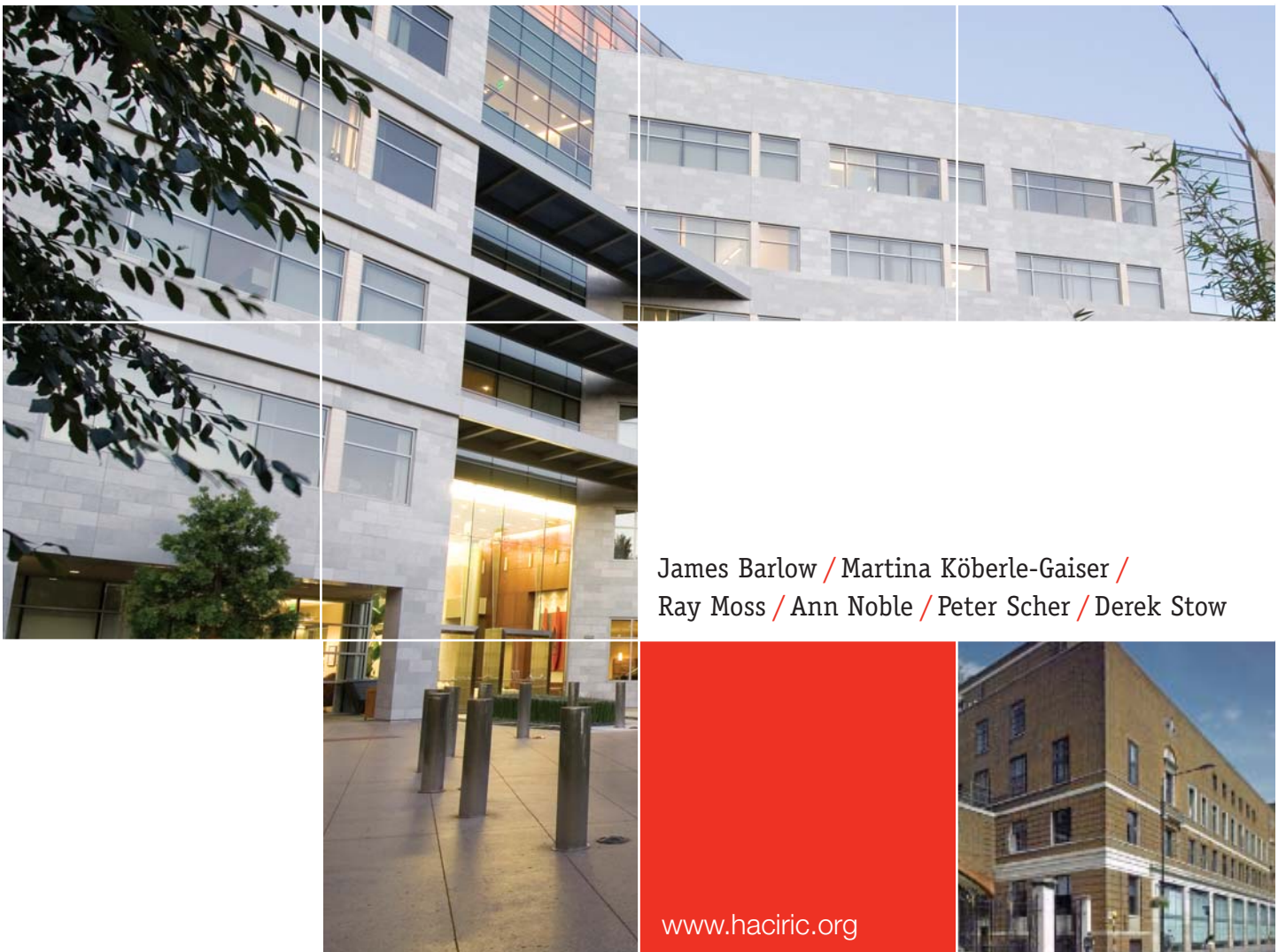


The Health and Care Infrastructure
Research and Innovation Centre

Adaptability and innovation in healthcare facilities

Lessons from the past for future developments

The Howard Goodman Fellowship report



James Barlow / Martina Köberle-Gaiser /
Ray Moss / Ann Noble / Peter Scher / Derek Stow

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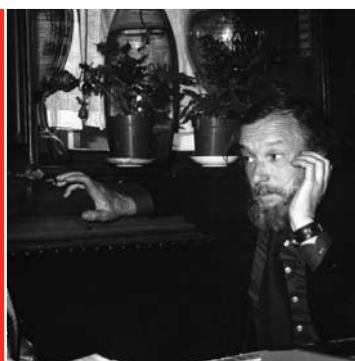




