Subjective wellbeing: a perspective on its use in health care and health policy

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Originality declaration

I hereby confirm that this thesis is my own work and that all external sources from institutions, researchers and agencies are fully referenced.

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Abstract

The nature and resource constraints of modern health care has led to increased reliance on rigorous treatment targets and detailed policy guidelines. Whilst well intentioned, this can shift the focus away from patients themselves and places emphasis on arbitrary measures of output or performance that can relate poorly to how people experience and benefit from health care. Considerable effort and resources are spent on health care interventions, but policy makers and clinicians may be left without a clear understanding of how these treatments actually affect people in the experience of their lives.

Subjective wellbeing (SWB) is a broad category of phenomena that includes people’s emotional responses, domain satisfactions (e.g., health or work), and global judgements of life satisfaction. Measures of SWB offer a means to gauge the impact of changes and events in the lives of individuals. In recent years, there has been increasing interest in the use of SWB in shaping public policy (e.g. in relation to environmental and economic policies).

In my thesis, I examine for the first time the ways in which measures of SWB can be used directly within a health care setting and to inform health policy decisions. In doing so, I have drawn on my understanding of clinical environments and health care systems as a practising clinician to bring a new perspective to the way that SWB is considered and used in health care and to how it can be applied in determining health policy.

I explore the use of SWB at both the macro and micro levels of policy making and address the challenges faced when using measures of SWB in these ways. At the macro level, I examine the limitations and challenges of existing methods and examine where using SWB would have the most impact. I also focus on the use of SWB measures at a micro level, setting out a new model of patient experience with reference to SWB. My thesis sets out original methods for SWB data collection developed through innovative empirical work. This work into hernia surgery and on the SWB of the staff and inpatients of an acute NHS hospital has generated new data sets in clinical populations. I discuss the implications of this research and explain how, when and where SWB measures, when used in health care, can be used in health policy.

All too often we lose sight of what really matters in life, and the world of health care is no exception. Through the application of measures of SWB in health care, I offer a novel perspective that ensures a greater focus is placed on the way that patients experience health interventions when developing health policy.
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<th>Description</th>
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<tbody>
<tr>
<td>BHPS</td>
<td>British Household Panel Survey</td>
</tr>
<tr>
<td>CABG</td>
<td>Coronary Artery Bypass Graft</td>
</tr>
<tr>
<td>CBA</td>
<td>Cost Benefit Analysis</td>
</tr>
<tr>
<td>EQ5D</td>
<td>EuroQol standardised instrument for use as a measure of health outcome</td>
</tr>
<tr>
<td>ICER</td>
<td>Incremental Cost Effectiveness Ratio</td>
</tr>
<tr>
<td>HRQoL</td>
<td>Health Related Quality of Life</td>
</tr>
<tr>
<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
</tr>
<tr>
<td>NICE</td>
<td>National Institute for Health and Care Excellence</td>
</tr>
<tr>
<td>PGI</td>
<td>Patient Generated Index</td>
</tr>
<tr>
<td>PROMS</td>
<td>Patient Reported Outcome Measures</td>
</tr>
<tr>
<td>PTCA</td>
<td>Percutaneous Transluminal Coronary Angioplasty</td>
</tr>
<tr>
<td>QALY</td>
<td>Quality Adjusted Life Year</td>
</tr>
<tr>
<td>SEIQOL</td>
<td>Schedule for the Evaluation of Individualised Quality of Life</td>
</tr>
<tr>
<td>SF6D</td>
<td>Short Form 6 Dimensions measure</td>
</tr>
<tr>
<td>SG</td>
<td>Standard Gamble</td>
</tr>
<tr>
<td>SRS</td>
<td>Sex Reassignment Surgery</td>
</tr>
<tr>
<td>SWB</td>
<td>Subjective Wellbeing</td>
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<tr>
<td>TTO</td>
<td>Time Trade Off</td>
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<tr>
<td>WTP</td>
<td>Willingness to Pay</td>
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Outputs from PhD

Work directly related to thesis

Publications


Presentations

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Lee, H; Metcalfe, R; Peasgood T, Dolan P. (2010) Uneven floors, broken ceilings, and other problems


Work arising from but not directly related to thesis


Presentations


1. Subjective wellbeing and health

When thinking about the effectiveness of health care it is all too easy to get caught up in health metrics and performance measures, and to lose sight of the main goal of making people better. Not enough notice is taken of how health care affects the lives of our patients overall, and in this thesis I aim to explore how global measures of subjective wellbeing (SWB) can be used in health care settings to benefit patients and inform policy makers.

I begin by setting out the current ways in which we allocate resources at a health policy level and show where and how approaches that use SWB may help to provide more balanced information when making these difficult decisions. The role of SWB in clinical environments is then discussed and a model proposed that sets out where and how measures of SWB can be used directly in clinical work. These theoretical considerations are then applied with new clinical studies that use SWB measures directly, for both patient and staff populations in clinical environments. The ways in which these measures of SWB can be used at policy levels are examined at each stage, and in the final discussion SWB measures are considered in relation to how, when and where they have a role in health policy.

1.1. Introduction

The necessity to demonstrate the effectiveness of health care interventions and treatments has formed the basis for evidence based care (Sackett et al., 1996) and this has led to significant improvements in way that care is delivered and choices regarding health care are made. Until relatively recently the evidence used in making these decisions has tended to be derived from clinical outcome data (e.g. mortality, survival, or infection rates), which has had a significant effect in shaping the way major health problems are tackled (e.g. use of statin therapy to reduce risk of cardiovascular mortality (The Scandinavian Simvastatin Survival Study Group, 1994)). In the last thirty years however, emphasis has also been placed on the way in which health technologies have an impact on the lives of those receiving care. This has led
to both the development of methods for valuing the relative cost effectiveness of treatments and also the emergence of a myriad of patient reported outcome measures (PROMs).

Whilst individually these objective and subjective measures can tell us something about a particular aspect of a patient’s life or response to treatment, they often provide an incomplete picture of what individuals are actually experiencing. For example, somebody with knee pain may score poorly on a PROM gauging pain and impact on mobility, but it actually may not impact that much on their life as a whole. This is a stylised example, but the idea that we are missing both a global evaluation and an assessment of experience (or experienced utility as economists would say) in appraising the effectiveness of health care is important and one that is becoming increasingly high profile (Chalkidou et al., 2009; P. Dolan, 2009; Richardson, 2002).

There is a wealth of research into such global measures of SWB in other domains such as crime and the environment (Clark et al., 2008; Kahneman & Krueger, 2006), and there have also been arguments calling supporting the use of SWB in particular clinical contexts (Cummins et al., 2004). There is a lack of clarity, however, both in terms of using them in meaningful ways in clinical environments and joining these measures up at a policy level. The manner in which these global measures of SWB can be defined, applied and integrated into health care and health policy will form the body of my thesis.

1.2. Accounts of subjective well being

It is helpful at this stage to consider the nature and construct of SWB, along with how best it has been and could be used in relation to health care and health policy. The three accounts of SWB proposed by Parfit (Parfit 1984) that allow for measurement of SWB over time and in response to health care interventions are objective lists; preference, satisfaction and mental states (or SWB).

Objective list accounts of SWB are based on assumptions about basic human needs and rights, and Sen (1999) famously argues that the satisfaction of these needs helps provide people with the capabilities to
‘flourish’ as human beings. In simple terms, people can live well and flourish only if they first have enough food to eat, are free from persecution, are protected from danger. In this way SWB can be measured against a list of set of capabilities. The preference satisfaction account is more closely aligned to a traditional economists view of what should make people happy, ie more income (Dolan and Peasgood, 2008). At the simplest level, “what is best for someone is what would best fulfil all of his desires” (Parfit, 1984). This account may be well suited to certain areas of policy research, but does not lend itself to work within the health care sector.

SWB is a relative newcomer in terms of its relevance politically and its robustness empirically Generally, SWB is measured by simply asking people about their happiness. In this sense, it shares the democratic aspect of preference satisfaction, in that it allows people to decide how good their life is going for them, without someone else deciding their wellbeing (Graham, 2010).

There have been a number of definitions of the mental state account of SWB over the years, and constructs of SWB overlap into the fields of health, psychology and philosophy. SWB can be considered as ‘a person’s cognitive and affective evaluations of his or her life’ (Diener, Lucas, & Oshi, 2002, p. 63).

The cognitive element refers to the evaluative aspect of SWB, namely what we think about our life satisfaction overall, or in relation to specific domains. The affective element refers to emotions, moods and feelings, and is a more experiential element of SWB. Its theoretical rigour extends back to Bentham (1789) who provided an account of wellbeing that is based on pleasure and pain, and which provided the background for utilitarianism.

Affect is considered positive when the emotions, moods and feelings experienced are pleasant and negative, when the emotions, moods and feelings experienced are unpleasant. A person who has a high level of satisfaction with their life, and who experiences a greater positive affect and little or less negative affect, would be deemed to have a high level of SWB.

A final dimension of SWB that should be considered is the eudomonic dimension, and relates to higher levels of psychological needs, such as meaning, autonomy, control and connectedness (Ryff, 1989), which
contribute towards wellbeing independently of any pleasure they may bring (Hurka, 1993). In some ways these constructs can be considered as objective lists, but they are subjectively experienced and relate to individual interpretation and as such are best thought of as a separate dimension.

The recent progress made in measuring the SWB of large populations has sought to capture each of these domains of SWB, so as to provide a rich landscape of information at several levels for analysis.

1.3. Measuring health and the benefits of treatment

There are inherent advantages in valuing the benefits that health care interventions and treatments can confer. The immediate advantage to patients is that they are much better placed to make informed decisions regarding which treatment(s) are likely to make them better, or at least see which treatments might give them some benefit. The majority of clinicians and health care professionals will use information regarding benefits, or effectiveness, in relation to decisions regarding specific patients. The broader application of benefit valuation concerns health policy, and it is in relation to these macro decisions that a great deal of research effort has been directed by health economists. For policy and resource allocation purposes, we need to be able to compare the effectiveness of different treatments for different conditions.

In order to best consider these issues it is important to come at things from the perspective of health economists, as this is where the origins of these approaches lie. Markets value goods and services (and treatments) according to our willingness to pay (WTP). The effects of demand and supply determine prices in areas of life where money is the currency through which we can buy (or sell) goods and services. There are other “non-market” goods, however, which we do not usually pay for, at least not in the same way we would buy a car or a pair of shoes, such as the environment or crime prevention. It is still helpful for policy purposes to value these non-market goods in monetary terms, so that we can compare them directly to costs – and this forms the basis of cost-benefit analysis (CBA). Monetary values for benefits are derived through WTP estimates, either by inferring values from preferences revealed through market
behaviour or stated directly in valuation studies. The Treasury provides guidance on these approaches in the Green Book (Treasury, 2003).

A notable exception is health benefits, which are often valued in health and not monetary units. The demand for non-monetary values was (and remains) in part due to unease at describing health in fiscal terms, and greatly aided by the use of outcome assessment in health care generally. There are also ethical concerns about the appropriateness of using willingness and ability to pay to value health. There is a much stronger culture of evaluation in health care than in most other areas of public policy, and as a result, quality of life measurement is quite widespread and life years gained has been a measure of the success for many treatments for many years. It became a logical next step to express the two main outcomes of health care – quality of life and length of life – in a single metric.

Quality-adjusted life years (QALYs) have been designed as this single metric. QALYs cannot be used to determine the resources that should be devoted to health care compared to other areas of public policy but they can be, and are, used to allocate health care resources. An efficient health care system will be one that invests in interventions that generate the most QALYs at least cost. We would effectively work down a list that ranked all interventions in terms of their incremental cost-per-QALY ratios until we have used up all health care resources.

Whilst a consensus has emerged about the need to value health benefits for resource allocation, no clear consensus exists about how best to do this. The National Institute for Health and Care Excellence (NICE) has led the way in the appraisal of health interventions and technologies in the UK, and other countries are following its lead (Avorn, 2009; Clement et al., 2009). In order to compare the cost-effectiveness of different interventions and technologies, NICE requires comparability across appraisals, and has consequently recommended the QALY approach and a particular set of methods and measures within its ‘reference case’ to be used in appraisals to facilitate these comparisons (NICE, 2008).

The following two sections highlight problems with NICE’s recommendations, particularly in relation to how health should be described (rather narrowly in terms of a limited number of dimensions of health)
and valued (using the hypothetical preferences of the general public) and set out where using measures of SWB might help with some of these issues. This alternative approach, takes a broader account of the way that individuals experience health care, and considers the use of measures of SWB directly in clinical work. This would see a change in the way that outcomes are measured and that CBA is undertaken, but, as will be discussed, it offers the opportunity to address some of the issues with the existing methods.

Different priorities would be set if more weight were to be given to how health conditions impact on SWB, and I set out why the current practice in health economic evaluation is too narrow in the way it thinks about benefits (in relation to both how benefits are defined and whose benefits are included). In line with the spirit of the Green Book (but not its specific recommendations in relation to WTP), this approach “emphasises the need to take account of the wider social costs and benefits of proposals, and the need to ensure the proper use of public resources” (Treasury, 2003).

1.4. The NICE approach and its problems

In order to fully understand where the problems lie with current methods it is necessary to have a full understanding of the current methods that are used by NICE when considering where to allocate health care resources as part of health technology appraisals. These methods are the core of health economics, but can seem far removed from the day-to-day clinical work of doctors or from the real work decision making of policy makers. Nonetheless it is necessary to discuss these methods at this stage so that a clear appreciation of existing problems can be set out.

NICE evaluates new technologies according to the number of QALYs they are expected to generate (NICE, 2008) by attaching quality of life weights (rather than monetary values) to different states of health and illness and then multiplying those weights by how long the states last. The Q in the QALY is calibrated on a cardinal scale between 0 (for dead) and 1 (for full health) so that it is possible to say how much better or worse one state is compared with another. One QALY represents one year of life in full health, or two years in 0.5 health, and so on. Other countries are following NICE’s lead (Chalkidou et al., 2009).
The QALY approach requires that we describe quality of life and that we value it. In fact, we must answer three core questions: what is to be valued, how is it to be valued and who is to value it (P. Dolan, 2000; McCrone et al., 2009). In terms of description, there are generic descriptive systems designed for calculating QALYs. The SF6D (derived from the widely used Medical Outcome Study SF36 measure (Brazier et al., 2002)) is one such measure. NICE currently recommends the use of another measure, the EQ5D (EuroQol, 1990), which describes health in terms of five dimensions (mobility, self-care, usual activities, pain and mood), each with three levels of severity (broadly, none, some and extreme problems). Each state is defined by a five number code, from 11111 to 33333, and so there are 243 (3^5) possible states. In describing their current health according to the dimensions of the EQ5D, an individual effectively assigns themselves to one of these states.

Values for these health states – the value of the Q in the QALY – are derived from people’s preferences over different health states (EuroQol, 1990). These are elicited through the willingness to give up life years (time trade-off (TTO) method) or take a risk of death (standard gamble (SG) method) for improved health. The SG requires respondents to consider the combination of the risk of full health and the risk of death that is equivalent to the certainly of a poor health state. The TTO requires respondents to consider how many years of life in full health, x, are equivalent to a longer time, t, in a poor health state. NICE currently favours the TTO. So if a study population is asked to consider what life would be if they lost their sight completely, and they report that five years in full health is equivalent to ten years in blindness, then the TTO value for blindness would be 0.5.

Critically, in relation to the question of ‘who’, NICE asks for values to be elicited from the general public in the form of hypothetical preferences, as opposed to individuals who have experience of these specific health states. These recommendations are in line with those proposed by the Washington Panel (Gold M et al., 1996), a group of experts convened by the US public health service in the mid 1990s to develop consensus-based recommendations for cost-effectiveness analysis.

The QALY approach seeks to broadly capture a central aim of prioritising those who ‘feel better for longer’. The recommendations about how they are valued, however, are problematic. In recommending
the EQ5D, NICE and other agencies are saying that the dimensions of health within it are the only important ones. There would seem to be no good normative or empirical basis for this claim, particularly when other dimensions, such as vitality, are thought of as being just as important dimensions of health and impact upon patients every bit as much as the ‘5D’ in the EQ5D. Since the EQ5D was designed for use amongst patient populations, it is also not clear that the EQ5D picks up the impact that conditions have on the families of patients. The impact on others affected by the condition is increasingly recognised as an important consideration in health technology assessments (e.g. in recent discussions about the cost-effectiveness of treatments for Alzheimer’s (Grossberg, 2008)) and we need to do more to capture those effects in ways that are comparable to the effects on patients.

As a starting point it is certainly not unreasonable that policy makers and health economists who led the way in the development of these methods decided to use population values for one health state over another. This has comparisons to taxation policy and WTP calculations and continues to be effective in this area (H.M. Treasury, 2003, 2008). There is, however a growing acknowledgement that experiences of patients need to be better represented in methodologies, and that public preferences can result in misleading results (Brazier et al., 2005). Responses to preference-based methods, such as TTO, are subject to various biases that mean they may not reflect real experiences. It is also the case that in the preference valuation studies people often rank certain health states as worse than death, which has obvious problems when trying to make useful policy decisions (Lamers, 2007).

In many ways, our health state preferences more accurately reflect our fears about particular health states rather than considered assessments of what life would actually be like in those conditions (including the extent of any adaptation). Whilst fear is certainly an important thing to consider in health care, it is not what the SG and TTO are designed to tap into. In any event, the fundamental problem from whomever TTO values are elicited is that the things that we focus on in a preference question are often not the things that we focus our attention on (and that matter to us) in the experience of our lives.

Public preferences tend to overvalue the effects of changes in mobility and the effects of pain on our health and underestimate the effects of anxiety and depression (Dolan et al., 2009). A reliance on the
EQ5D, the TTO and the general public means that NICE may make the wrong decisions about which treatments to recommend: wrong in the sense that more benefit could be gained by making different decisions.

How and at what stage to involve citizen preferences when using measures to capture the benefits of health care are not easy questions to answer, otherwise a straightforward solution would have already been adopted. In favour of the existing methods that seek to incorporate public preferences into the QALY methodology, is the fact that the values and sentiment of the general population with respect to different conditions are already represented with the QALY tariff. Within any health system there are resource limitations and as such decisions regarding which conditions should be treated ahead of others will need to be made. If citizen level preferences are accurately included by means of the health state preference evaluation exercise then this would be one way to help achieve this prioritisation.

The problem with this method is that the general population (from whom preferences are elicited) are poorly placed to predict the impact on their lives of conditions they know very little about. Citizen level preferences should continue to have an impact on resource allocation decisions, but these should be effected independently and not skew the collection of data from individuals experiencing the different health conditions being assessed. There will of course be populations from whom it is difficult or impossible to accurately collect experiential data, such as those with profound learning difficulties or in certain palliative or paediatric settings for example, and in such cases the hypothetical preferences of the general population will always have an important role to play.

1.5. SWB as an alternative

Many health economists recognise some of these problems and are looking for ways of refining conventional QALY methods (Smith et al., 2009). An alternative, but not incompatible approach, involves looking for more appropriate ways of capturing the real experiences associated with treatments and health care interventions. This involves looking for more suitable ways of valuing the whole
experience of a health care intervention, including the stages of treatment as well as their consequences. If we could find a measure that would allow us to make these various comparisons, we would be a lot nearer being able to join-up the various concerns in health care about quality, patient satisfaction and cost-effectiveness.

One way of doing this is to consider using measures of SWB directly in clinical populations, and this is gaining traction in policy circles (Cummins et al., 2004; P. Dolan & Kahneman, 2008; P. Dolan & White, 2007; H.M. Treasury, 2008). SWB is ‘a broad category of phenomena that includes people’s emotional responses, domain satisfactions (e.g., health, work, social relationships), and global judgements of life satisfaction’ (Diener et al., 1999). The impact of health upon SWB can then be calculated through regression analysis showing the marginal effects of different determinants of health or aspects of life generally (e.g. income, health, personal characteristics) on SWB.

This forms the basis of the way that social scientists and economists dealing with SWB consider the different effects that extraneous factors, such as health interventions, have on our SWB. In taking these methods forward in my thesis and bringing together these methods that have their basis in economics and social science with an understanding of clinical environments and trial methodologies, there is a great opportunity to understand more fully which aspects of health care have the greatest impact on our SWB.

SWB comes in a number of guises. Most attempts to capture SWB are based on global evaluations of life satisfaction (Diener et al., 1999). There have been recent attempts to capture the various feelings over the course of a day (Kahneman et al., 2004). Comparing and integrating these measures to more fully and more accurately represent an individual’s SWB over time is an important part of on-going research, and great progress has been made in this area in recent years (ONS, 2014; Stiglitz et al., 2010). This perspective does not necessarily require us to abandon the QALY approach of weighting each health state by its duration. Indeed, some assessments (e.g. based on daily reports of SWB) relate to short and specific periods of time and so lend themselves directly to duration weighting. A focus on SWB does, however, allow us more flexibility in how health is described and it allows us to think about valuation in a more complete way than focusing only on SG and TTO-type preferences.
There is a robust positive causal relationship between physical health states and SWB (Pressman and Cohen 2005) and SWB has also been shown in other areas to cause, and be caused by, many other objective circumstances such as marriage, children and income (Lyubomirsky et al., 2005). There is also increasing evidence correlating SWB and subjective measures of health with objective measures of health for large populations (A. J. Oswald & Wu, 2010).

The academic swell of interest has been mirrored by increasing policy interest, with the 2005 UK Sustainable Development Strategy (HM Government, 2005) focusing on applications of SWB, and a more recent Treasury working paper setting out policy uses for SWB across Government (H.M. Treasury, 2008). This sets out how at a macro resource allocation level, SWB represents a useful barometer by which to judge the benefits from interventions in key areas of public policy, such as environment, crime, and transport. The most high profile policy enterprise is without doubt the Office for National Statistics’ “Measuring National Well-being” programme, which was set up in 2011 with the aim of supplementing existing economic and social measures to give a fuller picture of “how society is doing” (ONS, 2014).

SWB has actually had quite a long tradition in health care (Bowling, 1995; Fitzpatrick et al., 1992; T. M. Gill & Feinstein, 1994) and it has previously been used to help value health outcomes for clinical effectiveness and service delivery in some settings, although this was not the primary aim of these studies (Gotay et al., 2008; Keyes C.L., 2006; Ried et al., 2006).

There have been quite influential attempts to distinguish between health (or health-related quality and life) and wellbeing (Boyd, 2000; Cummins et al., 2004; Torrance, 1987), and although the distinction is blurred at best, it actually misses the point. There is a view, not entirely uncontested, that SWB should be seen as the final consequence of policy intervention in any area of public policy – the left hand side or dependent variable in a regression analysis. Whilst this opinion may be far from a consensus statement, there is certainly something to be said for considering the overall impact of public policy, and certainly health policy in this way. We may quite legitimately decide at a citizen preference level through our elected policy makers, that particular determinants of SWB (the right hand side or independent variables) are the main responsibility of different government departments, so health care focuses on affecting health-related
determinants. We must be careful, however that we are able to fully capture the impact of policies, so that important impacts on populations are not missed. The precise mechanisms through which health care impacts upon SWB and its health-related determinants may never be fully established but this is less important from a policy perspective than fully capturing the effects that they do have.

Using measures of SWB offers one approach to some of the concerns regarding the use of the preferences of the general public over those who have experience of conditions when valuing health states. This method also eliminates the need for the narrow health state descriptive systems (such as the EQ5D) because the constraints in an approach that uses SWB are the degrees of freedom in a regression model rather the cognitive capacity of respondents to simultaneously weigh up different levels of different dimensions. In this way SWB provides a direct means through which meaningful values can be elicited from clinical, as well as non-clinical, populations.

1.6. Determinants of SWB and some initial methodological considerations

It is helpful at this point to briefly consider the different factors that influence SWB, such as employment, relationships, and income. These issues have been the subject of a considerable body of research, as there is inherent interest in what makes us happy, and a number of detailed review articles deliver in depth data can be recommended (e.g. Dolan et al (2009), Ferrer-i-Carbonell, A. (2005)). It is beyond the scope of this thesis to review all of these determinants, but essential that the scope and scale of key factors be discussed up front.

Studies consistently show a large negative effect of individual unemployment on SWB. Studies that have derived statistical models treating life satisfaction scales as a continuous variable generally find that the unemployed have around 5–15% lower scores than the employed (Di Tella et al., 2001; Frey & Stutzer, 2000, 2002; Helliwell, 2003). Being employed provides more of an opportunity to engage the mind and connect with others than being unemployed, where unemployment can lead to higher distress and lower life satisfaction (Oswald 1997). Men have been found to suffer most from unemployment (Clark, 2003a,
Studies consistently find a negative relationship between age and SWB and a positive relationship between age squared and SWB (Blanchflower & Oswald, 2004a; Ferrer-Carbonell, & Gowdy, 2007), and that women tend to report higher happiness (Alesina, Di Tella, & MacCulloch, 2004) but worst scores on for certain health questionnaires (Clark & Oswald, 1994). These differences have been found to disappear, however, when controlled for health conditions that prevent work or caring for others.

With respect to relationships, research has also found that married people are generally happier than those who are unmarried (Mastekaasa, 1994; Glenn, 1996; Myers, 2000), whether they are separated, divorced or single (Myers, 2000). One would think that co-habiting couples would have similar correlations with SWB as married couples, however, Diener (Diener et al, 1998) found that this was not the case, finding that married couples were happier than non-married couples, especially in collectivist cultures such as India. Having said this, within individualistic cultures such as the U.K., this trend is changing and the SWB of co-habiting couples are rising to levels in line with those of the married couples.

Leisure and recreation have beneficial short-term effects on SWB (Argyle, 2001). Exercise, for example, improves mood states in the short term and, in the long term, leads to increased SWB (Argyle, 2001). Whilst exercise provides better psychological and physical health outcomes, the pursuits of leisure and recreation and exercise often involve interaction with other people. Like places of work and places of worship, places of recreation and exercise [e.g. gyms, fitness classes] all involve connection with other people, and research has consistently shown that this promotes SWB.

There are a number of methodological issues when considering the ways that SWB can be used in clinical populations. The most significant of these are salience, timing and reliability.
The first is with respect to the salience of the SWB questions in relation to the individual and to the rest of the questions being asked. Any question that is posed will direct the participant’s attention towards something (Dolan and Kahneman, 2008), and this is likely to be a health related issue in the context of this research. It must also be recognised that the mere act of asking a SWB question might affect experiences (Wilson and Schooler, 1991; Wilson et al, 1993). The fact that people will be directed towards thinking about health before answering questions about their life as a whole may result in them over-reporting the impact that their health (or certain domains of it) has on their SWB. Adequately controlling for this will be important when considering SWB results in clinical populations, and perhaps more relevant at this stage when clinical SWB data sets are beginning to be created is the comparisons between patient and citizen derived SWB data.

The second concerns the timing of SWB measures. The time frame of assessment is not usually made explicit in the evaluative and ‘eudemonic’ measures in existing work, but will need to be when considering clinical populations. Currently, life satisfaction questions, for example, are usually phrased as ‘nowadays’ or ‘recently’, but with respect to SWB in health care there is a lack of evidence to suggest how frequently these types of SWB measures (evaluative and eudemonic) could be repeatedly valued. Going forward this is a key area in which to set standards for future work.

The third key consideration is reliability. In terms of reliability of the SWB measures then there evidence to suggest that domain satisfaction measures may have good reliability because they are relatively straightforward judgements that can be aggregated to generate overall satisfaction (Peasgood, 2008; Cummins, 2000). The regression based approach that underpins SWB calculations allows for researchers to control for life events and individual factors that are unrelated to health, provided that they are reported in the research questionnaire (i.e as independent variables). There is of course a limit to the number questions that we can expect patients to answer, and as such a balance must be struck between picking up important non-health related issues that may skew SWB results and designing a set of measures that can be easily answered with good response rates.
Other important issues particular to the use of SWB measures in health care relate to the use of aggregate or total scores, and how responses may change over time. How and whether to combine or aggregate different domains of SWB is an area for further work. Existing reports of SWB for populations will report on all different dimensions of SWB, and there is no overall aggregate score. This may be helpful or useful for resource allocation work, and would require focused econometric comparisons to be undertaken. This is considered in more detail in Chapter 6.

In order to make meaningful comparisons over time and across people, we need to understand how interpretations of the scales may change over time. Frick et al (2006) show that respondents in the German Socio-Economic Panel have a tendency to move away from the endpoints over time. For example, it is possible that the endpoints on a scale change when circumstances change and when key life events happen: the 7 I give to an evaluation question before having children may be different to the 7 I give after having children. This is particularly relevant when considering elderly populations, those with severe physical functioning limitations (e.g. paraplegia), and those in end of life or palliative care settings. This is not isolated to SWB research, and it is known that subjective reports of health are all open to the same response shifts and adaptations. None then less it is a consideration when interpreting SWB results and also when comparing SWB data from clinical and non-clinical populations.

In taking these lines of arguments forward there are a number of key areas in which SWB measures have the potential to influence health care through its impact on health policy. Macro level policy decisions, as discussed within this chapter have the potential to utilise SWB as an alternate or more realistically, at least at first, an additional tool in resource allocation decisions. It is worth highlighting at this stage that this thesis does not seek to challenge the established framework that considers distributional issues relating to health resources, rather it sets out means and methods that could support policy makers in their decision making. There is an obvious need to measure health, and particularly changes in health, in a way that does not privilege specific domains over others, and a more detailed examination of the determinants of health is helpful here. This is discussed in Chapter 2.
Alongside improved ways of valuing health, measures of SWB can be used to demonstrate clinical effectiveness and quality, and this new direction is discussed in Chapter 3. The adoption of SWB as outcome measures in their own right will not only offer an alternative measure from which to generate cost effectiveness data but also provide an accessible and relevant measure of care quality.

At the micro level a further broad area of impact for SWB measures is in providing an academically robust methodology for the use of using SWB measures in clinical populations. Existing approaches have fine-tuned measures aimed at gauging specific aspects of care (e.g. cancer survival and outcome), but lack a way of actually demonstrating experience. The studies detailed within Chapters 4 and 5 are original contributions to the field of SWB research and translate the methodologies used in economics and the social sciences into workable measures of SWB that can benefit patients and staff. Policy considerations and collective results are then discussed in Chapter 6.

Our SWB is important and clinicians and others involved in health need to know how health care and health policy can benefit from the SWB approach. The added value in this work is the joining up of the different facets of SWB into a cohesive picture of how SWB can be used to benefit health care at an individual, institutional and policy level.
2. Describing health

2.1. Introduction

The ability to be able to describe health in a way that allows us to compare different conditions across a range of population groups is central to establishing cost-effectiveness and of inherent interest to health policy makers. If health is valued using different measures, then it is possible that different valuations will be derived for the same conditions in the same populations and this may be different again from what is picked up if measures of SWB are used. A better understanding of what the existing measures of health (e.g. the EQ5D) actually pick up is essential if we are to understand how best to value health.

In considering these measures in relation to their use for resource allocation purposes three questions present themselves. First, do these measures adequately capture the domains of health that are important to individuals in the experiences of their lives? Second, what other dimensions are important that these measures fail to capture? Third, what would be seen if measures of SWB were used instead?

2.2. The EQ5D and SF6D

The two most widely used measures of HRQoL are the EQ5D and the SF6D. From the patient’s perspective, and that of the majority of those who use the measures in clinical work, both measures are relatively brief self-completed questionnaires. Each contains a number of domains and within each domain there are several different levels. The respondent chooses the level that most appropriately describes his or her health within each domain. These responses are then translated into a health state, which is the description of health that is used in subsequent valuation exercises.
The current version of the EQ5D has been used in hundreds of individual studies, primarily to help demonstrate cost effectiveness. The EQ5D measure was the result of a European collaborative group (known as the EuroQol group) in the 1990s (EuroQol, 1990). The group initially met in 1987 with the principle aim of developing and testing a non-disease-specific quality of life instrument (initially known as the EuroQol measure). The group was aware at the time that the measure would have considerable use in the field of health economics and health policy, and were consistent in their view that the measure would be used alongside other disease specific outcome measurements in the context of clinical trials. The measure was developed in a rather “top-down” way by members of the group, although lay health beliefs were consulted at early stages in its development.

The EuroQol group was mindful that the measure: 1) must be not too onerous on the individual completing it; 2) should be capable of being used in large scale studies, and therefore take the form of a self-completed questionnaire; and 3) should generate a single index value for any health state. Alongside these considerations was the fact that in constructing the measure *de novo*, the group would be able to determine the number of health states that could be described. The tension in any such process is between developing an instrument that is sensitive enough to capture all aspects of quality of life but that has thousands of possible health states, and one that has fewer health states, making it practically more useful, but runs the risk of being insensitive to certain conditions (Williams, 1995).

The choice of which domains to include within the measure was made following “a detailed examination of the descriptive content of existing health measures” (EuroQol, 1990), and initially contained six domains, each with two/three levels of severity. This gave a descriptive system of 216 health states. The evolution of this measure into the five domains each with three levels that form the EQ5D took place over a number of years. Initially domains pertaining to work activities and social relationships were separate, although subsequently joined as their contribution as individual constructs was not found to be significant. Perhaps more pertinent was the decision not to include an “energy and tiredness” dimension (Rabin & de Charro, 2001), which was not found to significantly affect health state valuations but which has been shown to be important in other measures (Brazier et al., 2002). A further issue is why the researchers did not simply ask a population sample what aspects of health were important to them? This
sounds very straightforward, and would have been a relatively uncomplicated study to perform given the considerable resources of the group. It was not however undertaken, and does beg the question what would have been included in the EQ5D if this had been the case.

The SF6D was derived from the widely used SF36 measure (Brazier et al., 2002). The chief motivation for developing the SF6D was to allow the creation of a preference based single index measure for valuing health as measured by the SF36. In addition, it was hoped that the development of this new measure would address the lack of sensitivity that the EQ5D had been criticised for. The SF36 generates scores across eight dimensions of health (physical functioning, role limitation due to physical problems, social functioning, bodily pain, role limitations due to emotional problems, mental health, and vitality (Ware & Sherbourne, 1992) but was not intended to be used for economic evaluation purposes. The SF6D includes domains of physical functioning, role limitations, social functioning, pain, mental health, and vitality. It seeks to make the valuation task more manageable whilst retaining the sensitivity of the SF36.

