

Healthcare Design Development in UK

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Abstract

The UK Government has embarked upon the largest healthcare building programme for a generation, aiming to build over 100 new hospitals by 2010. So far, about one third have been completed, some 60 or so are being developed. At the same time more investment is being made in primary and community care to extend diagnostic and treatment services to more local centres. What can we expect? And how much are we doing to ensure that the designs are good quality?

A recent survey (CABE 2004)¹ showed design does matter to nurses, and has most influence on their workplace performance, followed by recruitment and then retention. The extent to which the link between performance and capital expenditure has yet to be quantified, but an initiative to scope the case for investing in good design (FHN scoping study 2003)² for health through expert panels, suggests three main principles:

- Design can help reduce operating costs of the building itself and the service by creating more efficient working patterns, improving staff turnover, recruitment and retention.
 - Design can affect patient health outcomes. The wider community can also benefit from the contribution of schemes to regenerate the local economy and social conditions.
 - Design is a contributory factor in healthcare quality and patient safety.
- The need for a more sophisticated valuation system that recognises the benefits of social and environmental factors as well as economic factors needs now to be addressed.

The latest thinking about service redesign (re-organising services to provide a greater focus on patient flows) is being linked to physical design in home, community and hospital settings through a series of seminars called "Optimising Design"³, organised by FHN with support from NHS Estates and the NHS Modernisation Agency.

Topics have so far included changes to care outside hospitals, the impact of networks of care and patient pathways, and changes inside hospitals. The workshops have explored changes to

the organisation of care and its impact on the design of the physical environment. The sharing of good practice and innovative solutions between clients and designers has been at the heart of the project.

The extent to which these workplace issues are being addressed in the current programme of projects can be understood through the Design Quality⁴ Review Programme. Major capital projects over £25m undergo design review and over 50 schemes have been reviewed and a further is being planned. The initiative aims to ensure that good design is embedded within the NHS healthcare building programme. A panel, consisting of architects, engineers, project managers etc, reviews the proposed scheme designs and makes recommendations to the trusts. The Design Review Panel has identified key issues arising from the reviews. Together with the findings of an independent research evaluation of the process, a framework of 12 design principles is being developed that identify significant indicators of good design. This paper will focus on three of these issues, illustrated by a selection of current projects in development namely,

- Health and the city : the building in its context
- Quality of the internal spaces: staff and patient environment
- Future proofing the design

The case for investing in good design

The NHS is in the middle of the biggest capital programme of investment in environments for healthcare across the whole spectrum of settings from hospital to home. An ambitious programme of planning and development is underway with the potential to realise not only significant improvements in the modernisation of care and the quality of the physical environment but also to support a more efficient system that can deliver better health outcomes for patients, benefits for the trusts who will manage and staff the buildings, and for the consortia who will operate and run the facilities.

It is often assumed that good design is costly and that investing in design is superfluous. However, the UK Treasury has made it clear that value for money must be measured over the lifetime of a building and that design is essential to achieving value for money.⁵ The case for investing in good design for health, devised by the Future Healthcare Network (FHN Briefing 3) through expert panels is based on three main principles:

- Design can help reduce operating costs of the building itself and the service by creating more efficient working patterns, improving staff recruitment and retention
- Design can affect patient health outcomes. Patients benefit and costs are reduced through, for example, shortening patient lengths of stay and use of analgesics. The wider community can also benefit from the contribution of schemes to regenerate the local economy and social conditions.
- Design is a contributory factor in healthcare quality and patient safety

The evidence base

A growing evidence base is emerging to demonstrate the impact of the environment on staff performance, improvement to patient health outcomes, and effect on staff and patient safety. Many research, governmental and campaigning organisations are now supporting research and development projects on this topic in the UK.⁶ The potential to translate the American experience from 'Fable Hospital' and Pebble Projects initiatives at the Center for Health Design Studies is being explored.⁷ Studies that focus on cost benefit analysis of design covering aspects such as regeneration, sustainable development and visual and performing arts, are beginning to emerge. The need to integrate these issues into guidance for capital projects is now timely and imperative.

The notion that the capital cost of the building is overtaken by revenue costs in little over two years is an argument that has been rehearsed for

over 20 years in the health sector. Now, construction economists⁸ are refining the ratio of capital costs to maintenance of infrastructure costs to the cost of the service or business (originally understood as the 1 : 5 : 200 ratio) to show just how small the capital cost is relative to the revenue costs (let alone the design fee !); and to highlight how the potential design can positively affect the productivity and running costs of the service.

