



briefing

JUNE 2003

ISSUE 3

Investing in design Developing a business case for good design in health

This Future Healthcare Network briefing develops a case for demonstrating how the design of buildings can bring benefits to users and operators over time. It draws on initiatives and discussions with experts in health and other sectors across a wide range of disciplines including planning, architectural and engineering design, IT and the workforce. The focus is to relate issues from this wide range of disciplines to the planning and design of buildings for healthcare.

Our work is based on three key principles:

- Design can reduce operating costs both of the building itself and also of the service provided by creating more efficient working patterns and improving staff turnover, recruitment and retention.
- Design can affect health outcomes. Patients benefit and costs are reduced through reducing patient lengths of stay and the 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.

Capital financial system for health

Traditional financial systems tend to rely on the assessment of measurable factors such as capital cost, maintenance and running costs of the fabric, with greater emphasis on the costs in the earlier years. However, these costs are insignificant compared to the costs of running the service in the building. The ratio of capital cost to building maintenance to the revenue consequences of the service is reckoned typically to be 1:2:10 for hospital buildings compared to 1:5:200 for other buildings. Business cases also ignore the costs and benefits to



patients. This means that decisions made at the initial strategic stages of development have significant consequences for the building in operation and highlight the potential for good design to make significant reductions in the running costs of the services and add extra benefits to patients.

Private finance initiative and public-private partnership can make efficiencies and savings in relation to the capital and running costs of the building fabric – that is

the 1:2 part of the ratio. These forms of finance and procurement can potentially promote a whole-life value approach by linking capital with revenue costs. Certainly, this should reduce the costs of facilities management and operation. However, staffing and operational costs of the service remain the responsibility of the trusts. Therefore the clients need a 'hands on' approach to setting out the requirements for good design that will have the most impact on the operational costs of the service itself – that is the 1:10 part of the ratio. Such considerations are yet to be fully developed for healthcare.

*The value of better health buildings,*¹ sets out two important principles:

- good design does not cost more when measured across the life of a building
- good design flows from the employment of skilled and multidisciplinary design teams. The starting point of good design is client commitment.

The NHS is in the middle of one of the biggest ever programmes 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. This has the potential to realise not only

significant improvements in the modernisation of care and the quality of the physical environment, but also to create a more efficient system. This system could deliver better health outcomes for patients, with benefits for the trusts who will manage and staff the buildings and for the consortia who will operate and run the facilities.

How can design contribute? What lessons can we learn from other sectors that will better inform the briefing process? How do we bring together these initiatives into a deliverable framework to take advantage of internationally renowned design skills and expertise available in the UK?



Roadmap of current initiatives

There are five key areas that are being explored and developed:

- the concept of the therapeutic environment
- the impact of the modernisation of services
- the increasing importance of a safe hospital to minimise errors, increase physical security and reduce cross-infection
- the potential for sustainable developments relating to the life of the building and service over time
- the benefits to the local economy and community in terms of regeneration.

The concept of the therapeutic environment

The idea that the environment serves the needs of users is not a new one. Unfortunately, the therapeutic and social benefits have only recently been given serious consideration compared with the more conventional considerations of capital cost, time constraints and functional requirements.

The contribution of the environment to the healing process has been explored for 20 years, particularly in relation to art and design. Recent studies demonstrate the link between environment and patient health outcomes, perception and satisfaction. For example, they show that shorter lengths of stay, fewer analgesics, reduced treatment time and lower blood pressure can be linked to environmental factors such as light, views, temperature, art and design.

A recent study looking at patient health outcomes² from the University of Sheffield compares old and new purpose-built accommodation showing that:

- patients appear to make better progress in the new purpose-designed buildings than in their older counterparts
- in the mental health sector treatment times were reduced by about 14 per cent
- in the general medical sector non-operative patient treatment times were reduced by about 21 per cent
- patients rated both their treatment and the staff caring for them more highly
- in the mental health wards the number of serious cases of verbal abuse and threatening behaviour were significantly reduced. Patients were required to spend significantly less time in secure accommodation
- in general medical wards patients required reduced levels of class A analgesic medication.

And in terms of costs:

- costs do not appear to be significantly higher in the new accommodation

In the design of offices, research shows how the environmental factors such as air quality, heating, lighting and temperature can affect the productivity and satisfaction of the workforce. Some of these environmental factors have been shown to deliver improvements to patient health outcomes in healthcare.

- capital costs were less than the relevant benchmark figures for each building type
- service delivery costs show no significant differences between old and new wards
- over the life cycle of the buildings studied, they are more likely to save their respective trusts money compared with continuing to operate in the previous buildings.

A study at Chelsea and Westminster Hospital Arts for the Kings Fund³ shows that:

- 75 per cent of patients, staff and visitors said the visual and performing arts greatly diminished their stress levels, changed their mood for the better and helped take their mind off immediate worries or medical problems
- 50 per cent of nurses and doctors said the quality of the hospital environment is a very important factor in why they choose to work there
- among the findings on treatment times, labour during birth was reduced by two hours on the obstetric wards.

Design quality indicators embodied in AEDET (Achieving Excellence in Design Evaluation Toolkit)⁴ provide a systematic framework for assessing and scoring the quality of design. Many of the features highlighted in the research studies are incorporated into this toolkit which is currently being applied in the design review process for major hospital and primary care projects.