Both measures have been extensively tested in their own right for internal consistency and face validity (Brazier & Deverill, 1999; Brazier et al., 1993; van Agt et al., 1994) but important differences obviously exist between them. In particular, it has been known since at least 1993 that the EQ5D was less sensitive at the ceiling (approaching full health) than the SF36. This result was also found in Brazier’s 2004 review that compared the EQ5D with the SF36 across seven different conditions (Brazier et al., 2004). In this review, which led the way in terms of work directly comparing these two measures, the authors found convergent mean indices, representing apparently good evidence supporting the construct validity of each of the two measures. They did point out, however, that a more detailed examination of the comparative data revealed a significant degree of disagreement between the two measures, with an intra-class correlation coefficient of only 0.51 for the whole sample. The variability of the relationship between the two measures over the full range of ill health is so heterogeneous as to have “significant implications” for the estimate of QALY gain (Brazier et al., 2004).

The descriptive content of each of the measures is responsible to a degree for this lack of concordance, and in particular the focus in the levels of the SF6D on the milder or less severe health states was thought
to have highlighted the relative insensitivity of the levels of the EQ5D for conditions approaching full health. Conversely the SF6D was shown to have difficulties for those with more severe health states. Alongside the issues of the descriptive content of the measures, other issues were also raised concerning the valuation methods and scoring algorithms, and these are addressed elsewhere.

More recently, individual studies have sought to further compare the EQ5D and SF6D in specific populations. Some studies have demonstrated high degrees of concordance between the measures e.g. for HIV (Stavem et al., 2005) and for ankylosing spondylitis (Boonen et al., 2007). Others have not. Comparisons made between the two measures for a cohort of individuals with knee pain, for example, showed a relative insensitivity of the SF6D compared to the EQ5D (Barton et al., 2009). In a different study of patients with arthritis, and consistent with the idea that the EQ5D better reflects more severe states and the SF6D better reflects less severe ones, the EQ5D was more responsive to deteriorations in health and the SF6D more responsive to improvements in health (Harrison et al., 2009).

A similarly discordant result was shown in a study of patients with coronary artery heart disease (van Stel & Buskens, 2006), where the scores from the EQ5D and SF6D were deemed 'incomparable'. The study elicited EQ5D and SF6D values from individuals with ischaemic heart disease that were then randomised to three groups: two different surgical treatments (either off pump or on pump coronary artery bypass graft (CABG)) or a less invasive treatment (percutaneous transluminal coronary angioplasty (PTCA)). The authors found significant differences when comparing the EQ5D and SF6D responses from the same participants and that the measures generated different values for changes over time: The SF6D recorded greater change in the PTCA group and only the EQ5D demonstrated a significant improvement for the CABG group.

Lamers et al (Lamers et al., 2006) demonstrated that both measures were able to detect changes in mental health in 616 patients with mood and anxiety disorders over time but the EQ5D suggested greater gains from interventions, as reflected in the subsequent cost utility ratios (Mean utilities increased from 0.51 at baseline to 0.68 at 1.5 years follow-up for EQ-5D and from 0.58 to 0.70 for SF-6D). Sach et al (Sach et al., 2009) performed separate cost-effectiveness calculations using the EQ5D and SF6D when analysing
the data from a randomised controlled trial into lifestyle interventions for the treatment of knee pain. Interventions were (1) diet and strengthening exercise advice, (2) dietary advice alone, (3) strengthening exercise advice alone, and (4) information leaflet provision. The authors demonstrated that, at a threshold of £20,000 per QALY, different treatments were cost effective depending on whether the EQ5D or SF6D measure was used.

Marra et al (Marra et al., 2007) compared two drug treatments for patients with rheumatoid arthritis, and developed a mapping function to convert scores from a clinical measure into estimated utility scores. The authors calculated incremental cost effectiveness ratios (ICERs) for treatment with the new drug (infliximab) at $46,322 for the EQ5D compared to $69,826 for the SF6D. Similarly, in a study of physical therapy intervention to help treat symptoms of rheumatoid arthritis, van den Hout et al (van den Hout et al., 2005) found that intervention had an ICER <$50,000 according to the EQ5D, yet had an ICER of $67,000 when using the SF6D.

McCrone et al (McCrone et al., 2009) also demonstrated differences between the measures in a study of treatments for patients with schizophrenia. Although the mean utility scores were similar, the median scores were markedly higher for the EQ5D compared to the SF6D. The EQ5D scores were negatively skewed, whilst the SF6-6D scores followed a normal distribution. The authors concluded that in this population the SF6D measure be used, due to the normal distribution and lack of ceiling effect. In short, the different measures tend to produce different ICERs and can potentially result in different resource allocation recommendations.

The different recommendations that may be derived from these studies emanate from differences in the descriptive systems. Brazier et al (Brazier et al., 2004) suggest that the descriptive content has a considerable bearing on the differing values derived by the measures. This is supported by Grieve et al (Grieve et al., 2009), who demonstrate that the inclusion of separate items for vitality and social functioning within the SF6D are important in explaining the observed differences. Hemmett et al (Hemmett et al., 2004) examined the response to beta interferon treatment in a group of patients with multiple sclerosis. They found that vitality was highly correlated with social functioning, general health
and mental health and that improvement in patients symptoms in this domain were not reflected by
changes in the EQ5D score. The authors did however not go as far as calculating ICERs.

These reported differences found when different descriptive systems are used to measure the same
intervention or treatment have significant policy implications. It seems that there is a lottery as to which
measure gets used in clinical trials and accordingly this may impact on whether a specific intervention is
approved for funding in a HTA. There are some safeguards within this, in as much as NICE “prefers”
CBA data to be provided using the EQ5D, but this is not always the case and given the often high profile
and emotive nature of resource allocation decisions this methodological issue poses additional problems
for policy makers.

All of these issue raise serious concerns for the developers of new health technologies and for NICE – at
least insofar as they are concerned with valuing what matters most to those affected by health conditions.
There will of course be no ‘gold standard’ against which to determine what matters most, particularly
when there will be a trade-off between the need for descriptive completeness and precision which is what
everyone would want to see, versus the need for brevity and generalizability, which is the compromise
given the methodological difficulties with having broad based descriptive systems. The discussion can,
however, be grounded in two very simple questions (which may nonetheless produce different answers).
First, what dimensions of health matter most to people when you ask them about what matters to them?
Second, what dimensions of health matter most to people’s SWB?

2.3. What dimensions of health matter to people when you ask them?

There are very few studies that have directly asked which factors are important to health, and this seems
quite surprising. The involvement of the public and patients in developing measures has largely been to
ask about the impact that certain conditions and health states would have on overall quality of life (Carr
& Higginson, 2001) and focusing on particular states limits the degree to which the measures can claim to
reflect what matters most (T. M. Gill & Feinstein, 1994). A notable exception is the study by Bowling
Bowling, 1995), which surveyed 2,031 people with the aim of providing population norms on the dimensions of health that people perceived to be important. Energy/tiredness, sexual functioning, communication and sleep were important, which are missing from the EQ5D and only partly covered by the SF6D. Interestingly, no respondents volunteered self-care or activities of daily living as of great importance.

There has been some research to show that different patients attach different weights to the same health states at different stages in their treatment (Hickey et al., 1996). It makes a great deal of sense that the dimensions of importance will change as people progress through a condition, particularly as end of life becomes more salient. Accounting for these changes would represent a departure from current methods. Valuing an individual’s SWB in a systematic manner with respect to different stages of treatments may offer a solution. A great deal of current pharmacological innovation and research is direct towards developing novel chemotherapeutic agents targeted at advanced cancers. The focus on increasingly advanced disease is due to a combination of improved curative treatments for the earlier stages of some cancers, along with the fact that many existing non-curative treatments successfully prolong life resulting in the development of more advanced disease. The resulting population is therefore one that is increasingly living long periods of time in with chronic conditions.

What is important about the health of individuals living with such diseases, especially at advanced stages, is that the domains that are important to them may not be the same as those that would be important to the general population imagining life in those circumstances. Accordingly, health technologies that confer real benefits to these individuals may either go undetected or be undervalued using existing measures of health that are based upon values from non clinical populations. As an example, in focussing on groups of patients with recently diagnosed malignant cord compression, a condition that causes lower body neurological symptoms and can lead to paraplegia, Levack et al (Levack et al., 2004) found that only 29% of respondents considered independence as being important.

There is some evidence in the end-of-life literature that the domains of life deemed important to different people affected by and involved in a health condition may also differ quite markedly. Domains such as
“relieving burden” become more important to the individual with the condition than independence or mobility (Singer et al., 1999). Clinicians still place more emphasis on physical functioning (Heyland et al., 2006) and pain relief. Patients, however, seem to value being mentally aware most highly (Steinhauser et al., 2000).

With a view to addressing these concerns work has been carried out into measures that individualise quality of life e.g. the patient generated index (PGI) (Martin et al., 2007; Ruta et al., 1994). In this approach, the respondent is first asked to select up to five domains of their life that are the most important to their present quality of life. A sixth and seventh domain is included to represent “other health related areas” and “other non-health related areas”. In the second stage, the participant then rates how badly they are affected in each domain from 0-10. In the third stage, the participant “spends” 14 points on these areas to indicate the relative importance of each life area to indicate the relative importance of improvements in each area. The scores from stage two are multiplied by the weights from stage three to generate a single index score. The PGI has been used in a range of populations, including lower back pain (Ruta et al., 1994), atopic dermatitis (Herd et al., 1997) and rectal cancer (Camilleri-Brennan et al., 2002) and in different countries, including the UK, Bangladesh, Thailand and Ethiopia (Camfield & Ruta, 2007). It has been shown to be responsive to changes in health, and more so than the SF36 for some domains (Martin et al., 2007).

Other individualised scores have been developed along similar lines, although they differ slightly in methodology. They include the schedule for the evaluation of individualised quality of life (SEIQOL), where participants are asked to specify the five areas most important to their quality of life, and then rate their current status in each of these on a visual analogue scale from 0 to 100. Another such scale is the disease repercussion profile (Carr, 1996), which assesses the impact of a condition on an individual in each of six areas (functional activities, social activities and interactions, relationships, finance or work, emotional well-being, and body image and self esteem).

These individualised measures do not, unfortunately, offer easy solutions to the problems faced when valuing quality of life in different populations. Individuals may be reticent about volunteering domains
that may be important to them, particularly related to mental health or mood and these measures are much more complicated to complete than other measures such as the EQ5D and SF6D. As well as these practical issues, it is also true that the analysis of aggregated data derived from such measures can be complicated and difficult to interpret (Carr & Higginson, 2001). Individualised measures do, however, offer a way of establishing what domains are important in particular populations and the degree to which existing measures like the EQ5D and SF6D pick these things up.

2.4. What dimensions of health matter most to people's SWB?

In terms of what matters to people when we look at the determinants of SWB, we find that health is one of the most important dimensions: As Graham (Graham, 2008) points out, “health is among the handful of measurable variables that account for observed variability in human happiness”. In the only paper that could be found that elicited EQ5D and SWB, Graham et al (Graham et al., 2011) showed that anxiety/depression was strongly negatively correlated with life satisfaction in a South American population; in contrast mobility was much more weakly correlated. Beyond this, the dimensions that matter most have not been considered too closely in the literature thus far, with the emphasis on broad categories of disability (A.J. Oswald & Powdthavee, 2008) or specific health conditions, such as stroke and acute myocardial infarction (Shields & Wheatley Price, 2005), which have been shown to reduce SWB but it hard to say precisely where the losses in SWB are felt.

Here are examples of the generality of the results found from some of the most important studies to date. Marmot (Marmot, 2003) demonstrated the association of low overall SWB with poor general health, and reported correlations of approximately 0.60 between low SWB and subjective poor health in the Whitehall sample of British civil servants. This is an extremely strong correlation, and to put this in context the impact of employment on SWB is often reported as a shift of 0.05 on a 0-10 scale of SWB (Clark et al., 2008). It is certainly true that severe health problems that interfere with daily functioning can substantially lower SWB, as can life-threatening illnesses. For example, Verbrugge et al (Verbrugge et al.,
found that the SWB of people with serious chronic illnesses, such as congestive heart failure,declined over one year.

Pain is also important in terms of SWB, and patients with pain (from fibromyalgia and rheumatoid arthritis) showed lower life satisfaction as well as more depression and anxiety than control subjects (Celiker & Borman, 2001). People with low SWB also have more difficulty coping with pain than people who have a higher SWB, and retrospectively overestimate their previously experienced levels of pain (Keefe et al., 2001). Pain is however, not as important as might first be thought in terms of SWB and although the most severe levels of pain result in sustained stained losses of SWB people with who report mild or moderate levels of pain do not necessarily have lower SWB (P. Dolan & Kahneman, 2008; Graham, 2008).

There is a strong negative association between SWB and mental health. Diener and Seligman (Diener & Seligman, 2002) for example found that the happiest people showed very low levels of symptoms of mental illness. Conversely individuals with lower SWB are more likely to take risks and put their life in more danger. At the extreme end of the SWB scale, patients with the lowest SWB are more likely to engage in self harm and suicidal activities (H.T. Koivumaa-Honkanen et al., 2001). People with depression, anxiety disorders, or schizophrenia generally tend to have lower SWB (H. T. Koivumaa-Honkanen et al., 1999), as do individuals with other psychiatric diagnoses (Packer et al., 1997).

The penetration of mental health conditions into our lives and its persistent effect on our SWB must, in part at least, be due to difficulties that we have in adapting to these conditions compared to other diagnoses. We know, for example, that people with chronic health conditions or who are physically disabled show considerable levels of adaptation to these conditions (Hurst et al., 1994; Sackett & Torrance, 1978).

When considering adaptation, which is an important issue when measuring health in any way, and not just using measures of SWB, it is helpful to consider it in terms of attention. The impact of many things in life fades quickly, and whilst our attention may be drawn to it at first, it soon fades as we attend to something
else novel or unexpected that may follow. In this way our attention is diverted to the next new thing, which from an evolutionary and self-protective perspective ensures that we are not bogged down with constant attritions to our SWB, and our minds are freed up to focus on new issue. We quickly get used to things and this is part of the way that we can make the best of our situation. This innate mechanism helps to provide a so called “psychological immune system” (D. T. Gilbert et al., 1998), whereby we are protected against enduring long periods of low SWB, but also from long periods of high SWB.

The improvement in SWB (although not to pre-morbidity levels) after episodes of ill health has been explained by considering the role that attention has on the experience of illness. In this way paraplegia and other severe conditions can be considered as ‘part-time’ experiences, in as much as they only affect our SWB when attention to drawn to the various limitations the condition confers on the individual (P. Dolan & Kahneman, 2008). At first, when the impact of the loss of health is felt most acutely, our attention is constantly drawn to the condition, but over time as we get used to our new circumstances, and learn, for example, how to cope with reduced mobility or different needs with respect to pain control or tasks of daily living we attend less to the illness itself and more to the other areas of our life, such as how our children are doing at school, or whether we need a new car. Now this is certainly not to trivialise such conditions but to more accurately place them in the context of the richness of our lives.

We naturally adapt to some things more quickly than others. The positive impact of marriage on our SWB for example lasts for approximately five years, but is then seen to revert to baseline over time (Di Tella et al., 2007). We know that this is the case for certain health conditions as well, but in contrast, many mental health problems, such as depression, are more ‘full-time’ in their attention-seeking and impact on our lives. This is also the case for other conditions that are unpredictable, and individuals with epilepsy who have a lifetime of unpredictable seizures show some of the lowest levels of SWB due to health (Graham et al., 2011).

SWB is also affected by less attention seeking conditions. In an academically robust study using data on 16 countries, Blanchflower and Oswald (Blanchflower & Oswald, 2008) show that nations with higher SWB also report systematically lower levels of hypertension. This is interesting because hypertension is
often asymptotic and so there may also be latent effects of a condition on SWB. These findings lend further support the face validity of global measures of SWB.

All of these results cast some doubt on the popular idea that we have an in-built ‘baseline’ level of SWB to which we return. The paraplegics in the classic Brickman et al (Brickman et al., 1978) study were still less happy after a year than the control group; just not as unhappy as those focussing on their condition in particular, and not their lives in general would expect them to be. We recognise that there may be a genetic predisposition to have different baselines (De Neve, 2010) but some things, like depression, we simply do not adapt to. Even if such effects were not enduring, there will be considerable periods of time when they impact on SWB. We need to therefore capture the dynamics of SWB in response to changes in health.

The dangers of undervaluing health conditions to which people adapt well to is often cited as a criticism of adopting experience-based methods of valuation: see, for example, the critique from the ‘capabilities approach’ (Qizilbash, 2006; A. K. Sen, 1985). In moving forward with the SWB approach, we must be sensitive to the normative issues (Menzel et al., 2002) but we should also take serious notice of the conditions that are hardest to adapt to.

2.5. Conclusion

This chapter has identified that there are a number of issues with the current methods used to value health and has brought these together with evidence showing the effect that health has on our SWB. Some of the most important health state descriptive systems that are used at key levels in health policy making, especially the EQ5D, have significant structural problems. In addition to this there are also differences between the widely used health state descriptive systems, that could result in different policy decisions being made on the same intervention depending on which measure was used to evidence clinical outcome. These issues have been identified previously by research groups, but there has been no sustained argument as to where solutions might be found and no clear work on what steps might be taken.
to support policy makers when facing these problems. These issues serve as strong motivators for finding an alternative way to help support policy decisions by picking up the impacts that may not be detected using the established methods.

It is known that our SWB is improved by effective medical treatment, and numerous studies demonstrate that SWB improves when health care interventions effectively reduce symptoms (e.g. (Evers et al., 1997; Jones et al., 2007; Pressman & Cohen, 2005)). The relative effect that different aspects of health have on SWB for different treatments in different populations is less clear, although some work has been done on this is (Graham et al., 2011). The evidence from the literature is that whilst physical functioning and pain are important determinants of our SWB (Cummins et al., 2004; Windle, 2004), their impact may not be enduring as individuals adapt to their new circumstances. The opposite is seen for mental health conditions and illnesses that are unpredictable, which can have consistent and significant negative contributions to an individual's SWB.

Given this context, the policy implications that emerge can be considered in two broad areas. The first is that the current methodologies may undervalue the impact that mental health has on our health and misrepresent how other domains of health impact on our lives. With respect to mental health this relate to primary mental health diagnoses, or for example to the anxiety that individuals experience as part of other conditions. As such there is increasing concern that mental health may be underestimated or undervalued using existing measures (Dolan et al., 2009), and that other aspect of health may be correspondingly be overrepresented.

The second is that SWB measures may offer one way to address these problems. At this point the literature supports their use within clinical contexts, and work has been carried out identifying their potential role, although there is a lack of clarity and detail surrounding their application. Addressing these issues is the next step in my thesis, which sees the principles employed in SWB work in the social sciences literature translated into clinical environments and further health policy contexts. Chapter 3 sets out a model through which these concepts can be considered and specifically addresses concerns regarding the use of SWB measures in clinical populations.
3. Subjective well-being and the model of patient experience

3.1. Introduction

Concern about the quality of health care has existed for almost as long as health care itself, but there is now a renewed vigour for making quality the organising principle (Darzi, 2008; Hurtado, 2001) within health care. This has been coupled with increasing efforts to ensure that the patient is the focus of health care interactions, as opposed to the physician, treatment or condition. This quality movement has its roots in initiatives first discussed a decade ago (Coye & Detmer, 1998) and continues to be at the forefront of the health care agenda both in the USA and further afield. Measuring for quality improvement in health care has inherent benefits in terms of individual and population wide health improvement, evaluation and enhancement of treatments, and appraisal and valuation of services (Berwick et al., 2003).

Despite widespread enthusiasm and acknowledgement for the need to measure quality in health care there is as yet no clear consensus on how it should be achieved (Mayer et al., 2009). Quality of care means different things to each of the many stakeholders in health care (Chilgren, 2008), and as such a consensus definition of quality in health care can be hard to find. The chief concerns of a patient may surround accessibility, familiarity, and various hotel factors, such as a comfortable waiting room and a pleasant ward environment; a physician may place more emphasis on cancer excision margins and evidence-based practise; a manager might place premiums on cost effectiveness and service delivery initiatives. Hurtado (Hurtado, 2001) defines quality as “the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge” but such broad definitions can have limited direct applications.

There have been significant efforts to encapsulate the important facets of care that contribute to a quality service into a template from which to consider care pathways (Donabedian, 1966; Hurtado, 2001;
Maxwell, 1984; Schiff & Rucker, 2001; Sitzia & Wood, 1997), yet the degree to which clinicians and service developers have engaged with these efforts is questionable (Davies, 2007; Valderas et al., 2008). Progress has been made recently at a strategic level in many countries with the implementation of national quality programs (Agency for Healthcare Research and Quality, 2008; Australian Commission on Safety and Quality in Health Care, 2008; Department of Health, 2008) but further efforts are required before a culture of quality becomes pervasive.

Conceptual issues surrounding the definition of quality are inevitably translated to the measurement of quality. Many initiatives have focussed on descriptive measures as clinical outcomes, such as surgical wound infection rates, mortality rates and immunisation rates. These can be heterogeneous, and often actually represent only throughput or process measures, which can be poor proxies for many attributes of care quality (Mayer et al., 2009). The different types of measures used in health care to help demonstrate outcomes are set out in Figure 3.1.

**Figure 3.1 Summary of different types of measures used to demonstrate outcome**

<table>
<thead>
<tr>
<th>Objective</th>
<th>Current main area of use</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Descriptive measures</strong></td>
<td>To demonstrate clinical performance</td>
<td>National and local reporting</td>
</tr>
<tr>
<td><strong>Health Related Quality of Life (HRQoL) measures</strong></td>
<td>To demonstrate impact of treatment on health related quality of life</td>
<td>Macro level policy considerations for health technology appraisal</td>
</tr>
<tr>
<td><strong>Patient Reported Outcome Measure (PROM) – Condition specific</strong></td>
<td>To demonstrate impact of treatment on key domains of health specific to a certain illness or functions</td>
<td>Clinical trials</td>
</tr>
<tr>
<td><strong>Patient satisfaction measures</strong></td>
<td>To demonstrate the performance of the hospital or care institution in terms usually related to customer service</td>
<td>Institutional level</td>
</tr>
<tr>
<td><strong>Patient experience measures</strong></td>
<td>To demonstrate the way in which a patient feels about their care and hospital / institutional experience</td>
<td>Institutional level</td>
</tr>
<tr>
<td><strong>Subjective wellbeing (SWB) measures</strong></td>
<td>To show the impact of health on overall markers of wellbeing</td>
<td>Social sciences</td>
</tr>
</tbody>
</table>

* HRQoL measures are sometimes referred to as “Generic Patient Reported Outcome Measures” or Generic measures of HRQoL.
PROMs, which elicit the patient’s evaluation of their condition in the context of a given health care intervention or treatment, have gained prominence in recent times (Browne, 2007; Valderas et al., 2008). PROMs have been used to determine service provision, monitor intervention outcome and there are major initiatives aimed at developing these measures for use in more widespread clinical practise and research (PROMIS, 2009) and on-going work in this field in the USA has led to calls for the more widespread use of such measures in clinical and research programmes (DeWalt & Revicki, 2009).

PROMs go some way towards involving the patient in assessing the quality of their care, but are focused only on specific conditions or domains of health, and fail to capture the *global* impact of the health care intervention on the patient's life as a whole. This represents a problem with the current methodology of quality outcome measurement. A further criticism, and a major motivation for this chapter, is that current outcome measurement largely ignores the experiences of patients before and during their treatment, which are often the times that are associated with the most pain and suffering.

In a similar manner, generic measures of HRQoL also have limitations in their ability to capture the overall effects of treatment on an individual in the wider experience of their lives. The most widely used measures of HRQoL are the EQ5D and SF-36 metrics and these are often used in conjunction with PROMs to value the benefits of treatment for both individual patients and more widely for resource allocation decisions (Dolan, 1997; Giacomini, 2005). These measures, however, only value certain domains around which they have been constructed, and do not measure the overall impact of how the individual leads their life. Furthermore, these measures also neglect to acknowledge the potentially considerable effects that services and treatments can have on those closest to patients. They are in effect PROMs with a slightly broader frame of reference, and do not provide an adequate measure of experience that is necessary to appraise the quality of health care.

Satisfaction measures have also been lauded as markers of care quality, and yet these also have their shortcomings. The assessment of patient opinions and views has become part of the mainstream clinical practice and the scope of patient satisfaction assessment is broad (e.g., (Fitzpatrick, 1990; Ware et al., 1983), although the most commonly employed patient satisfaction instruments are those aimed at
assessing an overall service (e.g., assessing satisfaction of an in-patient hospital stay). The direct association of satisfaction as a marker of care quality should be treated with caution, however, as the two do not necessarily go hand in hand. A Canadian group studied 1866 patients post acute myocardial infarction and reviewed their care in terms of traditional health metrics, and also undertook a patient reported satisfaction study (D. S. Lee et al., 2008). They demonstrated that satisfaction with care was more likely in patients who were older, in those without depression, and in those with better functional capacity, but it was not associated with the quality of myocardial infarction care or survival. Furthermore, satisfaction measures can be a very narrow marker of what matters to an individual for a very short while, whereas the benefits from treatment that manifest themselves through quality care will be much longer lasting. Results from satisfaction surveys can be useful, but their significance in terms of appraising the quality of a service should not be overplayed.

The role of traditional health metrics in safeguarding and standardising patient care is undisputed. However central goals of making the patient feel better for longer can be easily lost in a world of national targets, performance benchmarks and health care league tables. What is needed is a method and a measure to join up the experiences that patients have during all their interactions with health services.

SWB is a recognised measure of the overall ‘wellness’ of an individual, and as such is fit to be used as this overall marker for how treatments affect people in the experience of their lives. In other words SWB measures the real impact that an episode of care has on the life of the individual, and we know that SWB correlates predictably with many objective circumstances (Lyubomirsky et al., 2005). In various guises, SWB actually has had a long tradition in health care (Bowling A, 1997; Fitzpatrick et al., 1992) and as has been discussed in Chapter 1 is increasingly being considered as a suitable metric for policy analysis (P. Dolan & White, 2007; van Praag BMS et al., 2003).

In the broadest possible sense, the objective of any quality health care intervention is to make the patient better for longer. This may be as simple as prescribing the correct antibiotic for a chest infection, or it may be the result of a complex multidisciplinary care package involving numerous health care professionals. In any given episode of care, there will be many aspects that contribute to the overall
quality of care, and all will contribute to an individual’s SWB. In essence, SWB represents a complete overall indicator of the impact of experience, and as such can be the ultimate reflection of the quality of care received. SWB is not yet formally recognised as an outcome measure, and yet it holds the most promise for a true account of how patients perceive the quality of their care.

There is currently inadequate overall appraisal of the impact of health care on patients’ lives and as such there are clear motivations for exploring the associations between patient experience and SWB in the episodes of health care. In this respect, more needs to be done to join-up PROMs at the micro level with HRQoL measures at the macro level, and I suggest that measures of SWB provide one way of doing this. Furthermore, using a global measure such as SWB will also enable us to recognise and value the impact that carers and family have in relation to care quality, thereby truly joining up measures of patient experience. SWB measures allow for generalisability across conditions and treatments, across patients and non-patients, and over time in ways that existing measures, designed for different purposes, do not. The currency of SWB allows us to place health conditions and health care in their appropriate context, without focussing respondents’ attention on the things we as researchers or practitioners think they should focus on. In a nutshell, SWB can provide data on the ‘epidemiology of experience’ in different clinical areas.

In line with these considerations, here is proposed a definition of quality in terms of the impact of an experience of health care on a patient’s SWB. There are three key concepts of importance in this definition of quality: experience, health care and SWB; and the rest of this chapter is devoted to defining, illustrating and discussing these concepts, their relationship and application.

In the second section, a temporal model is presented that joins up the key issues of health care experience and SWB, which can be applied to any episode of care. Each consecutive phase of the model is then discussed in turn alongside evidence and rationale for using SWB as a measure to value the impact of health care on the lives of patients and their carers. The third section discusses how to use SWB as a global measure of quality in clinical practice and outlines practical methods to enable adoption of this approach to valuing the patient experience.
3.2. A Temporal model of patient experience

The three key concepts of patient experience, health care and SWB are joined up together in the temporal model set out in Figure 3.2. Next each concept is defined briefly in turn.

Figure 3.2 The temporal model of experience

Health care can be considered as a series of discrete episodes of care, each of which has three stages of an individual’s interaction with health care services – pre-treatment, treatment, and post-treatment. Pre-treatment refers to the time period before health care is accessed. Treatment is the period during which treatment is received and is a broad term that encompasses therapy (e.g. speech therapy, cognitive behavioural therapy, physiotherapy etc), surgical procedures, and medical and pharmacological treatments. Post-treatment is when treatment is evaluated and follow-up is initiated and conducted. The model set out in Figure 1 relates an individual’s experiences with the three stages of their interaction with health care services. These stages can be fluid and their interfaces may overlap to some degree and in this respect the adoption of a universal measure of quality, as proposed, that can be valued along the whole pathway of care is particularly suitable.
It seems to make sense when appraising the quality of any episode of care (e.g. an outpatient appointment) from a patient’s perspective that we should pay attention to the domain of patient experience. This somewhat nebulous, yet often discussed, term represents the patient’s account of all factors that have contributed to their care including patient’s expectations, hotel factors, agency interaction (interpersonal factors) and clinical outcomes. These patient experiences will be in relation to individual pathways of care, and can be considered in terms of the temporal model.

During the pre-treatment phase the individual will have expectations about the care that they are due to receive and the standards that this treatment should meet. They will also experience various symptoms and form beliefs about the nature of their health condition. The treatment phase gives rise to immediate clinical results (e.g. resection of a tumour, or angioplasty of an artherosclerotic artery), which can be objectively assessed, or subjectively valued using PROMs. In addition, the individual will be constantly evaluating the quality of the care that they receive against their expectations and this is integral to their patient experience. The post-treatment experience will naturally be affected by the success of the treatment (e.g. repair of a hernia or treatment for a stroke), and again this can be valued objectively by health care professionals (e.g. blood pressure treatment) and subjectively by the individual, using PROMs. Importantly, the individual will make an evaluative judgement in this post-treatment phase regarding their overall care. This will inform on the overall satisfaction and it is this remembered experience that is so important, as it will go on to affect future episodes of care. This model serves as a template from which to consider any patient pathway, and as such the post-treatment experience from a given episode of health care will feed into the pre-treatment experience of the next episode.

Valuing the patient experience over the three phases of treatment can be considered as a new direction in quality appraisal. In order to value the patient experience, a global measure such as SWB is needed that can reflect the impact that treatments have on an individual’s life as a whole and can join up these experiences over the stages of the treatment experience. The model postulates that the experience during any phase of treatment will have a bearing on the SWB of an individual. There is, however, an important reverse causality in this dynamic and this is rarely captured or considered in existing appraisals of care quality. Essentially the pre-existing, or underlying, SWB that an individual enjoys will have a bearing upon
the experiences through all stages of treatment. Thus an individual with a lower SWB would have a different experience in the pre-treatment stage than someone with a higher SWB. This is important both in terms of service development and for accurately valuing the quality of a treatment, particularly in individuals with mental health conditions. It follows that efforts and policies that promote SWB in their own right could have an impact directly on the health of individuals, although the details of these mechanisms are often unclear.

Next, the three stages of health care as set out in the model are discussed, demonstrating the mutual causal relationships between patient experience and SWB. A wealth of evidence is presented that populates our model of patient experience. Examples from the social science, medical and psychology literature are described, which are of clear relevance and importance to clinicians, policy makers and patients. This chapter is not intended to be a systematic review of SWB literature, nor does it seek to explore every domain that could influence the patient experience. It does however present a simple model through which to approach the concept of patient experience and examines how and why this can be valued using measures of SWB to appraise the quality of care.

### 3.2.1. Pre-Treatment Experience and SWB

The quality of the experience in itself will affect an individual's SWB. Factors such as underlying health state, self-perceptions of health and daily activities all come to bear during the pre-treatment experience. Despite the impact that the pre-treatment experience has on an individual’s SWB, existing markers of quality of care rarely assess this. But it is also true that a patient’s SWB is a major determinant of the pre-treatment experience. Evidence about this two-way causality is presented in turn.
3.2.1.1. Pre-Treatment Experience Affects SWB.

Specific health conditions such as myocardial infarction and stroke reduce SWB (Shields & Wheatley Price, 2005) and in such conditions the rapidity of onset of symptoms, often with minimal warning, heralds the archetypal negative health state seen in the pre-treatment phase of patient experience. Individuals with more chronic conditions also experience reduced SWB when entering the different phases of patient experience as they re-present with flare-ups or exacerbations of their illness, and will cyclically pass through the pre-treatment phase of the experience model.

Severe health problems that interfere with daily functioning can substantially lower SWB, as can life-threatening illnesses. Verbrugge (Verbrugge et al., 1994), as discussed in Chapter 2, found that the SWB of people with serious chronic illnesses, such as congestive heart failure, declined over one year, and it has been shown that illnesses that cause pain and restrict movement lower SWB (Celiker & Borman, 2001), but that this may not be long lasting unless the pain is severe.

In addition, psychiatric disorders almost always cause low SWB (Packer et al., 1997). People with depression, anxiety disorders, or schizophrenia tend to have low SWB (H. T. Koivumaa-Honkanen et al., 1999), which also holds for bipolar disorder (Arnold et al., 2000). This evidence lends support to the fact that even though mental health interventions do not always permanently cure mental disorders, they can nevertheless offer considerable increases in SWB.

The relationship between objective health and SWB can, however, be small (Brief et al., 1993; Okun & George, 1984) in the general population, particularly in those that report no health problems. One longitudinal study for example failed to find a direct effect of objective health (measured by clinician visits and hospital admissions) on global life satisfaction (Brief et al., 1993). Instead this study showed that SWB was predicted by subjectively interpreted health, which was influenced by both negative affect and by objective measures of health. Therefore, self-rated health measures reflect not only one's actual physical condition but can also be due to one's level of emotional adjustment (Hooker & Siegler, 1992).
3.2.1.2. SWB Affects Pre-Treatment Experience.

An individual’s SWB during the pre-treatment experience has been shown in numerous studies to have a considerable bearing upon the effectiveness of treatment as shown by a range of outcome measures. Marmot (Marmot, 2003) demonstrated the association of low overall SWB with poor general health, and reported correlations of approximately 0.60 between low SWB and subjective poor health in the Whitehall sample of British civil servants. Such low SWB also influences pain and, importantly, whether people seek treatment for pain. People with low SWB have a more difficult time coping with pain than people who have a higher SWB, and retrospectively overestimate their previously experienced levels of pain (Keefe et al., 2001). This association with SWB and ill health has been shown to go further still by a longitudinal study in Scandinavia that found low SWB was a predictor of fatal accidents (H. Koivumaa-Honkanen et al., 2002).