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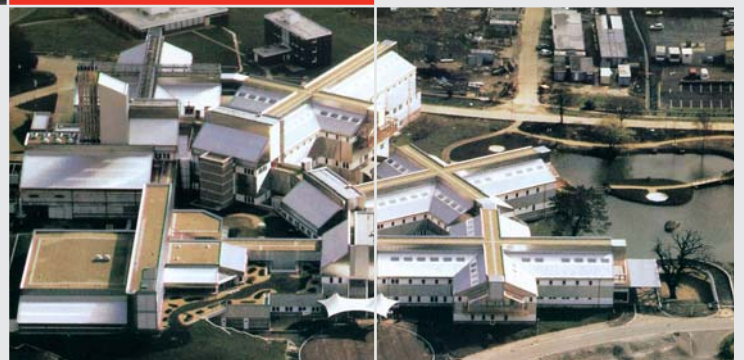
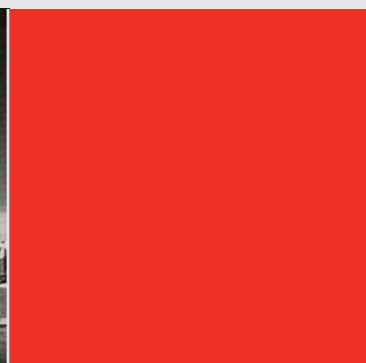
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The Howard Goodman Fellowship

The Howard Goodman Fellowship was established in memory of the architect Howard Goodman and to build upon his dedication to rationalising the provision of good quality healthcare buildings equitably for the whole of the National Health Service.

Howard Goodman, who died in 1999¹, joined the South Western Regional Hospital Board of the newborn NHS in 1949. Developing a national health service from the patchwork of very diverse existing organisations and facilities was an unprecedented task. For its first decade there were hardly any resources available for new buildings – or even for much-needed improvements to the existing stock – a period of austerity characterised by the World War II motto “make-do-and-mend”.

This situation changed in 1960 with a rapid increase in the capital available for hospital building. The Ministry of Health engaged a group of the ablest young architects with healthcare knowledge, experience and enthusiasm to develop the Hospital Building Programme under the new Chief Architect, William Tatton-Brown. Goodman, after a period designing hospitals in private architectural practices, was one of the leading members of Tatton-Brown’s Development Group.





At the Ministry, Goodman played a central and inspiring role in a distinguished multidisciplinary team researching hospital design and designing a comprehensive and equitable system of service planning, building design, cost control and procurement. As his success and reputation in this grew, his responsibilities widened. In 1971 he succeeded Tatton-Brown as Chief Architect, subsequently filling the post as Director of Development and Health Building in the enlarged Department of Health and Social Security.

Goodman and his team are recognised for many achievements. Among the most outstanding were the research and development for the new Greenwich District Hospital² in southeast London (1969), the 'Best Buy' hospital, the 'Harness' system³ (1970-73), the 'Nucleus' Hospital⁴ (1974) and the initiation of the research programme and construction of two low energy hospitals^{5, 6} (St Mary's, Isle of Wight in 1990 and Wansbeck, Northumberland in 1993). All these projects embodied many important innovations in master-planning, dimensional co-ordination, departmental design and building as well as environmental engineering technology.

Under Goodman's leadership these innovations were properly researched and tested and this deeper knowledge was diffused co-operatively and applied throughout the NHS. As a result, Britain became the world leader in healthcare architecture and our ideas and systems were emulated in many countries overseas.

Following Goodman's death, Professor Ray Moss, founder of the Medical Architecture Research Unit (and a long-time colleague at the Ministry and the Department of Health and Social Security), set out to raise funds for research that could rekindle interest in Goodman's work during a new era of healthcare building. With strong support from the Nuffield Trust and Architects for Health⁷, of which Goodman and Moss had been founding members and well-known active participants, Moss obtained contributions from NHS Estates (Department of Health), two NHS hospital trusts and leading firms in the building industry and professions. This enabled the funding of a three-year research project, to be based at Imperial College London, following discussions with Professor Sir Leszek Borysiewicz, then Principal of the Faculty of Medicine.

By 2004 the reform of the NHS and the introduction in 1992 of the Private Finance Initiative for capital projects in the public sector were beginning to transform the original processes, established and refined over some 30 years, for developing healthcare buildings⁸. A dramatic programme of new hospital developments was in progress⁹ and a number of large projects had already been completed. These presented an immediate opportunity for research case studies.

With regular advice from the Steering Committee, the research was conducted in two phases between October 2004 and March 2006, and between January 2007 and September 2008.

Notes

1. Noble, A. 'Howard Goodman 1928-1999'. *Hospital Development*, June 1999, pp. 9-12.
2. Goodman, H. 'Greenwich District Hospital. An exercise in logistics.' *Hospital Management, Planning and Equipment*, London, October 1966 pp. 574 - 577.
3. Webber, C. And Moss, R. 'Harness'. *Health and Social Services Journal*, 18 August 1973, pp1866-1867.
4. Department of Health and Social Security, *Nucleus Designers Handbook*, second edition, 1986
5. *Low Energy Study* Team/Department of Health and Social Security. *DHSS Low Energy Study Report*, January 1982. Department of Health and Social Security
6. Department of Health and Social Security. *The Second Low Energy Hospital Study Report*, London, HMSO, 1987
7. www.architectsforhealth.com
8. HM Treasury (2000) *Taskforce, Technote 7: How to achieve Design Quality in PFI Projects*, para 2.15.
9. National Health Service. *The NHS Plan. A Plan for Investment, a Plan for Reform*. London, HMSO, 2000

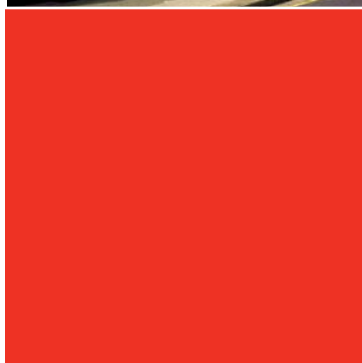


01

Introduction



Howard Goodman's career in healthcare architecture began with the formation of the NHS in 1949 and ended as Director of Development and Health Building in the Department of Health and Social Security in the 1970s. His work was key in helping to create a comprehensive and equitable system of health service planning, building design, cost control and procurement. The achievements of Howard Goodman and his team include a series of innovative hospital designs embodying innovations in master-planning, building design and construction.



