence where there is a perceived need for an alternative method of communication between themselves and their clinician email can fulfil this. Email consultation is arising in an ad hoc fashion between clinician and patient, rather than being formally introduced.

There were two key themes relating to the solutions email consultation brings for patients; the personalising effect that email has on their healthcare, and the sense that email makes healthcare more convenient. Personalised care is that based on personal circumstances and need, and where each individual has greater control and influence over the services they receive.<sup>83</sup> Email provides this in the form of personalised access and personalised communication with the clinician. Email allows patients to disrupt their normal access patterns, accessing their clinician directly. It provides a way to circumvent the usual pathway through general practice, minimising contact with reception and minimising attendance at the practice. Email is allowing patients to avoid the elements of general practice that are impractical, or that they are unhappy with, whilst still being able to access healthcare. In relation to personalising communication with the clinician, email acts as facilitator for communication, and for the transfer of information. Patients email about things they would not normally bother to, feeling that they can use email to discuss sensitive issues, and valuing the ability to retain the email for future reference. It strengthens the relationship between doctor and patient by providing a channel for the continuity of care.

Email also brings convenience, being described as easier, flexible, useful, time efficient, quick and helpful. It is less disruptive to the day to day lives of patients, especially working patients. The asynchronicity of email is a major element of its convenience.

There are clearly many benefits for patients in using email consultation. There are also problems associated with its use, and patients are well aware of these. These problems were in the form of three key themes; a lack of rules of encounter, uncertainty about clinician perspectives of email, and safety issues. The lack of negotiated and agreed rules of encounter were a problem for patients, who worried about whether they should be using email consultation. A particular concern related to delays in receiving a response to their email; in particular the uncertainty as to when this would be, though not all patients were concerned about this. Patients were uncertain about what their clinicians thought about their use of email consultation, and this bothered them. This uncertainty led them to speculation, with some patients speculating that it was a positive thing for clinicians, and others that it was negative. Finally patients had safety concerns when using email consultation. They felt

that email is not always appropriate or suitable; for instance for urgent or sensitive conditions, and they appreciate the possibility that something could go wrong if it is not used appropriately. They had considered privacy, security and confidentiality and had some concerns about these, but these were not enough to cease their use of email. The problems described are largely caused by the lack of official framework surrounding email consultation.

Patients are not passive in the face of these problems. They attempt to apply their own solutions, utilising social norms, drawing on their experiences of email use at work and in other areas of their lives. They apply these norms to their behaviour, conscious of not appearing to bother the clinician, trying to ensure that their use of email consultation remains appropriate. However social norms cannot address all of the problems associated with email consultation, for instance uncertainty about what clinicians think, or potential privacy breaches.

An additional finding related to the definition of email consultation produced for use in the thesis. The definition was widened as the study progressed because patients did not distinguish between using email with clinicians and non-clinicians in the practice as expected. They did not delineate between having contact with the GP and having contact with the practice in general and so four participants had used email for contact with non-clinical staff, for administrative matters. This is a crucial observation that could impact heavily on the design and implementation of any email consultation service, as limiting any such service to clinical contact would not necessarily be understood by patients, and may not entirely serve their needs.

The uncertainty surrounding the conduct of email consultation is a major barrier and the patient alone cannot overcome it. These factors illustrate how email has potential as a method of consultation, but successfully implementing it into general practice requires engagement by all those involved in providing it, and faces many challenges.

### **7.11 Comparison with other studies**

The findings of other studies investigating the use of email between clinician and patient are presented here in relation to how they cohere with the main findings in this study. Several of these studies are also patient interview studies.

### **7.11.1 Wider general practice setting**

Two of the factors arising in this study in relation to the wider general practice setting are those observed more widely in the literature; the importance of the doctor-patient relationship and patient issues with accessing a specific clinician in general practice.

#### *Doctor-patient relationship*

The importance of the doctor-patient relationship has been previously demonstrated. Patients consulting with a clinician in whom they have a high level of trust have higher satisfaction levels with the consultation.<sup>301;302</sup> Despite patients feeling that consultations in general practice are not long enough satisfaction with the consultation length increases when patients feel that the doctor listens and tries to understand them.<sup>303</sup> It has also been shown that patients are prepared to wait longer for an appointment so that they can see the clinician of their choice.<sup>304</sup>

#### *Accessing continuity of care*

It has been shown elsewhere that patients vary in the importance they place on continuity of care, though the majority value it.<sup>301;304</sup> For those who desire it, it is not always available. Reflecting the difficulties faced by working patients in accessing the healthcare they want, a study showed that patients were more likely to be able to consult with someone they knew or trusted if they were not in work or were retired.<sup>304</sup> Some patients in this patient interview study had expressed difficulties in accessing healthcare because they were working.

### **7.11.2 Doctor-patient relationship enabling email consultation use**

The doctor-patient relationship played a major part in determining the initiation of email consultation. This has also been recognised in other studies. A Norwegian study, carrying out interviews with 12 patients using a web-messaging service in primary care found that that a trusting relationship between doctor and patient appeared fundamental in being able to use email to communicate with their GP.<sup>153</sup> (This study was linked to one of the studies in systematic review, Kummervold 2004,<sup>253</sup> see Chapter 5).

### **7.11.3 Personalisation of care and convenience**

#### *Personalised access*

In this study email allows for personalised access to a clinician where patients are dissatisfied with existing provision for doing so. Other studies have shown email to be a solution to problems with accessing a specific clinician.

An interview study with the parents of children with atopic eczema, who had taken part in a randomised controlled trial exploring the potential use of electronic communication with a dermatology clinic in Norway<sup>305</sup> found that the participants in their study felt that email facilitated access to the clinician, providing a communication channel and allowing the flow of information between themselves and the clinician. (This study was linked to one of the studies in systematic review, Bergmo 2009,<sup>256</sup> see Chapter 5).

Another study set in general practice in Norway explored patient experiences of communication with their GP via secure web portal. They interviewed 15 patients and had similar findings to this patient interview study in relation to access. They identified that patients were experiencing easier access to their GP via email, because email meant the patient could avoid travelling to the practice or trying to get through via telephone.<sup>186</sup>

The only peer-reviewed evidence from England, a case study of Communicator (secure-web messaging in general practice) carried out interviews with 13 patients and 2 carers using the secure web-messaging, and found that patients saw Communicator as offering continuity of care, especially with a GP that it was hard to get an appointment with. Patients valued 'emotional continuity' and this was more significant than the transfer of particular items of knowledge or advice.<sup>22,306</sup> The main findings of the evaluation of Communicator were related to its aims. The original vision had been for a service where the messaging service supported management of long term conditions and where staff were largely interchangeable. The reality was that it gave patients much wanted access to a known and trusted personal doctor. This finding cohered with the findings of this patient interview study where access encouraged continuity of care.

The notion that email gives patients a 'direct route' to their doctor was described as an advantage for patients in a discussion article about email consultation, whereby control of the consultation becomes equitably shared between patient and doctor.<sup>164</sup> Additionally, the direct contact with a clinician offered by email consultation was described as a 'privilege' in a survey of the parents of patients using email consultation in a paediatric primary care setting.<sup>119</sup>

### *Personalised communication*

In this study email enables personalised communication with a clinician. Other studies have identified this benefit of email consultation. Another US study<sup>307</sup> assessed the experiences of patients who were early adopters of email communication with their clinician via in-depth telephone interview with 56 patients. Benefits reported were improved communication, more comfortable communication and the ability to save emails as a record of the communication.

The evaluation of Communicator found that patients used it as a way to ask a clinician something that they may have previously made a decision on themselves. This was contrary to the aims of the service; to empower patients to take more control over their healthcare<sup>80</sup> This finding coheres with the finding in this patient interview study that patients felt able to consult about things they otherwise would not, with email enabling this dialogue.

The Norwegian study set in primary care and examining perceptions of a web-messaging service<sup>153</sup> found that email communication lowered the threshold for contacting the doctor, permitting patients to ask questions they would not otherwise and aiding patients who could not physically make it into the surgery. They went on to speculate how this increased access might stimulate the building of the doctor-patient relationship. They also described how the written nature of email was a benefit, with patients describing how health questions are easier to remember and communicate in writing.

The Norwegian study set in general practice found that email was allowing patients to elaborate on complex health problems in a way they could not when face-to-face and this opened up communication between GP and patient.<sup>186</sup>



## *Convenience*

Email also provides convenient care. Other studies have identified this benefit of email consultation. The Norwegian interview study of patients using secure- web messaging in primary care identified 'space and time' as a key theme, and this referred to patients being able to choose when and where the communication would take place, with the asynchronicity of email permitting this.

Patients in a study of an 'ask-a-doctor' online service,<sup>224</sup> which allowed patients to email a doctor and ask a question, felt that convenience and time saving were the most important characteristics of the service. The study was set In Sweden where seeing a doctor is associated with having to stand in line or wait a long time for an appointment. Patients in the study were faced with the inconvenience of accessing general practice, and the online service offered a solution to this.

The Norwegian study set in a dermatology clinic and interviewing parents of children with atopic dermatitis<sup>305</sup> found that email enabled access to the clinician whilst simultaneously allowing the parent to maintain distance and avoid attending the hospital. They describe email as opening a personal asynchronous channel for communication.

It is evident that the finding in this patient interview study that email brings personalised and convenient care is supported by findings in the wider literature.

### **7.11.4 Problems with email consultation**

#### *Lack of rules of encounter*

A major cause of the uncertainty surrounding email consultation is the lack of agreed rules of encounter. It has been suggested elsewhere that setting user expectations so that patients know what to expect of email as a service would increase efficiency of email as a medium for communication in healthcare.<sup>155</sup> Authors of a survey of US physicians, who explored patient and physician email contact concluded that adoption of email will be reliant on how the exchange between professional and patient is managed. They drew a distinction between an unstructured approach where thought is not given to the 'rules' of the exchange and an approach which considers the management of the exchange, considering risks and benefits.<sup>124</sup>

An example where setting user expectations may be useful is in stating the time expected between sending an email and getting a reply. In this study, participants were concerned about how long they would have to wait for the reply, because they had no concept of how

long this wait should and would be. Guidelines on how long they could expect to wait would have avoided this uncertainty and improved patient satisfaction. This is supported in a discussion article on email communication in healthcare which suggests that regardless of the communication medium, the goals and expectation of senders and receivers influences the process of communication.<sup>164</sup>

The evaluation of Communicator<sup>80</sup> also demonstrated the uncertainty about rules of encounter that patients feel, along with the application of social norms in mediating this; patients described concerns about disturbing the doctor, and thus that they only sent essential messages to avoid overburdening them.

### *Safety issues*

Patients in this study outlined their concerns around safety issues relating to email consultation and other studies have identified similar worries in patients. The US study<sup>307</sup> assessing the experiences of early adopters of email communication with their physicians identified concerns about privacy as a barrier to the use of email in this way. The study set in Norwegian general practice exploring patient experiences of communication with their GP via secure web portal<sup>186</sup> found that patients had considered information confidentiality and were not concerned about it.

It is evident that the findings in this patient interview study are supported by findings in the wider literature, including those associated with concerns about the lack of rules of encounter and safety issues.

### **7.11.5 Summary: comparison with other studies**

Whilst the studies described here offer congruence with the findings of this study, this should be considered in the context of the settings and healthcare systems where they are carried out. The results may not be exactly comparable with English general practice, for instance where studies are set in the US or outside of primary care. However as congruence is occurring even despite these differences indicates that there are consistent themes arising around the use of email in healthcare and this strengthens the findings of this study.

There were some elements found in this patient interview study that were not identified in the other studies featured here; the uncertainty patients have about what clinicians think of email did not arise in the studies identified. Similarly the application of social norms in 'solving' the problems associated with email were not identified in these studies. This may be because most of these studies were intended to identify the benefits and barriers associated with email consultation and did not go beyond this. Many asked patients for their perspectives

without them having used email consultation and so they would not have such behaviours to report.

There were themes identified in these studies that did not feature in this patient interview study. The study set in Norwegian primary care<sup>153</sup> found that the access offered by email allowed patients to transfer responsibility to the doctor, relieving them of the burden of their illness. They also found that the use of email opened a path for using a more informal language and this in turn strengthened the sense of a doctor patient relationship. The study set in a Norwegian dermatology clinic<sup>256</sup> also found that patients thought that having access to a clinician was a way for patients to transfer parts of the responsibility for the illness to the doctor, and was a way to demedicalise the interaction between patient and clinician. Although patients in this patient interview study wanted to avoid any interaction with the general practice this was not attributed to a desire to demedicalise their care, though this is a possible area for further exploration.

With regard to responsibility and how email can transfer responsibility of the illness to the doctor, this ties in with the asynchronicity of email. Although this particular theme was not identified in this patient interview study, the notion of being able to send an email and then have the sense of completing a task is comparable, since the patient is offloading the healthcare task in having sent an email, and the responsibility is then on the clinician to reply.

The findings of this patient interview study were also congruent with some of the findings exhibited by non-users of email consultation in the studies described in chapter 2, page 45. Non-users felt that advantages of email might include the speed of email communication, the convenience of its asynchronous nature and the written nature of the medium. They felt that email might provide better access to a health professional and this was also a finding in the pilot interviews. They described having concerns about the security, privacy and confidentiality of email consultation and they were worried about the prospect of bothering the clinician by sending them an email. These findings were mirrored in this interview study and were identified by the patients in the pilot study.

As in this interview study research conducted with non-users provided some indication as to how the prior experiences of accessing healthcare might influence the decision to use email, where non-users did not want to use email consultation this was because they were satisfied with their existing access to their health professional. Users in this interview study were using email consultation where they felt it could improve their access to the GP.

However, non-users were not able to recognise the importance of the doctor-patient relationship and continuity of care in using email consultation. They could not provide information on how email consultation might arise, they did not envisage email as an alternative method of access to their health professional. Patients in the pilot interviews had not envisaged email consultation being available to them, they had not engaged with the notion of using it and what that might mean. The views of users provided a depth that could not be reached by asking non-users about their opinions, as they were able to provide information based on their experience rather than as a theoretical concept.

Overall there was good coherence of the findings in this study with the wider literature on communication between clinician and patient using email.

## **7.12 Methodological strengths and weaknesses**

### ***7.12.1 Approach***

The study focused on participants who had used or were using email consultation, thus collecting information that was related to actual experience and not speculation about what it might be like to use email consultation. This was a strength of the study, especially in relation to some of the other published studies discussed here, where a mixture of users and non-users of email consultation were interviewed, diluting the perspectives of those who have used it with speculative opinions.

### ***7.12.2 Setting***

The study was set in London, and the patients in the sample were attending large general practices each with several GPs working within them. The relevance of the findings in other areas of England may be questionable, for instance in single handed general practices and rural areas.

### ***7.12.3 Sample***

The study reached saturation point, which is the point at which further interviews do not generate anything new, and this was a strength of the study. However the study was not able to recruit any carers. All participants were using email as patients, and so the carer perspective was not included in this study.

As described in the methods section (chapter 6), the sample was a convenience sample, but information on patient characteristics was collected to provide context for the study, and this was because of the potential impact these factors have on the use of email consultation. Only one participant was in the 65+ age group in this study, and since older adults are more

likely to be left behind in relation to the uptake and use of new technologies, and many of the patients seen in general practice are older, this may reduce the transferability of the findings of this study. As age was collected according to three categories; 16-24, 25-64 and 65+ it is possible that participants placing themselves in the 25-64 category were near to the upper boundary for this category, but without asking for exact ages it was not possible to find out. As stated in the methods, the research ethics committee prevented the collection of specific age and this is a limitation of the study. Participants in this study were largely educated to higher level (degree level and above). Thus the participants will have exhibited high levels of literacy. Again this may affect the transferability of the study results.

Although patients were not asked what they consulted the doctor about, ten patients offered this information and a wide range of conditions was represented, including both acute and chronic conditions requiring long and short term care. This was a positive feature of the sample.

In relation to the types of email in use, only one participant was using a web portal, and the remainder were using standard email. This was expected given that email consultation is not as yet formalised in English general practice. Participants had experienced varying frequencies of email use and had been using email for a varied length of time, providing perspectives on a range of experience with email consultation which was a strength of the sample.

#### *Participants 2 and 4 & matched GP-Patient participants*

There were limitations relating to specific participants in the study. Participant 2 took part in the study via email. This alternative approach to including the participant reflected the fact that the participant was busy because of their work life, but still wished to participate in the study, and as this was also their reason for using email with the practice it was deemed appropriate to include them. Whilst sending the interview via email ensured that the participant could be involved, there were drawbacks to this approach. It did not allow for the use of prompt questions, and so the amount of material obtained from this participant was small. The findings cohered with the findings in the rest of the study, but this was only at a superficial level owing to the small amount of data. Though potentially a limitation, because the study reached saturation the impact of the small amount of data obtained was less than it could have been if saturation were not reached.

Participant 4 had only used email consultation with a secondary care consultant. As this only came to light during the interview, the interview was continued and the data reviewed after transcription. This participant had unique circumstances, they had access to a secondary

care consultant through personal networks and used email to have contact with them. Their reason for doing so was dissatisfaction with general practice. Whilst this interview provided an insight into what leads a patient to think about and go on to use email for consultation, and the findings cohered with those from other patients, the lack of email contact with a clinician in general practice meant that this participant's data was not directly relevant to the objectives of the study and this was a limitation.

For six of the patients in the study, their GP was taking part in the professionals study. Where patients and their GPs were both interviewed the power balance between the two was evident. Patients who were aware that their GP was in the study (where the GP had told them) were more conscious of what they said and despite reassurance that the interview was confidential they sometimes expressed concerns about what their GP might think of their use of email. However GPs did not express the same concerns. The main concern of patients in this context was doubt over whether their use of email was appropriate and this view may have been exacerbated in these patients.

#### *Patient seeing private GP*

The sample included a patient who was seeing a private GP. This participant was included to see if the findings would differ because of the difference in setting. It might have been expected that there would be a difference in views between an NHS and a private patient because private practice takes a consumerist approach to providing healthcare, providing the patient with a service in return for payment, either directly or via insurance. The patient in this study had moved from an NHS GP to a private one because they felt that they did not have a doctor-patient relationship with their NHS GP and they were struggling to obtain any continuity of care. They felt they had achieved this in the private sector. Email consultation was a part of this, offering convenience and continuity and these were factors that the NHS patients also realised in email consultation. Thus the views of the patient in relation to email consultation and what it could bring were similar. However, there was one distinct difference, and this was the additional benefit that email offered to the private patient in relation to resource allocation. The patient was concerned about spending money on a face-to-face consultation when email could be used instead, and was free. This is not a concern faced by NHS patients. Overall the findings from this patient cohered with the findings from the NHS patients.

#### **7.12.4 Definition**

The exploratory nature of the study was a strength. It allowed the eligibility criteria for the study to be expanded when it became apparent that not all participants were using email in a

way that met with the definition created for use in the thesis. It allowed for reflection on the definition, which was not interpreted by patients in the way intended. This related specifically to three participants who had used email for administrative purposes (requesting prescriptions and/or making appointments) with practice reception staff rather than a clinician. Additionally participant 4 had only used email consultation with a secondary care consultation, rather than a clinician in general practice.

As outlined in the methods, the eligibility criteria for the study were broadened at the interview stage to include use of email that was outside of the definition and so these participants were included in the study. Their experiences and opinions of using email cohered with those of the patients using email in a way that met with the definition. It seemed that patients did not think in terms of consultations with the clinician, rather in encounters with the practice.

The term consultation is familiar to researchers in primary care, but less familiar to a lay person and this is reflected by the way in which patients referred to 'the doctors' or 'the GP' as meaning the whole practice. The terms used by primary care practitioners and researchers are not necessarily relevant to patients, who develop their own definitions based on their experiences and position as lay people. Thus it is difficult for patients to appreciate a definition of email consultation that specifies roles and settings since they do not necessarily see the distinction between primary and secondary care, or between representatives of healthcare. This finding could influence how new consultation systems are introduced in future. If, as it seems, there is no dividing line between administrative and clinical purposes for email in the eyes of patients, then this has implications for the design of email consultation services and reiterates the need for rules of encounter if clinicians wish to make clear just what they are willing to use email for. It may lead to the development of parallel services offering both elements (clinical and administrative) but with clear guidelines as to what these services can be used for.

#### **7.12.5 Overall: strengths and weaknesses**

Overall, the strengths of this study were its exploratory nature and the ability this gave to expand and refine the eligibility criteria. The study reached saturation, and the findings cohered with those in the wider literature. Weaknesses were related to the sample, specifically a patient using email with a secondary care consultant and not in primary care, a patient who took part via email, and patients feeling more conscious about what they said where their GP took part in the professionals element of the study.

### 7.13 Implications of the study

Email consultation is occurring where there is a need for an alternative method of communication in general practice. Patients are not looking for it to replace their contacts with the general practice, instead it works as an addition to the options patients currently have for consulting.

Use of email consultation happens where there is an ongoing doctor-patient relationship, or where a doctor-patient relationship with continuity of care is sought by the patient, and so it is unlikely to offer the same benefits to patients if it were set up as a service run by different clinicians in rotation. It is the direct access to their clinician, rather than any clinician, that is of crucial importance to patients. Hence policymakers may be taking the wrong approach by focusing on convenience for patients via contact with any of a number of clinicians on the other end of an email. Communicator, devised by the Department of Health for England, was designed to offer contact with any clinician but in reality was used by patients to contact the clinician they already had a relationship with.<sup>22;306</sup>

This is not to say that convenience is not important, but email consultation is only convenient for patients in this study because it occurs within the existing framework of patient contact with their general practice. The importance of continuity to patients challenges the idea of a 'one-size-fits-all' approach to email consultation; any successful use would draw on the clinician-patient relationship.

A great deal of uncertainty is associated with the use of email consultation at present, and if it is to work as a method of consultation, the uncertainties surrounding it need to be addressed. This can be done by formalising email as a method of consultation. Formalising email consultation would involve creating a definition of email consultation and producing rules of encounter, along with addressing safety issues. Formalising email consultation and how it should be used as a consultation method would in turn address the uncertainty that patients feel about clinician perspectives of email consultation, as it would become an 'official' method.

Any attempt to define email consultation must take into account the patient perception of an email consultation, as this may not fit with the clinician perception. The patient perception that there is a lack of division between administrative and clinical purposes for email may have implications for how it is used in general practice, with rules of encounter more crucial than ever. It may also require the development of parallel services so that patient needs both administratively and clinically are met and thus reducing overlap between the two.



How email is formalised is not of concern to the patients, rather they want to hear that they are permitted to use it, can use it safely, and without upsetting the relationship they have with their general practice and its clinicians. This would allow them to benefit from it without having to worry about it. Patients are trying to use a technology that should, according to their prior experience of email consultation, work, but that it is not quite able to yet in the healthcare setting.

## **7.14 Chapter summary**

The patient interview study included 14 participants. These participants shared their prior experiences of general practice; how they valued the relationship they had with their clinician and their practice, but also how they experienced difficulties in accessing their clinician, especially in relation to having to do so via the reception staff. They also wanted to avoid attending general practice wherever possible. It was against this backdrop that the patients were using email consultation. It offered a solution to the issues they faced in general practice, and encouraged the factors they liked, offering personalised access and communication with a clinician, and convenience. It was initiated by both clinicians and patients where an alternative method of communication was required. Despite the ability email had to improve the patient's interaction with the general practice, there were problems associated with it. Patients reported concerns about the lack of rules of encounter, uncertainty about what clinicians thought about using email consultation and safety issues. These concerns were not enough to stop them from using email consultation, but were enough for them to consider ways to mitigate them. Patients applied social norms, and their experiences of existing methods of consultation in general practice to try and do so. Despite this, there was still a great deal of uncertainty surrounding the use of email consultation for these patients.

The findings in this study that relate to the wider general practice setting, the doctor-patient relationship enabling email consultation use, the personalisation of care and convenience and problems with email consultation, were supported in the wider literature, though the uncertainty that patients have about clinician perception of email consultation, and their application of social norms in solving the problems relating to email were not identified in other studies. Strengths of this study were the exploratory approach taken and the ability that this gave to refine the eligibility criteria, and the sample reaching saturation point. Weaknesses were the inclusion of a participant that had not used email with a clinician in general practice, and a patient who participated via email thus giving shorter responses.

The facilitators to email consultation use were the view of email as a normal day-to-day communication technology and the existence of a clinician-patient relationship. The barriers

to email consultation use concerned uncertainty; about how patients should use it, about what clinicians think of it and about whether it is safe. It is this uncertainty that would need to be taken into consideration if email were to become a routine method of consultation in general practice, taking into account patient perceptions and the unique setting that healthcare presents.

## Chapter 8: Professional interview study results & discussion

### *Chapter overview:*

This chapter presents the results of the professional study, with accompanying discussion of the findings. The professionals interview study highlights the key characteristics of general practice as described by the participants, and the status and organisation of email consultation in general practice at present. This sets the scene for their use of email consultation, which arises in response to patient demand and because of the advantages that email can bring to general practice. However email consultation is not without problems, and professionals are well aware of these. They even apply their own attempts at dealing with the problems, but it is not enough. The uncertainty surrounding the conduct of email consultation is a major barrier and professionals alone cannot overcome it. The discussion section of this chapter begins by reiterating the findings of the study, before comparing them with other studies, including other interview studies that have examined email consultation between clinicians and patients. The strengths and limitations of the study are discussed, in relation to the approach, the setting and the sample. Finally, the implications of the study results are outlined.

### **Results**

#### **8.1 Participant characteristics**

##### *Characteristics of participants*

Of the eleven professionals interviewed, ten were general practitioners and one was a practice manager for a general practice with two sites. Of the GPs taking part four were working full time, two part time, two were academic GPs working in general practice part-time, one was a specialist registrar and the final GP was working as an out of hours GP and cognitive behavioural therapist. (Table 8.1)

Of the eleven professionals one was based in a private general practice, the remainder were working in the NHS. Seven of the participants were female including the practice manager participant. Participants had been working in general practice for varying durations; the earliest qualification date given was 1975, the latest as 2004. Two had been working in their current practice for over twenty years, and just one for less than two years. (Table 8.1)

##### *Use of email*

Two participants were involved in using a web messaging service. The practice manager participant had been involved in setting up a centralised web service for the two practices

they managed. One GP offered email consultation via a web-based email consultation service. They were the only GP within their practice offering this service. They also used standard email with their patients.

The remaining nine participants were using standard email. Four of these used their own email address for sending and receiving email. Five participants were in practices where email was received from patients via a central practice email account and then forwarded onto the individual GP. The GP then responded directly to the patient using their own email address.

Eight participants had been using email for more than a year, the longest duration of use reported was seven years and the shortest was six months. Participants were using email regularly, with six participants using it at least once a week. (Table 8.1)

**Table 8.1: Contextual information about participants and their email use**

| <b>Factor</b>                                                              | <b>Number of participants</b> |
|----------------------------------------------------------------------------|-------------------------------|
| <b>Total number of participants</b>                                        | 11                            |
| <b>Type of professional</b>                                                |                               |
| <i>General practitioner</i>                                                | 8                             |
| <i>General practitioner and cognitive behavioural therapy practitioner</i> | 1                             |
| <i>Registrar in General Practice</i>                                       | 1                             |
| <i>Practice manager</i>                                                    | 1                             |
| <b>Role in practice</b>                                                    |                               |
| <i>Full time GP</i>                                                        | 4                             |
| <i>Part time GP</i>                                                        | 2                             |
| <i>Part time GP (academic)</i>                                             | 2                             |
| <i>GP registrar (full time)</i>                                            | 1                             |
| <i>CBT practitioner and OOH GP</i>                                         | 1                             |

|                                           |    |
|-------------------------------------------|----|
| <i>Practice manager</i>                   | 1  |
| <hr/>                                     |    |
| <b>Gender</b>                             |    |
| <i>Male</i>                               | 4  |
| <i>Female</i>                             | 7  |
| <hr/>                                     |    |
| <b>Year of qualification (clinicians)</b> |    |
| <i>1970's</i>                             | 3  |
| <i>1980's</i>                             | 5  |
| <i>1990's</i>                             | 0  |
| <i>2000's</i>                             | 2  |
| <hr/>                                     |    |
| <b>Duration in current practice</b>       |    |
| <i>More than 20 years</i>                 | 2  |
| <i>More than 10 years</i>                 | 5  |
| <i>Between two and ten years</i>          | 2  |
| <i>Less than two years</i>                | 1  |
| <hr/>                                     |    |
| <b>Type of General Practice</b>           |    |
| <i>NHS</i>                                | 10 |
| <i>Private</i>                            | 1  |
| <hr/>                                     |    |
| <b>Type of email in use</b>               |    |
| <i>Web messaging</i>                      | 2  |
| <i>Standard email</i>                     | 10 |
| <i>GP own address</i>                     | 4  |
| <i>Central practice address</i>           | 5  |
| <hr/>                                     |    |

|                                        |   |
|----------------------------------------|---|
| <b>Duration of email use</b>           |   |
| <i>≤ 1 year</i>                        | 2 |
| <i>&gt;1-3 years</i>                   | 2 |
| <i>&gt;3-5years</i>                    | 3 |
| <i>&gt;5 years</i>                     | 3 |
| <i>Not known (practice manager)</i>    | 1 |
| <b>Frequency of use</b>                |   |
| <i>Every day</i>                       | 2 |
| <i>More than one a week</i>            | 1 |
| <i>Once a week</i>                     | 3 |
| <i>Less than once a week</i>           | 2 |
| <i>Unable to estimate</i>              | 2 |
| <i>Not relevant (practice manager)</i> | 1 |

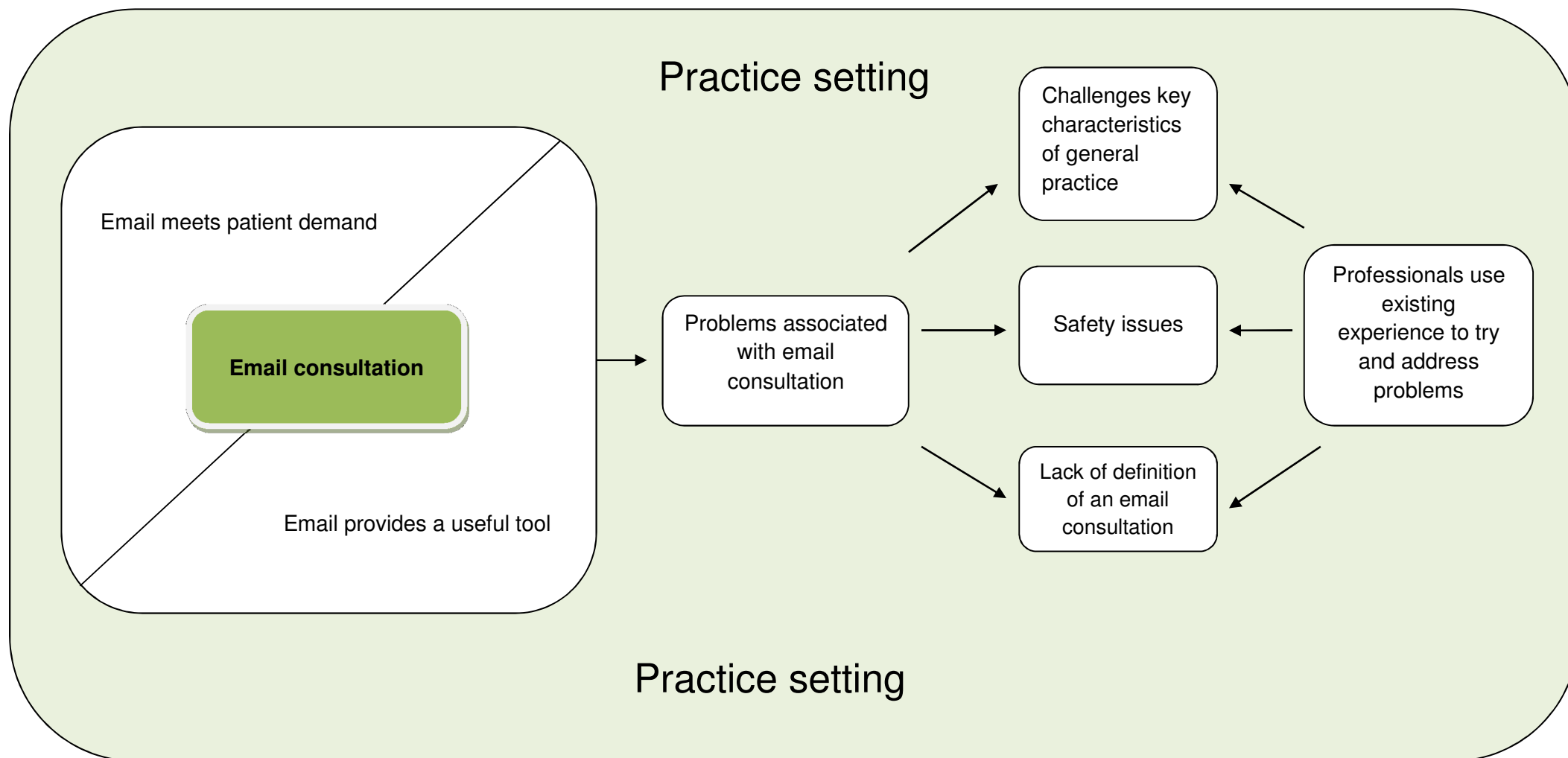
From here onwards participants will be referred to as either professionals (where the practice manager participant is included in the observation) or GPs (where the practice manager participant is not part of that observation).

## 8.2 Overview of themes and their relationship

An overview of the themes arising in this study and their relationship is presented illustratively in Figure 8.1. The results begin with an exploration of the wider general practice setting, in particular what the professionals felt were the key characteristics of general practice. They also described how email consultation sat in the context of the practice in relation to status and organisation. They shared these factors because they set the scene for their use of email consultation. The results then go on to describe how email arises because there is demand from patients, though this alone would not be enough and the fact that provides a useful tool in general practice impacts on the decision to use it. Although email consultation is a useful tool, it is not perfect, and there are problems associated with its use. These are described, along with the attempts by professionals to mediate these

problems. Despite these attempts, professionals are not able to fully solve the problems associated with using email consultation. The following sections present these themes and their relationships in more detail.

Figure 8.1: Themes in the professional interview study and their relationships





### **8.3 Key characteristics of general practice**

The characteristics of general practice set the scene for the use of email. The main themes arising were the general practice setting as busy and time pressured, general practitioner as a decision making role and the importance of communication with patients, specifically in relation to visual and verbal cues in the consultation.

#### **8.3.1 Busy and time pressured**

In the general practice setting GPs are under pressure. They have a high workload and are time pressured.

*'My day is jam-packed, 11 hours, 12 hours a day, um, and there isn't enough time sometimes.'*

(Participant 6, Female, Full-time GP, Senior Partner)

They describe how relationships with patients are not always straightforward.

*'There was one patient who's now left the practice who was a patient who, I suppose, um, one might, in old fashioned terms, call him a thick file, or a patient who's a regular consulter, and he had lots of issues, and so I was seeing him on a regular basis because that was the best way of, um, managing him, looking after him, and preventing him seeing lots of different doctors.'*

(Participant 5, Female, Part-time GP)

They communicated their view that the role of general practitioner is a busy and stressful one. The role also involves a certain level of responsibility, as indicated by GP views on decision making.

#### **8.3.2 Decision making**

With regard to decision making, GPs are aware that it is their role to use their judgement to make decisions.

*'In emergency situations of course you have to be able to direct people.'*

(Participant 7, Female, GP registrar)

*'But anecdotally, I mean most of us would expect that, maybe 50% are admin things, so definitely they don't need to come in, but anyone that genuinely does have a problem – like this morning I had a call-over – you know, if you genuinely think there's an issue, really, we have to go to them or they have to come to us. There's kind of no way around that.'*

(Participant 8, Male, Full time GP)

They have a sense of responsibility towards patients and want to make the right decisions about their care. The care delivered to patients in general practice is centred around the consultation, and GPs were also keen to share their views on the importance of visual and verbal cues in the consultation.

### **8.3.3 Visual and verbal cues in the consultation**

Professionals specifically refer to the importance of communication within the consultation, in particular the value of non-verbal cues identified by seeing the patient face-to-face. For them the visual is important.

*'I mean, we're kind of trained to consult using body language and using other non-verbal skills.'*

(Participant 8, Male, Full-time GP)

*'I think it's reading the personality. I mean, for us that starts the moment someone walks through the room. You know you could get an impression of them; they've already got an impression of you, but you can learn a lot just by watching a patient before they even open their mouth.'*

(Participant 5, Female, Part-time GP)

They also describe the importance of verbal cues and tone, which can be determined in both telephone and face-to-face consultations because of their aural nature.

*'Um, I think general, the beauty of general practice is by being able to talk to people and, and, and seeing them face-to-face and allowing them to tell their story.'*

(Participant 7, Female, GP registrar)

These factors, non-verbal and verbal cues, allow the GP to interpret and understand the patient in the consultation and form the basis of their interaction with the patient.

### **8.3.4 Summary: key characteristics of general practice**

The GPs in this study were keen to share these characteristics of general practice, in the context of exploring their experiences and understanding of email consultation. They described the busy and time pressured nature of general practice, the decision making role they take as general practitioner and the importance of communication in the consultation, specifically the visual and verbal clues in the consultation. As these characteristics define the setting in which GPs are working they wanted their use of email consultation be considered against this background.

## **8.4 Email consultation in the practice**

Professionals described how widely email consultation was used in the practice and how it was organised. Inconsistent approaches were reported within and between practices, some using email consultation more than others. Organisation of email consultation differed between practices, variably GPs used web-messaging services, a central email address with email routed via reception and or personal email accounts to have email consultations with their patients.

### **8.4.1 Status of email consultation in the practice**

Professionals talked about the practice as a setting for the use of email. Professionals reported variably that email was well established in their practice and that other GPs in the practice were considering the use of email.

*'So, um, I work at a practice where, um, email contact is, is, is fairly well established.'*

(Participant 7, Female, GP registrar)

*'Yes, well X has decided she'll have a go at doing it so, um, she's one of the young doctors. She wanted to do it so gradually people will, um, start to do it I think'.*

(Participant 11, Female, Full-time GP, partner)

Or conversely that few GPs in the practice use email, or that email was discouraged in the practice.

*Um, so in our practice, one or two doctors don't really use email very much, in fact in one case, not at all.'*

(Participant 2, Male, Part time GP [academic])

*'Um, well, this came up at the Practice meeting the other day and, um, they were basically saying they weren't going to use it, that was their view.'*

(Participant 1, Male, Part time GP [academic])

#### **8.4.2 Organisation of email consultation in the practice**

They also reported different approaches being taken to the organisation of email in the practice. With the exception of the two participants involved in using web-based email systems, it was clear that there had been no fixed strategy for introducing email into the practice. Some professionals were using their own email address (NHS or otherwise) and the practice was not involved. Others reported email being received and disseminated via central email accounts for the practice.

*'Um, and I, I, so I set up a Google mail address, um.....specifically to use for for, for patients.'*

(Participant 1, Male, Part time GP [academic])

*'Yes, so it's just a, it's, it's, the email address is the practice email address, and then emails get filtered through to the doctor, who, you know, who either picks it up or follows on from the patient that they've seen previously.'*

(Participant 7, Female, GP registrar)

Where a web messaging service was in place the GP described how the email would be directed to them.

*'Well what it does is... basically, yes, they... what happens is they, um, go through the website and it allows them to email me and then the email gets fed to me and then I email them.'*

(Participant 10, Male, Full-time GP, Partner)

The practice manager described how emails were collected centrally.

*'So what happen is we've got delegated person in the practice, got two, that we log onto the website and we'll pick up any request from patients, you know; they will be looked in constantly throughout the day.'*

(Participant 4, Practice Manager)

The distinction between the systems of email in use (centrally received versus personal) is an important one and concerns the responsibility that lies with the GP. Central accounts are fielded by reception staff and so they are responsible for the email in the first instance, absolving the GP of the responsibility of having emails come into their inbox.

*'Our secretaries then look at that twice a day and then forward it to the relevant person, and if that relevant person isn't there it will go to someone else, so that's a kind of structure that we've got around it because people are emailing in more and more.'*

(Participant 6, Female, Full-time GP, Senior Partner)

Using their personal email address means that the GP is solely responsible for receiving, reading and dealing with the patient request. There is no layer of administration between themselves and the patient. This is contrary to the usual methods of consultation, where the reception staff are responsible for controlling access to the GP. Email sent directly to or being sent from the doctor changes the standard doctor-patient interface because patients are bypassing the gatekeeper. GPs have already stressed how they feel responsibility for their patients and this adds to that responsibility.

#### **8.4.3 Summary: email consultation in the practice**

The backdrop to email consultation use differed across practices. Practice attitudes were on a spectrum from not wanting the practice to engage in email consultation through to email consultation being well established. Regardless of attitudes there did not seem to have been any strategic approach to introducing email consultation into the practice. For their email consultation GPs were variably using web-messaging, a central practice email address or a personal email address. Using a personal email address increases the responsibility that the GP faces as they receive the email directly and not via an intermediary. This section serves to highlight the inconsistencies in email consultation use across different practices, which would be expected when something is introduced with no strategy or plan.

### **8.5 Why email arises**

Professionals described their awareness that email is a popular day-to-day method of consultation. Where they made the decision to introduce its use with patients this was due

to a special interest in technology, or because they felt it was what the patient wanted. Patient demand for email consultation is reflected by the fact that most GPs began using email consultation because their patients asked for it or went ahead and used email to contact them. Professionals felt that email consultation was more popular with young and/or working patients. However professionals did feel that email consultation served a useful tool in general practice. There was a sense that email improves access, is convenient and brings something different to the usual methods of consulting.

#### **8.5.1 Email meets patient demand**

Professionals are aware of the status of email as a day-to-day technology.

*'I mean, I... you know, how long have we been using email? It's sort of part of everyday life.'*

(Participant 11, Female, Full-time GP, partner)

One GP felt that its use in healthcare would increase over time as a consequence of its popularity.

*'I think that's changing now, you have so many people now they are so used to using mobile phones and text messages and emails and social networking. I think it will change quite rapidly in the future and become much more common.'*

(Participant 2, Male, Part time GP [academic])

There is a sense of inevitability in relation to email, that its ubiquity means that eventually it will be expected as a consultation method in general practice, even if it is not currently. Where GPs have initiated email with patients reasons given include the GP having a special interest in technology, or because they feel patients want to be able to use it, because it is the norm.

*'Um, well it originally came about because I was always interested in IT and the internet.'*

(Participant 10, Male, Full-time GP, Partner)

There is a sense that there is patient demand for email consultation use. In keeping with this, many of the GPs in the study describe patients initiating the email contact.

*'It's usually initiated by the patient, or as a request by the patient: is there any way I could...? As opposed to us offering it.'*

(Participant 8, Male, Full-time GP)

*I suppose most of them, you know, most people use it all the time now and therefore people will look it up and do it automatically, so...'*

(Participant 6, Female, Full-time GP, Senior Partner)

The perception was that younger and/or working patients want to be able to use email consultation and the older and/or less affluent patients do not.

*'Uh, patients want it, and a lot of patients, um, because, uh, particularly younger generation, everything's done on email now, isn't it?'*

(Participant 5, Female, Part-time GP)

*'Yeah, yeah, so the older ones who seem me regularly, I can't think any of them use... I can't recall any of them ever using email ever. They prefer a face-to-face conversation.'*

(Participant 2, Male, Part time GP [Academic])

Professionals have tended to approach it tentatively, with one GP reporting that the use broadened over time, and another that on reflection they had engaged in more email consultation than they thought. They had previously thought their use of email consultation to be casual.

*'And, and now it's kind of broadened a little bit.....and at the drop of a hat I'll ask someone for their email address as a way of just sort of following up on something we've been talking about. And, and I, you know, so far that seems to work pretty well.'*

(Participant 1, Male, Part time GP [academic])

*'I was quite surprised to see how many patients I've seen or have had into, ah, had email contact with.'*

(Participant 11, Female, Full-time GP, partner)

Email is a commonly used communication method and patients want the option to use it in healthcare in the same way they do in other areas of their lives. Professionals are able to appreciate this view and this patient demand seems to influence their decision to use email consultation. Use arises in an ad hoc fashion, tentatively and developing in an iterative fashion, rather than being implemented in any systematic fashion.

### **8.5.2 Email provides a useful tool in general practice**

Email consultation might be arising as a consequence of its ubiquity in day to day life and patient demand, but demand alone is not enough. It is the benefit that email consultation brings as a communication tool that plays a part in the rationale for using it. Professionals want to deliver the best care possible and email aids their ability to do so.

- Access and convenience

Professionals perceive that patients struggle in obtaining access to the GP, with current routes of access not necessarily meeting patient expectations for the type of contact patients would like. Professionals perceive that email consultation serves to fill this gap.

*'Um, and if your access was fantastic through other routes, you may not really have a genuine need for email consultation. But it's because our access isn't as much as our patient demand would like, I think that's where the desire for other forms of access comes in.'*

(Participant 8, Male, Full-time GP)

*'So, I don't think it's added anything clinically, but I think it's allowed a much better access.'*

(Participant 5, Female, Part-time GP)

For example, in providing a practical method of contact for working patients who may otherwise struggle to make a convenient appointment without taking time out of their working day.

*'The feedback from patients is really good. They like it. I mean not... everything is online and a lot of people, you know, especially the people that works, that works full-time, if I work full-time from eight o'clock... from nine till five, you know, and I don't want to spend my break to go to the doctors - if the doctors are open during my lunch-break, I would like to log in a request or an advice, you know, by e-mail and that the doctor will call me back, or e-mail me, or be very... you know, I'm sure it's for you as well, be very practical.'*

(Participant 4, Practice Manager)

They highlight the fact that email offers patients direct and personal contact with the GP, allowing patients to bypass reception staff who usually screen requests for contact with the GP. This is even the case where a central email account for the practice is used, as the email is forwarded directly to the doctor in question by the reception staff and the patient need not interact directly with them at any point.



*'Um, and I think people like to know that they can talk to their doctor directly, um, as opposed to having to go through several tiers of, you know, telephonist, you know, receptionist, secretary.'*

(Participant 7, Female, GP registrar)

Additionally, the access provided by email allows patients to maintain contact with them specifically and not just any GP in the practice, thus encouraging continuity of care. GPs perceive that patients appreciate this.

*'So, I think probably from a patient's point of view, it adds to it [the doctor-patient relationship], because they feel a greater sense of – probably – a greater sense of access...And probably a greater sense of rapport.'*

(Participant 8, Male, Full-time GP)

The access email provides can span long distances, enabling continuity of care when patients are in another country. One GP described a patient who lives mostly in Spain but wished to maintain regular contact with their GP in England.

*'You know, again another patient who lives abroad who comes and sees me every time she comes back, so I will email her. I've forgotten about her actually. I haven't seen her here for a while. She lives in Spain, um, most of the time, and so, er, since... we used to fax. She used to fax me stuff and then email became easier so we would email, um, when I was trying to investigate...'*

(Participant 6, Female, Full-time GP, Senior Partner)

Another described a patient who was seriously injured whilst on holiday in India and wanted to be in regular contact with the GP whilst they were recovering in an Indian hospital.

*'So on, there's that one, a rather sad one. Got four here from a lady who had a accident in India, um, horrible accident, and her mum spoke to me and I actually emailed back to India for her.'*

(Participant 11, Female, Full-time GP, partner)

Email is providing a service in allowing these patients to have this contact across long distance, and in the case of the patient in India, when they are feeling vulnerable and scared and wish to communicate with a clinician that they know and who knows them.

The asynchronicity of email permits communication over long distances because it prevents differences in time zone from being a problem. For professionals, the asynchronicity of email was a benefit. Some GPs working part-time used it to maintain communication with patients between sessions, allowing patients to leave emails for GPs to collect when they next had a session in the practice.

*'...um, so if I, you know, if there's anything I want to follow up with patients there's a whole week before I'm back in the surgery again to follow them up, so again a way of, you know, keeping things going...'*

(Participant 1, Male, Part time GP [academic])

It also compared favourably with the synchronous nature of the telephone. GPs described how they could not necessarily take a telephone call if they were in surgery or otherwise unavailable. Email allows GPs to store emails so that they might read and reply to them when convenient.

*'So, with telephone calls it's quite constrained, you know, so if I'm in surgery I can't really take calls easily, and then you know, often I'm out at meetings, so if you ring up there's no guarantee that you will be put through. Whereas the emails, you know, it's just waiting and if I have time I'll deal with it.'*

(Participant 2, Male, Part time GP [academic])

It also makes getting in contact with patients easier, for example during the working day when patients cannot answer the telephone.

*'... because you call, they [the patient] say, oh, I just can't talk at the moment. Because the way offices are, you know, open-plan and things, I can't talk.'*

(Participant 9, Female, Part-time GP, Private practice)

This was especially the case for the GP working in private practice, who described caring for a largely working population. This GP stressed how the NHS was not able to provide the convenient care that these patients require. This view was contrary to the experiences reported by the NHS GPs in this study who did describe using email to provide convenient care.

Overall, professionals feel email offers a quick and time efficient method of communicating with patients.

*'Well, I think it's um, you know, it's just convenience. So I think, for example, for the web links, rather than writing it out by hand or printing it, it's just easier to put it in an email and send it to them.'*

(Participant 2, Male, Part time GP [academic])

*'They might not necessarily want to come in and spend 20 minutes talking about other things, um, and so, um, an email's quite an efficient way, efficient use of their time and our time.'*

(Participant 5, Female, Part-time GP)

- Different type of communication

Email offers a different type of consultation. It is a written communication form. The written nature of email is seen as an advantage for both GPs and patients, allowing for clarification and reflection.

*'I mean, you know, I'd rather have an email than I would have a, a lengthy conversation, which I, I can sort an email in my head, whereas I can't sort a conversation.'*

(Participant 11, Female, Full-time GP, partner)

*'I also strongly believe that when you write down what you want to say to someone, it clarifies it, and so, for some people it's actually a very good way of really sizing what they hope to get out of something.'*

(Participant 5, Female, Part-time GP)

Professionals perceived that a lack of physical and verbal contact could be preferable for their patients in certain circumstances, and thus email would encourage a contact where there might not be any otherwise.

*'And you see, what is interesting, is that I think some people prefer the faceless, the im... you know, the person... the guy they don't really know, they never have to eyeball, you know...'*

(Participant 3, Female, GP in OOH and CBT therapist)

One GP thought that email allowed patients to introduce topics that they did not feel they could raise face-to-face, allowing the GP to subsequently follow these up in a face-to-face consultation. Another felt that it could theoretically allow for history taking before a

conventional consultation, thus preparing the GP for the consultation, though they had not used it in this way.

*‘So that’s not quite email, but that’s some of the concept with, you know, getting people to do a history before they come in....which I do, you know, I’m grabbed by that. I think that it would be helpful.’*

(Participant 11, Female, Full-time GP, partner)

Email consultation is offering something different to telephone and face-to-face consultation and professionals have reflected on what it can bring that other consultation methods cannot.

The positive features of email consultation; improving access, being convenient and bringing something different to the usual methods of consultation are drivers in the decision by professionals to engage in email communication with patients.

### **8.5.3 Summary: why email consultation arises**

Email consultation arises because as a day-to-day technology, it is perceived to be popular with busy working age patients. As well as being desired as a consultation method by patients, it brings advantages. The advantages include improved access to the GP for patients and convenience for both patient and GP. It also has advantages as a different type of communication. The written nature is deemed a benefit for both patients and professionals in allowing reflection, and the lack of physical and verbal contact is sometimes beneficial for patients who want to share a problem they felt they could not do in person or over the telephone. Professionals want to deliver the care that is good for the patient and brings benefits to them and the practice. Email consultation provides a way of doing this.

## **8.6 Problems associated with email consultation**

Professionals had also considered the potential problems associated with the use of email consultation. They were concerned about the negative consequences of using email for consultation, rather than rejecting the notion of email outright. This reflects the responsibility they feel towards their patients.

### **8.6.1 Email challenges the key characteristics of general practice**

Professionals experience problems integrating email consultation into their already busy and time-pressured practice.

*'It's made it... um, I sometimes feel these days it's slightly too much for me because people use it and use it and use it [email] and of course it's like an extra surgery for me.'*

(Participant 10, Male, Full-time GP, Partner)

They are concerned that an escalation in email consultation use will only make their workload greater and put them under more time pressure.

Email removes proximity with the patient. This removes the visual and verbal cues that professionals associate so closely with communication in the consultation. Professionals described how email removed the option of examining the patient. One GP reported finding it very difficult to assess the tone of an email.

*'I mean, we're kind of trained to consult using body language and using other non-verbal skills, which you really can't convey effectively, necessarily, on email; and tone is really difficult to convey appropriately on... on pure text.'*

(Participant 8, Male, Full-time GP)

GPs compared email to the face-to-face consultation. They felt email created a sense of disconnection and that the depth of communication was lost. They also worried about the potential for the communication being misunderstood.

### **8.6.2 Email consultation lacks a formal definition**

Professionals though meeting the eligibility criteria for the study, which required them to be using email in a way which met with the pre-specified definition, did not necessarily agree with the definition and they shared their views on whether email communication constituted a consultation.

*'Uh, it's something I would say for me is something to support the consultation rather than being another form of consultation.'*

(Participant 2, Male, Part time GP [academic])

Professionals were not necessarily certain about what email should be used for.

*'So, for certain things, yes, I do believe that there is a place for email. But, um, I think then there's a bit of a grey area as well.'*

(Participant 7, Female, GP registrar)

*'If somebody, for instance, has had a respiratory tract infection, e-mail me saying, I'm no better, then I, I will e-mail them back and say, come and see me. So I don't, you know, I don't write back and say, are you wheezy, are you coughing up productive sputa? So I don't... I try not to manage their clinical condition.'*

(Participant 9, Female, Part-time GP, Private practice)

Though there were a set of purposes that professionals reported using email for; sending and receiving information, answering a referral request, providing test results and answering patient questions (of any type).

*'Okay, um, I've used email, um, as a way of patients being able to, um, write to me to ask me questions, and to discuss things.'*

(Participant 5, Female, Part-time GP)

*'I often show them something on the Internet which might be useful for them, you know, I'll just direct them to a website rather than print out a mass of information I just tend to email them the link directly.'*

(Participant 2, Male, Part time GP [academic])

GPs also described how email consultations with patients sometimes incorporated both a clinical and an administrative element. Thus the use of email was wider than that stated in the definition which was restricted to clinical content. Ordinarily administrative tasks such as prescription requests would be filtered via reception, or via specific systems in place. Many GPs described their practices as having established systems for patients to obtain repeat prescriptions or make appointments electronically, often via email and they did not tend to be involved in providing these services.

*'Um, we do get a lot of other emails as well, so for example we offer repeat prescription requests by email, but those come to a central email.'*

(Participant 2, Male, Part time GP [academic])

However despite there being separate systems in place to provide services like these GPs did report receiving emails of this nature, for example patients asking the GP directly for an appointment instead of using the online booking service.

*'So, um, it will be them saying, um, I mean some, for some people it's, can I, I, can I come and see you on this day?'*

(Participant 5, Female, Part-time GP)

GPs expressed a need for a formal definition of email consultation so that they know when an email communication becomes a consultation and they can act accordingly.

*'I guess I want clarity about what the dialogue was. Is it actually a consultation? Or is it actually a request for a little bit more information; or what?'*

(Participant 8, Male, Full-time GP)

The variability in whether and how professionals are defining email consultation highlights the potential difficulty in putting boundaries on what an email consultation may constitute, as each individual professional (and their patient) may have a different perspective.

### **8.6.3 Safety issues**

Professionals describe making consideration for safety, security and confidentiality in relation to email. They are worried about the potential for missing emails or not providing a timely response.

*'And... and... there's this is kind of... which I'm sure has come up in your other conversations, but this kind of feeling that in some way, what if they're lost, or missed, or someone doesn't pick it up, or if I'm not here who will manage it?'*

(Participant 8, Male, Full-time GP)

This was a particular concern for the part time GPs. They were concerned about what happens when they are not there to check email.

*'.....we have a system in the practice that patients can email us, although mostly not to our personal email address, because my anxiety about email consultations is that if I'm not here, even though I might have put my out of office up, that email sits there for... could be up to two weeks, so we have a system where they email into the xxx Clinic, um, box.'*

(Participant 6, Female, Full-time GP, Senior Partner)

The GPs using web messaging described how offering a practice wide email consultation service meant that they were sometimes required to consult with patients they had never consulted with before.