In the mental health domain, Deiner (Diener & Seligman, 2002) found that the happiest people showed very low levels of symptoms of mental illness. Conversely individuals with lower SWB are more likely to take risks and put their life in more danger. At the extreme end of the SWB scale, patients with minimal SWB will engage in self harm and suicidal activities (H.T. Koivumaa-Honkanen et al., 2001).

An important study performed by Kopp (Kopp et al., 2003) found that greater preoperative SWB predicted better recovery from surgery, and demonstrated the significance of preoperative SWB and its effect on the traditional measures of quality of care. This correlation between pre-treatment SWB and recovery has significant implications in terms of patient care. It follows that by improving pre-treatment experience, and its impact on SWB, a demonstrable increase in quality of care can be shown. It is in the development and identification of studies such as this that novel approaches to improving both quality of care and patient experience can be achieved.

Pre-treatment experience is rarely measured when assessing quality of care, but it is important to patients, has an impact on their health outcome, and is a key determinant of their SWB. It should not be neglected by clinicians, commissioners and policy makers as merely a ‘run in’ to clinical services, especially as the
patient may spend a long period of time in this phase of care, particularly when considered from a lifetime perspective.

3.2.2. Treatment Experience and SWB

Health care interventions and treatments aim to make people better for longer by improving their health, and in doing so improve their SWB. The exception to this is of course palliative care, where the primary emphasis is directly focused on improving SWB. Regardless of the specialty, however, the treatment experience in itself will impact on SWB, and underlying SWB will also affect treatment experience. A patient’s experiences as they receive treatment, as well as the relationships between patients and carers during this period, are not routinely measured, despite their inherent importance, and these issues are examined in this section.

3.2.2.1. Treatment Experience Affects SWB.

There is considerable evidence that SWB is improved by effective medical treatment, and numerous studies demonstrate that health care interventions not only reduce symptoms, but also increase SWB. For example, the reduction in joint inflammation seen in arthritis patients following successful treatment is accompanied by a lessening in levels of anxiety and depression (Evers et al., 1997). Psychological functions such as cognitive, emotional, and SWB also usually improve during hospital stay (Verbrugge et al., 1994), but interestingly, physical and social functions improve less quickly and on occasions even diminish, probably due to deconditioning and extensive assistance during hospitalization.

Clinical outcomes are the existing measures that are traditionally collected at the end of a patient’s treatment, and in fact there are very few routinely used measures that value a subjective or objective account of care during the treatment phase. In the model, there is an interface between ‘treatment experience’ and ‘post-treatment experience’ and it is from this point onwards that existing quality
assessments are usually made. Accordingly these measures are considered in the section on post-treatment experience. It must be clearly stated, however, that it is these clinical outcomes that are proxies for the quality and effectiveness of any treatments or interventions that a patient experiences, and that these affect SWB in a whole host of ways.

In the case of the palliative care of terminally ill patients, the individual’s treatment experience is in itself the most important outcome. During a patient’s palliative care treatment, which may last for many months, evaluations are often made in routine clinical practice that appraise the individual’s quality of life as a marker for the quality of care. Even in this population however it is acknowledged that there is a lack of evidence of SWB and quality of life assessment during the dying process (Kaasa & Loge, 2003; Lo et al., 2002). There are numerous scales in the palliative care setting in which the negative effect of pain on HRQoL and SWB can be determined (Finlay & Dunlop, 1994). Pain has a negative impact on quality of life (Chang et al., 2006; Lorenz et al., 2008; Ventafridda et al., 1990) and it is well known that appropriate analgesia can improve quality of life and well-being (Doyle, 2003; Higginson, 2000).

There are a number of other symptoms and dimensions of care in the palliative setting that have also been shown to improve HRQoL. In a recent review of palliative care patients with anxiety and depression (Delgado-Guy et al., 2008), those with higher levels of anxiety expressed a significantly higher frequency of nausea, pain and dyspnoea as well as expressing a higher intensity of pain, fatigue, worse appetite, and worse well-being. The impact of anxiety and depression is also shown by (K. G. Wilson et al., 2007) and approaches to these issues clearly reviewed by (Kelly et al., 2006).

These studies collectively form a convincing body of work that illustrate a key point in the application of SWB as a measure for the overall quality of care. Whilst each individual performance measure (e.g., appropriate and adequate analgesia) is important, in terms of appraising the overall quality of care, the chosen metric must be one that cannot be easily skewed by a simple adjustment of resources, and must be affected by key attributes of care that are important to the patient and their carers. In this respect, SWB serves not only to evaluate the care quality provided by a given service, but can be used to compare performance of different units to identify areas of quality care improvement.
The care and SWB of patients is central to any health care intervention or treatment. The welfare of the family and carer, however, is being increasingly recognised as an important issue in delivering services, particularly to individuals with chronic or terminal conditions. Traditionally the views and involvement of carers have been taken into account informally as part of the care pathway, with more or less attention being paid to them depending upon agency perceived need (Carers UK, 2008). This can be effective in some, usually straightforward situations, for example where mobility or access needs must be adapted. There are areas however in which the lack of carer involvement with the treatment experience has a negative impact on the patient’s, and potentially the carer’s, SWB. The 2008 sentinel stroke audit will be the first UK national study to assess the level of involvement of and communication with carers, with regards to a specific condition, and such initiatives are to be commended for highlighting this important dimension of care.

Significantly, treatments that involve the patient and their carers have also been shown to promote SWB of both parties. For example, programmes treating alcohol misuse that involved the patient’s spouse led to gradual improvements in abstinence, as well as higher reports of SWB and lower rates of marital separation (McGrady et al., 1991). Similarly, Longabaugh et al. (1983) found that two treatments for alcoholism that involved spouses were equally effective in producing abstinence, but that the treatment that allowed patients to go home at nights and on weekends rather than remain hospitalised led to reports of higher SWB.

There is great deal of scope for this area to be developed. In social health care programmes, there is a strong case to be made for the valuation of carers’ and relatives’ SWB when considering expensive novel therapies, such as second or third line cancer drugs. In such examples, the improved collective SWB of the family or patient-carer as a result of interventions, that may not necessarily prolong life for a great period of time, could be considered a strong enough reason to endorse these therapies despite their high cost.

In summary, unlike the pre-treatment experience, the treatment experience is already acknowledged as being important in terms of care quality. It is clear that an individual’s SWB is promoted by effective
treatments and can also be seen to improve when wider factors, such as carer involvement, feature within their care. There is a lack of measures that are routinely employed to value the experiences of patients and their carers during the treatment phase, when the individual may be at their most vulnerable, and measures of SWB are ideal to help join up these experiences along the treatment pathway and across the different people that have an impact upon quality of care. It is only by adopting such methods that a meaningful appraisal of how treatments impact on the lives of patients can be developed and acted upon.

3.2.2.2. SWB Affects Treatment Experience

There is causation from SWB to health, which supports anecdotal evidence and general medical experience that happier people “do better”. Pre-existing SWB has a sizeable role to play in the treatment experience (Carr et al., 2001), and there is good evidence to demonstrate this. A study in the 1980s demonstrated that that patients with end-state renal failure were more likely to survive for 4 years or more if they were happy than if they were not (Devins et al., 1990). Further work has shown that hope was associated with increased survival time in cancer patients (Faller et al., 1997), and optimism has consistently been found to predict outcomes in cardiovascular disease. For example, greater optimism is associated with lowered reports of symptoms of angina in cardiac patients (Fitzgerald et al., 2000). Overall survival is also affected by SWB, and individuals with a positive outlook on life live longer (Pitkala et al., 2004).

Conversely, negative emotions can often predict worse health outcomes. A study of cardiac patients demonstrated that those with mood disturbances such as depression were particularly likely to show increasingly poor functioning over time, and also exhibited worsening of cardiac symptoms (S. P. Clarke et al., 2000). Stress has also been related to changes in the immune system, which are in turn followed by inflammation and increased pain (Zautra et al., 1998). Further work has shown that low SWB as evidenced by psychological distress has been shown to be a predictor of fatal ischaemic stroke (May et al., 2002), and that individuals are more likely to die in the next year if they have fair/poor SWB compared to excellent/good SWB (Ried et al., 2006).
A poor treatment experience, in terms of lower measures of satisfaction with care, has been seen in those patients with low HRQoL and psychological distress (Greenley et al., 1982; Weingarten et al., 1995; P. M. Wilson et al., 1995), whereas positive psychological well-being (self-administered questionnaire) has been shown to be an independent marker of survival in patients with inoperable small cell lung carcinoma (Kaasa et al., 1989)

In addition, intervention around quality-of-life issues, even when they seem unrelated to a patient’s presenting complaint, may increase a patient’s satisfaction with treatment that is distinct from treatment outcomes such as symptoms relief (Frisch, 1998). This is an increasingly important feature of managed-care-sponsored outcome evaluations (Attkisson & Greenfield, 1994). These studies evidence the fact that certain outcomes will be influenced by the patient, and in this respect what is effective for one group of patients may be less effective for another based upon the patients underlying SWB.

3.2.3. Post-Treatment Experience and SWB

The lasting effects that treatments have on an individual and the effects that these have in terms of the wider experience of their lives is what should be valued in the post-treatment experience. What is often the case however, is that isolated clinical outcomes or productivity targets are regarded as surrogates for quality of care, and the overall objective of making the patient feel better for longer is again lost. Measuring SWB in response to treatments and interventions will not only help appraise the quality of care associated with a particular treatment, but will also join up the experiences form the previous stages of treatment.

3.2.3.1. Post-Treatment Experience Affects SWB

There is considerable evidence demonstrating that effective treatments have a positive impact upon SWB. SWB improves greatly in the first month after treatment and then stabilises to one year post discharge
(Verbrugge et al., 1994), and it has been shown that positive states of SWB generally correlate with better physical health (Murrell et al., 2003; Ostir et al., 2000) supporting the premise that effective treatment will improve SWB.

More specific work has shown that in breast reduction surgery (Thoma et al., 2007) the SWB effect of the surgery translates into an expected lifetime gain of 5.32 QALYs (equivalent to each patient living an additional 5.32 years in perfect health). Surgical intervention for particular disease related symptoms has also been shown to improve SWB. Gastric fundoplication surgery for gastro-oesophageal reflux disease improves SWB to pre-symptomatic levels and in some cases higher than pre-symptomatic levels (Nilsson et al., 2004).

Overall improvements in SWB and HRQoL have been shown in many areas as a direct result of surgical intervention. Improved HRQoL in individuals with peripheral arterial occlusive disease was demonstrated following endovascular intervention by means of percutaneous transluminal angiography with balloon angioplasty (Slovacek et al., 2008), and temporal lobectomy for temporal lobe epilepsy has been shown to improve HRQoL and SWB (Lowe et al., 2004). Transurethral resection of the prostate not only proved to be clinically effective, but also improved patients’ QoL and other symptoms. This was associated with long-term, high patient-rated satisfaction (Mishriki et al., 2008).

The post-treatment experience has a lasting contribution in terms of SWB also for individuals with severe emphysema who have undergone lung volume reduction surgery. These patients demonstrated an improvement in disease-specific symptoms and overall HRQoL over a two year follow-up period (Hamacher et al., 2002). Surgical intervention for psycho-social indications has also been shown to improve SWB. Individuals who underwent sex reassignment surgery (SRS) in Oregon reported overwhelmingly that they were happy with their SRS results and that SRS had greatly improved their HRQoL (Lawrence, 2003).

In terms of pharmacological intervention, there is not as much evidence that isolated treatments directly affect SWB. It has been demonstrated, however, that commonly used atypical antipsychotic drugs
improve SWB in patients with schizophrenia (Naber et al., 2001), and furthermore, that the use of antipsychotic medication in an outpatient setting also improves SWB in individuals with the same diagnosis (Wehmeier et al., 2007).

Conditions that confer a reduction in an individual's health will often cause a reduction in SWB, and this has been clearly shown in the case of stroke. Also, post-treatment conditions that interfere with daily functioning will continue to produce marked decrements in SWB. For example, a study of transplant recipients found that nearly half report clinically significant levels of distress (Stilley et al., 1999). The same is true of certain mental health conditions such as depression, and chronic illnesses where there is a continued focusing effect on health or loss of function. Reassuringly, this decline in SWB can be modified by health care interventions (P. Clarke et al., 2002), which may not necessarily be pharmacological or surgical in aetiology. There is strong evidence that exercise training for patients with chronic heart failure reduces mortality, hospital admissions due to heart failure, and cardiac events, whilst also improving quality of life (Belardinelli et al., 2000). Furthermore, patients with multiple sclerosis have greatly improved SWB following courses of physiotherapy (Wiles et al., 2001), and enrolment in the cardiac rehabilitation programme in Korea has been shown to confer significant improvements in HRQOL outcomes and exercise capacity to patients post myocardial infarction (Choo et al., 2007).

This evidence linking effective treatment to SWB is a powerful body of work, and as such the use of SWB, or another such global measure of wellness, as a tool for measuring the quality of interventions is increasingly seen as an appropriate measure.

3.2.3.2. SWB Affects Post-Treatment Experience.

Variations in SWB have been shown in themselves to affect the treatment outcome, and this is an important consideration. There is convincing evidence that SWB affects post-treatment recovery and rehabilitation, and this supports other work demonstrating the association between SWB, as evidenced by positive affect, and health (Pressman & Cohen, 2005). Studies have showed that the SWB of individuals
when they entered a whiplash rehabilitation programme predicted whether these patients were doing paid work two years later (Heikkila et al., 1998), and that greater functional improvement was seen at three and 12 months following knee surgery in patients with less anxiety and depression prior to surgery (Faller et al., 2003).

In addition, reports of high and low SWB correlate positively and negatively, respectively, with longevity, and subjective health (i.e., how people evaluate their symptoms and health state). For example, greater optimism is associated with greater longevity and lowered rates of nonfatal heart attacks (Kubzansky et al., 2001). Kubzansky (Kubzansky et al., 2002) also found similar evidence that people with an optimistic explanatory style had better pulmonary function than people with a more pessimistic style, and showed a slower decline in health over eight years.

These examples highlight the fact that an individual’s SWB can have a significant bearing on their outcome as measured by traditional health metrics. This can only support the argument that such measures are prone to being focused on individual domains of health, and fail to value wider experiences.

### 3.3. Measuring SWB in clinical contexts

Having established that SWB is an important ingredient in the definition of quality, it is important to point out the role that it can play in the measurement of quality. Only then can we integrate theory into practice to better join up health care quality. By using SWB we can join up the various stages of the health care process across people using a measure that matters to them. Thus, SWB can help provide a more complete picture of the effects of health care.

The effects that health care has on an individual will be reflected by the improvement or deterioration in that individual’s life as a result. This can be measured across the stages of treatment using SWB to value the more global impacts of health care that other outcome measures fail to capture. By utilising an already widely used global measure such as SWB in a systematic manner we can effect a real appraisal of the
quality of care associated with any clinical pathway. In particular, this approach to the measurement of quality embodies the temporal model by answering three key queries: what, how, and when do we measure? These questions are answered by referring to the three concepts defining quality: We should measure the impact of experiences on self-reported SWB during the different stages of health care.

Advances have been made in terms of identifying precisely what should be measured, and how, and this continues to be an area of innovation (P. Dolan & White, 2007). As such there are many ways of tapping into different components of our thoughts and feelings that are already used by researchers and policymakers. Current initiatives should focus on ‘joining-up’ or integrating these measures in ways that will allow us to fully represent an individual’s SWB over time.

It should be noted, for example, that correlations between objective physical health and SWB can be low in the nonclinical population when people report generally good health (Brief et al., 1993; Okun & George, 1984). This is in part because people appear to adapt over time to many illnesses, and not because most people are actually relatively healthy. Thus, as patients return to normal daily life, where their health no longer dominates their attention, health related matters will impact less on their SWB. This effect has been exemplified by a study into stroke rehabilitation where greatest improvements in SWB were in those who had returned to work (Vestling et al., 2003). Such individuals’ focus was more in line with their pre-morbid functioning, and as such there was increased adaptation. Another example of this effect is in respect to individuals with paraplegia, where SWB values taken vary depending upon whether reference is drawn to their paralysis. A duration-weighted measurement of affect will uncover that conditions such as paraplegia are not full-time states; they are experienced part-time (Kahneman & Krueger, 2006). These results suggest that the time interval between the end of the treatment experience and the point at which SWB is measured will have a bearing on the relative effect the intervention has on the SWB. A highly effective treatment, representing excellent quality of care, may show an improvement in SWB initially post procedure, but at some point this will fade as the individual re-enters the non-clinical population.
A further important methodological issue when considering the measurement of outcomes in health care is with respect to focusing effects. This relates to the way that our attention is drawn to a particular subject by prompts or cues that may not be the intention of the researcher. For example, in a clinical study that investigated the effect of treatment on hip pain, if the patient is confronted with a questionnaire entitled “hip pain questionnaire” or a subsection entitled “hip pain questions” their attention is immediately focused on pain, and they are more likely to report higher levels of that symptom as a result (Schkade & Kahneman, 2002). Careful consideration of these questions from a psychological perspective may lead to the title being changed to simply “participant questionnaire” or another term that does not focus on pain. Inevitably direct questions about pain, or other symptoms, may well need to be asked but this can be done without focusing the attention on a particular dimension from the outset. This is particularly relevant to broad measures of health and SWB. For example, responses to questions regarding overall life satisfaction can be strongly influenced by focusing effects due to the title of the questionnaire or preceding questions, that may serve to reinforce the symptoms or ill health that a patient experiences. Accordingly measures of SWB should be posed as the initial questions in a study questionnaire so as to avoid these focusing effects, and in developing study questions, experienced psychologists should be consulted to assist researchers with these matters.

Such issues represent areas for careful methodological development rather than insurmountable obstacles to progress. In practical terms, the existing robust framework for measuring SWB employed in other fields can be developed alongside new initiatives that seek to measure SWB in health care. Furthermore this approach is not inconsistent with the principle of QALYs as a means of comparing the effectiveness of different treatments over time (P. Dolan, 2000). It simply varies in its practise as SWB measures will be elicited rather than health state. In fact maintaining certain aspects of the existing QALY approach makes a lot of sense as it will ensure that the duration of benefit attributable to a given treatment or intervention is valued. After all, the ultimate objective has to be providing a better quality of life for longer for our patients.
3.4. Conclusion

Existing quality measures do not adequately account for the effect that health care has on the patient's overall SWB. All stakeholders within health care endeavour to make the patient feel better for longer, and this improvement in an individual's quality of life, as a whole, must be the global aim of our collective efforts.

In achieving these goals, we must also be mindful of the fact that those closest to the individual receiving treatment will almost always experience a burden of care to a greater or lesser degree. It is important that these issues are formally measured when appraisals of treatments and procedures are considered in terms of quality and cost-effectiveness.

The treatment experience, as set out in this model, allows for the consideration of all aspects of the health care process that a patient may receive, engage in and benefit from. Isolated health metrics that examine particular facets of care are useful in shaping the details of service provision, in ensuring that standards of care are met, and the individual performance improvements made as a result will impact on the quality of care provided. These improvements in quality of care will collectively serve to reduce mortality and morbidity, and in the majority of cases aim to provide the patient with a better quality of life for longer.

In terms of assessing the overall quality of care, however, a more global appraisal of the patient's experience needs to be taken. The effect that a health intervention has on a patient's overall quality of life is the key indicator of quality of care, and yet this measurement does not show up in the majority of existing health metrics, particularly in the pre-treatment and treatment stages of the patient experience. Quality care will, as has been shown, promote SWB, and it is this change in SWB in response to health care that can be taken as a true marker of quality of care.

Given that the central aim of modern health care is to ensure that as many people as possible stay in good health for longer (Darzi, 2008), efforts should be directed to incorporate SWB evaluation into quality of care assessment and to make this subjective outcome evaluation a focus of quality metrics. Achieving this in a clinical setting is not necessarily straightforward, however, there have been great advances in
systematic collection of subjective assessments in recent years. The next stage in moving forward from the conceptual framework into empirical studies, and the natural progression for this work, is to incorporate the systematic use of SWB measurement in a clinical setting. Studies with these overall objectives are set out in chapters four five and six.
4. SWB in clinical context: hernia surgery

4.1. Introduction

The end point of a health care intervention should be an improvement of an individual’s SWB, as set out in Chapter 1, and as such measuring SWB in response to treatment offers one way of appraising the effectiveness of this treatment. Capturing and measuring the flow of experience (as measured by SWB) that patients enjoy during their treatment is a focus of this chapter and represents an area where very little work has been carried out on a practical level before. This is a new development in the field of SWB and quality and outcomes research. Measuring the outcomes of patients is a major priority for both the staff looking after them, and the organisation within which services are being provided. This study was conceived to better capture the impact of treatments on the lives of patient using cutting edge academic theory with simple and easy to complete questionnaire style survey metrics. In doing so it puts into practise the theoretical framework set out in Chapter 3, whereby SWB and health metric data are collected alongside each other with respect to a particular health care technology.

This work serves to measure the experience and impact of a specific health care intervention, namely hernia surgery, on a clinical population in terms of SWB and health status, and also identifies how this relates to patient satisfaction. Alongside these new data a further major output is the development of research methodologies that have allowed the collection of information and follow up protocols for clinical populations. This is a further new contribution to the field of SWB research.

4.2. Background

There is increasing emphasis within the health care community on championing the role of patient experience, both in the UK NHS (Darzi, 2008) and further afield (e.g. Australia (Australian Commission on Safety and Quality in Health Care, 2008)). UK governments have stressed the importance of paying
attention to the view of patients from as far back as the Griffith Report in 1983 (Department of Health and Social Security, 1983), but there has been little detail of how this could and should be achieved. Although this has been taken up with enthusiasm by many stakeholders, the means and the methods for eliciting and aggregating this information can be difficult to provide, challenging to organise and represent considerable up-front costs (Mayer et al., 2009).

It is also the case that whilst there is consensus as to the general sentiment of valuing the views of patients, the exact parameters that are important to people have suffered from a lack of clarity and academic scrutiny (Pettersen et al., 2004). There is inherent value in ascertaining the patient’s perspective of the care that they receive so that a coordinated and meaningful appraisal of services can be made, but often the data produced by institutions is unhelpful and too broad.

In measuring the SWB of patients in response to treatment we are able to pick up how an individuals' life is going at that time. We are able to use changes in SWB to show the impact that the health care has had on patients and in this way it can be considered as a marker of patient experience and of clinical outcome.

There is wealth of literature regarding “patient satisfaction” and “patient experience” that has arisen from a well-motivated desire to improve care provision and quality. This area of work overlaps with the central theme of using SWB in clinical environments, and so a brief review of the literature is helpful. It must be stated up front that the novel uses of SWB in patient populations set out here seek to measure the impact of care in the experience of an individual’s life. This is a new development from existing approaches to patient experience and satisfaction, that work in a narrow siloed manner and that are usually focused on health care environments and customer service relate issues.

4.2.1. Patient satisfaction – a brief summary

Simple “satisfaction with care” questions have previously been central to gauging the patient’s opinion of the services that they have experienced. In its most simple usage this has previously taken the form of a
short questionnaire that patients complete on leaving the hospital or clinic to provide feedback to the
management or, less commonly, to the clinical teams that were providing their care. The origins of this in
the NHS are not well documented, but seem to have initially transferred from customer services
initiatives in other sectors and to have then been adopted in a health setting.

However such questions can have limited usefulness in terms of improving and adapting services, and
may not have an impact on valuing the benefits of resources that have been invested in treatments. Other
than the fact that it seems sensible to pay attention to what patients think of the services that are
provided, the role of patient satisfaction as we understand it has it roots in the work of Donebedian
(Donabedian, 1966). There has been a great deal of work into the field of patient satisfaction both in
terms of the resources invested by health care providers into eliciting responses from patients and carers,
and also in terms of the academic research that has grown up around it. The 1980s saw a number of
theories of patient satisfaction develop. The discrepancy and transgression theory of Fox and Storms
(Fox & Storms, 1981) stated that patients were satisfied if the health care “orientations” of the patient
and the health care provider were aligned, but if not then they were not satisfied. Ware (Ware et al., 1983)
proposed a theory that focused on the components and determinants of health care, where a patient’s
satisfaction was related to their subjective response to experienced care, mediated by preferences and
expectations. The role of expectations and personal beliefs of care was also central to the expectancy-
value theory proposed by Linder-Pelz (Linder-Pelz, 1982), which accounted for variations in satisfaction
based on differing expectations. A further theory, published by Fitzpatrick and Hopkins (Fitzpatrick &
Hopkins, 1983) set out the case that satisfaction was related to the degree to which the health goals of the
patient had been achieved, and that these were socially mediated.

Despite the solid academic grounding that the concept of patient satisfaction measurement has enjoyed,
there remains a mismatch between what is measured and what bearing it has on health care. Boyer (Boyer
et al., 2006) eloquently describes how results from the mandatory assessment of patient satisfaction in
French hospitals since 1998 have been used to improve the amenities, environment and hotel factors for
patients, but not necessarily to improve care. Numerous authors (e.g. (Boyer et al., 2006; Gill & White,
2009; Nguyen et al., 1983) have cited the lack of clarity of the concept of patient satisfaction and that this
represents a major barrier to more meaningful results. This is exemplified by the fact Crowe et al.'s 2002 review (Crow et al., 2002) that identified 37 papers that investigate methodological issues surrounding patient satisfaction and then 138 studies examining the determinants of patient satisfaction. The authors concluded that there remains widespread agreement that the definitive conceptualisation of patient satisfaction has still not been achieved and that there is also a lack of clarity surrounding the process by which a patient becomes dissatisfied.

Alongside issues of ambiguity around the construct of patient satisfaction, the emergence and adoption of numerous different satisfaction scales in the 1980s also resulted in early difficulties comparing results from these scales (Nguyen et al., 1983). More recently, Hawthorne (Hawthorne, 2006) reviewed both web-based and journal articles meeting inclusion criteria on patient satisfaction and found that the majority of papers did not report patient satisfaction adequately, or discuss the psychometric bases or methods that underpinned these measures. This was further highlighted by Gill & White (Gill & White, 2009), who reviewed five of the most extensive reviews of patient satisfaction measures and found that there were consistently poor methods employed in the patient satisfaction literature with respect to methodology and the validity of patient satisfaction measures.

The heterogeneity of different patient satisfaction measures means that whilst there is a consensus that the concept is often ill defined, there is also considerable variation in the way that it is measured. Furthermore it is often the case that it is taken as a surrogate for both process (e.g. satisfaction with how the service was delivered) and outcome (e.g. satisfaction with care rather than a health outcome). This is obviously confusing for both providers and users of health care and only serves to complicate an already nebulous construct. Patient satisfaction ratings can also be criticised for focusing on the provider’s agenda of what satisfaction should be based on, rather than taking into account what the users of health care regard as important. Perhaps this has been the main issue with such measures, that whilst they can show how satisfied with the canteen selection of sandwiches or the availability of parking, there is often difficulty in relating these issues to the real experiences of patients.
4.2.2. The move to measuring patient experience rather than patient satisfaction

In light of these and other issues (primarily response issues that are discussed later) there has been a decline in the use of patient satisfaction questions. In particular, broad questions regarding generalities of service (e.g. how satisfied were you with your care at XX hospital?) have been used less often in isolation, as if used in the absence of questions anchoring the individual patient to the care received they can be next to meaningless. Global satisfaction ratings can play a role in identifying macro level trends, but only if asked in an appropriate setting and alongside additional parameters. The acknowledgement of the limitations of patient satisfaction instruments and approaches has led to a greater interest in patient experience, although there remains a great deal of confusion (and conflation) between these two terms.

Rather than simply rating services as excellent, good, fair, poor or very poor (or a similar range of descriptive terms), measures of patient experience used by institutions aim to capture the richness of what patients (and potentially their carers and family members) enjoy by typically drilling down into details of care and service provision. They tend to target specific facets of care such as individual services or clinicians, and also enquire into those areas of care that individual patients regard as most important (de Silva, 2013).

There are a number of problems with the way that patient experience data are collected and utilised. One issue is that the questions employed may be either too broad so they do not pick up any meaningful information, or be too focused so that they can only relate to a very small area. Moreover they have often been undertaken as a way of paying lip service to a guideline or target and have not been designed to genuinely improve a service or care pathway. A further problem, as alluded to above, is that there is a disconnect between the objectives of those organising services and those involved in delivering the care. Accordingly, initiatives designed to capture patient experience may neglect to measure any aspect regarding the outcome of health care intervention, as those co-ordinating such programme may have little involvement with direct clinical care.

Global assessments of experience can be very informative, and in fact there is good evidence to show that measures of overall experience are the most useful indicators as they are often asked up front and without
the biasing effects of asking questions relating to other aspects of care. However in the absence of any clinical details these broad top-level data can be meaningless. Other important issues to consider involve incomplete and disproportionate patient sampling, and the fact that many patient experience measures stretch to several pages and are very burdensome for patients to complete.

Crucial to work into patient experience is the design of the questions themselves. The insular way in which many individual hospitals historically developed their own tools and strategies for this has meant that very little support was offered to those charged with delivering these data. Accordingly, whilst patient experience data can always have been thought of as interesting, it may not necessarily have been as instructive as it could have been. The wrong questions were asked at the wrong time (or not often enough) and then the data were not given to the right people.

Recent initiatives have led to greater prominence being given to patient experience. There has been support from policy makers for the systematic collection of patient experience data since the early 2000s (Darzi, 2008; Department of Health, 2000), and in the UK this has cemented the work of the Picker Institute in running the NHS Inpatient Survey (NHS Inpatient Survey, 2013). In this respect, the UK has been a leader in the systematic collection of patient experience data since 2002 when the first survey was undertaken. The survey represents the most joined up review of the experiences of inpatients receiving NHS care in the UK. The exact methodology of the survey has changed over the iterations, but essentially the survey is completed by a consecutive sample of the last 900 inpatients discharged from every acute NHS Trust for one of three possible sample months (June, July, August for the 2013 sample).

4.2.3. Making sense of patient experience and satisfaction data

A major criticism of these collective data relates to the way that individuals, and the population as a whole, tend to respond to questions relating their experience of health care. Generally speaking most people will respond with positive sentiments or scores when asked about health care services. This response bias is thought to be due to a range of factors, and has a ceiling effect so that patient satisfaction
surveys give uniformly high ratings of care, making it difficult for providers and policy makers to determine which aspects of care were in need of improvement. For example, Cleary et al describe a survey where 80% of 6455 respondents rated the care that they received as excellent or very good (Cleary et al., 1992), and this high level of positive responses is not unusual (Coulter et al., 2009). More discriminative patient experience (as opposed to patient satisfaction) questions have helped to uncover areas where perceived care quality could be improved, despite having high ratings for overall experience (Jha et al., 2008).

We have arrived at the situation where there is an acknowledgement that some patient satisfaction data is useful in terms of service planning (e.g. car parking, choice of food), but that the role of patient experience data is unclear as it is often unlinked to clinical outcomes and may not be fit for purpose. This study sets out to address this by using measures of SWB as markers of the patient experience so as to provide meaningful data on the impact of health care the lives of those receiving treatment.

It represents a new direction in the way that the patient experience is considered. It incorporates state of recently refined measures of SWB that have important applications for both service delivery/development and health policy research (Cummins et al., 2004; P. Dolan & Kahneman, 2008) and offers opportunities to identify where the greatest losses and gains in wellbeing are felt most acutely. This can, in turn, lead to ways of identifying where and why the problems with care occur, and allow for improvements to be made in care that is provided. At a policy level this approach would also allow for the identification of individuals who would stand to gain the most or least from different health technologies.

4.2.4. Surgery and subjective wellbeing

There have been some historical uses of SWB measures in health care in some form (Bowling A, 1997; Fitzpatrick et al., 1992; W. M. Gill, 1984) but there has been a relative paucity of work that explicitly
measures the SWB of individuals over time and in relation to discrete episodes of care or health care interventions.

We know that pain and loss of function are related to SWB losses as measured by life satisfaction (Marmot, 2003), see Section 2.2.2.1). This study seeks to investigate the SWB of patients in response to treatment and specifically to hernia surgery. A literature search ahead of initiating this work was undertaken, and an interrogation of the PubMed online database to search for studies measuring SWB in response to hernia surgery returned 285 results (the search teams and PubMed search algorithm are below). Review of the search output revealed that none of the studies had used measures of SWB in any form as part of their study protocol. This study seeks to address this lack of work in the field and is the first that sets out to measure SWB pre and post surgery for inguinal hernias.

4.3. Aims and objectives

The aims of this study were to translate the theoretical framework of the model of treatment experience set out in Chapter 3 into a clinical setting. The study set out to elicit SWB alongside health metrics in a clinical population and develops this methodology in a clinical environment for the future use of clinicians and policy makers. Specific objectives were to:

1. Determine whether patients undergoing elective primary unilateral inguinal hernia repair show improvements in SWB and health in response to surgery
2. Determine the impact that health and satisfaction with care has on the core ONS measures of SWB at different stages of the patient experience
3. Develop a patient centric self completed questionnaire and supporting methodology that can be used in future clinical work

\[\text{Search query: (Subjective well being) OR (Subjective wellbeing) OR (wellbeing) OR (life satisfaction)) AND (Hernia OR (inguinal herniorrhaphy) OR (hernia repair))}\]
4.4. Methods

The study is a prospective observational study of patients with symptomatic primary unilateral inguinal hernia.

4.4.1. Study procedure selection

The selection of primary open unilateral inguinal hernia surgery as the health care technology to be studied was made as it met three key criteria. First, the surgery was a recognisable health need with established surgical treatment (Jenkins & O'Dwyer, 2008). All health problems are associated with a range of symptomatology that individual patients will experience along a spectrum of severity. Inguinal hernias are no exception to this, but the range of symptoms associated with primary unilateral inguinal hernia and their severity is relatively limited compared to other conditions such as osteoarthritis of a particular joint or coronary artery stenosis.

Secondly, hernia surgery is a procedure that generally takes under one hour to perform, can be undertaken as a day-case, and has a generally accepted recovery time of less than six weeks. Bay-Nielson et al (Bay-Nielsen et al., 2004) report that the average return to work time post open hernia repair was 4.5 days for sedentary work and 14 days for strenuous work. This ensured that adequate enrolment and follow up could be undertaken within the time frame of the study period. The open technique (as opposed to laparoscopic repair) was selected as the focus of this study in light of current NICE guidance.