However, by the late 1990s, the need for rapid modernisation of NHS infrastructure had become evident and a dramatic programme of new hospital development was in progress. The Private Finance Initiative (PFI) was rapidly changing ways of developing healthcare facilities.

The overall aim of the research was to explore the relationship between PFI, as a delivery mechanism for healthcare infrastructure, and its potential to accommodate future changing needs, especially through flexibility and adaptability in the built form.

This work shows that we need to learn from the experience of developing new hospitals under the PFI model. But perhaps more important is learning from history. In this report we therefore situate the experience of hospital design and construction in the historical legacy of Goodman and his colleagues.

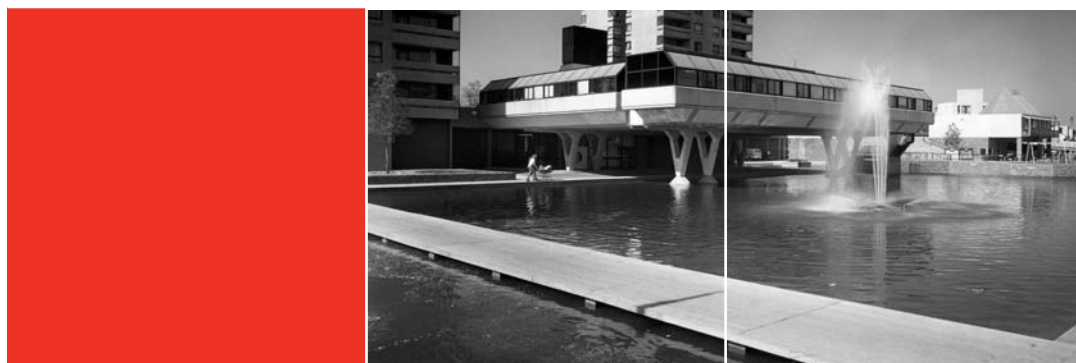


02

Context

The context for the research project was set by three broad interacting influences. First was the original intention to build upon the aims and substantial achievements of Howard Goodman's work for the NHS by developing independent research on the design of future healthcare buildings.





In the process of setting up the Fellowship, a number of topics for investigation were identified in discussion with the key sponsors and other experts in the field.

These included the changed hospital planning and design procedures affected by the procurement methods, the impaired communications between users and designers and the neglect of consideration both for the future adaptation of facilities and for innovation and change.

The 1962 Hospital Building Programme¹⁰ had, during the preceding three decades, shown how innovation could be achieved and there was a developing interest in exploring the contemporary experience in new hospital developments. The reform of the NHS had led to the dissolution of the trained and experienced multidisciplinary teams at the Department of Health and in the Regional Health Authorities. These had provided the whole of the NHS with a system of strategic planning based on assessment and equitable provision according to health need. Departmental and whole hospital operational policies were tested and recommended standards for spaces, services and equipment were set; guidance on functional design and reducing operating costs was provided; a system of dimensional co-ordination and performance standards for basic building elements and components was introduced together with a system of continuously monitored and up-to-date cost control for procurement.

The multidisciplinary teams at the health department had, in co-operation with teams in the regions, also initiated innovative research and development, testing them on pilot projects. As this system for creating and maintaining the NHS infrastructure was being rapidly replaced by untested alternatives such as PFI and LIFT, there was a strongly felt need to assess the effects of the changes on healthcare building design.

The second influence on the research was the contemporary scene in the NHS. Some five years had elapsed from the inception of the Fellowship, following Goodman's death in 1999, to the start of the research at Imperial College London in 2004. The reforms of the NHS were altering both policies and personnel throughout the service. Profound changes are continuing into the present especially in response to dramatic crises in national and global economies. At the same time, developments in healthcare technologies have enabled new approaches to care delivery, increasingly shifting services from acute hospitals to the community. The type of infrastructure needed to support healthcare has also been evolving.

And, thirdly, the rapidly expanding construction and reform programme in the UK has presented extensive opportunities for the independent sector, especially USA-based architects and healthcare corporations, to supply infrastructure and services to the NHS.

Clearly, the research took place at a time of massive upheaval. For healthcare planners, architects and the construction industry the most immediate change was the introduction of the PFI which had made possible a programme of major new hospital building for the NHS. Inevitably, the PFI became a central element in the research.