*'I mean the ones who've got the hang of the internet become regular customers so I often we... you get some of these chains of emails going backwards and forwards, backwards and forward. Um, but some come out of the blue.'*

(Participant 10, Male, Full-time GP, Partner)

The GP found the lack of proximity concerning with regard to safety; they could not verify the identity of the patient and did not have any sort of relationship with them upon which to base their actions.

Professionals were concerned about confidentiality and security. They worried about human error, for example accidentally sending the email to the wrong person, and they also worried about malevolent behaviour; someone hacking into emails, someone pretending to be the patient.

*'Um, I think, I think there is an issue very often if you're not careful, and especially if there's been kind of a series of conversations, you just might include the wrong person. You need to be careful about... very careful about confidentiality.'*

(Participant 6, Female, Full-time GP, Senior Partner)

*'I'm protecting myself and I'm trying to protect... I think I am. I wouldn't know if I am protecting them, but I'm doing what I think I'm... to minimise any sort of, you know, personal details, um, you know, being hacked into, whatever you say.'*

(Participant 9, Female, Part-time GP, Private practice)

They describe a need to be more careful and considered in their use of email as compared to when using the standard methods of consultation. These standard methods of consultation already have frameworks in place for addressing safety issues like confidentiality and email does not, leaving the GP to make consideration for these.

The GPs discussed incidences of inappropriate or unsafe use of email by patients. One GP reported a safety issue in having received an email with urgent content. In this case the GP was able to avoid a safety incident.



*'And actually just two weeks ago, I had a patient emailing the practice. I mean, I say 'I', but it's up in my court usually, who basically said, um, I wonder if you could recommend a, a counsellor, erm, I'm feeling quite suicidal. So, I then, you know... that came to my... fortunately, it was looked at that day.'*

(Participant 11, Female, Full-time GP, partner)

There were individual accounts given of patients and professionals behaving inappropriately in relation to email. For example colleagues giving out a GP's personal email address to a patient and the patient subsequently bombarding the GP with lots of emails.

*'And, um, one of my colleagues gave him my email address and that wasn't something I would, he wasn't someone I would necessarily have chosen, and I then got probably about ten emails from him every week, and, um, we had to sort of make some very strong ground rules about those.'*

(Participant 5, Female, Part-time GP)

*'This is one that was for doctor X because they've discovered if they haven't... if doctors here don't have an email address they can, um, email me and ask me to forward it on.'*

(Participant 10, Male, Full-time GP, Partner)

Again this reflects the lack of regulation around email consultation. This lack of regulation was especially evident in relation to the uncertainties expressed over how to deal with emails and the patient record. GPs were concerned about whether they should record the information from the email in the patient record, and whether and how they should store the email.

*'Yeah, but ideally, you know, in the long term I think you need some way of integrating the two, so an email is automatically attached to the patient's records so it's done without you thinking, you know, taking action, for medical and legal reasons because in case I at some point forget to record something, it's in an email but not in the notes.'*

(Participant 2, Male, Part time GP [Academic])

*'So I wouldn't keep those e-mails if it was just practical things. Maybe I should, I don't know.'*

(Participant 9, Female, Part-time GP, Private practice)

Another GP was uncertain about how to deal with a folder containing emails from one patient after they had left the practice.

*'Yes, and I'm not quite sure what to do with that because he's now left the practice, so, I've just kept it, because I don't really know what to do with it.'*

(Participant 5, Female, Part-time GP)

The practice manager participant did not share the same concern. They could not see why the method for dealing with putting the information in the patient record would differ from the approach used for other methods of consultation.

*'It's the same thing, let's say, when a home visit is requested that the doctor goes into their homes, and it's their responsibility to come back later and say what happened in the home visit, it's the same thing [with email], it it's just a form of consultation.'*

(Participant 4, Female, Practice Manager)

This may reflect the difference in their roles, with the GP ultimately responsible for the accuracy of the patient record and safety of patient data.

Overall there are significant concerns for professionals using email consultation. These reflect the uncertainty surrounding it as a method of consultation. Professionals are having to use it without regulation or guidance available to them.

#### **8.6.4 Summary: problems associated with email consultation**

There were problems associated with email consultation and these fell into three groups. Firstly, that it challenges the key characteristics of general practice, this included concerns about managing workload when already under time pressure and a lack of proximity to the patient. Secondly, it was a concern that email consultation lacks a formal definition. Professionals are not sure what it should be used for, and report using it in very different ways. Some report using it for both clinical and administrative purposes interchangeably. Finally there were safety issues. These included concerns about the confidentiality and security of emails, how to deal with the data generated via email and whether this should be in the patient record, and experiences of inappropriate use of email by patients. All of these factors reflect a lack of regulation around email consultation, and they cause great uncertainty.

#### **8.7 Attempts to regulate email consultation**

The professionals in this study have devised ways to manage their email consultation use. In order to create some sort of structure around their email use GPs draw on their experiences with the standard methods of consultation. They devise boundaries to place around their

email consultation use, these boundaries being for the patient to respect and the GP to adhere to.

This involved first and foremost forming an opinion on what they would regard as an email consultation and outlining how they exercise control by offering email consultation selectively to patients.

### **8.7.1 Creating a definition**

In the absence of a formal definition the GPs in this study imposed their own informal criteria for when an email could develop into an email consultation and when it could not. This allowed them to exercise control over the communication. They had ideas about when email became a consultation, for instance that their not responding straight away meant it was not a consultation.

*'Um, and... or the patient has asked me, could you send me this via email, then I'll just do it when it comes through, as opposed to actually entering into a consultation, or a real, true dialogue via email.'*

(Participant 8, Male, Full-time GP)

As well as deciding when they thought an email communication became an email consultation, they also exercised control by using email selectively with certain patients. They were exercising their personal choice in deciding which patients to email; reflecting their role as decision maker.

*'Yes, well I think it's... you know, it is, it is very personal and I, I certainly wouldn't dream of saying to all my patients please email me wherever you like, because that will be just crazy, um, but there are the few that maybe you're concerned about and you know, um, have a particular need, and then there are some it's just for convenience, um, and...'*

(Participant 6, Female, Full-time GP, Senior Partner)

This means that email is not a method of consultation that is open to all patients, and professionals ultimately have the control over who uses it even though it has largely arisen in response to patient demand.

GPs devise boundaries to place around their email consultation use. They describe setting boundaries with the patients and also maintaining boundaries themselves. These are less prescriptive than rules, and not explicitly stated, but were clearly identifiable as GPs shared their accounts of email use.

*'Um, before I've used email I've always, um, made some ground rules with the patients.'*

(Participant 5, Female, Part-time GP)

GPs also set themselves boundaries, for instance deciding only to check their email during work hours.

*'Because it's not, we don't, I don't read my emails everyday. I don't have access to my work emails. I don't have a Blackberry that I get my work emails from, so, I'm in the building when I'm in the building, so they understand that.'*

(Participant 5, Female, Part-time GP)

GPs clearly wish to maintain the same sort of boundaries they experience with other methods of consultation. This makes sense because the other methods of consultation are well established with clear boundaries associated with them.

#### **8.7.2 Drawing on experience with standard consultation methods**

Many draw upon their experiences with other methods of consultation in managing their use of email consultation, comparing email to how they manage telephone and face-to-face consultations.

*'Well I did it as the same as any consultation because you receive phone calls from patients, you receive letters from patients, you see them face-to-face and as in all of them you've got to put yourself in the position to make a diagnosis or management plan that's safe and, um, reasonable.'*

(Participant 10, Male, Full-time GP, Partner)

GPs also reported reverting to more standard methods of communication where they felt it was necessary.

*'But, you know, clearly there needs to be boundaries around all of these things, so often it's, uh, actually, this is not appropriate – why don't you make an appointment and come in?'*

(Participant 7, Female, GP registrar)

*'So some emails come and I'll think, you'd better come and see me, so they get told to go make an appointment.'*

(Participant 10, Male, Full-time GP, Partner)

In fact GPs seem rather relaxed about this, they often interchange different methods of communication with different GPs variably describing how email leads to a telephone consultation which then leads to a face-to-face consultation. They are reverting to the methods of consultation that are more familiar to them and often, the most appropriate method of consultation.

*'So, it's usually, you know, dear doctor I've had X, Y, Z, and it's usually quite a sort of, a generic email that goes back saying clearly these are symptoms that need to be explored further, I'd appreciate if you can make an appointment to see me, or one, one of the other doctors at your earliest convenience.'*

(Participant 7, Female, GP registrar)

Ultimately GPs know that even when using email consultation they can rely most on what they know best, the face-to-face consultation.

### **8.7.3 Ensuring safety**

The professionals in this study describe creating rules for patients that are designed to ensure patient safety, for example asking patients not to use email for urgent conditions and directing the patient to other people in the practice if they do not receive a reply. This is a way for GPs to try and manage the risk they feel is associated with using email.

*'Um, there are... yes, I've all... I always say to patients if you email me there is a risk I may not be here, and there is a risk that you won't get a reply, and if you don't then you must do... contact somebody else in the surgery.'*

(Participant 6, Female, Full-time GP, Senior Partner)

In an attempt to combat the issue of the patient record professionals devised their own methods for recording and storing emails. They drew on the approach taken already for face-to-face and telephone consultations in deciding how to manage the data generated by an email consultation and this decision was sometimes made in conjunction with the practice.

*'Yes, I try to... I used to just file them in my own folders but I... in fact, we've made a decision as a practice that we will print them off and file them in the patient's notes, so I try and do it when the whole thing's finished so it's not 20 different bits, you know.'*

(Participant 6, Female, Full-time GP, Senior Partner)

Some reported making arbitrary personal decisions on when it was necessary to save the content of an email, and when it was not, dependent on the content.

*'Uh, depending what it is, and if it's anything important, like if I send them a letter, that also would come into their records as well, and if there's anything important, I would record it. But if it's just a link about, you know, a website, I wouldn't bother recording that in the notes.'*

(Participant 2, Male, Part time GP [academic])

Despite going ahead and making these decisions on how to store the information there was still uncertainty amongst professionals. They questioned their approach, with one GP questioning what another GP in the practice did with email responses.

*'Yes, I mean one of the doctors, um, I think does use quite a bit of email, and I actually don't know exactly what she does... with the responses.'*

(Participant 11, Female, Full-time GP, partner)

Technological aspects of storing data were not mentioned by the participants. This may reflect their relative unimportance to the participants in the face of patient safety concerns associated with data storage.

Overall it is clear that professionals are using their experience to create their own version of regulations over how email consultation is used. This allows them to retain control over email consultation, in the same way they have control over standard methods of consultation.

#### **8.7.4 Summary: attempts to regulate email consultation**

In the absence of regulation professionals attempt to counter this themselves, using their professional experience. This regulation is not any sort of official attempt to solve the problems, rather a pragmatic approach to dealing with them. It involved creating their own definition of an email consultation, putting limits on what they would and would not use it for, and setting boundaries for patients and for themselves. They revert to standard methods of consultation (face-to-face, telephone) where necessary, as these are well established. They also try to ensure the safety of email. This includes devising ways of getting data into the patient record safely. Throughout it was evident that professionals draw on their existing experience to create these regulations. However this is not enough and professionals cannot be expected to consider and deal with every problem associated with email consultation. There is much scope for improving the regulation around email consultation.

## **8.8 Summary of results**

Email has arisen in an ad hoc way, driven by the wider popularity of email, patient demand for using it and the advantage it can bring to practices. However it is not without problems and there is a great deal of uncertainty surrounding its use. This uncertainty relates to the way it challenges the key characteristics of general practice, the lack of a definition for email consultation and potential safety concerns. In response to this GPs have made their own attempts to regulate email consultation and these largely draw on their experiences with other methods of consultation, using these as a point of reference. Since it appears that email consultation is occurring primarily for the patient's benefit, if the advantages of email are to outweigh the disadvantages then the uncertainties surrounding email consultation need to be addressed. Professionals will need to be reassured that this is a safe and workable method of consultation. They also require formal guidance on how to use it.

## **Discussion**

### **8.9 Summary of main findings**

The context of the setting in which email consultation was occurring was important to the professionals in this study, who shared what they felt to be key characteristics of general practice; a busy and time pressured environment in which they are expected to make decisions on patient care and take responsibility for these. They stressed the importance of visual and verbal cues to how they currently consult with their patients.

As well as describing their role and experiences as general practitioner they described the wider practice setting in relation to email consultation. They were communicating the backdrop to which they were using email and this was variable amongst practices; some were in practices where email consultation was well established, others in practices where it was discouraged. Where it was in use the organisation varied; two practices were using a specific system set up to offer web-messaging via a website, but the remainder were not. An interesting finding in relation to the responsibility that GPs feel towards their patients related to the practice use of central email accounts, whereby all emails came via a central email address. The responsibility for receiving and dealing with the email lies with reception/administrative staff, creating a layer of administration between the patient and GP in the conventional way. Where GPs were using a personal email address they took sole responsibility for dealing with the email and removed the practice from the interaction.

Overall the background to the practice setting provided a sense of how variable approaches to email consultation are and thus how professionals are likely to have different experiences

according to their practice setting. Thus introduction of email consultation is not occurring from the same baseline across practices.

Despite this varied background, all of the participants appreciate that email is a day-to-day technology, and they are aware of patient demand for using it to communicate with the general practice, especially in younger and/or working patients. Professionals perceived that demand arose where patients experienced problems in accessing general practice and email consultation could provide an alternative.

Overall email consultation arose because patients wanted it and professionals could appreciate the need for it, and it arose for these participants in an ad hoc fashion, evolving over time, even where systems were put in place for its use.

Responding to patient demand was not the only reason for professionals to start using email consultation. They perceived it as a tool that could assist them in carrying out their role as general practitioner. It provides an access route for patients to contact them where they currently struggle to, allowing a direct and personal communication with the GP, encouraging continuity of care, which the GPs appreciated. Email consultation is convenient, in particular its asynchronous nature which professionals deemed convenient for both themselves and for their patients, especially when compared to the telephone. This was particularly relevant when they considered their working patients, who could not necessarily talk on the telephone, leading to difficulties in getting hold of patients. Email offered a different type of communication, with the written nature seen as an advantage. Email removes visual and verbal contact and this was seen as positive in certain circumstances, allowing patients to share things they might not otherwise.

Professionals were positive about their use of email consultation, but had worries and concerns about using it. It impacted on the characteristics of general practice; raising concerns about workload when they are already busy, removing the proximity with the patient that they are accustomed to having in the consultation and creating a sense of disconnection when communicating with the patient.

They also reflected on the lack of formal definition of an email consultation; even though they were using email in way that met the definition of email consultation used in the thesis they did not necessarily agree with this definition, and each had their own perspectives about when an email becomes a consultation and what that consultation should be used for. There was also the blurring of the boundary between clinical and administrative uses of email with email consultation being used for both purposes, even where electronic services for administrative tasks were in place in the practice. This highlighted the potential difficulty



that may be faced in creating a unified definition of an email consultation, as professionals are individuals with their own perspectives on how they practice.

More practical concerns related to safety issues. Security and confidentiality of email was a concern, for instance sending the email to the wrong person or emails going missing. They also worried about having communication with patients they did not already know or were not familiar with, given the lack of proximity. There were also reports of inappropriate use of email by patients or colleagues dealing with emails inappropriately. Dealing with the data generated by email consultation was also deemed problematic, having to decide whether and how to store emails. These are issues that have rules and regulations associated with them for the standard methods of consultation, but not as yet for email, and all of the safety concerns reflected the lack of regulation around email consultation.

Despite all of these concerns, professionals were using email regardless and in fact making their own attempts to regulate its use. They created their own informal definitions of an email consultation, based on the kind of communication they were prepared to have with the patient, and allowing them to exercise some control over it. They also chose the patients they were willing to have this sort of communication with, leading to a service that was selective. They also placed their own boundaries around email consultation use, for the patients to adhere to, but also for them to apply to their own behaviours. Much of the regulation they applied drew on their experiences of existing and well established methods of consultation. Safety issues were harder to mitigate, though application of experience with telephone and face-to-face consultation was useful in deciding whether and how to put details of email consultations into the patient record.

Although the professionals applied their own experiences of practice to try and alleviate the problems associated with using email consultation, this was not enough and a great deal of uncertainty surrounded the use of email consultation by these professionals. They alone are not able to counter this uncertainty and as a result email consultation is a long way from being a standard method of consultation in general practice, despite its advantages.

### **8.10 Comparison with other studies**

The findings of other relevant studies investigating the use of email between clinician and patient are presented here in relation to how they cohere with the main findings in this study.

### **8.10.1 Email consultation in the practice**

#### *Status and organisation of email consultation in the practice*

A US study explored the experiences of physicians using email communication with their patients, carrying out telephone interviews with 45 physicians from a variety of medical settings.<sup>129</sup> To participate the physicians must have been receiving one or more emails from patients a day, so they were frequent users of email consultation. In relation to the organisation of the email consultation they experienced, the physicians felt that where there was no triage of email and the email was delivered straight to them, this was a burden. Though the sense of email as a burden was not directly expressed in this professionals interview study, GPs felt that receiving email directly added to the responsibility they already felt for their patients.

The only peer-reviewed evidence from England, a case study of Communicator (secure-web messaging in general practice)<sup>22;306</sup> asked three GPs who had piloted the system in their practices what their experiences had been. Where Communicator was used in practices it was introduced by a lead GP and they tried to engage their fellow clinicians in using Communicator, but found enthusiasm to be limited. The varied opinions on email consultation within a practice were demonstrated in this professionals interview study, whereby there may be one GP in the practice keenly using email consultation, where the rest of the practice staff do not agree that it is a good idea.

### **8.10.2 Why email arises**

#### *Email meets patient demand*

The US study of physicians<sup>129</sup> reported findings relating to patient demand for email; the physicians in the study accepted that email is a day-to-day technology and that its use will only increase in future, findings mirrored in this professionals interview study. The physicians also reported variably that they initiated the contact with their patients, or that the patients asked for email communication. The difference between the two studies was that many of the US physicians advertised their email addresses, inviting patients to contact them, and this was not the case for the participants in this professionals interview study. Though both studies were similar in that they reported an ad hoc rather than a systematic approach to the introduction of email consultation into their practice.

An interview study with 20 practice managers working in Scottish general practice examined their views on non face-to-face consultation, which included email.<sup>280</sup> The participants had reported differing levels of use of technology in their practices but whether their practice

used email consultation or not was unknown. The interviewees felt that as email became more prevalent in society as a whole general practice would incorporate it, however they also perceived a lack of patient demand for its use, suggesting that they felt that wider societal pressures, rather than individual patient demand would be the prompt for introducing email consultation.

### *Email provides a useful tool in general practice*

#### Access and convenience

The GPs carrying out the pilot of Communicator in their practices actively sought to maintain communication with patients outside of office hours, and one GP worked part-time, using Communicator to maintain contact with their patients when they were not working in the practice; behaviour exhibited by some GPs in this professionals interview study. The three GPs involved in piloting Communicator were described as having a longstanding interest in IT, working in practices well-equipped with IT and with a history of IT-based innovation and so they may not necessarily be regarded as typical.<sup>22;306</sup>

The findings relating to access and convenience from the US study of physicians<sup>129</sup> were very similar to those identified in this professionals interview study. The participants described the benefits they felt email consultation brought to patients; improving access by offering an alternative route of access for their patients, who experienced difficulties with getting through to the practice on the telephone. They perceived the patient having direct access to them as being positive. Email was deemed especially convenient for working patients, and for the GP dealing with working patients, as the asynchronous nature of email meant that they could contact them without having to spend time making many telephone calls. They described email being used for distance communication with patients who were travelling, also a finding of the professionals interview study.

The physicians in the US study<sup>129</sup> felt that email could improve the continuity of care with patients because of the improved and direct access it provided, for instance allowing follow up of patients with chronic conditions, and this sentiment was also expressed in the professionals interview study.

#### Different type of communication

The US study of physicians<sup>129</sup> found that email was deemed useful in allowing patients to communicate sensitive issues that they may not wish to consult about face-to-face. They also felt that being able to receive preliminary information from the patient before the consultation saved them time and aided patient management. Though the GPs in this

professionals interview study did not have this experience, one GP did suggest that collecting information from patients prior to consultation would be a useful purpose for email consultation.

### **8.10.3 Problems associated with email consultation**

#### *Email challenging key characteristics of consultation & safety issues*

Physicians in the US study<sup>129</sup> worried about the effect of email consultation on their workload, they were concerned about it becoming a burden. They were especially concerned about this when they were solely responsible for receiving the email to their personal email address. They also felt that the lack of proximity as compared to telephone and face-to-face consultation meant that email was not as good for dealing with complex issues.

The physicians in the US study<sup>129</sup> expressed worries relating to the safety of email consultation. These included worries about email not reaching them in a timely manner and concerns about how to document the email in the patient record. In relation to confidentiality some physicians were concerned and others were not, however all continued to use email consultation regardless of these concerns.

#### *Overall uncertainty*

The common factor the three type of problems identified in the professionals interview study; challenging characteristics of email consultation, lacking a formal definition and safety issues, are all exacerbated by the uncertainty surrounding email consultation and this uncertainty was recognised in other studies.

In the US study<sup>129</sup> physicians were concerned about the lack of formal policies in place for their use of email consultation, though some followed the AMA guidelines<sup>107</sup> when using email consultation (see Chapter 2, page 39 for description of these guidelines). Setting specific guidelines such as these are not available to GPs in England.

The interview study with practice managers in Scottish general practice found that they perceived a need for clear external guidance in implementing new methods of consultation, to ensure quality and safety.<sup>280</sup> This was an interesting contrast with Communicator, where despite it being a system designed to formalise email consultation, the GPs introducing it into their practices did not introduce formal systems to support its use.<sup>22;306</sup>

#### ***8.10.4 Attempts to regulate email consultation***

Physicians in the US study<sup>129</sup> identified a need for boundaries around email use, particularly in relation to what is appropriate content, what are appropriate response times and what happens to the email when they are not available. Some applied their own boundaries, with many stating that they only used email with selected patients, though specifying no criteria for how they did so. A US based questionnaire survey of physicians found that physicians were using email with selected patients and suggested that this was to limit the risks associated with email consultation.<sup>124</sup> Participants in this professionals interview study also reported using email with selected patients.

#### ***Drawing on experience with standard methods of consultation***

As in this patient interview study, physicians in the US study<sup>129</sup> reverted to standard methods of consultation where necessary. Where an email was difficult, vague or inappropriate physicians asked the patient to telephone them instead.

#### ***Ensuring safety***

Participants in other studies attempted to mitigate the potential safety issues associated with email consultation. Physicians in the US study<sup>129</sup> purposefully did not put personal details into emails. A survey conducted with health professionals in the UK<sup>19</sup> found that in relation to putting the detail of emails into the patient record GPs had devised their own systems, with most GPs cutting and pasting details of the email consultation into the record (52/513, 10%) and some adding contemporaneous notes (41/513, 8%) from the email.

#### ***8.10.5 Summary: comparison with other studies***

There were relatively few studies identified that examined professional perspectives of using email consultation, especially when compared to the many studies that have done so for patient perspectives. Patient perspectives seem to be more researched than professional perspectives and this is supported by the results of the systematic review (Chapter 5) where no primary outcomes relating to health professionals were identified.

Whilst the studies described here offer congruence with the findings of this study, this should be considered in the context of the settings and healthcare systems where they are carried out. The results may not be exactly comparable with English general practice, for instance the study set in the US. Some had a mixture of participants reporting on actual and speculative opinions on email consultation. The congruence occurring despite these

differences indicates that there are consistent themes arising around the use of email in healthcare and this strengthens the findings of this study.

There were elements found in this professionals interview study that were not identified in the other studies featured here. The issue of the definition of email consultation did not appear in any of the other studies. They did recognise concerns relating to a need for regulation around email use, but this did not extend to a definition of what is and what is not an email consultation. This may be because these other studies have approached email as a more general communication method rather than a consultation method, and so have not yet been required to make the distinction.

There were themes identified in these studies that did not feature in this professional interview study. The US interview study<sup>129</sup> with physicians reported that email consultation acted as a useful educational tool for use with patients. This suggestion did not feature as any part of the professionals interview study. The US study also addressed the issue of reimbursement, which is a major concern in the US owing to the nature of their healthcare system. The mixed market system means that physicians expect to charge for each item of work they carry out and for the patient to be subsequently reimbursed via insurance, be this private or Government insurance. Therefore an email may constitute an individual item of work, and the physician would expect to charge for this.<sup>63;170</sup> The physicians in the US interview study identified reimbursement to be a major concern. In contrast, reimbursement was not a concern for the GPs in the professional interview study since they would not be expected to charge for email consultations, being more concerned instead with fitting email consultation into their existing work patterns.

The findings of this patient interview study were also congruent with some of the findings exhibited by non-users of email consultation in the studies described in chapter 2, page 45, and in the pilot study. Non-users, when asked about the prospect of offering email consultation to their patients mostly reflected on potentially negative consequences; increases in workload, extra demands on time, confidentiality, privacy and security issues. They were also concerned about the prospect of making diagnoses via email. These findings were mirrored in this interview study. Where advantages of emails were discussed they referred to specific tasks that email could be used for; for example recalling patients or disseminating information to patients. Similar accounts were identified in this interview study.

One of the findings in this study, the lack of definition of an email consultation, reiterates concerns about how useful data from non-users is. If those professionals using email consultation were unable to agree on a definition then it is difficult to envisage how non-users could contemplate what it means to them. GPs taking part in this interview study

shared how they interacted with email consultation, and how they drew on the elements of other forms of consultation in using it. The views of users provided a depth that could not be reached by asking non-users about their opinions, as non-users would not be able to visualise these interactions and solutions because they had not had the opportunity to engage with email consultation.

Overall there was good coherence of the findings in this study with the wider literature on communication between clinician and patient using email.

## **8.11 Methodological strengths and weaknesses**

### ***8.11.1 Approach***

The study focused on professionals who had used or were involved in using email consultation, thus collecting information that was related to actual experience and not speculation about what it might be like to use email consultation. This was a strength of the study, especially in relation to some of the other published studies discussed here, where a mixture of users and non-users of email consultation were interviewed or surveyed, diluting the perspectives of those who have used it with speculative opinions.

### ***8.11.2 Setting***

The study was set in London, and the professionals in the sample were attached to large inner-city general practices each with several GPs working within them. The relevance of the findings in other areas of England may be questionable, for instance in single handed general practices and rural areas.

### ***8.11.3 Sample***

#### *Saturation*

- GP participants

A limitation of the professional interview study was the failure to reach saturation. It was not apparent until analysis was complete that there were some themes that may have been more evident if further interviews had been conducted. These themes included perspectives on the education of GPs in the use of technologies, generational effects on this use and also reflections on GP relationships with practice managers. These may or may not have gone on to be key themes in the analysis however without interviewing further participants it is not possible to tell.

At this point in the PhD programme there was not time or resources available to conduct further interviews. It was decided not to continue with interviews. Adding additional participants would have increased the time required substantially and this was not possible. The decision not to conduct any further interviews was aided by problems encountered when recruiting professional participants.

It is possible that the unofficial nature of email use by professionals discouraged them from participating. There may be professionals that feel they should not be using email, or that are doing it without wider permission or knowledge within the practice, and therefore did not feel they could talk about it. Certainly those GPs participating expressed concerns that the interviews and any associated quotes should remain anonymous. The GP survey carried out in Scotland about attitudes to and experiences of email consultation found that most of the respondents who stated that they had received patient emails did not answer the corresponding question about whether they had replied to the patient email, implying that they did not want to disclose whether they had engaged in email consultation with patients.<sup>137</sup>

The PCRN assisted with recruitment but even with their network of practices they struggled to identify eligible GP participants. Participants were mostly recruited in a snowball fashion, via word of mouth and asking GPs outright whether they used email.

The lack of saturation does not detract from the quality of the interviews that were conducted nor the key themes identified across all of these. Attempts were made to ensure rigour in the interviews that were conducted. In qualitative research the reliability and validity of the findings is important. It refers to how 'true' the findings are, and this can be assessed in part according to the quality of analysis and interpretation.<sup>215 308</sup>

Validity can be maximised by providing evidence from the data for each interpretation made, looking for deviant cases and disconfirming data and including context so that the reader can judge the interpretation.<sup>215</sup> Examples of measures taken to ensure validity in this study included re-examining uncoded sections of transcripts to look for disconfirming evidence, noting deviant cases as part of the presentation of the results and presenting contextual background information on the sample.

Reliability can be improved by ensuring accurate transcripts, comprehensively analysing the whole data set and discussing the coding and analysis with colleagues during the process.<sup>215;308</sup> To ensure reliability a professional transcription company were used to obtain clear interview transcripts and recordings were listened to at least once to check the



transcript and again for analysis purposes. Each transcript was coded in full. Two academic supervisors assisted in coding and analysing the data.

Despite attempts to ensure rigour, the lack of saturation does raise questions about whether there are additional factors relating to professional perspective of email consultation that could have been explored further.

#### ***8.11.4 Overall strengths and weaknesses of the study***

Overall, the strengths of this study were its exploratory nature and the collection of data from participants who were engaged in using email consultation. The study did not reach saturation, however key themes were identified and the findings cohered with those in the wider literature. The sample was varied in relation to factors deemed relevant to how email consultation was used. Weaknesses were related to the lack of saturation, particularly in the practice manager group, and lack of nurse participants in the study, and so the results may not fully address the objectives of the study.

- Practice managers

Despite efforts to recruit practice managers only one of those approached during recruitment was involved in the use of email in their practice. Therefore only one practice manager participated in this study. This may reflect a lack of involvement in email consultation by practice managers, however without trying to recruit from a wider range of practices this is not possible to determine. As only one practice manager was interviewed for this study saturation was not reached in this group of participants. The interview conducted with the practice manager was included in the analysis and many of the findings cohered with those obtained in the interviews carried out with GPs, however for the findings that appeared to be specific to the practice manager perspective it was not possible to ascertain if these were findings that would apply for all practice managers or just to the participant in question. Additional participants would likely have altered the findings in relation to the management perspective. The interview study with practice managers in Scottish general practice<sup>280</sup> found that practice managers were primarily responsible for ICT within their practices and they felt they would play a primary role in introducing new consultation methods to the practice team and negotiating any resistance to their implementation. As a result, any future studies would need to properly establish the views of the practice managers involved in email consultation.

Recruitment was ceased at eleven participants, partly because the ongoing analysis of interview data indicated that saturation was being reached for some of the key themes in the GP interviews, and partly because of difficulties associated with recruiting professionals as

compared to recruiting patients. It is possible that the unofficial nature of email use by professionals discouraged them from participating. There may be professionals that feel they should not be using email, or that are doing it without wider permission or knowledge within the practice, and therefore did not feel they could talk about it. Certainly those GPs participating expressed concerns that the interviews and any associated quotes should remain anonymous. The GP survey carried out in Scotland about attitudes to and experiences of email consultation found that most of the respondents who stated that they had received patient emails did not answer the corresponding question about whether they had replied to the patient email, implying that they did not want to disclose whether they had engaged in email consultation with patients.<sup>148</sup>

### *Nurses*

It was not possible to recruit any practice nurses to take part in the study. This was despite ensuring that recruitment materials were widely available to nurses including those in practices where GPs were using email consultation. This is possibly a reflection that nurses are not engaging in email consultation with patients, however without data available on how many clinicians in England use email consultation it is not possible to ascertain whether this study should have sampled nurses in order to gain a fuller perspective on email consultation in general practice. As the patient interview study included a participant who had used email consultation with a practice nurse it might be presumed that the professionals study is missing a nurse perspective.

### *Professional factors*

As described in the methods section (chapter 6), the sample was a convenience sample, but information on professional characteristics was collected to provide context for the study, and this was because of the potential impact these factors have on the use of email consultation.

Data was collected on date of qualification for the GP participants, with the presumption that there might be a cohort effect on how email consultation is used by GPs according to when they were trained. As stated in the methods section, chapter 4, communication and information technologies were introduced into the medical education setting in the late 1990's as a way to enhance learning and teaching,<sup>292;293</sup> and by the late 2000's this had extended to teaching students how they applied in practice.<sup>294</sup> The sample featured participants with a wide range of qualification dates and the majority of participants had been in practice over more than twenty years, which was a strength of the sample. However, the issue of communications technology related teaching in the medical curriculum at the time of

training was one of the factors that may have arisen if saturation had been reached amongst the GPs, as some participants indicated that a lack of formal education on communications technology use was something they had considered as impacting on their attitudes towards email consultation.

Data was collected on the duration at and role of GPs in the practice. Participants had largely been at their current practice for more than ten years. A wide range of roles were encountered amongst the participants; full time, part time, part time academic GPs and a GP registrar, and this was a strength of the study. However the two academic GPs were working in the Department of Primary Care and Public Health at Imperial College London. These participants were colleagues of the PhD candidate. This may have impacted on their responses, as they already had prior knowledge of the nature of the study, and already had a relationship with the researcher. They may have felt more inclined to provide useful information.

In relation to the types of email in use, only two participants were using a web portal and one of these was the practice manager participant. The remainder were using standard email either via a central practice email account or via a personal email account. This provided a varied range of perspectives according to the different types of email. Participants had experienced varying frequencies of email use and had been using email for a varied length of time, providing perspectives on a range of experience with email consultation which was a strength of the sample.

#### *Private GP*

The sample included a private GP. This participant was included to see if the findings would differ because of the difference in setting. It might have been expected that there would be a difference in views between an NHS and a private GP because private practice takes a consumerist approach to providing healthcare, providing the patient with a service in return for payment, either directly or via insurance. The GP working in the private sector referred several times to the differences they perceived there were between NHS and private practice, particularly in relation to providing convenient care for a working population comprised of patients in professional roles. However despite the view that there are differences, the findings from the interview with the private GP cohered with those from the NHS GPs. Both types of GP appreciated email for the convenience it brought them and their patients. There were no discernable differences between the two, and in fact the private practice had a less sophisticated system for email consultation than some of the NHS practices featured in the study.

## 8.12 Implications of the study

Email consultation is arising because of its ubiquity and professionals using email in their day-to-day lives are aware just how pervasive it is as a technology. Patient demand for using it reflects its ubiquity, and the benefits it brings, with professionals also able to utilise these benefits. The use of email for consultation with patients also fits with the patient-centred approach to policy taken in the English NHS in recent years, whereby improved access, convenience and choice in relation to healthcare was encouraged.<sup>69;71</sup> Email is assisting these professionals in providing this.

As in the patient study, a great deal of uncertainty is associated with the use of email consultation at present, and if it is to work as a method of consultation, the uncertainties surrounding it need to be addressed. This can be done by formalising email as a method of consultation. Formalising email consultation would involve creating a definition of email consultation and producing rules of encounter, along with addressing safety issues. Formalising email consultation and how it should be used as a consultation method would in turn address the uncertainty that professionals feel about adopting email consultation in their practice, as it would become an 'official' method of consultation. Any attempt at formalising email consultation would benefit from drawing on standard methods of communication and how they are carried out and regulated, particularly in relation to who receives the email. The responsibility the recipient has for the email should be taken into consideration, since when clinicians receive emails directly, this represents a change from the traditional models of communication in general practice, which are mediated by reception staff.

Any attempt to define email consultation must take into account the individual views that professionals have about what an email consultation should constitute. As described in the results section, the role of general practitioner involves making decisions and taking responsibility for them, and so the way in which email consultation is applied would need to reflect the responsibility the GP would have when using it with their patients.

The way that administrative and clinical purposes are mixed together where email is used for consultation may have implications for how it is used in general practice, with rules of encounter crucial in ensuring that email consultation does not become 'a free for all,' used for any task a patient deems necessary. It may also require that parallel services, e.g. online booking services, are clearly promoted as the only way to book appointments electronically, so that overlap between the two can be avoided.

As this study did not reach saturation amongst participants there are further explorations required to gain a fuller picture of professional experiences and opinions. This is especially

important given the likely influence that practice managers would have on the implementation and adoption of any email consultation service.

Despite the requirements for further investigation, this chapter concludes that email consultation has the potential to help meet the policy aims of a patient-centred NHS, bringing benefits to patients and professionals. However its current status is such that it has too many uncertainties and concerns associated with it to achieve widespread acceptance in general practice.

### **8.13 Chapter summary**

The professionals interview study included 11 participants, ten GPs and one practice manager. These participants shared what they felt were the key characteristics of general practice; the time pressured environment, their role as decision maker and the importance of visual and verbal cues in the consultation. They also shared information on how email consultation fitted into their practice, its status and organisation. These details set the scene for the email consultation use by these professionals. The professionals in the study appreciated the popularity of email as a communication method, and its use arose as a consequence of patient demand and the advantages it brought to clinical practice. It provided access and convenience, and a different type of communication, written and retainable.

Despite the popularity of email with their patients, and the advantages it brought to clinical practice, there were problems associated with it. Professionals felt that it posed potential issues with workload and removed the proximity with patients that they are accustomed to. They also questioned the lack of definition of an email consultation and concerns about what it should be used for, especially in relation to safety. These concerns were not enough to stop them from using email consultation, but were enough for them to consider ways to mitigate them. Professionals applied their own boundaries to email consultation, creating their own definitions of what it constituted and attempting to counteract the safety issues associated with email. They drew on their existing experiences of standard types of consultation in doing so. Despite this, there was still a great deal of uncertainty surrounding the use of email consultation for these professionals.

Findings in this study that related to the structure and organisation of email, patient demand, email as a useful tool, problems associated with it and attempts to rectify these were supported in the wider literature, though the issues around the lack of definition of an email consultation was not identified in other studies.

Strengths of this study were the exploratory approach taken and the collection of data from participants who were engaged in using email consultation, rather than collecting speculative opinions. Weaknesses were the study not reaching saturation and the lack of nurse participants in the study.

The facilitators to email consultation use were a positive practice perspective of email consultation, the view of email as a normal day-to-day communication technology and patient demand for its use in healthcare. The barriers to email consultation use concerned uncertainty; about what constitutes an email consultation, the lack of regulation around its use and the potential safety issues associated with it. It is this uncertainty that would need to be addressed if email were to become widely accepted in the general practice setting.

## **Chapter 9: Discussion and conclusions**

### ***Chapter overview***

The chapter begins with a presentation of the main findings of the thesis, which include a summary of the results of the thesis, drawn from the systematic review and interview study. This is followed by application of normalisation process theory to the interview study data; so that the key factors influencing normalisation of email consultation can be identified. The normalisation of email consultation is then explored in the wider context of the thesis.

Next there is a presentation of the methodological strengths and weaknesses of the thesis as a whole. This is not a repeat of those strengths and weaknesses outlined in the individual chapters, instead referring to the approach taken to addressing the thesis aim.

The next section addresses the implications of the findings of the thesis. This includes implications for policymakers, regulatory bodies and for practitioners. There is also an exploration of the implications on any further research conducted on email consultation. The chapter ends with the conclusion of the thesis.

### **9.1 Main findings of thesis**

#### ***9.1.1 Summary of results***

This thesis set out to explore the potential of email as a method of consultation in English general practice, and describe the key factors that may influence its normalisation. The results of the studies carried out are described here.

The thesis found that the experimental evidence base for email consultation globally is poor. There have been no trials carried out in the UK. The review found that email is sometimes found to be better than standard methods of communication for outcomes relating to patients, and is largely favoured over telephone counselling. It does not appear to have any negative impact on patient and health service outcomes. However, overall it was not possible to draw any conclusions from the review as to the effect of email as an intervention because of the many concerns about the quality of the evidence base and the lack of focus on health professional outcomes.

In relation to how email consultation is used in English general practice, patients are using it because they want personalised access and communication, and convenient care. This is to counteract the fact they felt they were not already obtaining this in general practice. Professionals were using email with their patients largely because of its ubiquity and patient demand for the convenient care it could offer. They also appreciated the benefits it brought

to their practice. However in using email to achieve these ends both groups encountered problems with the lack of regulatory framework associated with email as a consultation method. To try and combat this they applied their own solutions; patients applied social norms, clinicians drew on their clinical experiences and the structures relevant to other methods of consultation. Despite these attempts at self-regulation, there remained a great deal of uncertainty associated with using email consultation; whether to use it, how to use it, and as illustrated by the lack of experimental evidence, what the consequences of using it might be.

Facilitators to email consultation use are the view of email as a day-today technology, the doctor-patient relationship and patient demand for email consultation. Additionally a supportive practice setting facilitated email consultation use, along with the advantages it afforded to clinical practice. The barrier to email consultation use was the same for both patients and professionals: uncertainty.

### ***9.1.2 Key factors influencing normalisation of email consultation***

Normalisation Process Theory (NPT) was applied to the findings of the interview studies as a whole and this involved examining where the themes mapped to the components of NPT, then using this information to explore the potential for the normalisation of email consultation. Doing this allowed the analysis of the qualitative interviews to move beyond description into interpretation.

As described in chapter 6, NPT is concerned with the implementation and integration processes around a complex intervention. It explains how interventions become routinely embedded in their contexts by reference to four constructs; coherence, cognitive participation, collective action and contextual integration<sup>238</sup> (see chapter 6, page 156). The components of NPT are considered here in relation to both the patient and professionals perspectives.

#### *Coherence*

Coherence was described in chapter 6 as relating to the degree to which people understand what the new practice (email consultation) is and how they make sense of it. When applied to the findings of the interview studies it is apparent that there is a lack of coherence surrounding email consultation for both patients and professionals.

Patients are able to distinguish the intervention from other methods of consultation because of the differences in the communication medium, and they appreciate the value these



differences bring in relation to personalisation of care and convenience. However, they experience uncertainty about what they are supposed to use email consultation for, and how they are supposed to use it. There is a disconnect between what it can bring and how it can be achieved.

Professionals are similarly able to distinguish email consultation from the ways they currently consult. Like patients they appreciate the benefits email can bring. However a much bigger concern is their perception of the purpose of the intervention and what is required of them in using it. Professionals did not agree about the purpose for email consultation, each having their own ideas about when email communication became a consultation and what this should be used for. This reflected the lack of understanding as to what an email consultation is and exactly how it can be enacted. This lack of coherence is a barrier to the normalisation of email consultation.

### *Cognitive participation*

Cognitive participation was described in chapter 6 as being about people deciding whether or not to engage with the new practice. Patients considered email consultation against a backdrop of routine email use in day to day life, and engaged with it as a consultation method because of what it could bring to their healthcare. Once using it, and in the absence of any regulation around its use, they made attempts to regulate it themselves, using social norms, so that they could continue to use it despite the uncertainties associated with it.

Professionals were engaging with email consultation because of the popularity of email and the patient demand for using it in their healthcare. This demand, in conjunction with the benefits they perceived it could bring led them to introduce it. However they were using email consultation tentatively, with selected patients and placing their own form of regulation around it to allow it to function. This reflected their concerns about whether they should be engaging with email consultation as a method of consultation in the first place.

### *Collective action*

Collective action was described in chapter 6 as the work that people do to enact a new practice, thus, what is required of those involved (patients, professionals, other practice staff) in order to use and continue to use email consultation. It is comprised of four components; interactional workability, relational integration, skill set workability and contextual integration.

Interactional workability refers to the interactions between people and between people and the practice in question. For both professionals and patients in this study the relationship occurring between clinician and patient enabled consultation to be conducted via email

because it facilitated communication. For professionals the practice setting was influential, with a supportive practice being conducive to email consultation use.

Relational integration relates to whether people maintain trust in the intervention and in each other. Patients trusted their known clinician and this was what had enabled the email contact, but they had concerns about how email consultation was supposed to be administered by their clinician; an example being their worries about when or even whether they would receive a response to their email. Professionals who were using email were not confident in doing so, and the lack of guidance on how to use it compounded this. Some were receiving emails directly, with the patient bypassing reception and thus cutting out a whole series of practice staff who would normally be involved in arranging a consultation. This potentially disrupts the relationships between staff in the practice, as reception staff are usually responsible for screening all patient contacts with the practice.

This disruption of relationships is relevant to the next construct; skill set workability, which concerns the division of labour around the intervention. As described, for some professionals and for most patients email consultation offered a way to bypass the reception staff and obtain direct contact with a clinician, which was seen as a benefit. However this transferred the responsibility for receiving and dealing with the patient enquiry to the clinician, outside of the practice systems, where each staff member has a specific role. Email consultation brings what is ordinarily an administrative task to the clinician. This was supported by the way patients consulted the clinician not only about clinical matters but administrative matters too, even where it would not ordinarily be the role of the clinician to deal with these. Email consultation seems to challenge the traditional role of the clinician.

Finally, contextual integration refers to whether the intervention is supported in relation to resources, management, stakeholders, protocols and policy. Email consultation lacks contextual integration. For the patients and professionals in the interview studies email consultation lacked rules of encounter and a formal definition; there were no formal protocols or policies in use. For professionals the practice setting in which they were using email consultation was variable, with many facing a hostile or at best neutral environment. Even when using it to communicate with their clinician, patients perceived that clinicians did not want to be using it or that they found it to be an inconvenience. There was a sense that email consultation was not a supported or encouraged method of consultation in general practice and professionals had to adjust for this by introducing their own rules. They were also faced with the challenge of fitting email consultation into their work patterns where there was not any additional time allowed for its use.

### *Reflexive monitoring*

Reflexive monitoring was described in chapter 6 as consideration for the ways that a new set of practices affects the people using the intervention, with them trying to understand these practices via reflection. Patients in this study reflected on what they did and did not like about using email consultation, and shared their attempts to resolve the problems they associated with it, modifying their use of it accordingly. Overall they assess the intervention as worthwhile despite their reservations, indicated by their continued use of it. Professionals had also reflected on the usefulness of email consultation, using their experiences to make changes to how they applied the intervention. Again, they continue to use it in the face of uncertainty, thus deeming email consultation worthwhile overall, with the benefits outweighing the negatives, though these negatives would need to be addressed if email were to become a normalised method of consultation.

### *Summary*

There is a lack of coherence surrounding email consultation. The work involved in using email consultation is not consistent or clear to either group. Despite this, participants are willing to engage with email consultation though professionals find it harder to engage with than patients. The shifting of roles caused within the practice by email consultation creates problems and affects relationships. This may be because on the whole email consultation is not supported in the practice setting.

Reflexive monitoring indicates that both patients and professionals feel the intervention is worthwhile, but there are problems associated with it and these need to be addressed. These include a lack of trust in the intervention, reflecting the lack of structure associated with it.

Presently email is a long way from being a normalised method of consultation in English general practice. The implications of this are outlined later in this chapter.

### **9.1.3 Normalisation in the wider context of the thesis**

Interpretation of the findings of the interview study using NPT suggests that email has not normalised. In the wider context of the thesis, there are several possible reasons for this.

### *Evidence base*

It has been demonstrated in the thesis that the existing evidence base relating to email consultation is of poor quality. The summary in chapter 2 (page 47) of advantages and disadvantages typically associated with email consultation focused on factors relating to resource use, patient access, satisfaction and quality & safety. They were summarised according to data from observational studies (e.g. cross-sectional surveys and opinion pieces) and were mostly based on speculative data. The systematic review was unable to provide any additional data relating to these factors because of the poor quality of the empirical evidence base. The need to address the issues outlined in chapter 2, moving away from speculative opinion still stands, as those involved in providing and using email consultation still have no reliable means upon which to assess these factors.

The state of the evidence base for email use in healthcare more widely is also poor. Of the four linked systematic reviews carried out alongside this thesis, two identified no relevant studies; 'email for communicating the results of diagnostic medical investigations to patients' and 'email for the management of healthcare appointments and attendance reminders' and one review identified only one study; 'email for clinical communication between health professionals.' The remaining review 'email for the provision of information on health promotion and disease prevention' included six studies. These studies were of low quality and provided mostly inconclusive, or no evidence for the outcomes of interest.

Overall, the extent of the evidence base to date for the use of email in healthcare is poor and provides little or no information on how it might actually work. The findings of the thesis in relation to the evidence base are important. They provide a baseline from which future research can progress.

### *Lack of regulatory framework*

A lack of regulatory framework around email consultation was identified as a problem with its use, prompting patients and professionals to devise their own version of regulations. A lack of official framework was outlined in chapter 2 of the thesis with the professional bodies representing general practice having taken a negative or neutral stance to email consultation. There is also a lack of published setting specific guidance available.

Both patients and professionals have concerns about safety and appropriate use of email, though these concerns have more consequence for professionals, who must take responsibility for any encounter they have with the patient. As outlined in chapter 2, the

medical indemnity organisations representing clinicians in the UK have variably provided guidance and discouraged email consultation use, leaving clinicians uncertain and vulnerable.

Uncertainty also arises around the exact nature of an email consultation. Without knowing what exactly constitutes an email consultation it is not possible to place regulatory frameworks around it. The thesis demonstrated how difficult it can be to define exactly what it constitutes and what work is involved in using it. As it stands email consultation seems to disrupt the roles of stakeholders in general practice; reception staff and clinicians. It mixes clinical and administrative tasks in general practice in a way not seen with other methods of consultation. This mixing is understandable if users do not really know what email consultation is for.

The thesis makes a connection between this existing lack of regulation and the failure of email consultation to normalise. Despite this lack of normalisation there is a definitive sense amongst both professionals and patients that email consultation is usable, and if well managed could benefit both parties, as illustrated by their accounts in this thesis.

## **9.2 Methodological strengths and weaknesses**

The multiple methods approach taken in the thesis was a strength. It allowed for an in depth exploration of email consultation. However, the low quality of the primary data in the systematic review was disappointing. It meant that the review process did not lead to any reliable summary of the effect of email as an intervention.

In the interview study, the results cohere between the two samples; patient and professional, and this is a strength of the thesis. However the lack of transferability in the interview study was a weakness; as the study was conducted in inner-London where practices were large and busy. Other settings within England may have yielded a different perspective. For example, populations in rural areas, or populations with a lower proportion of young, working patients. Any application of the results should take into consideration the nature of the participants used.

In addition the results of the patient study indicated that patients were engaging in email communication with reception staff, and the results of the professional study indicated that in many cases reception staff were involved in using email consultation by routing emails to the clinician. However their perspectives were not obtained in this study and this was a

weakness, along with the lack of practice manager and nurse participants. It may mean that the findings are not entirely comprehensive. The failure to reach saturation in the professionals study is also a limitation of the thesis. Whilst it does not detract from the data collected from the interviews carried out, it raises questions about whether there are additional factors that are important in determining whether email could provide a method of consultation in general practice.

A strength of the interview study in relation to its sample was the fact that participants were required to have engaged in using email consultation. As discussed in chapters 7 & 8, the views of non-users, as demonstrated in the literature and in pilot interviews cohere with those from users with regard to some factors, for example worries about privacy and security, but users were able to provide additional depth information on how email consultation worked for them. The pilot interviews with non-users focused more heavily on the potentially negative aspects of using email for consultation than on any potential advantages. Users were able to provide a more balanced account via their experiences. These findings are more applicable to the actual use of email consultation than data that might have been attained by interviewing non-users alongside users.

The use of NPT in interpreting the findings of the interview study is a strength because of its focus on factors already empirically demonstrated to be important in promoting or inhibiting implementation, embedding and integration of complex interventions. However it should be noted that the application of the constructs of NPT to the findings of the interview study is subjective. Other researchers may reach different conclusions when looking at the same data and so the findings should not be considered definitive.

## **9.3 Implications**

### ***9.3.1 Implications for policymakers***

Email consultation has the potential to satisfy the desires of policymakers in providing patients with personalised and convenient care and better access, and this is what makes it attractive in political terms. However policy should not be formed in the absence of evidence. In making decisions about whether email consultation should be used in English general practice, policymakers should not rely on the existing trial evidence. If they are making evidence based policy decisions then they should refrain from introducing email consultation at present without carrying out further research, because of the lack of setting specific research carried out to date and the poor quality of existing trials. The quality of the evidence base as assessed in this thesis raises questions about how policymakers are currently making decisions on email consultation use.

With regard to considerations to be made when planning policy, the investment required by the clinician and their practice in introducing email consultation should be taken into account. This relates to investments of their time and their expertise. The push for patient-centred policy may neglect to consider the extra responsibility and workload faced by clinicians in adopting a new method of consultation, and the changes required in the general practice setting to ensure its safe use.

### ***9.3.2 Implications for practice***

Email consultation cannot be recommended because of the lack of evidence to support its routine use. However the lack of evidence means there are no grounds to directly advise against it. Participants in the interview study derived benefit from using it. There is a clear need for further research to establish whether and how it should be used.

From a practical perspective, where email consultation is going to happen regardless, professionals should extend their own attempts to regulate email consultation by ensuring that there is a clear dialogue between themselves and their patients in relation to email consultation use. As professionals already have a sense of the boundaries they wish to put around email consultation, and patients feel uncertain about what clinicians think of email consultation, formalising the communication exchange by introducing specific rules and regulation would be a positive step in satisfying both parties.

### ***9.3.3 Implications for regulatory bodies***

This thesis has shown how email consultation is already being used in an unregulated and unstructured way in English general practice. It would benefit both patients and professionals if this use were acknowledged by the professional bodies representing general practice (e.g. RCGP, BMA) and a regulatory framework were created around its use. At the very least, it should be brought in line with other methods of consultation with regard to regulation. To continually advise against email consultation is unlikely to prevent email consultation use, as demonstrated by the ad hoc way in which it arises for the participants in the thesis. Regulators have an opportunity to support their members and patients in working on producing this framework.

### ***9.3.4 Further research***

There is much scope for further research on email consultation. As saturation was not reached in the professional interview study there is scope to extend the interview study and focus on recruiting more GPs, nurses and practice managers. This would allow the findings identified so far to be validated, and would explore further the perspectives that could not be

reached in this study (nurses, practice managers). The findings of this study indicate that there is useful information on email consultation to be gained from these semi-structured interviews.

The thesis indicates that email consultation use may be used more often in general practice than anticipated. This includes varied types of use; for sending information, for requesting prescriptions, asking for diagnosis, amongst many others. A cross-sectional survey of GPs in England could be carried out to reveal how many GPs are using email with their patients and how they are using it. This information would be useful for policymakers, regulators and researchers alike. Creating guidance on how to use email consultation would be easier to achieve if there is evidence that it is in use. Additionally, the design of future studies of email consultation would be assisted by knowledge of what professionals are using email for with their patients, so that the research could be targeted towards producing evidence of direct applicability in the setting of interest.

There are no England specific peer-reviewed guidelines for the use of email consultation. There is scope to work with regulators in devising guidance on how email consultation should be used. This work could utilise the guidelines already published in other settings (US,<sup>107</sup> Europe<sup>112</sup>) and the findings of this thesis. It would build on the guidelines already in place for using other methods of consultation in general practice, and would focus on the differences between email and these other methods (face-to-face, telephone) in identifying the areas where guidance is most needed, for instance in the lack of visual and verbal cues when using email. It is likely that such guidelines would need to be redeveloped over time as the evidence base grew, but in the meantime they would help to fill the void of information surrounding email consultation use, and could be clear about the limitations of the existing evidence base.

A natural next step with regard to future research would be to carry out some high quality research into the use of email consultation, building on the research carried out in the thesis as part of the framework for the development and evaluation of complex interventions.<sup>61</sup> As described in chapter 3, the objectives of the thesis followed the part of the framework that refers to developing a complex intervention. There is scope to build on the findings of the thesis, further developing email as a complex intervention and eventually carrying out an evaluation of email consultation in English general practice. Overall the opportunities for conducting further research are broad, with the only caveat being that any future research is methodologically rigorous, taking into account the nature of email as a complex intervention and thus avoiding the problems faced by the studies in the systematic review.



## **9.4 Conclusion**

This thesis comprises an innovative and rigorous examination of email consultation in English general practice. It explores the background to email consultation use in relation to the evidence base and policy. It explores the usage of email consultation from the perspective of both patients and professionals. It uses a theoretical framework specific to the implementation of complex interventions in healthcare settings to guide the interpretation of the findings. It provides the first assessment of the current status of email consultation in this setting.

Email consultation is not a normalised method of consultation in English general practice. This is largely because of the lack of rules of encounter for its use. Email consultation involves reorganisation of the norms associated with standard methods of consultation, and substantial effort by both patients and professionals in mediating its use. For now, email consultation in general practice is still a long way from being the ubiquitous communication method it is in day to day life. However there is potential for its use as a method of consultation in English general practice, despite the problems it currently faces, and this was demonstrated by the positive aspects of its use widely recognised by patients and professionals alike. These factors prompted its use in the first place and are sure to continue to prompt its use in the near future.

# Email for clinical communication between patients/caregivers and healthcare professionals (Protocol)

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[Intervention Protocol]

# Email for clinical communication between patients/caregivers and healthcare professionals

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## ABSTRACT

This is the protocol for a review and there is no abstract. The objectives are as follows:

To assess the effects of healthcare professionals communicating with patients via email, when compared to other forms of communicating clinical information, on outcomes for health professionals, patients and carers, and health services, including harms.