The impact of the environment on patient safety is also a major concern, including healthcare acquired infection, medical errors, patient falls, medication errors, staff fatigue, and crime and vandalism. The project teams that develop programming briefs generally operate under great pressure and at short notice. They are obliged to explain the way design impacts on the previously mentioned factors, synthesizing both into a coherent and practical evidence-based brief. Key design considerations are being developed

by government in relation to these medical factors and will include, for example, air quality, arrangement of single/ multiple bedrooms, location of hand-washing facilities, lighting levels, flooring materials, standard layouts for clinical procedures and staff workspace.

A more sophisticated valuation system that recognises the benefits of social/medical environmental, and economic factors is urgently required to advance an integrated methodology.

Optimising design

The organisation of healthcare and the context in which it is taking place are undergoing rapid changes: there is a drive to better integrate health with social care, housing, education and employment. This drive, in turn, raises clear links with issues of sustainable communities and the impact of the public health agenda on the design of the environment.



Figure 1 BECaD View North

For the health sector itself there are also many changes in the application of technology: demographic population profiles becoming significantly older in many developed countries; increased consumer expectations of patients, developments in medical procedures; and changes in epidemiology and the labour force.

In the UK, we are also undergoing policy changes in delivery of care: to offer greater choice, diversity, and contestability with new financial flow mechanisms aimed to make the money follow the patient. All this makes planning care services for the future uncertain.

The impact on the buildings is profound, with a need to be able to plan beyond the individual project and to see it as part of a system of care and infrastructure. New activity clusters and even building types are emerging alongside the need for design that address outlook and observation, privacy and sharing, convenience and efficiency, well-being and intensive care, independence and support; and finally there is the potential to unpick the hospital as we know it.

Through a series of developmental seminars, organised by the FHN, with support from Department of Health Estates and Facilities (formerly NHS Estates) and the NHS Institute for Innovation and Improvement (formerly the NHS Modernisation Agency), the programme brought together key policy makers, project directors, clinicians and design professionals to explore the content of these changes – for example, care improvement, integrated planning, use of technology – and also how they will shape future buildings.

The aim of this presentation has been to stimulate discussion and debate about the links between service redesign and physical design and demonstrate practical examples of projects where new ideas are being developed. It is expected this information will increase knowledge amongst project teams in the health service,

engaged in major projects and the design teams and consortia who are generating the design proposals.

Optimising design has highlighted topics that are undergoing rapidly changing new thinking and demonstrates the impact on design of recent projects in development and use. Its focus has been on three settings: care outside hospitals, networks of care across the NHS, and care inside hospitals. Topics include care at home and intermediate care; maternity, children and diagnostic networks; and scheduled and inpatient care. This pilot project will be extended to cover further issues in the next year.

People now expect a more personalised health service which is tailored to individual needs, and one which respects their dignity and privacy.

With the new emphasis on customer service, the improvements in the quality of the healthcare experience for staff, visitors and patients are crucial – by fostering local pride and, importantly, reducing length of stay and staff turnover. Matching these aspirations in buildings that are uplifting and comfortable represents a successful solution.

The availability of more sophisticated IT-enhanced, miniature, cheap and automated equipment, linked through broadband to remote experts, is allowing more care to be provided outside hospitals. Patients and carers are becoming experts and can be empowered to look after themselves. It is now possible through design and technology to maintain monitoring and living skills at home. Ensuring that houses are built with sufficient space and infrastructure to support care at home is vital.

The public has for years been requesting the provision of more care in more numerous locations, particularly for people with long-term conditions, older people and those with young families. Patient pathways for community-wide services integrate health and social care across



Figure 2 *Waiting area at The Arches Center*

all settings from home to hospital. Some services, particularly those for children and older people, integrate health with other services to support wellness not just illness. These services can be further enabled by investment in IT connectivity, allowing organisations to coordinate their activities around individuals and move information rather than people.

Integrating patient pathways across health, social care and voluntary sector will also help to deliver seamless care. The creation of local centres for childrens' services enable professionals from different disciplines to work together to deliver care from one place. Networks of maternity services are able to distinguish between women who require consultant assisted births and those that can be supported by midwife care. Centres

for more natural births are now available with a less clinical ambience to support and celebrate this important life event.