The establishment of the Health and Care Infrastructure Research and Innovation Centre (HaCIRIC) in 2006 – a collaboration between Imperial College London and Loughborough, Reading and Salford Universities with funding from the Engineering and Physical Sciences Research Council – provided the Howard Goodman Fellowship with related knowledge and expertise. Lessons from the Fellowship research have now been taken up in other HaCIRIC projects.

Notes

10. Cmnd. 1604, National Health Service. A Hospital Plan for England and Wales, London HMSO, 1962.

03



The research

The overall aim of the research was to explore the relationship between the PFI delivery mechanism for healthcare infrastructure and the potential to accommodate future changing needs, especially through flexibility and adaptability in the built form.



3.1

Background

'Adaptability' was defined as the facility to accommodate changes of use or function, which result in the need to alter the building and its services physically or organisationally.

The research adopted a qualitative method focusing on case studies of selected hospital projects.

The first stage involved developing knowledge of the background both at a national and case study level and included a survey of a random sample of 52 senior representatives from PFI and LIFT consortia (26 responded) and informal interviews with 10 experts in the field from the Department of Health, NHS Estates, contractors, architects, and legal practitioners and consultants involved in PFI. From this background research two groups of hospitals were selected for case studies – hospitals completed using the pre-PFI funding and delivery model and hospitals planned and built via the first wave of PFI schemes.

Next, short case studies were undertaken of the first group of hospitals¹¹. These comprised informal interviews with healthcare architects and planners, visits to the hospitals and evaluations of the projects' background documents, where these were available.

This phase was followed by detailed case studies of the second group of six hospitals¹². The planning, delivery and operation processes of the six projects were explored through 33 semi-structured interviews with key stakeholders, visits to the hospitals and analyses of background documents¹³.

Interviewees comprised hospital trust project directors and clinical planners, special purpose vehicle (SPV) company managers, building contractors' managers, facilities management services managers and architects. A further eight representatives from the contemporary PFI projects were interviewed individually or participated in group discussions in October 2007 and April 2008.

In the final stage the preliminary research findings were presented to the research advisory group (comprising experts from healthcare architecture and construction) and at a workshop which included other academic researchers and 45 representatives from health policy, health services and the construction supply chain. The completed research, together with discussion of the results and conclusions, has now been published in a number of academic papers¹⁴ and presented at conferences.



3.2

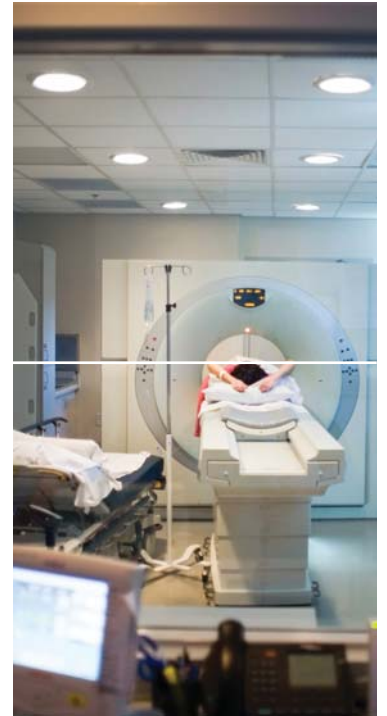
Key findings

There are four key findings from the research. Three of them - a tendency to poor project communication, risk aversion and overly tight control of capital spending – suggest serious issues in the PFI process that may diminish innovation for each project. The fourth, relating to general sharing of knowledge, raises concerns about how much learning from PFI leads to information on innovations being spread beyond the particular project. The team also found a general, but debilitating issue of a conservative ‘public sector mentality’ that can also be found beyond PFI projects.

3.2.1 BARRIERS IN COMMUNICATION BETWEEN ARCHITECTS AND HOSPITALS

In a PFI project the main contract is between the hospital trust and the special purpose vehicle (SPV)¹⁵. In the case studies it was found that the presence of the SPV established barriers to ready communication between the hospital operational system and the project delivery system. The PFI model had not led to more collaborative ways of working. Architects felt they had to serve two ‘clients’, the SPV as well as their traditional client, the hospital and its users.

In several cases the SPV was wary of overly close relationships between the trusts’ healthcare planners and the architects. In only one of the PFI cases studies was the SPV described as providing a supporting role and aiding communication. In the other cases communication was found to be difficult and detrimental to collaboration in planning and delivering the project. The research also found problems between NHS trusts and project subcontractors because of the contractual intervention of the SPV.



Communication and collaboration between trust, SPV and subcontractors difficult and disrupted because of the contractual arrangements

‘*The trust was not seen (by the SPV) as the client but rather as an impediment. ... Relationships among all parties were quite aggressive because of the underlying investment vehicle and the tight construction budget and timeframe.*’

Project director

‘*Our contract was with the SPV so we were not supposed to talk directly to the users, but we talked to them anyway. The relationship between the contractor, the client and us became very fragile. We and the client got along very well but the contractor was a barrier between us.*’

Healthcare architect

3.2.2 RISK AVERSION REDUCED ADOPTION OF INNOVATION

The main goal for the NHS is a facility delivering healthcare to its patients, whereas for the providers of private finance a hospital project is mainly seen as an investment vehicle. This mismatch causes more cautious attitudes to risks associated with innovations. Risk aversion is the result of three factors – the competitive bidding environment, the PFI funders' need to protect their investment and the trusts' need to transfer risk to the private sector.