## BACKGROUND

### Related systematic reviews

This review will form part of an overview of reviews, incorporating four other reviews:

- email for the provision of information on disease prevention and health promotion ([Atherton 2009a](#));
- email for communicating results of diagnostic medical investigations to patients ([Meyer 2009](#));
- email for the clinical communication between healthcare professionals ([Atherton 2009b](#)); and
- email for management of healthcare appointments and attendance reminders ([Atherton 2009d](#)).

### The use of email

The use of email as a medium for business and social communication is increasingly common ([Pew 2005](#)). This is consistent with the global expansion of users on the internet, with 90% of internet users said to use email ([Pew 2005](#); [IWS 2007](#)). While other industries such as insurance and banking have readily embraced such new technology in order to compete on the global stage ([CBI 2006](#)), the healthcare sector has been more cautious in its acceptance of this new medium ([Neville 2004](#)).

In 1998 a survey of American physicians showed that less than seven per cent had used email to contact their patients ([Lacher 2000](#)); however more recent surveys show this to be increasing. US surveys have revealed that the increase in use is variable, from 16% of physicians using email in a survey of primary care practitioners to as many as 72% in a large outpatients' department ([Gaster 2003](#); [Brooks 2006](#)). Uptake may vary according to patient group. The majority (79%) of doctors at a student health centre in Finland reported email use with patients ([Castren 2005](#)). This was a population with a high email and internet usage rate. Despite increasing rates of use by healthcare professionals, the volume of email communication remains low, with surveys reporting averages from 7.7 emails per month to 8.6 emails per week in the aforementioned Finnish student healthcare centre ([Gaster 2003](#); [Castren 2005](#)). Email communication was used for requesting prescriptions, booking appointments and for clinical consultation. It was commonly noted that email was used for non-urgent communication only ([Gaster 2003](#); [Brooks 2006](#)).

Several factors are likely to continue to drive the trend of increasing email use including the following.

- Increasing patient demand. A substantial amount of survey literature points to high levels of patient desire to contact doctors via email ([Couchman 2001](#); [Kleiner 2002](#); [Moyer 2002](#)). Notably this includes a recent poll in the US ([Harris 2006](#)) showing that 62% of patients with the ability to choose their doctor are influenced in their choice by whether the doctor is contactable via email.

- The natural demographic shift toward an increasing proportion of doctors (and patients) comfortable with using technology-driven care solutions.

- Increasing per capita demand on healthcare resources ([OECD 2006](#)) (for example with the advent of increased chronic care and demand for more preventive screening) resulting in a focus on working more efficiently.

- Some evidence showing increased physician productivity associated with the adoption of email communication ([Liederman 2005](#)).

Guidelines on the use of email in a healthcare environment were developed in an American white paper over 10 years ago ([Kane 1998](#)). These guidelines were developed to aid clinicians and healthcare delivery organisations in the use of electronic mail with patients, although evidence exists that physicians are not adhering to the recommendations ([Gaster 2003](#); [Brooks 2006](#)). These guidelines have been heavily referred to in much of the related literature but have not been updated since their release.

The vast majority of literature relating to the use of email originates in North America and it is uncertain whether the results of such research will be applicable to other international healthcare environments, where email availability and technology can be very different.

### Forms of electronic mail

In the absence of a standardised email communication infrastructure in the healthcare sector, email has been adopted in an ad-hoc fashion and this has included the use of unsecured and secured email communication.

Standard unsecured email is email which is sent unencrypted. Secured email is encrypted; encryption transforms the text into an un-interpretable format as it is transferred across the internet. Encryption protects the confidentiality of the data, however both sender and recipient must have the appropriate software for encryption and decoding ([TechWeb Network 2008](#)).

Secure email also includes various specifically developed applications such as patient portals which utilise web messaging. Such portals provide pro-formas into which patients can enter their message. The message is sent to the recipient in the manner of an email ([TechWeb Network 2008](#)).

Secure websites are distributed by secure web servers. Web servers store and disseminate web pages. Secure servers ensure data from an internet browser is encrypted before being uploaded to the relevant website. This makes it difficult for the data to be intercepted and deciphered ([TechWeb Network 2008](#)).

There are significant differences in terms of the applications. Bespoke secure email programmes may incorporate special features such as standard forms guiding the use and content of the email sent, ability to show read receipts (in order to confirm the patient has received the correspondence) and, if necessary, facilities for

receiving payment (Liederman 2005). However they are costly to set up and may require a greater degree of skill on the part of the user than standard unsecured email (Katz 2004). For the purpose of the review all methods will be included although secured versus unsecured email will be considered in a subgroup analysis.

## Methods of accessing email

Methods of accessing the internet and thus an email account have changed with time; traditionally access would occur via a personal computer or laptop at home or work, connecting to the internet using a fixed line. There are now several methods of accessing the internet. Wireless networks (known colloquially as wifi) allow internet connection to a personal computer, laptop computer or other device wherever a network is available (TechWeb Network 2008).

Internet connection is also possible via alternative networks using mobile devices. This includes access via mobile telephones to a wireless application protocol (WAP) network (rather than to the www) or to third generation (3G) network. Adaptors connecting to a universal serial bus (USB) port can be used to access the 3G network using a laptop computer (TechWeb Network 2008). Therefore email can be accessed away from the office or home in a variety of ways.

## The 'Digital Divide'

The so called 'digital divide' describes the inequality created by the increasing level of digital technology. As new technologies replace old systems, it has been suggested that certain sectors of the population are being left behind with regard to access and use of these services, for instance the elderly, non-English speakers and those in lower income groups (Hobbs 2003; Car 2004a; Goodyear-Smith 2005). A divide has also been observed amongst healthcare professionals. A UK-based survey showed that clinicians more recently-qualified feel comfortable using the internet and consider it reliable (Potts 2002). This is unsurprising given the relatively recent introduction of such technologies, and illustrates a potential generational effect on their use.

## Email for the two-way clinical communication between patients and healthcare professionals

Email for clinical communication between patients and healthcare professionals can take several forms. These may include the facility to email a healthcare professional about a predefined condition, ask questions about prescribed medication, or request a repeat prescription.

Email consultations could be used instead of telephone consultations for simple and non-urgent conditions (Car 2004b) such as urinary tract infections or back pain (Kassirer 2000). In such cases,

email consultation may be able to address unmet need for some patients in primary care, who may not otherwise be able to contact their practitioner easily (Katz 2003; White 2004). Healthcare professionals as well as patients have been shown to prefer email over telephone consultations for non-urgent problems (Liederman 2003).

Email consultation is not necessarily viewed as a replacement for more traditional methods, but instead as a complementary method of communication. Patients may be willing to use email instead of attending a face-to-face consultation for simple problems requiring only a straightforward and non-urgent response (Neill 1994; Katz 2003).

The use of a standard protocol for email communication by both healthcare professional and patient is important. This may include the types of communication permitted via email, such as administrative issues or clinical conditions. Similarly the health service could produce a predefined set of conditions that can be dealt with via email, and a list of conditions that are not appropriate for email consultation. Alongside this, the patient can be advised not to use this type of communication for urgent conditions (Car 2004b).

Despite such measures, the appropriateness of email for two-way communication in any given situation is an important consideration. Healthcare professionals would be expected to revert to a safer consultation method should any doubts arise around the effectiveness of email communication in a particular case (Car 2004b). Email consultations would not be appropriate for every circumstance. There are situations where this is apparent, such as for urgent communications and queries about symptoms like shortness of breath or chest pain that could indicate an emergency situation (Car 2004a), and for controversial topics such as questions about illicit drug use (Dunbar 2003; Katz 2003). In some cases patients may provide incomplete, abstract or inappropriate information via email, leading to the use of a different method of communication for clarification, such as telephone or personal communication (Patt 2003). There is recognition that the acceptability and potential of email communication will vary from patient to patient (Kassirer 2000).

## Sensitive issues

Email communication, by removing the face-to-face element of an 'in person' consultation, may encourage patients to raise issues that they feel to be sensitive or embarrassing and so may not otherwise discuss, thus addressing an unmet need. Carers have been documented as raising on behalf of the patient an issue that they have been reluctant to discuss with the healthcare professional (Patt 2003). Awareness of such an issue may provide a lead in to their discussion in any future consultation.

## Triage

Possible systems for implementation include triage-based systems for messages about health concerns, prescription renewals and referrals, all controlled by a nurse 'navigator' (Katz 2003). A randomised controlled trial of a triage system showed that physicians using such a system were more likely than those not, to like using email and think it was useful (Katz 2003), however use of email triage did not reduce telephone consultations and 'did not attends'.

## Prescriptions

Prescription renewals are a very specific use of email communication. Requesting prescriptions in this way has been shown to save time for both healthcare professionals and patients (Patt 2003). Renewals can usually be dealt with by a nurse who may require only verbal confirmation by the physician to act upon the email request (White 2004). A survey in UK general practice found that patients appreciated the convenience of such systems, and particularly the receipt of a reply confirming safe receipt of their prescription request (Neville 2004). Such systems would follow the same protocol regarding the number of repeat prescriptions permitted as currently used for telephone and in person requests.

## Chronic diseases

Email consultation has the potential to allow ongoing and close monitoring of patients with chronic diseases (Kleiner 2002). Email communication can also be used as a support service, for instance in diabetes care or management of osteoarthritis, whereby such technologies facilitate communication between patient and healthcare professional. Patients may also be able to communicate blood pressure levels or glucose levels to their healthcare professional for monitoring (Katz 2004). This type of service can improve continuity of care (Balas 1997). More generally it can reduce the number of face-to-face consultations required, and improve quality of care and quality of life (Perlemuter 2002).

## Psychiatry

The use of email has been suggested in psychiatry, providing another form of communication for support of patients; allowing patients to feel they have a connection with their psychiatrist. Such patients may be able to express themselves more freely using this method of communication (Johnston 1996). It has been demonstrated in patients with anorexia nervosa that regular email contact with their physicians helped with their therapy as part of a treatment plan, and clinicians found this acceptable in terms of allocation of professional resources (Yager 2001).

## Follow up

Email can also be used for communicating reminders to encourage observance of treatment programs, and to solicit responses about side effects of medication. Dunbar 2003 reports high satisfaction and improved medication adherence with such systems. Email can also be used for follow up, for instance after an appointment with a physician (Katz 2003), when clarification or added information may be required (Patt 2003). As well as being used for follow up, email can be used before an appointment, and for ongoing health updates from patient to physician (White 2004). Email can even be used to replace outpatient appointments after day surgery, since these appointments are often disliked by patients; email consultation can provide a middle ground between a face-to-face appointment and no appointment at all (Wedderburn 1996; Ellis 1999).

Qualitative evidence has shown that healthcare professionals already using email for patient consultations think it is a useful addition to the conventional methods of consultation, being easy to use and improving communication. It has also been postulated as being useful for enhancing management of chronic diseases, improving continuity of care and increasing flexibility in responding to non-urgent issues (Liederman 2003; Patt 2003).

## Advantages and disadvantages

The key advantages of email for clinical communication between patients and healthcare professionals include the following (adapted from Freed 2003; Car 2004a).

- Timely and low cost delivery of information (relative to conventional mail) (Houston 2003)
- Convenience: emails can be sent and subsequently read at an opportune time, outside of traditional office hours where convenient (Leong 2005).
- Read receipts can be used to confirm that communications have been received.
- Relative to verbal communication, the written nature of the communication can be of value as reference for the patient, aiding recall and if desired improving communication to other family members.
- Email addresses usually stay constant when an address or telephone number changes (Virji 2006) making this a reliable way of maintaining communication with transient patients.
- Email facilitates a response to changing patient needs and expanding healthcare demands.
- It may improve access for non-urgent and simple enquiries (Kassirer 2000, Katz 2003).
- Emails can be archived in online or offline folders separate from the inbox of the email account so that they do not use up space in the inbox but can be kept for reference (Car 2004a; Car 2004b).
- Patients may perceive that email is a more intimate and

considered form of direct communication than using the telephone (Katz 2003).

- It is an easier communication method for patients with disabilities, and with patients who are temporarily overseas e.g. seconded employees (Goodyear-Smith 2005).

There are also potential downsides, including the following.

- There is evidence of patient and physician concerns about privacy, confidentiality and potential misuse of information (Fridsma 1994; Harris 2001; Kleiner 2002; Moyer 2002; Katzen 2005).
- Physicians may be wary of a potential for email to generate an increased workload (Mandl 1998; Pondichetty 2004).
- Patients may expect a quick response, often within 48 hours, which may be problematic for healthcare professionals (Couchman 2001; Sittig 2001; Liederman 2003).
- it may encourage unrealistic patient expectations for the intimacy and depth of communication with the physician (Katz 2003).
- Email as a communication tool provides a different context for interaction. Face-to-face communication and telephone calls contain many layers of communication that are lost in an email; such as the emotive cues from vocal intonation or body language (Car 2004a). This may lead to misunderstandings.
- The possible misuse of email for urgent clinical matters (Couchman 2001).
- Recovery of implementation and other associated costs (especially in fee-for-service healthcare systems) (Mandl 1998).
- Medico-legal issues (including informed consent and use of non encrypted email) (Bitter 2000).
- The potential to widen health inequalities via the digital divide (Kleiner 2002; Katz 2003; Goodyear-Smith 2005; Virji 2006).
- Technological issues may occur, such as recipients having a full mailbox causing email to bounce back to the sender (Virji 2006).
- Systems may be at risk from communications failures, for instance a loss of the link to a central server (a computer which provides services used by other computers, such as email) (Car 2008a). There may be several causes for technological system failure; from local power failure to natural disasters.
- Potential for human error which can lead to unintentional content or incorrect recipients.

## Quality and safety issues

The main quality and safety issues around email consultation have included: confidentiality; potential for errors and ensuing liability; identifying clinical situations where email consultation is inefficient or inappropriate; securing payment; incorporating email into existing work patterns; and achievable costs (Moyer 1999;

Kleiner 2002; Gaster 2003; Gordon 2003; Hobbs 2003, Houston 2003; Car 2004b).

Privacy and confidentiality are a formidable challenge in the adoption of email communication (Car 2004b; Katz 2004). Patients are more likely to use this type of communication if they have access to the internet from home, rather than from work because of privacy issues (Fridsma 1994). Family email accounts can mean a lack of privacy at home (Mandl 1998).

Web messaging systems can address issues around security and liability that are associated with conventional email communication since they offer encryption capability and access controls (Liederman 2003). Such systems allow the structuring of communication; for example, messages can be triaged to the correct members of staff (Moyer 2002). However not all healthcare institutions are capable of providing such a facility and instead rely on standardised mail (Car 2004b).

Medico-legal issues are of substantial concern when implementing email communication in practice. Medico-legal issues that could arise include: potential liability for breaches in security allowing a third party to access confidential medical information; liability for responding to unsolicited email from an unknown person; and the possibility of identity fraud whereby someone poses as a patient to obtain private information (Moyer 1999). Thus consideration should be given to such occurrences.

Suggestions for minimising the legal implications of using email in practice have included: adherence to the same strict data protection rules that must be followed in business and industry; adequate infrastructure to provide encrypted secure email transit and storage; and the use of informed consent to ensure that the patient is aware of the risks and benefits associated with communicating with their healthcare professional via email (Car 2004b). Obtaining informed consent could include the provision of guidelines for patients about the use of email communication, and provide an opportunity for authentication of identity. Authentication of patient identity can be achieved by routinely validating patient email addresses when email communication commences. Ongoing validation of identity has also been recommended (Medem 2007).

Healthcare professionals should also exercise discretion about the patient's capability to use email communication. There may be patients who should be advised not to use this method of communication, and this should be at the discretion of the healthcare professional (Medem 2007). There is a clear need for the use of guidelines when considering using email communication to prevent potential medico-legal issues.

Although infrequent, email could be used in urgent situations. A survey in the US found that 7% of the physicians sampled reported receiving emails about urgent issues such as chest pain (Houston 2003). In this case, dissemination of guidelines to patients was recommended. Another US survey found that 52% of physicians surveyed had received an email deemed too urgent to respond to via email (Hobbs 2003).

Securing payment is an issue raised by doctors when considering



the use of email consultation, especially where fee-for-service arrangements are in place. Securing payment is possible with certain systems. Web messaging systems can allow clinicians to charge registered patients for reading their responses and patients can be pre-warned about this facility (Liederman 2003). This scenario is more common when email communication is used for ongoing care such as chronic disease management (Hobbs 2003).

Workload is a major concern for healthcare professionals when considering two-way email consultation. In a survey of paediatricians in the US 80% believed their workload would increase if they used email as a form of consultation (Kleiner 2002). This concern extends to staff associated with the health service who may act to triage emails (Moyer 2002).

Patient opinion of such systems is also important. Issues facing service users have included questionable reliability, timeliness and the impersonal nature of email (Katz 2003). However high patient satisfaction has been found in trials of email consultation, with patients preferring this method to telephone consultations and finding it easy to use (Liederman 2003). A content analysis of email communication between patients and healthcare professionals in the US found that only 1.8% of emails analysed were complaints, and these concerned timeliness and difficulties contacting the clinic via telephone (White 2004). The same content analysis found that patients adhered to guidelines for the use of email, avoiding urgent or sensitive requests and keeping emails formal and concise.

Education and training results in capable and competent end-users of any technology. This can be costly and time consuming, but enhances the chance of effective implementation of such systems and thus should be a priority. As well as the requirement for initial training, ongoing support is usually necessary to ensure continuing use and further development (Car 2008a). As indicated earlier, clinicians more recently qualified feel comfortable using the internet and email technologies (Potts 2002). This may influence training needs and the types of demographic groups leading the use of this technology.

Such issues are wide ranging and encompass both healthcare professional and patient perspective. All issues of quality and safety arising will be identified and addressed in the review.

## OBJECTIVES

To assess the effects of healthcare professionals communicating with patients via email, when compared to other forms of communicating clinical information, on outcomes for health professionals, patients and carers, and health services, including harms.

## METHODS

## Criteria for considering studies for this review

### Types of studies

Four protocols on the use of mobile phone messaging as a communication method in healthcare were published in 2008 (Car 2008b; de Jongh 2008; Gurol-Urganci 2008; Vodopivec-Jamsek 2008). We will draw on key methodological aspects of these protocols to aid comparison of the effects of email as a new communication technology. This affects the selection criteria for types of studies, participants, and interventions.

We will include randomised controlled trials (RCTs), quasi-randomised trials, controlled before and after studies (CBA) with at least two intervention and two control sites, and interrupted time series (ITS) with at least three time points before and after intervention.

Due to the practicalities of organisational change in a healthcare environment, most studies are not randomised and therefore we will consider quasi-randomised trials and CBAs. The inclusion of ITS is particularly valuable in assessing the ongoing merits of a new technology which may require a 'settling in' period. We will include trials with individual and cluster randomisation. Relevant trials with economic evaluations will also be evaluated.

### Types of participants

We will consider all healthcare professionals, patients and caregivers regardless of age, gender and ethnicity. We will include studies in all settings i.e. primary care settings (services of primary health care), outpatient settings (outpatient clinics), community settings and hospital settings. We will not exclude studies according to the type of healthcare professional (e.g. surgeon, nurse, doctor, allied staff).

We will consider participants originating the email communication, receiving the email communication and copied into the email communication.

### Types of interventions

This review will define the intervention as email used for two-way clinical communication between patients/caregivers and healthcare professionals. We will include interventions that use email to allow patients to communicate clinical concerns to a healthcare professional and receive a reply. Examples may include: advice sought on management of non-urgent or recurring conditions; sending reports of home testing to a healthcare professional; requests for repeat prescriptions; and advice on prescribed medication.

We will include interventions that use email in any of the following three forms:

1. Unsecured standard email to/from a standard email account.

2. Secure email which is encrypted in transit and sent to/from a standard email account with the appropriate encryption decoding software.

3. Web messaging; whereby the message is entered into a proforma which is sent to a specific email account, the address of which is not available to the sender.

All methods of connection will be considered. Methods of accessing email include broadband via a fixed line, broadband via a wireless connection, connecting to the 3G network and connecting to the WAP network.

Studies in which email is part of a multifaceted intervention will be included where the effects are individually reported, even if they do not represent the primary outcome. However these will only be considered where they achieve the appropriate statistical power. Where this cannot be determined or where it is not possible to separate the effects they will not be included.

Comparisons will be made between outcomes of email communication and no intervention, as well as other modes of communication such as face-to-face, postal letters, calls to a landline or mobile telephone, text messaging using a mobile telephone, and if applicable, automated versus personal emails.

We will exclude studies which consider the general use of email for healthcare professional-patient contact, i.e. for multiple purposes where clinical communication between patients/caregivers and healthcare professionals is included but not separately considered.

### Types of outcome measures

A number of processes and outcomes may be affected by interventions that aim to enhance and/or facilitate the communication between patients/caregivers and healthcare professionals using email. Primary outcomes of interest are whether the email has been understood and acted upon correctly by the recipient as intended by the sender, and secondary outcomes are whether email was an appropriate mode of communication.

### Primary outcomes

*Healthcare professional* outcomes resulting from whether the email has been understood and acted upon correctly by the recipient as intended by the sender, e.g. professional knowledge and understanding, professional preferences or views, and behaviour, action or performance.

*Patient* outcomes associated with whether email has been understood and acted upon correctly by the recipient as intended by the sender, e.g. patient understanding, patient health status and well-being, patient views (such as anxiety about self-testing) and patient behaviours or actions (such as adherence to treatment advice).

*Health service* outcomes associated with whether email has been understood and acted upon correctly by the recipient as intended by the sender, e.g. rates of treatment adherence.

*Harms* e.g. effects on safety or quality of care such as missed diagnoses, breaches in privacy, technology failures.

### Secondary outcomes

*Professional, patient or carer* outcomes associated with whether email was an appropriate mode of communication, e.g. knowledge and understanding, effects on professional-patient or professional-carer communication or relationship, evaluations of care (convenience, timeliness, acceptability, satisfaction).

*Health service* outcomes associated with whether email was an appropriate mode of communication, e.g. use of resources or time, costs, use of medical services, referrals, admissions.

### Search methods for identification of studies

We will follow Cochrane Consumers and Communication Group guidance on review methods

Initially we will search the following electronic bibliographic databases.

- Cochrane Consumers and Communication Review Group Specialised Register
- Cochrane Central Register of Controlled Trials (CENTRAL, *The Cochrane Library*)
- MEDLINE (1950 to present)
- EMBASE (1980 to present)
- CINAHL (1982 to present)
- ERIC (1965 to present)
- PsycINFO (1967 to present)

The MEDLINE (Ovid) search strategy, compiled by John Kistrigo, Trials Search Co-ordinator, Cochrane Consumers and Communication Group, is presented in [Appendix 1](#).

We will also search for grey literature and examine the references of retrieved relevant studies. Finally we will contact trial authors and experts in the field to ascertain if there are any further studies or unpublished data they may be aware of.

### Grey literature

We will search for grey literature via the following sources:

- Australasian Digital Theses Program <http://adt.caul.edu.au/>
- Networked Digital Library of Theses and Dissertations <http://www.ndltd.org>
- UMI ProQuest Digital Dissertations <http://wwwlib.umi.com/dissertations/>
- Index to Theses <http://www.theses.com/> (Great Britain and Ireland)
- Dissertation Abstracts (North American and European theses) via British Library
- TrialsCentralTM ([www.trialscentral.org](http://www.trialscentral.org))
- Clinical trials register ([Clinicaltrials.gov](http://Clinicaltrials.gov))

- WHO Clinical Trial Search Portal ([www.who.int/trialsearch](http://www.who.int/trialsearch))
- Current Controlled Trials ([www.controlled-trials.com](http://www.controlled-trials.com))
- Google Scholar; <http://scholar.google.co.uk/> (we will examine the first 500 hits)

We will search databases from their start date and there will be no limitation by language. We will keep records of all the search strategies applied.

## Data collection and analysis

The review methods are adapted from a suite of protocols about mobile phone messaging for communication in healthcare settings (Car 2008b; de Jongh 2008; Gurol-Urganci 2008; Vodopivec-Jamsek 2008).

### Selection of studies

Two review authors (HA and BM) will independently assess the potential relevance of all titles and abstracts identified from electronic searches. We will retrieve full text copies of all articles judged to be potentially relevant. At least two review authors will then independently assess these retrieved articles for inclusion. During a meeting of all review authors, we will verify the final list of included and excluded studies. Any disagreements about particular studies will be resolved by discussion. If the description of a study is insufficiently detailed to allow the review authors to judge whether it meets the review's inclusion criteria, the authors will be contacted to obtain more detailed information to allow a final judgement regarding inclusion or exclusion.

If the description of a study is insufficiently detailed to allow the review authors to judge whether it meets the review's inclusion criteria, we will contact the study authors to obtain more detailed information to allow a final judgement regarding inclusion or exclusion.

### Data extraction and management

We will extract data from all included studies using a standard form derived from the data extraction template provided by the Cochrane Consumers and Communication Review Group. We will extract the following data:

- *General information:* Title, authors, source, publication status, date published, language, review author information, date reviewed.
- *Details of study:* Aim of intervention and study, study design, location and details of setting, methods of recruitment of participants, inclusion/exclusion criteria, ethical approval and informed consent, consumer involvement.
- *Assessment of study quality:* Key features of allocation, contemporaneous data collection for intervention and control groups; and for interrupted time series, number of data points

collected before and after the intervention, follow-up of participants.

- *Risk of bias:* data to be extracted depends on study design (see [Assessment of risk of bias in included studies](#)).
- *Participants:* Description, geographical location, setting, number screened, number randomised, number completing the study, age, gender, ethnicity, socio-economic grouping and other baseline characteristics, health problem, diagnosis, treatment.
- *Health service:* description, geographical location, setting, age, gender, population served, medical setting and clinical context of patients.
- *Intervention:* Description of the intervention and control including rationale for intervention versus the control (usual care). Delivery of the intervention including email type (standard unsecured email, secure email, web portal or hybrid). Type of clinical information communicated. Content of communication (e.g. text, image). Purpose of communication (e.g. obtaining information, providing information). Communication protocols in place. Who delivers the intervention (e.g. healthcare professional, administrative staff). How consumers of interventions are identified. Sender of first communication (health service, professional, patient and/or carer). Recipients of first communication (health service, professional, patient and/or carer). Whether communication is responded to (content, frequency, method of media). Any co-interventions included. Duration of intervention. Quality of intervention. Follow up period and rationale for chosen period.
- *Outcomes:* principal and secondary outcomes, methods for measuring outcomes, methods of follow-up, tools used to measure outcomes, whether the outcome is validated.
- *Results:* for outcomes and timing of outcome assessment, control and intervention groups if applicable.

The data extraction template will be piloted to allow for unforeseen variations in studies. For every included study at least two review authors will independently perform the data extraction. Any discrepancies between the review authors' data extraction sheets will be discussed and resolved by the review authors who performed the data extraction. When necessary, we will involve another review author to resolve discrepancies.

### Assessment of risk of bias in included studies

Two review authors will independently assess the quality of included studies, with any disagreements resolved by discussion and consensus, and by consulting a third author where necessary. Studies of different designs will be dealt with separately throughout this review in both the quality assessment and analysis.

For RCTs (and quasi RCTs), we will assess and report on the following elements that contribute to bias, according to the guidelines outlined in [Higgins 2008](#):

- Sequence generation;
- Allocation concealment;

- Blinding (participants, personnel, outcomes assessors, data analysers);
- Intention-to-treat analysis;
- Incomplete outcome data;
- Selective outcome reporting.

We will describe the study and assign a judgement relating to the risk of bias for each item. We will use a template to guide the assessment of risk of bias, based upon the guidance by [Higgins 2008](#), judging each item as 'yes' (indicating a low risk of bias), 'no' (indicating a high risk of bias) or 'unclear' (indicating an uncertain risk of bias). For each study we will summarise the risk of bias for each outcome.

We will also assess a range of other possible sources of bias and indicators of study quality, in accordance with the guidelines of the Cochrane Consumers and Communication Review Group ([Ryan 2007](#)), including:

- Baseline comparability of groups;
- Validation of outcome assessment tools;
- Reliability of outcome measures;
- Other possible sources of bias

In the case of studies other than RCTs (that is, quasi-randomised controlled trials, CBA and ITS studies) we will additionally assess the quality of these studies systematically and according to the criteria outlined in the guidelines of the Cochrane Consumers and Communication Review Group so that risk of bias may be ascertained.

We will present the results of the risk of bias assessment in tables and will incorporate the results of the assessment of risk of bias into the review through systematic narrative description and commentary about each of the quality items, for each type of included study. This will lead to an overall assessment of the risk of bias across the included studies and a judgement about the possible effects of bias on the effect sizes of the included studies.

We will contact study authors for additional information about the included studies, or for clarification of the study methods as required.

### Measures of treatment effect

For continuous data, where outcomes have been measured in a standard way across studies, we will report the mean difference and confidence intervals. For dichotomous data, when outcomes have been measured in a standard way, we will report the odds ratio/risk ratio and confidence intervals.

### Unit of analysis issues

Issues may arise from the inclusion of cluster-randomised trials, repeated measurements and studies with more than two treatment groups. If applicable the data will be analysed according to recommendations in the Cochrane Collaboration Open Learning Module on issues related to the unit of analysis ([Alderson 2002](#)).

### Dealing with missing data

If data are missing from the relevant comparisons we will attempt to contact the authors of the studies to obtain the information. If the authors cannot be reached, or if the studies are found to be unsatisfactory on the basis of data provided, these studies will be excluded.

### Assessment of heterogeneity

It is important to consider heterogeneity in this review, given the fledgling nature of this field and the relatively recent development of associated interventions. Where there is substantial clinical, methodological or statistical heterogeneity, the results will not be combined in a meta-analysis. We will identify heterogeneity by visual inspection of forest plots, by using a standard  $\chi^2$  test and a significance level of  $\alpha = 0.1$ , in view of the low power of such tests.

We will also examine heterogeneity with  $I^2$ , where  $I^2$  values of 50% or more indicate a substantial level of heterogeneity ([Higgins 2003](#)). Where heterogeneity is moderate ( $< 50\%$ ) a random-effects model will be used. We will attempt to determine potential reasons for heterogeneity by examining individual study characteristics and those of subgroups of the main body of evidence.

### Assessment of reporting biases

Reporting biases will be assessed statistically, using funnel plots in RevMan 5 software. Selection bias, performance bias, attrition bias and detection bias will be assessed using the checklist provided in [Ryan 2007](#). The possibility of reporting bias will be raised in the review.

### Data synthesis

Data-synthesis will begin with a narrative overview of the findings in the form of a table systematically summarising the extracted results, separated by study design, and highlighting important characteristics of the included data, for instance the type of clinical information communicated and the ensuing diagnosis and treatment.

This will be followed by a quantitative meta-analysis if appropriate. The participants, interventions and/or outcomes will be assessed for comparability, which is necessary for statistical pooling. We will look for studies sufficiently 'similar' in terms of study design, setting, intervention, follow-up and outcome measures in order to combine the study data in a meta-analysis. A meeting of all review authors will decide whether or not it is appropriate to carry out such a meta-analysis.

The decision is likely to depend upon the type of intervention and the outcome measures used in the study. Therefore studies should be classified according to:

- Study design: RCTs, CBAs, ITS.

- Outcome measures used, as described under [Types of outcome measures](#).

Caution will be taken when considering the pooling of data in a meta-analysis, especially where differing study designs are concerned. The choice of model would depend on the heterogeneity of the studies included in the meta-analysis. A fixed-effect model assumes all studies are consistent and similar, and is more precise than the alternative, a random-effects model, because it usually has narrower confidence intervals. A random-effects model provides a more conservative estimate of effect and can be used where there is moderate heterogeneity.

We will conduct the analysis according to Cochrane Handbook guidance ([Higgins 2008](#)).

### Subgroup analysis and investigation of heterogeneity

Where there are sufficient data and where it is appropriate in the context of the study, we will conduct subgroup analysis. This will allow the examination of the effect of certain studies on the pooled effects of the intervention.

#### 1. Age

Consideration of the acceptability to different age groups (for both healthcare professionals and patients). This will be important as there is clear evidence that the use of email is predicted by age with a clear tailing off in the generation who have not grown up in the digital age. It is therefore important to consider the intervention's effects in the groups which are accustomed to the technology, since it is likely to become more generalisable to the population as it ages. This will be considered where the primary studies have sought to consider age group from the outset. We will distribute patients into three age subgroups: 0 to 17, 18 to 64, over 65. This distribution was made on the basis of two surveys by The Pew Internet & American Life survey ([Pew 2005](#)).

#### 2. Location

Location of the study will also be considered, since differing environments may condition the accessibility of the technology. For instance we would expect communication technologies and their accessibility to differ according to country and/or region within a country, such as rural or urban areas.

#### 3. Type of email communication

Additionally we propose to analyse the results by method of electronic mail utilized e.g. standard email versus a secure web messaging service.

#### 4. Year of Publication

Lastly we will consider results by year of publication, as those more recent studies may be more relevant given evidence of increasing usage and therefore assumed acceptability.

### Sensitivity analysis

Studies deemed to be of lower quality after examination of individual study characteristics will be removed from the analysis to examine the effect on the pooled effects of the intervention. We will also consider the assessment of the risk of bias of included studies, as described above.

We will exclude studies according to the following filters:

- Outlying studies after initial analysis.
- Largest studies.
- Unpublished studies.
- Language of publication.
- Source of funding (e.g. public versus industry).

Other possible considerations for sensitivity analysis will include different measures of effect size (risk difference, odds ratios).

### Consumer input

At this point in the expansion on technology use we need assurance from the consumers and healthcare professionals that the use of email is desired and that it will be implemented in the most widely acceptable and practical form. Secure systems are time consuming and costly to set up so a review guiding national policy is warranted. We will ask consumer referees to comment on the protocols and on the completed review.

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\* Indicates the major publication for the study

## APPENDICES

### Appendix I. MEDLINE (Ovid) search strategy

1. computer communication networks/
2. limit 1 to yr="1996 - 2002"
3. electronic mail/
4. (electronic mail\* or email\* or e-mail\* or web mail\* or webmail\* or internet mail\* or mailing list\* or discussion list\* or listserv\*).tw.
5. ((patient or health or information or web or internet) adj portal\*).tw.
6. (patient adj (web\* or internet)).tw.
7. ((web\* or internet or www or electronic\* or online or on-line) adj5 (messag\* or communicat\* or transmi\* or transfer\* or send\* or deliver\* or feedback or letter\* or interactiv\* or input\* or forum or appointment\* or booking\* or remind\* or referral\* or consult\* or prescri\*)).tw.
8. ((online or on-line or web\* or internet) adj4 (service\* or intervention\* or therap\* or treatment\* or counsel\*)).tw.
9. (e-communication\* or e-consult\* or e-visit\* or e-referral\* or e-booking\* or e-prescri\*).tw.
10. or/2-9
11. physician patient relations/
12. professional patient relations
13. interprofessional relations/
14. remote consultation/
15. or/11-14



16. internet/
17. 15 and 16
18. 10 or 17
19. randomized controlled trial.pt.
20. controlled clinical trial.pt.
21. random\*.tw.
22. placebo\*.tw
23. drug therapy.fs.
24. trial.tw.
25. groups.tw.
26. clinical trial.pt.
27. evaluation studies.pt.
28. research design/
29. follow up studies/
30. prospective studies/
31. (control\* or prospectiv\* or volunteer\*).tw.
32. cross over studies/
33. comparative study.pt.
34. experiment\*.tw.
35. time series.tw.
36. (pre test or pretest or post test or posttest).tw.
37. (pre intervention or preintervention or post intervention or postintervention).tw.
38. (impact\* or intervention\* or chang\*).tw.
39. effect\$.tw.
40. or/19-39
41. humans.sh.
42. 40 and 41
43. 18 and 42

## WHAT'S NEW

Last assessed as up-to-date: 10 May 2009.

| Date            | Event   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 26 October 2010 | Amended | <ol style="list-style-type: none"> <li>1. 'Types of Participants' - We removed the reference to public health settings since this was at odds with the purpose of the review.</li> <li>2. 'Types of Studies' - We will include controlled before and after (CBA) studies which include two or more intervention SITES and two or more comparison SITES; this was formerly incorrectly described in our protocol as intervention GROUPS and comparison GROUPS.</li> <li>3. We made minor changes to the wording of the Objectives.</li> </ol> |

## HISTORY

Protocol first published: Issue 3, 2009

## CONTRIBUTIONS OF AUTHORS

Josip Car conceived the idea for the protocol and supervised the production.

Helen Atherton wrote the protocol and revised the protocol.

Barbara Meyer designed and co-wrote the protocol.

## DECLARATIONS OF INTEREST

None known.

## SOURCES OF SUPPORT

### Internal sources

- eHealth Unit, Department of Primary Care and Social Medicine, Imperial College London, UK.  
JC received a salary and office space from the eHealth Unit. HA is hosted as a PhD student in the Unit.
- Department of Family Medicine, University of Ljubljana, Slovenia.  
JC is a visiting researcher in the Department, receiving salary and office space support.
- NHS Education for Scotland, UK.  
BM was funded during the production of the protocols by NHS Education for Scotland.

### External sources

- Medical Research Council, UK.  
HA is the recipient of a Medical Research Council PhD Studentship administered by Imperial College, London, UK.

# Email for communicating results of diagnostic medical investigations to patients (Protocol)

Meyer B, Car J, Atherton H, McKinstry B



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This is a reprint of a Cochrane protocol, prepared and maintained by The Cochrane Collaboration and published in *The Cochrane Library* 2010, Issue 12

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[Intervention Protocol]

# Email for communicating results of diagnostic medical investigations to patients

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## ABSTRACT

This is the protocol for a review and there is no abstract. The objectives are as follows:

To assess the effects of using email for communicating results of diagnostic medical investigations to patients, on outcomes for health professionals, patients and carers, and health services, including harms.

## BACKGROUND

### Related systematic reviews

This review will form part of an overview of reviews, incorporating four other reviews:

- email for the provision of information on disease prevention and health promotion (Atherton 2009a);
- email for clinical communication between patients/caregivers and healthcare professionals (Atherton 2009c),
- email for clinical communication between healthcare professionals (Atherton 2009b); and
- email for management of healthcare appointments and attendance reminders (Atherton 2009d).

### The use of email

The use of email as a medium for business and social communication is increasingly common (Pew 2005). This is consistent with the global expansion of users on the internet, with 90% of internet users said to use email (Pew 2005; IWS 2007). While other industries such as insurance and banking have readily embraced such new technology in order to compete on the global stage (CBI 2006), the healthcare sector has been more cautious in its acceptance of this new medium (Neville 2004).

In 1998 a survey of American physicians showed that less than seven per cent had used email to contact their patients (Lacher 2000), however more recent surveys show this is increasing. US surveys have revealed that the increase in use is variable, from 16% of physicians using email in a survey of primary care practitioners, to as many as 72% in a large outpatient department (Gaster 2003; Brooks 2006). Uptake may vary according to patient group. The majority (79%) of doctors at a student health centre in Finland reported using email with patients (Castren 2005). This was a population with a high email and internet usage rate.

Despite increasing rates of use by healthcare professionals, the volume of email communication remains low; with surveys reporting averages from 7.7 emails per month to 8.6 emails per week in the aforementioned Finnish student healthcare centre (Gaster 2003; Castren 2005). Email communication was used for requesting prescriptions, booking appointments and for clinical consultation. Several factors are likely to drive the trend of increasing email use, including the following.

- Increasing patient demand. A substantial amount of survey literature points to high levels of patient desire to contact doctors via email (Couchman 2001; Kleiner 2002; Moyer 2002). Notably, this includes a recent poll in the US (Harris 2006) showing that 62% of patients with the ability to choose their doctor are influenced in part when making this choice by whether the doctor is contactable via email.

- The natural demographic shift toward an increasing proportion of doctors (and patients) comfortable with using technology-driven care solutions.

- Increasing per capita demand on healthcare resources (OECD 2006) (for example with the advent of increased chronic care and demand for more preventive screening) resulting in a focus on working more efficiently.

- Some evidence showing increased physician productivity associated with the adoption of email communication (Liederman 2005).

Guidelines on the use of email in a healthcare environment were developed in an American white paper over 10 years ago (Kane 1998). These guidelines were developed to aid clinicians and healthcare delivery organisations in the use of electronic mail with patients, although evidence exists that physicians are not adhering to the recommendations (Gaster 2003; Brooks 2006). These guidelines have been heavily referred to in much of the related literature but have not been updated since their release.

The vast majority of literature relating to the use of email originates in North America and it is uncertain whether the results of such research will be applicable to other international healthcare environments, where email availability and technology can be very different.

### Forms of electronic mail

In the absence of a standardised email communication infrastructure in the healthcare sector, email has been adopted in an ad-hoc fashion and this has included the use of unsecured and secured email communication.

Standard unsecured email is email which is sent unencrypted. Secured email is encrypted; encryption transforms the text into an un-interpretable format as it is transferred across the internet. Encryption protects the confidentiality of the data, however both sender and recipient must have the appropriate software for encryption and decoding (TechWeb Network 2008).

Secure email also includes various specifically developed applications such as patient portals which utilise web messaging. Such portals provide pro-formas into which patients can enter their message. The message is sent to the recipient in the manner of an email (TechWeb Network 2008).

Secure websites are distributed by secure web servers. Web servers store and disseminate web pages. Secure servers ensure data from an internet browser is encrypted before being uploaded to the relevant website. This makes it difficult for the data to be intercepted and deciphered (TechWeb Network 2008).

There are significant differences in terms of the applications. Bespoke secure email programmes may incorporate special features such as standard forms guiding the use and content of the email sent, ability to show read receipts (in order to confirm the patient has received the correspondence) and, if necessary, facilities for

receiving payment ([Liederman 2005](#)). However they are costly to set up and may require a greater degree of skill on the part of the user than standard unsecured email ([Katz 2004](#)). For the purpose of the review all methods will be included, although secured versus unsecured email will be considered in a subgroup analysis.

## Methods of accessing email

Methods of accessing the internet and thus an email account have changed with time; traditionally access would occur via a personal computer or laptop at home or work, connecting to the internet using a fixed line. There are now several methods of accessing the internet. Wireless networks (known colloquially as wifi) allow internet connection to a personal computer, laptop computer or other device wherever a network is available ([TechWeb Network 2008](#)).

Internet connection is also possible via alternative networks using mobile devices. This includes access via mobile telephones to a wireless application protocol (WAP) network (rather than to the www) or to third generation (3G) network. Adaptors connecting to a universal serial bus (USB) port can be used to access the 3G network using a laptop computer ([TechWeb Network 2008](#)). Therefore email can be accessed away from the office or home in a variety of ways.

## The 'Digital Divide'

The so called 'digital divide' describes the inequality created by the increasing level of digital technology. As new technologies replace old systems, it has been suggested that certain sectors of the population are being left behind with regard to access and use of these services, for instance the elderly, non-English speakers and those in lower income groups ([Hobbs 2003](#); [Car 2004a](#); [Goodyear-Smith 2005](#)). A divide has also been observed amongst healthcare professionals. A UK survey showed that clinicians who qualified more recently feel comfortable using the internet and consider it reliable ([Potts 2002](#)). This is unsurprising given the relatively recent introduction of such technologies and illustrates a potential generational effect on their use.

## Email for communicating results of diagnostic medical investigations to patients

This review will consider the use of email for delivering the results of patients' diagnostic investigations, such as radiological examinations and blood tests. Email will not be suitable for all forms of communication, for example where negotiation or uncertainty is involved, however, it has been shown to be a sound communication medium for the purposes of requesting or delivering factual information ([Fridsma 1994](#)).

Of the potential applications of email, patients have cited the communication of results as one they are keen to see implemented ([Neill 1994](#); [Couchman 2001](#); [Goldman 2006](#)). Clinicians have also mirrored this desire (although to a lesser extent), particularly for sending out normal results ([Goodyear-Smith 2005](#)).

## Advantages and disadvantages

The key advantages of using email for communicating results of diagnostic medical investigations include the following (adapted from [Freed 2003](#); [Car 2004a](#)).

- Timely and low cost delivery of information (relative to conventional mail) ([Houston 2003](#)).
- Convenience; emails can be sent and subsequently read at an opportune time, outside of traditional office hours where convenient ([Leong 2005](#), [Neville 2004](#)).
- The ability to automate the generation of a frequently-used results message.
- The capacity to place hyperlinks to appropriate educational material in an email.
- Email addresses usually stay constant when an address or telephone number changes ([Virji 2006](#)) making this a more reliable way of maintaining communication with transient patients.
- Read receipts can be used to confirm that communications have been received.
- Relative to verbal communication, the written nature of the communication can be valuable as reference for the recipient, aiding recall and providing evidence of the exchange ([Car 2004a](#); [Car 2004b](#)).
- Patients may feel that email is a more intimate, direct communication than the telephone ([Katz 2003](#)).
- Emails can be archived in online or offline folders separate from the inbox of the email account so that they do not use up space in the inbox but can be kept for reference ([Car 2004a](#); [Car 2004b](#)).
- Easier communication for patients with disabilities, and with patients who are temporarily overseas, such as seconded employees ([Goodyear-Smith 2005](#)).

There are, however, some potential downsides such as the following.

- Evidence of patient and physician concerns regarding privacy, confidentiality and potential for the misuse of information ([Fridsma 1994](#); [Harris 2001](#); [Kleiner 2002](#); [Moyer 2002](#); [Katzen 2005](#)).
- Physicians are wary of the potential for email systems to generate an increased workload ([Podichetty 2004](#); [Mandl 1998](#)).
- Recovery of implementation and other associated costs (especially in fee-for-service healthcare systems) ([Mandl 1998](#)).
- Medico-legal issues (including informed consent and use of non-encrypted email) ([Bitter 2000](#)).

- It may encourage unrealistic patient expectations about the intimacy of communication with the physician (Katz 2003).
- Email as a communication tool provides a different context for interaction. Face-to-face communication and telephone calls contain many layers of communication that are lost in an email; such as the emotive cues from vocal intonation or body language (Car 2004a). This may lead to misunderstandings.
- The potential to widen health inequalities via the digital divide (Kleiner 2002; Katz 2004; Goodyear-Smith 2005; Virji 2006).
- Technological issues may occur, such as recipients having a full mailbox causing email to bounce back to the sender (Virji 2006).
- Systems may be at risk from communication failures, for instance a loss of the link to a central server (a computer which provides services used by other computers, such as email) (Car 2008a). There may be several causes of technological system failure; from local power failure to natural disasters.
- Potential for human error which can lead to unintentional content or incorrect recipients.

## Quality and safety issues

The main quality and safety issues around using email communication have included confidentiality, potential for errors and ensuing liability, identifying clinical situations where email consultation is inefficient or inappropriate, securing payment, incorporating email into existing work patterns and achievable costs (Moyer 1999; Kleiner 2002; Gaster 2003; Gordon 2003; Hobbs 2003; Houston 2003; Car 2004b).

Privacy and confidentiality are a formidable challenge in the adoption of email communication (Car 2004b; Katz 2004). Patients are more likely to use this type of communication if they have access to the internet from home, rather than from work, because of privacy issues (Fridsma 1994). Family email accounts can mean a lack of privacy (Mandl 1998).

Web messaging systems can address issues around security and liability that are associated with conventional email communication, since they offer encryption capability and access controls (Liederman 2003). Such systems allow the structuring of communication; for example, messages can be triaged to the correct members of staff (Moyer 2002). However not all healthcare institutions are capable of providing such a facility and instead rely on standardised mail (Car 2004b).

Medico-legal issues are of substantial concern when implementing email communication in practice. Medico-legal issues that could arise include: potential liability for breaches in security allowing a third party to access confidential medical information; liability for responding to unsolicited email from an unknown person; and the possibility of identity fraud whereby someone poses as a patient to obtain private information (Moyer 1999; Couchman 2001; Car 2004b). Thus consideration should be given to such occurrences.

Suggestions for minimising the legal implications of using email in practice have included: adherence to the same strict data protection rules that must be followed in business and industry; adequate infrastructure to provide encrypted, secure email transit and storage; and the use of informed consent to ensure that the patient is aware of the risks and benefits associated with communicating with their healthcare professional via email (Car 2004b). Obtaining informed consent could include the provision of guidelines for patients about the use of email communication, and provide an opportunity for authentication of identity. Authentication of patient identity can be achieved by routinely validating patient email addresses when email communication commences. Ongoing validation of identity has also been recommended (Medem 2007). Healthcare professionals should also exercise discretion about the patient's capability to use email communication. There may be patients who should be advised not to use this method of communication, and this should be at the discretion of the healthcare professional (Medem 2007). There is a clear need for the use of guidelines when considering using email communication, to prevent potential medico-legal issues.

Securing payment is an issue raised by doctors when considering the use of email communication with patients, especially where fee-for-service arrangements are in place. Securing payment is possible with certain systems, however. Web messaging systems allow clinicians to charge registered patients for reading their communication and patients can be pre-warned about this facility (Liederman 2003).

Patient opinion of such systems is also important. Issues facing service users have included questionable reliability, timeliness and the impersonal nature of email (Katz 2003). There is already evidence for patients having diverse preferences about receiving their diagnostic test results (Couchman 2005). For example, there may be a strong case for using email to deliver good news where no consultation is required (such as a negative chlamydia screening result). Complex messages, such as an inconclusive chest x-ray, may not be suitable for email communication.

Education and training results in capable and competent end-users of any technology. This can be costly and time consuming, but enhances the chance of effective implementation of such systems and thus should be a priority. As well as the requirement for initial training, ongoing support is usually necessary to ensure continuing use and further development (Car 2008a). As indicated earlier, clinicians more recently qualified have been shown to feel comfortable using the internet and email technologies (Potts 2002). This may influence training needs and the types of demographic groups leading the use of this technology.

Such issues are wide ranging and encompass both healthcare professional and patient perspectives. All issues of quality and safety arising will be identified and addressed in the review. The review is both timely and necessary, since the email delivery of diagnostic test results is in its infancy, and is currently developing in a non-uniform fashion in the absence of clear evidence of its efficacy,



safety and acceptability.

## OBJECTIVES

To assess the effects of using email for communicating results of diagnostic medical investigations to patients, on outcomes for health professionals, patients and carers, and health services, including harms.

## METHODS

### Criteria for considering studies for this review

#### Types of studies

Four protocols on the use of mobile phone messaging as a communication method in healthcare were published in 2008 (Car 2008b; de Jongh 2008; Gurol-Urganci 2008; Vodopivec-Jamsek 2008). We will draw on key methodological aspects of these protocols to aid comparison of the effects of email as a new communication technology; this affects the selection criteria for types of studies, participants and interventions.

We will include randomised controlled trials (RCTs), quasi-randomised trials, controlled before and after studies (CBAs) with at least two intervention and two control sites, and interrupted time series (ITS) with at least three time points before and after the intervention.

Due to the practicalities of organisational change in a healthcare environment, most studies are not randomised and therefore we will consider quasi-randomised trials and CBAs. The inclusion of ITS is particularly valuable in assessing the ongoing merits of a new technology which may require a 'settling in' period. We will include trials with individual and cluster randomisation.

Relevant trials with economic evaluations will also be evaluated.

#### Types of participants

We will consider healthcare professionals, associated administrative staff, patients and caregivers regardless of age, gender and ethnicity. We will include studies in all settings i.e. primary care settings (services of primary health care), outpatient settings (outpatient clinics), community settings and hospital settings. We will not exclude studies according to the type of healthcare professional (e.g. surgeon, nurse, doctor, allied staff).

We will consider participants originating the email communication, receiving the email communication and copied into the email communication.

#### Types of interventions

We will include interventions using email for communicating results of any diagnostic medical investigations to patients.

We will include interventions that use email in any of the following three forms:

1. Unsecured standard email to/from a standard email account.
2. Secure email which is encrypted in transit and sent to/from a standard email account with the appropriate decoding software.
3. Web messaging, whereby the message is entered into a proforma which is sent to a specific email account, the address of which is not available to the sender.

We will consider all methods of connection. Methods of accessing email include broadband via a fixed line, broadband via a wireless connection, connecting to the 3G network and connecting to the WAP network.

Studies in which email is part of a multifaceted intervention will be included where the effects are individually reported, even if they do not represent the primary outcome. However these will only be considered where they achieve the appropriate statistical power. Where this cannot be determined or where it is not possible to separate the effects, they will not be included.

Comparisons will be made between outcomes of email communication and no intervention, as well as other modes of communication such as face-to-face, postal letters, calls to a landline or mobile telephone, text messaging using a mobile telephone, and if applicable, automated versus personal emails.

Although text messaging may have similar qualities to email it has different implications in terms of security, and the messages are, by definition, short. They have limited ability to provide detailed information about conditions and cannot be used to provide hyperlinks. They will therefore be considered by a separate Cochrane review which is in preparation (Gurol-Urganci 2008).

We will exclude trials which consider the general use of email for healthcare professional-patient contact, that is for multiple purposes where results of diagnostic medical investigations are included but not separately considered.

#### Types of outcome measures

A number of processes and outcomes may be affected by interventions that aim to enhance and/or facilitate the communication of diagnostic medical investigations to patients using email.

Primary outcomes of interest are whether the email has been understood and acted upon correctly by the recipient as intended by the sender, and secondary outcomes are whether email was an appropriate mode of communication.

#### Primary outcomes

*Healthcare professional* outcomes resulting from whether the email has been understood and acted upon correctly by the recipient as

intended by the sender, e.g. professional knowledge and understanding, inter-professional communication (such as communication from outpatient department to general practice), professional behaviour, actions or performance.

*Patient* outcomes associated with whether the email has been understood and acted upon correctly by the recipient as intended by the sender, e.g. patient understanding, clinical progression, treatment outcomes, patient health status and well-being, patient behaviours or actions (such as making requested follow-up appointments).

*Health service* outcomes associated with whether the email has been understood and acted upon correctly by the recipient as intended by the sender, e.g. service use, management or coordination of health problem.

*Harms* e.g. effects on safety or quality of care, breaches in privacy, technology failures.

### Secondary outcomes

*Professional, patient or carer* outcomes associated with whether email was an appropriate mode of communication, e.g. knowledge and understanding, effects on professional-patient or professional-carer communication or relationship, evaluations of care (such as convenience, timeliness, acceptability, satisfaction).

*Health service* outcomes associated with whether email was an appropriate mode of communication, e.g. use of resources or time, costs.

## Search methods for identification of studies

We will follow Cochrane Consumers and Communication Group guidance on review methods

Initially we will search the following electronic bibliographic databases.

- Cochrane Consumers and Communication Review Group Specialised Register
- Cochrane Central Register of Controlled Trials (CENTRAL, *The Cochrane Library*)
- MEDLINE (1950 to present)
- EMBASE (1980 to present)
- CINAHL (1982 to present)
- ERIC (1965 to present)
- PsycINFO (1967 to present)

The MEDLINE (Ovid) search strategy, compiled by John Kistrigo, Trials Search Co-ordinator, Cochrane Consumers and Communication Group, is presented in [Appendix 1](#).

We will also search for grey literature, and search through the references of retrieved relevant studies. Finally we will contact trial authors and experts in the field to ascertain if there are any further studies or unpublished data they may be aware of.

### Grey literature

We will search for grey literature via the following sources:

- Australasian Digital Theses Program <http://adt.caul.edu.au/>
- Networked Digital Library of Theses and Dissertations <http://www.ndltd.org>
- UMI ProQuest Digital Dissertations <http://wwwlib.umi.com/dissertations/>
- Index to Theses <http://www.theses.com/> (Great Britain and Ireland)
- Dissertation Abstracts (North American and European theses) via British Library
- TrialsCentralTM ([www.trialscentral.org](http://www.trialscentral.org))
- Clinical trials register ([Clinicaltrials.gov](http://Clinicaltrials.gov))
- WHO Clinical Trial Search Portal ([www.who.int/trialsearch](http://www.who.int/trialsearch))
- Current Controlled Trials ([www.controlled-trials.com](http://www.controlled-trials.com))
- Google Scholar; <http://scholar.google.co.uk/> (we will examine the first 500 hits).

We will search databases from their start date and there will be no limitation by language. We will keep records of all the search strategies applied.

## Data collection and analysis

The review methods are adapted from a suite of protocols about mobile phone messaging for communication in healthcare settings (Car 2008b; de Jongh 2008; Gurol-Urganci 2008; Vodopivec-Jamsek 2008).