Thirdly, primary open unilateral inguinal hernia surgery is one of the highest volume procedures undertaken in the NHS. In England, there were approximately 70,000 surgical repairs of inguinal hernia in 2010/11, affecting 0.14% of the population (NHS Information Centre, 2012b). Of these procedures, 62,969 were for the repair of primary hernias. This volume of surgery makes it a significant public health issue and as such it is interest to policy makers and to clinicians alike. It is also one of the five procedures that make up the NHS national PROM study (NHS England, 2014) ensuring that there is a natural comparator for this work.
4.4.2. Measures

The selection of measures that participants completed was central to the effectiveness of the study and the four key areas that the study measures had to cover were SWB, health, satisfaction and background demographics. The details of these measures are set out in Figure 4.1 and the questionnaires used in the study can be seen in the appendix.

**Figure 4.1 Summary of measures used in clinical hernia study**

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<thead>
<tr>
<th>Domain</th>
<th>Measures</th>
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<tbody>
<tr>
<td>Patient SWB</td>
<td>4 SWB questions set out by the ONS:</td>
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<tr>
<td></td>
<td>- Life satisfaction</td>
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<td></td>
<td>- Happiness yesterday</td>
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<tr>
<td></td>
<td>- Anxiety yesterday</td>
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<tr>
<td></td>
<td>- Life being worthwhile</td>
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<tr>
<td>Patient health</td>
<td>EQ5D</td>
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<td></td>
<td>EQ5D Visual Analogue Scale</td>
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<tr>
<td>Patient satisfaction</td>
<td>Overall patient satisfaction rating</td>
</tr>
<tr>
<td>Background demographics</td>
<td>Age</td>
</tr>
<tr>
<td></td>
<td>Gender</td>
</tr>
<tr>
<td></td>
<td>Marital status</td>
</tr>
<tr>
<td></td>
<td>Smoking status</td>
</tr>
<tr>
<td></td>
<td>Employment status</td>
</tr>
<tr>
<td></td>
<td>Whether patient is a carer</td>
</tr>
<tr>
<td></td>
<td>Whether the patient has children</td>
</tr>
</tbody>
</table>

The selection of the measures of SWB was made following a study of the literature (Chapter 3) and integration with the plans (subsequently adopted) for measures to be used in the annual Subjective Wellbeing Annual Population Survey, conducted by the Office for National Statistics (ONS, 2014). Unlike for the assessment of health state there is not a vast array of suitable SWB measures in the literature, rather there are several constructs of SWB that have been proposed by different authors over time that measures have sought to capture. Different measures and scales have then been iterations of these questions. The measures chosen for this study aim to tap into the three broad accounts of SWB, and as such the study will include evaluative measures, experience measures, and eudemonic measures.

It is important that within the planned clinical SWB research a top level evaluative account of SWB be included. In numerous SWB studies previously this has been successfully captured using questions that ask about Life Satisfaction, Overall Happiness, Overall Satisfaction and also using smiling or sad faces
associated with a score. The most widely adopted in the clinical and social science literature for this domain is the “Life Satisfaction” question on a 0-10 scale and this was adopted.

The second domain to be included within the clinical work was a positive and negative affect, or experience, measure. This allows evidence on the more moment-to-moment aspects of life to be included. The most rigorous way of including these data would be to include the day reconstruction method (DRM). The DRM has been specifically designed to measure experienced utility in this way (Kahneman et al., 2004). The DRM asks respondents to divide the previous day into a number of episodes and then to rate different feelings during those activities. The ratings of different feelings in the DRM can be aggregated in different ways (Kahneman & Krueger, 2006) but any summary measure of feelings will have cardinal properties so long as each unit of time is treated equally. The main problems with this approach are that it is time consuming and response rates can be low (pilot data). In resolving these issues, Kahneman posited the use of a single question for positive and negative affect that would reflect the overall experience of respondents yesterday. This lends itself to the self-reported methodology used within the study design, and also allows for comparability with population samples (ONS 2009). Importantly there is a strong history of using such questions in the psychology and psychiatric literature, which lends clinical credibility to these measures.

The inclusion of a eudemonic domain within the SWB measures allows for an additional perspective to be considered. Issues such as worthwhileness of life may not seem immediately relevant to health care or surgery, however in relation to oncology treatments, palliative care, and treatments that increase independence they are actually very salient. There is no history of using such measures within a health care setting previously, and as such the measure that has been adopted by the ONS for the SWB Annual Population Survey has been included.

The inclusion of the EQ5D measure within the study allowed the capturing of comparative health data alongside the SWB data. The choice of the EQ5D was made as it is the preferred metric advocated by NICE in terms of HTA appraisal. It is also the metric of choice used in the UK NHS PROMs national programme that started in 2009 (NHS England, 2014). This allows for important comparisons to be
made within groups and also between this and existing data sets going forward. Importantly there is no widely accepted PROM for use in hernia populations, and this is reflected in the national PROMs programme. Certain PROMs do exist for hernia surgery (e.g. Carolinas Comfort Scale (Heniford et al., 2008)) but as they are not in widespread use and can be cumbersome to complete by patients they were not included. The decision to include the EQ5D measure rather than the SF6D or SF12 (which include the domain of vitality/energy) was made in light of these comparability considerations. It would have been possible to include both the EQ5D and the SF6D but there is no comparability data to demonstrate the validity of using one questionnaire immediately following another. This would also have added to the burden of questions to be answered by participants and as such the EQ5D alone was selected.

Selecting measures of patient experience and satisfaction was more challenging. Section 4.2.1 and 4.2.2 cover the background of these overlapping and areas, highlighting the lack of widespread and well-accepted measures in this field. Initial plans to adopt a multidimensional measure of patient satisfaction were in part curtailed by the lack of established evidence within a day surgery setting. The majority of patient experience and satisfaction measures are either directed at inpatient or outpatient services, and as the hernia surgery used as the focus for this study was undertaken as a day case procedure many of these domains were redundant. In light of this the most widely accepted measure of patient satisfaction with care was used, asking patients to rate the overall care that they received on a 0-10 scale. Further advice on this issue was sought from the patient experience team within the participating NHS trust, who supported this decision.

The selection of patient background measures and the demographics questionnaire was used from previous SWB data collection studies and also based on key variables from the BHPS surveys (British Household Panel Survey (BHPS), 2007).

The final questionnaire was designed in conjunction with a team at Imperial College with experience in patient questionnaire design. Importantly SWB questions were asked first so as to avoid focusing effects. The questionnaire was trialled on an initial sample of 10 patients undergoing surgery and feedback was
elicited to improve the readability and structure of the questionnaire. Copies of the self-completed questionnaire are given in the appendix.

4.4.3. Study protocol

The study was carried out at St Mary's Hospital, part of the Imperial College Health care NHS Trust. The hospital was selected as it is directly attached to the University through the Academic Health Science Centre.

Patients awaiting surgery for primary unilateral inguinal hernia repair were identified and contacted 4 weeks ahead of planned surgery date at the time of their pre operative assessment appointment. Questionnaires containing the measures and background demographics were mailed to participants with pre paid postage envelopes to return the completed questionnaires. If patients failed to return the questionnaires within 2 weeks a follow up telephone call was made and the patient requested to complete the questionnaire. If no questionnaire was returned by a week ahead of surgery the patient was telephoned again and requested to bring the questionnaire with them on the day of surgery when it was collected.

The recognised recovery time for inguinal hernia surgery is approximately 6 weeks and so an 8 week follow up interval was given to ensure that those slow to return to normal activity did not skew the sample. Patients were mailed a self-completion questionnaire to be completed at 8 weeks post operatively and asked to return using a pre paid envelope. Follow up telephone call was made as a reminder after 2 weeks if no reply was received. Telephone responses were then accepted to improve compliance if no reply was received after the follow up call. These calls were made in the following week.

The main exclusion criteria was English language, as participants had to be able to complete the study in English.
Ethical approval was sought for the study but the Research Ethics Committee deemed that non was necessary as no novel intervention or change in procedure was being investigated. Consent to complete questionnaires and be contacted by telephone was however taken as this was regarded as good practise.

4.5. Results & analysis

Data was collated according to the study protocol and entered into a spread sheet (Microsoft Excel) for analysis, which was undertaken using Microsoft Excel and SPSS for Windows Version 21. Only six patients dropped out of the study, which is low for a postal return study such as this. These incomplete responses have been excluded from the study.

The analysis of results initially includes descriptive statistics to summarize the basic demographic and background information of the patients enrolled in the study. A regression analysis was then undertaken to show the relationship between SWB of patients and their health state (EQ5D), along with other independent variables. Comparison of pre and post-operative SWB was also made and this was done using the t-test.

The trial was prospective and as such individuals were invited to participate as they were added to the waiting list. A total of 130 patients were invited to participate, 110 were enrolled and 104 patients completed the study. The trial flow diagram is given in Figure 4.2.
4.5.1. Descriptive statistics

The sample of the study consisted of 104 patients. The summary of their demographic information can be seen in Figure 4.2 and Figure 4.3. It can be seen that the mean age of the 104 patients was 56 (median 56 years) with a range of 24-92 years. 87.5% (91 patients) were male (87.5%) and there was an equal number of right (50%) and left (50%) sided hernia repairs. For the marital status of the patients, 64 (61.5%) were married, 32 (30.8%) single, and only 8 (7.7%) were widowed. Many (72 (69.2%)) of the 104 patients have children, and only 12 (11.5%) were carers. For the employment status, more than half or 59 (56.7%) were employed, 35 (33.7%) were retired, and only 10 (9.6%) classed themselves as unemployed.

These findings are in keeping with those presented in the NHS PROMs annual report, in which the age range is 18-4 years and median age is 60 years. Male : female frequency is reported as 8:1 nationally and there is no difference in frequency between left and right hand side procedures (NHS Information Centre 2012b). Also, the majority or 80 (76.9%) of the 104 samples of patients did not smoke. The overall satisfaction of the patients with the care of the hospital were mostly in the 6 (46.2%), 7 (28.8%) or 8 (22.1%) ratings with 1 as the lowest while 10 as the highest that most of the patients have more than average satisfaction with the care of the hospital.
Figure 4.3 Descriptive Statistics for population age

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Median</th>
<th>Std. Deviation</th>
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<td>24</td>
<td>92</td>
<td>56.39</td>
<td>56</td>
<td>15.93</td>
</tr>
</tbody>
</table>

Figure 4.4 Frequency and percentage summary of demographic information

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<th>Frequency</th>
<th>Per cent</th>
</tr>
</thead>
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<td></td>
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<tr>
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<td>87.5</td>
</tr>
<tr>
<td>Female</td>
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<td>12.5</td>
</tr>
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<td></td>
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<tr>
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<td>50</td>
</tr>
<tr>
<td>Left</td>
<td>52</td>
<td>50</td>
</tr>
<tr>
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</tr>
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<tr>
<td>Single</td>
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</tr>
<tr>
<td>Widowed</td>
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<td>7.7</td>
</tr>
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<td><strong>Children</strong></td>
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<td></td>
</tr>
<tr>
<td>No</td>
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<td>30.8</td>
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<tr>
<td>Yes</td>
<td>72</td>
<td>69.2</td>
</tr>
<tr>
<td><strong>Carer</strong></td>
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<td></td>
</tr>
<tr>
<td>No</td>
<td>92</td>
<td>88.5</td>
</tr>
<tr>
<td>Yes</td>
<td>12</td>
<td>11.5</td>
</tr>
<tr>
<td><strong>Employment</strong></td>
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<tr>
<td>Employed</td>
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<tr>
<td>Unemployed</td>
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<td>Retired</td>
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<tr>
<td>Yes</td>
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<td>23.1</td>
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<td><strong>Overall satisfaction with care</strong></td>
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</tr>
<tr>
<td>5</td>
<td>2</td>
<td>1.9</td>
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<td>30</td>
<td>28.8</td>
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<td>8</td>
<td>23</td>
<td>22.1</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
4.5.2. Normality Testing

Prior to conducting the statistical analyses of regression and t-test to address the objectives of the study, normality testing was first to check whether the data of the study variables were normally distributed. This is because it is a requirement of parametric tests such as regression and t-test that the data should exhibit normality distribution. First, the skewness and kurtosis statistics of the data of the study variables that were included in the statistical analysis were obtained and investigated to test whether the data were normally distributed or not. The statistics were summarized in Figure 4.6.

To determine whether the data follows normal distribution, skewness statistics greater than three indicate strong non-normality while kurtosis statistic between 10 and 20 also indicate non-normality (Kline, 2005). Looking at Table 3, the skewness statistic of the study variables were in the range of -0.37 to 5.71 while the kurtosis values ranged from -1.68 to 31.24. All the skewness fell within the criteria enumerated by Kline (Klein 2005) as did all the kurtosis statistics of the study variables except for the pre-test scores for mobile and self care and the post-test scores for mobile, self-care, pain/discomfort, and anxiety/depression. However, this is still acceptable since the skewness did not violate the rule thus, the data for the study variables were normally distributed and t-test can be conducted.

Second, histograms were generated for each of the study variables of 23 study variables as another test of normal distribution of the study variables. The histograms were presented in Figures 1. It can be observed that all histograms formed a bell shape or partial bell shaped curve. Although the bell-shaped pattern formed in the graph was not a perfect representation of the desired pattern, this is acceptable since the results of the normality testing through the skewness and kurtosis of the data for each study variable fell within the acceptable values, indicating that the data exhibited a normal distribution. Thus, the normality assumption for all the study was not violated.

Best fit curves for pre-test scores for mobility and self-care, and post-test scores for mobility, self-care, pain/discomfort, and anxiety/depression were however skewed to the left. This means that the scores for these variables were more frequent in the lower range of score, which is in keeping with the frequency of these health states in the general population.
Figure 4.5 Test for normality: Histograms of study variables for hernia patients
Figure 4.5 Test for normality: Histograms of study variables for hernia patients (Cont...)
Figure 4.5 Test for normality: Histograms of study variables for hernia patients (Cont…)
Figure 4.5 Test for normality: Histograms of study variables for hernia patients (Cont...)
### Figure 4.6 Kurtosis and Skewness Statistics

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Skewness Statistic</th>
<th>Std. Error</th>
<th>Kurtosis Statistic</th>
<th>Std. Error</th>
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<tr>
<td>Age</td>
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<td>0.04</td>
<td>0.24</td>
<td>-0.87</td>
<td>0.47</td>
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<tr>
<td>Gender</td>
<td>104</td>
<td>2.30</td>
<td>0.24</td>
<td>3.36</td>
<td>0.47</td>
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<tr>
<td>Employment</td>
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<td>0.48</td>
<td>0.24</td>
<td>-1.68</td>
<td>0.47</td>
</tr>
<tr>
<td>Life Satisfaction SWB1 (Pre)</td>
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<td>1.25</td>
<td>0.24</td>
<td>3.62</td>
<td>0.47</td>
</tr>
<tr>
<td>Happiness yesterday SWB2 (Pre)</td>
<td>104</td>
<td>0.31</td>
<td>0.24</td>
<td>1.08</td>
<td>0.47</td>
</tr>
<tr>
<td>Anxious Yesterday SWB3 (Pre)</td>
<td>104</td>
<td>1.85</td>
<td>0.24</td>
<td>3.57</td>
<td>0.47</td>
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<tr>
<td>Worthwhile Life SWB4 (Pre)</td>
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<td>0.58</td>
<td>0.24</td>
<td>-0.18</td>
<td>0.47</td>
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<td>Mobile EQ5D (Pre)</td>
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<td>3.51</td>
<td>0.24</td>
<td>10.48</td>
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<td>Self Care EQ5D (Pre)</td>
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<td>5.71</td>
<td>0.24</td>
<td>31.24</td>
<td>0.47</td>
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<td>Usual Activities EQ5D (Pre)</td>
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<td>Pain/Discomfort EQ5D (Pre)</td>
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<td>Anxiety/Depression EQ5D (Pre)</td>
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<td>0.24</td>
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<td>0.36</td>
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</tr>
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<td>Mobile EQ5D (Post)</td>
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<td>13.07</td>
<td>0.47</td>
</tr>
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<td>Self Care EQ5D (Post)</td>
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<td>5.71</td>
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<td>0.24</td>
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<td>EQ5D Health Score (Post)</td>
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<td>0.62</td>
<td>0.24</td>
<td>1.74</td>
<td>0.47</td>
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</tbody>
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#### 4.5.3. Multiple linear regression for the pre-operative relationship of SWB and health state of patients

A multiple linear regression model was conducted to determine the extent of the association of the independent variables of the health state of the patients and the dependent variable of subjective wellbeing of the patients. The SWB of the patients was measured with four wellbeing dimensions of life satisfaction, happiness yesterday, anxiety yesterday, and life being worthwhile. The health state of the patients was measured with five dimensions of mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Each of the dimensions of the dependent variable of SWB of the patients will have a separate regression model to determine the degree of influence of each of the five domains of the EQ5D has on the different elements of SWB and to determine whether they were significant or not. The
regression model created dummy variables for each of the independent variables of five dimensions of health state of mobility, self care, usual activities, pain/discomfort, and anxiety/depression; gender, marital status, and employment status for each of their respective categorical groupings since these variables were categorical measured variables.

The first group of regression models generated used the pre-operative scores of the patients. This analysis will determine whether the five dimensions of health state significantly influenced the SWB of the patients before the patients had undergone surgery. The results are presented in Figure 4.7. A level of significance of 0.05 was used in the regression analysis.

First, the effects of the pre-operative scores of the five dimensions of health state on the pre-operative life satisfaction dimension of SWB were investigated. The results showed that none of the independent variables of mobility level 1 ($t (103) = 1.60, p = 0.11$), self care level 2 ($t (103) = -0.90, p = 0.37$), usual activities level 1 ($t (103) = -0.80, p = 0.42$), pain/discomfort level 2 ($t (103) = -0.74, p = 0.46$), pain/discomfort level 3 ($t (103) = -0.34, p = 0.73$), and anxiety/depression level 2 ($t (103) = -1.34, p = 0.18$) had any significant influence to the pre-operative life satisfaction dimension of SWB since the $p$-values were all greater than the level of significance value of 0.05. This showed that the pre-operative score of health state of the patients were not significantly related to the pre-operative life satisfaction dimension of SWB. Also, the demographic variable of age ($t (103) = 0.35, p = 0.72$) and the categorically measured demographic variables of gender (female) ($t (103) = 0.48, p = 0.63$), marital status (married) ($t (103) = 0.46, p = 0.65$), marital status (widowed) ($t (103) = 0.46, p = 0.65$), employment (unemployed) ($t (103) = -1.18, p = 0.24$), and employment (retired) ($t (103) = -0.90, p = 0.37$) also did not have any significant influence to the pre-operative life satisfaction dimension of SWB.

Second, the effects of the pre-operative scores of five dimensions of health state of the patients to the pre-operative happiness yesterday dimension of SWB were investigated. The results also showed that none of the independent variables of mobility level 1 ($t (103) = 0.06, p = 0.95$), self care level 2 ($t (103) = -1.73, p = 0.09$), usual activities level 1 ($t (103) = -0.02, p = 0.98$), pain/discomfort level 2 ($t (103) = 0.49, p = 0.63$), pain/discomfort level 3 ($t (103) = 0.03, p = 0.98$), and anxiety/depression level 2 ($t (103) =
0.49, p = 0.63) had any significant influence to the pre-operative happiness yesterday dimension of SWB since the p-values were all greater than the level of significance value of 0.05. This showed that the pre-operative health states were not significantly related to the pre-operative happiness yesterday dimension of SWB. Also, the demographic variable of age (t (103) = 0.74, p = 0.46) and the categorically measured demographic variables of gender (female) (t (103) = 0.54, p = 0.59), marital status (married) (t (103) = -1.74, p = 0.09), marital status (widowed) (t (103) = -0.48, p = 0.63), employment (unemployed) (t (103) = -0.81, p = 0.42), and employment (retired) (t (103) = -0.03, p = 0.98) also did not have any significant influence to the pre-operative happiness yesterday dimension of SWB.

Third, the effects of the pre-operative scores of five dimensions of health state of the patients to the pre-operative anxiety yesterday dimension of SWB were investigated. The results also showed that only the independent variables of self care level 2 (t (103) = 3.28, p < 0.001) and anxiety/depression level 2 (t (103) = 12.50, p < 0.001) have significant influence to the pre-operative anxiety yesterday dimension of SWB, since these were the only p-values less than the level of significance value of 0.05. The unstandardized beta coefficient was analyzed to determine the independent contribution and the relative importance of the significant independents variables in predicting the dependent variable. The beta values of self care level 2 and anxiety/depression level 2 were 2.65 and 3.61, respectively. This suggested that both self care level 2 and anxiety/depression level 2 during the pre surgery period have positive contribution to the model in predicting the pre-operative anxiety yesterday dimension of the patients. The pre-operative score for anxiety yesterday dimension of the patients increases by 2.65 if the patients have a level 2 pre-operative self-care health state while the pre-operative score for anxiety yesterday dimension of the patients increases by 3.61 if the patients have a level 2 pre-operative anxiety/depression health state. This shows that the health state for self care and anxiety/depression of the patients were positively significantly related to the anxiety yesterday dimension of SWB before the hospital on-patients undergone the surgery. Aside from the independent variable of health state, the demographic variable of employment (unemployed) (t (103) = -0.73, p < 0.01) had also a significant influence to the pre-operative anxiety yesterday dimension of SWB. The anxiety yesterday SWB domain was scored on a 0 to 10 scale with maximum, or worst, anxiety being 10. The beta value was -0.73 indicating that employment
(unemployed) had a negative contribution to the model in predicting the pre-operative anxiety yesterday dimension of the patients. The pre-operative score for anxiety yesterday dimension of the patients decreases by 0.73 if the patients were unemployed.

Lastly, the effects of the pre-operative EQ5D scores (for each of the five dimensions of health state) on the pre-operative life being worthwhile dimension of SWB were investigated. The results also showed that none of the independent variables of mobility level 1 \((t /103) = -1.00, p = 0.32\), self care level 2 \((t /103) = 0.74, p = 0.46\), usual activities level 1 \((t /103) = -0.42, p = 0.68\), pain/discomfort level 2 \((t /103) = -1.11, p = 0.27\), pain/discomfort level 3 \((t /103) = -0.79, p = 0.43\), and anxiety/depression level 2 \((t /103) = -0.19, p = 0.85\) had any significant influence to the pre-operative life being worthwhile dimension of SWB, since the p-values were all greater than the level of significance value of 0.05. This showed that the pre-operative score of health state of patients were not significantly related to the pre-operative life being worthwhile dimension of SWB. Also, the demographic variable of age \((t /103) = -1.27, p = 0.21\) and the categorically measured demographic variables of gender (female) \((t /103) = -1.14, p = 0.26\), marital status (married) \((t /103) = 0.57, p = 0.57\), marital status (widowed) \((t /103) = 1.24, p = 0.22\), employment (unemployed) \((t /103) = -1.02, p = 0.31\), and employment (retired) \((t /103) = 1.92, p = 0.06\) also did not have any significant influence to the pre-operative life being worthwhile dimension of SWB.
### Figure 4.7 Regression showing impact of health state (EQ5D) on SWB (pre-operative)

<table>
<thead>
<tr>
<th></th>
<th>Life Satisfaction (Pre)</th>
<th>Happiness yesterday (Pre)</th>
<th>Anxiety yesterday (Pre)</th>
<th>Life being worthwhile (Pre)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>t</td>
<td>Sig.</td>
<td>B</td>
</tr>
<tr>
<td>(Constant)</td>
<td>6.18</td>
<td>13.04</td>
<td>0.00*</td>
<td>6.41</td>
</tr>
<tr>
<td>Mobility level 1 (Pre)</td>
<td>0.50</td>
<td>1.60</td>
<td>0.11</td>
<td>0.02</td>
</tr>
<tr>
<td>Self care level 2 (Pre)</td>
<td>-0.79</td>
<td>-0.90</td>
<td>0.37</td>
<td>-1.42</td>
</tr>
<tr>
<td>Usual Activities level 1 (Pre)</td>
<td>-0.15</td>
<td>-0.80</td>
<td>0.42</td>
<td>0.00</td>
</tr>
<tr>
<td>Pain/Discomfort level 2 (Pre)</td>
<td>-0.14</td>
<td>-0.74</td>
<td>0.46</td>
<td>-0.12</td>
</tr>
<tr>
<td>Pain/Discomfort level 3 (Pre)</td>
<td>-0.28</td>
<td>-0.34</td>
<td>0.73</td>
<td>0.02</td>
</tr>
<tr>
<td>Anxiety/Depression level 2 (Pre)</td>
<td>-0.42</td>
<td>-1.34</td>
<td>0.18</td>
<td>0.14</td>
</tr>
<tr>
<td>Age</td>
<td>0.00</td>
<td>0.35</td>
<td>0.72</td>
<td>0.01</td>
</tr>
<tr>
<td>Gender (Female)</td>
<td>0.11</td>
<td>0.48</td>
<td>0.63</td>
<td>0.12</td>
</tr>
<tr>
<td>Marital Status (Married)</td>
<td>0.08</td>
<td>0.46</td>
<td>0.65</td>
<td>-0.27</td>
</tr>
<tr>
<td>Marital Status (Widowed)</td>
<td>-0.11</td>
<td>-0.33</td>
<td>0.74</td>
<td>-0.15</td>
</tr>
<tr>
<td>Employment (Unemployed)</td>
<td>-0.31</td>
<td>-1.18</td>
<td>0.24</td>
<td>-0.20</td>
</tr>
<tr>
<td>Employment (Retired)</td>
<td>-0.20</td>
<td>-0.90</td>
<td>0.37</td>
<td>-0.01</td>
</tr>
<tr>
<td>Smoking</td>
<td>0.18</td>
<td>1.23</td>
<td>0.22</td>
<td>0.08</td>
</tr>
<tr>
<td>Carer</td>
<td>0.25</td>
<td>-0.44</td>
<td>0.66</td>
<td>0.06</td>
</tr>
</tbody>
</table>

*Significant at level of significance of 0.05
4.5.4. Multiple linear regression for the post-operative relationship of SWB and health state of patients

The second group of regression models generated used the post-operative scores for patients undergoing hernia surgery in this study. The analysis set out to determine whether the five dimensions of health state significantly influenced the SWB of the patients when sampled after surgery. The results are presented in Figure 4.8. A level of significance of 0.05 was used in the regression analysis.

First, the effects of the post-operative scores of five dimensions of health state of the patients on the post-operative life satisfaction dimension of SWB were investigated. The results showed that none of the independent variables of the post-operative mobility, self care, usual activities, pain/discomfort, and anxiety/depression levels 1, 2 and 3 had any significant influence to the post-operative life satisfaction dimension of SWB since the p-values were all greater than the level of significance value of 0.05. This showed that the post-operative score of health state of the patients were not significantly related to the post-operative life satisfaction dimension of SWB. Also, none of the demographic variable significantly influenced the post-operative life satisfaction dimension of SWB.

Second, the effects of the post-operative scores of five dimensions of health state of the patients to the post-operative happiness yesterday dimension of SWB were investigated. The results showed that none of the independent variables of the post-operative mobility, self care, usual activities, pain/discomfort, and anxiety/depression levels 1, 2 and 3 had any significant influence to the post-operative happiness yesterday dimension of SWB since the p-values were all greater than the level of significance value of 0.05. This showed that the post-operative score of health state of the patients was not significantly related to the post-operative happiness yesterday dimension of SWB. Also, none of the demographic variables significantly influenced the post-operative happiness yesterday dimension of SWB.

Third, the effects of the post-operative scores of the five dimensions of health state on the post-operative anxiety yesterday dimension of SWB were investigated. The results showed that only the independent variables of post-operative self care level 2 ($t(103) = 2.84, p = 0.01$) and post-operative anxiety/depression level 2 ($t(103) = 7.66, p < 0.001$) had significant influence on the post-operative
anxiety yesterday dimension of SWB, since these were the only p-values less than the level of significance value of 0.05. The beta values of self-care level 2 and anxiety/depression level 2 were 1.38 and 2.84 respectively. This suggests that existing in either health state self care level 2 or anxiety/depression level 2 in the post surgery period has a positive contribution to the model in predicting the post-operative anxiety yesterday dimension of the patients. The post-operative score for the SWB anxiety yesterday dimension increases by 1.38 if the patients have a level 2 post-operative self-care health state, while the post-operative score for anxiety yesterday dimension increases by 2.84 if the patients have a level 2 post-operative anxiety/depression health state. This showed that the health state for self care and anxiety/depression of the patients were positively significantly related to the anxiety yesterday dimension of SWB after the patients had undergone the surgery.

Lastly, the effects of the post-operative scores of the five dimensions of health state on the post-operative life being worthwhile dimension of SWB were investigated. The results showed that none of the independent variables of the post-operative mobility, self care, usual activities, pain/discomfort, and anxiety/depression levels 1, 2 and 3 had any significant influence to the post-operative life being worthwhile dimension of SWB since the p-values were all greater than the level of significance value of 0.05. This showed that the post-operative score of health state of the patients were not significantly related to the post-operative life being worthwhile dimension of SWB. Also, none of the demographic variables significantly influenced the post-operative life being worthwhile dimension of SWB.
Figure 4.8 Regression showing impact of health state (EQ5D) on SWB (post-operative)

<table>
<thead>
<tr>
<th></th>
<th>Life Satisfaction (Post)</th>
<th>Happiness yesterday (Post)</th>
<th>Anxiety yesterday (Post)</th>
<th>Life being worthwhile (Post)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>t</td>
<td>Sig.</td>
<td>B</td>
</tr>
<tr>
<td>(Constant)</td>
<td>6.45</td>
<td>10.83</td>
<td>0.00*</td>
<td>6.18</td>
</tr>
<tr>
<td>Mobility level 1 (post)</td>
<td>0.17</td>
<td>0.45</td>
<td>0.65</td>
<td>-0.07</td>
</tr>
<tr>
<td>Self care level 2 (post)</td>
<td>0.37</td>
<td>0.77</td>
<td>0.45</td>
<td>-0.25</td>
</tr>
<tr>
<td>Usual Activities level 2 (post)</td>
<td>0.10</td>
<td>0.33</td>
<td>0.74</td>
<td>0.18</td>
</tr>
<tr>
<td>Pain/Discomfort level 2 (post)</td>
<td>0.03</td>
<td>0.08</td>
<td>0.94</td>
<td>-0.01</td>
</tr>
<tr>
<td>Anxiety/Depression level 2 (post)</td>
<td>0.05</td>
<td>0.13</td>
<td>0.90</td>
<td>-0.22</td>
</tr>
<tr>
<td>Age</td>
<td>0.00</td>
<td>0.10</td>
<td>0.92</td>
<td>0.01</td>
</tr>
<tr>
<td>Gender (Female)</td>
<td>0.18</td>
<td>0.74</td>
<td>0.46</td>
<td>-0.01</td>
</tr>
<tr>
<td>Marital Status (Married)</td>
<td>0.16</td>
<td>0.90</td>
<td>0.37</td>
<td>0.11</td>
</tr>
<tr>
<td>Marital Status (Widowed)</td>
<td>0.18</td>
<td>0.53</td>
<td>0.60</td>
<td>0.37</td>
</tr>
<tr>
<td>Employment (Unemployed)</td>
<td>-0.13</td>
<td>-0.47</td>
<td>0.64</td>
<td>0.01</td>
</tr>
<tr>
<td>Employment (Retired)</td>
<td>-0.09</td>
<td>-0.40</td>
<td>0.69</td>
<td>-0.19</td>
</tr>
<tr>
<td>Smoking</td>
<td>-0.10</td>
<td>-0.96</td>
<td>0.34</td>
<td>-0.02</td>
</tr>
<tr>
<td>Carer</td>
<td>-0.12</td>
<td>-0.99</td>
<td>0.32</td>
<td>-0.02</td>
</tr>
</tbody>
</table>

*Significant at level of significance of 0.05
4.5.5. Comparison of pre and post operative subjective wellbeing and health state

The t-test was conducted to compare the SWB of the patients before and after surgery. The comparison was made between the pre and post data. A level of significance of 0.05 was also used in the hypothesis testing.

Firstly, group descriptive statistics of the four SWB dimensions of life satisfaction, happiness yesterday, anxiety yesterday, and life being worthwhile were obtained. The descriptive statistics are summarized in Figure 4.9. For the SWB scores, the mean comparison showed that the patients have higher life satisfaction, happiness, and life being worthwhile after they undergone surgery while the patients have lesser anxious yesterday after they undergone survey. These were because the means for the post-operative scores were higher than in the pre-operative scores.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>N</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Satisfaction SWB1</td>
<td>Pre</td>
<td>6.55</td>
<td>0.74</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>6.77</td>
<td>0.71</td>
<td>0.07</td>
</tr>
<tr>
<td>Happiness yesterday SWB2</td>
<td>Pre</td>
<td>6.44</td>
<td>0.68</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>6.55</td>
<td>0.56</td>
<td>0.05</td>
</tr>
<tr>
<td>Anxious Yesterday SWB3</td>
<td>Pre</td>
<td>1.74</td>
<td>1.18</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>1.64</td>
<td>1.06</td>
<td>0.10</td>
</tr>
<tr>
<td>Worthwhile Life SWB4</td>
<td>Pre</td>
<td>6.76</td>
<td>0.85</td>
<td>0.08</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>7.01</td>
<td>0.85</td>
<td>0.08</td>
</tr>
</tbody>
</table>

When considering comparisons of health state pre and post-operatively it must be remembered that the EQ5D health states cannot be used as a continuous variable on a 1-3 scale. The most useful comparison is to compare the frequency of the health state domains for the pre and post-operative groups. This is shown in Figure 4.10.
It is clear that there is a marked reduction in the severity of health state following surgery and this is visually represented in the charts shown in Figure 4.11 and Figure 4.12.

It can be seen that pre-operatively this patient sample only contained patients in level 3 for pain/discomfort. Following surgery these patients reported lesser levels of pain, so that there were no patients in level 2 for pain and a reduction from 29 patients (28%) in level 2 to only 4 patients (4%) in level 2. The domain that also showed a considerable change following surgery was that of usual activities, and here we saw a fall from 41 patients (39%) in level 2 pre-operatively to 9 patients (9%) post-operatively.
Given that the health states are not continuous variables it is not possible to perform a T-test on these values to look for statistical differences between the two groups. In order to compare the differences between pre and post-operative health states it is necessary to consider another way to look at this. It is possible to do this directly and indirectly. The direct method uses the self-reported EQ5D visual analogue scale as a marker of health state. The indirect method uses the EQ5D population based preference tariff (based on the time trade off calculations and modelling (Dolan, 1997)) to provide a health state index for the pre and post operative health states for each patient that can then be compared. For this indirect method each health state was converted to a numerical integer according to this methodology and then the analysis run on these values. These two results are shown in Figure 4.13.