There was a tension between the potential for promoting innovation at the bidding stage (seen as an important 'sales' advantage) and the risk averse attitude that prevailed within PFI consortia. PFI consortia bidding against each other were unwilling to offer more than the minimum necessary to meet a brief containing statements about the need for unspecified adaptability.

It was felt that, as design was carried out concurrently with tendering, opportunities for innovation under PFI were very limited. Private sector funders exert pressure to protect their return on investment and tender to reduce risk by using conventional designs and construction methods.

There were a number of examples of advantageous innovations that required derogation from current, often out-of-date, NHS guidance. Derogation takes time and resources and adds risks for those who are tendering. Prescriptive NHS guidance focuses mainly on technical objectives with measurable targets but does not include any detailed requirements for infrastructure adaptability. The research found that it is a disincentive for the SPV to introduce adaptability partly because the rewards would only benefit the trust and partly because additional income could be achieved through making future alterations at the hospital.

Risk, incentives and innovative solutions

PFI stifles innovative solutions. Investors and financiers are not interested in innovation; they do not want to take risk.

Project director

We achieved a reasonable design with regard to flexibility. This was probably more despite PFI since there is a strong focus on initial capital cost. The SPV takes the view: "Why spend the money if we cannot recoup this investment?"

Director, architects' practice

It's a game to bring the business case down to get approval from the Department. This results in an unrealistic budget, which doesn't allow for the implementation of innovative ideas.

SPV Project director

3.2.3 KNOWLEDGE TRANSFER AND LEARNING FROM PFI PROJECTS IS LIMITED

Learning from the experience of carrying out a succession of projects can lead to effective development of new innovative ideas. Hospital PFI projects are generally large, one-off developments, a characteristic that potentially weakens each trust's ability to learn. Systematic capture of experience on PFI projects by hospital trusts is largely absent. Furthermore, the transfer of knowledge between trusts was found to be very limited. As a result of this lack of disseminated learning, inexperienced trusts may compile inadequate design briefs.

All private sector partners reported that they used various strategies to learn from their completed PFI schemes. However, the competitive environment ensured that their experiences typically remained within individual firms, with only some sharing within the PFI consortium.

Transfer of knowledge – within and between projects

The transfer of knowledge between individual trusts is very limited. The knowledge resides within the consortia and architects.

Healthcare director, architects' practice

3.3

Research conclusions and recommendations

3.2.4 CAPITAL COSTS AND CONSERVATIVE MENTALITY HINDER INNOVATION

Another factor impeding innovation was the need to reduce capital costs to match the approved affordability limits established by the 'public sector comparator'. These limits were considered to be unrealistically low in several cases. Although not explored in the case studies, the payment-by-results mechanism for generating NHS hospitals' revenues does not allow for the high availability charges incurred through PFI projects. Because of these limits to affordability, innovation and measures for future adaptability could not be included in PFI projects.

A 'public sector mentality' which prevents NHS stakeholders from taking initiatives 'outside the box' was also considered a hindrance to innovation. Reorganisations of the NHS stifled 'the focus on the future' even further; NHS culture was found to be short term, concentrating on 'fulfilling today's needs', rather than thinking long-term.

After examining a group of projects, it was found that the PFI model may have been less effective in stimulating design innovation than the system it replaced. While by no means perfect, it enabled greater coordination between the project development and health service operational systems throughout the NHS. Increasing the role of the private sector in the delivery of infrastructure projects had not provided the innovation benefits expected through adopting this model.

The selected cases studied were all early examples of PFI hospital projects. Later projects may have improved innovation outcomes, although interviews on a contemporary project suggested this may not have been the case.

The main structural problem – separation of the project supply side (the private sector consortium) and the operational services delivered through the NHS – remains unresolved.

The research concluded with the proposal that policy makers should incentivise industry to deliver innovation. Future delivery models based on public-private partnerships should include incentive mechanisms for the partners to consider quality and efficiency improvements in the hospital's care outcomes. This should be far more effective in encouraging the innovative potential of the private sector in providing healthcare infrastructure.

Hospital trusts also hinder innovation

“*(The trust management) are content to get a new building and don't think about redesigning the process first ... Buildings are built for the current working practices.*”

Healthcare director, architects' practice

“*The (SPV) would like five years' advanced notice (of requirements), but this is not NHS culture. It is short-term, fulfilling today's needs.*”

Trust director of nursing

Notes

11. Greenwich District Hospital; Northwick Park Hospital; West Suffolk Hospital; Guy's and St. Thomas' Hospital; Homerton Hospital; St. Mary's Hospital, Isle of Wight.
12. Confidential under the terms of the research agreement with the case studies.
13. See page 16 for questions explored in case study interviews.
14. Barlow, J., Köberle-Gaiser, M., Delivering innovation in hospital construction. Contracts and collaboration in the UK's Private Finance Initiative hospitals program. California Management Review 51(2), pp.126-143.