### Selection of studies

Two review authors (BM and HA) will independently assess the potential relevance of all titles and abstracts identified from electronic searches. We will retrieve full text copies of all articles judged to be potentially relevant. At least two review authors will then independently assess these retrieved articles for inclusion. During a meeting of all review authors, we will verify the final list of included and excluded studies. Any disagreements about particular studies will be resolved by discussion. If the description of a study is insufficiently detailed to allow the review authors to judge whether it meets the review's inclusion criteria, the study authors will be contacted to obtain more detailed information to allow a final judgement regarding inclusion or exclusion.

### Data extraction and management

We will extract data from all included studies using a standard form derived from the data extraction template provided by the Cochrane Consumers and Communication Review Group. We will extract the following data:

- *General information:* Title, authors, source, publication status, date published, language, review author information, date reviewed.

- *Details of study:* Aim of intervention and study, study design, location and details of setting, methods of recruitment of participants, inclusion/exclusion criteria, ethical approval and informed consent, consumer involvement.

- *Assessment of study quality:* Key features of allocation, contemporaneous data collection for intervention and control groups; and for interrupted time series, number of data points collected before and after the intervention, follow-up of participants.

- *Risk of bias:* data to be extracted depends on study design (see [Assessment of risk of bias in included studies](#)).

- *Participants:* Description, geographical location, setting, number screened, number randomised, number completing the study, age, gender, ethnicity, socio-economic grouping and other baseline characteristics, test requested, diagnosis, treatment.

- *Health service:* description, geographical location, setting, age, gender, population served, medical setting and clinical context of patients.

- *Intervention:* Description of the intervention and control including rationale for intervention versus the control (usual care). Delivery of the intervention including email type (standard unsecured email, secure email, web portal or hybrid). Type of clinical information communicated. Content of communication (e.g. text, image). Purpose of communication (e.g. obtaining information, providing information). Communication protocols in place. Who delivers the intervention (e.g. healthcare professional, administrative staff). How consumers of interventions are identified. Sender of first communication (health service, professional, patient and/or carer). Recipients of first communication (health service, professional, patient and/or carer). Whether communication is responded to (content, frequency, method of media). Any co-interventions included. Duration of intervention. Quality of intervention. Follow up period and rationale for chosen period.

- *Outcomes:* principal and secondary outcomes, methods for measuring outcomes, methods of follow-up, tools used to measure outcomes, whether the outcome is validated.

- *Results:* for outcomes and timing of outcome assessment, control and intervention groups if applicable.

The data extraction template will be piloted to allow for unforeseen variations in studies. For every included study at least two review authors will independently perform the data extraction. Any discrepancies between the review authors' data extraction sheets will be discussed and resolved by the review authors who performed the data extraction. Where necessary, we will involve another review author to resolve discrepancies.

### Assessment of risk of bias in included studies

Two review authors will independently assess the quality of included studies, with any disagreements resolved by discussion and consensus, and by consulting a third author where necessary. Stud-

ies of different designs will be dealt with separately throughout this review in both the quality assessment and analysis.

For RCTs (and quasi RCTs), we will assess and report on the following elements that contribute to bias, according to the guidelines outlined in [Higgins 2008](#):

- Sequence generation;
- Allocation concealment;
- Blinding (participants, personnel, outcomes assessors, data analysers);
- Intention-to-treat analysis;
- Incomplete outcome data;
- Selective outcome reporting.

We will describe the study and assign a judgement relating to the risk of bias for each item. We will use a template to guide the assessment of risk of bias, based upon the guidance by [Higgins 2008](#), judging each item as 'yes' (indicating a low risk of bias), 'no' (indicating a high risk of bias) or 'unclear' (indicating an uncertain risk of bias). For each study we will summarise the risk of bias for each outcome.

We will also assess a range of other possible sources of bias and indicators of study quality, in accordance with the guidelines of the Cochrane Consumers and Communication Review Group ([Ryan 2007](#)), including:

- Baseline comparability of groups;
- Validation of outcome assessment tools;
- Reliability of outcome measures;
- Other possible sources of bias

In the case of studies other than RCTs (that is, quasi-randomised controlled trials, CBA and ITS studies) we will additionally assess the quality of these studies systematically and according to the criteria outlined in the guidelines of the Cochrane Consumers and Communication Review Group so that risk of bias may be ascertained.

We will present the results of the risk of bias assessment in tables and will incorporate the results of the assessment of risk of bias into the review through systematic narrative description and commentary about each of the quality items, for each type of included study. This will lead to an overall assessment of the risk of bias across the included studies and a judgement about the possible effects of bias on the effect sizes of the included studies.

We will contact study authors for additional information about the included studies, or for clarification of the study methods as required.

### Measures of treatment effect

For continuous data, where outcomes have been measured in a standard way across studies, we will report the mean difference and confidence intervals. For dichotomous data, when outcomes have been measured in a standard way, we will report the odds ratio/risk ratio and confidence intervals.

## Unit of analysis issues

Issues may arise from the inclusion of cluster-randomised trials, repeated measurements and studies with more than two treatment groups. If applicable the data will be analysed according to recommendations in the Cochrane Collaboration Open Learning Module on issues related to the unit of analysis (Alderson 2002).

## Dealing with missing data

If data are missing from the relevant comparisons we will attempt to contact the authors of the studies to obtain the information. If the authors cannot be reached, or if the studies are found to be unsatisfactory on the basis of data provided, these studies will be excluded.

## Assessment of heterogeneity

It is important to consider heterogeneity in this review, given the fledgling nature of this field and the relatively recent development of associated interventions. Where there is substantial clinical, methodological or statistical heterogeneity, the results will not be combined in a meta-analysis. We will identify heterogeneity by visual inspection of forest plots, by using a standard  $\chi^2$  test and a significance level of  $\alpha = 0.1$ , in view of the low power of such tests.

We will also examine heterogeneity with  $I^2$ , where  $I^2$  values of 50% or more indicate a substantial level of heterogeneity (Higgins 2003). Where heterogeneity is moderate (< 50%) a random-effects model will be used. We will attempt to determine potential reasons for heterogeneity by examining individual study characteristics and those of subgroups of the main body of evidence.

## Assessment of reporting biases

Reporting biases will be assessed statistically, using funnel plots in RevMan 5 software. Selection bias, performance bias, attrition bias and detection bias will be assessed using the checklist provided in Ryan 2007. The possibility of reporting bias will be raised in the review.

## Data synthesis

Data synthesis will begin with a narrative overview of the findings in the form of a table systematically summarising the extracted results, separated by study design, and highlighting important characteristics of the included data, for instance the type of diagnostic test, type of results and the depth of information provided in the intervention.

This will be followed by a quantitative meta-analysis if appropriate. The participants, interventions and/or outcomes will be assessed for comparability, which is necessary for statistical pooling. We will look for studies sufficiently 'similar' in terms of study design, setting, intervention, follow-up and outcome measures in order to

combine the study data in a meta-analysis. A meeting of all review authors will decide whether or not it is appropriate to carry out such a meta-analysis.

The decision is likely to depend upon the type of intervention and the outcome measures used in the study. Therefore studies should be classified according to:

- Study design: RCTs, CBAs, ITS.
- Outcome measures used, as described under [Types of outcome measures](#).

Caution will be taken when considering the pooling of data in a meta-analysis, especially where differing study designs are concerned. The choice of model would depend on the heterogeneity of the studies included in the meta-analysis. A fixed-effect model assumes all studies are consistent and similar, and is more precise than the alternative, a random-effects model, because it usually has narrower confidence intervals. A random-effects model provides a more conservative estimate of effect and can be used where there is moderate heterogeneity.

We will conduct the analysis according to Cochrane Handbook guidance (Higgins 2008).

## Subgroup analysis and investigation of heterogeneity

Where there are sufficient data and where it is appropriate in the context of the study, we will conduct subgroup analysis. This will allow the examination of the effect of certain studies on the pooled effects of the intervention.

### 1. Age

Consideration of the acceptability to different age groups (for both healthcare professionals and patients). This will be important as there is clear evidence that the use of email is predicted by age with a clear tailing off in the generation who have not grown up in the digital age. It is therefore important to consider the intervention's effects in the groups which are accustomed to the technology, since it is likely to become more generalisable to the population as it ages. This will be considered where the primary studies have sought to consider age group from the outset. We will distribute patients into three age subgroups: 0 to 17, 18 to 64, over 65. This distribution was made on the basis of two surveys by The Pew Internet & American Life survey (Pew 2005).

### 2. Location

Location of the study will also be considered, since differing environments may condition the accessibility of the technology. For instance we would expect communication technologies and their accessibility to differ according to country and/or region within a country, such as rural or urban areas.

### 3. Type of email communication

Additionally we propose to analyse the results by method of electronic mail utilized e.g. standard email versus a secure web messaging service.

### 4. Year of Publication

Lastly we will consider results by year of publication, as more recent studies may be more relevant given evidence of increasing usage and therefore assumed acceptability.

### Sensitivity analysis

Studies deemed to be of lower quality after examination of individual study characteristics will be removed from the analysis to examine the effect on the pooled effects of the intervention. We will also consider the assessment of the risk of bias of included studies, as described above. We will exclude studies according to the following filters:

- Outlying studies after initial analysis.
- Largest studies.
- Unpublished studies.
- Language of publication.
- Source of funding (e.g. public versus industry).

Other possible considerations for sensitivity analysis will include different measures of effect size (risk difference, odds ratios).

### Consumer input

At this point in the expansion of technology use we need assurance from consumers and healthcare professionals that the use of email is desired and that it will be implemented in the most widely acceptable and practical form. Secure systems are time consuming and costly to set up so a review guiding national policy is warranted. We will ask consumer referees to comment on the protocols and on the completed review.

## ACKNOWLEDGEMENTS

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\* Indicates the major publication for the study



## APPENDICES

### Appendix I. MEDLINE (Ovid) search strategy

1. computer communication networks/
2. limit 1 to yr="1996 - 2002"
3. electronic mail/
4. (electronic mail\* or email\* or e-mail\* or web mail\* or webmail\* or internet mail\* or mailing list\* or discussion list\* or listserv\*).tw.
5. ((patient or health or information or web or internet) adj portal\*).tw.
6. (patient adj (web\* or internet)).tw.
7. ((web\* or internet or www or electronic\* or online or on-line) adj5 (messag\* or communicat\* or transmi\* or transfer\* or send\* or deliver\* or feedback or letter\* or interactiv\* or input\* or forum or appointment\* or booking\* or remind\* or referral\* or consult\* or prescri\*)).tw.
8. ((online or on-line or web\* or internet) adj4 (service\* or intervention\* or therap\* or treatment\* or counsel\*)).tw.
9. (e-communication\* or e-consult\* or e-visit\* or e-referral\* or e-booking\* or e-prescri\*).tw.
10. or/2-9
11. physician patient relations/
12. professional patient relations
13. interprofessional relations/
14. remote consultation/
15. or/11-14
16. internet/
17. 15 and 16
18. 10 or 17
19. randomized controlled trial.pt.
20. controlled clinical trial.pt.
21. random\*.tw.
22. placebo\*.tw
23. drug therapy.fs.
24. trial.tw.
25. groups.tw.
26. clinical trial.pt.
27. evaluation studies.pt.
28. research design/
29. follow up studies/
30. prospective studies/
31. (control\* or prospectiv\* or volunteer\*).tw.
32. cross over studies/
33. comparative study.pt.
34. experiment\*.tw.
35. time series.tw.
36. (pre test or pretest or post test or posttest).tw.
37. (pre intervention or preintervention or post intervention or postintervention).tw.
38. (impact\* or intervention\* or chang\*).tw.
39. effect\$.tw.
40. or/19-39
41. humans.sh.
42. 40 and 41
43. 18 and 42



## WHAT'S NEW

Last assessed as up-to-date: 10 May 2009.

| Date            | Event   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 26 October 2010 | Amended | <ol style="list-style-type: none"><li>1. 'Types of Participants' - We removed the reference to public health settings since this was at odds with the purpose of the review.</li><li>2. 'Types of Studies' - We will include controlled before and after (CBA) studies which include two or more intervention SITES and two or more comparison SITES; this was formerly incorrectly described in our protocol as intervention GROUPS and comparison GROUPS.</li><li>3. We made a minor change to the wording of the Objectives.</li></ol> |

## HISTORY

Protocol first published: Issue 3, 2009

## CONTRIBUTIONS OF AUTHORS

Josip Car conceived the idea for the protocol and supervised the production.

Barbara Meyer designed and wrote the protocol.

Helen Atherton co-wrote the protocol and revised the protocol.

Brian McKinstry provided general advice on the review.

## DECLARATIONS OF INTEREST

None known.

## SOURCES OF SUPPORT

### Internal sources

- NHS Education for Scotland, UK.

BM was funded during the production of the protocols by NHS Education for Scotland.

- eHealth unit, Department of Primary Care and Social Medicine, Imperial College London, UK.

JC received a salary and office space from the eHealth Unit. HA is hosted as a PhD student in the Unit.

- Department of Family Medicine, University of Ljubljana, Slovenia.

JC is a visiting researcher in the Department, receiving salary and office space support.

- Division of Community Health Sciences, University of Edinburgh, UK.

BMCK holds a post in the Division and is funded by the Chief Scientist Office, part of the Scottish Government Health Directorates.

## External sources

- Medical Research Council, UK.

HA is the recipient of a Medical Research Council PhD Studentship, administered by Imperial College, London, UK.





# Email for the management of healthcare appointments and attendance reminders (Protocol)

Atherton H, Car J, Meyer B



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[Intervention Protocol]

# Email for the management of healthcare appointments and attendance reminders

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## ABSTRACT

This is the protocol for a review and there is no abstract. The objectives are as follows:

To assess the effects of using email for the management of healthcare appointments and attendance reminders, on outcomes for health professionals, patients and carers, and health services, including harms.

## BACKGROUND

### Related systematic reviews

This review will form part of an overview of reviews, incorporating four other reviews:

- email for the provision of information on disease prevention and health promotion (Atherton 2009a);
- email for the clinical communication between patients/caregivers and healthcare professionals (Atherton 2009c);
- email for the clinical communication between healthcare professionals (Atherton 2009b); and
- email for communicating results of diagnostic medical investigations to patients (Meyer 2009).

### The use of email

The use of email as a medium for business and social communication is increasingly common (Pew 2005). This is consistent with the global expansion of users on the internet, with 90% of internet users said to use email (Pew 2005; IWS 2007). While other industries such as insurance and banking have readily embraced such new technology in order to compete on the global stage (CBI 2006), the healthcare sector has been more cautious in its acceptance of this new medium (Neville 2004).

In 1998 a survey of American physicians showed that less than seven per cent had used email to contact their patients (Lacher 2000), however more recent surveys show this to be increasing. US surveys have revealed that the increase in use is variable, from 16% of physicians using email in a survey of primary care practitioners, to as many as 72% in a large outpatient department (Gaster 2003, Brooks 2006). Uptake may vary according to patient group. The majority (79%) of doctors at a student health centre in Finland reported using email with patients (Castren 2005). This was a population with a high email and internet usage rate. Despite increasing rates of use by healthcare professionals, the volume of email communication remains low, with surveys reporting averages between 7.7 emails per month and 8.6 emails per week in the Finnish student healthcare centre (Gaster 2003; Castren 2005). Email communication was used for requesting prescriptions, booking appointments and for clinical consultation. Several factors are likely to drive the trend of increasing email use including the following.

- Increasing patient demand. A substantial amount of survey literature points to high levels of patient desire to contact doctors via email (Kleiner 2002; Moyer 2002). Notably, this includes a recent poll in the US (Harris 2006) showing that 62% of patients with the ability to choose their doctor are influenced in part when making this choice by whether the doctor is contactable via email.

- The natural demographic shift toward an increasing proportion of doctors (and patients) comfortable with using technology-driven care solutions.

- Increasing per capita demand on healthcare resources (OECD 2006) (for example with the advent of increased chronic care and demand for more preventive screening) resulting in a focus on working more efficiently.

- Some evidence showing increased physician productivity associated with the adoption of email communication (Liederman 2005).

Guidelines on the use of email in a healthcare environment were developed in an American white paper over 10 years ago (Kane 1998). These guidelines were developed to aid clinicians and healthcare delivery organisations in the use of electronic mail with patients, although there is evidence that physicians are not adhering to the recommendations (Gaster 2003; Brooks 2006). These guidelines have been heavily referred to in much of the related literature but have not been updated since their release.

The vast majority of literature on the use of email originates in North America and it is uncertain whether the results of such research will be applicable to other international healthcare environments, where email availability and technology can be very different.

### Forms of electronic mail

In the absence of a standardised email communication infrastructure in the healthcare sector, email has been adopted in an ad-hoc fashion and this has included the use of unsecured and secured email communication.

Standard unsecured email is email which is sent unencrypted. Secured email is encrypted; encryption transforms the text into an un-interpretable format as it is transferred across the internet. Encryption protects the confidentiality of the data, however both sender and recipient must have the appropriate software for encryption and decoding (TechWeb Network 2008).

Secure email also includes various specifically developed applications such as patient portals which utilise web messaging. Such portals provide pro-formas into which patients can enter their message. The message is sent to the recipient in the manner of an email (TechWeb Network 2008).

Secure websites are distributed by secure web servers. Web servers store and disseminate web pages. Secure servers ensure data from an internet browser is encrypted before being uploaded to the relevant website. This makes it difficult for the data to be intercepted and deciphered (TechWeb Network 2008).

There are significant differences in terms of the applications. Bespoke secure email programmes may incorporate special features such as standard forms guiding the use and content of the email sent, ability to show read receipts (in order to confirm the patient has received the correspondence) and, if necessary, facilities for



receiving payment ([Liederman 2005](#)). However they are costly to set up and may require a greater degree of skill on the part of the user than standard unsecured email ([Katz 2004](#)). For the purpose of the review all methods will be included although secured versus unsecured email will be considered in a subgroup analysis.

## Methods of accessing email

Methods of accessing the internet and thus an email account have changed with time; traditionally access would occur via a personal computer or laptop at home or work, connecting to the internet using a fixed line. There are now several methods of accessing the internet. Wireless networks (known colloquially as wifi) allow internet connection to a personal computer, laptop computer or other device wherever a network is available ([TechWeb Network 2008](#)).

Internet connection is also possible via alternative networks using mobile devices. This includes access via mobile telephones to a wireless application protocol (WAP) network (rather than to the www) or to third generation (3G) network. Adaptors connecting to a universal serial bus (USB) port can be used to access the 3G network using a laptop computer ([TechWeb Network 2008](#)). Therefore email can be accessed away from the office or home in a variety of ways.

## The 'Digital Divide'

The so-called 'digital divide' describes the inequality created by the increasing level of digital technology. As new technologies replace old systems, it has been suggested that certain sectors of the population are being left behind with regard to access and use of these services, for instance the elderly, non-English speakers and those in lower income groups ([Hobbs 2003](#); [Car 2004a](#); [Goodyear-Smith 2005](#)). A divide has also been observed amongst healthcare professionals. A UK-based survey showed that clinicians more recently-qualified feel comfortable using the internet and consider it reliable ([Potts 2002](#)). This is unsurprising given the relatively recent introduction of such technologies, and illustrates a potential generational effect on their use.

## Email for the management of healthcare appointments and reminders for attendance

This review will consider the use of email for the management of healthcare appointments and reminders for attendance, particularly scheduling, rescheduling and cancelling healthcare appointments, and providing prompts/reminders for attendance at appointments.

The aim of using email interventions is to reduce healthcare inefficiencies caused by missed appointments, and to reduce unnec-

essary waiting times as well as providing continuous and effective healthcare to patients.

In the UK non-attendance rates for general practice and hospital outpatient appointments are around 12% but range from 5% to 34% across different specialities and between regions ([Sharp 2001](#)). Non-attendance can arise from problems associated with cancelling an appointment, such as through poor provision for cancelling or rearranging an appointment, or because a patient lacks access to a telephone at a suitable time.

Reasons given for missing an appointment are most commonly forgetting the appointment, and family or work commitments ([Sharp 2001](#)). For hospital appointments, however, inadequate communication is deemed to be the main factor ([Hamilton 1999](#)). The problem of non-attendance has long been recognised. A study of failed outpatient appointments in 1989 suggested that non-attendance may be due to inadequate communication between the referring doctor and patient ([Frankel 1989](#)). Missed appointments are costly; in 1997 the estimated total cost to the NHS was £300 million annually, approximately £65 per lost appointment. Non-attendance also creates long waiting lists ([Hamilton 1999](#)).

## Scheduling

It has been recommended that to reduce non-attendance, the patient should be allowed to select a suitable appointment time and date. In the case of outpatient appointments this has been shown to reduce non-attendance by between 30% and 50% ([Read 1997](#); [Sharp 2001](#)). Traditionally, patients have appointments arranged for them by the secondary care health service, or they choose an appointment from those offered to them; this occurs via letter, telephone or in person. Patients often have difficulty contacting their general practitioner or equivalent by telephone, and using email instead may offer a viable alternative ([Fridsma 1994](#)). Where email systems are in place there will usually be a specific email address for non-urgent appointments which patients can use ([Neville 2004](#)).

Booking appointments via email may involve the patient sending an email with suitable times for an appointment and their choice of clinician. Alternatively, a pro-forma may be used. The University of Texas Medical Branch has an online appointment scheduling and rescheduling form, which asks patients to fill in patient information, contact information, and preferred appointment information including preferred physician and a time preference. A response is delivered by email or telephone within two days. The form includes a clear warning that it is not to be used in emergency or urgent situations ([UTMB 2008](#)).

In general, responses specify with whom the appointment has been made, the date and time. Standard responses can be created to save time. Patients have reported satisfaction with this method; stating that it is more convenient since it allows communication outside of office hours. A close alternative is a web-based secure system, such as that used to purchase tickets online, which shows

free appointments and therefore prevents the back and forth of emails (Neill 1994; Neville 2004).

Email for managing appointments and attendance has been found to be acceptable for healthcare professionals as well as patients. In a survey of US physicians, 75% considered scheduling appointments to be an appropriate use of email, regarding it as a simple, straightforward use of such technology (Gaster 2003).

## Reminders

Reminders have been shown to reduce non-attendance rates by 23% (Campbell 1994) and these are traditionally in the form of letters or telephone calls. Reductions in non-attendance of 82% have been shown in a trial using confirmation by reply, whereby patients were required to post back a pre-paid reply to their appointment confirmation, and any non-responders were telephoned (Sims 1995). The option for patient confirmation or re-booking has also been shown to reduce non-attendance rates (Car 2004a).

Email is well suited to appointment reminders (Kane 1998) and can be used to allow patients to confirm their attendance at an appointment. Email has many benefits since reminders can be automated and can contain extra information at no extra cost. It may also allow patients to reschedule or change an appointment at a convenient time, without having to wait to be connected to the receptionist or feeling obliged to explain the reasons for a cancellation (Car 2004a).

## Advantages and disadvantages

The key advantages of email for managing healthcare appointments and reminders for attendance include the following (adapted from Freed 2003; Car 2004a).

- Timely and low cost delivery of information (relative to conventional mail) (Houston 2003).
- Convenience; emails can be sent and subsequently read at an opportune time, outside of traditional office hours where convenient (Neville 2004; Leong 2005).
- Read receipts can be used to confirm that communications have been received.
- Relative to verbal communication, the written nature of the communication can be of value as reference for the patient, aiding recall and providing evidence of the exchange.
- It is an easier communication method for patients with disabilities, and with patients who are temporarily overseas, such as seconded employees (Goodyear-Smith 2005).
- Email addresses usually stay constant when an address or telephone number changes (Virji 2006) making this a reliable way of maintaining communication with transient patients.

There are, however, some potential downsides such as the following.

- Evidence of patient and physician concerns regarding privacy, confidentiality and potential misuse of information

(Fridsma 1994; Harris 2001; Kleiner 2002; Moyer 2002; Katzen 2005).

- Email may generate an increased workload for healthcare professionals and associated staff. More than one email exchange may be required if a suitable appointment cannot be found, so that a mutually suitable time can be established. This is a particular issue where potential appointment times are not available to view online (Mandl 1998; Neville 2004; Podichetty 2004).

- Patients may find it difficult to obtain an appointment at short notice via email; since a timely reply cannot be guaranteed (Moyer 2002).

- Email as a communication tool provides a different context for interaction. Face-to-face communication and telephone calls contain many layers of communication that are lost in an email; such as the emotive cues from vocal intonation or body language (Car 2004a). This may lead to misunderstandings.

- Recovery of implementation and other associated costs (especially in fee-for-service healthcare systems) (Mandl 1998).

- Potential medico-legal issues (such as use of non-encrypted email) (Bitter 2000).

- The potential to widen health inequalities via the digital divide (Kleiner 2002; Katz 2004; Goodyear-Smith 2005; Virji 2006).

- Technological issues may occur, such as recipients having a full mailbox causing email to bounce back to the sender (Virji 2006).

- Systems may be at risk from communications failures, for instance a loss of the link to a central server (a computer which provides services used by other computers, such as email) (Car 2008a). There may be several causes for technological system failure, from local power failure to natural disasters.

- Potential for human error which can lead to unintentional content or incorrect recipients.

## Quality and safety issues

The main quality and safety issues around the use of email in healthcare have included: confidentiality; potential for errors and ensuing liability; identifying clinical situations where email communication is inefficient or inequitable; securing payment; incorporating email into existing work patterns; and achievable costs (Kleiner 2002; Gaster 2003; Gordon 2003; Hobbs 2003; Houston 2003; Car 2004b).

Privacy and confidentiality are a formidable challenge in the adoption of email communication (Car 2004b; Katz 2004). Patients are more likely to use this type of communication if they have access to the internet from home, rather than from work, because of privacy issues (Fridsma 1994). Family email accounts can mean a lack of privacy (Mandl 1998).

Web messaging systems can address issues around security and liability that are associated with conventional email communi-

cation since they offer encryption capability and access controls (Liederman 2003). Such systems allow the structuring of communication; for example, messages can be triaged to the correct members of staff (Moyer 2002). However not all healthcare institutions are capable of providing such a facility and instead rely on standardised mail (Car 2004b).

Suggestions for minimising the legal implications of using email in practice have included: adherence to the same strict data protection rules that must be followed in business and industry; adequate infrastructure to provide encrypted secure email transit and storage; and the use of informed consent to ensure that the patient is aware of the risks and benefits associated with communicating with their healthcare professional via email (Car 2004b). Obtaining informed consent could include the provision of guidelines for patients about the use of email communication, and would provide an opportunity for authentication of identity. Authentication of patient identity can be achieved by routinely validating patient email addresses when email communication commences. Ongoing validation of identity has also been recommended (Medem 2007).

Healthcare professionals should also exercise discretion about the patient's capability to use email communication. There may be patients who should be advised not to use this method of communication, and this should be at the discretion of the healthcare professional (Medem 2007). There is a clear need for the use of guidelines when considering email communication, to prevent potential medico-legal issues.

Introducing the option of email for making healthcare appointments may introduce inequity, and disempower those patients most in need, for example those with severe illness and those in deprived areas. Email systems may also discriminate against patients who speak a different language, and those with learning difficulties or sensory disabilities (Sharp 2001). Patients who are comfortable using email would be able to use new systems more easily and so may obtain optimum appointments, while those patients booking by telephone or in person may have to compete with this fast moving email system to find an appointment to suit them (Moyer 2002).

Securing reimbursement for having such a service available is an issue raised by healthcare professionals and their organisations when considering their use, especially where fee-for-service health systems are in operation. Securing payment is possible with certain systems. Web messaging systems allow clinicians to charge registered patients for reading their responses and patients can be pre-warned about this facility (Liederman 2003).

Education and training result in capable and competent end-users of any technology. This can be costly and time consuming, but enhances the chance of effective implementation of such systems and thus should be a priority. As well as the requirement for initial training, ongoing support is usually necessary to ensure continuing use and further development (Car 2008a). As indicated earlier, clinicians more recently qualified have been shown to feel com-

fortable using the internet and email technologies (Potts 2002). This may influence training needs and the types of demographic groups leading the use of this technology.

These issues are wide ranging and encompass both healthcare professional and patient perspectives. All issues of quality and safety arising will be identified and addressed in the review.

## OBJECTIVES

To assess the effects of using email for the management of healthcare appointments and attendance reminders, on outcomes for health professionals, patients and carers, and health services, including harms.

## METHODS

### Criteria for considering studies for this review

#### Types of studies

Four protocols on the use of mobile phone messaging as a communication method in healthcare were published in 2008 (Car 2008b; de Jongh 2008; Gurol-Urganci 2008; Vodopivec-Jamsek 2008). We will draw on key methodological aspects of these protocols to aid comparison of the effects of email as a new communication technology; this affects the selection criteria for types of studies, participants and interventions.

We will include randomised controlled trials (RCTs), quasi-randomised trials, controlled before and after studies (CBAs) with at least two intervention and two control sites, and interrupted time series (ITS) with at least three time points before and after intervention.

Due to the practicalities of organisational change in a healthcare environment, most studies are not randomised and therefore we will consider quasi-randomised trials and CBAs. The inclusion of ITS is particularly valuable in assessing the ongoing merits of a new technology which may require a 'settling in' period. We will include trials with individual and cluster randomisation. Relevant trials with economic evaluations will also be evaluated.

#### Types of participants

We will consider all healthcare professionals, associated administrative staff, patients and caregivers regardless of age, gender and ethnicity. We will include studies in all settings i.e. primary care settings (services of primary health care), outpatients settings (out-patient clinics), community settings and hospital settings. We will not exclude studies according to the type of healthcare professional (e.g. surgeon, nurse, doctor, allied staff).

We will consider participants originating the email communication, receiving the email communication and copied into the email communication.

### Types of interventions

We will assess the effects of email used for the management of patient healthcare appointments and attendance reminders. We will include interventions that use email for scheduling health appointments, for reminders for a scheduled health appointment and for ongoing management of health appointments.

We will include interventions that use email in any of the following three forms:

1. Unsecured standard email to/from a standard email account.
2. Secure email which is encrypted in transit and sent to/from a standard email account with the appropriate encryption decoding software.
3. Web messaging; whereby the message is entered into a proforma which is sent to a specific email account, the address of which is not available to the sender.

All methods of connection will be considered. Methods of accessing email include broadband via a fixed line, broadband via a wireless connection, connecting to the 3G network and connecting to the WAP network.

Studies in which email is part of a multifaceted intervention will be included where the effects are individually reported, even if they do not represent the primary outcome. However these will only be considered where they achieve the appropriate statistical power. Where this cannot be determined or where it is not possible to separate the effects they will not be included.

We will exclude studies in which invitations for routine preventive screening (such as cervical screening) are administered, or for appointments related solely to preventive healthcare. Invitations for such screening and health promotion activities, and any associated reminders and management, will be considered in the parallel review [Atherton 2009a](#). However, where an appointment concerns both preventive and routine healthcare, studies may be included in both reviews where relevant.

We will exclude studies which consider the general use of email for healthcare professional-patient contact, i.e. for multiple purposes where management of healthcare appointments and attendance reminders are included but not separately considered.

Included studies could compare email communication with no intervention, as well as with other modes of communication such as face-to-face, postal letters, calls to a landline or mobile telephone, text messaging using a mobile telephone, and if applicable, automated versus personal emails.

### Types of outcome measures

A number of processes and outcomes may be affected by interventions that aim to enhance and/or facilitate the use of email

for the management of healthcare appointments and attendance reminders.

Primary outcomes of interest are whether the email has been understood and acted upon correctly by the recipient as intended by the sender, and secondary outcomes are whether email was an appropriate mode of communication.

### Primary outcomes

*Patient* outcomes associated with whether email has been understood and acted upon correctly by the recipient as intended by the sender, e.g. patient understanding, patient health status and well-being, and patient behaviours or actions.

*Health service* outcomes associated with whether email has been understood and acted upon correctly by the recipient as intended by the sender, e.g. appointments made, attendance rates.

*Harms* e.g. effects on safety or quality of care such as missed diagnoses, breaches in privacy, technology failures.

### Secondary outcomes

*Professional, patient or carer* outcomes associated with whether email was an appropriate mode of communication, e.g. knowledge and understanding, effects on professional-patient or professional-carer communication or relationship, evaluations of care (convenience, timeliness, acceptability, satisfaction).

*Health service* outcomes associated with whether email was an appropriate mode of communication, e.g. use of resources or time, costs, use of medical services, referrals, admissions.

### Search methods for identification of studies

We will follow Cochrane Consumers and Communication Group guidance on review methods

Initially we will search the following electronic bibliographic databases.

- Cochrane Consumers and Communication Review Group Specialised Register
- Cochrane Central Register of Controlled Trials (CENTRAL, *The Cochrane Library*)
- MEDLINE (1950 to present)
- EMBASE (1980 to present)
- CINAHL (1982 to present)
- ERIC (1965 to present)
- PsycINFO (1967 to present)

The MEDLINE (Ovid) search strategy, compiled by John Kis-Rigo, Trials Search Co-ordinator, Cochrane Consumers and Communication Group, is presented in [Appendix 1](#).

We will also search for grey literature, and examine the reference lists of retrieved relevant studies. Finally, we will contact authors and experts in the field to ascertain if there are any further studies or unpublished data they may be aware of.

## Grey literature

We will search for grey literature via the following sources:

- Australasian Digital Theses Program <http://adt.caul.edu.au/>
- Networked Digital Library of Theses and Dissertations <http://www.ndltd.org>
- UMI ProQuest Digital Dissertations <http://wwwlib.umi.com/dissertations/>
- Index to Theses <http://www.theses.com/> (Great Britain and Ireland)
- Dissertation Abstracts (North American and European theses) via British Library
- TrialsCentralTM ([www.trialscentral.org](http://www.trialscentral.org))
- Clinical trials register ([Clinicaltrials.gov](http://Clinicaltrials.gov))
- WHO Clinical Trial Search Portal ([www.who.int/trialsearch](http://www.who.int/trialsearch))
- Current Controlled Trials ([www.controlled-trials.com](http://www.controlled-trials.com))
- Google Scholar; <http://scholar.google.co.uk/> (we will examine the first 500 hits).

We will search databases from their start date and there will be no limitation by language. We will keep records of all the search strategies applied.

## Data collection and analysis

The review methods are adapted from a suite of protocols about mobile phone messaging for communication in healthcare settings (Car 2008b; de Jongh 2008; Gurol-Urganci 2008; Vodopivec-Jamsek 2008).

## Selection of studies

Two review authors (HA and BM) will independently assess the potential relevance of all titles and abstracts identified from electronic searches. We will retrieve full text copies of all articles judged to be potentially relevant. At least two review authors will then independently assess these retrieved articles for inclusion. During a meeting of all review authors, we will verify the final list of included and excluded studies. Any disagreements about particular studies will be resolved by discussion. If the description of a study is insufficiently detailed to allow the review authors to judge whether it meets the review's inclusion criteria, the authors will be contacted to obtain more detailed information to allow a final judgement regarding inclusion or exclusion.

## Data extraction and management

We will extract data from all included studies using a standard form derived from the data extraction template provided by the Cochrane Consumers and Communication Review Group. We will extract the following data:

- *General information:* Title, authors, source, publication status, date published, language, review author information, date reviewed.
- *Details of study:* Aim of intervention and study, study design, location and details of setting, methods of recruitment of participants, inclusion/exclusion criteria, ethical approval and informed consent, consumer involvement.
- *Assessment of study quality:* Key features of allocation, contemporaneous data collection for intervention and control groups; and for interrupted time series, number of data points collected before and after the intervention, follow-up of participants.
- *Risk of bias:* data to be extracted depends on study design (see [Assessment of risk of bias in included studies](#)).
- *Participants:* Description, geographical location, setting, number screened, number randomised, number completing the study, age, gender, ethnicity, socio-economic grouping and other baseline characteristics, health problem, diagnosis, treatment.
- *Health service:* description, geographical location, setting, age, gender, population served, medical setting and clinical context of patients.
- *Intervention:* Description of the intervention and control including rationale for intervention versus the control (usual care). Delivery of the intervention including email type (standard unsecured email, secure email, web portal or hybrid). Type of clinical information communicated. Content of communication (e.g. text, image). Purpose of communication (e.g. obtaining information, providing information). Communication protocols in place. Who delivers the intervention (e.g. healthcare professional, administrative staff). How consumers of interventions are identified. Sender of first communication (health service, professional, patient and/or carer). Recipients of first communication (health service, professional, patient and/or carer). Whether communication is responded to (content, frequency, method of media). Any co-interventions included. Duration of intervention. Quality of intervention. Follow up period and rationale for chosen period.
- *Outcomes:* principal and secondary outcomes, methods for measuring outcomes, methods of follow-up, tools used to measure outcomes, whether the outcome is validated.
- *Results:* for outcomes and timing of outcome assessment, control and intervention groups if applicable.

The data extraction template will be piloted to allow for unforeseen variations in studies. For every included study at least two review authors will independently perform the data extraction. Any discrepancies between the review authors' data extraction sheets will be discussed and resolved by the review authors who performed the data extraction. Where necessary, we will involve another review author to resolve discrepancies.

## Assessment of risk of bias in included studies



Two review authors will independently assess the quality of included studies, with any disagreements resolved by discussion and consensus, and by consulting a third author where necessary. Studies of different designs will be dealt with separately throughout this review in both the quality assessment and analysis.

For RCTs (and quasi RCTs), we will assess and report on the following elements that contribute to bias, according to the guidelines outlined in [Higgins 2008](#):

- Sequence generation;
- Allocation concealment;
- Blinding (participants, personnel, outcomes assessors, data analysers);
- Intention-to-treat analysis;
- Incomplete outcome data;
- Selective outcome reporting.

We will describe the study and assign a judgement relating to the risk of bias for each item. We will use a template to guide the assessment of risk of bias, based upon the guidance by [Higgins 2008](#), judging each item as 'yes' (indicating a low risk of bias), 'no' (indicating a high risk of bias) or 'unclear' (indicating an uncertain risk of bias). For each study we will summarise the risk of bias for each outcome.

We will also assess a range of other possible sources of bias and indicators of study quality, in accordance with the guidelines of the Cochrane Consumers and Communication Review Group ([Ryan 2007](#)), including:

- Baseline comparability of groups;
- Validation of outcome assessment tools;
- Reliability of outcome measures;
- Other possible sources of bias

In the case of studies other than RCTs (that is, quasi-randomised controlled trials, CBA and ITS studies) we will additionally assess the quality of these studies systematically and according to the criteria outlined in the guidelines of the Cochrane Consumers and Communication Review Group so that risk of bias may be ascertained.

We will present the results of the risk of bias assessment in tables and will incorporate the results of the assessment of risk of bias into the review through systematic narrative description and commentary about each of the quality items, for each type of included study. This will lead to an overall assessment of the risk of bias across the included studies and a judgement about the possible effects of bias on the effect sizes of the included studies.

We will contact study authors for additional information about the included studies, or for clarification of the study methods as required.

### Measures of treatment effect

For continuous data, where outcomes have been measured in a standard way across studies, we will report mean difference and confidence intervals. For dichotomous data, when outcomes have

been measured in a standard way, we will report the odds ratio/risk ratio and confidence intervals.

### Unit of analysis issues

Issues may arise from the inclusion of cluster-randomised trials, repeated measurements and studies with more than two treatment groups. If applicable, we will analyse the data according to recommendations in the Cochrane Collaboration Open Learning Module on issues related to the unit of analysis ([Alderson 2002](#)).

### Dealing with missing data

If data are missing from the relevant comparisons we will attempt to contact the authors of the studies to obtain the information. If the authors cannot be reached, or if the studies are found to be unsatisfactory on the basis of data provided, these studies will be excluded.

### Assessment of heterogeneity

It is important to consider heterogeneity in this review, given the fledgling nature of this field and the relatively recent development of associated interventions.

Where there is substantial clinical, methodological or statistical heterogeneity, we will not combine the results in a meta-analysis. We will identify heterogeneity by visual inspection of forest plots, by using a standard  $\chi^2$  test and a significance level of  $\alpha = 0.1$ , in view of the low power of such tests.

We will also examine heterogeneity with  $I^2$ , where  $I^2$  values of 50% or more indicate a substantial level of heterogeneity ([Higgins 2003](#)). Where heterogeneity is moderate ( $< 50\%$ ), we will use a random-effects model. We will attempt to determine potential reasons for heterogeneity by examining individual study characteristics and those of subgroups of the main body of evidence.

### Assessment of reporting biases

Reporting biases will be assessed statistically, using funnel plots in RevMan 5 software. Selection bias, performance bias, attrition bias and detection bias will be assessed using the checklist provided in [Ryan 2007](#). The possibility of reporting bias will be raised in the review.

### Data synthesis

Data synthesis will begin with a narrative overview of the findings in the form of a table systematically summarising the extracted results, separated by study design, and highlighting important characteristics of the included data, for instance the number of email exchanges constituting the intervention and the type of appointment that is being made.

This will be followed by a quantitative meta-analysis if appropriate. The participants, interventions and/or outcomes will be assessed

for comparability, which is necessary for statistical pooling. We will look for studies sufficiently 'similar' in terms of study design, setting, intervention, follow-up and outcome measures in order to combine the study data in a meta-analysis. A meeting of all review authors will decide whether or not it is appropriate to carry out such a meta-analysis.

The decision is likely to depend upon the type of intervention and the outcome measures used in the study. Therefore studies should be classified according to:

- Study design: RCTs, CBAs, ITS.
- Outcome measures used, as described under [Types of outcome measures](#)

Caution will be taken when considering the pooling of data in a meta-analysis, especially where differing study designs are concerned. The choice of model would depend on the heterogeneity of the studies included in the meta-analysis. A fixed-effect model assumes all studies are consistent and similar, and is more precise than the alternative, a random-effects model, because it usually has narrower confidence intervals. A random-effects model provides a more conservative estimate of effect and can be used where there is moderate heterogeneity.

We will conduct the analysis according to Cochrane Handbook guidance ([Higgins 2008](#)).

### Subgroup analysis and investigation of heterogeneity

Where there is sufficient data and where it is appropriate in the context of the study, subgroup analysis will be carried out. This will allow the examination of the effect of certain studies on the pooled effects of the intervention.

#### 1. Age

Consideration of the acceptability to different age groups (for both healthcare professionals and patients). This will be important as there is clear evidence that the use of email is predicted by age with a clear tailing off in the generation who have not grown up in the digital age. It is therefore important to consider the intervention's effects in the groups which are accustomed to the technology; since it is likely to become more generalisable to the population as it ages. This will be considered where the primary studies have sought to consider age group from the outset. We will distribute patients into three age subgroups: 0 to 17, 18 to 64, over 65. This distribution was made on the basis of two surveys by The Pew Internet & American Life survey ([Pew 2005](#)).

#### 2. Location

Location of the study will also be considered, since differing environments may condition the accessibility of the technology. For instance we would expect communication technologies and their accessibility to differ according to country and/or region within a country, such as rural or urban areas.

### 3. Type of email communication

Additionally we propose to analyse the results by method of electronic mail utilised e.g. standard email versus a secure web messaging service.

### 4. Year of Publication

Lastly we will consider results by year of publication, as those more recent studies may be more relevant given evidence of increasing usage and therefore assumed acceptability.

### Sensitivity analysis

Studies deemed to be of lower quality after examination of individual study characteristics will be removed from the analysis, to examine the effect on the pooled effects of the intervention. We will also consider the assessment of the risk of bias of included studies, as described above.

Studies will be excluded according to the following filters:

- Outlying studies after initial analysis.
- Largest studies.
- Unpublished studies.
- Language of publication.
- Source of funding (e.g. public versus industry).

Other possible considerations for sensitivity analysis will include different eligibility and clinical criteria and different measures of effect size (risk difference, odds ratios).

### Consumer input

At this point in the expansion on technology use we need assurance from the consumers and healthcare professionals that the use of email is desired and that it will be implemented in the most widely acceptable and practical form. Secure systems are time consuming and costly to set up so a review guiding national policy is warranted. We will ask consumer referees to comment on the protocols and on the completed review.

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\* Indicates the major publication for the study

## APPENDICES

### Appendix I. MEDLINE (Ovid) search strategy

1. computer communication networks/
2. limit 1 to yr="1996 - 2002"
3. electronic mail/
4. (electronic mail\* or email\* or e-mail\* or web mail\* or webmail\* or internet mail\* or mailing list\* or discussion list\* or listserv\*).tw.
5. ((patient or health or information or web or internet) adj portal\*).tw.
6. (patient adj (web\* or internet)).tw.
7. ((web\* or internet or www or electronic\* or online or on-line) adj5 (messag\* or communicat\* or transmi\* or transfer\* or send\* or deliver\* or feedback or letter\* or interactiv\* or input\* or forum or appointment\* or booking\* or remind\* or referral\* or consult\* or prescri\*)).tw.
8. ((online or on-line or web\* or internet) adj4 (service\* or intervention\* or therap\* or treatment\* or counsel\*)).tw.
9. (e-communication\* or e-consult\* or e-visit\* or e-referral\* or e-booking\* or e-prescri\*).tw.
10. or/2-9
11. physician patient relations/
12. professional patient relations
13. interprofessional relations/
14. remote consultation/
15. or/11-14
16. internet/
17. 15 and 16
18. 10 or 17
19. randomized controlled trial.pt.
20. controlled clinical trial.pt.
21. random\*.tw.
22. placebo\*.tw.
23. drug therapy.fs.
24. trial.tw.
25. groups.tw.
26. clinical trial.pt.
27. evaluation studies.pt.
28. research design/
29. follow up studies/
30. prospective studies/
31. (control\* or prospectiv\* or volunteer\*).tw.

32. cross over studies/
33. comparative study.pt.
34. experiment\*.tw.
35. time series.tw.
36. (pre test or pretest or post test or posttest).tw.
37. (pre intervention or preintervention or post intervention or postintervention).tw.
38. (impact\* or intervention\* or chang\*).tw.
39. effect\$.tw.
40. or/19-39
41. humans.sh.
42. 40 and 41
43. 18 and 42

## WHAT'S NEW

| Date            | Event   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 26 October 2010 | Amended | <ol style="list-style-type: none"> <li>1. 'Types of Participants' - We removed the reference to public health settings since this was at odds with the purpose of the review.</li> <li>2. 'Types of Studies' - We will include controlled before and after (CBA) studies which include two or more intervention SITES and two or more comparison SITES; this was formerly incorrectly described in our protocol as intervention GROUPS and comparison GROUPS.</li> <li>3. We made a minor change to the wording of the Objectives.</li> </ol> |

## HISTORY

Protocol first published: Issue 3, 2009

## CONTRIBUTIONS OF AUTHORS

Josip Car conceived the idea for the protocol and supervised the production.

Helen Atherton wrote the protocol and revised the protocol.

Barbara Meyer designed and co-wrote the protocol.

## DECLARATIONS OF INTEREST

None known.

## **SOURCES OF SUPPORT**

### **Internal sources**

- eHealth Unit, Department of Primary Care and Social Medicine, Imperial College, UK.

JC received a salary and office space from the eHealth Unit. HA is hosted as a PhD student in the Unit.

- Department of Family Medicine, University of Ljubljana, Slovenia.

JC is a visiting researcher in the Department, receiving salary and office space support.

- NHS Education for Scotland, UK.

BM was funded during the production of the protocols by NHS Education for Scotland.

### **External sources**

- Medical Research Council, UK.

HA is the recipient of a Medical Research Council PhD Studentship, administered by Imperial College, London, UK



# Email for the provision of information on disease prevention and health promotion (Protocol)

Atherton H, Car J, Meyer B



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[Intervention Protocol]

# Email for the provision of information on disease prevention and health promotion

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## ABSTRACT

This is the protocol for a review and there is no abstract. The objectives are as follows:

To assess the effects of email for the provision of information on disease prevention and health promotion on outcomes for health professionals, patients and carers, and health services, including harms.



## BACKGROUND

### Related systematic reviews

This review will form part of an overview of reviews, incorporating four other reviews:

- email for communicating results of diagnostic medical investigations to patients ([Meyer 2009](#));
- email for the clinical communication between patients/caregivers and healthcare professionals ([Atherton 2009c](#));
- email for the clinical communication between healthcare professionals ([Atherton 2009b](#)); and
- email for management of healthcare appointments and attendance reminders ([Atherton 2009d](#)).

### The use of email

The use of email as a medium for business and social communication is increasingly common ([Pew 2005](#)). This is consistent with the global expansion of users on the internet, with 90% of internet users said to use email ([Pew 2005](#); [IWS 2007](#)). While other industries such as insurance and banking have readily embraced such new technology in order to compete on the global stage ([CBI 2006](#)), the healthcare sector has been more cautious in its acceptance of this new medium ([Neville 2004](#)).

In 1998 a survey of American physicians showed that less than seven per cent had used email to contact their patients ([Lacher 2000](#)); however, more recent surveys show this to be increasing. US surveys have revealed that the increase in use is variable, from 16% of physicians using email in a survey of primary care practitioners to as many as 72% in a large outpatient department ([Gaster 2003](#); [Brooks 2006](#)). Uptake may vary according to patient group. The majority (79%) of doctors at a student health centre in Finland reported email use with patients ([Castren 2005](#)). This was a population with a high email and internet usage rate.

Despite increasing rates of use by healthcare professionals, the volume of this type of communication remains low; with surveys reporting averages from 7.7 emails per month to 8.6 emails per week in the aforementioned Finnish student healthcare centre ([Gaster 2003](#); [Castren 2005](#)). Email communication was used for requesting prescriptions, booking appointments and for clinical consultation.

Several factors are likely to drive the trend of increasing email use, including the following.

- Increasing patient demand. A substantial amount of survey literature points to high levels of patient desire to contact doctors via email ([Couchman 2001](#); [Kleiner 2002](#); [Moyer 2002](#)). Notably this includes a recent poll in the US ([Harris 2006](#)) showing that 62% of patients with the ability to choose their doctor are influenced in part when making this choice by whether the doctor is contactable via email.

- The natural demographic shift toward an increasing proportion of doctors (and patients) comfortable with using technology-driven care solutions.

- Increasing per capita demand on healthcare resources ([OECD 2006](#)) (for example with the advent of increased chronic care and demand for more preventive screening) resulting in a focus on working more efficiently.

- Some evidence showing increased physician productivity associated with the adoption of email communication ([Liederman 2005](#)).

Guidelines on the use of email in a healthcare environment were developed in an American white paper over 10 years ago ([Kane 1998](#)). These guidelines were developed to aid clinicians and healthcare delivery organisations in the use of electronic mail with patients, although evidence exists that physicians are not adhering to the recommendations ([Gaster 2003](#); [Brooks 2006](#)). These guidelines have been heavily referred to in much of the related literature but have not been updated since their release.

The vast majority of literature relating to the use of email originates in North America and it is uncertain whether the results of such research will be applicable to other international healthcare environments, where email availability and technology can be very different.

### Forms of electronic mail

In the absence of a standardised email communication infrastructure in the healthcare sector, email has been adopted in an ad-hoc fashion and this has included the use of unsecured and secured email communication.

Standard unsecured email is email which is sent unencrypted. Secured email is encrypted; encryption transforms the text into an un-interpretable format as it is transferred across the internet. Encryption protects the confidentiality of the data, however both sender and recipient must have the appropriate software for encryption and decoding ([TechWeb Network 2008](#)).

Secure email also includes various specifically developed applications such as patient portals which utilise web messaging. Such portals provide pro-formas into which patients can enter their message. The message is sent to the recipient in the manner of an email ([TechWeb Network 2008](#)).

Secure websites are distributed by secure web servers. Web servers store and disseminate web pages. Secure servers ensure data from an internet browser is encrypted before being uploaded to the relevant website. This makes it difficult for the data to be intercepted and deciphered ([TechWeb Network 2008](#)).

There are significant differences in terms of the applications. Bespoke secure email programmes may incorporate special features such as standard forms guiding the use and content of the email sent, ability to show read receipts (in order to confirm the patient has received the correspondence) and if necessary facilities for re-

ceiving payment (Liederman 2005). However they are costly to set up and may require a greater degree of skill on the part of the user than standard unsecured email (Katz 2004). For the purpose of the review all methods will be included, although secured versus unsecured email will be considered in a subgroup analysis.

## Methods of accessing email

Methods of accessing the internet and thus an email account have changed with time. Traditionally access would occur via a personal computer or laptop at home or work, connecting to the internet using a fixed line. There are now several methods of accessing the internet. Wireless networks (known colloquially as wifi) allow internet connection to a personal computer, laptop computer or other device wherever a network is available (TechWeb Network 2008).

Internet connection is also possible via alternative networks using mobile devices. This includes access via mobile telephones to a wireless application protocol (WAP) network (rather than to the www) or to third generation (3G) network. Adaptors connecting to a universal serial bus (USB) port can be used to access the 3G network using a laptop computer (TechWeb Network 2008). Therefore email can be accessed away from the office or home in a variety of ways.

## The 'Digital Divide'

The so-called 'digital divide' describes the inequality created by the increasing level of digital technology. As new technologies replace old systems, it has been suggested that certain sectors of the population are being left behind with regard to access and use of these services, for instance the elderly, non-English speakers and those in lower income groups (Hobbs 2003; Car 2004a; Goodyear-Smith 2005). A divide has also been observed amongst healthcare professionals. A UK-based survey showed that clinicians more recently-qualified feel comfortable using the internet and consider it reliable (Potts 2002). This is unsurprising given the relatively recent introduction of such technologies, and illustrates a potential generational effect on their use.

## Email for the provision of information on disease prevention and health promotion

Email can be used as a one-way, healthcare professional-to-patient method of providing information on disease prevention and health promotion. Use of the internet by patients to seek health information has increased and continues to increase; a Harris Poll in 2000 found that 76% of people surveyed had searched the internet for health information for themselves or others (Harris 2000).

Patients are more educated than ever on health issues and are progressively more likely to request facts and information so that they can assess their options for care (Hesse 2005; Bansil 2006).

Of those people using the internet, women and older users are more likely to seek health-related information; and clinicians report that in general an increasing number of patients ask about information they have found on the internet and ask for recommended websites to be sent to them via email (Anderson 2003). Email contact from a healthcare professional may therefore disseminate information more widely than conventional methods of providing information, reaching a wider audience or a specific target audience, such as older people.

Email can be used to improve the content and quality of communication with patients; for instance by sending patients emails with attachments containing tailored health information. Such information can increase knowledge and encourage positive healthcare choices, in turn leading to better health outcomes (Anderson 2003; Hesse 2005; Hardey 2008).

## Disease prevention

Email can be used to send invitations for a service and also reminders, for instance for attendance at screening programmes. Traditionally such invitations and reminders have been administered via the post or telephone to inform patients when they are due for services such as paediatric immunisations, cervical smear tests, mammography and heart disease risk assessment (Car 2004a; Stone 2002).

Websites which provide a reminder service exist, but they are limited in number and based in the US. They offer to provide emailed reminders for various screening services such as mammography and diabetes testing at a pertinent time (College of American Pathologists 2008).

Email dissemination of information can be used to aid smoking cessation, counsel on contraception and advise on protection against sexually transmitted diseases, amongst other conditions (Virji 2006). Email communication can also form part of a disease management strategy. Those people with chronic conditions such as hypertension or diabetes can be sent information on how to modify risk factors and manage symptoms to prevent further sequelae of their condition (Katz 2004).

## Health promotion

Email may provide a suitable method for disseminating health promotion messages to patients; bridging the gap between a need to share information with patients and the limited opportunity for face-to-face clinician to patient contact (Car 2004a).

Such health information is now widely available in an online format, for example via the National Health Services (NHS) website 'NHS direct', or the UK National Asthma Campaign's e-helpdesk (Car 2004a). This website provides information on asthma trig-

gers, medicines and treatments and controlling asthma (Asthma 2008).

Email can add a time saving element to consultation; this is because information provided by the clinician via email, or from a website highlighted by a clinician, is much more in depth than that conveyed in a short consultation or a brochure. Patients can read such information in their own time, and keep it for reference (Anderson 2003). In a qualitative study, US physicians reported that they felt email was a useful educational tool and that patients appreciate being sent information by email to supplement the consultation (Patt 2003).

An increase in high quality websites run or co-run by laypersons can provide a wealth of information for patients, and clinicians can refer patients to such sites via email. An example is 'lung-canceronline.org', a website set up in the US by a lung cancer sufferer. The site is held in high esteem by healthcare professionals who appreciate that the creator of the site can devote time to the single issue of lung cancer and can present information on treatments or symptoms in a user friendly way. Working in conjunction with healthcare professionals to exchange information maintains the quality of such sites (Ferguson 2000).