Investment in more diagnostic services and elective capacity is enabling earlier diagnosis and greater access to treatment with the aim of improving health outcomes, particularly for cancer. This flexibility offers the potential to maximise flows through buildings and reduce waiting times. This investment, if handled well, will also help reduce medical errors and infection rates, thereby improving patient safety. Teamwork and multidisciplinary working teams are very important for the diagnosis and treatment of patients with complex or several diseases. Creating space that supports team working may help to achieve better health outcomes.

Improvements in care processes have the potential to increase healthcare productivity, partly by standardising care processes for common conditions through protocols that maximise patient flows. However, we still need to develop strategies for maximising productivity through design, which may allow staffing levels to be reduced over time. Better design is needed to maximise efficient flows for patient and staff journeys between activities. There should be a reduced need for waiting and wayfinding should be easy. Design can assist by standardising room sizes to suit these protocols.

Space needs to be thought of as a common resource to avoid individual ownership. This means, for example, rethinking office space in terms of activities such as group work, and quiet work, meetings rather than as individual offices. Diagnostics and treatment involves developing planning templates that minimise variation in terms of organizational flows and reducing the design differentials to create standard clusters to suit the flows. IT supported networks can help to reduce reliance on physical adjacencies and enable more efficient use of staff time, simultaneous reading and reporting from different locations. Design can help to reduce medical incidents, medical errors and infections by supporting teamwork and discouraging interruption.

Perhaps the most important challenge facing health services is the sheer speed with which key components need to be replaced—eg IT systems after three years, medical equipment after five years, models of care in ten to fifteen years, with buildings lasting for 30- 60 years. It is clear that flexibility for the future is vital.

Changing buildings can be a catalyst for organisational change: projects may stimulate ‘disruptive innovation’ to change habits of behaviour, question traditional departmental clusters and conventional layouts.

Design Quality

A programme of Design Reviews for major capital projects over £25m has been developed over the past 18 months. The initiative, which was mandated by the former Secretary of State for Health in England, is intended to ensure that good design is embedded within NHS healthcare building programme. Managed by the Design Centre at the DH, the reviews take place at two stages in the project development: at the beginning when the Trust is developing a PSC (Public Sector Comparator) and later at ITN (Invitation To Negotiate) when two (or more) bidders’ proposals are being developed.

A panel, consisting of architects, engineers, project managers etc. meets the Trust at the site to review the proposed designs. The panel offers constructive criticism and recommendations to the trust. Further developments are underway to extend the review to community and primary care projects. The potential for developing a Strategic Planning Review is also being considered : this would assess the service content within a strategic area framework commenting on the organization of care the content as well as the location of the building.

Achieving Excellence in Design : measuring design quality

A systematic approach to design appraisal has been developed with the aid of a toolkit based on Vitruvian principles of good design: ‘commodity, firmness and delight’ that translate into modern language as functionality, build quality and impact.⁹ Excellent design requires all three of these elements to work together and none can be ignored.

The health service has developed its own version called AEDET, (Achieving Excellence Design Evaluation Toolkit) that closely follows the Design Quality Indicators (DQIs) developed by the Construction Industry Council (CIC) as an industry standard for evaluating building design.



Figure 3 *The Arches Center atrium*

The toolkit provides a useful aid to clients and their advisors, to score designs for their degree of excellence in design. It is also a reminder to those using it, that the environment is a complex organism with no absolute right answers and plenty of contradictions. However, it has served to put issues such as ambience, light quality, and sensory stimulation on an equal footing with ‘fitness for purpose’ and technical performance.

AEDET Evolution¹⁰, an updated and simplified version of the toolkit, is applicable to all types of health buildings. The structure links closely with the issues raised in the design reviews and provides a methodical way of comparing design proposals as part of the technical evaluations.

The relative weighting of design to other considerations in the selection of bidders is set by the Trusts, and for some, greater emphasis is put on clinical planning and decanting than design. Whilst this may deliver some short term benefits and clinical support for the schemes, it is unlikely to ensure that the designs will deliver good patient environments and long term benefits in terms of site planning.