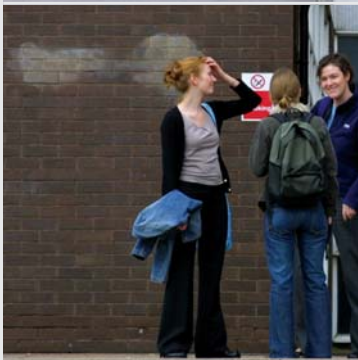
Barlow, J., Köberle-Gaiser, M., The private finance initiative, project form and design innovation, Research Policy 37 (2008), pp. 1392-1402.
15. A "Special Purpose Vehicle" is a company or consortium formed to provide finance, design, construction and maintenance for a specific project.

‘
The PFI model may have been less effective in stimulating design innovation than the system it replaced. That system involved greater co-ordination throughout the NHS.’



Research questions

Topics discussed in the semi-structured open-ended interviews included considerations for flexibility during the planning phase, implemented strategies for flexibility, changes since completion, and the implications of the financing and procurement process for adaptability and innovation.



1. **INTERVIEWEE'S INVOLVEMENT:**

- What was the interviewee's role during the delivery process?
- What is his/her role now?

2. **NEED FOR NEW FACILITY:**

- What were the reasons for the new hospital?
- How was healthcare provided before this facility existed?

3. **CHOICE OF PROCUREMENT METHOD:**

- Which procurement mechanism was chosen?
- Why was this mechanism considered to be the best choice?
- What was the determining factor for choosing one bidder over another?
- What level of importance had the design and the consideration for flexibility in the decision for the successful bidder?

4. **CONSIDERATIONS FOR FLEXIBILITY DURING THE PLANNING PHASE:**

- Was flexibility to accommodate future change a concern during planning phase?
- To what extent were operational running cost a consideration during the planning phase?
- What was the planning horizon of the people involved?
- Who of the stakeholder was the most interested in flexibility?
- Were there any incentives to consider and to plan for flexibility?

5. **IMPLEMENTED STRATEGIES FOR FLEXIBILITY:**

- Does the hospital provide potential for changes in the future?
- Does the facility allow for sharing one room between different (clinical) disciplines?
- How easily can the function of one room be changed?
- How easily can an entire area be changed in order to accommodate new care delivery models and/or technological changes?
- How easily can departments grow and shrink?
- Does the facility provide the potential to expand and to contract?
- Does the facility provide the potential for a non-hospital use?
- Is there a strategy for the change of building elements in place?
- Is there a strategy for the change of engineering services in place?
- How realistically is change achievable considering feasibility and the level of disruption on the operation?

6. **CHANGES SINCE COMPLETION:**

- Which physical aspects have been changed since completion?
- What were the reasons for these changes?
- How easily were these changes implemented?
- Which of the changes have been foreseen during the planning phase and which have been unforeseen?
- Which of the measures for flexibility worked to accommodate these changes and which not?
- Did the building prevent necessary changes?

7. **INNOVATION:**

- Are there any parts/features of the hospital that you consider 'innovative' (especially with regard to future flexibility)?
- How did these innovations come about?

8. **PROCUREMENT PROCESS AND FLEXIBILITY:**

- Did the contractual arrangements provide a climate for creative ideas and innovative solutions for future flexibility?
- What was the attitude towards risk for innovative solutions among the different parties involved?
- Do the contractual arrangements allow changes easily to be made to the physical structure during the operational phase?
- Is there a case to build a PFI hospital with a contract that includes all service provisions (provision of facility, FM services and clinical services)?
- What would have been different to the current building and its delivery process?





04

Commentary

The National Health Service's desire to foster innovation in its healthcare infrastructure has been manifest in policy documents throughout its history. The ambition of the government was clear in arguing that PFI is "much more than a new hospital building programme...It has to become the principal mechanism for getting new design solutions into the NHS"¹⁶.

So the conclusions of this research paper may cause some disappointment. The research has found that most, if not all, of the stakeholders interviewed were open to innovative proposals. However, the nature of PFI tended to raise rather than reduce barriers to new thinking. Risk-aversion tended to increase, difficulties arose due to non-compliance with existing NHS guidance, there were financial disincentives to adaptability and unduly low cost limits on projects. These sat alongside resistance to change, springing from a conservative 'public sector mentality', problems related to NHS re-organisation as well as short-term thinking within the health service.



4.1

Lessons from the past

Despite the shortcomings of the PFI, the desire and ambition to nurture innovation is clear. What lessons, then, can now be learned to make this vision a reality, so that innovation is genuinely achieved and more widely adopted in the future? This commentary argues that experience from the 1950s and 1960s offers signposts about how better to measure and share innovation, as well as guidance on the type of institutions that could ensure continuing knowledge development and transfer in the field of healthcare infrastructure development.

Looking back at the post-war period, it is apparent that the successful capture and dissemination of new ideas required forethought and planning. In part, this was achieved via opportunities that sprang out of adversity. Gradual economic recovery from the war meant that the new health service was established for more than a decade before the long overdue hospital building programme could be afforded.

This lengthy delay in construction offered planners time for a reflection. During the ten year hiatus after the foundation of the NHS, *Studies in the Function and Design of Hospitals*¹⁷ was published by the Nuffield Trust. It made available an outstanding body of research and development and – most importantly – impeccable research methodology. This work – and the Nuffield research team that carried it out – became the foundation for the programme embarked upon by the architects at the Ministry of Health and also of the Medical Architecture Research Unit (MARU) which was established in 1964.