Despite the credibility of such websites, many others are less reliable. So that patients can avoid misleading or inaccurate data, various clinicians in the US are using web-based information prescriptions; these are "prescriptions of specific, evidence-based information to manage health problems" (D'Alessandro 2004). They allow healthcare professionals to direct patients and their families to high quality and appropriate information, which the patient can then browse at their leisure, and keep for reference. The prescriptions are regularly updated and can be arranged so as to be appealing and engaging (Ritterband 2005).

## Advantages and disadvantages

The key advantages of email for the provision of information on disease prevention and health promotion include the following (adapted from Freed 2003; Car 2004a).

- Timely and low cost delivery of information (relative to conventional mail and provision of educational materials) (Houston 2003)
- The capacity to place hyperlinks in an email, leading to appropriate educational material.
- Read receipts can be used to confirm that communications have been received.
- Relative to verbal communication, the written nature of the communication can be of value as reference for the patient, aiding recall and, if desired, improving communication to other family members.
- Information in this format can be easily and inexpensively updated in accordance with new evidence; and can be customised for individual patient needs (Ritterband 2005).

- Patients are party to additional information about their health condition which they can review whenever and wherever they like, at their desired speed (Ritterband 2005).

- Email addresses usually stay constant when an address or telephone number changes (Virji 2006) making this reliable way of maintaining communication with transient patients.

- Easier communication method for patients with disabilities, and with patients that are temporarily overseas, such as seconded employees (Goodyear-Smith 2005).

There are, however, some potential downsides such as the following.

- There is evidence of patient and physician concerns regarding privacy, confidentiality and the potential misuse of patient information (Harris 2001; Kleiner 2002; Moyer 2002; Katzen 2005).
- Physicians may be wary of the potential for email to generate an increased workload (Katz 2004; Podichetty 2004).
- It may encourage unrealistic patient expectations for the intimacy of communication with the physician (Katz 2003).
- Email as a communication tool provides a different context for interaction. Face-to-face communication and telephone calls contain many layers of communication that are lost in an email; such as the emotive cues from vocal intonation or body language (Car 2004a). This may lead to misunderstandings.
- Potential medico-legal issues (including informed consent and use of non encrypted email) (Bitter 2000).
- The potential to widen health inequalities due to the digital divide (Kleiner 2002; Katz 2004; Goodyear-Smith 2005; Virji 2006).
- Technological issues may occur, such as recipients having a full mailbox causing email to bounce back to the sender (Virji 2006).
- Systems may be at risk from communications failures, for instance a loss of the link to a central server (a computer which provides services used by other computers e.g. email) (Car 2008a). There may be several causes for technological system failure; from local power failure to natural disasters.
- Potential for human error which can lead to unintentional content or incorrect recipients.

## Quality and safety issues

The main quality and safety issues around the use of email in healthcare have included: confidentiality; potential for errors and ensuing liability; identifying clinical situations where email consultation is inefficient or inappropriate; securing payment; incorporating email into existing work patterns; and achievable costs (Kleiner 2002; Gaster 2003; Gordon 2003; Hobbs 2003; Houston 2003; Car 2004b).

Privacy and confidentiality are a formidable challenge in the adoption of email communication (Car 2004b; Katz 2004). Patients

are more likely to use this type of communication if they have access to the internet from home, rather than from work, because of privacy issues (Fridsma 1994). Family email accounts can mean a lack of privacy at home (Mandl 1998).

Web messaging systems can address issues around security and liability that are associated with conventional email communication, since they offer encryption capability and access controls (Liederman 2003). Such systems allow the structuring of communication; for example messages can be triaged to the correct members of staff (Moyer 2002). However not all healthcare institutions are capable of providing such a facility, and instead rely on standardised mail (Car 2004b).

Medico-legal issues are of substantial concern when implementing email communication in practice. Medico-legal issues that could arise include: potential liability for breaches in security allowing a third party to access confidential medical information; liability for responding to unsolicited email from an unknown person; and the possibility of identity fraud whereby someone poses as a patient to obtain private information (Moyer 1999; Couchman 2001; Car 2004b).

Suggestions for minimising the legal implications of using email in practice have included: adherence to the same strict data protection rules that must be followed in business and industry; adequate infrastructure to provide encrypted, secure email transit and storage; and the use of informed consent to ensure that the patient is aware of the risks and benefits associated with communicating with their healthcare professional via email (Car 2004b). Obtaining informed consent could include the provision of guidelines for patients about the use of email communication, and provide an opportunity for authentication of identity. Authentication of patient identity can be achieved by routinely validating patient email addresses when email communication commences. Ongoing validation of identity has also been recommended (Medem 2007).

Healthcare professionals should also exercise discretion about the patient's capability to use email communication. There may be patients who should be advised not to use this method of communication, and this should be at the discretion of the healthcare professional (Medem 2007). There is a clear need for the use of guidelines when considering the use of email communication to prevent potential medico-legal issues.

Securing reimbursement for having such a service available is an issue raised by doctors when considering the use of such systems, especially where fee-for-service health systems are in operation. Securing payment is possible with certain systems. Web messaging systems can allow clinicians to charge registered patients for reading their responses and patients can be pre-warned about this facility (Liederman 2003). This scenario is more common when email communication is used for ongoing care such as chronic disease management (Hobbs 2003).

Despite fears about increasing workloads, methods such as a web-based information system for disseminating information are designed to be easy to use for both patient and practitioner; they

can be updated quickly and easily and information can be personalised using data about patient needs to generate suitable algorithms (D'Alessandro 2004; Ritterband 2005).

Education and training result in capable and competent end-users of any technology. This can be costly and time consuming, but enhances the chance of effective implementation of such systems and thus should be a priority. As well as the requirement for initial training, ongoing support is usually necessary to ensure continuing use and further development (Car 2008a). As indicated earlier, clinicians more recently qualified have been shown to feel comfortable using the internet and email technologies (Potts 2002). This may influence training needs and the types of demographic groups leading the use of this technology.

Patient opinion is important, since distributing information is only useful if patients access and review it upon receipt. In a trial of a web-based information prescription concerning childhood constipation, reasons given by parents for not accessing the recommended website included 'I forgot' and 'I didn't have time' (Ritterband 2005). Thus non-compliance may prove to be an issue when using email for the provision of information.

These issues are wide ranging and encompass both healthcare professional and patient perspectives. All issues of quality and safety arising will be identified and addressed in the review.

## OBJECTIVES

To assess the effects of email for the provision of information on disease prevention and health promotion on outcomes for health professionals, patients and carers, and health services, including harms.

## METHODS

### Criteria for considering studies for this review

#### Types of studies

Four protocols on the use of mobile phone messaging as a communication method in healthcare were published in 2008 (Car 2008b; de Jongh 2008; Gurol-Urganci 2008; Vodopivec-Jamsek 2008). We will draw on key methodological aspects of these protocols to aid comparison of the effects of email as a new communication technology; this affects the selection criteria for types of studies, participants and interventions.

We will include randomised controlled trials (RCTs), quasi-randomised trials, controlled before and after studies (CBAs) with at least two intervention and two control sites, and interrupted

time series (ITS) with at least three time points before and after intervention.

Due to the practicalities of an organisational change in a healthcare environment most studies are not randomised and therefore we will consider quasi-randomised trials and CBAs. The inclusion of ITS is particularly valuable in assessing the ongoing merits of a new technology which may require a 'settling in' period. We will include trials with individual and cluster randomisation. Relevant trials with economic evaluations will also be evaluated.

### Types of participants

We will consider all healthcare professionals, associated administrative staff, patients and caregivers regardless of age, gender and ethnicity. We will include studies in all settings i.e. primary care settings (services of primary health care), outpatient settings (out-patient clinics), community settings and hospital settings. We will not exclude studies according to the type of healthcare professional (e.g. surgeon, nurse, doctor, allied staff).

We will consider participants originating the email communication, receiving the email communication and copied into the email communication.

### Types of interventions

We will include studies in which email is used by healthcare professionals for providing information to patients on disease prevention and health promotion. We will include interventions that use email for providing disease prevention and health promotion related information e.g. smoking cessation information, immunisation information, public health education and invitations or reminders for a preventive health check up.

We will include interventions that use email in any of the following three forms:

1. Unsecured standard email to/from a standard email account.
  2. Secure email which is encrypted in transit and sent to/from a standard email account with the appropriate encryption decoding software.
  3. Web messaging; whereby the message is entered into a form which is sent to a specific email account, the address of which is not available to the sender.
- All methods of connection will be considered. Methods of accessing email include broadband via a fixed line, broadband via a wireless connection, connecting to the 3G network and connecting to the WAP network.

Studies in which email is part of a multifaceted intervention will be included where the effects are individually reported, even if they do not represent the primary outcome. However these will only be considered where they achieve the appropriate statistical power. Where this cannot be determined or where it is not possible to separate the effects they will not be included.

This review will also consider invitations for routinely administered preventive screening e.g. cervical screening and associated reminders and/or management. All other types of appointment and associated reminders will be considered in the parallel review 'Email for the management of healthcare appointments and attendance reminders' (Atherton 2009d). However, where an appointment concerns both preventive and routine healthcare, studies may be included in both reviews where relevant.

We will exclude trials which consider the general use of email for healthcare professional-patient contact i.e. for multiple purposes where health promotion or prevention information is included but not separately considered.

Comparisons will be made between outcomes of email communication and no intervention, as well as other modes of communication such as face-to-face, written material, postal letters, calls to a landline or mobile telephone, text messaging using a mobile telephone, and if applicable, automated versus personal emails.

### Types of outcome measures

A number of processes and outcomes may be affected by interventions that aim to enhance and/or facilitate the communication between healthcare professionals using email.

Primary outcomes of interest are whether the email has been understood and acted upon correctly by the recipient as intended by the sender, and secondary outcomes are whether email was an appropriate mode of communication.

#### Primary outcomes

*Healthcare professional* outcomes resulting from whether the email has been understood and acted upon correctly by the recipient as intended by the sender, e.g. professional knowledge and understanding, professional behaviour, action or performance.

*Patient* outcomes associated with whether email has been understood and acted upon correctly by the recipient as intended by the sender, e.g. patient understanding, patient health status and well-being (e.g. lipid levels), skills acquisition, support, treatment outcomes, and patient behaviours or actions (e.g. information seeking, smoking cessation, physical activity, weight management, nutrition and stress management).

*Health service* outcomes associated with whether email has been understood and acted upon correctly by the recipient as intended by the sender, e.g. uptake of preventive checks or screening.

*Harms* e.g. effects on safety or quality of care, breaches in privacy, technology failures.

#### Secondary outcomes

*Professional, patient or carer* outcomes associated with whether email was an appropriate mode of communication, e.g. knowledge and understanding, effects on professional-patient or professional-carer communication or relationship, evaluations of care (convenience, timeliness, acceptability, satisfaction).



*Health service* outcomes associated with whether email was an appropriate mode of communication, e.g. use of resources or time, costs, use of medical services, referrals, admissions.

## Search methods for identification of studies

We will follow Cochrane Consumers and Communication Group guidance on review methods.

Initially we will search the following electronic bibliographic databases.

- Cochrane Consumers and Communication Review Group Specialised Register
- Cochrane Central Register of Controlled Trials (CENTRAL, *The Cochrane Library*)
- MEDLINE (1950 to present)
- EMBASE (1980 to present)
- CINAHL(1982 to present)
- ERIC (1965 to present)
- PsycINFO (1967 to present)

The MEDLINE (Ovid) search strategy, compiled by John Kis-Rigo, Trials Search Co-ordinator, Cochrane Consumers and Communication Group, is presented in [Appendix 1](#).

We will also search for grey literature, and examine the references of retrieved relevant studies. Finally we will contact trial authors and experts in the field to ascertain if there are any further studies or unpublished data they may be aware of.

## Grey literature search

We will search for grey literature via the following sources:

- Australasian Digital Theses Program <http://adt.caul.edu.au/>
- Networked Digital Library of Theses and Dissertations <http://www.ndltd.org>
- UMI ProQuest Digital Dissertations <http://wwwlib.umi.com/dissertations/>
- Index to Theses <http://www.theses.com/> (Great Britain and Ireland)
- Dissertation Abstracts (North American and European theses) via British Library
- TrialsCentralTM ([www.trialscentral.org](http://www.trialscentral.org))
- Clinical trials register ([Clinicaltrials.gov](http://Clinicaltrials.gov))
- WHO Clinical Trial Search Portal ([www.who.int/trialsearch](http://www.who.int/trialsearch))
- Current Controlled Trials ([www.controlled-trials.com](http://www.controlled-trials.com))
- Google Scholar; <http://scholar.google.co.uk/> (we will examine the first 500 hits).

We will search databases from their start date and there will be no limitation by language. We will keep records of all the search strategies applied.

## Data collection and analysis

The review methods are adapted from a suite of protocols about mobile phone messaging for communication in healthcare settings (Car 2008b; de Jongh 2008; Gurol-Urganci 2008; Vodopivec-Jamsek 2008).

## Selection of studies

Two review authors (HA and BM) will independently assess the potential relevance of all titles and abstracts identified from electronic searches. We will retrieve full text copies of all articles judged to be potentially relevant. At least two review authors will then independently assess these retrieved articles for inclusion. During a meeting of all review authors, we will verify the final list of included and excluded studies. Any disagreements about particular studies will be resolved by discussion. If the description of a study is insufficiently detailed to allow the review authors to judge whether it meets the review's inclusion criteria, the study authors will be contacted to obtain more detailed information to allow a final judgement regarding inclusion or exclusion.

## Data extraction and management

We will extract data from all included studies using a standard form derived from the data extraction template provided by the Cochrane Consumers and Communication Review Group. We will extract the following data:

- *General information:* Title, authors, source, publication status, date published, language, review author information, date reviewed.
- *Details of study:* Aim of intervention and study, study design, location and details of setting, methods of recruitment of participants, inclusion/exclusion criteria, ethical approval and informed consent, consumer involvement.
- *Assessment of study quality:* Key features of allocation, contemporaneous data collection for intervention and control groups; and for interrupted time series, number of data points collected before and after the intervention, follow-up of participants.
- *Risk of bias:* data to be extracted depends on study design (see [Assessment of risk of bias in included studies](#)).
- *Participants:* Description, geographical location, setting, number screened, number randomised, number completing the study, age, gender, ethnicity, socio-economic grouping and other baseline characteristics, health problem, diagnosis, treatment.
- *Health service:* description, geographical location, setting, age, gender, population served, medical setting and clinical context of patients.
- *Intervention:* Description of the intervention and control including rationale for intervention versus the control (usual care). Delivery of the intervention including email type (standard unsecured email, secure email, web portal or hybrid). Type of clinical information communicated. Content of

communication (e.g. text, image). Purpose of communication (e.g. obtaining information, providing information). Communication protocols in place. Who delivers the intervention (e.g. healthcare professional, administrative staff). How consumers of interventions are identified. Sender of first communication (health service, professional, patient and/or carer). Recipients of first communication (health service, professional, patient and/or carer). Whether communication is responded to (content, frequency, method of media). Any co-interventions included. Duration of intervention. Quality of intervention. Follow up period and rationale for chosen period.

- *Outcomes*: principal and secondary outcomes e.g. desired behaviour change, methods for measuring outcomes, methods of follow-up, tools used to measure outcomes, whether the outcome is validated.

- *Results*: for outcomes and timing of outcome assessment, control and intervention groups if applicable.

The data extraction template will be piloted to allow for unforeseen variations in studies. For every included study at least two review authors will independently perform the data extraction. Any discrepancies between the review authors' data extraction sheets will be discussed and resolved by the review authors who performed the data extraction. When necessary, we will involve another review author to resolve discrepancies.

### Assessment of risk of bias in included studies

Two review authors will independently assess the quality of included studies, with any disagreements resolved by discussion and consensus, and by consulting a third author where necessary. Studies of different designs will be dealt with separately throughout this review in both the quality assessment and analysis.

For RCTs (and quasi RCTs), we will assess and report on the following elements that contribute to bias, according to the guidelines outlined in [Higgins 2008](#):

- Sequence generation;
- Allocation concealment;
- Blinding (participants, personnel, outcomes assessors, data analysers);
- Intention-to-treat analysis;
- Incomplete outcome data;
- Selective outcome reporting.

We will describe the study and assign a judgement relating to the risk of bias for each item. We will use a template to guide the assessment of risk of bias, based upon the guidance by [Higgins 2008](#), judging each item as 'yes' (indicating a low risk of bias), 'no' (indicating a high risk of bias) or 'unclear' (indicating an uncertain risk of bias). For each study we will summarise the risk of bias for each outcome.

We will also assess a range of other possible sources of bias and indicators of study quality, in accordance with the guidelines of the

Cochrane Consumers and Communication Review Group ([Ryan 2007](#)), including:

- Baseline comparability of groups;
- Validation of outcome assessment tools;
- Reliability of outcome measures;
- Other possible sources of bias

In the case of studies other than RCTs (that is, quasi-randomised controlled trials, CBA and ITS studies) we will additionally assess the quality of these studies systematically and according to the criteria outlined in the guidelines of the Cochrane Consumers and Communication Review Group so that risk of bias may be ascertained.

We will present the results of the risk of bias assessment in tables and will incorporate the results of the assessment of risk of bias into the review through systematic narrative description and commentary about each of the quality items, for each type of included study. This will lead to an overall assessment of the risk of bias across the included studies and a judgement about the possible effects of bias on the effect sizes of the included studies.

We will contact study authors for additional information about the included studies, or for clarification of the study methods as required.

### Measures of treatment effect

For continuous data, where outcomes have been measured in a standard way across studies, we will report the mean difference and confidence intervals. For dichotomous data, when outcomes have been measured in a standard way, we will report the odds ratio/risk ratio and confidence intervals.

### Unit of analysis issues

Issues may arise from the inclusion of cluster-randomised trials, repeated measurements and studies with more than two treatment groups. If applicable the data will be analysed according to recommendations in the Cochrane Collaboration Open Learning Module on issues related to the unit of analysis ([Alderson 2002](#)).

### Dealing with missing data

If data are missing from the relevant comparisons we will attempt to contact the authors of the studies to obtain the information. If the authors cannot be reached, or if the studies are found to be unsatisfactory on the basis of data provided, these studies will be excluded.

### Assessment of heterogeneity

It is important to consider heterogeneity in this review, given the fledgling nature of this field and the relatively recent development of associated interventions.

Where there is substantial clinical, methodological or statistical heterogeneity, the results will not be combined in a meta-analysis. We will identify heterogeneity by visual inspection of forest plots, by using a standard  $\chi^2$  test and a significance level of  $\alpha = 0.1$ , in view of the low power of such tests.

We will also examine heterogeneity with  $I^2$ , where  $I^2$  values of 50% or more indicate a substantial level of heterogeneity (Higgins 2003). Where heterogeneity is moderate ( $< 50\%$ ) a random-effects model will be used. We will attempt to determine potential reasons for heterogeneity by examining individual study characteristics and those of subgroups of the main body of evidence.

### Assessment of reporting biases

Reporting biases will be assessed statistically, using funnel plots in RevMan 5 software. Selection bias, performance bias, attrition bias and detection bias will be assessed using the checklist provided in Ryan 2007. The possibility of reporting bias will be raised in the review.

### Data synthesis

Data-synthesis will begin with a narrative overview of the findings in the form of a table systematically summarising the extracted results, separated by study design, and highlighting important characteristics of the included data, for instance the health behaviour the intervention aims to change and the disease the intervention wishes to prevent.

This will be followed by a quantitative meta-analysis if appropriate. The participants, interventions and/or outcomes will be assessed for comparability, which is necessary for statistical pooling. We will look for studies sufficiently 'similar' in terms of study design, setting, intervention, follow-up and outcome measures in order to combine the study data in a meta-analysis. A meeting of all review authors will decide whether or not it is appropriate to carry out such a meta-analysis.

The decision is likely to depend upon the type of intervention and the outcome measures used in the study. Therefore studies should be classified according to:

- Study design: RCTs, CBAs, ITS.
- Outcome measures used, as described under 'types of outcome measures'.

Caution will be taken when considering the pooling of data in a meta-analysis, especially where differing study designs are concerned. The choice of model would depend on the heterogeneity of the studies included in the meta-analysis. A fixed-effect model assumes all studies are consistent and similar, and is more precise than the alternative, a random-effects model, because it usually has narrower confidence intervals. A random-effects model provides a more conservative estimate of effect and can be used where there is moderate heterogeneity.

We will conduct the analysis according to Cochrane Handbook guidance (Higgins 2008).

### Subgroup analysis and investigation of heterogeneity

Where there are sufficient data and where it is appropriate in the context of the study, we will conduct subgroup analysis. This will allow the examination of the effect of certain studies on the pooled effects of the intervention.

#### 1. Age

Consideration of the acceptability to different age groups (for both healthcare professionals and patients). This will be important as there is clear evidence that the use of email is predicted by age with a clear tailing off in the generation who have not grown up in the digital age. It is therefore important to consider the effectiveness in the groups which are accustomed to the technology, since it is likely to become more generalisable to the population as it ages. This will be considered where the primary studies have sought to consider age group from the outset. We will distribute patients into three age subgroups: 0 to 17, 18 to 64, over 65. This distribution was made on the basis of two surveys by The Pew Internet & American Life survey (Pew 2005).

#### 2. Location

Location of the study will also be considered, since differing environments may condition the accessibility of the technology. For instance we would expect communication technologies and their accessibility to differ according to country and/or region within a country, such as rural or urban areas.

#### 3. Type of email communication

Additionally we propose to analyse the results by method of electronic mail utilized e.g. standard email versus a secure web messaging service.

#### 4. Year of publication

Lastly we will consider results by year of publication, as those more recent studies may be more relevant given evidence of increasing usage and therefore assumed acceptability.

### Sensitivity analysis

Studies deemed to be of lower quality after examination of individual study characteristics will be removed from the analysis, to examine the effect on the pooled effects of the intervention. We will also consider the assessment of the risk of bias of included studies, as described above. Studies will be excluded according to the following filters:

- Outlying studies after initial analysis.
- Largest studies.
- Unpublished studies.
- Language of publication.
- Source of funding (e.g. public versus industry).



Other possible considerations for sensitivity analysis will include different measures of effect size (risk difference, odds ratios).

### Consumer input

At this point in the expansion on technology use we need assurance from the consumers and healthcare professionals that the use of email is desired and that it will be implemented in the most widely acceptable and practical form. Secure systems are time consuming and costly to set up so a review guiding national policy is warranted. We will ask consumer referees to comment on the protocols and on the completed review.

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\* Indicates the major publication for the study

## APPENDICES

### Appendix I. MEDLINE (Ovid) search strategy

1. computer communication networks/
2. limit 1 to yr="1996 - 2002"
3. electronic mail/
4. (electronic mail\* or email\* or e-mail\* or web mail\* or webmail\* or internet mail\* or mailing list\* or discussion list\* or listserv\*).tw.
5. ((patient or health or information or web or internet) adj portal\*).tw.
6. (patient adj (web\* or internet)).tw.
7. ((web\* or internet or www or electronic\* or online or on-line) adj5 (messag\* or communicat\* or transmi\* or transfer\* or send\* or deliver\* or feedback or letter\* or interactiv\* or input\* or forum or appointment\* or booking\* or remind\* or referral\* or consult\* or prescri\*)).tw.
8. ((online or on-line or web\* or internet) adj4 (service\* or intervention\* or therap\* or treatment\* or counsel\*)).tw.
9. (e-communication\* or e-consult\* or e-visit\* or e-referral\* or e-booking\* or e-prescri\*).tw.
10. or/2-9
11. physician patient relations/
12. professional patient relations
13. interprofessional relations/
14. remote consultation/
15. or/11-14
16. internet/
17. 15 and 16
18. 10 or 17
19. randomized controlled trial.pt.
20. controlled clinical trial.pt.
21. random\*.tw.
22. placebo\*.tw
23. drug therapy.fs.
24. trial.tw.
25. groups.tw.
26. clinical trial.pt.
27. evaluation studies.pt.
28. research design/
29. follow up studies/
30. prospective studies/
31. (control\* or prospectiv\* or volunteer\*).tw.
32. cross over studies/
33. comparative study.pt.
34. experiment\*.tw.
35. time series.tw.
36. (pre test or pretest or post test or posttest).tw.
37. (pre intervention or preintervention or post intervention or postintervention).tw.
38. (impact\* or intervention\* or chang\*).tw.
39. effect\$.tw.
40. or/19-39
41. humans.sh.
42. 40 and 41
43. 18 and 42

## WHAT'S NEW

| Date            | Event   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 26 October 2010 | Amended | 1. 'Types of Participants' - We removed the reference to public health settings since this was at odds with the purpose of the review.<br>2. 'Objectives' - We removed the reference to a comparison with other forms of health promotion material, since this differed from the comparisons specified in the 'Types of Interventions' section.<br>3. 'Types of Studies' - We will include controlled before and after (CBA) studies which include two or more intervention SITES and two or more comparison SITES; this was formerly incorrectly described in our protocol as intervention GROUPS and comparison GROUPS. |

## HISTORY

Protocol first published: Issue 3, 2009

## CONTRIBUTIONS OF AUTHORS

Josip Car conceived the idea for the protocol and supervised the production.

Helen Atherton wrote the protocol and revised the protocol.

Barbara Meyer designed and co-wrote the protocol.

## DECLARATIONS OF INTEREST

None known.

## SOURCES OF SUPPORT

### Internal sources

- eHealth Unit, Department of Primary Care and Social Medicine, Imperial College, UK.  
JC received a salary and office space from the eHealth unit. HA is hosted as a PhD student in the Unit.
- Department of Family Medicine, University of Ljubljana, Slovenia.  
JC is a visiting researcher in the Department, receiving salary and office space support.
- NHS Education for Scotland, UK.  
BM was funded during the production of the protocols by NHS Education for Scotland.

## External sources

- Medical Research Council, UK.

HA is the recipient of a Medical Research Council PhD Studentship, administered by Imperial College, London, UK.

# Email for clinical communication between healthcare professionals (Protocol)

Atherton H, Car J, Meyer B, Majeed A



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[Intervention Protocol]

# Email for clinical communication between healthcare professionals

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## ABSTRACT

This is the protocol for a review and there is no abstract. The objectives are as follows:

To assess the effects of healthcare professionals communicating clinical information via email, when compared to other forms of communicating clinical information, on outcomes for health professionals, patients and carers, and health services, including harms.

## BACKGROUND

### Related systematic reviews

This review will form part of an overview of reviews, incorporating four other reviews:

- email for the provision of information on disease prevention and health promotion ([Atherton 2009a](#));
- email for the clinical communication between patients/caregivers and healthcare professionals ([Atherton 2009c](#));
- email for communicating results of diagnostic medical investigations to patients ([Meyer 2009](#)); and
- email for management of healthcare appointments and attendance reminders ([Atherton 2009d](#)).

### The use of email

The use of email as a medium for business and social communication is increasingly common ([Pew 2005](#)). This is consistent with the global expansion of users on the internet, with 90% of internet users said to use email ([Pew 2005](#); [IWS 2007](#)). While other industries such as insurance and banking have readily embraced such new technology in order to compete on the global stage ([CBI 2006](#)), the healthcare sector has been more cautious in its acceptance of this new medium ([Neville 2004](#)).

Guidelines on the use of email in a healthcare environment were developed in an American white paper over 10 years ago ([Kane 1998](#)). These guidelines were developed to aid clinicians and healthcare delivery organisations in the use of electronic mail with patients, although evidence exists that physicians are not adhering to the recommendations ([Gaster 2003](#); [Brooks 2006](#)). These guidelines have been heavily referred to in much of the related literature but have not been updated since their release.

The vast majority of literature relating to the use of email originates in North America and it is uncertain whether the results of such research will be applicable to other international healthcare environments, where email availability and technology can be very different.

Healthcare professionals have been communicating via email since the early 1990s. Healthcare professionals use email in the clinical setting for varying purposes. Consulting with colleagues, disseminating new research findings and scheduling meetings are all common uses ([Moyer 1999](#)). A survey of over 4000 US physicians showed that 63.8% were using email to contact other healthcare professionals ([Brooks 2006](#)).

### Forms of electronic mail

In the absence of a standardised email communication infrastructure in the healthcare sector, email has been adopted in an ad-hoc fashion and this has included the use of unsecured and secured email communication.

Standard unsecured email is email which is sent unencrypted. Secured email is encrypted; encryption transforms the text into an un-interpretable format as it is transferred across the internet. Encryption protects the confidentiality of the data, however both sender and recipient must have the appropriate software for encryption and decoding ([TechWeb Network 2008](#)).

Secure email also includes various specifically developed applications such as patient portals which utilise web messaging. Such portals provide pro-formas into which patients can enter their message. The message is sent to the recipient in the manner of an email ([TechWeb Network 2008](#)).

Secure websites are distributed by secure web servers. Web servers store and disseminate web pages. Secure servers ensure data from an internet browser is encrypted before being uploaded to the relevant website. This makes it difficult for the data to be intercepted and deciphered ([TechWeb Network 2008](#)).

There are significant differences in terms of the applications. Bespoke secure email programmes may incorporate special features such as standard forms guiding the use and content of the email sent, ability to show read receipts (in order to confirm the patient has received the correspondence) and, if necessary, facilities for receiving payment ([Liederman 2005](#)). However they are costly to set up and may require a greater degree of skill on the part of the user than standard unsecured email ([Katz 2004](#)). For the purpose of the review all methods will be included although secured versus unsecured email will be considered in a subgroup analysis.

### Methods of accessing email

Methods of accessing the internet and thus an email account have changed with time; traditionally access would occur via a personal computer or laptop at home or work, connecting to the internet using a fixed line. There are now several methods of accessing the internet. Wireless networks (known colloquially as wifi) allow internet connection to a personal computer, laptop computer or other device wherever a network is available ([TechWeb Network 2008](#)).

Internet connection is also possible via alternative networks using mobile devices. This includes access via mobile telephones to a wireless application protocol (WAP) network (rather than to the www) or to third generation (3G) network. Adaptors connecting to a universal serial bus (USB) port can be used to access the 3G network using a laptop computer ([TechWeb Network 2008](#)). Therefore email can be accessed away from the office or home in a variety of ways.

### The 'Digital Divide'

The so called 'digital divide' describes the inequality created by the increasing level of digital technology. As new technologies replace old systems, it has been suggested that certain sectors of

the population are being left behind with regard to access and use of these services, for instance the elderly, non-English speakers and those in lower income groups (Hobbs 2003; Car 2004a; Goodyear-Smith 2005). A divide has also been observed amongst healthcare professionals. A UK-based survey showed that clinicians more recently-qualified feel comfortable using the internet and consider it reliable (Potts 2002). This is unsurprising given the relatively recent introduction of such technologies, and illustrates a potential generational effect on their use.

## Uses of email for the clinical communication between healthcare professionals

Communication between healthcare professionals can occur on several different levels; from one-on-one communication to that between members of a multidisciplinary team, and official communication such as that between healthcare professionals and organisations. These communications can occur in various settings and some of these are given as examples here.

### Care settings

In primary care, email is routinely used to allow healthcare professionals to communicate within and between institutions about a range of issues, from diagnoses to logistical issues. Messages can convey multiple content and can be sent to several recipients if necessary (Stiles 2007). One area where email communication between healthcare professionals can be used is to request prescriptions from pharmacists; in the US this has been shown to reduce the enquiries pharmacists make about handwritten prescriptions (Podichetty 2004).

Email provides a facility for referring patients; it allows requests to be sent between clinicians or clinician offices quickly and clerical staff can be integrated into the system to maintain records of referrals (Kassirer 2000). It can also be used to obtain information from other healthcare professionals at hospital laboratories, for instance to obtain test results (Couchman 2005).

### Telemedicine

For surgeons practising in remote locations across the world email communication can create valuable access to outside opinion, since it allows low-cost communication of photographic images. More traditional methods have included using the telephone or fax machines, and email can offer a richness of communication that these methods cannot. Digital photographs for diagnosis have proven useful in several fields of surgery (Stutchfield 2007). Similar systems have been used for surgical pre-screening to guide referral to relevant centres outside of remote areas, or to provide prior information for visiting surgeons travelling to remote areas of the world (Lee 2003). It can be used in areas of conflict such as the Middle East to support local doctors and improve healthcare (Patterson 2007).

## Public health

Public health systems rely on the reporting of data from healthcare professionals on disease outbreaks so that they can respond and plan accordingly. Laboratory reporting has seen improved notification rates of late, but the maintenance of good communication is vital (Ward 2008) and many healthcare professionals typically fail to comply because of a lack of information and reminders (Voss 1992). Email communication can offer a method of reminding healthcare professionals about notification, and links to websites with the appropriate forms and a list of notifiable diseases. An electronic media intervention trialled in the US showed increased reporting of diseases by clinicians and this was found to be acceptable to use in practice (Ward 2008).

## Professional development

Email technology can be used to set up electronic mailing lists, allowing a network of healthcare professionals to share information and opinions about a healthcare topic via email and provide each other with links to relevant websites. Subscription to such lists is free and anyone interested in the particular topic can join (Thede 2007). 'Contact, Help and Information networks' (CHAIN) is a UK example of such a network. Anyone working in health or social care can sign up to the various lists, and it is multi-professional and cross-organisational. The aim of CHAIN is to disseminate information between members to achieve effective health care (CHAIN 2007).

### Advantages and disadvantages

The key advantages of email for clinical communication between healthcare professionals include the following (adapted from Freed 2003; Car 2004a).

- Timely and low cost delivery of information (relative to conventional mail) (Houston 2003).
- Convenience: emails can be sent and subsequently read at an opportune time, outside of traditional office hours where convenient (Leong 2005).
- Read receipts can be used to confirm that communications have been received.
- Relative to verbal communication, the written nature of the communication can be of value as reference for the recipient, aiding recall and providing evidence of the exchange (Car 2004a; Car 2004b).
- Emails can be archived in online or offline folders separate from the inbox of the email account so that they do not use up space in the inbox but can be kept for reference (Car 2004a; Car 2004b).
- Email networks allow the wide dissemination of information amongst a specific group of professionals (Thede 2007).
- Digital images can be transferred easily and quickly between healthcare professionals (Stutchfield 2007).
- The convenience of the technology facilitates

communication among healthcare professionals that may otherwise not occur (Stiles 2007), thus extending the breadth of communication.

There are, however, some potential downsides such as the following.

- Evidence of patient and physician concerns regarding privacy, confidentiality and potential misuse of information when healthcare professionals communicate via email (Harris 2001; Kleiner 2002; Moyer 2002; Katzen 2005).
- Physicians may be wary of the potential for email to generate an increased workload, as a consequence of the depth of content permitted by this method of communication (Podichetty 2004).
- Potential medico-legal issues (including informed consent and use of non-encrypted email) when communicating information about a patient via email (Bitter 2000).
- Email is not appropriate for all communication situations, particularly those requiring urgency since email is not necessarily read immediately upon receipt (Stiles 2007).
- Email as a communication tool provides a different context for interaction. The various layers of communication experienced during a face-to-face encounter or during a telephone call are lost in an email; for example the emotive cues from vocal intonation or body language (Car 2004a).
- Technological issues may occur, such as recipients having a full inbox causing email to bounce back to the sender (Virji 2006).
- Systems may be at risk from communications failures, for instance a loss of the link to a central server (a computer which provides services used by other computers, such as email) (Car 2008a). There may be several causes for technological system failure; from local power failure to natural disasters.
- Potential for human error can lead to unintentional content or incorrect recipients.

## Quality and safety issues

The main quality and safety issues around email consultation have included: confidentiality, potential for errors and ensuing liability, identifying clinical situations where email communication between healthcare professionals is inefficient or inappropriate, incorporating email into existing work patterns and achievable costs (Kleiner 2002; Gaster 2003; Gordon 2003; Hobbs 2003; Houston 2003; Car 2004b).

Privacy and confidentiality are a formidable challenge in the adoption of email communication (Couchman 2001; Moyer 2002). Web messaging systems can address issues around security and liability that are associated with conventional email communication since they offer encryption capability and access controls (Liederman 2003). However not all healthcare institutions are ca-

pable of providing such a facility, and rely instead on standardised mail (Car 2004b).

Medico-legal issues are of substantial concern when implementing email communication in practice. Medico-legal issues that could arise include: potential liability for breaches in security allowing a third party to access confidential medical information, liability for responding to unsolicited email from an unknown person and the possibility of identity fraud whereby someone poses as a patient to obtain private information (Moyer 1999; Couchman 2001; Car 2004b). Thus consideration should be given to such occurrences. Suggestions for minimising the legal implications of using email in practice have included: adherence to the same strict data protection rules that must be followed in business and industry; adequate infrastructure to provide encrypted secure email transit and storage; and the use of informed consent to ensure that the patient is aware of the risks and benefits associated with communicating with a healthcare professional via email (Car 2004b).

Education and training results in capable and competent end-users of any technology. This can be costly and time consuming, but enhances the chance of effective implementation of such systems and thus should be a priority. As well as the requirement for initial training, ongoing support is usually necessary to ensure continuing use and further development (Car 2008a). As indicated earlier, clinicians more recently qualified have been shown to feel comfortable using the internet and email technologies (Potts 2002). This may influence training needs and the types of demographic groups leading the use of this technology.

All issues of quality and safety arising will be identified and addressed in the review.

## OBJECTIVES

To assess the effects of healthcare professionals communicating clinical information via email, when compared to other forms of communicating clinical information, on outcomes for health professionals, patients and carers, and health services, including harms.

## METHODS

### Criteria for considering studies for this review

#### Types of studies

Four protocols on the use of mobile phone messaging as a communication method in healthcare were published in 2008 (Car 2008b; de Jongh 2008; Gurol-Urganci 2008; Vodopivec-Jamsek

2008). We will draw on key methodological aspects of these protocols to aid comparison of the effects of email as a new communication technology. This affects the selection criteria for types of studies, participants, and interventions.

We will include randomised controlled trials (RCTs), quasi-randomised trials, controlled before and after studies (CBAs) with at least two intervention and two control sites, and interrupted time series (ITS) with at least three time points before and after the intervention.

Due to the practicalities of organisational change in a healthcare environment, most studies are not randomised and therefore we will consider quasi-randomised trials and CBAs. The inclusion of ITS is particularly valuable in assessing the ongoing merits of a new technology which may require a 'settling in' period. We will include trials with individual and cluster randomisation. Relevant trials with economic evaluations will also be evaluated.

### Types of participants

We will consider all healthcare professionals regardless of age, gender and ethnicity. We will include studies in all settings i.e. primary care settings (services of primary health care), outpatients settings (outpatient clinics), community settings and hospital settings. We will not exclude studies according to the type of healthcare professional (e.g. surgeon, nurse, doctor, allied staff).

We will consider participants originating the email communication, receiving the email communication and copied into the email communication.

### Types of interventions

This review will define the intervention as email used for two-way clinical communication between healthcare professionals to facilitate inter-service consultation. We will include interventions that use email to allow healthcare professionals to contact each other, for example to send information about a patient, to provide notifications for public health purposes, or to facilitate the sharing of relevant information about the healthcare institution.

We will include interventions that use email in any of the following three forms for communication between healthcare professionals:

1. Unsecured standard email to/from a standard email account.
2. Secure email which is encrypted in transit and sent to/from a standard email account with the appropriate encryption decoding software.
3. Web messaging, whereby the message is entered into a proforma which is sent to a specific email account, the address of which is not available to the sender.

All methods of connection will be considered. Methods of accessing email include broadband via a fixed line, broadband via a wireless connection, connecting to the 3G network and connecting to the WAP network.

Studies in which email is part of a multifaceted intervention will be included where the effects are individually reported, even if they do not represent the primary outcome. However these will only be considered where they achieve the appropriate statistical power. Where this cannot be determined or where it is not possible to separate the effects they will not be included.

Comparisons will be made between outcomes of email communication and no intervention, as well as other modes of communication such as face-to-face, postal letters, calls to a landline or mobile telephone, text messaging using a mobile telephone, and if applicable, automated versus personal emails.

We will exclude studies of email between professionals solely for educational purposes. We will exclude studies which consider the general use of email for communication between healthcare professionals i.e. for multiple purposes where clinical communication between healthcare professionals is included but not separately considered.

### Types of outcome measures

A number of processes and outcomes may be affected by interventions that aim to enhance and/or facilitate the communication between healthcare professionals using email.

Primary outcomes of interest are whether the email has been understood and acted upon correctly by the recipient as intended by the sender, and secondary outcomes are whether email was an appropriate mode of communication.

#### Primary outcomes

*Healthcare professional* outcomes resulting from whether the email has been understood and acted upon correctly by the recipient as intended by the sender, e.g. professional knowledge and understanding, inter-professional communication and relationships, professional behaviour, actions or performance.

*Patient* outcomes associated with whether the email has been understood and acted upon correctly by the recipient as intended by the sender, such as patient understanding, patient health status and well-being, treatment outcomes, skills acquisition, support, patient behaviours or actions.

*Health service* outcomes associated with whether email has been understood and acted upon correctly by the recipient as intended by the sender, e.g. service use, management or coordination of a health problem.

*Harms* e.g. effects on safety or quality of care, breaches in privacy, technology failures.

#### Secondary outcomes

*Professional, patient or carer* outcomes associated with whether email was an appropriate mode of communication, e.g. knowledge and understanding, effects on professional or professional-carer communication, evaluations of care (such as convenience, acceptability, satisfaction).

*Health service* outcomes associated with whether email was an appropriate mode of communication, e.g. use of resources or time, costs.

## Search methods for identification of studies

We will follow Cochrane Consumers and Communication Group guidance on review methods.

Initially we will search the following electronic bibliographic databases:

- Cochrane Consumers and Communication Review Group Specialised Register
- Cochrane Central Register of Controlled Trials (CENTRAL, *The Cochrane Library*)
- MEDLINE (1950 to present)
- EMBASE (1980 to present)
- CINAHL (1982 to present)
- ERIC (1965 to present)
- PsycINFO (1967 to present)

The MEDLINE (Ovid) search strategy, compiled by John Kis-Rigo, Trials Search Co-ordinator, Cochrane Consumers and Communication Group, is presented in [Appendix 1](#).

We will also search for grey literature, and examine the reference lists of retrieved relevant studies. Finally we will contact trial authors and experts in the field to ascertain if there are any further studies or unpublished data they may be aware of.

## Grey literature

We will search for grey literature via the following sources:

- Australasian Digital Theses Program, <http://adt.caul.edu.au/>
- Networked Digital Library of Theses and Dissertations, <http://www.ndltd.org>
- UMI ProQuest Digital Dissertations, <http://wwwlib.umi.com/dissertations/>
- Index to Theses, <http://www.theses.com/> (Great Britain and Ireland)
- Dissertation Abstracts (North American and European theses) via British Library
- TrialsCentralTM, [www.trialscentral.org](http://www.trialscentral.org)
- Clinical trials register, [Clinicaltrials.gov](http://Clinicaltrials.gov)
- WHO Clinical Trial Search Portal, [www.who.int/trialsearch](http://www.who.int/trialsearch)
- Current Controlled Trials, [www.controlled-trials.com](http://www.controlled-trials.com)
- Google Scholar; <http://scholar.google.co.uk/> (we will examine the first 500 hits).

We will search databases from their start date and there will be no limitation by language. We will keep records of all the search strategies applied.

## Data collection and analysis

The review methods are adapted from a suite of protocols about mobile phone messaging for communication in healthcare settings (Car 2008b; de Jongh 2008; Gurol-Urganci 2008; Vodopivec-Jamsek 2008).

## Selection of studies

Two review authors (HA and BM) will independently assess the potential relevance of all titles and abstracts identified from electronic searches. We will retrieve full text copies of all articles judged to be potentially relevant. At least two review authors will then independently assess these retrieved articles for inclusion. During a meeting of all review authors, we will verify the final list of included and excluded studies. Any disagreements about particular studies will be resolved by discussion. If the description of a study is insufficiently detailed to allow the review authors to judge whether it meets the review's inclusion criteria, the study authors will be contacted to obtain more detailed information to allow a final judgement regarding inclusion or exclusion.

## Data extraction and management

We will extract data from all included studies using a standard form derived from the data extraction template provided by the Cochrane Consumers and Communication Review Group. We will extract the following data:

- *General information:* Title, authors, source, publication status, date published, language, review author information, date reviewed.
- *Details of study:* Aim of intervention and study, study design, location and details of setting, methods of recruitment of participants, inclusion/exclusion criteria, ethical approval and informed consent, consumer involvement.
- *Assessment of study quality:* Key features of allocation, contemporaneous data collection for intervention and control groups; and for interrupted time series, number of data points collected before and after the intervention, follow-up of participants.
- *Risk of bias:* data to be extracted depends on study design (see [Assessment of risk of bias in included studies](#)).
- *Participants:* Description, geographical location, setting, number screened, number randomised, number completing the study, age, gender, ethnicity, socio-economic grouping and other baseline characteristics, health problem, diagnosis, treatment.
- *Intervention:* Description of the intervention and control including rationale for intervention versus the control (usual care). Delivery of the intervention including email type (standard unsecured email, secure email, web portal or hybrid). Type of clinical information communicated (e.g. diagnostic test results, information on an individual patient). Content of communication (e.g. text, image). Purpose of communication (e.g. obtaining information, providing information).



Communication protocols in place. Who delivers the intervention (e.g. healthcare professional, administrative staff). How consumers of interventions are identified. Sender of first communication (health service, professional, patient and/or carer). Recipients of first communication (health service, professional, patient and/or carer). Whether communication is responded to (content, frequency, method of media). Any co-interventions included. Duration of intervention. Quality of intervention. Follow up period and rationale for chosen period.

- *Outcomes:* principal and secondary outcomes, methods for measuring outcomes, methods of follow-up, tools used to measure outcomes, whether the outcome is validated.
- *Results:* for outcomes and timing of outcome assessment, control and intervention groups if applicable.

The data extraction template will be piloted to allow for unforeseen variations in studies. For every included study at least two review authors will independently perform the data extraction. Any discrepancies between the review authors' data extraction sheets will be discussed and resolved by the review authors who performed the data extraction. When necessary, we will involve another review author to resolve discrepancies.

### Assessment of risk of bias in included studies

Two review authors will independently assess the quality of included studies, with any disagreements resolved by discussion and consensus, and by consulting a third author where necessary. Studies of different designs will be dealt with separately throughout this review in both the quality assessment and analysis.

For RCTs (and quasi RCTs) we will assess and report on the following elements that contribute to bias, according to the guidelines outlined in [Higgins 2008](#):

- Sequence generation;
- Allocation concealment;
- Blinding (participants, personnel, outcomes assessors, data analysers);
- Intention-to-treat analysis;
- Incomplete outcome data;
- Selective outcome reporting.

We will describe the study and assign a judgement relating to the risk of bias for each item. We will use a template to guide the assessment of risk of bias, based upon the guidance by [Higgins 2008](#), judging each item as 'yes' (indicating a low risk of bias), 'no' (indicating a high risk of bias) or 'unclear' (indicating an uncertain risk of bias). For each study we will summarise the risk of bias for each outcome.

We will also assess a range of other possible sources of bias and indicators of study quality, in accordance with the guidelines of the Cochrane Consumers and Communication Review Group ([Ryan 2007](#)), including:

- Baseline comparability of groups;
- Validation of outcome assessment tools;

- Reliability of outcome measures;
- Other possible sources of bias

In the case of studies other than RCTs (that is, quasi-randomised controlled trials, CBA and ITS studies) we will additionally assess the quality of these studies systematically and according to the criteria outlined in the guidelines of the Cochrane Consumers and Communication Review Group so that risk of bias may be ascertained.

We will present the results of the risk of bias assessment in tables and will incorporate the results of the assessment of risk of bias into the review through systematic narrative description and commentary about each of the quality items, for each type of included study. This will lead to an overall assessment of the risk of bias across the included studies and a judgement about the possible effects of bias on the effect sizes of the included studies.

We will contact study authors for additional information about the included studies, or for clarification of the study methods as required.

### Measures of treatment effect

For continuous data, where outcomes have been measured in a standard way across studies, we will report the mean difference and confidence intervals. For dichotomous data, when outcomes have been measured in a standard way we will report the odds ratio/risk ratio and confidence intervals.

### Unit of analysis issues

Issues may arise from the inclusion of cluster-randomised trials, repeated measurements and studies with more than two treatment groups. If applicable the data will be analysed according to recommendations in the Cochrane Collaboration Open Learning Module on issues related to the unit of analysis ([Alderson 2002](#)).

### Dealing with missing data

If data are missing from the relevant comparisons we will attempt to contact the authors of the studies to obtain the information. If the authors cannot be reached, or if the studies are found to be unsatisfactory on the basis of data provided, these studies will be excluded.

### Assessment of heterogeneity

It is important to consider heterogeneity in this review, given the fledgling nature of this field and the relatively recent development of associated interventions. Where there is substantial clinical, methodological or statistical heterogeneity, the results will not be combined in a meta-analysis. We will identify heterogeneity by visual inspection of forest plots, by using a standard  $\chi^2$  test and a significance level of  $\alpha = 0.1$ , in view of the low power of such tests.

We will also examine heterogeneity with  $I^2$ , where  $I^2$  values of 50% or more indicate a substantial level of heterogeneity (Higgins 2003). Where heterogeneity is moderate ( $< 50\%$ ) a random-effects model will be used. We will attempt to determine potential reasons for heterogeneity by examining individual study characteristics and those of subgroups of the main body of evidence.

### Assessment of reporting biases

Reporting biases will be assessed statistically, using funnel plots in RevMan 5 software. Selection bias, performance bias, attrition bias and detection bias will be assessed using the checklist provided in Ryan 2007. The possibility of reporting bias will be raised in the review.

### Data synthesis

Data synthesis will begin with a narrative overview of the findings in the form of a table systematically summarising the extracted results, separated by study design, and highlighting important characteristics of the included data, for instance the type of clinical information communicated, and the level of communication in the intervention.

This will be followed by a quantitative meta-analysis if appropriate. The participants, interventions and/or outcomes will be assessed for comparability, which is necessary for statistical pooling. We will look for studies sufficiently 'similar' in terms of study design, setting, intervention, follow-up and outcome measures in order to combine the study data in a meta-analysis. A meeting of all review authors will decide whether or not it is appropriate to carry out such a meta-analysis.

The decision is likely to depend upon the type of intervention and the outcome measures used in the study. Therefore studies should be classified according to:

- Study design: RCTs, CBAs, ITS.
- Outcome measures used, as described under 'types of outcome measures'.

Caution will be taken when considering the pooling of data in a meta-analysis, especially where differing study designs are concerned. The choice of model would depend on the heterogeneity of the studies included in the meta-analysis. A fixed-effect model assumes all studies are consistent and similar, and is more precise than the alternative, a random-effects model, because it usually has narrower confidence intervals. A random-effects model provides a more conservative estimate of effect and can be used where there is moderate heterogeneity.

We will conduct the analysis according to Cochrane Handbook guidance (Higgins 2008).

### Subgroup analysis and investigation of heterogeneity

Where there are sufficient data and where it is appropriate in the context of the study, we will conduct subgroup analysis. This will

allow the examination of the effect of certain studies on the pooled effects of the intervention.

#### 1. Age

Consideration of the acceptability to different age groups (for both healthcare professionals and patients). This will be important as there is clear evidence that the use of email is predicted by age with a clear tailing off in the generation who have not grown up in the digital age. It is therefore important to consider the intervention's effects in the groups which are accustomed to the technology, since it is likely to become more generalisable to the population as it ages. This will be considered where the primary studies have sought to consider age group from the outset. We will distribute patients into three age subgroups: 0 to 17, 18 to 64, over 65. This distribution was made on the basis of two surveys by The Pew Internet & American Life survey (Pew 2005).

#### 2. Location

Location of the study will also be considered, since differing environments may condition the accessibility of the technology. For instance we would expect communication technologies and their accessibility to differ according to country and/or region within a country, such as rural or urban areas.

#### 3. Type of email communication

Additionally we propose to analyse the results by method of electronic mail utilised e.g. standard email versus a secure web messaging service.

#### 4. Year of Publication

Lastly we will consider results by year of publication, as those more recent studies may be more relevant given evidence of increasing usage and therefore assumed acceptability.

### Sensitivity analysis

Studies deemed to be of lower quality after examination of individual study characteristics will be removed from the analysis to examine the effect on the pooled effects of the intervention. We will also consider the assessment of the risk of bias of included studies, as described above.

We will exclude studies according to the following filters:

- Outlying studies after initial analysis.
- Largest studies.
- Unpublished studies.
- Language of publication.
- Source of funding (e.g. public versus industry).

Other possible considerations for sensitivity analysis will include different measures of effect size (risk difference, odds ratios).



## Consumer input

At this point in the expansion of technology use we need assurance from the consumers and healthcare professionals that the use of email is desired and that it will be implemented in the most widely acceptable and practical form. Secure systems are time consuming and costly to set up so a review guiding national policy is warranted. We will ask consumer referees to comment on the protocols and on the completed review.

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We thank the authors of [Car 2008b](#), [de Jongh 2008](#), [Gurol-Urganci 2008](#) and [Vodopivec-Jamsek 2008](#) for the use of their data management and analysis framework.

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\* Indicates the major publication for the study

## APPENDICES

### Appendix I. MEDLINE (Ovid) search strategy

1. computer communication networks/
2. limit 1 to yr="1996 - 2002"
3. electronic mail/
4. (electronic mail\* or email\* or e-mail\* or web mail\* or webmail\* or internet mail\* or mailing list\* or discussion list\* or listserv\*).tw.
5. ((patient or health or information or web or internet) adj portal\*).tw.
6. (patient adj (web\* or internet)).tw.
7. ((web\* or internet or www or electronic\* or online or on-line) adj5 (messag\* or communicat\* or transmi\* or transfer\* or send\* or deliver\* or feedback or letter\* or interactiv\* or input\* or forum or appointment\* or booking\* or remind\* or referral\* or consult\* or prescri\*)).tw.
8. ((online or on-line or web\* or internet) adj4 (service\* or intervention\* or therap\* or treatment\* or counsel\*)).tw.
9. (e-communication\* or e-consult\* or e-visit\* or e-referral\* or e-booking\* or e-prescri\*).tw.
10. or/2-9
11. physician patient relations/
12. professional patient relations
13. interprofessional relations/
14. remote consultation/
15. or/11-14
16. internet/
17. 15 and 16
18. 10 or 17
19. randomized controlled trial.pt.
20. controlled clinical trial.pt.
21. random\*.tw.
22. placebo\*.tw

23. drug therapy.fs.
24. trial.tw.
25. groups.tw.
26. clinical trial.pt.
27. evaluation studies.pt.
28. research design/
29. follow up studies/
30. prospective studies/
31. (control\* or prospectiv\* or volunteer\*).tw.
32. cross over studies/
33. comparative study.pt.
34. experiment\*.tw.
35. time series.tw.
36. (pre test or pretest or post test or posttest).tw.
37. (pre intervention or preintervention or post intervention or postintervention).tw.
38. (impact\* or intervention\* or chang\*).tw.
39. effect\$.tw.
40. or/19-39
41. humans.sh.
42. 40 and 41
43. 18 and 42

## WHAT'S NEW

| Date            | Event   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 26 October 2010 | Amended | <ol style="list-style-type: none"> <li>1. 'Types of Participants' - We removed the reference to public health settings since this was at odds with the purpose of the review.</li> <li>2. 'Types of Studies' - We will include controlled before and after (CBA) studies which include two or more intervention SITES and two or more comparison SITES; this was formerly incorrectly described in our protocol as intervention GROUPS and comparison GROUPS.</li> <li>3. We made minor amendments to the wording of the Objectives.</li> </ol> |

## HISTORY

Protocol first published: Issue 3, 2009

## CONTRIBUTIONS OF AUTHORS

Josip Car conceived the idea for the protocol and supervised the production.

Helen Atherton wrote the protocol and revised the protocol.

Barbara Meyer designed and co-wrote the protocol.

Azeem Majeed provided input on the content of the protocol and proof read the protocol.

## DECLARATIONS OF INTEREST

None known.

## SOURCES OF SUPPORT

### Internal sources

- Department of Primary Care and Social Medicine, Imperial College London, UK.  
AM holds a post in the Department and is funded by Imperial College London.
- eHealth Unit, Department of Primary Care and Social Medicine, Imperial College London, UK.  
JC received a salary and office space from the eHealth Unit. HA is hosted as a PhD student in the Unit.
- Department of Family Medicine, University of Ljubljana, Slovenia.  
JC is a visiting researcher in the Department, receiving salary and office space support.
- NHS Education for Scotland, UK.  
BM was funded during the production of the protocols by NHS Education for Scotland.

### External sources

- Medical Research Council, UK.  
HA is the recipient of a Medical Research Council PhD Studentship, administered by Imperial College, London, UK.