Design Champions

Having advocates for good design is crucial and the Design Champions at Board level appointed by each trust are expected to raise awareness about design and intervene in and support project developments. Whilst this initiative is undoubtedly well intentioned, unless it is balanced by design expertise in the project teams, it is unlikely to have sufficient impact on the day to day decisions about design. The name ‘technical advisors’ is perhaps a further reflection of the low status given by many trusts to their architectural and planning consultants in the PFI process.

Design Quality- in practice

Whilst the quality of schemes reviewed is inevitably variable with a programme of this scale, it is encouraging that most of the schemes now

endeavour to make spaces that are comfortable and optimistic for patients and staff. There are however, three significant issues emerging that require further effort:

- Health and the city : the building in its context
- Quality of the internal spaces
- Development of design

These are not unique to the UK but apparent in many critiques of healthcare architecture in many European countries.

Health and the city

There is growing interest in how the built environment can benefit public health through the provision of, for example, parks, open spaces and transport systems. The integration of health into the development of sustainable communities is also beginning to emerge.

How the building relates to its immediate site context and neighbouring developments should be reflected in the overall form of the building. Each site is unique and the design should reflect that. The height and shape of the building may vary depending on whether it is in a built up area or adjoining woodlands and fields; the path of the sun and direction of prevailing winds and views, for example, will affect the internal planning and the specification of materials on the external elevations.

Many trusts describe the desire to make a ‘landmark building’ and this opens up the opportunity to make an obvious public entrance. Developing a sense of civic pride in a major public building for the community needs to be compatible with resolving the more logistical considerations of access and wayfinding for the various different categories of users, including patients, visitors, staff and support services. Traditionally, design of clearly defined entrances and wayfinding have been poorly executed in the health service.

Most schemes include landscape designs that help to soften the impact of these often massive forms on their surroundings. How well the site is connected to public transport services is a key consideration and can significantly affect the need for car parking, bus routes and stops on site, ease of connecting to train stations and places where people can be dropped close to the entrance, etc. But there is yet to be some radical thinking about the provision for car parking which can both provide for the convenience of patients whilst achieving efficient and sensible use of land.

Quality of the internal spaces

Whilst some schemes are committed to compact deep plan buildings with the inevitable arrangement of internal rooms, other are endeavouring to give priority for natural light and views to patient and staff areas. These are most often formulated around a central atrium or series of courtyards to secure maximum external wall surface for windows. However, the pressing requirement to reduce the overall footprint to keep capital cost low, all too often results in courtyards being reduced to light-wells within a compressed footprint that offers insufficient light at ground level, marginal opportunity to see the sky and little 'elbow room' for the inevitable changes that occur over time.

Many schemes include generous public spaces that offer a clear and welcoming entrance with appropriate formality. The interior design for the public spaces is also well developed- with high volumes, mood lighting, colour co-ordination and robust materials. But this is sometimes in stark contrast to the more functional clinical spaces where conventional finishes and arrangements, mandated by clinical requirements, are more common. This is not to say they should be the same, but rather that each deserves to be treated with care and respect in the internal décor. The clinical spaces are inevitably those where staff and patients will spend a great deal of their time. Providing a dignified setting for

nursing and privacy for patients that is stimulating, attractive and uplifting is very important.

Many proposals have arts programme integrated into the designs but how these will be financed and maintained is often rather unclear.

Future-proofing design

Healthcare is undergoing significant changes in the way in which care is organised and delivered. Accepting that change is inevitable, then is it possible to determine the extent and rate of change and how this can be suitably accommodated? How can we ensure that what we are building now will be fit for the future? It will mean shifting away from the notion that service configuration and models of care are static and that space is a fixed commodity. This implies not only a different framework at planning stage but also a shift in the way we think about the management of space over time.

It is impossible to predict changes to care delivery with absolute certainty but there are techniques that can help to imagine the possibilities; from this we can extrapolate some principles and trends to inform and clarify the planning process. For example, using scenario planning we can formulate mental maps of the consequences of certain planning approaches.

The scope and intentions of the scenarios can be wide ranging to test seemingly unlikely or extreme possibilities : though unrealistic in themselves, they may at least help to clarify and distinguish key activities that are more likely to remain constant from those that are susceptible to greater change. Controlled simulation studies enable us to rigorously test our thinking, strategies, plan and policies before making decisions. System dynamics generates visual modelling that identifies patterns rather than focusing on events. It encourages innovative and ambitious thinking and enable experimental 'what if' assumptions to be explored.