The Nuffield approach was simply and clearly expressed in the introduction to the *Studies* as ‘a balanced relationship’ between ‘the accumulated knowledge and experience of those whose daily work has been within the hospital or in hospital design’ and the input of ‘fresh minds and methods from outside’.

The drive to think anew also came from the scale of the enterprise eventually undertaken. Howard Goodman and his colleagues were obliged to innovate if they were to deliver the unprecedented national hospital building programme introduced in 1962, based upon assessment of the population’s medical needs. Fortunately, they kept their heads, learning in a systematic way from both their successes and their mistakes.

Different initiatives were researched, piloted and openly exposed to professional assessment before being adapted for wider application in the NHS. Each successive initiative – each innovation – built upon the experience of its predecessors. As a result, healthcare building in the UK developed positively for several decades and was acknowledged as leading the world in its field.

Beginning with the innovative 1962 ‘Hospital Plan’, design and process innovations were introduced such as Departmental Guidance Notes, CUBITH (Coordinated Use of Building Industrial Technology for Hospitals), and MDB (Manufacturers Data Base), as well as innovative hospital designs – Greenwich District Hospital, ‘Best Buy Hospital’, the ‘Harness’ system, the ‘Nucleus’ hospital, and Low Energy Hospitals. Achieved in an extraordinarily productive and innovative period, this series may be seen as a growing tree of development.

In summary, innovations arose from the combination of experience in the field and fresh ideas from outside and they were introduced widely only after changes had been demonstrated to be improvements. The lesson of all this for those wishing to nurture effective innovation today is that we also need to think ahead about capturing and disseminating learning. We must create a system to ensure that initiatives are researched, piloted and critically examined by experts before being more widely employed.



“
Each successive initiative
built upon the experience
of its predecessors.”

4.2

Measuring and evaluating innovation

These lessons, however, raise further questions. Measuring and evaluating innovation requires understanding about where its real value lies. One source of value, written into countless NHS design briefs, has been the need to design hospitals to accommodate adaptability or flexibility for possible future change in use.

In the 1955 Nuffield Studies there is a brief discussion of flexibility, the seed for what developed into Nuffield's authors' 'growth-and-change' theory of hospital design¹⁸. This approach was intensively researched and developed, culminating in the design for Northwick Park Hospital¹⁹. This line of development in hospital design focused very effectively on growth as the generator of change. Unfortunately, closer examination of adaptability or flexibility – while still required in NHS design briefs – received limited attention.

However, the architects in Goodman's team within the the health department did carry out and commission a number of studies, for example on operating department utilisation, exploring differing use patterns within a given layout. MARU made a study of outpatient accommodation using mathematical models relating the number of rooms ('string length') to demand²⁰.

This paper influenced the design of the outpatients' department at Greenwich District Hospital where combinations of differing strings of interconnecting consulting and examination rooms proved effective as patterns of demand and usage changed over the life of the hospital. The design of Greenwich piloted a number of innovations, providing flexibility for significant internal rearrangement to ease the pressures for growth on a restricted inner-city site.

This understanding of flexibility has atrophied subsequently. It was difficult to identify examples of flexibility in the PFI case studies. In mitigation, it should be added that some of the case study projects had only very recently been completed when the research was carried out. So it would have been hard to distinguish significant changes in use since completion from operational activities that were still adjusting to the new hospital.

Additionally, the research highlights the general absence of an existing body of organised data and serious analysis of actual adaptability and flexibility in NHS hospitals, a deficiency that pre-dates PFI. Nevertheless, the systemic problems already highlighted around innovation within PFI do appear to be a factor in the shortage of detail about flexibility in these schemes.

‘*The architects in Goodman's team carried out and commissioned a number of studies.*’

‘*Now may be the time to produce some clear guidelines for future projects.*’

4.3

Flexibility and adaptability in the built form

Clearly, then, there is a need for more sophisticated research in this field. We must understand what 'flexibility and adaptability in the built form' amounts to and how, in new buildings, we can recognise 'the potential to accommodate future changing needs'. This is a tricky area. How, precisely, can 'potential' be identified ahead of the future? How can it be assessed or measured for a specific project?

Experience from the 1960s and 1970s suggests some options. It may, for example, be possible to identify potential adaptability through drawing board exercises. Non-loadbearing internal partitions have long been an automatic choice in all types of modern buildings; these were even discussed in the Nuffield Studies. In any given interior a variety of hypothetical layouts can be planned with demountable partitions. An illuminating example of a drawing board exercise was the pioneering and highly innovative Community Health Centre for the Greater London Council's new town at Thamesmead (1972)²¹. Before approval was given to the health centre's design, the architects were required to demonstrate how the built form could be adapted satisfactorily for future use as a public library.

Another way to identify potential adaptability is to apply knowledge derived from comparing a range of actual adaptations with their original built forms. In October 2006, 'Architects for Health' issued members with a brief pro forma on which they could indicate examples known to them of realised adaptability and flexibility. A small number were offered but it was insufficient for significant follow-up and analysis. The resources to derive deeper knowledge of actual adaptations were not available within this research project. Now may be the time to put more resources into such work and produce some clear guidelines for future projects.