## Search strategy: Medline

1. computer communication networks/
2. limit 1 to yr="1996 - 2002"
3. electronic mail/
4. (electronic mail\* or email\* or e-mail\* or web mail\* or webmail\* or internet mail\* or mailing list\* or discussion list\* or listserv\*).tw.
5. ((patient or health or information or web or internet) adj portal\*).tw.
6. (patient adj (web\* or internet)).tw.
7. ((web\* or internet or www or electronic\* or online) adj5 (messag\* or communicat\* or transmi\* or transfer\* or send\* or deliver\* or feedback or letter\* or interactiv\* or input\* or forum or appointment\* or booking\* or remind\* or referral\* or consult\* or prescri\*)).tw.
8. ((online or web\* or internet) adj4 (service\* or intervention\* or therap\* or treatment\* or counsel\*)).tw.
9. (e-communication\* or e-consult\* or e-visit\* or e-referral\* or e-booking\* or e-prescri\*).tw.
10. or/2-9
11. physician patient relations/
12. professional patient relations/
13. interprofessional relations/
14. remote consultation/
15. or/11-14
16. internet/
17. 15 and 16
18. 10 or 17
19. randomized controlled trial.pt.
20. controlled clinical trial.pt.
21. random\*.tw.
22. placebo\*.tw.
23. drug therapy.fs.
24. trial.tw.
25. groups.tw.
26. clinical trial.pt.
27. evaluation studies.pt.
28. research design/
29. follow up studies/
30. prospective studies/
31. (control\* or prospectiv\* or volunteer\*).tw.
32. cross over studies/
33. comparative study.pt.
34. experiment\*.tw.
35. time series.tw.
36. (pre test or pretest or post test or posttest).tw.
37. (pre intervention or preintervention or post intervention or postintervention).tw.
38. (impact\* or intervention\* or chang\*).tw.
39. effect?.tw.
40. or/19-39
41. exp animals/ not humans.sh.
42. 40 not 41
43. 18 and 42



## Search strategy: Central

| ID  | Search                                                                                                                                                                                                                                                                                                 | Hits | Edit                 | Delete                 |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----------------------|------------------------|
| #1  | <a href="#">MeSH descriptor <b>Electronic Mail</b>, this term only</a>                                                                                                                                                                                                                                 | 81   | <a href="#">edit</a> | <a href="#">delete</a> |
| #2  | <a href="#">(electronic-mail* or email* or e-mail* or web-mail* or webmail* or internet-mail* or mailing-list or discussion-list or listserv*):ti,ab,kw</a>                                                                                                                                            | 393  | <a href="#">edit</a> | <a href="#">delete</a> |
| #3  | <a href="#">(patient or health or information or web or internet) next portal</a>                                                                                                                                                                                                                      | 30   | <a href="#">edit</a> | <a href="#">delete</a> |
| #4  | <a href="#">patient next (web or internet)</a>                                                                                                                                                                                                                                                         | 9    | <a href="#">edit</a> | <a href="#">delete</a> |
| #5  | <a href="#">(web* or internet or www or electronic* or online or on-line) near (messag* or communicat* or transmi* or transfer* or send* or deliver* or feedback or letter or interactiv* or input* or forum or appointment or booking or schedul* or remind* or referral or consult* or prescri*)</a> | 964  | <a href="#">edit</a> | <a href="#">delete</a> |
| #6  | <a href="#">(online or on-line or web* or internet) near (service or intervention or therap* or treatment or counsel*)</a>                                                                                                                                                                             | 1004 | <a href="#">edit</a> | <a href="#">delete</a> |
| #7  | <a href="#">e-communication or e-consult* or e-visit or e-referral or e-booking or e-prescri*</a>                                                                                                                                                                                                      | 33   | <a href="#">edit</a> | <a href="#">delete</a> |
| #8  | <a href="#">MeSH descriptor <b>Computer Communication Networks</b>, this term only</a>                                                                                                                                                                                                                 | 69   | <a href="#">edit</a> | <a href="#">delete</a> |
| #9  | <a href="#">(#8), from 1996 to 2002</a>                                                                                                                                                                                                                                                                | 41   | <a href="#">edit</a> | <a href="#">delete</a> |
| #10 | <a href="#">(#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #9)</a>                                                                                                                                                                                                                                         | 2015 | <a href="#">edit</a> | <a href="#">delete</a> |
| #11 | <a href="#">MeSH descriptor <b>Physician-Patient Relations</b>, this term only</a>                                                                                                                                                                                                                     | 786  | <a href="#">edit</a> | <a href="#">delete</a> |
| #12 | <a href="#">MeSH descriptor <b>Professional-Patient Relations</b>, this term only</a>                                                                                                                                                                                                                  | 377  | <a href="#">edit</a> | <a href="#">delete</a> |
| #13 | <a href="#">MeSH descriptor <b>Interprofessional Relations</b>, this term only</a>                                                                                                                                                                                                                     | 171  | <a href="#">edit</a> | <a href="#">delete</a> |
| #14 | <a href="#">"doctor patient relation":kw</a>                                                                                                                                                                                                                                                           | 71   | <a href="#">edit</a> | <a href="#">delete</a> |
| #15 | <a href="#">"interpersonal communication":kw</a>                                                                                                                                                                                                                                                       | 98   | <a href="#">edit</a> | <a href="#">delete</a> |
| #16 | <a href="#">"human relation":kw</a>                                                                                                                                                                                                                                                                    | 44   | <a href="#">edit</a> | <a href="#">delete</a> |
| #17 | <a href="#">"patient counseling":kw</a>                                                                                                                                                                                                                                                                | 156  | <a href="#">edit</a> | <a href="#">delete</a> |
| #18 | <a href="#">MeSH descriptor <b>Telemedicine</b> explode all trees</a>                                                                                                                                                                                                                                  | 792  | <a href="#">edit</a> | <a href="#">delete</a> |
| #19 | <a href="#">telehealth or telemedicine or teleconsultation or telecommunication</a>                                                                                                                                                                                                                    | 980  | <a href="#">edit</a> | <a href="#">delete</a> |
| #20 | <a href="#">diagnostic-test or laboratory-test</a>                                                                                                                                                                                                                                                     | 5071 | <a href="#">edit</a> | <a href="#">delete</a> |
| #21 | <a href="#">(#11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20)</a>                                                                                                                                                                                                                   | 7772 | <a href="#">edit</a> | <a href="#">delete</a> |
| #22 | <a href="#">internet:kw,ti</a>                                                                                                                                                                                                                                                                         | 1216 | <a href="#">edit</a> | <a href="#">delete</a> |
| #23 | <a href="#">(#21 AND #22)</a>                                                                                                                                                                                                                                                                          | 133  | <a href="#">edit</a> | <a href="#">delete</a> |
| #24 | <a href="#">(#10 OR #23)</a>                                                                                                                                                                                                                                                                           | 2043 | <a href="#">edit</a> | <a href="#">delete</a> |
| #25 | <a href="#">(#24).....[in Clinical Trials]</a>                                                                                                                                                                                                                                                         | 1214 | <a href="#">edit</a> | <a href="#">delete</a> |





## Search strategy: EMBASE

1. e-mail/
2. (electronic mail\* or email\* or e-mail\* or web mail\* or webmail\* or internet mail\* or mailing list\* or discussion list\* or listserv\*).tw.
3. ((patient or health or information or web or internet) adj portal\*).tw.
4. (patient adj (web\* or internet)).tw.
5. ((web\* or internet or www or electronic\* or online) adj5 (messag\* or communicat\* or transmi\* or transfer\* or send\* or deliver\* or feedback or letter\* or interactiv\* or input\* or forum or appointment\* or booking\* or scheduling or remind\* or referral\* or consult\* or prescri\*)).tw.
6. ((online or web\* or internet) adj4 (service\* or intervention\* or therap\* or treatment\* or counsel\*)).tw.
7. (e-communication\* or e-consult\* or e-visit\* or e-referral\* or e-booking\* or e-prescri\*).tw.
8. or/1-7
9. doctor patient relation/
10. interpersonal communication/
11. human relation/
12. patient counseling/
13. exp telemedicine/
14. telecommunication/
15. exp diagnostic test/
16. or/9-15
17. internet/
18. 16 and 17
19. 8 or 18
20. randomized controlled trial/
21. single blind procedure/ or double blind procedure/
22. crossover procedure/
23. random\*.tw.
24. trial.tw.
25. placebo\*.tw.
26. ((singl\* or doubl\*) adj (blind\* or mask\*)).tw.
27. (experiment\* or intervention\*).tw.
28. (pre test or pretest or post test or posttest).tw.
29. (preintervention or postintervention).tw.
30. (cross over or crossover or factorial\* or latin square).tw.
31. (assign\* or allocat\* or volunteer\*).tw.
32. (control\* or compar\* or prospectiv\*).tw.
33. (impact\* or effect? or chang\* or evaluat\*).tw.
34. time series.tw.
35. or/20-34
36. nonhuman/
37. 35 not 36
38. 19 and 37

## Search strategy: ERIC

(KW=(computer mediated communication\* or electronic mail\* or email\* or e-mail\* or web mail\* or webmail\* or internet mail\* or mailing list\* or discussion list\* or listserv\*) or KW=((patient or health or information or web or internet) within 1 portal\*) or KW=(patient within 1 (web\* or internet)) or KW=((web\* or internet or www or electronic\* or online or on-line) within 5 (messag\* or communicat\* or transmi\* or transfer\* or send\* or deliver\* or feedback or letter\* or interactiv\* or input\* or forum or appointment\* or booking\* or schedul\* or remind\* or referral\* or consult\* or prescri\*)) or KW=((online or on-line or web\* or internet) within 4 (service\* or intervention\* or therap\* or treatment\* or counsel\*)) or KW=(e-communication\* or e-consult\* or e-visit\* or e-referral\* or e-booking\* or e-prescri\*)) and (KW=(health\* or medic\* or patient\* or clinic\* or hospital\* or illness\* or disease\* or disorder\* or therap\* or physician\* or doctor\* or psychotherap\* or psychiatr\* or telemedic\* or treatment\* or consult\* or counsel\* or referral\* or remind\* or appointment\* or booking\* or schedul\* or visit\* or prescri\* or promot\* or prevent\* or diagnos\* or test result\* or screen\* or intervention\* or care)) and (KW=(random\* or trial\* or placebo\* or assign\* or allocat\* or volunteer\* or crossover or cross over or factorial\* or singl\* blind\* or doubl\* blind\* or clinical stud\* or longitudinal stud\* or control\* or compar\* or intervention\* or

preintervention or postintervention or pre test or pretest or post test or posttest or experiment\* or prospectiv\* or chang\* or evaluat\* or impact\* or effect\* or time series))

## Search strategy: PsycINFO

1. exp electronic communication/
2. (electronic mail\* or email\* or e-mail\* or web mail\* or webmail\* or internet mail\* or mailing list\* or discussion list\* or listserv\*).tw.
3. ((patient or health or information or web or internet) adj portal\*).tw.
4. (patient adj (web\* or internet)).tw.
5. ((web\* or internet or www or electronic\* or online) adj5 (messag\* or communicat\* or transmi\* or transfer\* or send\* or deliver\* or feedback or letter\* or interactiv\* or input\* or forum or appointment\* or booking\* or schedul\* or remind\* or referral\* or consult\* or prescri\*)).tw.
6. ((online or web\* or internet) adj4 (service\* or intervention\* or therap\* or treatment\* or counsel\*)).tw.
7. online therapy/
8. (e-communication\* or e-consult\* or e-visit\* or e-referral\* or e-booking\* or e-prescri\*).tw.
9. or/1-8
10. exp therapeutic processes/
11. interpersonal communication/
12. telemedicine/
13. feedback/
14. or/10-13
15. internet/
16. exp internet usage/
17. 15 or 16
18. 14 and 17
19. 9 or 18
20. ("32" or "33" or "34").cc.
21. (health\* or medic\* or patient\* or clinic\* or hospital\* or illness\* or disease\* or disorder\* or therap\* or physician\* or doctor\* or psychotherap\* or psychiatr\* or telemedic\* or treatment\* or consult\* or counsel\* or referral\* or remind\* or appointment\* or booking\* or schedul\* or visit\* or prescri\* or promot\* or prevent\* or diagnos\* or test result\* or screen\* or intervention\* or care).ti,ab,hw,id.
22. 20 or 21
23. 19 and 22
24. random\*.ti,ab,hw,id.
25. (experiment\* or intervention\*).ti,ab,hw,id.
26. trial\*.ti,ab,hw,id.
27. placebo\*.ti,ab,hw,id.
28. groups.ab.
29. ((singl\* or doubl\* or trebl\* or tripl\*) and (blind\* or mask\*)).ti,ab,hw,id.
30. (pre test or pretest or post test or posttest).ti,ab,hw,id.
31. (preintervention or postintervention).ti,ab,hw,id.
32. (cross over or crossover or factorial\* or latin square).ti,ab,hw,id.
33. (assign\* or allocat\* or volunteer\*).ti,ab,hw,id.
34. (control\* or compar\* or prospectiv\*).ti,ab,hw,id.
35. (impact\* or effect? or chang\* or evaluat\*).ti,ab,hw,id.
36. time series.ti,ab,hw,id.
37. exp experimental design/
38. ("0430" or "0450" or "0451" or "1800" or "2000").md.
39. or/24-38
40. limit 39 to human
41. 23 and 40

## **Search strategy: Grey Literature**

### *Australian Digital Theses Program:*

Electronic mail (all fields) (includes phrase)  
Email (all fields) (includes word/s anywhere)  
E-mail (all fields) (includes word/s anywhere)  
Web messaging (all fields) (includes phrase)  
Web AND patient (all fields) (includes word/s anywhere)  
Internet AND health (all fields) (includes word/s anywhere)  
Internet AND patient (all fields) (includes word/s anywhere)

### *Networked Digital Library of Theses and Dissertations:*

email\*  
Email\* AND doctor\*  
Email\* AND medic\*  
Email\* AND clinic\*  
Email\* AND health\*  
Email\* AND patient\*  
Electronic AND mail  
Web AND patient  
Web AND Messaging  
Internet AND health  
Internet AND patient  
Online AND patient

### *Index to Theses:*

Any field: (email OR e-mail OR electronic mail OR web messag\* OR patient portal OR online OR internet) AND (patient\* ) OR (health\*)  
Any field: (email OR e-mail OR electronic mail OR web messag\* OR patient portal OR online OR internet) AND (doctor\*) OR (physician\*) OR (medic\*)

### *Clinical trials register (clinical trials.gov):*

Interventional studies: (email OR e-mail OR electronic mail OR web messag\* OR patient portal OR online OR internet)

### *WHO Clinical Trial Search Portal:*

email OR e-mail OR electronic mail OR web messag\* OR patient portal OR online OR internet

### *Current Controlled Trials:*

email OR e-mail OR electronic mail OR web messag\* OR patient portal OR online OR internet

### *Google Scholar:*

Search by articles and patents, anytime, include citations: email OR e-mail OR electronic mail OR web messaging AND patient OR health OR doctor OR physician OR medic

## **Search strategy: Proquest**

In Advanced Search (all search box options set to "Citation and abstract"):

((web\* or internet or electronic\* or online) W/6 (messag\* or communicat\* or send\* or letter\* or appointment\* or booking\* or schedul\* or remind\* or referral or consult\* or prescri\*)) or electronic mail\* or email\* or e-mail\* or patient portal\*

AND

patient\* or health\* or medic\* or doctor\* or physician\* or clinic\* or disease\*

AND

random\* or trial or assign\* or allocat\* or intervention\* or control\* or compar\*



## *Data Extraction Template for Cochrane Reviews*

### Introduction

The Cochrane Consumers & Communication Review Group has developed this template for its review authors, drawing on templates developed by other Cochrane Review Groups as well the forms used by authors with our Group, and guidance from the *Cochrane Handbook*. The template is designed to capture relevant information about the types of interventions covered within our Group's scope.

***This template is recommended as a guide only, and review authors should revise it as appropriate for their own review topic.***

This template is for use with included studies only. It suggests elements which should be addressed in the *Characteristics of Included Studies* table, *Risk of Bias* tables and Data and Analyses section in RevMan 5. This template is most suited to the assessment of bias for RCTs; however, elements can be adapted for use in the assessment of non-randomised studies.

Before finalising and piloting your own tailored data extraction form, read the Cochrane Handbook for Systematic Reviews of Interventions (Chapter 7 "Selecting studies and collecting data") which contains further relevant instructions. For guidance on completing the assessment of risk of bias, you must refer to the Cochrane Handbook (Chapter 8).

#### Notes on using a data extraction form:

- *Be consistent in the order and style you use to describe the information...This will make it easier to complete the Characteristics of Included Studies and Risk of Bias tables, prevent you from overlooking information and make reading of the review easier.*
- *When extracting this information, you should record the source of each piece of information, including the precise location within a document.*
- *Highlight any missing information as unclear or not described, to make it clear to the reader of your review that the information was not included in the description of the study, not that you forgot to extract it.*
- *It may be reasonable to make assumptions about how the study was conducted, but these assumptions must be reported by the review author for transparency.*
- *Supplement ambiguous quotes with 'Probably done' or 'Probably not done', providing a rationale for the assumption.*
- *Include instructions and decision rules on the data collection form....it is crucial that you practice using the form and receive, or give, training if the form was designed by someone other than the person using it.*
- *You must seek to contact study authors for any additional information or clarification required. When asking trial authors for more information about the study design and conduct, open ended questions will reduce the risk of overly positive answers. See Cochrane Handbook section 8.3.4. Sample letters to authors are available from the Managing Editor.*

#### A note on record keeping:

Completed extraction sheets (paper or electronic) must be retained by the lead author to facilitate data checking. These sheets should be made available to the Review Group editorial base upon request by the Managing Editor. These will be requested in select circumstances where it is unclear how data in the review were derived.

---

Please send us your feedback on this form's usefulness for your own review, and any suggestions for amendments, to  
cochrane@latrobe.edu.au

**Form version/date** (eg. Version 1.3, 5 August 2009)  
**Review Title**  
**Study ID** (Surname Year: as it appears in RevMan)  
**Language**  
**Name of review author completing this form**  
**Date form completed**  
**Notes** (*Unpublished – for own use*) Eg. References to be followed up, source of information (especially if multiple reports of same trial, or unpublished data/personal communication included).

## Methods:

Details of Study  
 Aim of intervention (as stated in the trial report/s. What was the problem that this intervention was designed to address?)  
 Aim of study (as stated in the trial report/s. What was the trial designed to assess?)  
 Study design  
 Details of setting (incl. medical setting of health service - description, age, gender, population served and clinical context of patients)  
 Location  
 Methods of recruitment of participants (how were potential participants approached and invited to participate?)  
 Inclusion/exclusion criteria for participation in study  
 Informed consent obtained? (Yes / No / Unclear)  
 Ethical approval? (Yes / No / Unclear)  
 Funding (including source, amount, if stated).  
 Statistical methods and their appropriateness (if relevant)  
 Consumer involvement (eg. In design of study and/or intervention; in delivery of intervention; in evaluation of intervention; in interpretation of study findings)

## Assessment of study quality:

Key features of allocation  
 contemporaneous data collection? (for intervention and control)  
 Interrupted time series - number of datapoints collected (before and after intervention)

## Assessment of risk of bias (used to complete the 'Risk of Bias' tables in RevMan 5)

For details on how to complete this section, you must refer to the Cochrane Handbook, chapter 8, particularly Table 8.5.c.

NOTE: if you are including non-RCTs you may need to tailor the Risk of Bias criteria accordingly.

For tips on how to enter data into RevMan 5, see "Risk of Bias" tables in the RevMan User Guide.

Adapted from Cochrane Handbook Table 8.5a: The Cochrane Collaboration's tool for assessing risk of bias

| Domain | Review authors' judgement | Description |
|--------|---------------------------|-------------|
|--------|---------------------------|-------------|



|                                                                                                                                                                                                      |                     |                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Was the allocation sequence adequately generated?                                                                                                                                                    | Yes / No / Unclear* | Describe the method used to generate the allocation sequence in sufficient detail to allow an assessment of whether it should produce comparable groups.                                                                                                                                                                                                                               |
| Was allocation adequately concealed?                                                                                                                                                                 | Yes / No / Unclear  | Describe the method used to conceal the allocation sequence in sufficient detail to determine whether intervention allocations could have been foreseen in advance of, or during, enrolment.                                                                                                                                                                                           |
| <b>Blinding: Was knowledge of the allocated intervention adequately prevented during the study?</b> [Note: you can add additional rows to assess blinding for different outcomes/groups of outcomes] | Yes / No / Unclear  | Describe all measures used, if any, to blind study participants and personnel from knowledge of which intervention a participant received. Provide any information relating to whether the intended blinding was effective                                                                                                                                                             |
| <b>Were incomplete outcome data adequately addressed?</b><br>Assessments should be made for each main outcome (or class of outcomes).                                                                | Yes / No / Unclear  | Describe the completeness of outcome data for each main outcome, including attrition and exclusions from the analysis. State whether attrition and exclusions were reported, the numbers in each intervention group (compared with total randomized participants), reasons for attrition/exclusions where reported, and any re-inclusions in analyses performed by the review authors. |
| <b>Are reports of the study free of suggestion of selective outcome reporting?</b> Assessments should be made for each main outcome (or class of outcomes).                                          | Yes / No / Unclear  | State how the possibility of selective outcome reporting was examined by the review authors, and what was found.                                                                                                                                                                                                                                                                       |
| <b>Other sources of bias.</b><br>For example:                                                                                                                                                        |                     | State any important concerns about bias not addressed in the other domains in the tool. If particular questions/entries were pre-specified in the review's protocol, responses should be provided for each question/entry.                                                                                                                                                             |
| <b>- Were the intervention and control groups comparable at baseline?</b>                                                                                                                            | Yes / No / Unclear  |                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>- Have measures been taken within the study to protect against contamination?</b>                                                                                                                 | Yes / No / Unclear  |                                                                                                                                                                                                                                                                                                                                                                                        |
| See Cochrane Handbook 8.14.1.6 Further examples of potential biases                                                                                                                                  | Yes / No / Unclear  |                                                                                                                                                                                                                                                                                                                                                                                        |

|                                                                                                                                                    |                    |                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Other quality indicators (ie. potential sources of imprecision).</b></p> <p><i>example:</i></p> <p style="text-align: right;"><i>For</i></p> |                    | <p><i>Note: A potential source of bias must be able to change the magnitude of the effect estimate, whereas sources of imprecision affect only the uncertainty in the estimate (i.e. its confidence interval). Potential factors affecting precision of an estimate include technological variability (e.g. measurement error), and observer variability.</i></p> |
| - Were outcome measurement tools validated?                                                                                                        | Yes / No / Unclear |                                                                                                                                                                                                                                                                                                                                                                   |
| - Are the outcome measures reliable?                                                                                                               | Yes / No / Unclear |                                                                                                                                                                                                                                                                                                                                                                   |
| - Did the study obtain ethics approval?                                                                                                            | Yes / No / Unclear |                                                                                                                                                                                                                                                                                                                                                                   |

\* Note: Yes indicates a 'low risk of bias'; No indicates a 'high risk of bias'; Unclear indicates an 'uncertain risk of bias'.

## Participants:

|                                                                          |                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                                                              | <i>(eg. Patients/consumers; carers; parents of patients/consumers; health professionals; well people in the community)</i>                                                                                             |
| Geographic location                                                      | <i>(eg. City/State/Country)</i>                                                                                                                                                                                        |
| Setting                                                                  | <i>(eg. Community, home, primary health centre, acute care hospital, extended care facility)</i>                                                                                                                       |
| Number (number screened, number randomised, number completing the study) | <i>(Eligible, excluded, refused to take part, randomised to intervention, randomised to control, excluded post randomisation, withdrawn, lost to follow up, died, included in analysis, included for each outcome)</i> |
| Age                                                                      | <i>range, mean (standard deviation)</i>                                                                                                                                                                                |
| Gender                                                                   |                                                                                                                                                                                                                        |
| Ethnicity                                                                |                                                                                                                                                                                                                        |
| Principal health problem or diagnosis (if relevant)                      |                                                                                                                                                                                                                        |
| Other health problem/s (if relevant)                                     |                                                                                                                                                                                                                        |
| Stage of problem/illness (if relevant)                                   |                                                                                                                                                                                                                        |
| Treatment received/receiving                                             |                                                                                                                                                                                                                        |
| Other social/demographic details                                         | <i>(eg. Literacy or reading level)</i>                                                                                                                                                                                 |

## Interventions:

|                         |                                                                                                                                                                                                         |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Details of intervention | <i>including theoretical basis (with key references), aim, content, format(s) (media), source, setting. (Capture this information for each arm of the study, eg. Intervention A, Intervention B...)</i> |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                     |                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| consumers of intervention (how are they identified?)                                                |                                                                                                                                                                                                                               |
| Details of control/usual or routine care (rationale for intervention vs control)                    |                                                                                                                                                                                                                               |
| Details of co-interventions in all groups                                                           | <i>(co-interventions may be separate to the intervention of interest for this review, or they may be other similar elements in a suite of interventions having a common purpose. Record all relevant information).</i>        |
| Delivery of intervention: email type (standard unsecured email, secure email, web portal or hybrid) | <i>(eg. stages, timing, frequency, duration) (for each intervention included in the study, eg. Intervention A; Intervention B...)</i>                                                                                         |
| Type of clinical information communicated?                                                          |                                                                                                                                                                                                                               |
| Content of communication (text, image?)                                                             |                                                                                                                                                                                                                               |
| Purpose of communication (obtaining information, providing information?)                            |                                                                                                                                                                                                                               |
| Communication Protocols (Is there any sort of protocol in place)                                    |                                                                                                                                                                                                                               |
| Details of providers -who delivers (healthcare professional, administrative staff).                 | <i>(Who delivers the intervention?; number of providers; training of providers in delivery of intervention).</i>                                                                                                              |
| Sender of first communication (health service, professional, patient and/or carer).                 |                                                                                                                                                                                                                               |
| Recipients of first communication (health service, professional, patient and/or carer).             |                                                                                                                                                                                                                               |
| Has communication been responded to? (content, frequency, method of media).                         |                                                                                                                                                                                                                               |
| Co-interventions included?                                                                          |                                                                                                                                                                                                                               |
| Duration of intervention                                                                            |                                                                                                                                                                                                                               |
| Intervention quality (if relevant):                                                                 | <i>(record any information on the quality of the intervention - assessed by study authors, others, or by you - such as the evidence base of the intervention, or the quality of staff training for intervention delivery)</i> |
| Follow-up period and rationale for chosen period                                                    |                                                                                                                                                                                                                               |
| Fidelity/integrity                                                                                  | <i>(Was the intervention delivered as intended? Record any assessment of this).</i>                                                                                                                                           |

## Outcomes:

|                                                                         |                                                                                     |
|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Principal and secondary outcome measures e.g. desired behaviour change? | <i>(as identified by the study authors).</i>                                        |
| Methods of assessing outcome measures (outcome validated?)              | <i>(eg. Phone survey, questionnaire, physical measurements (for each outcome))</i>  |
| Methods of follow-up for non-respondents                                |                                                                                     |
| Timing of outcome assessment                                            | <i>(including frequency, length of follow up (for each outcome))</i>                |
| Adverse events                                                          | <i>(eg. Complaints, levels of dissatisfaction, adverse incidents, side effects)</i> |

## Notes (Published)

For example:

- *Contact with author (SEE NOTE ON PAGE 1)* *(Yes (information obtained)/No)*
- *Power calculation?*
- *Record if the study was translated from a language other than English.*

- Record if the study was a duplicate publication.

Results

This data will be used in the “Comparisons and Data” section in RevMan (not the table “Characteristics of Included Studies”) , and as the basis for the “Results” section of your review text.

All data are numbers (of patients/units), not percentages.

Dichotomous outcomes

| Outcome | Timing of outcome assessment (days/months) | Intervention group* |           | Control group |           | Notes |
|---------|--------------------------------------------|---------------------|-----------|---------------|-----------|-------|
|         |                                            | Observed (n)        | Total (N) | Observed (n)  | Total (N) |       |
|         |                                            |                     |           |               |           |       |
|         |                                            |                     |           |               |           |       |
|         |                                            |                     |           |               |           |       |
|         |                                            |                     |           |               |           |       |
|         |                                            |                     |           |               |           |       |
|         |                                            |                     |           |               |           |       |

\*Note: add additional columns if the is more than one intervention group, eg. Intervention Group A, Intervention Group B...

Continuous outcomes

| Outcome | Timing of outcome assessment (days/months) | Intervention group  |                    |   | Control group       |                    |   | Notes |
|---------|--------------------------------------------|---------------------|--------------------|---|---------------------|--------------------|---|-------|
|         |                                            | *Mean / Mean change | Standard deviation | N | *Mean / Mean change | Standard deviation | N |       |
|         |                                            |                     |                    |   |                     |                    |   |       |
|         |                                            |                     |                    |   |                     |                    |   |       |
|         |                                            |                     |                    |   |                     |                    |   |       |
|         |                                            |                     |                    |   |                     |                    |   |       |
|         |                                            |                     |                    |   |                     |                    |   |       |
|         |                                            |                     |                    |   |                     |                    |   |       |

\*delete as appropriate

conclusions/ key findings

## Methods as per protocol

As outlined in the methods section of the systematic review, there are methods stated in the published protocol for the review that it was not possible to utilise in carrying out the review, owing to the nature of the studies identified. However these methods may be used in future updates of the review, if additional studies are identified.

### *Measures of treatment effect*

Where outcomes are measured in a standard way across studies data will be presented in the following way:

- For continuous data the mean difference and confidence intervals will be reported. Where standard deviations were not available these will be calculated where possible using mean difference, sample size and standard error values.
- For dichotomous data odds ratios/risk ratios and confidence intervals will be presented.

### *Assessment of statistical heterogeneity*

Statistical heterogeneity will be assessed in the first instance using visual inspection of forest plots. Where confidence intervals for individual studies have poor overlap it generally indicates the presence of statistical heterogeneity.

Secondly, a standard  $\text{Chi}^2$  test will be used to formally test for the presence of statistical heterogeneity. The test is automatically included in the forest plot produced by reference manager software. A low P value generated by the test provides evidence of heterogeneity of intervention effects. Where a meta-analysis includes studies with a small sample size or where studies are few in number the  $\text{Chi}^2$  test has low power. In this case a P value of 0.10 (rather 0.05) is used to determine statistical significance. Though a significant result may indicate a problem with heterogeneity, a non-significant result does not provide evidence of no heterogeneity.

It has been argued that since clinical and methodological diversity always occurs in a meta-analysis, some level of statistical heterogeneity is inevitable.<sup>245</sup> The view takes that whether heterogeneity is tested for or not it will always exist and thus a statistical test which states whether it is, or is not present is irrelevant in choosing the type of analysis. Thus as well as carrying out a  $\text{Chi}^2$  test, an  $I^2$  statistic will be used. The test assesses the impact of heterogeneity on the meta-analysis, rather than simply testing whether heterogeneity is

present. The  $I^2$  statistic quantifies inconsistency across the studies. It describes the % of the variability in effect estimates that is due to heterogeneity rather than sampling error.

Though the inconsistency in a meta-analysis depends on several factors, a rough guide to interpretation of the  $I^2$  statistic can be used:

- 0% to 40%: might not be important;
- 30% to 60%: may represent moderate heterogeneity;
- 50% to 90%: may represent substantial heterogeneity;
- 75% to 100%: considerable heterogeneity.

The importance of the observed value of  $I^2$  depends on the magnitude and direction of effects, and the strength of the evidence for heterogeneity ( $\text{Chi}^2$  test, confidence intervals for  $I^2$ ). Both the  $\text{Chi}^2$  value and the  $I^2$  value can be used together to assess the potential statistical heterogeneity in a meta-analysis.

Where statistical heterogeneity is identified reasons for the heterogeneity will be sought by examining clinical and methodological heterogeneity. These are assessed by comparing the included studies according to participants, interventions, outcomes and study designs, by assessing the risk of bias and by examining subgroups. The level of statistical heterogeneity present will be taken into account when choosing the method of analysis for the review.

### *Assessment of reporting biases*

Where data in the review has been standardised and pooled funnel plots will be used to check for publication bias. Funnel plots are produced using review manager software.

A funnel plot is a simple scatter plot, which plots the intervention effect estimate from a single study versus a measure of the study's size or precision. In the absence of bias the plot should resemble a symmetrical inverted funnel. The precision of an estimated intervention effect increases as the size of the study increases. Effect estimates from small studies scatter more widely at the bottom of the graph, with the spread narrowing amongst larger studies.

When creating a funnel plot the standard error of the intervention effect estimate is plotted rather than the sample size on the vertical axis. This is because the statistical power of a study is determined by more than just sample size and standard error (SE) summarises these other factors. These other factors may include the standard deviation for responses (continuous data) or the number of events (dichotomous data). On the horizontal axis, for odds ratios/risk ratios, these are plotted on a logarithmic scale. This is to ensure that effects of the same magnitude but going in opposite directions are equidistant from 1.0. Mean differences and standardised mean differences are plotted as such. Where there is reporting bias, for instance where smaller studies without statistically significant results remain unpublished, the funnel will appear asymmetrical. Where studies are not included in the review because they remain unpublished, a meta-analysis will overestimate the intervention effect. Generally, the more asymmetrical the funnel the more likely it is that bias is present.

In interpreting the funnel plot it is necessary to consider possible reasons for asymmetry other than publication bias and these might include poor methodological design and sampling variation.

### *Data synthesis*

Where possible the data will be pooled in a meta-analysis. The decision to carry out a meta-analysis is dependent on the nature of the studies included in the review. The diversity between studies according to clinical factors, comparisons and outcomes will be considered. The risk of bias in the included studies will also be considered. Where there is great diversity between studies, and/or a high risk of bias, it is not necessarily appropriate to pool the data. A decision on whether to carry out a meta-analysis will be made according to these factors and after discussion amongst study authors.

Where it is deemed appropriate to carry out a meta-analysis the choice of model will be influenced by the level of statistical heterogeneity identified using both the  $\text{Chi}^2$  and  $I^2$  test. There are two types of model to choose from; a fixed-effects model and a random-effects model. They each make a different assumption.

A random-effects meta-analysis assumes that the studies are not all estimating the same intervention effect. It can be used to incorporate heterogeneity among studies. It is not a substitute for a thorough investigation of heterogeneity and is intended primarily for heterogeneity that cannot be explained. It provides a more conservative estimate of effect. A fixed-effect meta-analysis assumes that each study is estimating exactly the same quantity and that any variation between the results of the studies is due to chance. It is more precise than a random-effects model, because in the presence of statistical heterogeneity it usually has narrower confidence intervals.

All analysis will be conducted according to the guidance available in the Cochrane Handbook.<sup>245</sup>

### *Subgroup analysis and investigation of heterogeneity*

Where appropriate the effect of certain variables on the pooled effects of the intervention will be investigated.

Subgroups of interest:

#### *1. Age*

Consideration of the acceptability to different age groups (for both health professionals and patients) of email use is important, as there is clear evidence that the use of email is predicted by age with a clear tailing off in the generation who have not grown up in the digital age. It is therefore important to consider the intervention effects in the groups which are accustomed to the technology, since it is likely to become more generalisable to the population as it ages. This will be considered where the primary studies seek to consider the effect of interventions across different age groups from the outset. Patients will be distributed into three age subgroups: 0 to 17, 18 to 64, over 65.

#### *2. Location*

Location of the studies will also be considered, since differing environments may affect the accessibility of the technology. For instance, it may be expected that communication



technologies and their accessibility might differ according to country and/or region within a country, such as rural or urban areas.

### *3. Type of email communication*

Additionally, it was proposed that the results will be analysed by method of electronic mail utilised e.g. standard email versus a secure web messaging service.

### *4. Year of Publication*

Lastly, results will be considered by year of publication, as those more recent studies may be more relevant given evidence of increasing usage and therefore assumed acceptability.

### *Sensitivity analysis*

When reviewers are concerned that small study effects are influencing the results of a meta-analysis, they may want to conduct sensitivity analyses in order to explore the robustness of the meta-analysis' conclusions to different assumptions about the causes of funnel plot asymmetry.

Studies deemed to be of lower quality after examination of individual study characteristics and their risk of bias, will be removed from the analysis. This will allow examination of the effect of study quality on the pooled effects of the intervention.

Studies will be excluded according to the following filters:

- Outlying studies after initial analysis.
- Largest studies.
- Unpublished studies.
- Language of publication.
- Source of funding (e.g. public versus industry).

Other possible considerations for sensitivity analysis would include different measures of effect size (risk difference, odds ratios).

**Table 1. Excluded studies**

| <b>Study</b>   | <b>Reason for exclusion</b>                                                                                                                                                                                                                                                                                                                 |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Carlbring 2006 | The effects of email were not individually reported. Multifaceted Internet intervention with an email component.                                                                                                                                                                                                                            |
| Ezenkwele 2003 | Intervention does not constitute two-way communication for communicating clinical concerns. Compares email with telephone for follow-up after an emergency department visit. The intervention email requires a one off response from the participants.                                                                                      |
| Goldman 2004   | Intervention does not constitute two-way communication for communicating clinical concerns. Compares email with telephone for follow-up after a paediatric emergency department visit. The intervention email requires a one off response from the participants.                                                                            |
| Hanauer 2009   | Communication in the intervention was not with a health professional. Intervention assessed the use of email reminders to support diabetes management. Communication was between the participant and a web system. A multi-faceted intervention comprising a web-based module and a messaging/reminder module designed to run autonomously. |
| Klein 2006     | The effects of email were not individually reported. Multifaceted intervention with an email component.                                                                                                                                                                                                                                     |
| Klein 2009a    | Effect of the frequency of email is being tested rather than the email itself. Two interventions each offering differing frequencies of email support (1 email per week versus 3 emails per week).                                                                                                                                          |
| Klein 2009b    | The effects of email were not individually reported. Multifaceted Internet intervention with an email component.                                                                                                                                                                                                                            |
| Leong 2005     | Study does not meet the inclusion criteria for type of study in this review. Despite being described as a study with an intervention and control group, the authors acknowledge that participants were not randomised, 'thereby creating uncertainty regarding the effects of the intervention'.                                            |
| Leveille 2009  | Intervention assesses content of emails (aimed towards behaviour change) rather than the email itself. The control group also received emails, but with different content.                                                                                                                                                                  |
| Pier 2008      | Study does not meet the inclusion criteria for type of study in this review . Despite being described a controlled trial it had a natural groups design (participants assigned into groups according to how they learned of the programme).                                                                                                 |
| Simon 2011     | Intervention assesses content of emails (care management programme) rather than the email itself.                                                                                                                                                                                                                                           |
| Tate 2003      | The effects of email were not individually reported. Multifaceted Internet intervention with an email component.                                                                                                                                                                                                                            |

**Table 2: Ongoing study**

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Study details</b>       | Author: Ruland, C.M National Clinical Trial number: 00971139                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Study name</b>          | Implementing Online Patient-Provider Communication into Clinical Practice (OPPC)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Methods</b>             | RCT (Parallel)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Participants</b>        | <p>Patients with cancer, having had liver transplantation or diabetes.</p> <p>Inclusion Criteria:</p> <ul style="list-style-type: none"> <li>• Male and female, 18 years of age and older.</li> <li>• Able to read/speak Norwegian and have Internet with secure access (BankID) at home.</li> </ul> <p>Exclusion Criteria:</p> <ul style="list-style-type: none"> <li>• Excluded are patients who have brain metastasis and patients with cerebral affection caused by the disease (e.g., encephalopathy) as this may affect their abilities to reliably report their symptoms.</li> <li>• Excluded are also patients who receive a liver transplant indicated by cancer coli, as they participate in another study.</li> </ul> <p>The investigators will include patients with various diagnoses from heterogeneous practice settings to increase external validity.</p> |
| <b>Interventions</b>       | Access to the online patient-provider communication (OPPC) service. A service where patients can ask questions and receive advice and support from care providers and social counsellors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Outcomes</b>            | <p>Primary Outcome :</p> <ul style="list-style-type: none"> <li>• Severity and duration of patients' symptom distress (measured at baseline and at 2, 4, 6 and 8 months).</li> </ul> <p>Secondary Outcomes:</p> <ul style="list-style-type: none"> <li>• Impacts of the OPPC service on organisational processes/organisational change such as care processes (measured at end of study at 8 months after last included patient).</li> <li>• Health care utilization (measured at post intervention, at 12 and 18 months).</li> </ul>                                                                                                                                                                                                                                                                                                                                      |
| <b>Starting date</b>       | November 2009                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Contact information</b> | Cornelia M Ruland, PhD. Oslo University Hospital. cornelia.ruland@rr-research.no<br>Cecilie Varsi, MS. Oslo University Hospital. cecilie.varsi@rr-research.no                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Notes</b>               | This study is currently recruiting participants. June 2012 is the final data collection date for the primary outcome measure. The anticipated completion date is December 2012.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

**Table 3. Characteristics of included studies**

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Study</b>         | Bergmo 2009                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Methods</b>       | <p><b>Study design:</b> Randomised controlled trial</p> <p><b>Duration of Intervention:</b> One year</p> <p><b>Recruitment:</b> 131 parents invited to participate during outpatient consultation at the paediatric and dermatology clinic at University Hospital North Norway. Additional patients asked from Hammerfest Hospital Norway. Recruitment period lasted 15 months.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Participants</b>  | <p><b>Description:</b> Parents of children who visited the Paediatric and Dermatology clinic</p> <p><b>Setting:</b> Paediatric and Dermatology clinics at secondary care hospitals.</p> <p>Inclusion/exclusion criteria: None.</p> <p><b>Number participating:</b> 119 parents agreed to participate, 21 did not return consent form, 98 children randomised, 50 to intervention group and 48 to control group.</p>                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Interventions</b> | <p><b>Intervention:</b> Web system allowed parents of children to send photos of the eczema area and a written description of the child's condition to the specialist. Specialist responds with treatment advice. Parents provided with software enabling them to use the secure messaging system. A digital camera was loaned to parents who did not own one.</p> <p><b>Control:</b> Received standard treatment without access to specialist care. Encouraged to seek treatment through traditional means such as GP visits and hospital care.</p> <p><b>Co-interventions:</b> Both groups took part in a 30 minute individual face-to-face educational session prior to the intervention - knowledge of atopic dermatitis and self-management skills were strengthened by instruction in eczema-related skin care from a specialist nurse.</p> |
| <b>Outcomes</b>      | <ul style="list-style-type: none"> <li>• Use of web consultations (during study period, unclear how measured).</li> <li>• Self management behaviour (via self-reported participant questionnaire)</li> <li>• Severity of eczema (assessed by physicians using the SCOring Atopic Dermatitis (SCORAD) tool).</li> <li>• Resource use (via self-reported participant questionnaire)</li> <li>• Parents absence from employment (via self-reported participant questionnaire).</li> </ul>                                                                                                                                                                                                                                                                                                                                                            |
|                      | Digenio 2009                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Study</b>         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Methods</b>       | <p><b>Study design:</b> Randomised controlled trial (described in study report as randomised 6 month open label study)</p> <p><b>Follow-up:</b> At 2, 4, 12 and 24 weeks.</p> <p><b>Recruitment:</b> Advertisements placed in the community</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

## Participants

**Description:** Community based persons fitting eligibility criteria.

**Setting:** 12 US research centres comprising mostly non-academic independent clinics that had experience running clinical trials with obese patients.

**Inclusion criteria:** Aged 25-60 years, body mass index of at least 30kg/m<sup>2</sup> but less than 40kg/m<sup>2</sup>. Eligible to receive sibutramine (per the US package insert), able to adhere to study procedures and having access to the Internet and email.

**Exclusion criteria:** Uncontrolled blood pressure ( $\geq 140/90$  mm Hg); type 1 or 2 diabetes; coronary heart disease; chronic congestive heart failure; stroke; substantial metabolic, hepatic or renal disease; current cancer or gastric bypass surgery. Lost 10% or more of initial weight in last 6 months, participated in a structured weight loss program or taken weight loss drugs. Women who are pregnant or breastfeeding.

**Other criteria:** Women of childbearing potential had to use adequate contraception.

**Number participating:** 437 potential participants screened, 376 assigned to the study and randomised. Assignment of participants to groups: HF-F2F = 74, LF-F2F = 76, HF-TEL = 76, HF-EMAIL = 74, SELF = 76. Detail on groups below.

## Interventions

**Intervention:** Lifestyle modification program with varying frequency and type of contact with a dietician. Five intervention groups: high frequency\* face-to-face counselling (HF-F2F). Low frequency<sup>§</sup> face-to-face counselling (LF-F2F). High frequency telephone counselling (HF-TEL). High frequency email counselling (HF-EMAIL). Lifestyle modification program but with no dietician contact (SELF).

\*High frequency = weekly dietician contact during first 3 months of study and every other week during the following 3 months. <sup>§</sup>Low frequency = monthly dietician contact.

### Co-interventions:

- All 5 groups received same drug treatment (sibutramine, 10mg/d) and a standardised lifestyle modification program for weight-loss that included a printed manual and access to a weight-loss website.
- All participants to adopt a 750 kcal/deficit diet with a minimum intake of 1000 kcal/d for women and 1200 kcal/d for men. Macronutrient composition of the diet consisted of 15% protein, 30% (or less) fat and 55% carbohydrate.
- Recommended walking as the primary method of physical activity. All participants given a pedometer and recommended increasing their number of steps per day by approximately 500 steps each week. Participants encouraged to build to a goal of 10,000 steps per day.
- Behavioural treatment strategies included goal setting, self-monitoring (including weekly weighing and completion of daily food intake and physical activity logs), stimulus control, enlisting the support of family and friends, use of problem-solving skills to overcome barriers, cognitive restructuring, and coping with slips and lapses.
- All participants received the same support materials, which were a lifestyle modification manual (both in print and

electronic format) and access to an interactive weight-loss Web site application. Participants were encouraged to log on to the Web site at least once a week

## Outcomes

Primary outcome:

- 6-month change in body weight (weighed at clinic)

Secondary outcomes:

- 6-month changes in waist circumference (measured at clinic)
- 6 month changes in lipid, glucose and insulin levels (fasting lipid, glucose, insulin levels); blood pressure (taken at clinic)
- 6 month changes in quality of life and weight related symptoms (measured using the Impact of Weight on Quality of Life-Lite (IWQOL-Lite) and the Weight-Related Symptoms Measure (WRSM)) (via self-reported participant questionnaire)
- Adherence to the intervention for the groups with dietician contacts (actual divided by expected contact)

Also included descriptively summarised data collected via website: frequency of logins, number of days logged.

## Notes

Research grant from Pfizer Global Research and Development, Groton, Connecticut. Potential financial conflicts of interest: all authors employed by Pfizer, all authors have stock ownership or options (other than mutual funds) in Pfizer.

Nineteen participants discontinued the study because of adverse events. Authors state 'none were serious or attributed to the intervention.' Event included: dizziness, headache, depression, palpitations, amnesia, insomnia, nausea, vomiting, chest pain. Authors state 'rate of occurrence similar amongst groups' and 'no changes of clinical significance in urinalysis, serum chemistry or hematologic test results.'

## Study

Katz 2003

## Methods

**Study design:** Cluster randomised controlled trial (described in study report as randomised controlled trial)

**Duration of study:** 11 months

**Recruitment:** Invited all practising physicians in the two participating clinics.

## Participants

**Description:** Physicians (faculty and resident) in internal medicine and family practice in primary care clinics.

**Setting:** Two university affiliated primary care clinics, Michigan, Mid-West America.

**Inclusion/exclusion criteria:** None.

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Interventions</b> | <p><b>Number participating:</b> physician sample consisting of 98 physicians (24 staff physicians, 74 resident physicians) randomised, 50 to intervention group, 48 to control group.</p> <p><b>Intervention:</b> EMAIL - Electronic messaging, advice and information link. System consists of an e-mail interface between patients and the health system. All emails automatically routed to a central resource account managed by a nurse navigator who routed messages within the account to appropriate staff. Physicians received copies of their messages but replied to only those requiring physician input, such as patient-specific health questions. Clinic staff entered the central account to receive and respond to messages not requiring physician input. Intervention physicians were encouraged to forward patient emails from their personal email accounts to the triage account, encouraged to ask patients to use their study-specific addresses in future correspondence and encouraged to give their patients a card during clinic visits with a study specific e-mail address on it and a description of the triage system and how to use it. Flyers were mailed to a random sample of 5,000 patients who had visited an intervention doctor in the prior 6 months of the study period or were scheduled to visit an intervention doctor during the study period. The flyers encouraged patients to e-mail their physician using the special email addresses and educated patients about appropriate content, response times, and message handling by the clinics.</p> <p><b>Control:</b> Physicians did not have access to the E-MAIL account.</p> |
| <b>Outcomes</b>      | <ul style="list-style-type: none"> <li>• Email volume (via physician self-report of all types of email)</li> <li>• Telephone call volume (via staff telephone logs)</li> <li>• Visit distribution (via medical centre information system)</li> <li>• Physician opinion on use of email with patients, attitudes towards the benefits of email, how much they are bothered by different types of patient email messages and satisfaction with patient and staff communication (via self-reported questionnaire).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Notes</b>         | <p>Study also featured an end of study patient satisfaction questionnaire, however this was not part of the randomised controlled trial. Participant groups for this survey (intervention and control) were derived from a random sample of 900 patients (450 who had seen an intervention physician one or more times and a control physician no more than once during the study period and 450 patients who has seen a control doctor one or more times during the study period and an intervention physician no more than one time during the study period). Therefore this data was not included in the review.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Study</b>         | Katz 2004                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Methods</b>       | <p><b>Study design:</b> Cluster randomised controlled trial (described in study report as randomised controlled trial).</p> <p><b>Duration of study:</b> 40 weeks.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Participants</b>  | <p><b>Recruitment:</b> Invited all practising physicians in the four participating clinics.</p> <p><b>Description:</b> Physicians (faculty and resident) in internal medicine and family practice in primary care clinics.</p> <p><b>Setting:</b> Four university affiliated primary care clinics, Michigan, Mid-West America.</p> <p><b>Inclusion/exclusion criteria:</b> None.</p> <p><b>Number participating:</b> Physician sample consisting of 132 physicians (41 faculty physicians, 91 resident physicians) randomised, 65 to intervention group, 67 to control group.</p>                                       |
| <b>Interventions</b> | <p><b>Intervention:</b> Secure web-based patient -provider communication tool to allow communication with clinic staff. Patients prompted through regular e-mail to enter the Website to read responses from the staff. Website contained educational content addressing appropriate message content, expected response times and message handling by clinic staff. Patients of intervention physicians were encouraged to use the Web system through promotion, including cards distributed by intervention physicians and brochures mailed to patient homes.</p>                                                      |
| <b>Outcomes</b>      | <p><b>Control:</b> Did not have access to the secure web-based patient -provider communication tool.</p> <ul style="list-style-type: none"> <li>• Number and type of web-messages (obtained from website)</li> <li>• Email volume (physician recall)</li> <li>• Telephone call volume by type of call and physician (via staff telephone logs)</li> <li>• Attitudes toward web and e-mail communication, preferences for different modes of communication and satisfaction with communication (via self-reported questionnaire).</li> </ul>                                                                             |
| <b>Notes</b>         | <p>Study also featured an end of study patient satisfaction questionnaire, however this was not part of the randomised controlled trial. Participant groups for this survey (intervention and control) were derived from a random sample of 900 patients (425 who had seen an intervention physician one or more times and a control physician no more than once during the study period and 425 patients who has seen a control doctor one or more times during the study period and an intervention physician no more than one time during the study period). Therefore this data was not included in the review.</p> |
| <b>Study</b>         | Kummervold 2004                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Methods</b>       | <p><b>Study design:</b> Randomised controlled trial</p> <p><b>Duration of intervention:</b> One year</p> <p><b>Recruitment:</b> Recruitment forms were handed out to all adults (18 and over) with a scheduled appointment to see the GP, in the primary clinic waiting room. Participants not recruited in this way were recruited via posters and flyers in the following month.</p>                                                                                                                                                                                                                                  |
| <b>Participants</b>  | <p><b>Description:</b> Patients at a general practice, Tromsø, Northern Norway.</p> <p><b>Setting:</b> Sentrum Legekontor, a general practitioners office in Tromsø, Northern Norway. It is a group practice with a City office</p>                                                                                                                                                                                                                                                                                                                                                                                     |



and two district practices a day a week.

**Inclusion criteria:** Must have access to the Internet and a personal mobile phone.

**Exclusion criteria:** None.

**Number participating:** 335 participants approached in the waiting room. 126 eligible and willing to participate. Further 75 recruited via posters/flyers. One excluded for medical reasons before randomisation. 200 participants entered the study. 100 participants randomised into the intervention group, 100 into the control group.

## Interventions

**Intervention:** PasientLink, an electronic messaging system for sending messages between doctors and patients. Patients use a web browser to log in and send patient-link (secure messaging system) messages to the doctor. Single email interface used to send messages to the doctor. No length/content restriction. Doctors alerted about new messages using a flashing icon on the computer desktop, messages automatically stored in the registry system. Patients notified by text message when doctor responds to their request.

**Control:** Standard care only.

## Outcomes

- Differences between groups in the number of telephone/visits to the doctors office (via system logs)
- Number of online consultations during study period for each patient (via system logs).
- Patients experiences of the scheme (self-administered patient questionnaire).
- Doctors experiences of the scheme (qualitative interview).
- Willingness to pay (WTP) for electronic GP contact (self-administered patient questionnaire).

## Notes

This study is reported across four publications (Kummervold 2004 & 2008, Bergmo 2005 & 2007). One of the publications was in Norwegian and a translation was obtained.

## Study

Lin 2005

## Methods

**Study design:** Randomised controlled trial.

**Duration of study:** Six months

**Recruitment:** Recruited via descriptive brochures, a poster and a research assistant in the practice waiting room and via additional brochures in the examination rooms. Two broadcast emails were sent to 6000 employees of the University of Colorado Health Science Centre. An article about the study was also distributed to 2000 employees in the hospital's newsletter.