**Figure 4.12 Post-operative EQ5D health state distribution**

Key to EQ5D health states: M – mobility, S/C – Self care, U/A – Usual activities, P/D – Pain or discomfort, A/D – anxiety or depression.
The paired differences of the mean for the pre minus post scores for both the EQ5D visual analogue scale and the EQ5D index were negative, meaning that there was on average an improvement in self reported health state when measured directly using the visual analogue component of the EQ5D and the tariff method that involves taking into account public preferences. The p value is <0.05 and as such this difference is statistically significant, demonstrating a positive average impact of the surgery on the self reported health state of the patients within the study.

Figure 4.14 shows a graphical representation of the changes in average SWB for the study population.

Figure 4.14 Chart to show changes in average SWB pre and post operatively
The statistics of the t-test of differences of the SWB dimensions between the pre-operative and post-operative values are summarized in Figure 4.15. A significant difference is observed if the p-value of the t statistics does not exceed the critical value of the level of significance set at 0.05. Results of the t-test showed that the pre and post-operative SWB dimensions of life satisfaction ($t (103) = -4.19, p < 0.001$), anxious yesterday ($t (103) = 2.28, p = 0.03$), and life being worthwhile ($t (103) = -4.12, p < 0.001$) were all significantly different.

The mean difference showed that the SWB in terms of life satisfaction (Mean difference = -0.22), anxious yesterday (Mean difference = 0.10), and life being worthwhile (Mean difference = -0.25) were significantly better after they undergone surgery.

### Figure 4.15 T-Test Results of differences between pre and post-operative SWB

<table>
<thead>
<tr>
<th></th>
<th>Paired Differences</th>
<th>$t$</th>
<th>df</th>
<th>P value</th>
<th>2-tailed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Satisfaction SWB1</td>
<td>Pre - Post</td>
<td>-0.22</td>
<td>0.54</td>
<td>-4.19</td>
<td>103</td>
</tr>
<tr>
<td>Happiness yesterday SWB2</td>
<td>Pre - Post</td>
<td>-0.11</td>
<td>0.85</td>
<td>-1.27</td>
<td>103</td>
</tr>
<tr>
<td>Anxious Yesterday SWB3</td>
<td>Pre - Post</td>
<td>0.10</td>
<td>0.43</td>
<td>2.28</td>
<td>103</td>
</tr>
<tr>
<td>Worthwhile Life SWB4</td>
<td>Pre - Post</td>
<td>-0.25</td>
<td>0.62</td>
<td>-4.12</td>
<td>103</td>
</tr>
</tbody>
</table>

*Significantly different at level of significance of 0.05

### 4.6. Discussion of results

The purpose of this study was to translate the theoretical framework of the model of patient experience set out in Chapter 3 into a clinical setting. This was achieved by prospectively measuring the SWB and health of patients prior to and following elective inguinal hernia surgery for a cohort of NHS patients. The overall aim of the study was met, and this work has seen the generation of new data alongside new methodologies.

The patient sample had a broad age range and this was anticipated ahead of the study, as individuals can develop hernias at any stage. It is also not uncommon to offer hernia surgery in their 9th decade of life,
and this was also seen in the sample population. Groin hernias are more common in men than women and this was also reflected in the study population.

The distribution of health states was largely as expected given the sample population (NHS Information centre, 2012a). Groin hernias are generally uncomfortable pre-operatively but if they cause severe pain then they are scheduled for emergency surgery due to the risk of bowel ischaemia and for compassionate reasons. Such patients are generally admitted as emergency cases and not listed for elective surgery, which explains the fact that there were only three patients with high scoring EQ5D states for pain. The patients with these higher levels of pain had other medical conditions that contributed to their self-reporting of this health state (e.g. osteoarthritis). It is understandable that individuals with groin hernias have some difficulty with mobility and usual activity and this was also shown in the pre-operative EQ5D health states.

Interestingly, the regression analyses did not show an impact of employment on life satisfaction in the pre or post-operative samples. Nor did marital status have a significant impact on SWB, which is usually reported (P. Dolan et al., 2008). One reason for this may be that the sample size of the population is small compared to the larger studies used for population wide SWB analysis. Another reason may be due to the focusing effect of the study and a subconscious health related response to SWB questions despite no health in the overt reference in their wording.

The regression analysis showed that the EQ5D health state dimensions of self care level 2 and anxiety/depression level 2 were significantly positively correlated with the SWB dimension of anxiety yesterday of the study patients. These were true pre and post operatively. The fact that limitations in the ability to care for oneself impacts on SWB is not surprising, as reliance on others and feelings of obligation can understandably have an impact on the way we feel. The fact that it impacts on the dimension of anxiety and not on life satisfaction is interesting, as this is probably not what would be expected. It must be remembered however that when considering the domain of life satisfaction there are a great many, in fact almost infinite independent variables, and so in a small sample such as this (or even in larger samples) issues of reliance on others for small to moderate degree for self care may not impact
on a self assessment of life satisfaction. Part of this will also be due to the fact that one readily adapts to the way in which is cared for. When considering how anxious one feels, however, this may be more salient, as an individual may have concerns about personal hygiene or a carer arriving to assist with some task of daily living, for example, that incite a degree of anxiety. It certainly makes sense that the EQ5D dimension of anxiety/depression has an impact on the SWB domain of anxiety yesterday throughout the sample population.

The regression analysis also identified the fact that the anxiety yesterday dimension of SWB before surgery becomes lesser if the patients were unemployed. One explanation of this may be due to the higher levels of worry and concern that individuals who are in work might have with respect to either their hernia or the anticipated hernia surgery, and the impact that it may have on their life as a whole. This may be perceived differently for those not in active employment, due to the inherent pressures on being able to return to work quickly and in a position to be able to return to usual duties as soon as possible. It is certainly interesting that those who are unemployed or retired did not have this association. There was no discrimination between self-employment and those employed by others, and further work could seek to examine this area.

An important negative finding from the results was that in this clinical sample of patients the regression analyses in the pre and post samples did not identify the different domains of SWB as consistently significant. For example, population level data consistently shows the anxiety domain on the EQ5D as having a negative impact on SWB as measured by Life Satisfaction (British Household Panel Survey (BHPS), 2007), whereas this was not shown in this data. I think that the most likely explanation for this would be in relation to the anxiety associated with the unknown, which has been shown in other areas such as epilepsy (Graham, 2008). Patients within this clinical work have had recent contact with health services and understand what their diagnosis is and what will be done about it, which in this case is surgery. In this way there is less of an unknown quantity regarding their health and they are likely to be less anxious or depressed because of it. This group of patients is also generally well in other respects, due to the nature of the patients selected for day surgery. The fact that they have also sought medical advice for their hernia may also indicated that they would have sought advice for other ill health and suffer less
anxiety or depression as a result. These explanations are plausible, but we cannot expect to explain all of the findings of new work such as this from first principles. It is certainly the case that these findings are at first puzzling, and will provide fertile ground for new work to help map out the epidemiology of SWB in clinical populations.

The impact of the surgery on the health state of individuals was, in contrast, quite apparent, and the reduction of all individuals from level 3 for pain/discomfort to lesser states was seen. The overall results show a very consistent improvement in self reported health state that is much more consistent than is seen in the nationally reported PROMs data. Generally for comparable hernia surgery in 2010/2011, 50% of cases reported improvement in self reported health as measured by the EQ5D index and only 30% reported an improvement as measured by the EQ5D visual analogue scale (NHS Information centre, 2012a). The three most obvious reasons for this are the possible focusing effect that the study has, the patient population within the study and the surgical technique used.

The study involved regular contact with patients with the pre and post-operative questionnaire, along with the initial contact of the patient and often further contact to prompt the patient to respond to the questionnaires. Accordingly, once enrolled into the study the patient may feel invested within it and disinclined to report negative health outcomes. Patients will also be focused on the fact that this work was related to their hernia surgery and as such other extraneous aspects of their health may not be reported within the study data that may have more of a bearing in the nationally reported PROMs programme. For example, if patient x has osteoarthritis of her hip and a groin hernia that is repaired within the study, the patient may focus on the success of the groin hernia when responding to the post-operative measures as they associate the study with the hernia surgery. For the national PROMs programme they may not feel compelled to do this as they are not as invested within the study.

The second explanation for the differences could be the population sampled. The patients were generally in good health and the average age was 56 years. All the patients were suitable for day surgery within the day surgical unit at the study hospital. Accordingly, and in order for them to be considered for surgery in this unit their general health would have had to have been necessarily good with very few medical co-
moriadbities. They would also have had to have had good independent mobility would and have a body mass index of <34. All these factors mean that individuals in the study are more likely to have fewer extraneous health problems other than the hernia, and so that after the surgical treatment of the hernia and the post operative recovery period they are likely to be returned to a position close to full health. This is not the situation with the nationwide collection of data, where all patients undergoing groin hernia surgery are included. Importantly this would include individuals with more serious medical co-morbidities that may have a day-to-day impact on their lives, such as angina pectoris or chronic obstructive pulmonary disease who would generally receive surgery in a full main operating theatre with access to an intensive care unit if necessary. The medical co-morbidities for these patients may prevent the self-reporting of significant improvements in health as the other co-morbidities still have an impact when using the EQ5D health measure.

The final consideration when comparing the self-reported health state improvement of the study population to the national sample is the surgical technique. Open groin hernia surgery necessarily involves the use of a synthetic mesh to provide a scaffold for healing and reduces the rate of hernia recurrence (Jenkins & O'Dwyer, 2008). This mesh can be sutured into place, which is the more commonly adopted method, or held in place with fastening tacks that are applied using a hand held applicator. This latter method has been reported as conferring a benefit in terms of reduced post-operative pain, although there is no guidance at a national level as to the optimal approach. Within the study centre there is widespread adoption of this surgical innovation, although this is not consistent, and as such patients within the sample may be benefitting from this technique. No data is collected nationally on this aspect of the surgery, nor was data of this type collected within this study as the aim was not to compare techniques. It may however contribute to the better than average scores that are seen within the study population.

The comparison of pre and post-operative SWB scores shows that there is a general improvement in SWB following surgery. This is a significant finding, as it has not been shown before in this way for prospective clinical studies, and is a new contribution to the field of SWB research. The results of the t-tests showed that the SWB in terms of life satisfaction, anxiety yesterday, and life being worthwhile were
significantly better after the patients undergone surgery. This finding meets the first objective of the study.

The fact that life satisfaction was affected significantly is very important as it suggests that the timing of the measurements for the questionnaire in the post-operative stage of the study was about right. Life satisfaction is inherently affected by all manner of domains within the life of an individual, and in order to ensure that any benefit of health intervention is detected this must be captured (or reported) at a time that the individual is still feeling this benefit. You are more likely feel the benefit of a health care intervention in the few months afterwards then two to three years down the line. The paired coefficient for SWB life satisfaction dimension changed by 0.22, which is a large change, and corresponds to a major life event. To put this in context, our SWB changes positively by 0.5 if we are employed and by 0.2 if we have close friends (Helliwell, 2003). Methodologically it is reassuring that this impact was demonstrated so clearly.

The fact that individuals reported significantly less levels of anxiety yesterday following surgery can be explained in part by a relief at having successfully completed the operation and also that the worry or anticipation of the procedure is no longer affecting them. The secondary impacts of the surgery on their day-to-day lives in terms of returning to employment and their ability to accomplish personal goals and objectives would also mean that anxiety levels may be reduced.

4.6.1. Methodological developments

This was the first study of its type that used measures of SWB alongside health measures before and after surgery, and in doing so addresses the final objective of the study. The design of the questionnaire was central to ensuring good engagement with the patients, and the excellent response and low drop out rates for the study bear testimony to this. The methodology for this study is robust and one that can be transferred to other clinical areas readily for future work. In this way it can also help form the basis for on-going research in this field and is a major output from this project.
The timing of the responses was a methodological issue that was debated considerably ahead of the study. The pre-operative measures were generally collected three to four weeks pre-operatively and over two weeks after being listed for surgery. This seemed effective in gaining a high response rate from patients, and ensured that the focusing effect of completing the questionnaires in the surgical outpatient clinic was avoided. The timing of the post-operative questionnaire was set at eight weeks following surgery, but due to the need for follow up telephone calls to prompt participants to reply this did vary by up to two weeks.

The follow up of the patients to ensure data collection was moderately labour intensive and required the researcher to regularly prompt participants to respond to questionnaires. This had a very good effect in terms of response rates, and for a modest scale study such as this was very achievable. It does however raise the question of how labour intensive larger scale studies would be. This issue is not isolated to studies of SWB, however, and is a methodological challenge that faces any outcomes based research initiative.

Patients completed the questionnaires that were used within the study readily, and there was no ambiguity in terms of data transfer from the completed sheets to the database. The forms gave patients the opportunity for participants to leave feedback on the questionnaire design, but the majority of patients did not complete this. The only consistent comment was to print the forms on both sides so as to reduce the amount of paper used.

4.6.2. Limitations and further work

The size of the sample population in most studies such as this, where there is a novel methodological development, will always be an area that could be improved upon. Having greater than 100 subjects enrolled did ensure that there was a broad range of the commonest health states within the sample, however one criticism is that the sample did not contain many individuals in the most severe health states. In order to overcome this there would have to be an oversampling of this population, which is not always straightforward as the EQ5D health state is a subjective score and as such it is up to the individual
to allocate themselves into a health state, which may be difficult to predict in advance. It is also likely that individuals in severe health states may not present with asymptomatic hernias as they may have a greater focus on other aspects of their health that are causing a greater impact in their lives. Accordingly it may be difficult to identify such patients at all within the potential study population. Further work examining individuals in poorer health or with chronic conditions may help to recruit higher numbers of patients in severe health states.

It is difficult in any study that is obviously related to health care to avoid focusing effects with respect to health. The wording of the study was careful so as not to draw attention to any issue of health ahead of the SWB questions, but in order to introduce the study it was naturally necessary to relate the work to contact with the hospital, although “hernia” and surgery were not mentioned so as to try and reduce this. The issue of focusing effects can be considerable as discussed in Chapter 3, but in patient populations such as this it is almost impossible to avoid a degree of focusing for practical reasons, if not ethical ones. An important issue in further work should therefore be to continue to reduce these effects as much as possible through careful wording of patient questionnaires and the timing of responses, and to acknowledge that these effects may impact on results.

Avenues for work that follows on from this would naturally be to replicate a similar study with respect to other treatments and health technologies. From a strategic policy perspective an overall goal for future work would be to map out clearly the impact that health has on SWB at different stages of treatment in different populations, in much the same way that we know about how patient symptoms respond to certain treatments. This could be achieved by large-scale data collection of clinical populations, but this does not have to be in isolation from other work. As a clinician I can see that these measures could easily be included within planned trials or existing clinical outcomes programmes and these would greatly inform on the overall picture of SWB that clinical populations experience. One direction that I can certainly see important developments in is with respect to the use of mobile and personal technology in reporting of outcomes. Already this is becoming commonplace with respect to pharmaceutical clinical trials where patients have smartphone applications through which they can respond to PROMs, and there are considerable opportunities in this way to further SWB research.
A next step analytically, and one that would involve further primary data collection with respect to specific treatments, would be to generate SWB based QALYs, as set out in Chapter 2. This could lead to an alternate index of SWB QALYs that may help policy makers in making decisions at a macro resource allocation level.

4.7. Conclusion

The use of SWB to measure the patient experience and gauge the impact of surgery on patients undergoing hernia surgery has not been done before and this chapter has shown that this is readily achievable. The study met each of the primary objectives of the work. It had a very low participant drop out rate and this was supported by the ability to elicit responses over the telephone and in written format. Taking forward the use of SWB measures in this way in clinical populations is a high impact contribution from this work and will lead the way for more clinical investigations using similar or adapted methods.

The chapter has examined the pre and post-operative relationships between SWB and their health state (EQ5D). Interesting associations were shown between moderate levels (EQ5D level 2) of anxiety/depression and self care on SWB for patients before and after surgery, showing that that the more help you need with life and the more anxious/depressed you are the worse you feel. Further associations were demonstrated between employment and the anxiety dimension of SWB, which could have policy implications in terms of prioritising surgery for certain populations. Whilst I certainly do not have all the answers to the findings within the new data produced, there are consistent and important positive findings that are in keeping with the established data from general population samples and help to validate these methods in clinical work.

The most striking results were in relation to the changes in SWB seen following surgery, demonstrating improvements in SWB following surgery for the study population, alongside improvements in self rated health. This is an important finding and will help support the use of SWB measures in more widespread clinical environments going forward.
5. Patient and staff SWB

5.1. Introduction

There is growing interest in the use of SWB in different populations and measuring impacts using the SWB approach is supported at the highest level (H.M. Treasury, 2008). Within health care and health policy there are similar gains to be made in quantifying the impact of care through utilising these measures of SWB. The macro level considerations have focused on resource allocation methodologies (Dolan et al., 2009; P. Dolan et al., 2012), and these have been discussed in Chapters 1 and 3. There are also compelling arguments at the micro level by which to measure the impact of health care interventions (or treatments) such as surgery on SWB (H. Lee et al., 2013) and the rationale and methodology for such approaches has been set out in Chapters 2 and 4. There is, however, more to be said on the use of SWB in clinical populations, as the patient can be said to be only one side of the story.

SWB is affected by a host of factors that are experienced by patients whilst they undergo treatment, such as environment, infection, severity of health condition and pre-existing SWB. It is also the case however that the interpersonal relationships patients have with those directly looking after them are important (Jackson et al., 2001). The kind acts that are performed by an empathetic nurse in the middle of a hectic shift are often remembered and valued by patients a long time after discharge from hospital, and equally, or perhaps more so, poor experiences of care givers are also often recounted to friends and may impact on future treatment experiences (Chapter 3). During the treatment experience (Figure 3.2), patients in hospital spend a great amount of time with those who are caring for them directly, and as such may well be affected by how things are going in the lives of the nurses caring from them.

This chapter sets out to examine the impact of the SWB of nurses on the patients that they are looking after: do happy nurses have happier patients?. In adopting the use of measures of SWB at
a micro level within a hospital population, it will be possible to say more about how SWB of
patients and nurse is affected by different levels of health, and also by each other.

5.2. Background

Measures of SWB, as has been posited in Chapters 2 and 4, are very well suited to capturing the
experiences of patients, but we also know that they can have applications in a whole range of
other non-patient populations (Stiglitz et al., 2010). The work in this chapter takes forward this
notion. Specifically it sets out to capture the dynamic between patient and staff SWB and to link
these data to existing measures of patient experience, self reported measures of health, and
externally observed parameters, such as length of stay and markers of infection. This is a new
development in SWB research and is the first of study to do this.

Patient experience gains a great deal of attention in many significant health policy initiatives
(Darzi, 2008) and yet there is a lack of consensus as to what this term means, and how to value
this (Pettersen et al., 2004). Strategies aimed at improving patient experience can in turn be
difficult to assess in light of this uncertainty. An overview of patient satisfaction and patient
experience has been set out in Chapter 4 (see 4.2.1-4.2.3), but an initial consideration of what is
already understood about the wellbeing of nurses and the dynamics between patient experience
(and SWB) and staff wellbeing is warranted ahead of designing the clinical study.

There are inherent benefits in having a workforce with high wellbeing, and in the late 2000s there
was a growing acknowledgement that it would be helpful to know more about the wellbeing of
the NHS workforce, in part as a response to the Dame Carol Black’s report on the health of the
UK’s working age population (Black, 2008). The response to this from the Department of Health
was a far reaching review of the staff wellbeing within the NHS (Boorman, 2009) along with a
host of recommendations for NHS Trusts to implement in order to safeguard the working lives
of NHS staff.
The review undertakes a detailed examination of the working lives of NHS staff, including health behaviours such as smoking habits, alcohol consumption, subjective accounts of health and stress, alongside levels of sickness and presenteeism. In a similar vein to many reports and discussions on “well-being” however, the report does not clearly explain what is meant by “well-being” and as such it is left as a somewhat ill defined construct related to health and prosperity in relation to work. The author does not use the term “well-being” to refer to SWB as has been defined within the social science literature (e.g. Diener’s definition of SWB, see Chapter 3 (Diener et al., 1999)), but the report does not necessarily suffer from this. What sets it apart from other papers and studies with the field of occupational health in a health care setting is the inclusion of measures of overall life satisfaction within the study. This is a key measure of SWB (P. Dolan et al., 2011) and as such the report is an important comparator for any work into the SWB of health workers in the UK, or other developed health care systems. The details of the research that supported the review are set out in more detail in an accompanying report (Van Stolk et al., 2009).

Summary data suggested that most (78% of >13000 responses) were satisfied with their lives overall, but that employees with self reported mental illness reported 31% lower rates of life satisfaction and 20% lower for those with self reported physical impairments. The report defines sleep deprivation as <6 hours of sleep per night and found that employees who reported being sleep deprived also reported being less satisfied. A wealth of additional data relating to number of days of sick leave and subjective feelings of pressure to return to work are also presented, along with other data relating to more traditional occupational health matters.

The annual NHS staff survey is a further well-known measure of the health and “wellbeing” of NHS staff, and this has been in existence since 2003. Initially set up and by the Health care Commission it is now owned by NHS England and run by the Picker Institute. The survey sets out to gauge the attitude and experiences of NHS staff and to allow NHS Trusts to benchmark their performance in this area against key national guidelines, as well as helping to inform on safety and quality issues. The work does not however measure any domain within its current
guise that can be used as a proxy for SWB. It does provide a set of established questions however, that can be included within studies that seek to capture the satisfaction of health care staff along with results. There exists a wealth of additional literature surrounding employee satisfaction with different dimensions of the working environment, and the implications that these factors can have in terms of rates of absence and projected harm and financial expenditure. There is however a lack of work that explicitly measures the SWB of staff in clinical environments.

This study seeks to build on what is already known about patient and staff satisfaction and SWB. There is a lack of evidence in this area and until now there has been no study that examines the SWB profile of staff and patients with and NHS hospital in such a systematic manner. The broad objective is to determine any associations between the health and SWB of patients and the nurses looking after them.

5.3. Aims and objectives

This study aims to measure the SWB and health of an entire inpatient population in an NHS hospital, alongside that of the nurses caring directly for these patients. Specific objectives are to

1. Identify the determinants of SWB in terms of health and other factors for both the inpatient population of an entire hospital and the nurses looking after them
2. Establish the nature of any associations between patient and staff wellbeing – do happy nurses make happy patients?
3. Determine whether patient satisfaction affects SWB

5.4. Methods

The study is a cross sectional survey of the entire adult inpatient population of an NHS hospital and the nurses caring for the patients at the time of the study. In order to increase the sample
size the study was undertaken at two time points, one in the summer and one in the winter. All eligible hospital inpatients were invited to participate in the study and data was collected using a brief self completed questionnaire.

5.4.1. Inclusion criteria

All adult inpatients resident on surgical, medical and gynaecology wards were invited to participate by the researcher. The study questionnaire was only available in English and patients unable to complete this were excluded. It was decided to exclude the paediatric population as this would be a small sample size and the SWB and health measures used are less well validated for paediatric inpatient populations. A further exclusion was made for the patients admitted to the Intensive Care Unit at the time of the study due to reduction in level of cognition and consciousness associated with this population.

Decisions regarding the eligibility for those patients on general wards with reduced levels of consciousness were also made in the study protocol. It was decided that individuals identified by ward nurses as having reduced consciousness as measured by the Glasgow Coma Scale (GCS) due to medical illness would not be invited to participate. This was a broad measure of inclusion/exclusion, and the most common reason for non-inclusion was “confusion”, which equates to a GCS of 14/15. The rationale behind this exclusion was that although certain individuals with confusion may be able to report on their SWB (e.g. those with early dementia), this may not be the case for all such patients. Given that this work is pioneering in many respects the criteria for inclusion on this issue were high.
5.4.2. Study measures

In order to address each of the aims of the study it was necessary to collect information from patients and nurses over the same four key areas as in Chapter 4, namely patient/staff SWB, patient/staff health, patient/staff satisfaction (either with care for patients or job satisfaction for nurses), patient/staff background and demographics. The measures are summarised in Figure 5.1.

Figure 5.1 Summary of measures used in patient and staff study

<table>
<thead>
<tr>
<th>Domain</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient/Staff SWB</td>
<td>4 SWB questions set out by the ONS:</td>
</tr>
<tr>
<td></td>
<td>- Life satisfaction</td>
</tr>
<tr>
<td></td>
<td>- Happiness yesterday</td>
</tr>
<tr>
<td></td>
<td>- Anxiety yesterday</td>
</tr>
<tr>
<td></td>
<td>- Life being worthwhile</td>
</tr>
<tr>
<td>Patient/Staff Health</td>
<td>EQ5D</td>
</tr>
<tr>
<td></td>
<td>- EQ5D Visual Analogue Scale</td>
</tr>
<tr>
<td></td>
<td>- Sleep dimension</td>
</tr>
<tr>
<td></td>
<td>- Energy dimension</td>
</tr>
<tr>
<td></td>
<td>- Whether the patient had undergone surgery</td>
</tr>
<tr>
<td></td>
<td>- Whether the patient had been treated for an infection</td>
</tr>
<tr>
<td>Patient satisfaction</td>
<td>5 most important patient satisfaction ratings</td>
</tr>
<tr>
<td>Staff job satisfaction</td>
<td>Staff job satisfaction ratings</td>
</tr>
<tr>
<td>Background demographics</td>
<td>Age</td>
</tr>
<tr>
<td></td>
<td>- Gender</td>
</tr>
<tr>
<td></td>
<td>- Marital status</td>
</tr>
<tr>
<td></td>
<td>- Smoking status</td>
</tr>
<tr>
<td></td>
<td>- Whether the individual has children</td>
</tr>
<tr>
<td></td>
<td>- Length of hospital stay (patients)</td>
</tr>
<tr>
<td></td>
<td>- Length of time as a nurse (nurses)</td>
</tr>
</tbody>
</table>

The rationale for the selection of measures of SWB for this study mirrors that for Chapter 4 (Section 4.4.2), mainly for comparative reasons. There is also a convergence of ideas within the literature on this issue and these measures of SWB are also used within the annual Subjective Wellbeing Annual Population Survey, conducted by the ONS (ONS, 2010). This takes into the account that there are a number of accounts of SWB as discussed in Chapter 1 (Section 1.2). The domains of SWB that are included are evaluation measures (life satisfaction), experience measures (happiness yesterday, anxious yesterday) and a eudemonic measure (worthwhileness).
Significantly this study will elicit SWB scores from patients (a clinical population) and also staff, who are in this setting a non-clinical population. Attention was paid as to whether the SWB measures should be different for these two populations, however it would be of greater interest to use the same measures and see how they performed in different populations (with reference to external data).

Again the inclusion of a suitable self-reported measure for health was needed for this study, and the EQ5D measure was selected due to its use within the field of health technology appraisal and that it remains the metric that NICE prefers. These measures are well established. Further questions enquiring about sleep and energy levels were also included, in order to help ascertain their relative contribution to an individual’s SWB. Chapter 2 identified the somewhat arbitrary inclusion of some domains over others in traditional health metrics (including the EQ5D) and these measures were included to ascertain the impact of these important issues on SWB.

The choice of patient and staff satisfaction was made following a study of the existing literature (summarised in sections 4.2.1 and 4.2.2) and a series of meetings with the Patient Experience team at Imperial College London. Considerable investment in this area by the Trust had identified several key indicators for patient satisfaction that policy makers have found useful. These had their original grounding in the NHS annual in-patient survey (NHS Inpatient Survey, 2013) and were part of the core set of measures that the Trust used as part of their on-going patient experience programme.

Unlike the study in Chapter 4, there was an established record of asking in-patients a series of questions regarding their satisfaction with care. It was initially thought that the full NHS inpatient survey could be used as a template for this aspect of the study, but the number of domains and length of time taken to complete was prohibitive. A review of the patient satisfaction and experience literature had already been undertaken (Section 4.2.1-3) and this helped support the decision making process behind the selection of measures. Crow et al (Crow et al., 2002) support the use of overall satisfaction with care measures and this was included as a result.
The decision to include the satisfaction with nurses and doctors was made to help discriminate between these two aspects of patient care and these measures are included within the NHS inpatient survey. The identification of differences between health care providers that a patient receives care from has been shown to be helpful when analysing results for improvement and policy development purposes (Boyer et al. 2006) and this supports their inclusion in the study protocol. The domains of communication and dignity and respect, have been identified as key targets for patient experience initiatives by the Trust and other bodies (e.g. Carers UK, NHS England) and as such were included.

Workforce wellbeing within the NHS is subject to an annual NHS workforce survey, as discussed in section 5.2. The aim of the study was not to fully characterise the employment related SWB determinants of the nursing population, but rather to help identify associations between nurses’ and patients’ SWB. With this in mind a limited number of questions were included. Theses questioned overall job satisfaction, how valued by the employer they felt, and whether they would recommend the hospital to a friend or family member.

The selection of patient background measures and the demographics questionnaire was used from previous SWB data collection studies and also based on key variables from the BHPS surveys (British Household Panel Survey (BHPS), 2007).

The questionnaires were designed in conjunction with the Behavioural team at Imperial College London, who have extensive experience in questionnaire design. Importantly SWB questions were asked first so as to avoid focusing effects. The questionnaires were trialled on an initial sample of 16 ward in-patients and a sample of nurses from a sister hospital not partaking in the study. Feedback was elicited to improve the readability and structure of the questionnaire. The questionnaires used for the data collection are given in the appendix.
5.4.3. Sample size

The study site hospital has a total of 495 inpatient beds, although during the study period due to improvement works this was reduced to 460. The total number of eligible beds was 378, after excluding paediatric and critical care patients. This gives 378 patients eligible for inclusion on two sampling occasions, a total of 756. The number of nurses eligible for inclusion is more variable, due to day-to-day staffing variations. Consultation with the senior nursing team at the study site suggested that between four and six nurses would be on duty on each of the ten wards within the study. Accordingly the sample size would be between 40-60 nurses for each study period, giving a total of 80-120 for the study.

5.4.4. Study protocol

On the days of the study all adult wards were visited by the researcher, who invited all eligible inpatients to complete the study questionnaire. Patients were able to receive assistance in completing the questionnaire but it was made clear that the responses must be from the patient themselves and not on their behalf. All nurses directly caring for the patients at the time of the study (i.e. all the nurses on shift at the same time as the study) were invited to complete the nurses questionnaire.

Patients and staff were then asked to complete the study questionnaires within a 3 hour time period on the same day for two different days of the year. The data was collected in the afternoon so as not to interfere with morning clinical ward rounds. The researcher collected all results on the same day and transcribed these to a database for analysis.

Ethical approval was sought for the study but the Research Ethics Committee deemed that non was necessary as no novel intervention or change in procedure was being investigated. The study was discussed with the patient experience team and the senior nursing team ahead of the study,
and both groups were supportive of the work. A consent signature was included in the first page of the study to ensure the work was carried out to best practise principles.

5.5. Results and analysis

The results are divided into the descriptive statistics to summarize the basic demographic and background information of both the patient population within the study and the nurses who were enrolled. Regression analyses were then used to show the relationship between SWB and health state (EQ5D) for both the inpatient cohort and the nurses looking after them (directly addressing objectives 1 and 3). Given the fact that the data for this cross sectional study were taken once in the summer and once in the winter, the t-test was used to compare SWB of patients and their health state (EQ5D) during the summer and winter period. Finally, a correlation analysis was used to determine the relationship between the patient and nurse staff wellbeing, as well as between job satisfaction of nurses and their length of time as a nurse.

5.5.1. Descriptive statistics

The sample of the study consisted of 73 nurses and 446 inpatients from a cohort of an hospital. The trial flow diagrams are shown in
Figure 5.2 for the patients and Figure 5.3 for the nurses. The summary of their demographic information can be seen in Figure 5.4 and Figure 5.5.
Figure 5.2 Trial flow diagram - patients

Time period 1
- 378 Potential participants eligible
  - 47 excluded (Language / GCS)
  - 106 declined to participate
  - 226 enrolled

Time period 2
- 378 Potential participants eligible
  - 61 excluded (Language / GCS)
  - 97 declined to participate
  - 220 enrolled

446 patients enrolled

Figure 5.3 Trial flow diagram - nurses

Time period 1
- 40-60 potential nurses
  - 59 nurses on duty
  - 22 declined to participate
  - 37 enrolled

Time period 1
- 40-60 potential nurses
  - 54 nurses on duty
  - 18 declined to participate
  - 36 enrolled

73 nurses enrolled
For the demographic information of the 73 nurses, it can be seen that the mean age was 35.96 years old. The lowest age of the nurses was 23 years old while the highest was 60 years old. This is in keeping with what was expected and nurses are known to have long working lives (Boorman, 2009). The mean overall job satisfaction of the nurses was 6.95 which the ratings ranging from 4 to 10, which is again broadly in keeping with national values (between 65% and 75% (on a 100 scale) for the last 3 years (Boorman, 2009; Healthcare Commission, 2013)). The mean length of time working as nurses was 13.81 years. The breakdown of the demographic information of the 73 nurses showed that most were female (80.8%) which consist of 59 out of the 73 nurses.

In terms of the timing of the data collection (summer Vs winter), the number of nurses recruited was approximately equal for both data collection periods. For the smoking status of the 73 nurses, 24 (32.9%) classed themselves as smokers which slightly higher than the nationally reported rate of approximately 24% (Healthcare Commission, 2013). Many (53 (72.6%)) were married and only 20 (27.4%) were single. 40 (54.8%) out of the 73 nurses that have children. For the overall job satisfaction of the nurses, majority of the ratings were 6 (26%), 7 (46.6%), and 8 (13.7%) ion a 0-10 scale. The majority (57 (78.1%)) said that their employer valued them (compared to the national average of between 40-65%) and 58 (79.5%) out of the 73 nurses would recommend their hospital to a friend (compared to the National level of 63% in 2012).

For the demographic information of the 446 inpatients, the mean age was 59.05 years old. The lowest age among the patients was 15 years old while the highest was 95 years old. The mean satisfaction of the patients with the hospital service was 6.71 which the ratings ranging from 2 to 9. The mean length of hospital stay of the patients was 5.30 days with the lowest duration being 1 day while the highest length of stay was 45 days. The breakdown of the demographic information of the 446 inpatients cohort showed that there were more female (58.3%) than male (41.7%) patients. A similar number of patients were enrolled in the study for the summer and the winter data collection times (summer (50.7%), winter (49.3%)). 100 of the 446 (22.4%) inpatients identified themselves as smokers. The majority of inpatients were married (289 (64.8%)), and 97
(21.7%) were single, 58 (13%) widowed, and 2 (0.4%) divorced. There were 319 (71.5%) out of the 446 inpatients cohort that had children.