4.4

Pre-requisites of success

There are also questions about the contexts that are required to develop learning in this field. Experience from the post-war period suggests that a pre-requisite of success is a coherent policy that respects the synthesis between structure and infrastructure upon which to base strategic planning.

On a practical level, research in healthcare design should be multidisciplinary. Teams should include experienced, representative medical and care professionals as well as design and construction professionals. Their expertise should combine effectively to analyse the changing structure and infrastructure requirements for healthcare and to develop the strategic planning.

The benefits that can be achieved from this can be seen from the research presented in the 1955 Nuffield Studies. This work was of substantial value to the developing NHS and an outstanding achievement both in itself and in what flowed from it. The Nuffield team went on to advise the Ministry of Health and to provide advanced training for its architects entering the field of hospital design. The strength and value of the research-based knowledge became the foundation for the work of Tatton-Brown and Goodman at the the health department, and of MARU.

In this period, professionals across the field cooperated wholeheartedly in research and development, unconstrained by considerations of competitive market policies and commercial confidentiality. For example, the Hospital Design Unit at the the health department, the South East Metropolitan Regional Hospital Board, MARU and the King's Fund together published in detail their researches for the Greenwich Hospital project.²²

Subsequently, Richard Llewelyn Davies, who directed the Nuffield team, set up a powerful research base at the Bartlett School of Architecture, University College London, and also, in partnership with his

Nuffield colleague John Weeks, established a leading private practice carrying out major hospital and other projects in which their research-based innovations would be implemented.

More broadly, the institutional structure for planning and delivering healthcare facilities has changed fundamentally since the 1960s and 1970s. The old model of strategic planning by the UK central government department - plus implementation by regional and area authorities - no longer applies. Scotland, Wales and Northern Ireland now have their own health services; in England there are 10 Strategic Health Authorities that guide, regulate and monitor the business cases of a variety of separate trusts for hospitals, primary care and other elements of the NHS.

There is no longer an effective body of established and experienced multi-disciplinary planning and design professionals at the Department of Health with the resources to carry out research and development of infrastructure for innovative services.

Research in healthcare design in academic institutions has become piecemeal and poorly-resourced, as a result of the NHS, the major sponsor of such work, no longer demanding this learning. Academic research in this field has latterly relied upon opinion surveys and anecdotes, or else has combed medical literature for connections between medical outcomes and the designed environment. Before it was finally dissolved, NHS Estates was no longer in a position to publish the type of guidance that could really meet all the needs of professionals involved in PFI projects.

“*Multidisciplinary teams should analyse requirements for healthcare and develop strategic planning.*”



4.5

Applying learning to the modern day

The situation today in some ways resembles the problems that existed immediately prior to the setting up of the new hospital building teams at the Ministry of Health and the Regional Hospital Boards in 1960.

The Howard Goodman research project has provided an opportunity to appreciate the achievement of these teams in organising *ab initio* the infrastructure for the new nationwide healthcare system. That achievement offers important insights into the research that is now needed, focused on infrastructure design, to examine and define more precisely what 'adaptability' and 'flexibility' in built form entails and how the service requirement may be specified. A systematic field study of actual examples would require very significant resources but a well-researched analysis would help to fill a major gap in our understanding.

Such a development would take place in a context that may be less expansive than in Howard Goodman's day. There are considerable constraints on new investment in NHS infrastructure as a result of pressure on public and private sector finances. There are still a considerable number of projects already proceeding that will become operational in the next few years, but it is unlikely that major new projects will be approved in the foreseeable future. So, more concern will be given to conserving and maximising the use of existing infrastructure. This will certainly include necessary adaptation of spaces and services to changing needs as they arise, with exploration of options for re-planning and re-equipping existing facilities.

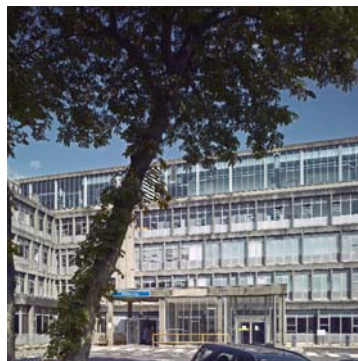
The issues that today's planners face are also different. The impact and timing of global climate change will be difficult to anticipate at the local level. There will be continuing - and almost certainly accelerating - pressure on energy supplies and costs. Additionally the control of healthcare associated infection will require new practices and new designs.

For architects and others involved in healthcare design this context will affect the nature of the designing they are asked to carry out. These could include a majority of much smaller projects involving adaptations and conversions, energy conservation and sustainability measures applied to existing infrastructure as well as accommodating health services to cope with disasters and strategies for safely handling epidemics.

Nevertheless, despite the difference of the contexts, today's planners face many issues of methodology that Howard Goodman and his colleagues grappled with so successfully half a century ago. Today's government and its healthcare planners would do well to heed the lessons of the relatively recent past.

Notes

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‘ Experience from the 1950s and 1960s offers signposts about how to measure and share innovation as well as guidance on institutions that could ensure continued knowledge development. ’

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