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Participants</b>  | <p><b>Description:</b> Patients at an ambulatory internal medicine practice.</p> <p><b>Setting:</b> Academic ambulatory internal medicine practice affiliated with the University of Colorado Hospital, Denver, CO, USA.</p> <p><b>Inclusion criteria:</b> Patients at least 18 years old, English speaking and having experience using an Internet browser.</p> <p><b>Exclusion criteria:</b> None</p> <p><b>Number participating:</b> 7100 patients visited the clinic during the enrolment period; 606 patients were not randomised after completing the baseline questionnaire: 305 into the Intervention group, 301 into the control group.</p>                                                                                                                                                                                                                                        |
| <b>Interventions</b> | <p><b>Intervention:</b> 'My Doctor's Office', a patient portal allowing patients to request appointments, prescription refills, specialist referrals and send secure electronic messages to their physicians. Portal patients instructed to register a username and password for the patient portal.</p> <p><b>Control:</b> Usual care, and received access to a website providing general health advice. Received access to the portal after the study ended.</p> <p><b>Co-interventions:</b> All participants could contact the clinic by telephone at their discretion or for urgent messages. Both groups had access to the incoming telephone triage system (for both portal and control patients) via the Electronic Medical Record, and could use standard email to communicate with physicians. Broadcast emails were sent monthly during the study to patients in both groups.</p> |
| <b>Outcomes</b>      | <p>This intervention is multifaceted. Only the outcomes relating to the use of electronic messaging will be of relevance to this review, but all outcomes are outlined here.</p> <p>Primary outcomes:</p> <ul style="list-style-type: none"> <li>• Patient satisfaction with communication, overall care by the clinic, administrative requests (appointments, prescriptions, referrals) and clinical messaging (portal and telephone) with their physician (via self-administered patient questionnaire).</li> </ul> <p>Secondary outcomes:</p> <ul style="list-style-type: none"> <li>• Content and tally of messages (via portal tracking system, intervention group only).</li> <li>• Value to patients (via self-administered patient questionnaire).</li> </ul>                                                                                                                       |
| <b>Study</b>         | MacKinnon 1995                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Methods</b>       | <p><b>Study design:</b> Randomised controlled trial (described in study report as pretest-post-test control group design with random assignment)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

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| <b>Participants</b>  | <p><b>Duration of study:</b> Six months.</p> <p><b>Recruitment:</b> Subjects existing clients of the service and asked to participate (if eligible).</p> <p><b>Description:</b> Caregivers and children/young adults with physical disability attending a rehabilitation centre.</p> <p><b>Setting:</b> Augmentative Communication Service at Thames Valley Children's Centre. A rehabilitation centre for children and young adults with physical disabilities serving southwestern Ontario, Canada.</p> <p><b>Inclusion criteria:</b> Clients must have been involved with the augmentative communication service for at least 4 months, be physically able to use a computer and modem for written communication purposes as determined by clinic staff, have had a home computer system available for at least a 3-month period, and with a working knowledge of a word processing program. <b>Exclusion criteria:</b> None.</p> <p><b>Number participating:</b> Twenty-five individuals met the inclusion criteria, 17 (68%) agreed to participate. 17 participants were randomised, 8 to the intervention, 9 to the control. After assignment one individual dropped out of the intervention group due to technical difficulties, leaving 16 participants, 7 in the intervention group, 9 in the control group.</p> |
| <b>Interventions</b> | <p><b>Intervention:</b> Participants asked to make all of their contacts to the augmentative communication service by electronic mail via the disability information service of Canada (DISC) telecommunications system. A presentation oriented the subjects to the use of the electronic mail feature of the DISC telecommunications system. Each participant received a demonstration, a full DISC users manual and a set of reduced instructions for easy reference. A home installation visit was then conducted; operational aspects of using electronic mail were reviewed. Participants asked to make one independent contact to the augmentative communication service within 48 hours of the home installation. Study made use of the subjects' existing computer systems, which were prescribed through the Ontario government's funding system.</p> <p><b>Control:</b> Continued to contact the augmentative communication system in their usual manner: letter, telephone, and/or site visit and did not receive any equipment to access the service. Long distance calls were covered within the project's budget to ensure that the cost of contacting the service did not deter control subjects from initiating contact.</p>                                                                             |
| <b>Outcomes</b>      | <p>Primary outcomes:</p> <ul style="list-style-type: none"> <li>• Participant satisfaction with the augmentative communication service [including knowledge of and familiarity with computers and computer usage], (assessed via researcher administered questionnaire).</li> <li>• Overall number of contacts made (documented by staff using a specific form).</li> <li>• Number of independent contacts made (documented by staff using a specific form).</li> </ul> <p>Secondary outcomes:</p> <ul style="list-style-type: none"> <li>• Client and staff perceptions of the utility of the electronic mail service (assessed via questionnaire, intervention group only).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

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| <b>Study</b>         | Ross 2004                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Methods</b>       | <p><b>Study design:</b> Randomised controlled trial.</p> <p><b>Duration of study:</b> One year</p> <p><b>Recruitment:</b> Initial approach involved sending a recruitment letter explaining the study was sent to eligible patients. Secondary approach involved a research assistant approaching patients in the waiting room of the practice, asking them if they would be interested in reading their medical records online in the context of a study.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Participants</b>  | <p><b>Description:</b> Heart failure patients attending a speciality clinic.</p> <p><b>Setting:</b> Speciality clinic for heart failure, University of Colorado Hospital, US. Majority of patients in the practice have New York Heart Association Class II or Class III symptoms of heart failure.</p> <p><b>Inclusion criteria:</b> Being followed in the practice, speak English and 18 years of age or older. Participants needed to have used a web browser before.</p> <p><b>Exclusion criteria:</b> Physicians, nurses, physician assistants and nurse practitioners as not typical users.</p> <p><b>Number participating:</b> In total 394 patients were approached to participate, 312 received the mailing prior to the recruitment period and 82 presented to the clinic during the recruitment period without receiving the mailing. Of these, 287 declined access to online medical records, 144 returned the baseline survey before declining. In total 107 (27% of eligible) participants were randomised; 54 into the intervention group, 53 into the control group.</p> |
| <b>Interventions</b> | <p><b>Intervention:</b> SPPARO (System providing patients access to records online). Three components to SPPARO; medical record, educational guide and messaging system. Participants given user identification and password and a written user guide to the system. The messaging system allowed patients to exchange secure messages with the nursing staff in the practice.</p> <p><b>Control:</b> Patients in control group continued to receive standard care in the practice and were offered use of SPARRO after the study was completed as an incentive to participate.</p> <p><b>Co-interventions:</b> All participants will have seen the educational guide either online, or in printed form when they first attend the clinic. Periodic messages were sent by the research staff to all participants - they were informed about upcoming surveys and encouraged to contact the research assistant if they had a change of address or telephone number</p>                                                                                                                    |
| <b>Outcomes</b>      | <p>Not all outcomes were relevant to the review but are listed here for completeness.</p> <p>Primary outcome:</p> <ul style="list-style-type: none"> <li>• Self-efficacy (as assessed by the self-efficacy domain of the Kansas City Cardiomyopathy Questionnaire (KCCQ)).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

Other outcomes:

- Health status (as assessed by the KCCQ).
- Patient satisfaction with doctor-patient communication (as assessed using the Art of Medicine Questionnaire).
- Adherence to medications (assessed using the questions derived from).
- General adherence to medical regimens (assessed using the General Adherence Scale from the Medical Outcomes Study (MOS)).
- Mortality (from chart review, nursing staff and telephone and mail contact with the homes of patients throughout the study).
- Emergency department visits and hospitalisations at the University of Colorado Hospital (from chart review throughout the study period).

*Outcomes relevant to review:*

- Electronic messages and phone messages from participants (via SPARRO system and for phone via review of written medical record and staff logs)

**Notes**

This intervention is multifaceted. Only the outcomes relating to the use of secure messaging will be of relevance to this review.

**Study**

Stalberg 2008

**Methods**

**Study design:** Prospective randomised controlled clinical trial

**Duration of study:** rolling, with final outcome assessment administered following the first postoperative consultation of each patient.

**Recruitment:** All patients referred to single surgeon for thyroid or parathyroid surgery during the study were randomised into the study (those older than the age limits subsequently excluded).

**Participants**

**Description:** Patients referred for thyroid or parathyroid surgery.

**Setting:** Peri-operative surgical setting for head and neck surgery, tertiary referral centre, Australia

**Inclusion criteria:** Aged 18-65, able to access to the Internet at work as well as at home (authors link Internet access at work to being of working age and so exclude those people above retirement age).

**Exclusion criteria:** None.

## Interventions

**Number participating:** Patients randomised until number meeting inclusion criteria ( $\leq 65$  years of age) was 50 in intervention group and 50 in control group. Two participants in intervention group and one in the control group did not proceed to surgery leaving 48 in intervention group and 49 in control group.

**Intervention:** Participants were informed by the surgeon that e-mail was the preferred mode of communication and the surgeon's email address was at the top of the list of contact details given out.

**Control:** Participants did not receive the verbal statement about email being the preferred method of communication and were not given the email address in the list of contact details.

**Co-intervention:** All participants in the study received a standardised approach to information including a detailed discussion of the indications, risks and complications of thyroid/parathyroid surgery, a hand drawn diagram detailing the proposed procedure, copy of the Royal Australasian College of Surgeons brochure entitled "Patient Guide on Surgery of the Thyroid Gland and Parathyroid Glands". All participants were given a typed sheet entitled 'If you have further questions about your operation' which emphasised the need for participants to have any outstanding issues or questions addressed or explained before the date of surgery.

## Outcomes

- Numbers, age and sex distribution of patients using any form of communication with the surgeon in the perioperative period outside of the routine booked consultations (via patient files).
- Method of communication used (via patient files).
- Number of emails per patient, content of the emails, origin of the email (patient, relative etc) (emails printed out and placed in patient file).
- Patient satisfaction (via self-administered questionnaire given out post-operatively).

**Table 4: Risk of bias in included studies**

| Study       | Item                               | Judgement | Decision                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------|------------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bergmo 2009 | Adequate sequence generation?      | Yes       | Children were consecutively randomised into two groups, using the simple randomisation method with shuffled envelopes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|             | Allocation concealment?            | Yes       | Sealed envelopes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|             | Blinding?                          | No        | The dermatologist assessing the severity of eczema in participants was aware of group allocation. For all other outcomes investigators were blinded. This was confirmed by contact with the author.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|             | Incomplete outcome data addressed? | No        | <p>For measures of self management behaviour, resource use and parents absence from employment only 74% of participants responded to the post-intervention questionnaire and no information is given on non-responders.</p> <p>For severity of eczema: No information given on whether the SCORAD tool for measuring severity of eczema was completed for all participants and it is not possible to tell by looking at the results.</p> <p>Not possible to tell if an intention to treat analysis was carried out due to the way in which the results of the study are presented.</p>                                                                                                                                                                                 |
|             | Free of selective reporting?       | No        | <p>Results for the primary outcomes are presented as mean values for the whole sample before the intervention versus the whole sample at the end of the intervention rather than for intervention and control groups separately. It is not possible to see how many were in the intervention and control groups separately.</p> <p>Author contact confirmed that authors chose to present the data selectively '<i>We would have presented the results separately for the two groups in more detail if we had found an interaction effect (between group differences). But we did not.</i>'</p>                                                                                                                                                                        |
|             | Free of other bias?                | No        | <ul style="list-style-type: none"> <li>• Baseline comparability: Sample differed significantly by age of parents (<math>P=0.02</math>) (control parents older) and number of people living in urban areas (<math>P=0.006</math>) with more people in the control group living in urban areas. Otherwise comparable.</li> <li>• Validation of measures: SCORAD tool is validated.</li> <li>• Reliability of measures: Authors state that the lack of inter-rater reliability in the estimated SCORAD score is a limitation.</li> <li>• Selection bias: There was potential for selection bias as all study participants had Internet access, and they were recruited at outpatient clinics (authors discuss 'bias towards technology acceptance and a higher</li> </ul> |

|                     |                                    |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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|                     |                                    |     | frequency of health care visits than children with AD in general').<br>• Recall bias: questionnaires and data on resource use were self-reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Digenio 2009</b> | Adequate sequence generation?      | Yes | Assigned participants to 1 of 5 intervention groups using computer-generated randomisation schedule consisting of randomly permuted blocks. Block length was 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                     | Allocation concealment?            | Yes | Central telephone randomisation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                     | Blinding?                          | No  | Contact with author confirmed that dieticians, patients and investigators were not blinded. Study is described as 'open-label' because all participants were aware that they would receive the drug Sibutramine.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                     | Incomplete outcome data addressed? | No  | Participants excluded after randomisation are accounted for and reasons for exclusion provided. Number of participants not completing the study given along with reasons (111 (30%) did not complete; adverse events:19, defaulted (at their request or lost to follow up): 85, other: 7).<br><br>Results for all outcomes are presented in a table as having been calculated for the number of completers only. This is despite the authors describing a modified intention-to-treat analysis which included all randomly assigned participants who had a baseline measurement and at least 1 post baseline measurement of body weight. Additionally a sensitivity analysis was carried out using three imputation methods.<br><br>The denominator is not known for the post-hoc analysis of weight loss of at least 5% and 10%.                                                                                   |
|                     | Free of selective reporting?       | No  | There was the addition of an unspecified additional post-hoc analysis comparing the proportions of participants achieving 5% and 10% weight loss at 24 weeks.<br><br>Additionally the result for a comparison (Low Frequency F2F, SELF and EMAIL) is described in the text as being non-significant but a P-value is not presented in the results so this cannot be confirmed.<br><br>None of the website data (web utilisation, number of logins, number of days logged, steps per day and calories per day) were pre-specified in the study protocol. The published report stated that self-reported data collected through the website would be descriptively summarised (web utilisation, number of logins, number of days logged, steps per day (pedometer readings) and calories per day). However data for steps per day (pedometer readings) and calories per day are not presented in the results section. |



|                  |                                    |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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|                  | Free of other bias?                | No  | <ul style="list-style-type: none"> <li>Baseline comparability: Authors state that 'there were no differences of clinical or statistical significance in baseline characteristics among treatment groups' however no data is presented for a comparison.</li> <li>Validation of measures: IWQOL-Lite and the WRSB tool are validated.</li> <li>Reliability of measures: Patient-reported scales (IWQOL-Lite, WRSB) may be subject to reporting bias by patients. Body weight measurements were obtained using a calibrated scale with the same scale used at each site. No information given on reliability of biochemical measurements</li> <li>Lack of usual care control group: Five interventions were compared, but all groups received the drug sibutramine. This makes it difficult to separate the effects of the drug and intervention. The authors mention this in the discussion: 'lack of randomly assigned group without sibutramine does not allow us to properly separate the effect of the drug from the lifestyle intervention.'</li> </ul> |
|                  |                                    |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Katz 2003</b> | Adequate sequence generation?      | Yes | The study randomised by half-day clinic block; all of the physicians seeing patients during a certain half day window were randomised as a group to either the intervention or control group. A coin was flipped, assigning 'heads' to treatment, 'tails' to control.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                  | Allocation concealment?            | No  | Contact with the author confirmed that the study did not conceal the random allocation sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                  | Blinding?                          | No  | Contact with the author confirmed that staff and investigators were not blind to group assignment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                  | Incomplete outcome data addressed? | No  | An intention to treat analysis was not carried out.<br>Approximately 20% of physicians did not report patient email volume during waves of data collection and missing estimates were imputed to zero, thus remaining empty.<br>Response rate to the physician survey was high (90.8%) however no information was given on characteristics of non-responders.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                  | Free of selective reporting?       | No  | The authors present data on weekly email received by physicians in the intervention and control groups. For comparison between intervention and control groups the data is split into two comparisons; email received by resident physicians and email received by staff physicians. A comparison between groups for all types of physician was not carried out. Additionally whilst the total number of each type of physicians is known, the numbers of physicians in the intervention and control groups by physician type is not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

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|                  | Free of other bias?           | Unclear | <ul style="list-style-type: none"> <li>• Baseline comparability: Potential concerns with cluster randomised trials include baseline imbalances between the randomised groups with regard to individuals and groups. No significant differences were observed between the intervention and control groups at individual level however because the authors were not aware that they had carried out a cluster randomised trial they did not assess comparability at group level.</li> <li>• Validation of measures: It is unclear whether the utilisation variable created for analytical purposes was subject to any validation, despite the claim that volume of communication is highly correlated with the level of clinical activity of individual physicians.</li> <li>• Reliability of measures: Cronbach's alpha coefficient for internal consistency reliability is presented for the different scales used in the physician survey: 'email benefits scale', 7 items, <math>\alpha=0.87</math>, 'email bother scale', 8 items, <math>\alpha = 0.87</math>, 'general communication scale', 8 items, <math>\alpha = 0.95</math>. As a higher score means higher reliability, and a score of 0.7 is a recommended threshold for reliability, then the reliability of these scales is acceptable.</li> <li>• Recall and reporting bias: For baseline data physicians were asked to self report (recall) number of email messages received directly from patients in the previous 2 weeks. The physician survey was also self-administered. Information on phone call volume and type of call was collected from staff logs. All of these measures may be subject to some reporting unreliability.</li> <li>• Contamination: As there was no valid primary care patient roster the intervention system was promoted to patients who were likely to be those of intervention physicians but some may have been patients of control physicians. Both groups had access to standard email with their physician throughout the intervention. Independent of the study patients of intervention and control physicians could email their physicians by using the physician's personal email account available through physician's personal cards or by searching the medical centre directory.</li> </ul> |
| <b>Katz 2004</b> | Adequate sequence generation? | Yes     | The study randomised by half-day clinic block; all of the physicians seeing patients during a certain half day window were randomised as a group to either the intervention or control group. A coin was flipped, assigning 'heads' to treatment, 'tails' to control.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

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|--|------------------------------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Allocation concealment?            | No      | Contact with the author confirmed that the study did not conceal the random allocation sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|  | Blinding?                          | No      | Contact with the author confirmed that staff and investigators were not blind to group assignment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|  | Incomplete outcome data addressed? | No      | For email volume on average 91.7% of staff physicians responded versus 67.4% of residents. Missing estimates for residents were imputed to zero and authors stated that this was 'because feedback suggested that these residents had low email use with patients'<br>An intention to treat analysis was not carried out.<br>Response rate to the physician survey was 71.2%, however no information was given on characteristics of non-responders.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|  | Free of selective reporting?       | Yes     | Results reported as per the intended outcomes and as outlined in the statistical methods. No published protocol.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|  | Free of other bias?                | Unclear | <ul style="list-style-type: none"> <li>• Baseline comparability: Potential concerns with cluster randomised trials include baseline imbalances between the randomised groups, with regard to individuals and groups. No significant differences were observed between the intervention and control groups at individual level for the demographic data that is presented (faculty physicians, female sex and mean number of scheduled visits per week) however because the authors were not aware that they had carried out a cluster randomised trial they did not assess comparability at group level.</li> <li>• Validation of measures: It is unclear whether the utilisation variable created for analytical purposes was subject to any validation, despite the claim that volume of communication is highly correlated with the level of clinical activity of individual physicians.</li> <li>• Reliability of measures: Cronbach's alpha coefficient for internal consistency reliability is presented for the different scales used in the physician survey: 'web benefits scale' 4 items, <math>\alpha=.88</math>, general communication scale, 4 items, <math>\alpha = .82</math>. As a higher score means higher reliability, and a score of 0.7 is a recommended threshold for reliability, then the reliability of these scales is acceptable.</li> <li>• Recall and reporting bias: for email volume physicians were asked to recall the number of email messages received directly from patients during the previous week. The physician survey was also self-administered. Information on phone call volume and type of call was collected from staff logs. All of these measures may be subject to some reporting unreliability.</li> </ul> |
|  |                                    |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

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| <b>Kummervold 2004</b> | Adequate sequence generation?      | Yes | A stratified sample was used to ensure equal distribution of males/females and those aged over 60 in the two groups. Participants separated into three groups; more than 60 years, women less than 60, men less than 60. Each group then centrally randomised into two groups and one randomly chosen to be the intervention group. Randomisation by drawing of lots.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                        | Allocation concealment?            | No  | Drew lots and looked up the numbers from the participation list.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                        | Blinding?                          | No  | Authors state that blinding 'was not included in the project, but would not have been impossible to accomplish' <sup>254</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                        | Incomplete outcome data addressed? | No  | An intention to treat analysis was not carried out (although only one participant withdrew post randomisation).<br>Questionnaire: response rate 73% for the intervention group, and 93% for the control group ( 83% of participants in total). Analysis was based on those who completed the survey and non-responders were not accounted for. Willingness to pay element of questionnaire: response rate 68% for the intervention group and 84% for the control group. Analysis was based on those who completed the survey and non-responders were not accounted for.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                        | Free of selective reporting?       | Yes | Results reported as per the intended outcomes and as outlined in the statistical methods. No published protocol.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                        | Free of other bias?                | No  | <ul style="list-style-type: none"> <li>• Baseline comparability: A comparison of demographic characteristics is presented and the authors state that there are no significant differences between intervention and control groups for demographic variables however no data for a comparison is presented.</li> <li>• Validation of measures: No information given on whether the questionnaire was validated as a tool.</li> <li>• Reliability of measures: Questionnaire self-reported with open-ended questions which can introduce bias. Performance bias is a potential problem, authors acknowledge this: 'the staff at the practice might have registered clinical activity more conscientiously during the second year of the data collection period than the first due to our intervention'. For the WTP element of the questionnaire the authors eliminated a series of what they describe as 'protest' zeros, but these were determined as 'protest' zeros according to the authors opinion.</li> <li>• Selection bias - all patients had access to the Internet and mobile phones and expressed an interest in participating in electronic communication with their doctor - this would not be representative of the general population and such participants may be more sympathetic to the intervention. The GP surgery used was chosen because physicians were positive towards receiving electronic messages from their patients.</li> </ul> |

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|-----------------|------------------------------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lin 2005</b> | Adequate sequence generation?      | No  | A predetermined randomisation scheme developed using a statistical software package, with equal numbers of portal and control participants in blocks of 10. Patients consecutively assigned to intervention or control groups by a research assistant.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                 | Allocation concealment?            | No  | Contact with the author confirmed that the study did not conceal the random allocation sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                 | Blinding?                          | Yes | The research assistant conducted the randomisation process and the principal investigators did not see the list of patient group assignments.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                 | Incomplete outcome data addressed? | No  | <p>An intention to treat analysis was not carried out.</p> <p>Throughout the study those who had an invalid email address were 'disenrolled from the study' but no numbers are presented in the report. However the numbers of participants lost to follow up in each group are comparable (I: 42, 14% C: 46, 15%).</p> <p>Response rate to the follow-up questionnaire was: I: 67%, C: 65%. Authors compared overall satisfaction with care on the baseline survey between participants who completed the study and those who did not (lost to follow up plus those who did not complete final survey). Those not completing were less satisfied on the baseline survey, and this difference was significant. This difference was not adjusted for in the analysis and may have biased the final overall result.</p>                                                                                                                                                                                                                                                                                  |
|                 | Free of selective reporting?       | No  | <p>The addition of an intervention 'non-user' group to the patient satisfaction outcome as part of the analysis was not pre-specified.</p> <p>There were discrepancies in the data. Different values were presented for participants in the intervention group between the study flow chart and the text. The study flow chart reports the number of returned follow up questionnaires as 175, and the number of participants giving consent to view their record as 149. In the text this is reported as returned follow up questionnaire 174, consent to view record 148. In the text, under the heading 'qualitative content analysis of administrative requests and clinical messaging' it is stated that only 95 patients used the portal, and according to table 2 there were 98 non-portal users in the portal group. Combined this is 193 participants, yet the portal group comprises 175 participants. It was not possible to clarify these discrepancies as the corresponding author stated that they no longer have access to the primary data to confirm the accuracy of the numbers.</p> |

|  |                     |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--|---------------------|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  |                     |    | <p>Where 'type of message' is examined, it is between two groups; clinical phone messages and clinical portal messages. This is a subgroup analysis based on participants who returned the follow-up questionnaire and consented for investigators to review their medical record and who had a completed clinical message exchange (as defined by the study investigators). It constitutes only around half of the originally randomised participants in each group and no information is given on these participants, nor how they compare to those not responding to the follow up questionnaire, those not consenting, and those not fulfilling the definition of completed clinical message exchange. The assessment of clinical messages only completed clinical messages are included and those encompassing routine prescription refills, appointment requests and referral requests are excluded.</p> <p>For the value to patients outcome, data is presented for the whole sample and not by group (portal versus control). The corresponding author stated that this was a 'peripheral part of our study and we elected not to break apart the responses for portal versus control. Most responses were "ZERO" and those who were willing to pay varied from a few pennies to \$25, and it did not appear to be different between groups.'</p>   |
|  | Free of other bias? | No | <ul style="list-style-type: none"> <li>• Baseline comparability: there were no significant differences between the intervention and control group with regard to age, gender, education and income.</li> <li>• Validation of measures: The patient satisfaction survey was adapted from prior instruments by the investigators. References given to prior instrument in two studies. The surveys were piloted in non study patients. Where clinical messages were divided into categories, categories were from a previously published validated taxonomy of clinical requests, however the author added categories for the purpose of the study.</li> <li>• Reliability of measures: Survey was piloted first which increases potential reliability. The patient satisfaction questionnaire was self-administered and used Likert scales, these are subjective measures. The questionnaire was carried out online and it is not clear whether the control group definitely have access to the Internet.</li> <li>• Contamination: the authors state in the discussion ' control group patients who continued emailing their physician may have diluted the difference between groups'</li> <li>• Participant bias: A third of participants were employees of the Hospital and 70% were college graduates .Being an employee of the hospital may</li> </ul> |

|                       |                                    |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------|------------------------------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                       |                                    |         | influence the way the participant approaches use of the service and the way in which they answer the questionnaire, since they may wish to please the researchers introducing bias into the answers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>MacKinnon 1995</b> | Adequate sequence generation?      | Yes     | Individuals randomly assigned to the experimental or control groups using the drawing of lots.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                       | Allocation concealment?            | Unclear | No information is given in the report on the nature of concealment and upon contact authors unable to confirm whether allocation was concealed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                       | Blinding?                          | No      | Staff responding to messages were not blinded to the allocation and they were responsible for completing data collection on number of contacts made.<br><br>The pre-study satisfaction questionnaire was administered to all subjects by a research assistant not associated with the service. The authors state that 'for procedural reasons subjects were aware of their random assignment to condition at the time that they completed the first satisfaction questionnaire.'                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                       | Incomplete outcome data addressed? | No      | An intention to treat analysis is not carried out .One intervention participant dropped out post randomisation and a reason is given.<br><br>The method of contact for independent contacts in the intervention group was recorded only for 24 of 32 contacts. Authors confirmed via contact that this omission was because clinicians did not specify this information on the contact forms they were required to complete.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                       | Free of selective reporting?       | Yes     | Results reported as per the intended outcomes and as outlined in the statistical methods. No published protocols.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                       | Free of other bias?                | No      | <ul style="list-style-type: none"> <li>• Baseline comparability: Investigators measured receptive vocabulary (measured at baseline using Peabody Picture Vocabulary Test-Revised (PPVT-R)) and there was no significant difference between the two groups in their mean age equivalence scores.</li> <li>• Validity of measures: PPVT-R is a validated questionnaire. Seven references are provided on its use and adaptation for non-speakers (of which there are 5 in the study).</li> <li>• Reliability of measures: The baseline PPVT-R was administered face-to-face by a qualified speech/language pathologist. The patient satisfaction questionnaire was administered to all subjects by a research assistant not associated with the augmentative communication service. The satisfaction questionnaires were carried out either face-to-face or over telephone. The different delivery methods may have led to differing responses. Number of contacts data relies on self-report by staff (contact forms) and this</li> </ul> |

|                  |                                    |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------|------------------------------------|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  |                                    |     | <p>introduces a risk of bias, especially given that staff were not blind to group allocation.</p> <ul style="list-style-type: none"> <li>Other: During the fifth month of the study the network agency (DISC) made a major change to their computer system and directions for usage had to be reissued. Some participant computers required technical/software changes. In the results the authors saw a drop in the number of independent contacts by the intervention group at the point where DISC changed the system set up and organisation. They speculate that without this interruption which involved orientation and system set up, 'a plateau might have been seen in the number of independent contacts by the experimental group as was the case for the number of contacts. Authors also state that 'the unforeseen technical problems likely affected subjects' attitudes towards electronic mail and its potential use, and may have affected the primary outcome of interest.' These unforeseen problems may feasibly have affected the effect size.</li> </ul> |
| <b>Ross 2004</b> | Adequate sequence generation?      | Yes | As initial questionnaires were received a predefined computer-generated randomisation scheme consecutively assigned identification numbers linked to either the intervention or control group. Randomisation was restricted so that equal numbers of patients were assigned to the intervention and control groups in blocks of 10.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                  | Allocation concealment?            | Yes | Sequential sealed envelopes were used.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                  | Blinding?                          | Yes | <p>Investigators were blind to group allocation.</p> <p>Participants were blind to group allocation when they completed the baseline questionnaire</p> <p>Staff administering the service were blind to group allocation: 'physicians and practice staff not told which patients were enrolled into the study. They could become aware of a patient's enrolment status, however, if a patient directly mentioned using it, or if a patient sent an electronic message using SPPARO.'</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                  | Incomplete outcome data addressed? | Yes | <p>Participant attrition is acknowledged and reasons for drop-outs are given.</p> <p>An intention to treat analysis is not carried out, however statistical methods are used to account for missing participants in the analysis for the scored questionnaire items (repeated measures analysis) across all outcomes. Repeated measures analysis involved using baseline data for censored individuals and using</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |



|                      |                               |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------|-------------------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                      |                               |     | observations from uncensored individuals to provide an estimate. This implicitly assumed that the associations observed among the baseline, 6-month, and 12-month measures in the uncensored subjects would have been observed in the censored subjects.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                      | Free of selective reporting?  | No  | <p>Figure 4 presents data graphically, with a P value for a significant difference between groups presented in the text. Numerical data upon which the comparison is carried out (intervention versus control) are not presented.</p> <p>Data for the number of total messages per patient was presented for the whole intervention period and also for the first six months and second six months of the intervention period separately. This was not pre-specified.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                      | Free of other bias?           | Yes | <ul style="list-style-type: none"> <li>• Baseline comparability: Baseline demographic statistics are presented for both intervention and control groups, but then the overall sample is compared statistically to the decliners group and not intervention versus control. The authors state in the results that 'at baseline, the intervention and control groups did not differ in their socio-economic characteristics, or in their health status as assessed by the KCCQ symptom score.'</li> <li>• Validity of measures: The KCCQ, Art of Medicine questionnaire, Morisky and MOS tools are validated instruments. No information given on how messages were categorised or how the categories were devised.</li> <li>• Reliability of measures: Phone messages were tracked by asking nurses to keep logs and by referring to medical record. This may introduce some unreliability. All questionnaires were self-administered which may introduce recall bias.</li> <li>• Generalisability: study investigators identified 288 patients who did not enrol in the primary study and of these 144 completed a 'decliners survey'. There was found to be no difference in socioeconomic characteristics and health status assessed by the KCCQ symptom score between decliners and participants. Therefore the study population is a good representation of the practice population.</li> </ul> |
| <b>Stalberg 2008</b> | Adequate sequence generation? | Yes | Sealed envelopes used but authors did not specify how the sequence was generated. Envelopes were handed out to every patient at consultation and after exclusion of patients based on age limits, randomisation was terminated when 50 patients had been acquired in each group'                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                      | Allocation concealment?       | Yes | Envelopes opened by the surgeon at the time of consultation after the provision of information session with the participant.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

|  |                                    |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--|------------------------------------|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Blinding?                          | No | Investigators were not blind to the group assignment of participants. Investigators had access to the patient notes which contained the randomisation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|  | Incomplete outcome data addressed? | No | <p>An intention to treat analysis was carried out for all outcomes other than patient satisfaction.</p> <p>An intention to treat analysis could not be carried out on the patient satisfaction outcome as the patients not proceeding to surgery did not complete the post-operative questionnaire. Additionally, the response rate to the questionnaire was 76% (I: 77%, C: 76%) and there is no exploration of non-responders.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|  | Free of selective reporting?       | No | For participants using fax and telephone to contact the surgeon, the authors only present values for the whole group and not split by intervention and control groups. This means it is not possible to see if they differed between groups, nor is it possible to examine them in relation to the results for email use. The authors no longer have the data and so could not provide it.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|  | Free of other bias?                | No | <ul style="list-style-type: none"> <li>• Baseline comparability: no statistically significant difference between the two groups with respect to either age distribution or sex distribution.</li> <li>• Validation of measures: the patient satisfaction questionnaire was not a validated instrument.</li> <li>• Reliability of measures: both response and recall bias are possible with a self-completed patient questionnaire. Other outcomes measured via collation of emails from each participant. Authors use age as a proxy for Internet access at work which may exclude those aged over 65 and still working. No rationale is given for why both work and home Internet access was required for participation; it will have lead to exclusion of participants according to their employment status.</li> <li>• Contamination: Study states that control participants would still have had access to the surgeon's email address, which was available on the appointment card as well as on the Australian Endocrine Surgeons Web site, although attention was not specifically drawn to it.</li> </ul> |

**Table 5. Email as additional method of communication compared to standard methods: primary outcomes: patient**

| Outcome                                    |                                                                                                                          | Study                                                    | Intervention  | Control       | Comparison                              |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|---------------|---------------|-----------------------------------------|
| <b>Patient understanding</b>               | How did communication with the surgeon affect your understanding of postoperative instructions? Median scale score (1-7) | Stalberg 2008<br><br>(Intervention, n=37, Control, n=37) | 7             | 7             | >.99                                    |
|                                            |                                                                                                                          |                                                          |               |               |                                         |
| <b>Patient health status and wellbeing</b> | How did communication with the surgeon affect your anxiety level on the day of the operation? Median scale score (1-7)   | Stalberg 2008<br><br>(Intervention, n=37, Control, n=37) | 4             | 5             | P=0.33                                  |
|                                            | SCORAD score                                                                                                             | Bergmo 2009<br><br>(Intervention, n=37, Control, n=36)   | Not presented | Not presented | P=0.55 (for interaction between groups) |
|                                            |                                                                                                                          |                                                          |               |               |                                         |
| <b>Patient/caregiver views</b>             | Questions and concerns addressed in a satisfactory manner? Median scale score (1-7)                                      | Stalberg 2008<br><br>(Intervention, n=37, Control, n=37) | 7             | 7             | P=0.69                                  |

|                                   |                                                                                                                                                              |                                                      |          |          |                |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|----------|----------|----------------|
|                                   | How did communication with the surgeon affect your sense of preparedness for the operation? Median scale score (1-7)                                         | Stalberg 2008<br>(Intervention, n=37, Control, n=37) | 7        | 7        | P=0.47         |
|                                   | How did communication with the surgeon affect your sense that the surgeon was available to deal with any problems that might arise? Median scale score (1-7) | Stalberg 2008<br>(Intervention, n=37, Control, n=37) | 6        | 7        | P=0.26         |
|                                   | Requests and questions dealt with in a timely manner; mean satisfaction rating at 6 months                                                                   | MacKinnon 1995<br>(Intervention, n=7, Control, n=9)  | 4        | 3.3      | Not calculated |
|                                   | Problems dealt with adequately; mean satisfaction rating at 6 months                                                                                         | MacKinnon 1995<br>(Intervention, n=7, Control, n=9)  | 4.3      | 3.3      | Not calculated |
|                                   |                                                                                                                                                              |                                                      |          |          |                |
| <b>Patient behaviours/actions</b> | Use the internet to find information about your disease? % and                                                                                               | Stalberg 2008<br>(Intervention, n=37,                | 70% (26) | 67% (25) | P=0.40         |

|  |                                                                                                                                                 |                                                      |               |               |                                         |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|---------------|---------------|-----------------------------------------|
|  | total number                                                                                                                                    | Control, n=37)                                       |               |               |                                         |
|  | Used internet to find information about where to seek treatment % and total number                                                              | Stalberg 2008<br>(Intervention, n=37, Control, n=37) | 5% (2)        | 8% (3)        | P=0.34                                  |
|  | How did communication with the surgeon affect your ability to make appropriate work/family arrangements for operation. Median scale score (1-7) | Stalberg 2008<br>(Intervention, n=37, Control, n=37) | 7             | 6             | P=0.21                                  |
|  | Mean number of skin care treatments per week performed by parents                                                                               | Bergmo 2009<br>(Intervention, n=37, Control, n=36)   | Not presented | Not presented | P=0.48 (for interaction between groups) |
|  | Family costs during intervention period                                                                                                         | Bergmo 2009<br>(Intervention, n=37, Control, n=36)   | Not presented | Not presented | P=0.74                                  |
|  | Parental loss of employment during intervention period                                                                                          | Bergmo 2009<br>(Intervention, n=37, Control, n=36)   | Not presented | Not presented | P=0.45                                  |

**Table 6. Email as additional method of communication compared to standard methods: primary outcomes: health service (patient participants)**

| Outcome                                    |                                                                                          | Study                                                   | Intervention                              | Control                                   | Comparison |
|--------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------|-------------------------------------------|-------------------------------------------|------------|
| <b>Resource use (patient participants)</b> | Visits to complementary therapist: reduction in visits.                                  | Bergmo 2009<br>(Intervention, n=37, Control, n=36)      | 0.8                                       | 0.09                                      | P=0.09     |
|                                            | Resource use during intervention period                                                  | Bergmo 2009<br>(Intervention, n=37, Control, n=36)      | Not presented                             | Not presented                             | P=0.64     |
|                                            | Mean number of contacts to GP and front office during study period: change from baseline | Kummervold 2004<br>(Intervention, n=74, Control, n=92)  | Mean 3.19, SD 1.79<br>(95% CI: 2.44-3.94) | Mean 4.45, SD 2.11<br>(95% CI: 3.60-5.29) | P = 0.032  |
|                                            | Change from baseline: office visits per patient per year                                 | Kummervold 2004<br>(Intervention, n=99, Control, n=100) | Median -1 [-3 to 0]                       | Median -1 [-2 to 1.75]                    | P=0.034    |
|                                            | Change from baseline: phone consultation per patient per year                            | Kummervold 2004<br>(Intervention, n=99, Control, n=100) | Median 0 [-2 to 1]                        | Median 0 [-1 to 2]                        | P=0.258    |

**Table 7. Email as additional method of communication compared to standard methods: primary outcomes: health service (physician participants)**

|                                                      |                                                                                                                                           |                                                         |      |      |                                                                                                                |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|------|------|----------------------------------------------------------------------------------------------------------------|
| <b>Resource use<br/>(physician<br/>participants)</b> | Email rates for both<br>intervention and non<br>intervention email (per<br>100 average weekly<br>scheduled visits over 5<br>time periods) | Katz 2003<br><br>(Intervention, n=50,<br>Control, n=48) | 9    | 6.4  | Incident rate ratio 3.6<br>[95% CI 2.1-6.2]<br>(controlling for<br>physician type and<br>clinic)<br><br>P<.001 |
|                                                      |                                                                                                                                           |                                                         | 23.7 | 7.4  |                                                                                                                |
|                                                      |                                                                                                                                           |                                                         | 49.8 | 9    |                                                                                                                |
|                                                      |                                                                                                                                           |                                                         | 29   | 8    |                                                                                                                |
|                                                      |                                                                                                                                           |                                                         | 27   | 10.4 |                                                                                                                |
|                                                      | Email rates for non-<br>intervention email only<br>(per 100 average<br>weekly scheduled visits<br>over 5 time periods)                    | Katz 2004<br><br>(Intervention, n=48,<br>Control, n=46) | 11.5 | 10.2 | P=0.09<br>(controlling for<br>physician type and<br>clinic)                                                    |
|                                                      |                                                                                                                                           |                                                         | 13.7 | 10.4 |                                                                                                                |
|                                                      |                                                                                                                                           |                                                         | 11.3 | 12.5 |                                                                                                                |
|                                                      |                                                                                                                                           |                                                         | 12.8 | 11.2 |                                                                                                                |
|                                                      |                                                                                                                                           |                                                         | 13.7 | 12.2 |                                                                                                                |

|  |                                                         |                                                  |      |      |                                                                                                                      |
|--|---------------------------------------------------------|--------------------------------------------------|------|------|----------------------------------------------------------------------------------------------------------------------|
|  | Phone rates (per 100 average weekly scheduled visits)   | Katz 2003<br>(Intervention, n=50, Control, n=48) | 59.2 | 60.1 | Incident rate ratio 1.2 [95% CI 0.9-1.4] (adjusted for differences in trends between intervention and control group) |
|  |                                                         |                                                  | 61.2 | 55.2 |                                                                                                                      |
|  |                                                         |                                                  | 67   | 55.5 |                                                                                                                      |
|  |                                                         |                                                  | 70.5 | 58.9 |                                                                                                                      |
|  |                                                         |                                                  | 75.2 | 70   |                                                                                                                      |
|  |                                                         | Katz 2004<br>(Intervention, n=48, Control, n=46) | 71.2 | 80.5 | P=0.18 (controlling for physician type and clinic)                                                                   |
|  |                                                         |                                                  | 74.6 | 87.8 |                                                                                                                      |
|  |                                                         |                                                  | 79.8 | 81.7 |                                                                                                                      |
|  |                                                         |                                                  | 81.6 | 84.5 |                                                                                                                      |
|  |                                                         |                                                  | 63.7 | 70.6 |                                                                                                                      |
|  | No-show rates (per 100 average weekly scheduled visits) | Katz 2003<br>(Intervention, n=50, Control, n=48) | 10.2 | 10.2 | Incident rate ratio 1.2 [95% CI 0.9-1.6](adjusted for differences in trends between intervention and control group)  |



|  |                                              |                                                     |      |      |        |
|--|----------------------------------------------|-----------------------------------------------------|------|------|--------|
|  |                                              |                                                     | 11.4 | 10   |        |
|  |                                              |                                                     | 12.4 | 12   |        |
|  |                                              |                                                     | 11.6 | 9.7  |        |
|  |                                              |                                                     | 12.2 | 11.5 |        |
|  | Weekly emails received                       | Katz 2003<br>(Intervention, n=50,<br>Control, n=48) |      |      |        |
|  | Weekly emails received<br>- residents        | (74 resident physicians)                            | 2.1  | 0.5  | P<.001 |
|  | Weekly emails received<br>- staff physicians | (24 staff physicians)                               | 12.3 | 5.5  | P<.001 |

**Table 8. Email as additional method of communication compared to standard methods: secondary outcomes: health professional**

| Outcome                                |                                                                                                  | Study                                          | Intervention  | Control       | Comparison                                                |
|----------------------------------------|--------------------------------------------------------------------------------------------------|------------------------------------------------|---------------|---------------|-----------------------------------------------------------|
| <b>Health professional perceptions</b> | Email benefits scale (range of scale -14 to 14)                                                  | Katz 2003<br>(Intervention n=43, Control n=46) | 6.3           | 3.1           | P=0.12<br><br>(controlling for physician type and clinic) |
|                                        | Email bother scale (range of scale 8 – 24)                                                       | Katz 2003<br>(Intervention n=43, Control n=46) | 12.1          | 15.3          | P=0.03<br><br>(controlling for physician type and clinic) |
|                                        | Perception that email is a good way for patients to reach me % agreement                         | Katz 2003<br>(Intervention n=43, Control n=46) | Not presented | Not presented | P=0.19                                                    |
|                                        | I like using email to communicate with my patients % agreement                                   | Katz 2003<br>(Intervention n=43, Control n=46) | 59.1% (25)    | 35.5% (16)    | P=0.11                                                    |
|                                        | Perception that email is a good way to answer patients' non-urgent medical questions % agreement | Katz 2003<br>(Intervention n=43, Control n=46) | 81.8% (35)    | 61.4% (28)    | P=0.06                                                    |
|                                        | Perception that email is helpful for handling patients' administrative concerns % agreement      | Katz 2003<br>(Intervention n=43, Control n=46) | 86% (37)      | 58% (27)      | P=0.05                                                    |

|  |                                                                                                    |                                                |               |               |        |
|--|----------------------------------------------------------------------------------------------------|------------------------------------------------|---------------|---------------|--------|
|  | Perception that email is a good way to follow up with patients after their appointment % agreement | Katz 2003<br>(Intervention n=43, Control n=46) | Not presented | Not presented | P=0.46 |
|  | I don't mind if patients email me % agreement                                                      | Katz 2003<br>(Intervention n=43, Control n=46) | Not presented | Not presented | P=0.12 |
|  | Perception that email has the potential to improve the doctor-patient relationship % agreement     | Katz 2003<br>(Intervention n=43, Control n=46) | Not presented | Not presented | P=0.31 |
|  | How much of a problem are emails from patients who haven't seen you in a long time? % bother       | Katz 2003<br>(Intervention n=43, Control n=46) | 7.1% (3)      | 28.6% (12)    | P<0.1  |
|  | How much of a problem are emails with incomplete information? % bother                             | Katz 2003<br>(Intervention n=43, Control n=46) | 10% (4)       | Not presented | P=0.11 |
|  | How much of a problem are emails about complicated medical problems? % bother                      | Katz 2003<br>(Intervention n=43, Control n=46) | Not presented | Not presented | P=0.21 |

|  |                                                                                                         |                                                  |               |               |                                                            |
|--|---------------------------------------------------------------------------------------------------------|--------------------------------------------------|---------------|---------------|------------------------------------------------------------|
|  | How much of a problem are emails with multiple requests? % bother                                       | Katz 2003<br>(Intervention n=43, Control n=46)   | Not presented | Not presented | P=0.26                                                     |
|  | How much of a problem are emails that are unrelated to health? % bother                                 | Katz 2003<br>(Intervention n=43, Control n=46)   | Not presented | Not presented | P=0.41                                                     |
|  | How much of a problem are emails about sensitive medical problems? % bother                             | Katz 2003<br>(Intervention n=43, Control n=46)   | Not presented | Not presented | P=0.43                                                     |
|  | Web benefits scale (higher score indicates more benefits)                                               | Katz 2004<br>(Intervention, n=48, Control, n=46) | 4             | 1.1           | P=0.008<br><br>(Controlling for physician type and clinic) |
|  | Physicians web benefits scale: would encourage my patients to use web % agree/strongly agree            | Katz 2004<br>(Intervention, n=48, Control, n=46) | 63.4% (30)    | 39.2% (18)    | P=0.6                                                      |
|  | Physicians web benefits scale -would be a good way for my patients to contact me % agree/strongly agree | Katz 2004<br>(Intervention, n=48, Control, n=46) | 56.3% (27)    | 41.3% (42)    | P=0.04                                                     |

|  |                                                                                                              |                                                  |            |            |        |
|--|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------|------------|------------|--------|
|  | Physicians web benefits scale - would be a good way to follow up after an appointment % agree/strongly agree | Katz 2004<br>(Intervention, n=48, Control, n=46) | 77.1% (37) | 52.2% (24) | P=0.01 |
|  | Physicians web benefits scale - would like to use web to communicate with patients % agree/strongly agree    | Katz 2004<br>(Intervention, n=48, Control, n=46) | 62.3% (30) | 39.4% (18) | P=0.03 |
|  | Patient communication outside of clinic visits % satisfied                                                   | Katz 2003<br>(Intervention n=43, Control n=46)   | 44.7% (19) | 37.9% (16) | P=0.25 |
|  |                                                                                                              | Katz 2004<br>(Intervention, n=48, Control, n=46) | 41.7% (30) | 47.9 (22)  | P=0.35 |
|  | General Communication Scale (Katz 2003, range of scale -16 to 16, Katz 2004, range not known)                | Katz 2003<br>(Intervention n=43, Control n=46)   | 7.6        | 7.9        | P=0.63 |
|  |                                                                                                              | Katz 2004<br>(Intervention, n=48, Control, n=46) | 1.6        | 1.9        | P=0.58 |

**Table 9. Email as additional method of communication compared to standard methods: secondary outcomes: patient**

| Outcome                                             |                                                                                       | Study                                             | Intervention | Control  | Comparison     |
|-----------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------|--------------|----------|----------------|
| <b>Effect on patient-professional communication</b> | Communicating non-urgent messages to doctor and/or nurse rated as excellent/very good | Lin 2005<br>(Intervention, n=141, Control, n=137) | 55% (77)     | 31% (43) | P<.001         |
|                                                     | Communicating non-urgent messages to doctor and/or nurse rated as excellent           | Lin 2005<br>(Intervention, n=141, Control, n=137) | 29% (41)     | 9% (12)  | Not calculated |
|                                                     | Communicating non-urgent messages to doctor and/or nurse rated as very good           | Lin 2005<br>(Intervention, n=141, Control, n=137) | 26% (36)     | 23% (31) | Not calculated |
|                                                     | Communicating non-urgent messages to doctor and/or nurse rated as good                | Lin 2005<br>(Intervention, n=141, Control, n=137) | 19% (27)     | 27% (37) | Not calculated |
|                                                     | Communicating non-urgent messages to doctor and/or nurse rated as fair                | Lin 2005<br>(Intervention, n=141, Control, n=137) | 18% (26)     | 28% (39) | Not calculated |
|                                                     | Communicating non-urgent messages to doctor and/or nurse rated as poor                | Lin 2005<br>(Intervention, n=141, Control, n=137) | 8% (11)      | 13% (18) | Not calculated |

|                           |                                                                                                  |                                                        |                    |                   |          |
|---------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------|--------------------|-------------------|----------|
|                           |                                                                                                  |                                                        |                    |                   |          |
|                           | How effective was the communication with your surgeon prior to surgery? Median scale score (1-7) | Stalberg 2008<br>(Intervention, n=37, Control, n=37)   | 7                  | 7                 | P=0.26   |
|                           | How effective was the communication with your surgeon after surgery? Median scale score (1-7)    | Stalberg 2008<br>(Intervention, n=37, Control, n=37)   | 6                  | 6                 | P=0.71   |
|                           | Overall, how effective was the communication with your surgeon? Median scale score (1-7)         | Stalberg 2008<br>(Intervention, n=37, Control, n=37)   | 6                  | 7                 | P=0.39   |
|                           |                                                                                                  |                                                        |                    |                   |          |
| <b>Evaluation of care</b> | Overall satisfaction with surgical experience                                                    | Stalberg 2008<br>(Intervention, n=37, Control, n=37)   | 7                  | 7                 | P=0.2    |
|                           |                                                                                                  |                                                        |                    |                   |          |
| <b>Value of service</b>   | Willingness to pay per online consultation in euros (Median, percentiles)                        | Kummervold 2004<br>(Intervention, n=67, Control, n=84) | 4.39 (1.26 - 6.28) | 6.28 (3.14-12.55) | P= 0.028 |

**Table 10. Email as additional method of communication compared to standard methods: secondary outcomes: health service outcomes**

| Outcome                        |                                                                                                                                                                   | Study                                                   | Intervention                                         | Control                          | Comparison     |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|----------------------------------|----------------|
| <b>Use of medical services</b> | Telephone messages per patient; median and overall number of messages (for those consenting to allow a view of their medical record only)                         | Lin 2005<br><br>(Intervention n=149, Control, n=142)    | 0 (110)                                              | 0 (126)                          | P=0.26         |
|                                | Total messages [telephone plus portal] per patient; median and overall number of messages (for those patients consenting to allow a view of their medical record) | Lin 2005<br><br>(Intervention n=149, Control, n=142)    | 0 (186)                                              | 0 (126)                          | P=0.29         |
|                                | Mean number of contacts with the augmentative communication service                                                                                               | MacKinnon 1995<br><br>(Intervention, n=7, Control, n=9) | 6.4                                                  | 1                                | Not calculated |
|                                | Mean number of independent contacts with the augmentative communication service                                                                                   | MacKinnon 1995<br>(Intervention, n=7, Control, n=9)     | 4.6                                                  | 0.1                              | Not calculated |
|                                | Total messages sent to the practice during recruitment and study period                                                                                           | Ross 2004<br><br>(Intervention, n=54, Control, n=53)    | 350<br><br>(287 phone calls, 63 electronic messages) | 267<br><br>(phone messages only) |                |



|  |                                                                        |                                                      |          |         |        |
|--|------------------------------------------------------------------------|------------------------------------------------------|----------|---------|--------|
|  | Total messages sent per patient                                        | Ross 2004<br>(Intervention, n=54, Control, n=53)     | 259      | 192     | P=0.02 |
|  | Total messages sent per patient in first 6 months of intervention      | Ross 2004<br>(Intervention, n=54, Control, n=53)     | 150      | 88      | P=0.05 |
|  | Total messages sent per patient in the second 6 months of intervention | Ross 2004<br>(Intervention, n=54, Control, n=53)     | 109      | 103     | P=0.66 |
|  | Number of total messages sent per month                                | Ross 2004<br>(Intervention, n=54, Control, n=53)     | 21       | 16      | P=0.70 |
|  | Initiated contact with the surgeon % and total number                  | Stalberg 2008<br>(Intervention, n=50, Control, n=50) | 38% (19) | 14% (7) | P=0.01 |
|  | Used email to contact surgeon % and total number                       | Stalberg 2008<br>(Intervention, n=50, Control, n=50) | 81% (18) | 18% (4) | P=0.02 |

**Table 11. Email compared to telephone for delivery of counselling: primary outcomes: patient**

| Outcome                                    |                                                                      | Study        | Email (52)                              | Telephone (53)                          | Comparison                                                                                                    |
|--------------------------------------------|----------------------------------------------------------------------|--------------|-----------------------------------------|-----------------------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>Patient health status and wellbeing</b> | Body weight - change from baseline (%)                               | Digenio 2009 | -5.9 (95% CI: -6.8 to -5.0)             | -7.7 (95% CI: -8.7 to -6.8)             | Text states telephone group significantly greater weight loss than email but no data on comparison presented. |
|                                            | Mean absolute weight loss at 6 months (kg)                           | Digenio 2009 | 5.4 (95% CI: 4.35 to 6.85)<br>SD: 5.26  | 7.26 (95% CI: 5.62 to 8.93)<br>SD: 6.03 | Not calculated                                                                                                |
|                                            | Waist circumference - mean absolute change from baseline (inches)    | Digenio 2009 | -2.7 (95% CI: -3.2 to -2.2)<br>SD: -3.1 | -2.6 (95% CI: -3.4 to -2.3)<br>SD: -2.5 | Not calculated                                                                                                |
|                                            | Systolic blood pressure - mean absolute change from baseline (mm Hg) | Digenio 2009 | 1.6 (95% CI: -1.1 to 4.3)<br>SD: 10.1   | 0.7 (95%CI: -2.0 to 3.3)<br>SD: 9.46    | Text states comparison of all five groups in study finds no significant difference amongst groups. No data.   |
|                                            | Diastolic blood pressure - mean absolute from baseline (mm Hg)       | Digenio 2009 | 0.6 (95% CI: -1.2 to 2.4)<br>SD: 6.49   | -0.1 (95% CI: -1.9 to 1.7)<br>SD: 6.55  | Text states comparison of all five groups in study finds no significant difference amongst groups. No         |

|  |                                              |              |                                           |                                            |                                                                                                             |
|--|----------------------------------------------|--------------|-------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------------------------------|
|  |                                              |              |                                           |                                            | data.                                                                                                       |
|  | Pulse rate (bpm)                             | Digenio 2009 | 2.2 (95% CI: 0.1 to 4.3)<br>SD: 7.93      | 2.7 (95% CI: 0.6 to 4.8)<br>SD: 8.01       | Text states comparison of all five groups in study finds no significant difference amongst groups. No data. |
|  | Total cholesterol - change from baseline (%) | Digenio 2009 | -2.0 (95% CI: -5.3 to 1.2)<br>SD: -11.9   | -2.1 (95% CI: -5.2 to 1.1)<br>SD:-13.7     | Not calculated                                                                                              |
|  | Triglycerides - change from baseline (%)     | Digenio 2009 | -15.0 (95% CI: -23.7 to -6.2)<br>SD: 45.2 | -19.8 (95% CI: -28.4 to -11.2)<br>SD: 29.1 | Text states comparison of all five groups in study finds no significant difference amongst groups. No data. |
|  | HDL-C - change from baseline (%)             | Digenio 2009 | 11.6 (95% CI: 7.5 to 15.8)<br>SD: 15.7    | 5.7 (95% CI: 1.5 to 9.9)<br>SD: 13.8       | Text states comparison of all five groups in study finds no significant difference amongst groups. No data. |
|  | LDL-C - change from baseline (%)             | Digenio 2009 | 1.4 (95% CI: -5.8 to 8.5)<br>SD: 33.5     | 2.9 (95%CI: -4.1 to 9.8)<br>SD: 30.7       | Not calculated                                                                                              |

|                                   |                                                                 |              |                                         |                                          |                                                                                                                                                                                                        |
|-----------------------------------|-----------------------------------------------------------------|--------------|-----------------------------------------|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                   | Fasting glucose - change from baseline (%)                      | Digenio 2009 | -3.3 (95%CI: -21.2 to 14.7)<br>SD: 11.7 | -5.9 (95% CI: -24.5 to 12.6)<br>SD: 9.3  | Text states comparison of all five groups in study finds no significant difference amongst groups. No data.                                                                                            |
|                                   | Insulin - change from baseline (%)                              | Digenio 2009 | 2.9 (95% CI: -14.7 to 20.4)<br>SD: 71.9 | -6.6 (95% CI: -24.2 to 11.0)<br>SD: 58.1 | Text states comparison of all five groups in study finds no significant difference amongst groups. No data.                                                                                            |
|                                   | Proportion (n) of participants with weight loss of at least 5%  | Digenio 2009 | 38% (20)<br>(95% CI: 27-49)             | 49% (26)<br>(95% CI: 38-60)              | A significant difference between groups was observed P=0.024. The highest proportions of participants with weight loss were observed in the high frequency face-to-face group and the telephone group. |
|                                   | Proportion (n) of participants with weight loss of at least 10% | Digenio 2009 | 18% (9)<br>(95% CI: 9-27)               | 27% (14)<br>(95% CI: 17-37)              | Comparison of all five groups in study finds no significant difference amongst groups; P=0.052                                                                                                         |
|                                   |                                                                 |              |                                         |                                          |                                                                                                                                                                                                        |
| <b>Patient behaviours/actions</b> | IWQOL-Lite score: mean absolute change                          | Digenio 2009 | 11.4 (95% CI: 8.4-14.4)                 | 12.7 (95% CI: 10-15.5)                   | Text states comparison of all five groups in study finds no                                                                                                                                            |

|  |                                                                           |              |                                           |                                           |                                                                                                                                                                                                                                                     |
|--|---------------------------------------------------------------------------|--------------|-------------------------------------------|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | from baseline                                                             |              | SD: 82.9                                  | SD: 78.6                                  | significant difference amongst groups. No data.                                                                                                                                                                                                     |
|  | WRSM total bothersomes score - mean absolute change from baseline         | Digenio 2009 | -9.2 (95% CI: -14.0 to -4.4)<br>SD: 131.2 | -6.8 (95% CI: -11.3 to -2.4)<br>SD: 122.3 | Text states comparison of all five groups in study finds no significant difference amongst groups. No data.                                                                                                                                         |
|  | Mean % participants adhering to dietician contact                         | Digenio 2009 | 79.9%<br>SD: 27.6                         | 76.2%<br>SD: 31                           | A significant difference between low frequency face-to-face counselling and the other groups in the study was observed P=0.018. Both email and telephone groups had significantly higher adherence than the low frequency face-to-face counselling. |
|  | Web utilisation (number of participants using the website)                | Digenio 2009 | 48                                        | 52                                        | Not calculated                                                                                                                                                                                                                                      |
|  | Mean number of logins to website                                          | Digenio 2009 | 57<br>SD: 10.1                            | 68<br>SD: 15.7                            | Not calculated                                                                                                                                                                                                                                      |
|  | Mean number of days participants logged into website to enter information | Digenio 2009 | 64<br>SD: 8.0                             | 64<br>SD: 7.8                             | Not calculated                                                                                                                                                                                                                                      |

**Table 12. Email compared to telephone for delivery of counselling: primary outcomes: harms**

| Harms |                                          | Study        | Email (74) | Telephone (76) | Comparison         |
|-------|------------------------------------------|--------------|------------|----------------|--------------------|
|       | Discontinued study due to adverse events | Digenio 2009 | 5          | 4              | No comparison made |

**Table 13. Summary of findings: email as additional method of communication compared to standard methods of communication: patient participants**

| <b>Email as additional method of communication compared to standard methods of communication</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                     |                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Patient or population:</b> Healthcare users <sup>1</sup><br><b>Settings:</b> Different healthcare settings <sup>2</sup><br><b>Intervention:</b> Email communication <sup>3</sup>                                                                                                                                                                                                                                                                                                                                                                                                |                                     |                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Outcomes</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>No of Participants (studies)</b> | <b>Quality of the evidence (GRADE)</b>         | <b>Impact</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Patient understanding</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 74<br>(1 study)                     | ⊕⊕⊕⊕<br><b>very low</b> <sup>4,5,6</sup>       | Email communication was not shown to make a significant difference to patient understanding and support when used in addition to standard methods of communication.                                                                                                                                                                                                                                                                                                                                                   |
| <b>Patient/caregiver health status and wellbeing</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 147<br>(2 studies)                  | ⊕⊕⊕⊕<br><b>very low</b> <sup>7,8,9,10,11</sup> | Email communication was not shown to make a significant difference to patient health status and wellbeing when used in addition to standard methods of communication.                                                                                                                                                                                                                                                                                                                                                 |
| <b>Patient views</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 90<br>(2 studies)                   | ⊕⊕⊕⊕<br><b>very low</b> <sup>12,13</sup>       | Email communication was not shown to make a significant difference to patient views when used in addition to standard methods of communication. One study did not carry out comparison tests between groups and so the results are inconclusive.                                                                                                                                                                                                                                                                      |
| <b>Patient/caregiver behaviours and actions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 147<br>(2 studies)                  | ⊕⊕⊕⊕<br><b>very low</b> <sup>14,15,16,17</sup> | Email communication was not shown to make a significant difference to patient behaviours and actions when used in addition to standard methods of communication                                                                                                                                                                                                                                                                                                                                                       |
| <b>Health service outcome; resource use</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 379<br>(3 studies)                  | ⊕⊕⊕⊕<br><b>very low</b> <sup>18,19,20,21</sup> | <p>Evidence is inconclusive. Email communication shown to lead to significant difference in health service resource use for four measures (reduction in mean number of contacts to GP and front office, office visits, visits to a complementary therapist and total messages in first 6 months of intervention).</p> <p>Conversely email communication was not shown to make a significant difference for three measures (resource use, phone consultations, total messages in second 6 months of intervention).</p> |
| <b>Health professional outcomes</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0<br>(0)                            | See impact                                     | NOT MEASURED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Harms</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0<br>(0)                            | See impact                                     | NOT MEASURED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p>GRADE Working Group grades of evidence</p> <p><b>High quality:</b> Further research is very unlikely to change our confidence in the estimate of effect.</p> <p><b>Moderate quality:</b> Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.</p> <p><b>Low quality:</b> Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.</p> <p><b>Very low quality:</b> We are very uncertain about the estimate.</p> |                                     |                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

## Footnotes

<sup>1</sup> children& young adults, caregivers, adults

<sup>2</sup> head and neck surgery, paediatric dermatology clinic, augmentative communication service, heart failure clinic, primary care.