Just as these techniques help to formulate degrees of uncertainty in the planning vision over time so they can be used also to help to recognise that different parts of the building will need to change at different rates over their lifetime. In this way, we begin to develop a more sophisticated understanding of the building requirements – one that is also dynamic and changeable- in which we can drive greater efficiency of the utilisation of space through more effective management.

The extent to which the designs in development can accommodate inevitable but unpredictable changes is questionable. Some argue that short life buildings are most suitable since they can be replaced by more appropriate ones as required. For others, the issue of sustainability will be a driver for flexible, elastic and more robust designs at the outset that can adapt over time to the changes in circumstances. The notion of build-

ings that are designed to be ‘long life, loose fit’ is a still rather apt with the proviso that due consideration is taken for what will not change.

However, this notion that health buildings need to be flexible is not new- it has been well documented and explored since the last major hospital plan in the 1960s- with theories and practice to illustrate the experimental thinking that it attracted even then. But what is different this time is not so much a technical issue affecting single buildings- the hospital, the GP surgery or health centre- as the impact that integrating planning for acute and primary care is likely to have on the location and clustering of care. Strategic planning of services across these sectors may well result in new service configurations and building types.

We are already seeing the emergence of treatment centres, community hospitals, combined



Figure 4 CMH

centres for health and social care, fitness, advice and so on. These are likely to vary according to local need, suggesting that standardised solutions are not appropriate. But whatever these service changes and technological advances bring, the places where patients and health professionals meet face to face will still matter. Design principles for achieving futureproofing are set out in the FHN briefing ¹¹ and include:

- Planning facilities across the system to get good strategic fit
- Optimising investment of people and infrastructure
- Investing in quality real estate- avoiding bespoke solutions
- Making clear and unobstructed circulation routes
- Masterplanning the site to make best use of local amenities
- Maximising the potential to expand and contract buildings
- Distinguishing between parts of the buildings that require different levels of engineering
- Developing the shape and form of the buildings to allow changes over time
- Standardising room sizes to accommodate alternate space layouts
- Using space to maximise utilisation

It is likely that healthcare will change every 5-10 years buildings last for 30- 60 years. These principles can help to recognize that notion and bridge the gap, so supporting amore sustainable investment.

In Conclusion: Realising good design

With increasing pressure on the health service to deliver efficient and economic healthcare, the expectation of new infrastructure to support these developments will increase. This will reflect on the types of buildings, their location, and how they are planned. The shift to a network of critical care hospitals, local nursing care hospitals, supported by enhanced primary care facilities is an obvious solution, and one that

some organisations are now trying to develop. The role the built environment can play in helping to deliver a manageable capital spend and sustain an efficient service in operation, given these changes in policy and service delivery, is yet to be fully tested.

The notion of making a building with civic quality that is stimulating and uplifting to patients and staff, is now embedded in the rhetoric of the trust briefs and many of the bidders' proposals. The extent to which quality is realised in the designs and then the actual buildings is, however, disappointing- even greater efforts are required to make quality design a reality.

We are engaged in a massive programme of investment in infrastructure from which to deliver health care. There is a paradigm shift in the way that care will be organised, where it will be located, and who will deliver it. The projects are complex and fast moving and require an understanding of a significant number of factors from many points of view. In this demanding scenario, it would be a tragedy to overlook or underrate, the potential of design to help achieve the transformations being sought. The FHN is supporting a number of trusts to develop better informed project teams about design and strategic planning with particular respect to quality, productivity and sustainability.

Patient expectations of the service and the environment are growing and the culture is developing in the health service that will give greater priority to patient and public involvement in decisions. Given that the environmental factors are often more tangible than clinical ones, it may be that patients will feel that they are more able to assess the quality of the environment than the clinical service. In which case making places special through design will be all the more important in future.

References

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⁸ *Hughes, Ancell, Gruneberg, Hirst. Exposing the myth of the ratio. etc Discussion paper. Reading University School of Construction 2005*

⁹ *This model was set down by the Roman architect Vitruvius and translated by Sir Henry Wootton in the Art of Building in 1624.*

¹⁰ *AEDET Evolution is available on the DH website*

¹¹ *Briefing 9 Futureproofing Buildings for Healthcare. FHN 2005*