For the overall satisfaction with care of the inpatients cohort, the majority of the ratings were 6 (31.8%), 7 (41.5%), and 8 (16.4%). For the satisfaction with doctors, the ratings were 6 (38.3%), 7 (29.8%), and 8 (16.4%) and for the satisfaction with nurses, the majority of the ratings were also 6 (24.7%), 7 (46.9%), and 8 (14.8%). The figures do show that there were higher levels of satisfaction with nurses than doctors however, which is different from the NHS inpatient survey, which reports that 69% of patients were satisfied with their doctors and nurses (NHS Inpatient Survey, 2013). Similar satisfaction figures were seen for the satisfaction with communication (6 (36.3%), 7 (36.8%), and 8 (14.6%)). For the satisfaction in terms of being treated with dignity and respect, majority of the ratings were also 6 (31.6%), 7 (38.1%), and 8 (14.3%) indicating that the inpatients cohort have more than average satisfaction when being treated with dignity and respect by the health care provider. 146 (32.7%) out of the 446 inpatients cohort reported having had surgery on this admission and 133 (29.8%) out of the 446 inpatients self reported treatment for an infection on this admission. It is difficult to provide context for these last figures as different hospitals in the UK have different data. The information was discussed with the hospital management and microbiology teams locally are in keeping with expected figure.

<table>
<thead>
<tr>
<th>Nurse</th>
<th>Age</th>
<th>N</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overall satisfaction with job</td>
<td>73</td>
<td>4</td>
<td>10</td>
<td>6.95</td>
<td>1.08</td>
</tr>
<tr>
<td></td>
<td>Length of time working as a nurse</td>
<td>73</td>
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<td>33</td>
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Figure 5.5 Descriptive demographic and satisfaction statistics for patient and nurse populations

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5.5.2. Test for normality

Prior to conducting the regression analyses, t-tests, and correlation analysis, the data was checked to determine whether they were normally distributed. This is because it is a requirement of parametric tests (such as regression, t-test, and correlation tests) that the data be normally distributed. The skewness and kurtosis statistics of the data of the study variables that were included in the statistical analysis were obtained and investigated to test whether the data were normally distributed or not. These statistics are presented in Figure 5.6.

To determine whether the data follows a normal distribution, skewness statistics greater than three indicate strong non-normality while kurtosis statistic between 10 and 20 also indicate non-normality (Kline, 2005). Looking at Figure 5.6, the skewness statistic of the study variables for the nurses data were in the range of -0.77 to 2.95 with kurtosis values from -1.33 to 3.00, while the skewness statistic of the study variables for the patient data were in the range of -0.77 to 2.95, with kurtosis values from -1.90 to 15.79. All the skewness for both nurse and patient data fell within the criteria enumerated by Kline (Kline 2005) while all the kurtosis statistics of the study variables except for both nurse and patient data length of hospital stay fell within these criteria. However, this is still acceptable since the skewness did not violate the rule. Thus, the data for the study variables can be considered to be normally distributed and the regression, t-test, and correlation analysis can be conducted.
Figure 5.6 Kurtosis and Skewness Statistics

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Second, histograms were generated for each of the study variables of 16 study variables for the nurse data and 21 study variables for the patient data as another test of normal distribution of the study variables. The histograms were presented in Figure 5.7 for the nurse data and Figure 5.6 for the patient data. It can be observed from all histograms except for both nurse and patient data length of hospital stayed formed a partial representation of a bell-shaped curve pattern for a normal distribution. Although the bell-shaped pattern formed in the graph was not a perfect representation of the desired pattern, this is acceptable since the results of the normality testing through the skewness and kurtosis of the data of each of these study variables fell within the acceptable values indicating that the data exhibited normality distribution. Thus, the normality assumption for all the study was not violated. However, the histogram data for both nurse and patient data length of hospital stay were skewed to the left. This means that the data of length of stay for both nurses and patients were more frequent in the lower length of years.

![Figure 5.7 Test for normality: Histograms of study variables for nurse data](image-url)
Figure 5.7. Test for normality: histogram of study variables for nurse data (Cont..)
Figure 5.7. Test for normality: histogram of study variables for nurse data (Cont..)
Figure 5.7. Test for normality: histogram of study variables for nurse data (Cont.)

Figure 5.8 Test for normality: histogram of study variables for patient data
Figure 5.8. Test for normality: histogram of study variables for patient data (Cont..)
Figure 5.8. Test for normality: histogram of study variables for patient data (Cont..)
5.5.3. Multiple linear regression analysis to determine the relationship between SWB and health state for the nurses

A multiple linear regression model was conducted to identify the determinants of SWB of the nurses looking after the patients within the study population. This analysis determined of the extent of the association of the independent variables of the EQ5D health state of mobility, self-care, usual activities, pain/discomfort, and anxiety/depression of the nurses on the four dependent SWB variables of life satisfaction, happiness yesterday, anxiety yesterday, and life being worthwhile. Other independent variables included in the model were age, gender, energy yesterday, sleep yesterday, smoking status, marital status, having children, feeling valued by the
employer, whether they would recommend the hospital to a friend or not, and overall satisfaction with job.

Each of the dependent variables (dimensions of SWB) has a separate regression model to determine whether the influence of each of the five dimensions of EQ5D health state, and other independent variables, were significant predictors or not. The regression model created dummy variables for each of the independent variables of five dimensions of health state of mobility, self care, usual activities, pain/discomfort, and anxiety/depression; gender, smoking status, marital status, having children, valued by the employer, and the staff member recommended hospital to a friend or not, for each of their respective categorical groupings since these variables were categorical measured variables. The results were presented in Figure 5.9. A level of significance of 0.05 was used in the regression analysis.

First, the effects of the five dimensions of health state on the life satisfaction dimension of SWB were investigated. The results showed that none of the independent variables of mobility level 2 \( (t(73) = 0.64, p = 0.52) \), pain/discomfort level 2 \( (t(73) = 0.55, p = 0.55) \), anxiety/depression level 2 \( (t(73) = -1.02, p = 0.31) \), and anxiety/depression level 3 \( (t(73) = -0.57, p = 0.57) \) have any significant influences to the life satisfaction dimension of SWB since the p-values were all greater than the level of significance value of 0.05. Only the independent variable of overall job satisfaction \( (t(73) = 2.42, p = 0.02) \) had a significant influence on the life satisfaction dimension of SWB for the nurses. The unstandardized beta coefficient was analyzed to determine the independent contribution and the relative importance of overall job satisfaction job in predicting the life satisfaction dimension of SWB. The beta value of overall job satisfaction was 0.35. This suggests that overall job for the nurses has positive contribution to the model in predicting their life satisfaction. The life satisfaction of the nurses increases by 0.35 if their overall satisfaction with their job increases.

Second, the effects of the five dimensions of health state on the happiness yesterday domain of SWB were investigated. The results also showed that none of the independent variables of
mobility level 2 ($t(73) = 0.68, p = 0.50$), pain/discomfort level 2 ($t(73) = -0.13, p = 0.90$), anxiety/depression level 2 ($t(73) = -1.65, p = 0.11$), and anxiety/depression level 3 ($t(73) = -1.30, p = 0.20$) had any significant influence to the happiness yesterday domain of SWB since the $p$-values were all greater than the level of significance value of 0.05. This showed that the health states of the nurses were not significantly related to the happiness yesterday domain of SWB. Also, the demographic variable of age ($t(73) = 0.88, p = 0.38$), energy yesterday ($t(73) = 1.02, p = 0.31$), sleep yesterday ($t(73) = 0.58, p = 0.57$), and the categorically measured demographic variables of gender (female) ($t(73) = -0.29, p = 0.77$), smoking status (no) ($t(73) = 0.57, p = 0.57$), marital status (married) ($t(73) = -1.40, p = 0.17$), have children (no) ($t(73) = 0.12, p = 0.91$), valued by employer (no) ($t(73) = -1.10, p = 0.92$), staff member recommend hospital to a friend or not (no) ($t(73) = -0.43, p = 0.67$), and overall satisfaction with job ($t(73) = -1.22, p = 0.23$) also did not have any significant influence on the happiness yesterday domain of SWB.

Third, the effects of the five dimensions of health state on the anxiety yesterday domain of SWB were investigated. The results showed that only the independent variables of anxiety/depression level 2 ($t(73) = 3.09, p < 0.001$) and anxiety/depression level 3 ($t(73) = 3.25, p < 0.001$) had a significant influence to the anxiety yesterday domain of SWB, since these were the only $p$-values less than the level of significance value of 0.05. The beta values of anxiety/depression levels 2 and 3 were 1.92 and 3.61, respectively. This suggests that both anxiety/depression levels 2 and 3 have a positive contribution to the model in predicting their SWB in terms of anxiety yesterday. The anxiety yesterday score increases by 1.92 if the patients have a level 2 anxiety/depression health state while their anxiety yesterday score increases by 3.61 if they report a level 3 anxiety/depression health state. This result suggests that nurses having more severe health state levels of anxiety/depression will have lower levels of SWB as measured by anxiety yesterday.

Lastly, the effects of the five dimensions of health state on the life being worthwhile dimension of SWB were investigated. The results also showed that only the independent variables of anxiety/depression level 2 ($t(73) = 3.09, p < 0.001$) and anxiety/depression level 3 ($t(73) = 3.25, p < 0.001$) have significant influence to the life being worthwhile dimension of SWB for the
nurses, since these were the only p-values less than the level of significance value of 0.05. The beta values of anxiety/depression levels 2 and 3 were -0.71 and -0.97, respectively. This suggests that both anxiety/depression levels 2 and 3 both have negative contributions to the model in predicting their life being worthwhile dimension. The life being worthwhile dimension of SWB decreases by 0.71 if the nurses have a level 2 anxiety/depression health state and by 0.97 if they report a level 3 anxiety/depression health state. This result suggests that nurses having more severe health state levels of anxiety/depression will have lower levels of SWB as measured by anxiety yesterday.
Figure 5.9 Regression Result of Influence of Health State to SWB (Nurses)

<table>
<thead>
<tr>
<th></th>
<th>Life Satisfaction</th>
<th></th>
<th>Happiness yesterday</th>
<th></th>
<th>Anxiety yesterday</th>
<th></th>
<th>Life being worthwhile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>t</td>
<td>Sig.</td>
<td>B</td>
<td>t</td>
<td>Sig.</td>
<td>B</td>
</tr>
<tr>
<td>(Constant)</td>
<td>3.85</td>
<td>1.98</td>
<td>0.06</td>
<td>3.90</td>
<td>2.08</td>
<td>0.04*</td>
<td>1.08</td>
</tr>
<tr>
<td>Mobility level 2 (Pre)</td>
<td>0.26</td>
<td>0.64</td>
<td>0.52</td>
<td>0.26</td>
<td>0.68</td>
<td>0.50</td>
<td>-0.23</td>
</tr>
<tr>
<td>Pain/Discomfort level 2 (Pre)</td>
<td>0.28</td>
<td>0.55</td>
<td>0.59</td>
<td>-0.06</td>
<td>-0.13</td>
<td>0.90</td>
<td>-0.98</td>
</tr>
<tr>
<td>Anxiety/Depression level 2 (Pre)</td>
<td>-0.47</td>
<td>-1.02</td>
<td>0.31</td>
<td>-0.73</td>
<td>-1.65</td>
<td>0.11</td>
<td>1.92</td>
</tr>
<tr>
<td>Anxiety/Depression level 3 (Pre)</td>
<td>-0.46</td>
<td>-0.57</td>
<td>0.57</td>
<td>-1.02</td>
<td>-1.30</td>
<td>0.20</td>
<td>3.61</td>
</tr>
<tr>
<td>Gender (Female)</td>
<td>0.24</td>
<td>0.66</td>
<td>0.51</td>
<td>-0.10</td>
<td>-0.29</td>
<td>0.77</td>
<td>-0.22</td>
</tr>
<tr>
<td>Age</td>
<td>0.01</td>
<td>0.72</td>
<td>0.47</td>
<td>0.01</td>
<td>0.88</td>
<td>0.38</td>
<td>0.00</td>
</tr>
<tr>
<td>Energy Yesterday SWB5</td>
<td>0.02</td>
<td>0.12</td>
<td>0.90</td>
<td>0.19</td>
<td>1.02</td>
<td>0.31</td>
<td>0.03</td>
</tr>
<tr>
<td>Sleep Yesterday SWB6</td>
<td>0.05</td>
<td>0.31</td>
<td>0.76</td>
<td>0.08</td>
<td>0.58</td>
<td>0.57</td>
<td>0.11</td>
</tr>
<tr>
<td>Smoking Status (No)</td>
<td>0.00</td>
<td>0.01</td>
<td>0.99</td>
<td>0.18</td>
<td>0.57</td>
<td>0.57</td>
<td>0.46</td>
</tr>
<tr>
<td>Marital Status (Married)</td>
<td>-0.36</td>
<td>-1.02</td>
<td>0.31</td>
<td>-0.47</td>
<td>-1.40</td>
<td>0.17</td>
<td>-0.53</td>
</tr>
<tr>
<td>Children (No)</td>
<td>0.14</td>
<td>0.46</td>
<td>0.65</td>
<td>0.03</td>
<td>0.12</td>
<td>0.91</td>
<td>-0.11</td>
</tr>
<tr>
<td>Valued by employer (No)</td>
<td>-0.60</td>
<td>-0.82</td>
<td>0.42</td>
<td>-0.07</td>
<td>-0.10</td>
<td>0.92</td>
<td>1.43</td>
</tr>
<tr>
<td>Staff member recommend hospital to a friend or not (No)</td>
<td>0.16</td>
<td>0.22</td>
<td>0.83</td>
<td>-0.30</td>
<td>-0.43</td>
<td>0.67</td>
<td>1.26</td>
</tr>
<tr>
<td>Overall job satisfaction</td>
<td>0.35</td>
<td>2.42</td>
<td>0.02*</td>
<td>0.17</td>
<td>1.22</td>
<td>0.23</td>
<td>-0.06</td>
</tr>
</tbody>
</table>

*Significant at level of significance of 0.05
5.5.4. Multiple linear regression analysis to determine the relationship between SWB and health state for the patients

Another multiple linear regression model was conducted to determine the determinants of SWB for the patients. This analysis determined the extent of the association of the independent variables of the different dimensions of EQ5D health state and the dependent variables of the four dimensions of SWB (life satisfaction, happiness yesterday, anxiety yesterday, and life being worthwhile). Other independent variables included in the model were age, gender, energy yesterday, sleep yesterday, smoking status, marital status, having children, surgery on this admission, treated for infection, overall satisfaction with care, satisfaction with doctors, satisfaction with nurses, satisfaction with communication, mean satisfaction scores, and length of hospital stay.

Each of the dimensions of the dependent variable of SWB for the patients have separate regression models to determine whether the influence of each of the five dimensions of health state and other independent variables were significant predictors or not. The regression model created dummy variables for each of the independent variables of five dimensions of health state of mobility, self care, usual activities, pain/discomfort, and anxiety/depression, gender, smoking status, marital status, having children, having surgery, and being treated for infection, for each of their respective categorical groupings since these variables were categorical measured variables. The results are presented in Figure 5.10. A level of significance of 0.05 was used in the regression analysis.

First, the effects of the independent variables on the life satisfaction dimension of SWB were investigated. The results showed that self care level 3 ($t_{(446)} = -2.50, p = 0.01$), pain/discomfort level 3 ($t_{(446)} = -3.33, p < 0.001$), and anxiety/depression level 3 ($t_{(446)} = -5.35, p < 0.001$) have significant influences on the life satisfaction dimension of SWB, since these were the $p$-values less than the level of significance value of 0.05. The unstandardized beta coefficient was analysed to determine their independent contribution and relative importance. The beta values of self care level 3, pain/discomfort level 3, anxiety/depression level 3 were -0.48, -0.68, and -1.03, respectively. This suggests that self care level 3, pain/discomfort level 3, and anxiety/depression level 3 have significant negative contributions to the model in predicting life satisfaction of the patients. The life satisfaction for patients decreases by 0.48
if they have level 3 self-care; decreases by 0.68 if they have level 3 pain/discomfort; and decreases by 1.03 if they have level 3 anxiety/depression health state. This result shows that patients that self-report more severe health states for self care, pain/discomfort, and anxiety/depression will have lower levels of SWB as measured by life satisfaction.

Alongside the independent variable of health state, the independent variables of energy yesterday \((t(446) = 3.47, p < 0.001)\) and the demographic information of smoking yesterday (no) \((t(446) = 2.33, p = 0.02)\) have also significant influences to the life satisfaction dimension of SWB. The beta values for energy yesterday and smoking status (no) were 0.13 and 0.24, respectively indicating that energy yesterday and smoking status (no) have positive contributions to the model in predicting the life satisfaction domain of SWB for patients. The life satisfaction increases by 0.13 for every one increase of their energy yesterday score; and increases by 0.24 for non-smokers, meaning that non-smoking patients who report higher energy levels have higher levels of life satisfaction.

Second, the effects of the five dimensions of EQ5D health state of patients on the happiness yesterday dimension of SWB were investigated. The results show that the independent variables of mobility level 2 \((t(446) = -2.29, p = 0.02)\), mobility level 3 \((t(446) = -2.73, p = 0.01)\), and anxiety/depression level 3 \((t(446) = -3.89, p < 0.001)\) have significant influences to the happiness yesterday dimension of SWB, since the p-values are less than the level of significance value of 0.05. The beta values of mobility level 2, mobility level 3, anxiety/depression level 3 were -0.21, -0.42, and -0.70, respectively. This suggests that mobility level 2, mobility level 3, and anxiety/depression level 3 have significant negative contributions to the model in predicting happiness yesterday of the patients. The happiness yesterday SWB score decreases by 0.21 if they have level 2 mobility; decreases by 0.42 if they have level 3 mobility; and decreases by 0.70 if they have level 3 anxiety/depression health state. This shows that the patient EQ5D health states for mobility and anxiety/depression were negatively significantly related to the happiness yesterday dimension of SWB. This means that patients who report more difficulty with their mobility and more anxiety and depression will have lower levels of SWB, as measured by happiness yesterday.
Aside from the independent variable of health state, the independent variable of sleep yesterday ($t (446) = 3.26, p < 0.001$), demographic information of gender (female) ($t (446) = -1.99, p = 0.05$), marital status (widowed) ($t (446) = -2.07, p = 0.04$), and surgery (no) ($t (446) = -2.22, p = 0.03$) have also significant influences on the happiness yesterday dimension of SWB. The beta values for sleep yesterday, gender (female), marital status (widowed), and surgery (no) were -0.17, 0.09, -0.26 and -0.20, respectively, indicating that gender (female), marital status (widowed), and surgery (no) have negative contributions while sleep yesterday has positive contribution to the model in predicting the happiness yesterday of patients. The happiness yesterday of inpatient cohort of an entire hospital increases by 0.09 for every one increase of their sleep yesterday score; decreases by 0.17 for female patients; decreases by 0.29 for widowed patients; and decreases by 0.20 for those who have not experienced surgery.

Third, the effects of the five dimensions of EQ5D health state of patients on the anxiety yesterday dimension of SWB were investigated. The results showed independent variables of anxiety/depression level 2 ($t (446) = 6.43, p < 0.001$) and anxiety/depression level 3 ($t (446) = 8.73, p < 0.001$) have significant influences on the anxiety yesterday dimension of SWB, since these were the p-values less than the level of significance value of 0.05. The beta values of anxiety/depression levels 2 and 3 were 0.96, and 2.44, respectively. This suggested that anxiety/depression levels 2 and 3 have significant positive contributions to the model in predicting anxiety yesterday of the patients. The anxiety yesterday SWB score increases by 0.96 if they have level 2 anxiety/depression, and increases by 2.44 if they have level 3 anxiety/depression health state. This positive and significant means that those in more severe EQ5D states of anxiety/depression will report higher anxiety scores and experience lower levels of SWB.

The independent variable of energy yesterday ($t (446) = -1.95, p = 0.05$) also had a significant influence on the anxiety yesterday dimension of SWB. The beta values for energy was -1.10 indicating that energy yesterday has negative contribution to the model in predicting the SWB in terms of anxiety yesterday for patients. The patient SWB scores for anxiety yesterday decreases by 0.10 for every one increase of their energy yesterday score.
In the fourth regression model, the effects of the five dimensions of health state on the life being worthwhile dimension of SWB were investigated. The results show that only the independent variable of anxiety/depression level 3 (\(t(446) = -2.54, p = 0.01\)) had significant influence on the life being worthwhile dimension of SWB. The beta value of anxiety/depression level 3 was -0.54. This suggests that EQ5D anxiety/depression level 3 has a significant negative contribution to the model in terms of predicting life being worthwhile for the patients. The patient life being worthwhile SWB score decreases by 0.54 if they report EQ5D state level 3 for anxiety/depression. This means that that the health state of anxiety/depression was negatively significantly related to the life being worthwhile dimension of SWB, and it follows that patients who report the most severe EQ5D health state of anxiety/depression will have lower levels of SWB as measured by life being worthwhile.

In addition to this, the independent variables of energy yesterday (\(t(446) = 0.97, p = 0.05\)) and surgery (no) (\(t(446) = -1.99, p = 0.05\)) have also significant influences to the life being worthwhile dimension of SWB. The beta values for energy yesterday and surgery (no) were 0.08 and 0.21, respectively, indicating that surgery (no) had a negative contribution while energy yesterday has positive contribution to the model in predicting the life being worthwhile SWB dimension for patients. The life being worthwhile SWB score increases by 0.08 for every one increase of their energy yesterday score and decreases by 0.10 if the patient has not experienced surgery.
### Figure 5.10 Regression Result of Influence of Health State to SWB

<table>
<thead>
<tr>
<th></th>
<th>Life Satisfaction</th>
<th>Happiness yesterday</th>
<th>Anxiety yesterday</th>
<th>Life being worthwhile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>t</td>
<td>Sig.</td>
<td>B</td>
</tr>
<tr>
<td>(Constant)</td>
<td>4.88</td>
<td>10.72</td>
<td>0.00*</td>
<td>5.85</td>
</tr>
<tr>
<td>Mobility level 2 (Pre)</td>
<td>-0.16</td>
<td>-1.64</td>
<td>0.10</td>
<td>-0.21</td>
</tr>
<tr>
<td>Mobility level 3 (Pre)</td>
<td>-0.20</td>
<td>-1.21</td>
<td>0.23</td>
<td>-0.42</td>
</tr>
<tr>
<td>Self care level 2 (Pre)</td>
<td>-0.07</td>
<td>-0.73</td>
<td>0.47</td>
<td>-0.16</td>
</tr>
<tr>
<td>Self care level 3 (Pre)</td>
<td>-0.48</td>
<td>-2.50</td>
<td>0.01*</td>
<td>-0.27</td>
</tr>
<tr>
<td>Usual Activities level 1 (Pre)</td>
<td>0.09</td>
<td>0.90</td>
<td>0.37</td>
<td>-0.05</td>
</tr>
<tr>
<td>Usual Activities level 3 (Pre)</td>
<td>0.16</td>
<td>0.94</td>
<td>0.35</td>
<td>0.12</td>
</tr>
<tr>
<td>Pain/Discomfort level 1 (Pre)</td>
<td>-0.10</td>
<td>-1.04</td>
<td>0.30</td>
<td>-0.10</td>
</tr>
<tr>
<td>Pain/Discomfort level 3 (Pre)</td>
<td>-0.68</td>
<td>-3.33</td>
<td>0.00*</td>
<td>-0.21</td>
</tr>
<tr>
<td>Anxiety/Depression level 2 (Pre)</td>
<td>-0.10</td>
<td>-0.96</td>
<td>0.34</td>
<td>0.03</td>
</tr>
<tr>
<td>Anxiety/Depression level 3 (Pre)</td>
<td>-1.03</td>
<td>-5.35</td>
<td>0.00*</td>
<td>-0.70</td>
</tr>
<tr>
<td>Gender (Female)</td>
<td>-0.12</td>
<td>-1.27</td>
<td>0.21</td>
<td>-0.17</td>
</tr>
<tr>
<td>Age</td>
<td>0.00</td>
<td>0.85</td>
<td>0.40</td>
<td>0.00</td>
</tr>
<tr>
<td>Energy Yesterday SWB5</td>
<td>0.13</td>
<td>3.47</td>
<td>0.00*</td>
<td>0.03</td>
</tr>
<tr>
<td>Sleep Yesterday SWB6</td>
<td>0.03</td>
<td>1.09</td>
<td>0.28</td>
<td>0.09</td>
</tr>
<tr>
<td>Smoking Status (No)</td>
<td>0.24</td>
<td>2.33</td>
<td>0.02*</td>
<td>0.14</td>
</tr>
<tr>
<td>Marital Status (Single)</td>
<td>-0.12</td>
<td>-1.06</td>
<td>0.29</td>
<td>-0.05</td>
</tr>
<tr>
<td>Marital Status (Widowed)</td>
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<td>-1.38</td>
<td>0.17</td>
<td>-0.26</td>
</tr>
<tr>
<td>Marital Status (Divorced)</td>
<td>-0.52</td>
<td>-0.79</td>
<td>0.43</td>
<td>0.81</td>
</tr>
<tr>
<td>Children (No)</td>
<td>-0.08</td>
<td>-0.81</td>
<td>0.42</td>
<td>0.03</td>
</tr>
<tr>
<td>Surgery (No)</td>
<td>-0.01</td>
<td>-0.05</td>
<td>0.96</td>
<td>-0.20</td>
</tr>
<tr>
<td>Infection (No)</td>
<td>-0.08</td>
<td>-0.82</td>
<td>0.41</td>
<td>0.07</td>
</tr>
<tr>
<td>Overall satisfaction with care</td>
<td>0.14</td>
<td>1.72</td>
<td>0.09</td>
<td>0.07</td>
</tr>
<tr>
<td>Satisfaction with doctors</td>
<td>0.06</td>
<td>0.89</td>
<td>0.38</td>
<td>0.11</td>
</tr>
<tr>
<td>Satisfaction with nurses</td>
<td>0.11</td>
<td>1.45</td>
<td>0.15</td>
<td>0.03</td>
</tr>
<tr>
<td>Satisfaction with communication</td>
<td>0.03</td>
<td>0.37</td>
<td>0.71</td>
<td>0.04</td>
</tr>
<tr>
<td>Mean satisfaction score</td>
<td>-0.18</td>
<td>-0.72</td>
<td>0.47</td>
<td>-0.22</td>
</tr>
</tbody>
</table>

*Significant at level of significance of 0.05
5.5.5. Comparison of SWB and self reported health score (EQ5D-VAS) between summer and winter

The t-test was conducted to compare the health state and subject of well being of the nurses and inpatient cohorts during two measurement points of summer and winter. A level of significance of 0.05 was also used in the hypothesis testing. Descriptive statistics of the SWB dimensions of life satisfaction, happiness yesterday, anxiety yesterday, life being worthwhile, and the further variables of energy yesterday, and sleep yesterday, and the EQ5D visual analogue scale for self rated health score of the nurses and patients are summarized in Figure 5.11.

For the SWB dimensions, the mean comparison showed that the nurses and inpatient cohorts have higher life satisfaction, happiness, energy yesterday, and sleep yesterday during the summer than in the winter. These were because the mean scores during summer were higher than during winter. The anxious yesterday and worthwhile life scores where higher during the winter than in the summer.

For the health state comparisons it is not possible to compare EQ5D states on a continuous scale, however the EQ5D visual analogue scale was collected and this was used as a self reported health state as a continuous variable. The nurses and patients both reported better health states in terms of the EQ5D visual analogue score in the summer than in the winter. The mean differences were further validated by the t-test of difference to see if the differences are significance or not, based on the t statistics at the level of significance of 0.05.
The resulting statistic of the t-test of differences of the SWB and EQ5D visual analogue score between the summer and winter are shown in Figure 5.12. This shows that the SWB dimensions of happiness yesterday (t (517) = 2.79, p = 0.01), energy yesterday (t (484.17) = 2.56, p = 0.01), and sleep yesterday (t (477.44) = 3.00, p < 0.001) were significantly different between the summer and winter period. The mean difference showed that the SWB in terms of happiness yesterday (Mean difference = 0.23), energy yesterday (Mean difference = 0.29), and sleep yesterday (Mean difference = 0.44) of nurses and inpatient cohorts was significantly greater in the summer season than in the winter season; but that there was no significant difference in the EQ5D visual analogue health score between the seasons.
In order to examine any potential relationship between the SWB of the patients and the health and SWB of the nurses a set of analyses were undertaken. An initial correlation test was performed to highlight any strong interactions and the a further set of regressions were run using the patient SWB as the dependent variable and the nurses’ health and SWB as the independent variables.

5.5.6.1. Correlation results between patients’ and nurses’ SWB

Pearson correlation test was conducted to determine the relationship between the patient and nurse staff wellbeing. A further correlation test was also run to determine whether there was an association between the job satisfaction of nurses and their length of time as a nurse. A level of significance of 0.05 was also used in the hypothesis testing. A significant relationship existed once the p-value of significance (sig.) is less than or equal to the level of significance value of 0.05. The Pearson correlation test also investigated the direction of the correlation (positive or negative), and the results are shown in Figure 5.14.
The correlation test showed that the patient’s SWB in terms of life being worthwhile was significantly negatively correlated with the nurses’ SWB in terms of both happiness yesterday \((p = 0.04, r = -0.24)\) and life being worthwhile \((p = 0.03, r = -0.26)\). This means that the patients’ SWB in terms of life being worthwhile was higher when the nurses SWB in terms of happiness yesterday and life being worthwhile was lower. The results suggest that nurses that were happy and had higher SWB scores for life being worthwhile looked after patients with lower SWB scores for life being worthwhile. The results of the correlation test showed that the overall job satisfaction of nurses was not significantly correlated with the length of time working as a nurse \((p = 0.41, r = 0.10)\).

Figure 5.13 shows a scatter plots generated to graphically represent the significant linear relationships of patient SWB life being worthwhile with nurse SWB happiness yesterday and life being worthwhile. This is based on the negative correlations of patient SWB life being worthwhile with nurse SWB happiness yesterday and life being worthwhile were observed in the graph since the scatter plot exhibited a negative gradient straight light pattern.
Figure 5.14 Pearson correlation test result of relationship of SWB between the nurse and patient populations

<table>
<thead>
<tr>
<th></th>
<th>Life Satisfaction SWB1 (nurse)</th>
<th>Happiness Yesterday SWB2 (nurse)</th>
<th>Anxious Yesterday SWB3 (nurse)</th>
<th>Worthwhile Life Score SWB4 (nurse)</th>
<th>Length of time working as a nurse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Satisfaction (patients)</td>
<td>Pearson Correlation 0.15</td>
<td>-0.21</td>
<td>0.02</td>
<td>-0.13</td>
<td>0.10</td>
</tr>
<tr>
<td>N</td>
<td>73</td>
<td>73</td>
<td>73</td>
<td>73</td>
<td>73</td>
</tr>
<tr>
<td>Happiness Yesterday (patients)</td>
<td>Pearson Correlation 0.01</td>
<td>0.01</td>
<td>0.1</td>
<td>-0.07</td>
<td>0.10</td>
</tr>
<tr>
<td>N</td>
<td>73</td>
<td>73</td>
<td>73</td>
<td>73</td>
<td>73</td>
</tr>
<tr>
<td>Anxious Yesterday (patients)</td>
<td>Pearson Correlation 0.00</td>
<td>-0.03</td>
<td>-0.04</td>
<td>0.09</td>
<td>0.41</td>
</tr>
<tr>
<td>N</td>
<td>73</td>
<td>73</td>
<td>73</td>
<td>73</td>
<td>73</td>
</tr>
<tr>
<td>Worthwhile Life Score (patients)</td>
<td>Pearson Correlation -0.18</td>
<td>-0.24</td>
<td>0.12</td>
<td>-0.26</td>
<td>73</td>
</tr>
<tr>
<td>N</td>
<td>73</td>
<td>73</td>
<td>73</td>
<td>73</td>
<td>73</td>
</tr>
<tr>
<td>Overall satisfaction with job</td>
<td>Pearson Correlation 0.12</td>
<td>0.04*</td>
<td>0.31</td>
<td>0.03*</td>
<td>73</td>
</tr>
<tr>
<td>N</td>
<td>73</td>
<td>73</td>
<td>73</td>
<td>73</td>
<td>73</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tailed).
5.5.6.2. Regression analysis of influence of nurses health and SWB on patient SWB

The final analysis in this section set out to determine the impact of nurse SWB and health on the SWB of the patients. In order to run a regression analysis to see whether the nurses' health and SWB is a determinant of the SWB of the patients it is necessary to provide values of the nurses scores that correspond to each patient. It is thus necessary to identify the nurse that has looked after each individual patient, or to provide an aggregated score at a ward level. On a practical level patients are primarily looked after by one nurse per shift, but over a period of days the care received would be provided by a number of different nurses depending on shift pattern, annual leave and other considerations. Accordingly the mean health and SWB scores for the nurses on each ward were calculated and used as independent variables. This approach allows for the variation that will inevitably be seen within the staff population and takes into account the dynamic status of nursing care provided.

The SWB score for the nurses was calculated by generating the mean SWB for each nurse as a mean of the four SWB domains (anxiety was reverse coded to give a maximum anxiety of 10 and a minimum of 0). The mean of this compound value was then taken for the nurses working on each ward. The “mean nurses' health score” was the self-rated EQ5D-VAS, which was also averaged for the nurses on each ward. The third independent variable used in this analysis was the “mean nurses job satisfaction” for the nurses working on each ward. The results are shown in Figure 5.15.

First, the effects of the independent variables on the life satisfaction dimension of SWB were investigated. The results showed that the mean nurses’ health score ($t (446) = 2.12, p = 0.04$) and the mean nurses’ job satisfaction ($t (446) = 2.65, p = 0.01$) both have significant influences on the life satisfaction dimension of SWB, since the p-values are less than the level of significance value of 0.05. The unstandardized beta coefficient was analysed to determine their independent contribution and relative importance. The beta values of the mean nurses’ health score and mean job satisfaction were 0.14 and 0.15 respectively. This suggests that both have significant positive contributions to the model in predicting life satisfaction of the patients.
Next, the effects of the independent variables on the happiness yesterday dimension of SWB were investigated. The results showed that the mean nurses’ job satisfaction ($t(446) = 2.49, p = 0.01$) has a significant influence on the happiness yesterday dimension of SWB, since the p-value is less than the level of significance value of 0.05. The unstandardized beta coefficient was analysed to determine their independent contribution and relative importance. The beta value of the mean nurses’ health score was 0.14. This suggests that it has a significant positive contribution to the model in predicting the happiness yesterday dimension of SWB of the patients.