<sup>3</sup> standard email, secure web system, patient portal.

<sup>4</sup> Serious limitation, 3 of 6 domains have high risk of bias

<sup>5</sup> Examines patient understanding in relation to post-operative instructions only

<sup>6</sup> One study for this outcome, 74 participants responding, measure using median values as data not normally distributed.

<sup>7</sup> Two studies, one with 3 of 6 domains high risk, another with 4 of 6 high risk

<sup>8</sup> Both studies found no significant difference between groups. One study has missing data

<sup>9</sup> Both studies found no significant difference between groups. One study has missing data

<sup>10</sup> Not possible to fully assess precision due to missing data for one of the studies. One of the studies uses median values.

<sup>11</sup> One measure for this outcome was not fully reported, and author told us upon contact that this was because the difference between groups was not significant.

<sup>12</sup> Both studies with 3 of 6 domains high risk

<sup>13</sup> One study looks only at median values. Other study had very small sample size and did not carry out any analysis of data.

<sup>14</sup> Two studies, one with 3 of 6 domains high risk, another with 4 of 6.

<sup>15</sup> A mix of general measures (use of Internet, costs, resources) and setting specific measures.

<sup>16</sup> One measure uses median values, other measures do not present confidence intervals, data is partly missing for two measures.

<sup>17</sup> Three measures for this outcome were not fully reported, and author told us upon contact that this was because the difference between groups was not significant.

<sup>18</sup> One study has 1 of 6 domains high risk, two have 4 of 6 domains

<sup>19</sup> Evidence is inconclusive, each study has contradictory results for different measures under this outcome

<sup>20</sup> One measure looked at use of complementary therapy. Three measures set in heart failure clinic with heart failure patients. But all measures general in relation to resource use.

<sup>21</sup> For one measure data is missing and authors say this is because the difference between groups was not significant. Two measures look at the same thing over two different time points, no justification given for splitting the time period (first 6 months, second 6 months of intervention) and data is not presented for the study period overall. This could be construed as selective reporting.



**Table 14. Summary of findings: email as additional method of communication compared to standard methods of communication: physician participants**

| <b>Email as additional method of communication compared to standard methods of communication</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                     |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Patient or population:</b> Physicians<br><b>Settings:</b> Primary care clinics<br><b>Intervention:</b> Email communication <sup>1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                     |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Outcomes</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>No of Participants (studies)</b> | <b>Quality of the evidence (GRADE)</b> | <b>Impact</b>                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Patient outcomes</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0<br>(0)                            | See impact                             | NOT MEASURED                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Health service outcome; resource use</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 230<br>(2 studies)                  | ⊕⊕⊕⊕<br><b>very low</b> <sup>2,3</sup> | <p>Evidence is inconclusive.</p> <p>Email communication shown to lead to significant difference in health service resource use for two measures (email volume (intervention and non-intervention email), volume of weekly emails).</p> <p>Conversely email communication not shown to lead to a significant difference in health service resource use for three measures (telephone volume, no show rates and non-intervention email).</p> |
| <b>Health professional outcome</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0<br>(0)                            | See impact                             | NOT MEASURED                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Harms</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0<br>(0)                            | See impact                             | NOT MEASURED                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <p>GRADE Working Group grades of evidence</p> <p><b>High quality:</b> Further research is very unlikely to change our confidence in the estimate of effect.</p> <p><b>Moderate quality:</b> Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.</p> <p><b>Low quality:</b> Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.</p> <p><b>Very low quality:</b> We are very uncertain about the estimate.</p> |                                     |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                            |

## Footnotes

<sup>1</sup> Secure email interface, secure web based tool

<sup>2</sup> Both studies have 3 of 6 domains at high risk of bias, and one domain unclear.

<sup>3</sup> Evidence within studies is inconclusive; each study has contradictory results for different measures under the same outcome; some measures are significantly different, others not.

**Table 15. Summary of findings: email counselling compared with telephone counselling**

| <b>Email counselling compared with telephone counselling</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                     |                                              |                                                                                                                                                                                                                                                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Patient or population:</b> Adults (25-60 years)<br><b>Settings:</b> Independent research clinic<br><b>Intervention:</b> Email counselling<br><b>Comparison:</b> Telephone counselling                                                                                                                                                                                                                                                                                                                                                                    |                                     |                                              |                                                                                                                                                                                                                                                                                                      |
| <b>Outcomes</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>No of Participants (studies)</b> | <b>Quality of the evidence (GRADE)</b>       | <b>Impact</b>                                                                                                                                                                                                                                                                                        |
| <b>Patient health status and wellbeing</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 105<br>(1 study)                    | ⊕⊕⊕⊕<br><b>very low</b> <sup>1,2,3,4,5</sup> | Evidence is inconclusive<br><br>The values presented in this study indicate that telephone counselling was more effective in changing patient health status and wellbeing than email counselling; however without tests for difference between the two groups definitive conclusions cannot be made. |
| <b>Patient behaviours and actions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 105<br>(1 study)                    | ⊕⊕⊕⊕<br><b>very low</b> <sup>6,7</sup>       | Evidence is inconclusive<br><br>The values presented in this study indicate that telephone counselling was more effective in changing patient behaviours and actions than email counselling; however without tests for difference between the two groups definitive conclusions cannot be made.      |
| <b>Health service outcomes</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0<br>(0)                            | See impact                                   | NOT MEASURED                                                                                                                                                                                                                                                                                         |
| <b>Health professional outcomes</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0<br>(0)                            | See impact                                   | NOT MEASURED                                                                                                                                                                                                                                                                                         |
| <b>Harms</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 150<br>(1 study)                    | ⊕⊕⊕⊕<br><b>very low</b> <sup>6,7</sup>       | Evidence is inconclusive<br><br>Number of participants discontinuing the study due to adverse events are presented and the values are similar between groups, however without tests for difference between the two groups definitive conclusions cannot be made.                                     |
| GRADE Working Group grades of evidence<br><b>High quality:</b> Further research is very unlikely to change our confidence in the estimate of effect.<br><b>Moderate quality:</b> Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.<br><b>Low quality:</b> Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.<br><b>Very low quality:</b> We are very uncertain about the estimate. |                                     |                                              |                                                                                                                                                                                                                                                                                                      |

## Footnotes

<sup>1</sup> For this study 4 of 6 domains have high risk of bias.

<sup>2</sup> One study with twelve different measures from the same study for this outcome. No comparison data, but 9 measures in favour of telephone and 3 in favour of email. Two post hoc measures favoured the telephone.

<sup>3</sup> Population is patients meeting very specific criteria for obesity and drug intake. Setting is research clinic, which is not very applicable in the real world sense intended by this review.

<sup>4</sup> Only one study. Confidence intervals visibly wide for three measures.

<sup>5</sup> Two measures presented that were from a post hoc analysis.

<sup>6</sup> For this study 4 of 6 domains with high risk of bias.

<sup>7</sup> Population is patients meeting very specific criteria for obesity and drug intake. Setting is research clinic, which is not very applicable in the real world sense intended by this review.

**Brompton, Harefield & NHLI Research Ethics Committee**

Room W4/11, 4th Floor West  
Charing Cross Hospital  
Fulham Palace Road  
London  
W6 8RF

Telephone: 0208 846 7287

Facsimile: 0208 846 7280

18 January 2010

Miss Helen Atherton  
Primary Care and Social Medicine  
IC London  
Charing Cross Campus  
The Reynolds Building  
London  
W6 8RP

Dear Miss Atherton

**Study Title:** Exploring the potential of email as a method of  
consultation in UK primary care.

**REC reference number:** 09/H0708/70

Thank you for your letter of 04 January 2010, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chairman.

**Confirmation of ethical opinion**

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

**Ethical review of research sites**

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

**Conditions of the favourable opinion**

The favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

For NHS research sites only, management permission for research ("R&D approval") should be obtained from the relevant care organisation(s) in accordance with NHS research governance arrangements. Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at <http://www.rdforum.nhs.uk>.

*Where the only involvement of the NHS organisation is as a Participant Identification Centre, management permission for research is not required but the R&D office should be notified of the study. Guidance should be sought from the R&D office where necessary.*

*Sponsors are not required to notify the Committee of approvals from host organisations.*

**It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).**

## **Approved documents**

The final list of documents reviewed and approved by the Committee is as follows:

| <i>Document</i>                                                                             | <i>Version</i>     | <i>Date</i>       |  |
|---------------------------------------------------------------------------------------------|--------------------|-------------------|--|
| Covering Letter                                                                             |                    | 09 October 2009   |  |
| REC application                                                                             | 252449/67382/1/763 | 08 October 2009   |  |
| Investigator CV                                                                             |                    |                   |  |
| Letter from Sponsor                                                                         | CRO1409            | 05 October 2009   |  |
| Dr Josip Car's CV                                                                           |                    |                   |  |
| Use e-mail to contact your doctor instead of coming here?                                   | 2                  | 25 September 2009 |  |
| Invitation to participate in a study about e-mail consultation                              | 2                  | 25 September 2009 |  |
| Qualitative interview topic guide- patients currently using e-mail                          | 1                  | 25 September 2009 |  |
| Qualitative interview topic guide-GP/nurse/practice staff/practice manager not using e-mail | 1                  | 25 September 2009 |  |
| Qualitative interview topic guide-GP/nurse/practice staff/practice manager using e-mail     | 1                  | 25 September 2009 |  |
| Qualitative interview topic guide-Commissioner (not currently commissioning e-mail)         | 1                  | 25 September 2009 |  |
| Qualitative interview topic guide-Policymaker                                               | 1                  | 25 September 2009 |  |
| Qualitative interview topic guide-Ethical expert                                            | 1                  | 25 September 2009 |  |
| Qualitative interview topic guide-Medical-legal-expert                                      | 1                  | 25 September 2009 |  |
| Protocol                                                                                    | 3                  | 04 January 2010   |  |
| Participant Information Sheet: Healthcare workers and professionals                         | 2                  | 15 December 2009  |  |
| Participant Information Sheet: Expert participants                                          | 2                  | 15 December 2009  |  |
| Participant Information Sheet: Patient participants                                         | 2                  | 15 December 2009  |  |
| Participant Consent Form                                                                    | 3                  | 04 January 2010   |  |

|                                             |  |                 |  |
|---------------------------------------------|--|-----------------|--|
| Response to Request for Further Information |  | 04 January 2010 |  |
|---------------------------------------------|--|-----------------|--|

### Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

### After ethical review

Now that you have completed the application process please visit the National Research Ethics Service website > After Review

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the website.

The attached document *“After ethical review – guidance for researchers”* gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Progress and safety reports
- Notifying the end of the study

The NRES website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

We would also like to inform you that we consult regularly with stakeholders to improve our service. If you would like to join our Reference Group please email [referencegroup@nres.npsa.nhs.uk](mailto:referencegroup@nres.npsa.nhs.uk).

|                    |                                                       |
|--------------------|-------------------------------------------------------|
| <b>09/H0708/70</b> | <b>Please quote this number on all correspondence</b> |
|--------------------|-------------------------------------------------------|

Yours sincerely

**Dr Derek Gibson**  
**Chairman**

Email: [adriana.fanigliulo@imperial.nhs.uk](mailto:adriana.fanigliulo@imperial.nhs.uk)

*Enclosures:* “After ethical review – guidance for researchers”  
*Copy to:* Michelle Quaye, R+D Office, Imperial College

**Applied Research Unit**  
Wembley Centre for Health & Care  
116 Chaplin Road  
Wembley  
Middlesex  
HA0 4UZ

Tel: 020 8795 6730/5  
Fax: 020 8795 6737

Miss Helen Atherton  
Imperial College London  
Dept Primary Care and Public Health  
IC London, Charing Cross Campus  
London  
W6 8RP

Email: [ricky.banarsee@brentpct.nhs.uk](mailto:ricky.banarsee@brentpct.nhs.uk)

17<sup>th</sup> May 2010

Dear Helen

**Project Title:** Exploring the potential of email as a method of consultation in UK primary care.  
**REC** 09/H0708/70  
**Portfolio No** CSP No 25249

Thank you for your assistance providing the documentation for extending your study to NHS Brent. The original approval dated 14<sup>th</sup> April 2010 covered H&F and K&C.

I am satisfied that your proposal meets with the requirements of the Research Governance Framework (RGF). The NW London RG Unit has extended your approval on behalf of NHS Brent on the understanding that you adhere to the RGF conditions on the attached document. The end date of the project is listed as October 2011.

Please note that you can't approach patients until you submit a completed Research Passport and the appropriate Letter of Access is sent to you.

The documents received and approved were: -

|                                                                                      |          |
|--------------------------------------------------------------------------------------|----------|
| Ethics R&D form                                                                      |          |
| Brompton, Harefield & NHLI Research Ethics Service favourable ethical opinion letter | 18/01/10 |
| SSIF for Brent                                                                       |          |
| All study documents as per REC letter listed above                                   |          |

Please ensure that you:

1) Report all SUSARs (Serious unexpected serious adverse reaction) to the Research Ethics Committee and any affecting our patients should be reported to Sylvia Westrup. Failure to abide by this will result in the withdrawal of the Trust's approval.

2) Respond to any requests from Brent PCT's, which hosts the audit function, and provide it with any project amendments, project extensions or terminations. PCTs are required by the Research Governance Framework to maintain a comprehensive database of all research projects.

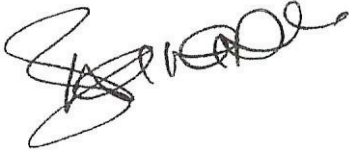
3) Inform us that the study has been completed by sending a copy of the NRES 'Declaration of the End of Study' form (or completing our brief end of study report form which will be

emailed to you after the end date), a summary of the final report and the number of patients/staff from NW London who took part in your study.

4) If your study is on the NIHR CCN Portfolio study you are required to report accruals to the NIHR CCN.

Please do not hesitate to contact the RMG Unit (Sylvia Westrup, [s.westrup@imperial.ac.uk](mailto:s.westrup@imperial.ac.uk)) if you require further assistance.

With kind regards



Ricky Banarsee  
Director WeLReN/Applied Research Unit at Brent PCT  
North West London Research Management Governance Unit

Emailed to  
[helen.atherton07@imperial.ac.uk](mailto:helen.atherton07@imperial.ac.uk)  
[iosip.car@imperial.ac.uk](mailto:iosip.car@imperial.ac.uk)  
[gary.roper@imperial.ac.uk](mailto:gary.roper@imperial.ac.uk) (sponsor)  
[nlh-tr.LNWCSP@nhs.net](mailto:nlh-tr.LNWCSP@nhs.net)  
R&D Leads



**Applied Research Unit**  
Wembley Centre for Health & Care  
116 Chaplin Road  
Wembley  
Middlesex  
HA0 4UZ

Tel: 020 8795 6730/5  
Fax: 020 8795 6737

Miss Helen Atherton  
Imperial College London  
Dept Primary Care and Public Health  
IC London, Charing Cross Campus  
London  
W6 8RP

Email: [ricky.banarsee@brentpct.nhs.uk](mailto:ricky.banarsee@brentpct.nhs.uk)

14<sup>th</sup> April 2010

Dear Helen

**Project Title:** Exploring the potential of email as a method of consultation in UK primary care.  
**REC** 09/H0708/70  
**Portfolio No** CSP No 25249

Thank you for your assistance providing the documentation for the scrutiny of the proposal.

I am satisfied that your proposal meets with the requirements of the Research Governance Framework (RGF). The NW London RG Unit has approved your proposal on behalf of NHS **Hammersmith & Fulham and Kensington & Chelsea** on the understanding that you adhere to the RGF conditions on the attached document. The end date of the project is listed as October 2011.

Please note that you can't approach patients until you submit a completed Research Passport and the appropriate Letter of Access is sent to you.

The documents received and approved were: -

|                                                                                      |          |
|--------------------------------------------------------------------------------------|----------|
| Ethics R&D form                                                                      |          |
| Brompton, Harefield & NHLI Research Ethics Service favourable ethical opinion letter | 18/01/10 |
| SSIFs for H&F and K&C                                                                |          |
| Evidence of Sponsorship                                                              |          |
| All study documents as per REC letter listed above                                   |          |

### Research Governance Requirement

From the information provided and the requirement of the Research Governance Framework have been satisfied in the following areas: -

| Check list                                                                      |
|---------------------------------------------------------------------------------|
| The study has received peer review within MRC funding                           |
| The study has been approved by the local service manager – N/A as GP practices. |
| Use of PCT resources – patients through GP practices plus GP practice staff     |

|                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Data Protection – Form states that Identifiable personal data stored on the chief researcher's Imperial College computer will be registered with the data protection officer at Imperial College. It will be protected by firewall and encrypted for security purposes..</p> <p><b>Please note it is the responsibility of the sponsor to ensure all patient identifiable data stored electronically is encrypted</b></p> |
| <p>Research Passport requested – awaiting completed Research Passport</p>                                                                                                                                                                                                                                                                                                                                                    |

Please ensure that you:

1) Report all SUSARs (Serious unexpected serious adverse reaction) to the Research Ethics Committee and any affecting our patients should be reported to Sylvia Westrup. Failure to abide by this will result in the withdrawal of the Trust's approval.

2) Respond to any requests from Brent PCT's, which hosts the audit function, and provide it with any project amendments, project extensions or terminations. PCTs are required by the Research Governance Framework to maintain a comprehensive database of all research projects.

3) Inform us that the study has been completed by sending a copy of the NRES 'Declaration of the End of Study' form (or completing our brief end of study report form which will be emailed to you after the end date), a summary of the final report and the number of patients/staff from NW London who took part in your study.

4) If your study is on the NIHR CCN Portfolio study you are required to report accruals to the NIHR CCN.

Please do not hesitate to contact the RMG Unit (Sylvia Westrup, [s.westrup@imperial.ac.uk](mailto:s.westrup@imperial.ac.uk)) if you require further assistance.

With kind regards



Ricky Banarsee  
 Director WeLReN/Applied Research Unit at Brent PCT  
 North West London Research Management Governance Unit

Emailed to  
[helen.atherton07@imperial.ac.uk](mailto:helen.atherton07@imperial.ac.uk)  
[josip.car@imperial.ac.uk](mailto:josip.car@imperial.ac.uk)  
[gary.roper@imperial.ac.uk](mailto:gary.roper@imperial.ac.uk) (sponsor)  
[nlh-tr.LNWCSP@nhs.net](mailto:nlh-tr.LNWCSP@nhs.net)  
 R&D Leads

Miss Helen Atherton  
Primary Care and Social Medicine  
IC London, Charing Cross Campus  
The Reynolds Building  
London  
W6 8RP

18<sup>th</sup> May 2010

Dear Miss Atherton

**Project Title: Exploring the potential of email as a method of consultation in UK  
Primary Care**  
**R & D Reference: RDLAG 536 / CSP 25249**

Thank you for your assistance providing the documentation for the scrutiny of this project.

I am satisfied that this study meets with the requirements of the Research Governance Framework. It has been approved by the research lead for the respective NHS organisation.

Approval is given on behalf of NHS Lambeth and NHS Greenwich on the understanding that you adhere to the conditions on the attached document. The end date of the project is listed as 31<sup>st</sup> October 2011.

If you require any further information, please contact Dr Anne Grant on 020 7525 0289.

Yours sincerely

**Hiten Dodhia**

Consultant in Public Health and R&D lead for NHS Lambeth  
Chair of the Research Management Group for South East London NHS  
Bexley, Bromley, Greenwich, Lambeth, Lewisham & Southwark



Directorate of Human Resources and Organisational Development

Wembley Centre for Health & Care  
116 Chaplin Road  
Wembley  
Middlesex, HA0 4UZ

Tel: 020 8795 7457

Fax: 020 8795 6760

Email: Gemma.Davies@brentpct.nhs.uk

Miss Helen Atherton  
Imperial College London  
Dept Primary Care and Public Health  
Reynolds Building  
St Dunstan Road  
London  
W6 8RP

10<sup>th</sup> August 2010

Dear Helen

**Letter of access for research – Exploring the potential of email as a method of consultation in UK primary care. (09/H0708/70)**

This letter confirms your right of access to conduct research through Brent PCT for the purpose of conducting face to face interviews with GPs and their staff and their patients in NHS Brent, H&F and K&C on the terms and conditions set out below. This right of access commences on 30<sup>th</sup> July 2010 and ends on 30<sup>th</sup> October 2011 unless terminated earlier in accordance with the clauses below. If you require an extension beyond this date you will need to request an extension from this organisation.

You have a right of access to conduct such research as confirmed in writing in the letter of permission for research from this NHS organisation. Please note that you cannot start the research until the Chief/Principal Investigator for the research project has received a letter from us giving permission to conduct the project.

The information supplied about your role in this research as a PhD student at Imperial College has been reviewed and you do not require an honorary research contract with this NHS organisation.

You are considered to be a legal visitor to the GP practices and PCT's premises. You are not entitled to any form of payment or access to other benefits provided by this NHS organisation to employees and this letter does not give rise to any other relationship between you and this NHS organisation, in particular that of an employee.

While undertaking research through Brent PCT's you will remain accountable to Imperial College but you are required to follow the reasonable instructions of Mr Ricky Banarsee,

Head of Applied Research Unit in this NHS organisation or those given on his behalf in relation to the terms of this right of access.

Where any third party claim is made, whether or not legal proceedings are issued, arising out of or in connection with your right of access, you are required to co-operate fully with any investigation by this NHS organisation in connection with any such claim and to give all such assistance as may reasonably be required regarding the conduct of any legal proceedings.

You must act in accordance with Brent PCTs' policies and procedures, which are available to you upon request, and the Research Governance Framework.

You are required to co-operate with Brent PCT in discharging its duties under the Health and Safety at Work etc Act 1974 and other health and safety legislation and to take reasonable care for the health and safety of yourself and others while on PCT premises. You must observe the same standards of care and propriety in dealing with patients, staff, visitors, equipment and premises as is expected of any other contract holder and you must act appropriately, responsibly and professionally at all times.

You are required to ensure that all information regarding patients or staff remains secure and *strictly confidential* at all times. You must ensure that you understand and comply with the requirements of the NHS Confidentiality Code of Practice ([www.dh.gov.uk/assetRoot/04/06/92/54/04069254.pdf](http://www.dh.gov.uk/assetRoot/04/06/92/54/04069254.pdf)) and the Data Protection Act 1998. Furthermore you should be aware that under the Act, unauthorised disclosure of information is an offence and such disclosures may lead to prosecution.

You should ensure that, where you are issued with an identity or security card, a bleep number, email or library account, keys or protective clothing, these are returned upon termination of this arrangement. Please also ensure that while on the premises you wear your ID badge at all times, or are able to prove your identity if challenged. Please note that this NHS organisation accepts no responsibility for damage to or loss of personal property.

We may terminate your right to attend at any time either by giving seven days' written notice to you or immediately without any notice if you are in breach of any of the terms or conditions described in this letter or if you commit any act that we reasonably consider to amount to serious misconduct or to be disruptive and/or prejudicial to the interests and/or business of this NHS organisation or if you are convicted of any criminal offence. Imperial College is responsible for your conduct during this research project and may in the circumstances described above instigate disciplinary action against you.

Brent PCT will not indemnify you against any liability incurred as a result of any breach of confidentiality or breach of the Data Protection Act 1998. Any breach of the Data Protection Act 1998 may result in legal action against you and Imperial College.

If your current role or involvement in research changes, for example, if your study has an impact on the participant's care you must inform this organisation and your nominated manager in this NHS organisation.

Yours sincerely



**Gemma Davies**  
**Head of HR**

**cc:**

**Sylvia Westrup**, Northwest London Research Governance Unit, Room 334, 3rd floor, Reynolds Building, St Dunstan's Road, London W6 8RP [s.westrup@imperial.ac.uk](mailto:s.westrup@imperial.ac.uk)  
[z.stevens@ucl.ac.uk](mailto:z.stevens@ucl.ac.uk) - Assistant Project Coordinator, Research Department of Primary Care & Population Health, University College London Medical School, Royal Free Campus, Rowland Hill Street, London NW3 2PF

## APPENDIX A

### Agreement between

*please tick applicable Trust(s)*

#### TRUST(S)

Bexley Care Trust

Bromley  
PCT

Greenwich PCT

☒

Lewisham PCT

Lambeth  
PCT

☒

Southwark PCT

AND

Name: Helen Carina

Surname: Atherton

Home Address:

Flat 10, 102 Westminster Bridge Road, London, SE1 7XT

Employer/Sponsor:

Imperial College London

Accountable to:  
At institution (HoD, PI,  
supervisor)  
At Trust

Dr Josip Car  
Primary Care and Social Medicine  
Imperial College London, Charing Cross  
Campus, The Reynolds Building  
W6 8RP

Location of placement:

GPs and surgery staff in Lambeth and  
Greenwich

Purpose of Placement :

Recruiting patients and interviewing GP and  
Surgery Staff.

Work Tel: 02075940778

Home Tel:  
07904934952

Email:  
Helen.atherton07@imperial.ac.uk

#### TERM of PLACEMENT

From: 02/08/2010

To: 01/08/2013

Term : 3 years

Effective Date:

02/08/2010

#### SIGNATURES

Researcher:

*Helen Carina*

Date:

02/08/2010

R&D office:

*Celine Q. Grant*

Date:

03/08/2010

a) R&D office will provide NHS Trust with copy of agreement

b) It is the responsibility of the researcher to provide their substantive employer  
with a copy of this document

Patient form

Interview number:

|                                                                                                                                                                          |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Practice registered at</b>                                                                                                                                            |  |
| <b>Age</b> <ul style="list-style-type: none"><li>• 16-24</li><li>• 25-64</li><li>• 65+</li></ul>                                                                         |  |
| <b>Highest level of education</b> <ul style="list-style-type: none"><li>• Secondary</li><li>• A level/Further</li><li>• Higher</li><li>• Postgrad/Professional</li></ul> |  |
| <b>Long term/short term condition</b>                                                                                                                                    |  |
| <b>Approx when first used email consultation?</b>                                                                                                                        |  |
| <b>Frequency of email consultation use (one off, regular etc)</b>                                                                                                        |  |
| <b>System for use?</b>                                                                                                                                                   |  |
| <b>Practice permission first?</b>                                                                                                                                        |  |
| <b>Other relevant information</b>                                                                                                                                        |  |



Professionals form

Interview number:

|                                                                                                  |  |
|--------------------------------------------------------------------------------------------------|--|
| <b>Practice</b>                                                                                  |  |
| <b>Age</b> <ul style="list-style-type: none"><li>• 16-24</li><li>• 25-64</li><li>• 65+</li></ul> |  |
| <b>Date of qualification</b>                                                                     |  |
| <b>Duration in General Practice (where different)</b>                                            |  |
| <b>Role in practice (ST4, salaried, partner)</b>                                                 |  |
| <b>System for email consultation</b>                                                             |  |
| <b>Duration of email consultation use (when did you first start)</b>                             |  |
| <b>Frequency of email consultation use (approx)</b>                                              |  |
| <b>Technical info (where relevant)</b>                                                           |  |
| <b>Other relevant information</b>                                                                |  |

## **Email sent to the Department of Primary Care and Public Health**

Hello,

As part of my PhD on email consultation between GPs/practice nurses and patients I am carrying out an interview study.

I am looking for practices where any of the GPs or nurses use email for two way communication with a named patient. This excludes email for appointments/repeat prescriptions etc. It may take the form of a formalised email system or just normal emailing back and forth.

If you work at such a practice or use email yourself I would be really grateful if you could let me know so that I may invite the practice to participate.

Also, if you use email with your doctor as a patient and you would be happy to talk to me about it, then please let me know so that I can formally invite you to take part.

I am happy to answer any questions you might have, just let me know.

Thanks very much,

Helen

## **Advertisement published on Gumtree website**

If you have used/are using email to communicate with your GP or nurse at your general practice then I would like to invite you to take part in a research study.

I want to find out what patients think about using email as a way of contacting their GP or nurse about their health.

Taking part would involve talking with me about what you think of using email to communicate in this way and this would last up to an hour.

Your travel costs would be reimbursed and you would receive a £20 M&S voucher as a thank you for taking the time to help.

The study has been reviewed and approved by a Research Ethics Committee.

If you would like to find out more or think you would like to take part then please contact me.

Helen Atherton

[helen.atherton07@imperial.ac.uk](mailto:helen.atherton07@imperial.ac.uk)

PLEASE NOTE - TO PARTICIPATE YOU MUST HAVE USED OR BE USING EMAIL TO COMMUNICATE DIRECTLY WITH YOUR GP (this does not include emailing a centralised practice email address about administrative issues).

## Using email to contact your doctor?

I would like to invite you to take part in a research study, which is part of my PhD studies at Imperial College. I wish to find out what patients think about using email as a way of contacting the general practice about routine health concerns.



Taking part would involve talking with me about what you think of using email to consult with your doctor/nurse and this would last up to 1 hour.

You would receive a £20 M&S voucher as thank you for taking the time to help.

If you would like to find out more or think you would like to take part then please contact Helen Atherton.

[helen.atherton07@imperial.ac.uk](mailto:helen.atherton07@imperial.ac.uk)

\*please note, to take part you must have been using email to have contact with a GP or nurse at this surgery\*

## **Invitation to participate in a study about email consultation.**

I would like to invite you to take part in a research study, which is part of my PhD studies at Imperial College. The study is concerned with exploring the potential for email as a method of consultation in English general practice.

As part of this research I wish to find out what xxxx think about the possibility of using email in this way. This is an opportunity for you to influence the potential development of any future email consultation service.

Taking part would involve being interviewed for approximately 1 hour, about what you think about the prospect of using email to consult with patients.

The interview can take place at your place of work or at Imperial College and you would be reimbursed for travel to the interview site.

If you would like to find out more or think you would like to participate then please contact Helen Atherton, PhD student:

Helen Atherton  
Department of Primary Care and Social Medicine  
Imperial College London  
Charing Cross Campus  
Reynolds Building  
St Dunstons Road  
London W6 8RP

[helen.atherton07@imperial.ac.uk](mailto:helen.atherton07@imperial.ac.uk)

T: 020 7594 0778

F: 020 7594 0854

## Participant Information Sheet Patient participants

**Study Title: Exploring the potential of email as a method of consultation in UK primary care.**

### **Invitation Paragraph:**

*We would like to invite you to take part in a research study. Before you decide you need to understand why the research is being done and what it will involve for you. Please take time to read the following carefully and discuss it with others if you wish.*

*Part 1 tells you the purpose of this study and what will happen to you if you take part*

*Part 2 gives you detailed information about the conduct of the study*

*If you would like any further information or if anything is not clear, please ask us. Take time to decide whether or not you wish to take part*

### **Part 1**

#### **What is the purpose of the study?**

The purpose of the study is the exploration of email as a potential method of consultation between a doctor and a patient. This research study forms part of the PhD studies of the researcher.

Information technology is now a major part of everyday life and its development over the decades has paralleled population changes; an ageing population who are living longer and a rise in the number of people suffering from chronic diseases. To combat the pressures faced by the health service, cost-effective and high quality care is required and information technology can help to provide this.

So far the introduction of IT into the NHS has not included any system for using email as a method of consultation with a doctor. There has not been much research to date on the use of email consultation and what there is has mostly been based in America. There has not been any examination of whether email could be successfully used as an alternative way to consult with a doctor in the UK.

#### **Why have I been invited?**

As a patient your perspective is important to the research study. Your interview will be one of around 30 interviews with various participants. As well as patients, healthcare professionals and other experts will be interviewed so that a wide range of viewpoints is obtained.

**Do I have to take part?**

*It is up to you to decide whether or not to take part. If you do, you will be given this information sheet to keep and asked to sign a consent form. You are still free to withdraw at any time and without giving a reason. A decision to withdraw at any time or not take part will not affect any future healthcare you receive.*

**What will happen to me if I take part?**

Your participation will comprise a face-to-face interview with the researcher.

The researcher will invite you to meet them at Imperial College's Charing Cross campus where the interview will be carried out in a meeting room at a pre-specified time. It is not anticipated that the interview will last longer than one hour.

At the start of the interview you will be asked to read and sign a consent form. The interview will be recorded using a digital recorder and this will be switched on when you are ready to start. The interviewer will give a brief introduction to the topic of the interview and then will begin to ask you questions. These questions will invite you to discuss your thoughts and opinions about email consultation.

You may terminate the interview at any point and may ask the researcher to switch off the recorder.

At the end of the interview the researcher will summarise your discussion to ensure that you are happy with your responses. You will be given a £20 voucher for a high street store as recompense for the time taken in attending the interview. Any travel costs incurred will also be refunded.

**What do I have to do?**

You will need to schedule an interview time with the researcher and attend the interview.

**What are the disadvantages and risks of taking part?**

You will have to take at least an hour out of your day for the interview and travel to the interview site.

You will be asked questions relating to healthcare which may lead you to consider your personal experiences, some people may find this distressing.

**What are the possible benefits of taking part?**

There are no direct benefits associated with taking part.

**What if there is a problem?**

*Any complaint about the way you have been dealt with or any possible harm you might suffer will be addressed. The detailed information on this is given in part 2*

**Will my taking part in the study be kept confidential?**

*Yes, all the information about your participation in this study will be kept confidential. The details are in part 2.*

This completes Part 1.

If the information in Part 1 has interested you and you are considering participation, please read the additional information in part 2 before making any decision.

## Part 2

### **What if relevant new information becomes available?**

If new research becomes available during the course of the study, the content of the interview may change slightly to reflect this change and to ensure that you are being asked the most useful questions.

### **What will happen if I don't want to carry on with this study?**

You may decide at any point to leave the study. You are free to decide after participation that you do not wish us to use your interview.

### **What if there is a problem?**

If you are harmed by taking part in this research project, there are no special compensation arrangements. If you are harmed due to someone's negligence, then you may have grounds for a legal action. Regardless of this, if you wish to complain, or have any concerns about any aspect of the way you have been treated during the course of this study then you should immediately inform the Investigator:

Helen Atherton  
Department of Primary Care and Social Medicine  
Imperial College London  
Charing Cross Campus  
Reynolds Building  
St Dunstons Road  
London W6 8RP  
T: 020 7594 0778  
F: 020 7594 0854  
helen.atherton07@imperial.ac.uk

The normal National Health Service complaint mechanisms are also available to you. To find out more about these mechanisms and obtain confidential advice, support and information you can contact the Patient Advice and Liaison Service (PALS), who have officers in every hospital and also an online information service.  
<http://www.pals.nhs.uk/>

If you are still not satisfied with the response, you may contact the Imperial College AHSC Joint Research Office.

Imperial College London  
G02, Sir Alexander Fleming Building  
South Kensington campus  
London  
SW7 2AZ  
+44(0)20 7594 1893

### **Will my taking part in the study be kept confidential?**

Your confidentiality will be safeguarded during and after the study.



- It will be recorded using a digital recorder and downloaded onto a computer after the interview.
- The data will then be deleted from the recorder.
- All data will be stored securely. The data will be saved in a password protected file, on the researcher's remote drive.
- Each interview will be coded so that only the researcher knows who gave the interview.
- The data will be used solely for this study and only the lead researcher will have access to view the data.
- The data will be retained for 5 years and once this time has elapsed the data will be securely disposed of.

### **What will happen to the results of the research study?**

The interviews will be analysed and presented in the finished PhD document. The results of the study will be submitted to a healthcare journal for publication. Individual quotations from the interviews may be used in this publication. These quotations will be anonymised and you will not be identified. You may request a copy of the results if you wish.

### **Who is organising and funding the research?**

The Medical Research Council funds the PhD student and research study. Imperial College London is organising the research.

### **Who has reviewed the study?**

*All research in the NHS is looked at by an independent group of people called a Research Ethics Committee to protect your safety, wellbeing and dignity. This study has been reviewed and given a favourable opinion by a favourable opinion by Brompton, Harefield & NHLI Research Ethics Committee.*

### **Further Information and Contact Details**

Helen Atherton, PhD student.  
Department of Primary Care and Social Medicine  
Imperial College London  
Charing Cross Campus  
Reynolds Building  
St Dunstons Road  
London W6 8RP

T: 020 7594 0778  
M: 07904934952  
F: 020 7594 0854

## Participant Information Sheet

### Healthcare workers and professionals

**Study Title: Exploring the potential of email as a method of consultation in UK primary care.**

#### **Invitation Paragraph:**

*We would like to invite you to take part in a research study. Before you decide you need to understand why the research is being done and what it will involve for you. Please take time to read the following carefully and discuss it with others if you wish.*

*Part 1 tells you the purpose of this study and what will happen to you if you take part*

*Part 2 gives you detailed information about the conduct of the study*

*If you would like any further information or if anything is not clear, please ask us. Take time to decide whether or not you wish to take part*

#### **Part 1**

##### **What is the purpose of the study?**

The purpose of the study is the exploration of email as a potential method of consultation between a doctor and a patient. This research study forms part of the PhD studies of the researcher.

Information technology is now a major part of everyday life and its development over the decades has paralleled population changes; an ageing population who are living longer and a rise in the number of people suffering from chronic diseases. To combat the pressures faced by the health service, cost-effective and high quality care is required and information technology can help to provide this.

So far the introduction of IT into the NHS has not included any system for using email as a method of consultation with a doctor. There has not been much research to date on the use of email consultation and what there is has mostly been based in America. There has not been any examination of whether email could be successfully used as an alternative way to consult with a doctor in the UK.

##### **Why have I been invited?**

As someone working in or associated with primary care your perspective is important to the research study. Your interview will be one of around 30 interviews with various participants. As well as those working in primary care, patients and experts in fields relating to email consulting will be interviewed so that a wide range of viewpoints is obtained.

**Do I have to take part?**

*It is up to you to decide whether or not to take part. If you do, you will be given this information sheet to keep and asked to sign a consent form. You are still free to withdraw at any time and without giving a reason. A decision to withdraw at any time or not take part will not affect any future healthcare you receive.*

**What will happen to me if I take part?**

Your participation will comprise a face-to-face interview with the researcher.

The interview can be held at your place of work or in a meeting room at Imperial College's Charing Cross campus, according to your preference. It is not anticipated that the interview will last longer than one hour.

At the start of the interview you will be asked to read and sign a consent form. The interview will be recorded using a digital recorder and this will be switched on when you are ready to start. The interviewer will give a brief introduction to the topic of the interview and then will begin to ask you questions. These questions will invite you to discuss your thoughts and opinions about email consultation.

You may terminate the interview at any point and may ask the researcher to switch off the recorder.

At the end of the interview the researcher will summarise your discussion to ensure that you are happy with your responses. Any travel costs incurred will be refunded.

**What do I have to do?**

You will need to schedule an interview time with the researcher and attend the interview.

**What are the disadvantages and risks of taking part?**

You will have to take at least an hour out of your day for the interview and travel to the interview site.

You will be asked questions relating to healthcare which may lead you to consider your personal experiences, some people may find this distressing.

**What are the possible benefits of taking part?**

There are no direct benefits associated with taking part.

**What if there is a problem?**

*Any complaint about the way you have been dealt with or any possible harm you might suffer will be addressed. The detailed information on this is given in part 2*

**Will my taking part in the study be kept confidential?**

*Yes, all the information about your participation in this study will be kept confidential. The details are in part 2.*

This completes Part 1.

If the information in Part 1 has interested you and you are considering participation, please read the additional information in part 2 before making any decision.

## Part 2

### **What if relevant new information becomes available?**

If new research becomes available during the course of the study, the content of the interview may change slightly to reflect this change and to ensure that you are being asked the most useful questions.

### **What will happen if I don't want to carry on with this study?**

You may decide at any point to leave the study. You are free to decide after participation that you do not wish us to use your interview.

### **What if there is a problem?**

If you are harmed by taking part in this research project, there are no special compensation arrangements. If you are harmed due to someone's negligence, then you may have grounds for a legal action. Regardless of this, if you wish to complain, or have any concerns about any aspect of the way you have been treated during the course of this study then you should immediately inform the Investigator:

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helen.atherton07@imperial.ac.uk

The normal National Health Service complaint mechanisms are also available to you. To find out more about these mechanisms you can obtain information online via NHS Choices:  
<http://www.nhs.uk/choiceintheNHS/Rightsandpledges/complaints/>

If you are still not satisfied with the response, you may contact the Imperial College AHSC Joint Research Office.

Imperial College London  
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South Kensington campus  
London  
SW7 2AZ  
+44(0)20 7594 1893

### **Will my taking part in the study be kept confidential?**

Your confidentiality will be safeguarded during and after the study.

- It will be recorded using a digital recorder and downloaded onto a computer after the interview.
- The data will then be deleted from the recorder.

- All data will be stored securely. The data will be saved in a password protected file, on the researcher's remote drive.
- Each interview will be coded so that only the researcher knows who gave the interview.
- The data will be used solely for this study and only the lead researcher will have access to view the data.
- The data will be retained for 5 years and once this time has elapsed the data will be securely disposed of.

### **What will happen to the results of the research study?**

The interviews will be analysed and presented in the finished PhD document. The results of the study will be submitted to a healthcare journal for publication. Individual quotations from the interviews may be used in this publication. These quotations will be anonymised and you will not be identified. You may request a copy of the results if you wish.

### **Who is organising and funding the research?**

The Medical Research Council funds the PhD student and research study. Imperial College London is organising the research.

### **Who has reviewed the study?**

*All research in the NHS is looked at by an independent group of people called a Research Ethics Committee to protect your safety, wellbeing and dignity. This study has been reviewed and given a favourable opinion by a favourable opinion by Brompton, Harefield & NHLI Research Ethics Committee.*

### **Further Information and Contact Details**

Helen Atherton, PhD student.  
Department of Primary Care and Social Medicine  
Imperial College London  
Charing Cross Campus  
Reynolds Building  
St Dunstons Road  
London W6 8RP

T: 020 7594 0778

M: 07904934952

F: 020 7594 0854

Patient Identification Number for this study:

## CONSENT FORM

Title of project: Exploring the potential of email as a method of consultation in English general practice.

Name of Principal investigator: Helen Atherton

**Please initial box**

1. I confirm that I have read and understood the information sheet dated 15<sup>th</sup> December 2009 (version 2) for the above study and have had the opportunity to ask questions. ☐
2. I agree to the interview being digitally recorded by the chief investigator. ☐
3. I agree that the sponsor, Imperial College London, may access my personal details and data for audit purposes. ☐
4. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected. ☐
5. I agree to take part in the above study. ☐

---

Name of Participant

---

Date

---

Signature

---

Name of Person taking consent

---

Date

---

Signature

1 form for Participant;  
1 to be kept as part of the study documentation.

## **Email to instruct patient participant how to do interview via email**

Dear X

Thanks again for agreeing to participate.

I attach a word document with the details of the interview. You may answer in the word document or in the body of the email, either way is fine. The answers are anonymised (given a patient ID number), hence why the document is called participant 16. There is no need to write your name anywhere on the document.

The answers can be as long or as short as you like, the main thing is that I want to get an idea of your experiences in using email with Dr X.

Please take as long as you like to return it to me.

Any questions just let me know,

Best wishes,

Helen

## Box 6.1. Interview guide for patient interviews (non-users of email consultation)

### Qualitative interview guide: patient

#### Introduction

- Thank interviewee for taking part in the research and introduce myself.
- Ask the participant if they are happy for the interviewer to take written notes as this will help with analysis.
- Make sure the participant is comfortable.

The purpose of this research is to hear your views on the prospect of using email as a method of consultation with your GP, or any other healthcare professional associated with your GP practice. A consultation is an encounter with the GP concerning your health or the health of someone you are responsible for. At the moment you can see your GP in person and in some practices you can arrange to consult with them over the telephone. Today I want to know what you think about doing this using email.

We think this information will help to predict whether email can work as a routine method of consulting with your GP.

Do you have any questions at this point?

#### Questions

1. Can you tell me a bit about what you think of the prospect of general practices offering email as a method of communicating directly with a doctor, instead of visiting or using the telephone?  
Prompts [if necessary]
  - a) Does this sound like a realistic prospect to you?
  - b) Does it seem like something that could be routinely used?
2. Would you consider using email to consult with your doctor?  
Prompts [if necessary]
  - a) Why do you feel this way?
  - b) What sort of things might influence your decision?
3. Can you tell me how you think email might differ from other ways of consulting with your doctor?  
Prompts [if necessary]
  - a) How do you think the doctor-patient relationship be affected?
  - b) Would you feel more or less confident about using this than other methods of consulting?
  - c) Would it be easier for you to use or more difficult than the way you currently consult?
  - d) Do you think you would use it in the same way that you use other methods of consulting?
4. Is there anything else you would like to talk about that we haven't covered?

Is there anything else you would like to ask me?

Thank interviewee for their time and valuable contribution.



### Box 6.1. Interview guide for patient interviews (non-users of email consultation)

#### Qualitative interview guide: professional

##### Introduction

- Thank interviewee for taking part in the research and introduce myself.
- Ask the participant if they are happy for the interviewer to take written notes as this will help with analysis.
- Make sure the participant is comfortable.

The purpose of this research is to hear your views on the prospect of using as a method of consultation with patients. At the moment you are not offering this in your practice. Today I want to know what you think about consulting using email.

We think this information will help to predict whether email has the potential to become a routine method of consultation in primary care.

Do you have any questions at this point?

##### Questions

1. Can you tell me a bit about what you think of the idea of using email as a method of consultation in primary care?  
Prompts [if necessary]
  - a) Does this sound like a realistic prospect to you?
  - b) Do you think it could become routine?
2. Would you consider offering email consultation in your practice?  
Prompts [if necessary]
  - a) Why do you feel this way?
  - b) What sort of things might influence your decision?
3. Can you tell me how you think email might differ from other methods of consultation?  
Prompts [if necessary]
  - a) How do you think the doctor-patient relationship might change?
  - b) Would you feel more or less confident about this than other methods of consulting?
  - c) Do you think it could be used in the same way that you use other methods of consulting?
4. Is there anything else you would like to talk about that we haven't covered?
5. Is there anything else you would like to ask me?

Thank interviewee for their time and valuable contribution.

### **Box 6.3. Interview guide for email interview with patient**

#### **Qualitative interview guide: patient**

##### **Background questions**

Age category (please choose from 16-24, 25-64, 65+).

Highest level of education (please choose from Secondary, Further, Higher and Postgrad/Professional)

Approximately when did you first use email to communicate with/receive communications from the GP?

Approximately how frequently do you use it?

What type of email account do you use in your communications with the GP? (work, home e.g. hotmail).

##### **Exploratory questions**

You have used or are using email to communicate with your GP. The purpose of this interview is to hear about your experiences and your opinions on this.

This section is designed to be exploratory, so please use these question guides to tell me what your thoughts and experiences are. There is no minimum/maximum answer length, please write as much or as little as you would like, or as time permits. If you feel the question is not relevant then there is no need to answer.

- Can you tell me a bit about how you have been using email with your doctor (Dr X)?  
(e.g. what you have used it for, whether the usage has changed over time)
- Can you tell me how you came to use email in this way in the first place?  
(e.g. what sort of things influenced your decision)
- Can you tell me how you think it compares with the other ways you can contact your doctor?  
(e.g. what makes it different, what is the same, whether it changes the relationship with the doctor)
- What has email consultation meant for you?  
(e.g. what difference it makes to you, if any)
- Finally, if there is anything else you wish to share that is not covered by these questions please write that here:

**Thank you very much for your contribution.**

## Box 6.4. Interview guide for patient interviews

### Qualitative interview guide: patient

#### Introduction

- Thank interviewee for taking part in the research and introduce myself.
- Re-iterate each point in the consent form.
- Ask the participant if they are happy to have the interview recorded as this will help with analysis.
- Show them the recorder and explain that it will be placed on the table and can be switched off at any point.
- Explain that interview will be transcribed by an outside agency and that I will also be taking a few notes.
- Make sure the participant is comfortable and able to stay for one hour.
- Start recording.

You have used or are using email consultation with your GP/someone in your practice. The purpose of this interview is to hear about your experiences and your opinions on this. We think this information will help to predict whether email has the potential to become a routine method of consultation in general practice.

Do you have any questions at this point?

#### Questions

1. Can you tell me a bit about how you have been using email consultation with your doctor?  
Prompts [if necessary]
  - a) What have you used it for?
  - b) Has the experience you have had changed over time?
2. Can you tell me how you came to use email for consulting with the doctor?  
Prompts [if necessary]
  - a) What sort of things influenced your decision to use email?
  - b) What was involved in being able to use email consultation?
3. Can you tell me how you think it has compared with other ways that have contacted your doctor previously?  
Prompts [if necessary]
  - a) Do you use it in the same way you use other types of consultation?
  - b) How do you feel it has changed the relationship you have with your doctor?
  - c) How do you feel about it as a way to address your particular concerns?
4. What has email consultation meant for you?  
Prompts [if necessary]
  - a) What are your reflections on using it?
  - b) Why do you feel this way?
5. Is there anything else you feel we haven't covered?
6. Is there anything else you would like to ask me?

Thank interviewee for their time and valuable contribution, turn off digital recorder. Provide the participant with reimbursement (obtain signature) and complete travel expense form.

## Box 6.5. Interview guide for professional interviews

### Qualitative interview guide: professional

#### Introduction

- Thank interviewee for taking part in the research and introduce myself.
- Re-iterate each point in the consent form.
- Ask the participant if they are happy to have the interview recorded as this will help with analysis.
- Show them the recorder and explain that it will be placed on the table and can be switched off at any point.
- Explain that interview will be transcribed by an outside agency and that I will also be taking a few notes.
- Make sure the participant is comfortable and able to stay for one hour.
- Start recording.

You have used or are using email consultation with your GP/someone in your practice. The purpose of this interview is to hear about your experiences and your opinions on this. We think this information will help to predict whether email has the potential to become a routine method of consultation in general practice.

Do you have any questions at this point?

#### Questions

1. Can you tell me a bit about how you have been using email consultation?  
Prompts
  - a) What have you used it for?
  - b) Has this changed since you started to use it for x or for y?
2. Can you tell me what led you to use email in this way?  
Prompts
  - a) What sort of things influenced the decision?
  - b) What sort of processes did you go through to get to the stage you are at now.
3. How do you think it is working out/worked out?  
Prompts [if necessary]
  - a) How does it work with/compare to other methods of consultation?
  - b) How has it affected relationships (with patients/colleagues)?
  - c) What sort of skills did it require?
  - d) How was it to set up?
4. How would you reflect on your use of email consultation?  
Prompts [if necessary]
  - a) What do you think of it?
  - b) Why do you feel this way?
5. Is there anything else you would like to discuss about that we haven't covered?
6. Is there anything else you would like to ask me?

Thank interviewee for their time and valuable contribution, turn off digital recorder. Provide the participant with reimbursement (obtain signature) and complete travel expense form.

## Box 6.6. Interview guide for practice manager interview

### Qualitative interview guide: practice manager

#### Introduction

- Thank interviewee for taking part in the research and introduce myself.
- Re-iterate each point in the consent form.
- Ask the participant if they are happy to have the interview recorded as this will help with analysis.
- Show them the recorder and explain that it will be placed on the table and can be switched off at any point.
- Explain that interview will be transcribed by an outside agency and that I will also be taking a few notes.
- Make sure the participant is comfortable and able to stay for one hour.
- Start recording.

Your practice is using online (email) consultation with patients. The purpose of this interview is to hear about your experiences and your opinions of this. We think this information will help to predict whether email has the potential to become a routine method of consultation in general practice.

Do you have any questions at this point?

#### Questions

7. Can you tell me a bit about the practice's online consultation system?  
Prompts [if necessary]
  - a) What sort of things is it used for?
  - b) Has the system changed and developed since the practice started using it?
8. Can you tell me how the system came about?  
Prompts [if necessary]
  - a) What sort of things influenced the decision to introduce it?
  - b) What was involved in setting up the system?
9. How is it working?  
Prompts [if necessary]
  - a) Is it used in the same way as other types of consultation?
  - b) How do you feel it has changed the relationship between clinicians and patients?
  - c) Are there any experiences with it you would like to share?
10. Now that the practice has been using an email consultation system for a while, what are your reflections on using it?  
Prompts [if necessary]
  - a) How do you think the service will continue? Will there be changes to it?
  - b) Why do you feel this way?
11. Is there anything else you feel we haven't covered?
12. Is there anything else you would like to ask me?

Thank interviewee for their time and valuable contribution, turn off digital recorder. Provide the participant with reimbursement (obtain signature) and complete travel expense form.

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