The third regression showed the effect of the independent variables on the anxiety yesterday dimension of SWB. The results showed that none of the three independent variables had a significant impact on the anxiety yesterday dimension of SWB of the patients.

In the final regression, the effects of the independent variables on the life being worthwhile dimension of SWB were investigated. The results showed that the mean nurses’ health score ($t(446) = 2.73, p = 0.01$) and the mean nurses’ job satisfaction ($t(446) = 0.21, p = 0.00$) both have significant influences on the life being worthwhile dimension of SWB, since the p-values are less than the level of significance value of 0.05. The unstandardized beta coefficient was analysed to determine their independent contribution and relative importance. The beta values of the mean nurses’ health score and mean job satisfaction were 0.18 and 0.21 respectively. This suggests that both have significant positive contributions to the model in predicting the life being worthwhile dimension of SWB.
Figure 5.15 Regression analysis of influence of mean nurse health and SWB scores on patient SWB

<table>
<thead>
<tr>
<th></th>
<th>Life Satisfaction</th>
<th>Happiness yesterday</th>
<th>Anxiety yesterday</th>
<th>Life being worthwhile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>t</td>
<td>Sig.</td>
<td>B</td>
</tr>
<tr>
<td>(Constant)</td>
<td>5.27</td>
<td>0.00</td>
<td></td>
<td>6.77</td>
</tr>
<tr>
<td>Nurse SWB</td>
<td>0.00</td>
<td>0.05</td>
<td>0.96</td>
<td>-0.06</td>
</tr>
<tr>
<td>Mean nurse health score (EQ5D VAS)</td>
<td>0.14</td>
<td>2.12</td>
<td>0.04*</td>
<td>0.11</td>
</tr>
<tr>
<td>Mean nurse job satisfaction</td>
<td>0.15</td>
<td>2.65</td>
<td>0.01*</td>
<td>0.14</td>
</tr>
</tbody>
</table>

*Correlation is significant at the 0.05 level (2-tailed).
5.6. Discussion

This chapter set out to measure the SWB and health of the inpatient population of an NHS hospital and the nurses looking after them. A key objective was to identify any associations between the SWB of patients and the nursing staff looking after them. It also sought to investigate the determinants of SWB for both the patients and the nurses looking after them. Results from SWB work such as these can be challenging to interpret and their format may not be familiar to policy makers and clinicians, with this in mind a clear context is provided throughout the discussion and an approach that focuses on real world implications is taken.

Previous work has demonstrated that within clinical populations there are strong associations between more severe health states of mental illness and lower levels of SWB (Graham et al., 2009) but that surprisingly other domains of the EQ5D such as mobility were only weakly negatively associated with SWB and not significantly. There is a relative lack of such comparative studies in this area, but other work undertaken in Sheffield has further corroborated these findings, and even found that pain and physical functioning had a positive effect on SWB in some cases.

The study population was 446 in-patients, and this in itself represents a significant contribution to the field of SWB research, as there are very few datasets of this kind that include patient SWB and health state, and none that also link this with the SWB and health state of the care providers. There are inherent difficulties in capturing the data for these paired populations within a clinical environment, and these are discussed later along with strategies that could help with future work. Having said this the demographic data have been seen to be largely in keeping with national levels (Boorman, 2009; Healthcare Commission, 2013; NHS Inpatient Survey, 2013) and as such are representative of the population in which we are practising.

For the patients within the study, it was shown that SWB in terms of life satisfaction was significantly negatively affected by the most severe EQ5D health states for the self care, pain/discomfort and anxiety/depression domains. This is in keeping with the health and SWB presented by Graham from South America (Graham et al., 2011), but there is no comparable data from European or North American
populations. The loss of the ability to care for oneself is central to illness and health losses generally, and not being able to look after oneself particularly for an elderly patient is not uncommonly a reason to present to acute medical services, even in the absence of an acute illness. It is perhaps not surprising therefore that SWB in terms of life satisfaction was significantly negatively affected for patients who reported the most severe levels self care (EQ5D self care level 3). This determinant of SWB is also reported for population wide samples both in terms of this EQ5D health state (P. Dolan & Metcalfe, 2012), and also the similar domain of “role limitations” within the SF6D for both moderate and severe limitations (P. Dolan et al., 2012).

Level 3 of the EQ5D health state domain of pain/discomfort had a significant negative impact on the life satisfaction dimension of SWB. Again, this negative association has been demonstrated in other work and helps support the validity of this sample (P. Dolan & Metcalfe, 2012). The majority of work that has analysed the determinants of SWB in terms of self-reported health states are from large population samples and as such any comparisons should be cautious. It is interesting that given the fact that patients in hospital are more likely to be in pain than those in non-clinical populations (primarily in relation to trauma and recent surgery) that associations between pain/discomfort and other dimensions are not seen. One explanation is that there were adequate analgesia prescriptions within the in-patient cohort, but it is equally possible that in general people’s SWB is not that affected by pain in moderate or low levels. This has significant policy implications, as the cornerstone of the health technology appraisal methodology supported by NICE (NICE, 2008) uses the hypothetical preferences of the general population to rank health state severity (Brazier et al., 2005). These population preference derived data may exaggerate the impact of pain/discomfort when compared to mental health states, which is in contrast to these findings.

Severe levels of anxiety/depression were also found to have a significant impact on the life satisfaction dimension of SWB for the patients. This was anticipated, as mental health has a consistent and negative effect on the SWB of patients and non-clinical populations (P. Dolan et al., 2008; H. T. Kosvumaa-Honkanen et al., 1999). EQ5D level 3 for anxiety/depression was also significantly associated with every dimension of SWB that was included in the study, further highlighting its importance in clinical populations. None of the other domains of EQ5D had such a consistent impact on the SWB of patients.
It is perhaps not surprising that the EQ5D level 2 for anxiety/depression is also significantly negatively associated with the anxiety yesterday dimension of SWB. This impact across the board for anxiety/depression is a clear message for policymakers and for those in clinical roles caring for patients.

The priorities within an acute hospital that does not directly provide mental health inpatient or outpatient services may well not be geared to addressing the mental health of patients. This may be entirely appropriate, as the clinical workload would not usually include treating mental health complaints as the chief medical problem. It must be remembered that patients can however have more than one problem, and for those patients who self report anxiety and depression, discussing or working through their anxiety or treating their depression must be highlighted as a priority as it has such a significant impact on SWB. Initiatives that could help integrate such priorities are discussed in Chapter 6, but local or national programmes that could help screen for and treat mental health conditions pro-actively within hospitals could be one way that policy makers could use this data to reduce the burden of illness effectively.

One way forward would be for patients to complete an admission health questionnaire on admission to the ward. This would not have to be completed if they were critically unwell, but at a juncture when they were able to consider the questions fully. The questionnaire could act as a screening tool for mental health conditions and help uncover any undiagnosed mental health problems, or other health issues. The answers to the questionnaire would generate a score that could trigger referral to the mental health liaison service within the hospital (all NHS acute hospitals have this service). An abbreviated tool could also be employed in Emergency Departments where there is often a need to rapidly diagnose mental health issues, that are often not the complaint that they patient may volunteer on presentation to health care services.

The happiness yesterday dimension of SWB is significantly affected by EQ5D anxiety/depression level 3, and also EQ5D mobility level 2 and level 3. This negative association with the mobility domain of the EQ5D is not reported in the regression data for EQ5D and health state data elsewhere. It has been argued that the lack of association in non-clinical populations between mobility and SWB is due to issues of adaptation. In this way, an individual who has some difficulties getting about (EQ5D mobility level 1)
will adapt to these difficulties so that they do not impact on their life as a whole. A simple example of this could be that they catch the bus into town rather than walk, which they used to. In this way their SWB as measured does not suffer any significant losses. One explanation of the result for the impact of the mobility domain on the SWB dimension of happiness yesterday in the population sample is that these adaptive strategies have yet to develop. Lack of mobility due to illness is common, and this is reflected in the much higher rates of EQ5D mobility level 3 in the study sample when compared to the general population (BHPS, 2011). These sudden reductions in mobility may be transient or long term, but their impact on positive affect as measured by the SWB of happiness yesterday is felt significantly at moderate and severe levels. All acute hospitals have dedicated teams led by physiotherapists that tailor exercises and care plans to improve mobility alongside treatment of any acute medical problem. The findings from this work serve to highlight the importance of improving mobility in clinical populations in order to help address patient SWB.

The regression analysis for the patient sample within the study also demonstrated a significant association between energy and life satisfaction. This does not seem unexpected, and the notion of including energy as a determinant of health seems sensible, as discussed in Chapter 2. It is notably absent from the EQ5D health state classification system, and so this finding is significant. The result is worthy of further exploration and consideration as efforts that can help improve the subjective energy levels of patients may help improve their SWB. A further association was noted between life satisfaction and not smoking. From a health policy perspective this seems like music to the ears of policy makers and clinicians alike. In the experience of patients, however, it is more likely that the impact on SWB is felt not because smokers have poorer health, but due to the fact that smokers are unable or find it difficult to smoke whilst as an inpatient and have a lower SWB as a result.

Sleep was also found to be an important determinant of SWB in terms of happiness yesterday, and those who were more satisfied with their sleep reported higher levels of happiness. Sleep can be a scarce resource in hospitals (M. Southwell & Wistow, 1995a; M. T. Southwell & Wistow, 1995b), and there has been great interest in improving the environments to improve sleep. This study is the first that
demonstrates a significant impact on SWB due to reduced subjective sleep scores and as such it provides evidence for investment in strategies to improve sleep quality for patients whilst in hospital.

In taking this forward there are a number of initiatives that have helped with improving sleep in isolated trials and studies that could be rolled out to help improve sleep quality. Simple initiatives that consolidate the number of nursing rounds that are made overnight and having an effective alarm silencing system for non-critical devices have been shown to be highly effective and can often have zero or minimal cost implications (Freedman et al. 1999). Other efforts have demonstrated that background music in an area that is unavoidably noisy can help patients (Niet et al. 2009) and also shown that simple eye mask and ear plugs, much like passengers receive on a long haul flight greatly improve the quality and length of sleep (Patel et al. 2014). Many of these ideas are simple and easy to implicate but it is in delivering these ideas to the clinical environment that presents a challenge. Patient experience teams may be well placed to help lead and champion these issues going forward.

Structural considerations such as the size of hospital wards and the number of patients sharing a room or bay also have influence on the sleep quality of patients. There may be little appetite or budget for large scale hospital redesign for the purposes of sleep improvement, but these data certainly support initiatives that seek to improve sleep quality when new units or hospitals are planned.

More difficult to explain are the findings that female gender, being widowed and not having surgery were all associated with happiness yesterday. Within a relatively small sample some unexpected results are to be expected and this would most likely account for these statistically significant results.

When considering the results of the regression analysis for the nurse population within the study sample the most apparent significant determinant of their SWB is overall job satisfaction. This was found to be significant for the life satisfaction dimension of SWB. The nursing sample can be considered as a group of professionals in their working environment, and as such there are greater comparisons for this population to the general (non-clinical) population than to clinical populations. It is surprising that there are no other significant determinants of life satisfaction within the sample. This is most likely due to the
small sample size of the population, as in general population samples there are consistent positive associations between marriage/significant life partner and life satisfaction (BHPS, 2011; P. Dolan et al., 2008). The association between life satisfaction and job satisfaction may be due to the focusing effect of completing a questionnaire about your life and your job whilst at work. Care was taken however to ask the SWB questions first, so that the independent factors would not bias the dependent ones, and as such the result is most likely to be a valid one. The results from the Boorman review into wellbeing at work for the NHS support these findings (Boorman, 2009), and specifically the staff perception survey undertaken by the Work Foundation for the Department of Health (Van Stolk et al., 2009).

Moderate and severe levels of anxiety/depression (EQ5D levels 2 and 3) had a significant effect on the SWB of the nurses within the sample, as measured by the anxiety yesterday dimension of SWB. This correlation between the two constructs of negative affect was anticipated, however the fact that both moderate and severe levels of anxiety significantly impacted on the life being worthwhile dimension of SWB was not forecast. There have been no previous accounts that detail similar measurements within clinical for the life worthwhile dimension of SWB, but it has been reported previously that anxiety impacts on life satisfaction and also on levels of perceived stress (Van Stolk et al., 2009). This significant negative effect that anxiety/depression has on the worthwhileness of the lives of nurses is important, as it follows that if life is less worthwhile than employee engagement is less, and from this point there are clear and well established associations with higher rates of absenteeism and poorer performance (Boorman, 2009).

The results also demonstrated an interesting difference between the summer and the winter sampling. This was done primarily to achieve a higher sample number, but offered an interesting natural experiment. The results of the t-tests showed that the SWB in terms of happiness yesterday, energy yesterday, and sleep yesterday were significantly better in the summer season than in the winter. This result has been noted previously in population samples (Harmatz MG. et al., 2000) but as this is a relatively small sample that is yet to be replicated, caution should be taken when generalising about such findings. Smith (Smith TW., 1979) highlights the issues with such seasonal trends and goes on to report (now) historic data that fail to adequately explain a clear overall pattern of seasonality with respect to
SWB. This is the first time, however, that it has been replicated within a clinical population and as such is an important consideration for future larger scale work.

A really significant finding from the study was the lack of impact that satisfaction had on the SWB for the patient sample. At the planning stage of the study there was considerable debate as to which measures of satisfaction with care or patient experience to include. The inclusion of three different domains was decided upon as they tapped into different areas that would have meaning for policy makers. The first issue to mention is that there was no reporting of extremely low levels of satisfaction (0 and 1), which suggests that there was no serious underlying dissatisfaction with the care received. However it is known that responses to satisfaction instruments are rarely given at this lower end of the scale even when patients are unhappy with their care and as such this is not unusual (Cleary et al., 1992, Coulter et al., 2009). This issue has also been discussed in the NHS inpatient Survey report (NHS Inpatient Survey 2013). Within the study, however, none of the three different domains of satisfaction proved to be significant determinants of the SWB of the patient population. This may be seen as a surprising finding, but given the lack of clarity surrounding the meaning of such measures for patients, and often policy makers, this result is more in line with the evidence set out in Chapter 4. This result does raise serious questions with respect to the value of patient experience data, as if there are no real effects on any of the four domains of SWB then should we continue to collect it?

The final analysis within the results was to assess for any direct relationship between the SWB of the nurses and the patients. Does a happy nurse necessarily mean a happy patient? The results of the correlation test showed that there were no associations between the life satisfaction of the patients and the nurses, which is perhaps the most widely used measure of SWB.

The correlation test was not without significant findings, however and it was shown that patient’s SWB in terms of life being worthwhile was significantly negatively correlated with the nurses’ SWB in terms of both happiness yesterday and life being worthwhile. Accordingly there was an association between patients that had a greater eudemonic (life being worthwhile) SWB and nurses that had lower levels of happiness yesterday and lower levels of life being worthwhile. This result is difficult to explain and may
be the result of having a small sample of nurses within the study population. Both Pearson correlation statistics are low and only just significant at the 5% level. If the findings did hold true in further or larger studies then this would certainly be an interesting avenue to research further. It seems intuitive that a nurse with higher SWB in terms of happiness yesterday would help reduce the anxiety of their patient and impact on their happiness, but this has not been shown in the correlation.

Correlation tests by their nature are very broad indicators of association and lack the nuanced specifics that could help develop focused policy interventions. They are however a good “yard stick” to look for any striking relationships on which to base more in depth analysis. The challenge in performing the regression was how to assign corresponding values for nurse health and SWB which made sense. Taking the mean values for these variables for each ward allowed this series of regression analysis to be undertaken (Section 5.5.6.2) and interesting results were seen. It was shown that the nurses’ job satisfaction was a significant determinant of patient SWB in terms of life satisfaction, happiness yesterday and life being worthwhile, and nurse health score was a significant determinant of patient SWB for the life satisfaction and life being worthwhile domains. Interestingly there were no significant associations between the nurses SWB and patient SWB. Overall these results suggest that it is not happy nurses that have happy patients, but rather it is healthy nurses and those satisfied with the jobs that have happy patients.

This is a new and noteworthy finding, and one that will naturally have implications that will support the health of nurses in clinical work. The reasons for this could be in part explained by the fact that healthier nurses are more able to perform their job, which is often strenuous and stressful. Healthier nurses may also be more pro-social and likely to engage with patients, which may result in improved patient SWB. Similar arguments would also account for the finding that nurse job satisfaction is a significant determinant of patient SWB. The specific details of the nurse health are not known in depth, and this is self reported health that has been used within the analysis, but this has been shown consistently to correspond with objective levels of health (Helliwell, 2003). Future work can be directed at examining this more closely to help uncover in more detail which aspects of nurse health have the greatest influence on patient SWB.
From a policy perspective these are very interesting results, and in taking them forward there are a number of areas that can be considered as targets for interventions. Improvements in nurses’ health would appear to help benefit patients in terms of their SWB, and so alongside schemes that promote nurses health such as access to medical treatment and occupational health services, which are currently under severe pressure (Boorman, 2009), other innovate policies could be developed. These may be for example in terms of behaviour change programmes that incentivise exercise or healthy eating (Dolan P et al., 2010), or could include discounted gym membership.

5.6.1. Methodological developments

This was the first time that a full picture of the SWB of inpatients for an entire acute hospital was captured along with the SWB of the nurses caring directly for them. The questionnaire was easily understood by the patients and there were no problems in terms of inadequate responses or omitted scores. It was necessary for some more infirm or frail patient have assistance with completing the questionnaire but the measures themselves were easily understood. This is a significant output from this work and a contribution to the measurement of SWB in clinical populations.

I was was very involved in the data collection and personally introduced the study to participants on the wards and ensured that enrolment levels were as high as possible. The same was true for recruiting the nursing sample. The protocol for each ward was set out so that there was an introductory visit on the morning of the study to prime the ward staff and patients. The second visit was immediately after lunch and saw the distribution of the questionnaires, followed by a final visit to collect the completed forms and prompt those who had yet to return a form to do so. All data was successfully collected within the intended timeframe, but this strategy is quite an intense period of data collection. Considerable advanced planning with scheduled times to visit each ward was required to ensure that all data was collected on the same day in all possible wards that were available for the study.
The advantage of this methodology was that the whole cross section could be captured within a four hour window. An initial discussion was had around how technological innovation may help improve the data collection process, particularly concerning the development of a smartphone “app” or online data collection tool. The chief problems encountered here were with respect to capturing all the data within a narrow timeframe to enable comparability. Introducing participants to a new platform for questionnaires on a tablet or smartphone is not necessarily straightforward and would have significantly increased the study time. Self completing forms on a hand held tablet device can be very straightforward, but it would then have to be passed from patient to patient which would represent a considerable infection control risk as well as greatly extending the data collection time.

For cross sectional data such as this, simple self completed paper questionnaires still offer the best approach when moderate to large numbers of participants are enrolled. For more selected populations, and certainly those where follow up measures are planned then technology may well have an exciting role to play.

Focusing effects play a big role in SWB data collection, and given the clinical setting there are bound to be considerable effects in this clinical population. This will always be the case however when hospital inpatients are asked about their SWB, and whilst from a methodological perspective the questionnaire was designed not to focus on health ahead of answering the SWB questions, the environment in which responses were elicited will have had an impact. This is important when comparing these data to those derived from population samples, but in taking things forward there will be further clinical SWB to act as comparators, which will help place this and other new work in context.

5.6.2. Limitations

Sample size for the nursing population within the study is the most important limitation within this study. There was a great deal of reluctance form the nursing team to participate within the study and the most common reason given for not wanting to participate was lack of time. The researcher had worked in a
clinical capacity within the hospital and had a good working relationship with many of the nursing staff, which helped with recruitment but may be difficult to replicate in other hospitals where clinical staff are not familiar with the research team.

In order to allow for completion of the questionnaire within a fairly limited timescale difficult decisions had to be made with respect to what domains to include and what to exclude. Ideally further clinical data surrounding the method of admission, co-morbidities and medications would have been collected, however in the trialling of the initial data questionnaire it became apparent that this would significantly extend the time taken to complete the form and so the existing data set was decided upon.

The analysis of the data when considered as two separate groups (nurses and patients) required standard regression principles to be applied. In considering the effects of the nurses’ health and SWB on the SWB of the patients however a greater challenge was met. The decision to take the mean values for the nurses on each ward allowed this analysis to be undertaken with a regression based approach, but this does inevitably mean that some of the subtleties in the patterns of these relationships may be lost. In a situation where there was one-to-one care provided by a nurse (e.g. home care situation or in intensive care units) this would not be necessary. The approach taken does offer a realistic way forward in this analysis and also ensures that one particularly unhappy or unsatisfied nurse does not skew the results, which is likely to reflect the real life situation.

A separate limitation and one that is inherent in any cross sectional study is that there is no follow up data for these patients. Turning this methodology into a cohort study would be challenging due to the variations in diagnoses that these patients would have and the identification of appropriate follow up intervals. For this reason cohort studies may be better when examining the SWB of a clinically related group of individuals as set out in Chapter 4. The other issue with respect to cross sectional data is that it is not possible to control internally for any underlying individual differences in SWB. This is done automatically for panel data as the responses are from the same individual, and it is the difference between the values over time that is the main finding. In future work this could be controlled by asking patients to report on personal optimism, which in some studies has been shown to be a marker of
baseline SWB (Graham et al., 2011), and this may help provide internal controls for future cross sectional studies such as this.

The enrolment criterion regarding the ability to complete the questionnaire in English is a further limitation of the study.

5.7. Conclusions

This study has delivered a methodology and set of measures for the collection for data for hospital inpatients and the staff looking after them, and in doing so has met the overall aim. This is a significant contribution to the field and will enable further research to build upon these tested approaches to an emerging area of interest. Each of the main objectives were also met.

The life satisfaction of patients was shown to be significantly affected by severe levels of EQ5D states of pain/discomfort, anxiety/depression and self-care. The happiness of patients (happiness yesterday dimension of SWB) was significantly affected by severe anxiety and also by moderate or severe impairment in mobility. The most severe EQ5D level of anxiety was in fact seen to affect all dimensions of SWB and this represents an important area for all those working in hospitals to be more aware of.

There was no significant impact on any of the domains of patient satisfaction on any dimension of SWB. This finding has implications in terms of the appropriateness of continuing to collect these data. Energy levels were shown to be important for patients, both in terms of their significant associations with SWB as measured by life satisfaction and its negative association with the anxiety yesterday dimension of SWB. Policy makers should take note of this as it is an important determinant of SWB but omitted from the EQ5D health state classification tool.

For the nursing population it was seen that overall job satisfaction was a significant determinant of overall life satisfaction. It was also seen within the entire population that SWB was generally higher in the
summer sample when compared to the winter. The final important output from this study was that there were few, and where present confusing, significant associations between the SWB of nursing and patient populations when examined using a correlation approach. When considering the data on a ward-by-ward basis however it was shown that nurses health and job satisfaction were important determinants of patient SWB. It is not possible to say that a happy nurse will have a happy patient, but a healthy nurse (that is satisfied with their job) is more likely to.
6. Discussion

The overall objective of health care in very simple terms is to make people better. This may be to remove a cancer or treat a chest infection; and although sometimes a cure is not possible, such as in palliative care settings, even in these difficult situations we try to alleviate suffering, and improve the lives of those needing help. A chief motivator for my thesis was that as a practising clinician and a doctor with interests in health policy, I recognised that we often do not know enough about how treatments impact on the lives of our patients. Certain facets of health care, and even the model of health services that we as a society have adopted, can lead to a degree of suffering, even if this is short lived. Given the often difficult journey that patients have to go down in receiving health care, it is crucial that we pay attention to how people feel during and particularly after their treatment, so as to inform clinicians, policy makers and society as to whether these expensive and resource intensive initiatives really do make people better and improve their lives.

It makes a lot of sense to everyone that the benefits, or detriments, to health care be measured in some way, and this underpins the way that medicine has evolved and more recently supports the quality movement within health care (Leatherman, 2003). The problems with the status quo, however, are that we can all too easily lose sight of what really matters to patients, and even when we are trying to measure the benefits or treatments, the tools that are being used (EQ5D, PROMs etc) can fail to pick up changes in areas of life that are important to patients. This argument really struck a chord with me from the outset. I was genuinely surprised by how the cost effectiveness methodologies that are now the foundation of health technology appraisals (and therefore approved for use within the NHS) are based on relatively insensitive measures of health, and use the hypothetical preferences of the general population to inform policy decisions.

SWB is strongly influenced by our health (Graham, 2008; Marmot, 2003), along with a host of factors (P. Dolan et al., 2008), and the use of SWB in health care aims to capture the richness of experience that may be lost using other methods used to measure outcomes. I recognised that bringing together the field of
SWB research directly to a health care setting, and specifically into a clinical environment, could offer new opportunities to help address some of the issues with current methods.

The development of the arguments and ideas within my thesis has been a far from well trodden path, in that a lot of the concepts and methods that are customarily applied within SWB research are far-removed from clinical work and even medical statistics. The use of SWB measures in primary clinical work has not been undertaken previously with true academic rigour and much of the work before has been derived from secondary datasets. Accordingly a new approach has been required to initiate and carry out this work. This is, however, part of why the area is so rich for development and such an exciting field to work in. It calls upon clinicians and policy makers to consider things in a different, and to be fair, quite unfamiliar way, that people may not be confident in dealing with at first. There are real opportunities here to make significant new contributions to the way that we think and act on SWB data in health care and this work is at the start of the new field of research.

Throughout my thesis I have considered the dual impact that SWB can play in health policy, both at a macro level where concerns related to resource allocation decisions and cost effectiveness calculations can be brought to bear, and at the micro level, where the impact of treatments and services can be demonstrated, and the quality of care can be assured. It is not to say that these two areas are separate, but it helps to consider them in turn, and this is summarised in Figure 6.1, alongside the policy areas that could benefit from paying attention to SWB data in health care.

My thesis has set out where I see the major current shortfalls in outcomes research and technology appraisal methods, and offers new ways to address some of these issues using approaches that utilise measures of SWB. Each stage of this consideration of the role of SWB in health care and health policy has seen the generation of new ideas and of original contributions to the field of SWB research. In this final chapter these findings and ideas are brought together and the policy implications stemming from this body of work are discussed.
6.1. Why should we care? The rationale for a more prominent role of SWB measures in health care and health policy

The starting point for my thesis and work into SWB, was the persuasive argument that the existing way that health outcomes are measured for policy purposes may not be the best way to do this (De Wit et al., 2000; P. Dolan, 2008; Gold M et al., 1996). Within a health service that has limited resources it is necessary to allocate these resources where they will see the most benefit for the greatest number of individuals. Such policy decisions are often difficult to make and the very nature of clinical work means that there can be an emotive dimension that is difficult to set aside. Having said this, methods have been developed that do exactly this, namely the QALY approach, which aims to deliver information regarding the cost effectiveness of treatments in a manner that is comparable across the breadth of health care treatments. The problem is that this approach may fail to allocate the resources where they will do the most good.

So why, and how, could measures of SWB help address these macro health policy considerations, and what would things look like if they did? The problems with the existing system, as set out in Chapter 1, relate to the methods and the measures used in QALY generation. The methods used are based on the hypothetical health state preferences of the general population (NICE, 2008), and the measures are the health state descriptive systems themselves (e.g. EQ5D (Gudex C, 1995), SF6D (Brazier et al., 2002)).

I think that it is fair to say that clinicians generally are not overly familiar with the details surrounding cost effectiveness calculations, despite their relevance in clinical practise in the UK (and beyond). Accordingly challenges to these approaches are regarded as the domain of health economists that may have little real influence on the way that clinical work is carried out. This is a big challenge, as although the existing methodologies represent a transparent way in which outcomes are measured and effectiveness calculated (NICE, 2008) this does not necessarily make it the best way, or the fairest.

The first problem relates to the methods used within the QALY approach, which relies on the use of public preferences of health states. It is known that the public's hypothetical preferences of certain health states over others will give preference to alleviating pain and improving mobility over treating mental
health conditions (P. Dolan, 2008), and in this respect we are all prone to “miswanting” (D.T. Gilbert & Wilson, 2000). There is also some evidence that the existing health state descriptive systems (e.g. EQ5D) may fail to pick up on anxiety and depression which may be having a considerable negative impact on the experience of people's lives (P. Dolan, 2011). One way around this could be the systematic use of measures of SWB within health care across the full spectrum of treatment, which may obviate the need for these health state preferences. In simple terms, this means measuring the impact of health care on SWB across different populations, to see what impact treatments actually have on the real lives of patients.

The initial synthesis in Chapter 1 sets out this premise, and describes the notion that measures of SWB could be used to demonstrate the impact of health care as an alternative to using such descriptive systems. This is a new idea that was published in the BMJ (Dolan et al., 2009) but builds on a principle that more attention should be paid to the experiences of patients, rather than the public preferences of the general population (Brazier et al., 2005).

The problems with respect to the measures used within the existing methodology advocated by NICE are discussed in detail in Chapter 2, and I have highlighted the fact that certain determinants of health (e.g. energy or fatigue) are excluded from the EQ5D for seemingly no good reason. Using measures of SWB and the regression based analysis of SWB data used within the social sciences, we are able to uncover the real impact of health care interventions on patients, without relying on limited descriptive systems. This review of how health is currently described and the determinants of health formed the basis for original published work (P. Dolan et al., 2012) that has been presented internationally (P. Dolan et al., 2010).

So coming back to the motivations for using SWB, it is clear that there are problems with the existing system and I have argued that SWB measures offer one way that could help to address these. Perhaps just as relevant and something that is generally lacking from the literature is a consideration of how we would go about implementing such an approach, and what differences would this make.
The first thing to say is that this is an apple cart that does not like to be upset. The establishment of NICE and the methods underpinning health technology appraisals are, however flawed, great achievements, and so arguments that advocate changes to these approaches will continue to meet with challenges from proponents of health state descriptive systems, and supporters of the current approach in general. The first point to make is that a departure from the reliance on the EQ5D (or any health state descriptive system) does not necessarily mean abandoning the QALY, or some evolution of this. This is an important message from the first chapter, and would see the creation of a SWB based QALY.

In practical terms this would mean that for a given treatment a series of measures would be taken before during and after a healthcare intervention to demonstrate the impact that it had on the SWB of individuals receiving care. This would be done in very much the same way that existing measures of health, such as the EQ5D, are currently completed for the purposes of health technology appraisal.

Much like the health state index that is derived from the EQ5D measure, the changes in SWB observed for different conditions would give a coefficient derived from the regression analysis. SWB coefficients could then be used in a similar manner to generate SWB based QALYs for use in resource allocation decisions. These decisions would be made at a policy level, by bodies such as NICE in the UK, or local commissioning groups that are seeking to allocate resources within a particular region. The advantage of considering their use in this way is the familiarity of health economists and clinicians with the QALY as a concept. Clinicians are used to dealing with and considering QALYs in their practise as are policy makers, and so having a similar concept, based on a SWB methodology, may help overcome resistance to their use. Issues relating to the integration of these measures into policy decisions are discussed later, in Section 6.4.

So the final question in this section is what would things look like if we did adopt an approach based on SWB data? The evidence presented in Chapter 2 suggests that when considering the effect of different determinants of health on SWB, mental health can be seen as making a greater impact than other domains such as physical functioning or pain, although these were shown to have important contributions. There are no primary studies looking into this question directly, and the paucity of work in
clinical populations makes it difficult to make specific projections about what exact differences would be seen, and in fact this gap in our understanding of these issues helped motivate the work in subsequent chapters. This evidence does suggest, however, that current approaches do not pay enough attention to mental health and place greater emphasis on pain and physical functioning.

For policy makers, and for those working in the health sector this has considerable implications. An underestimation of the impact of mental health on our lives supports the premise that current health state descriptive systems do not reflect the whole picture of the human experience. The results of this may mean that treatments addressing pain and immobility may currently receive unjustly higher levels of resources compared to treatments for depression and anxiety. An approach based on SWB measurement would see resources distributed differently, so that mental health conditions received more resources than is currently the case.

This may well no be an easy task to accomplish, as we are good at treating pain and the resources devoted to alleviating pain are considerable. Orthopaedic surgery, for example, is the most resource intensive specialty in health care and is primarily focused on relieving pain and improving physical functioning. Part of the issue here is that there are very good treatments for painful conditions, whereas the treatment of mental health conditions is less consistent and often requires life long support.

Now this line of reasoning would not and should not change things overnight, and in no way can it be suggested that painful conditions are ignored or that people with severe osteoarthritis should not receive hip replacement surgery. There is, however, a building momentum of ideas here, that supports the use of SWB measures in resource allocation decisions, and if this is followed through then we should see more resources being devoted to mental health work than is currently the case. Which areas of health care resources can be diverted from, given the constrained environment that we work in, remains to be seen, and will ultimately be a citizen preference level decision enacted by policy makers. What is certainly the case is that mental health services are currently under considerable financial pressure (Mental Health Foundation., 2013), and these findings would support research to demonstrate the relative under resourcing of mental health treatments when compared to other areas in health care.
There are of course challenges within any new approach, and the adoption of measures of SWB into clinical studies and trials is no exception. The timing of the measures of SWB for clinical populations and the issue of adaptation to illness or immobility are both important considerations. An individual’s SWB is affected at all times by a host of factors, and we know that our attention is drawn to what is salient or novel in our lives. With respect to measuring health using an umbrella measure such as SWB it is predictable that immediately after receiving a positive health care intervention the SWB will increase, for example treatment of a chest infection with antibiotics. What is not clear is for how long and by how much an individual will continue to feel this benefit in terms of SWB. This has parallels with arguments concerning the nature of adaptation to certain health states, and it is certainly the case that individuals with severe physical immobility which members of the general public would regard as health states worse than death according to the EQ5D (Brazier et al., 2005; P. Dolan, 1999), report high levels of SWB. This methodological consideration is important both at the macro level and micro level as data collected on individual treatments will collectively form the aggregate data used to inform on policy. The methods developed in Chapters 4 and 5 go some way to answering this but it is still a key area for future research to focus on.

The arguments presented here suggest that current methods of cost effectiveness calculation and health technology appraisal may not adequately reflect the real experiences of individuals receiving treatment. Measures of SWB offer some ways to address these issues and it is possible to generate meaningful data based on these data for use by policy makers when making resource allocation decisions. A greater focus on SWB in clinical trials and clinical practise will help populate the different areas of health care with SWB data and this is a key next step in terms of future research direction.
6.2. New results: the application of SWB measures directly in health care environments

The next step when considering the use of SWB in health care was to move forward from the theoretical synthesis and review work and to engage with the empirical collection of SWB data within health care environments.

The results form the first data chapter (Chapter 4) go a long way to support the use of measures of SWB in clinical populations. This was the first study to measure SWB in response to hernia surgery and examined the pre and post-operative relationships between SWB and health state. Significant improvements in the SWB of participants were shown following surgery alongside self-rated health state as measured by EQ5D. This supports the use of SWB measures in this way and is an important step in taking forward the wider use of measures of SWB in clinical work. These findings showed improvements in SWB of 0.5 for Life Satisfaction, which is approximately the same as the effect of employment seen in large scale population samples (Winkelmann & Winkelmann, 1998).

The details of the results uncovered some interesting findings with relation to employment. In the pre-operative measures of SWB, those that were employed had significantly lower levels of SWB in the anxiety dimension (i.e. they reported significantly higher score for “anxiety yesterday”). It follows that these individuals have a worse pre-treatment experience as they have higher levels of anxiety. Given that the health service is publically funded and that those in employment are likely to make a greater contribution to the treasury through taxation there could be a discussion to be had surrounding priority of services for those in employment. This is the first time that this has been reported, but it is an interesting finding nonetheless, although there are ethical considerations that may well make this argument unsustainable. Would it be fair to prioritise those in work, who pay taxes to fund social healthcare, over those who are not working if it can be shown that employed individuals waiting for treatment suffer more as they are waiting? It may well be unethical to place certain people ahead of others based on their employment status, but it does identify a problem. Efforts to reduce the anxiety of those in employment awaiting treatment, through supported decision making pathways, counselling or other initiatives may help these individuals, which may have further effects on reduced recovery time and return
to work. This finding in isolation cannot be the basis for widespread policy reform, but it does illustrate the fact that systematic and careful collection of SWB data can help uncover problems that could be the target for focused policy interventions.

The study in Chapter 4 also highlighted the impact that mental health has on SWB generally, and the most severe health state of anxiety/depression (EQ5D level 3) had a consistently significant negative impact across all dimensions of SWB. The effect of mental health on SWB continues to be a theme within this work and in taking things forward policy makers should take note of this. In practical terms there are very real opportunities within existing working arrangements that could be used to reduce the impact of mental health in individual treatment populations. One example of this would be to offer patients that are selected for surgery a screening questionnaire that can identify those with mental health needs and automatically trigger an appointment with a qualified practitioner to help address any unmet mental health needs and would be able to help identify and initiate treatment for mental health conditions. A similar screening tool could be employed for hospital inpatient populations, and this may have particular relevance to the trauma patients. If such an approach were to identify and reduce the burden of mental illness of inpatients then the effects on SWB would be considerable, and as such the benefits experienced by patients (and those closest to them such as family and loved ones) would be felt more acutely. It is not overly optimistic to suggest that such interventions could reduce the length of stay in hospital, as we know that those with higher SWB tend to have shorter hospital stays.

Chapter 5 was a more ambitious study that collected the SWB data for the entire patient population of an acute hospital and similar data relating to the nurse looking after them. This is the first such study that has measured SWB data from the patients and health care providers in parallel and as such is a genuine contribution to the field. Regression analysis demonstrated that the life satisfaction of patients was significantly affected by severe levels of EQ5D states of pain/discomfort, anxiety/depression and self care. The happiness of patients (happiness yesterday dimension of SWB) was significantly affected by severe anxiety and also by moderate and severe impairment in mobility. These values are particularly interesting as they are derived directly from clinical populations, rather than from general population samples such as the BHPS (BHPS, 2011) or those responding with the ONS measuring national
wellbeing programme (ONS, 2014). In this clinical work there is a much greater impact of self care than in those values seen in the general population (approximately double the impact), but this is a small sample in comparison to the national sample, and very few patients reported the most severe health states. The most likely explanation for this is the loss of independence that often comes with an admission to hospital takes time to adapt to, and as such self-care is closely associated with losses of health and SWB whilst an inpatient.

From a methodological perspective it is interesting to see that such differences could be uncovered in this way, and that if such persistent effects existed then policy interventions targeted at addressing specific needs at either a local or national level could be initiated. For example, if a consistent effect was shown in terms of SWB anxiety yesterday in patients following a certain treatment or diagnosis then additional cognitive behavioural therapy services could be set up to meet this need. This is a simple scenario, but does help illustrate how SWB measures used in conjunction with existing PROMS may identify areas for policy development at a micro level, as well as informing on care quality.

The regression analysis undertaken in Chapter 5 also determined significant associations between reported levels of energy and SWB. Energy yesterday was a question within both the patient and nurse questionnaires, and this was included in response to the findings from Chapter 2, which identified it as an important determinant of health, but noted its omission from the EQ5D. Energy levels were shown to be important for patients, both in terms of their significant associations with SWB as measured by life satisfaction and its negative association with the anxiety yesterday dimension of SWB. This finding has more of a macro level policy implication as it supports the arguments presented earlier. EQ5D health state data will fail to pick up on the importance of subjective energy levels despite its apparent importance to the SWB of patients, which may be particularly important in certain conditions where lethargy and malaise may contribute to the symptomatology. This could conceivably have an important bearing on the experience of those receiving chemotherapy (which often includes such symptoms as side effects) and the assessment of such technologies by NICE may be less accurate for this. In isolation there is no easy remedy to this finding in terms of a macro policy level response. It does, however, add further depth to the picture of a less than perfect system, and supports the use of measures of SWB (which certainly do
take account of patient energy levels) at some stage in the decision making process for resource allocation decisions.

Chapter 5 also provided two important further findings, the first being that whilst there was no clear association between the SWB of the patients and that of the nurses, there was a significant relationship between the self reported health of the nurses and the SWB of the patients that they were looking after. A significant relationship was shown between the job satisfaction of the nurses and the SWB of the patients. This has considerable implications for policy and potentially far reaching effects. The take home message here is that healthier nurses that are more satisfied with their jobs have happier patients. In terms of explaining this finding then it makes sense that healthier nurses would be more able to do their job, and less likely to be tired or feel fatigued. It also follows that they would take less time off sick, and so improve patient SWB in this respect. Those nurses with higher levels of job satisfaction are also more likely to be motivated to perform better at work and to be more empathetic, as reported by Boorman (Boorman, 2009), which is likely to have a direct impact on patient SWB.

In terms of policy implications then these are far reaching. This study has shown that healthier nurses have happier patients and so arguments that advocate strategies to improve nurse employee health are all of a sudden much more compelling. Schemes that offer reduced gym membership for nurses in order to improve or maintain good health should be considered for example, alongside services that seek to ensure occupational health facilities are readily available to nursing staff. There are certainly grounds for improving the smoking cessation services that are afforded to nurses and offering support to those with low levels of job satisfaction to help improve their working experiences.

Perhaps the most compelling arguments based on these findings are to be made with respect to the reverse causality of health and SWB. It is known that there is some reverse causality of SWB to health, and so it follows that if healthier and more satisfied nurses have happier patients, then this will also impact directly on their self reported health. The extent to which this can be said to be true is difficult to gauge as this is a new finding, but it certainly goes a long way to support investment in the clinical workforce of a hospital to directly improve health of patients.
A further important finding from Chapter 5 was that none of the markers of patient satisfaction were shown to have a significant effect on any dimension of SWB for the patient population. Given the lack of academic rigour that has gone into many of these questions I am far from surprised at this, but it is in a way quiet shocking given the considerable efforts that exist to capture dimensions of patient experience at both an institutional and national level. It certainly raises the question of whether or not such data is worth collecting, and supports the discussions set out at the beginning of Chapter 4 regarding the unclear nature of the format and role of patient satisfaction data in general. From a policy perspective it is difficult to support on-going investment in the collection of such data is they are shown to have relationship to any dimension of SWB. Ahead of coming to such polarising decisions, however, it would be important to seek out a larger patient sample in a different institution and ideally to collect data as part of a longitudinal study.

These new empirical findings are an important collection of results. They are the first studies of their kind to generate primary SWB research data in clinical populations and they have produced significant positive and negative results. These results have some immediate and obvious implications for policy and others that will naturally be the focus of further work and academic endeavour. The next stages are to consider the methodology supporting the wider methodological and policy implications of this work.

6.3. How to use measures of SWB in clinical populations and what should come next - methodological considerations, limitations and future research

In this thesis I have taken techniques and approaches that have their origins in the social sciences and the SWB literature, and translated them directly into a health care setting. Their use in clinical situations has of course been proposed previously, but in actually undertaking this research new challenges have been met and this is particularly the case in terms of the methods adopted to generate the results. In this section I discuss some of these issues and where further work will naturally follow on from my achievements.
6.3.1. Methodological considerations

The natural next step in considering the use of SWB measure in health care was to put into practise the theoretical approaches set out in Chapter 3, namely the concept of measuring SWB over the course of an individual’s treatment experience (H. Lee et al., 2013). In doing so it can enable measures of SWB to act as outcomes in their own right, and serve as a barometers of overall care quality, as well as identifying where the greatest gains and losses in SWB are felt in clinical populations. This systematic application of SWB measures within a health care setting and their use as markers of care quality is an original contribution to the field of SWB and outcomes research (H. Lee et al., 2013). Importantly the methods proved robust and the collection of the data was achieved in the planned timeframe with good response rates. This in itself is a real positive step in this area of research and it has been shown that the measurement of SWB along the treatment pathway in a systematic manner is a template that can be taken forward in future work.

The first methodological issue that was faced was with respect to the timing of SWB reports within the studies. The impact of health care on SWB will vary depending on when SWB is measured, and due to the broad nature of SWB measures this will be decline over time when the perceived importance of health on the individual is less as their health improves. The model of patient experience set out in Figure 3.2 supports the use of measures before during and after treatment, and this is academically attractive with the hypothesis being that SWB would dip during periods of illness and then improve as a response to quality health care. The results from Chapter 4 show that measures of SWB certainly do pick up on the positive impact that the hernia surgery had, and a follow up programme is underway to ascertain whether this effect is longstanding or at what point the SWB returns to pre-intervention levels.

The optimal timing of measuring SWB in the different phases of the treatment experience can be only really be addressed with further quantitative data, and in these early stages of integrating measures of SWB within clinical studies a careful and iterative methodology should be advocated. Perhaps an area that carries the greatest opportunities in this respect is in patients with chronic diseases, where serial measures...
of SWB could be taken at planned follow up appointments and also in respect to unplanned admissions or treatments.

The issue of reverse causality is an area within SWB research that is particularly relevant to work in health care, and one that has significant implications at policy levels. We know that higher levels of health generally make people happier, or rather increase their SWB, but it is also true that there is some two way traffic and that SWB can improve the health of individuals. This finding is seen with respect to income in other areas of SWB research, where higher levels of SWB seem to predict future earnings (E. Diener et al., 2002). The evidence so far on this issue is far from conclusive, and authors previously have agreed that specific health related SWB research will help elucidate this issue (Diener et al., 1999). Future work in clinical populations adopting the methods used in my research will help to establish the nature and degree of reverse causality from SWB to health. This is interesting academically, but perhaps more important has policy implications in that if those with higher levels of SWB are healthier, or for example show improved wound healing rates or responses to specific treatments, then targeting SWB independently from other health care strategies may confer treatment advantages.

The role of focusing effects in outcomes research is under researched and an issue that is likely to be pervasive in most clinical trials and other studies that are undertaken. We inevitably focus on what we are attending to at any given moment, but if our attention is drawn to a particular issue ahead of answering questions then our responses will be influenced by that focus (Dolan P et al., 2010; Schkade & Kahneman, 2002). For example, if a study is titled “Hip pain questionnaire” then the responses are already focused on the pain that the patient may, or may be having, where as a title of “Background questionnaire” may give different result that are not biased in this way. In the SWB research undertaken in Chapters 4 and 5 great care was to taken to avoid focusing effects as far as possible, and experienced psychologists from with Imperial College London helped to draft the questionnaires to minimise this any focusing effects. Unlike research undertaken in the general population, such as the Measuring National Well-being programme, patients responding to these questions will know that the study is looking into their health in some way and so a degree of focusing effect cannot be avoided, but efforts to reduce any
overt references to attention grabbing symptoms such as pain or waiting times should be avoided. This is an important lesson to be carried forward in on-going research.

At a practical level the studies were designed with an experienced team of clinicians and social scientist, and this is where the added value has really been demonstrated. The generation of good data is due to the collaborative and multidisciplinary approach that was taken from the outset. Other researchers seeking to replicate and continue this work must ensure that they integrate similar expertise in their teams in order to maximise the quality of data derived from their studies. This is particularly important when considering the details surrounding the questions asked, the ordering of the questions and the way in which potential participants are enrolled into studies and contacted subsequently for follow up work.

In so far as data collection is concerned then these studies were intensive in the requirements placed in the researcher. A lot of lessons were learned in respect to this around motivating colleagues, getting staff to participate in the research and in physically being able to collect the data within a suitable timeframe to ensure academic comparability. It is widely recognised that dedication and persistence are required in order to ensure low drop out rates and proper response completion. This was certainly the case for both studies, and I certainly felt that I had to champion the cause of the study amongst staff and patients, and when this was done for the whole hospital for the research presented in Chapter 5, it was no small undertaking. In terms of the bigger picture it presents no real obstacle for the purposes of targeted studies, but for more widespread and continuous data collection then further methodological developments, such as the use of online questionnaires and digital data collection, would be required to ensure continued high response rates.

6.3.2. Limitations and future research

Any body of work, particularly when empirical data is collected will have limitations, and these issues will help inform on where the next research work should naturally follow on.
The sample size was the greatest limitation for the hernia study in Chapter 4. It is the case with many projects that adopt health state descriptive systems (such as the EQ5D used in this work) there were very few patients in the most severe health states for certain domains making interpretation of the results difficult. This was also seen in Chapter 5, but the sample size was greater and given that there were a number of patients in actually quite poor health who responded this was not such an issue. Addressing this issue is not easy, as many patients undergoing routine elective surgery will actually be in otherwise good health, and so this is likely to be an on-going issue when considering the use of health state descriptive systems alongside measures of SWB in research.

It was not possible to include a PROM specific to hernia surgery within the methods for Chapter 4, due to a lack of consensus (at a national and international level) regarding a suitable measure, however in other areas of research suitable PROMs do exist. This is particularly the case in orthopaedic surgery (e.g. Oxford hip and knee scores), but also for medical conditions such as asthma and angina. The inclusion of PROM data within future work would allow the different domains within the measures to be used as independent variables in regression analyses and therefore identify which particular areas contribute the most (or least) to changes in SWB.

There are a number of key areas that continue to pose challenges when considering the use of SWB as an outcome measure in health care and health policy. Causality is central to these issues, and the degree to which health affects SWB is an on-going issue with SWB data sets and this work is not immune from these criticisms. It is always possible that external and background influences such as traumatic events in the private lives of patients may influence SWB in ways that are not picked up on using the study questions, and so a fuller picture of the health and background of patients for future work would help isolate the impact of certain pre-morbid or background events and circumstances that could influence the analysis. Including a questionnaire that sets out the major determinants of SWB (from existing literature) and asking participants to identify if there have been any changes in these areas of life may be one way to isolate the SWB data from these extraneous issues.
Other important caveats do exist when considering SWB data in health policy, and as with most complex systems balance is required when interpreting data from large populations containing general trends. This is particularly relevant when considering the role of adaptation with respect to SWB. People do adapt to changes in their circumstances and to their health, and this is well reported (Graham, 2008; A. Sen, 1992; A. K. Sen, 1985), and so establishing when and where the adaptations are most prevalent, and how this influences reports of SWB in clinical populations will be important. This issue does not only affect research using measures of SWB and is seen across the spectrum of health care research. Patients readily adapt to changes after treatment and even before treatment and so this issue is not one isolated to SWB work. It does warrant further scrutiny and the steps towards this would be to gauging the optimal follow up and timing intervals for both inpatients and with respect to individual treatments. Of particular interest is the length of time that the positive (or negative) impact that health technologies or interventions have on an individuals' SWB takes to wash out. It could be that there is a constant or usual time period that we all share, and that following an intervention of a certain type most people's SWB returns to its pre-morbid level after 18 months, for example, or it could be very individual and based more on personal factors. This is an important area for new work.

The lack of an acknowledged anchor point is another issue when considering SWB research. For health state descriptive systems (e.g. EQ5D) then anchor or ultimate comparator is death, and respondents are asked to compare health states with death, or rather a limited length of life (in the time trade off exercise). With SWB studies it is acknowledged that we as individuals have difficulty in conceiving what a SWB of 0 would be like, and as such there is an issue of reference shifts across populations. The fact that SWB changes as we get older in a U shaped function is also another factor that must be considered when interpreting SWB results. This is, however, well evidenced but must be controlled for when comparing results across ages for similar conditions.

Great emphasis has been placed at policy levels of the role of patient experience in health care, and the relationship between patient experience and care quality has been highlighted both in the UK (Darzi, 2008) and other advanced health care systems such as the USA (CAHPS, 2010) and Australia (Australian Commission on Safety and Quality in Health Care, 2008). The evidence from Chapter 5 suggests that the
routine collection of patient satisfaction data may be less than instructive in helping to shape policy, as no significant relationships were shown between patient satisfaction and health or SWB. One way forward from this could be to utilise the existing resources and infrastructure that are currently used to collect patient satisfaction data to collect data on patient SWB. Patient satisfaction data is often collected on a very large scale by NHS trusts in the UK, and so integration of measures of SWB at this level would allow the rapid generation of large data sets of SWB in clinical populations. Issues surrounding the inclusion of specific health parameters and clinical information will require careful discussions but this offers a fertile area through which new data could be readily collected.

Other key areas for further research that have been identified in writing this thesis, and carrying out these studies, centre on the use of technology, the role of clinician feedback, and the effect of patient choice. Technological innovations have had enormous impacts on the collection of outcome data in the last five years, and research into SWB stands to gain a lot from these developments. With respect to research into specific conditions and studies then smart phone applications that prompt the user to respond and have an easy to use interface for answering survey questions can help ensure high quality data collection. The integration of SWB measures within such applications is not technically challenging and one that is planned in further work.

Signalling the impact that health care has on patients to those delivering care can be a powerful motivator, and yet in clinical practise we are very rarely told how well are patients are doing. One area for further research, using SWB as a key indicator of care quality, is into the effect that SWB outcome data has on the way that clinicians work. Knowing that the work you have done as a doctor has directly improved their SWB is a powerful motivator, and may be more salient to clinicians than other markers of outcome. This could be readily achieved within a targeted clinical study or at a ward or hospital level, and would help to improve our understanding of the interplay between patient SWB and clinical performance.

Greater choices are being afforded to patients within the NHS and other providers, whether they be private or commissioned by NHS bodies. It is generally thought that individuals like to be able to make choices with respect to their health care but it can be difficult to demonstrate any direct benefits of this.
Integrating measures of SWB alongside PROM and health data for those making choices and those not making choices with respect to certain health decisions would allow regression analyses of these data. This would allow the calculation of the impact of patient choice on the SWB of patients independent of their clinical outcome, which would help policy makers when deciding whether health related choices should be expanded or curtailed.

SWB research in health care offers a lot of opportunities for researchers and there is now an established methodology set out in this thesis that can be taken forward. There are areas that require methodological development, such as with respect to adaptation and focusing effects, and these will help strengthen work in the future. A clear way forward is also seen in terms of the next steps for on-going research, in terms of delivering more data on specific treatments with generation of SWB based QALYs.

SWB based QALYs would require careful trial design and methodological rigour. The experiential nature of SWB means that each condition of technology being assessed would require a separate or at least integrated study, so that the data is captured without interference from other factors, or so that spill over effects and could be controlled for. Studies would need to be prospective and measure SWB over time alongside existing health state measures (EQ5D or SF6D etc) and be adequately powered so as to demonstrate changes over time in response to treatment. The follow up period here will need to be carefully examined, and there is scope for further preliminary work in this area to help determine the duration of time that certain health interventions take to “wash out” from the measureable SWB of individuals. The final stage in generating the SWB QALY would then be to help calibrate the nature of changes in SWB in relation to a different array of health interventions. This would set out the landscape of SWB changes in relation to health care interventions, so that policy makers and the general public have a greater context upon which to base resource allocation decisions.

There is also great potential for innovation in broader areas such as integrating technology into SWB research and the role of patient choice on SWB. Following on from these research considerations are how best to consider this work in a policy perspective.
6.4. How, when and where? Joining up SWB research from a health policy perspective

In this thesis I have shown how measures of SWB can be used to join up key areas of health care so as to better inform policy decisions at the macro and the micro level. Central themes have emerged throughout, and these have been related to the inadequacy of current health technology appraisal methods, the under-estimated impact of mental health on our SWB, and the fact that despite apparent obstacles, the use of SWB measures in empirical clinical work is readily achievable. Specific results have also been demonstrated regarding the fact that healthier nurses have happier patients, and that subjective energy is important in terms of our SWB but is not included in the methods favoured by NICE to appraise new health technologies,

In joining up these new approaches and data with the day-to-day workings of health care provision and practise, it is essential that a clear policy context is provided from which to take this work forward. This is outlined in Figure 6.1, which considers the issues in terms of how, when and where these new data and research tools can be used by policy makers.

Figure 6.1 Joining up SWB research from a health policy perspective
The “How” aspect of SWB research and data in a health policy context has two main aspects to it. There is the practical side of generating the SWB data and then there is the promotion of this work to engage clinicians and policy makers in order to establish a mutual and better understanding of the role and uses of SWB. The generation of new SWB data can be achieved through primary work as undertaken in Chapters 4 and 5, or in the analysis of existing data sets, either in isolation, or through linking with paired or corresponding data from health databases such as the HES database (Hospital Episode Statistics, 2012). This data generation is dependent on the degree to which researchers and clinicians engage with SWB measures and appreciate its potential in health policy work. There is certainly an appetite for SWB data, and the interest generated by the ONS SWB programme has identified this (ONS, 2010). Part of this is due to the fact that it is readily understood by people across different specialties and research communities, as well as the non-clinician. This can and should serve to improve the visibility of these approaches within the academic community and help to increase the quantity and quality of new data.

The “when” relates to the stages in which policy makers and researchers should consider reaching for measures of SWB in order to help address policy or clinical questions. It has been shown that SWB data can provide helpful information around specific treatments and I would argue that in designing new trials and preparing studies designed to be part of health technology appraisals, measures of SWB are included as part of the standard set of measures asked of patients at every stage. In this way additional data is generated at a minimal cost to the research group that can provide additional information that existing measures may (as has been argued) fail to capture. I certainly would not propose that these measures take the place of existing metrics or PROMs, rather their use in a supporting role may help provide a more balanced picture of outcome and impact that may support existing trial data.

Getting the message through to research groups embarking on new trials and studies will be a key challenge, however progress at high levels has been made with this and important studies led by Cancer Research UK and MacMillan Cancer Support are including SWB measures up front in their work. Further discussions are scheduled at senior levels with the National Institute for Health Research (NIHR) and the local research design service in London (RDS London) to help raise the profile of these measures within a health care and health research setting.
The “where” with respect to the health policy considerations of SWB measures pertains to the different forums that these data can be considered in, and by whom. From a macro perspective then those making decisions regarding cost effectiveness of health technologies stand to be better informed about the impact of treatments if SWB data is presented alongside existing evidence. In the English NHS these decisions are made by NICE and while SWB would certainly not address all the problems with existing approaches, it would certainly help provide context and balance as to the impact that treatments and technologies have on the lives of those receiving treatments as they experience them. From a practical perspective these SWB data may well take the form of additional data submitted alongside HTAs, but there is certainly a case to be made that measures of SWB can help support the patient’s perspective of treatment which will have traction at many levels of health policy.

There is also interest within NICE regarding outcome measures other than the EQ5D, as there has been a growing acknowledgement that the existing NICE test case may benefit from a more balanced approach (NICE, 2008). This was a main discussion point when I presented at the Health Technology International conference in Dublin, and there was a consensus of opinion within the delegate community (which included the Chief Executive of NICE and the Health Technology Evaluation Centre Director) that broader measures such as SWB had a greater role to play in NICE’s future decision making. It seems important at these stages to establish a dialogue along these lines that would see SWB data taken into consideration as supporting evidence in addition to the traditional and more econometric data that form the basis of health technology appraisals at present.

At a more local level, and one that has gained importance with the emergence in the last 18 months of Clinical Commissioning Groups within the UK, SWB data can help to identify where the gains and losses in SWB are felt most acutely by the patients experiencing services. This could be at an acute NHS Trust level, where SWB in relation to A&E treatment maybe considered, or where a group of clinicians and local policy makers are trying to improve the clinical pathways for complex care, such as stroke or vascular surgery. In all such areas, knowing where people are benefitting (and where they are not) from health services in terms of their SWB, as well as other health measures, can only help to guide health policy.
In this thesis I have brought together approaches from social science and translated them in an academically robust way into clinical environments for the first time. In doing so I have laid down some important building blocks for further research, and consolidated the arguments and challenges that we face. There is lots of scope for new work in pushing forward the use of measures of SWB in health care as well as the ways and means that they can be considered for policy purposes. Ultimately, however, I feel strongly that evidencing the impact of clinical care on the lives of patients can only help better inform policy makers and help motivate clinicians.
7. References


Giacomini, M. (2005). One of these things is not like the others: the idea of precedence in health technology assessment and coverage decisions. Milbank Q, 83, 193-223.


Steinhauser, K.E., Christakis, N.A., Clipp, E.C., McNeilly, M., McIntyre, L., & Tulsky, J.A. (2000). Factors considered important at the end of life by patients, family, physicians, and other care providers. *JAMA, 284*, 2476-2482.


8. Appendices

Questionnaire used for hernia SWB study (Chapter 4)

Questionnaire used for inpatient & nurse SWB study (Chapter 5) - patient

Questionnaire used for inpatient & nurse SWB study (Chapter 5) - nurse
8.1. Questionnaire used for hernia SWB study (Chapter 4)

The questionnaire was completed pre and post surgery as set out in the methods section (Section 4.4 page 73).
Patient questionnaire

Thank you for agreeing to complete this questionnaire about yourself. Please do not hesitate to contact the survey team if you have any questions. The contact details are at the end of the questionnaire.

Please read each of the questions below carefully and answer by entering a number from 0 to 10 in the adjacent box.

1. Overall, how satisfied are you with your life nowadays?
   0 (not at all satisfied) to 10 (completely satisfied)

2. Overall, how happy did you feel yesterday?
   0 (not at all happy) to 10 (completely happy)

3. Overall, how anxious did you feel yesterday?
   0 (not at all anxious) to 10 (extremely anxious)

4. Overall, to what extent do you feel the things you do in your life are worthwhile?
   0 (not at all worthwhile) to 10 (completely worthwhile)
Some questions about your health

By placing a tick in one box in each group below, please indicate which statements best describe your own health state today.

**Mobility**
- I have no problems in walking about
- I have some problems in walking about
- I am confined to bed

**Self-Care**
- I have no problems with self-care
- I have some problems washing or dressing myself
- I am unable to wash or dress myself

**Usual Activities** (e.g. work, study, housework, family or leisure activities)
- I have no problems with performing my usual activities
- I have some problems with performing my usual activities
- I am unable to perform my usual activities

**Pain/Discomfort**
- I have no pain or discomfort
- I have moderate pain or discomfort
- I have extreme pain or discomfort

**Anxiety/Depression**
- I am not anxious or depressed
- I am moderately anxious or depressed
- I am extremely anxious or depressed
To help people say how good or bad a health state is, we have drawn a scale (rather like a thermometer) on which the best state you can imagine is marked 100 and the worst state you can imagine is marked 0.

We would like you to indicate on this scale how good or bad your own health is today, in your opinion. Please do this by drawing a line from the box below to whichever point on the scale indicates how good or bad your health state is today.

Your own health state
Some background information about yourself

This is completely confidential and will not be passed on to anybody else, including your specialist doctor and general practitioner

a. How old are you? ________________ years

b. Are you male or female? Male / Female

c. What is your marital status?

- Single
- Married or Civil partnership
- Separated
- Widowed

d. Which best describes your employment status?

- Full-time employment
- Part-time employment
- Unemployed
- Retired

e. Do you smoke? Yes / No

f. Do you care for any members of your family who have special needs, disabilities, are sick or elderly and require assistance? Yes / No

Many thanks for completing this questionnaire.
Please return it TODAY in the stamped addressed envelope provided
8.2. Questionnaire used for inpatient SWB study (Chapter 5)

The questionnaire was completed by all eligible hospital inpatients as set out in the methods section (Section 5.4 page 110).
Patient questionnaire

Thank you for agreeing to complete this questionnaire about yourself. Please do not hesitate to ask the survey team if you have any questions.

This is completely confidential and will not be passed on to anybody else, including your specialist doctor and general practitioner

Please read each of the questions below carefully and answer by entering a number from 0 to 10 in the adjacent box.

1. Overall, how satisfied are you with your life nowadays?
   0 (not at all satisfied) to 10 (completely satisfied)

2. Overall, how happy did you feel yesterday?
   0 (not at all happy) to 10 (completely happy)

3. Overall, how anxious did you feel yesterday?
   0 (not at all anxious) to 10 (extremely anxious)

4. Overall, to what extent do you feel the things you do in your life are worthwhile?
   0 (not at all worthwhile) to 10 (completely worthwhile)

5. Overall, how much energy did you have yesterday?
   0 (no energy at all) to 10 (completely energised)

6. Overall, how well did you sleep last night?
   0 (not at all well) to 10 (extremely well)
Some questions about your health

By placing a tick in one box in each group below, please indicate which statements best describe your own health state today.

<table>
<thead>
<tr>
<th>Mobility</th>
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<tr>
<td>I have no problems in walking about</td>
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<td>I have some problems in walking about</td>
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<td>I am confined to bed</td>
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<th>Self-Care</th>
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<tr>
<td>I have no problems with self-care</td>
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<tr>
<td>I have some problems washing or dressing myself</td>
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<td>I am unable to wash or dress myself</td>
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<th>Usual Activities (e.g. work, study, housework, family or leisure activities)</th>
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<td>I have no problems with performing my usual activities</td>
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<tr>
<td>I have some problems with performing my usual activities</td>
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<td>I am unable to perform my usual activities</td>
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<th>Pain/Discomfort</th>
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<tr>
<td>I have no pain or discomfort</td>
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<td>I have moderate pain or discomfort</td>
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<th>Anxiety/Depression</th>
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<tr>
<td>I am not anxious or depressed</td>
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<tr>
<td>I am moderately anxious or depressed</td>
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To help people say how good or bad a health state is, we have drawn a scale (rather like a thermometer) on which the best state you can imagine is marked 100 and the worst state you can imagine is marked 0.

We would like you to indicate on this scale how good or bad your own health is today, in your opinion. Please do this by drawing a line from the box below to whichever point on the scale indicates how good or bad your health state is today.
Some questions about how you feel about your treatment

Overall, how satisfied are you with the care you have received?

<table>
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<tr>
<th>Not satisfied at all</th>
<th>Completely Satisfied</th>
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Overall, how satisfied are you with the doctors that have treated you?

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<tr>
<th>Not satisfied at all</th>
<th>Completely Satisfied</th>
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Overall, how satisfied are you with the nurses that have treated you?

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<th>Not satisfied at all</th>
<th>Completely Satisfied</th>
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<td>0 1 2 3 4 5 6 7 8 9 10</td>
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Overall, how satisfied with the communication from the staff?

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<th>Not satisfied at all</th>
<th>Completely Satisfied</th>
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Overall, how satisfied are you that you have been treated with dignity and respect?

<table>
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<tr>
<th>Not satisfied at all</th>
<th>Completely Satisfied</th>
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<td>0 1 2 3 4 5 6 7 8 9 10</td>
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</table>
Some background information about yourself

*This is completely confidential and will not be passed on to anybody else, including your specialist doctor and general practitioner*

a. How old are you? ________________ years

b. Are you male or female? Male / Female

c. What is your marital status?
   - Single
   - Married or Civil partnership
   - Separated
   - Widowed

d. Do you smoke? Yes / No

e. Do you have any children? Yes / No

f. Have you been treated for an infection during your hospital stay? Yes / No

g. *How many days have you been in hospital* (including the day you were admitted)? ________________ days

Many thanks for completing this questionnaire.
Please return it TODAY to the survey team on your ward
9.1. Questionnaire used for inpatient & nurse SWB study (Chapter 5) – nurse questionnaire

The questionnaire was completed by all eligible hospital nurses caring for those patients responding to the inpatient questionnaire, as set out in the methods section (Section 5.4 page 110).
Staff questionnaire

Thank you for agreeing to complete this questionnaire about yourself. Please do not hesitate to ask the survey team if you have any questions.

*This is completely confidential and will not be passed on to anybody else, including your employer, occupational health department or general practitioner*

Please read each of the questions below carefully and answer by entering a number from 0 to 10 in the adjacent box.

1. Overall, how satisfied are you with your life nowadays?  
   0 (not at all satisfied) to 10 (completely satisfied)

2. Overall, how happy did you feel yesterday?  
   0 (not at all happy) to 10 (completely happy)

3. Overall, how anxious did you feel yesterday?  
   0 (not at all anxious) to 10 (extremely anxious)

4. Overall, to what extent do you feel the things you do in your life are worthwhile?  
   0 (not at all worthwhile) to 10 (completely worthwhile)

5. Overall, how much energy did you have yesterday?  
   0 (no energy at all) to 10 (completely energised)

6. Overall, how well did you sleep last night?  
   0 (not well at all) to 10 (extremely well)
Some questions about your health

By placing a tick in one box in each group below, please indicate which statements best describe your own health state today.

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We would like you to indicate on this scale how good or bad your own health is today, in your opinion. Please do this by drawing a line from the box below to whichever point on the scale indicates how good or bad your health state is today.
Some questions about how you feel about your job

Overall, how satisfied are you with your job?

Overall, how valued do you feel by your employer?

Would you recommend this hospital to a friend or family member?

Yes / No

How many years have you worked as a nurse? ____________ years
Some background information about yourself

This is completely confidential and will not be passed on to anybody else, including your employer, occupational health department or general practitioner

a. How old are you? 
   __________ years

b. Are you male or female? 
   Male / Female

c. What is your marital status?
   Single □
   Married or Civil partnership □
   Separated □
   Widowed □

d. Do you smoke? 
   Yes / No

e. Do you have any children? 
   Yes / No
   __________ days

Many thanks for completing this questionnaire. 
Please return it TODAY to the survey team on your ward