The impact of the modernisation of services

As a whole health systems approach to service and workforce redesign generates new models of care, new building types may emerge and existing ones be redefined. Planning buildings will increasingly need to take account of:

- the patient journey across the system as well as through each building
- workforce redesign: the emergence of new roles and teamworking in spaces that optimise adjacencies, collocations and travel distances between and within departments. Modern workplace theory shows that increasing opportunities for informal contact between people facilitates key transfers of knowledge that benefit the efficiency of the organisation
- service redesign: review space requirements for streamlined and responsive services that eliminate bottlenecks and optimise the way that patients flow through the system
- medical and information technology: providing basic diagnostic and pathology testing and electronic prescribing in all settings, using automated tools and monitoring devices with the advantages of precision, miniaturisation and sophistication; and specialised provision in centralised locations. Also, e-health is changing, improving and shortening the time that patients spend in healthcare
- integration of health with other services such as social care, education and leisure.

A review of design guidance to take account of service redesign, technological advances and workforce changes is urgently needed. Some measures and methodologies are developing for identifying staff travel distances to check and optimise planning relationships.

The importance of safety

There are reported to be 850,000 incidents every year in hospitals in the UK that affect one in ten patients. Fourteen per cent of these incidents are serious or life-threatening, and can each cause additional lengths of stay for patients of between seven to eight days.⁵ They are mostly caused by system errors and about a third to a half are thought to be preventable. Some result from human errors such as lapses in memory and vigilance that would be helped by simplification, standardisation and teamwork.

There is a ten per cent risk to patients of catching HAI (healthcare associated infection) and an even higher risk of developing it after leaving a hospital. This creates an estimated cost to the NHS each year of around £2 billion in hospital stays alone. These costs and effects are apparent not only in hospitals but also in community and primary care services and buildings. Guidance is being developed to provide evidence and specifications for achieving improved air quality and ventilation with contamination-free environments.

Initiatives for designing safer hospitals are underway that focus on:

- creating space for teamworking to support effective handover and good communication
- specifying appropriate environmental conditions for efficient working including layout, lighting and temperature to help, for example, reduce picking errors for pharmacy
- considering design factors that reduce patient accidents such as slips, trips and falls
- developing effective strategies to improve control of infection, for example ventilation and hygiene.

There are already some measures that can help, for example analysing plans to predict potential crime hot spots, vandalism and violence. However, more work is needed in this area.

The potential of sustainability

Sustainable development addresses the prudent use of natural resources and human potential drawing together an even wider set of factors for consideration including global resources, urban design, social development, building and landscape design and engineering, and operational consequences in terms of staffing, revenue funding and maintenance.

The concept of 'sustainability accounting' is beginning to emerge with tools that link 'improvements in social and environmental issues with financial opportunities,'⁶ allowing for the accounting not only of financial aspects of an organisation's performance but also of their social and environmental performance.

A sustainability accounting statement produced for The Great Western Hospital at Swindon demonstrates that sustainability initiatives built into the design, construction and maintenance phases of the hospital generated an estimated £1,639,788 in direct savings for the consortium. It is an illustrative model that applies to the construction and concession phase (27 years).



Life-cycle costs and adaptability

It is important to account not only for the initial costs of buildings but also for the costs and performance over time. Changes in clinical practice, technological developments in relation to equipment, communications and information handling are key drivers for making buildings that are adaptable.



This means being able to:

- change the use of the building: make it capable of being used, at least in part, for a purpose other than healthcare
- increase or decrease the overall size of the building over time – that is, to make it elastic
- design environmental services and structure so that future changes will cause minimal disruption to the users of the building and will be easy to maintain
- build in capacity in terms of floor loading capability, size of service routes, to allow for better response to anticipated changes in technology such as the use of robotics and automation in theatres, interventional suites, pharmacy and intensive treatment unit (ITU). Consider the use of modularised rooms and components that could be plugged in and out, for example for upgrading and service change
- adopt a common planning grid to increase coordination

- cluster spaces of a similar kind and distinguish between and designate spaces as ‘hard’ (designed for a specific purpose or with expensive services or equipment) or ‘soft’ (more easily adapted for different purposes)
- manage space as a resource not a territory by, for example, sharing space through timetabling a room’s uses.

Durability

Invest in materials and systems that are robust, reliable and hard wearing to reduce future maintenance responsibilities.

Life expectancy and replacement

Plan the maintenance, upgrading and replacement at design stage to take account of the fact that the overall structure of the building may have a life expectancy of 60 years, some engineering services may need to be replaced after 15 years, and equipment after five to ten years.

Standardisation

Explore the potential to standardise and develop generic room sizes, particularly for diagnostic and treatment rooms, consultation and bed spaces for longer-term adaptability. Integrate standardisation with the need to design each building to suit the specific site – that is, to develop a form of mass customisation that uses standard building blocks within a design layout that is responsive to site conditions such as access, orientation, light and views.

Generic key performance indicators for measuring and monitoring environmental performance set targets in six key areas including waste disposal, recycling, emissions, embodied energy use and transport systems, water conservation and bio-diversity⁷. A specific guide to sustainability for health buildings called NHS Environmental Assessment Tool (NEAT)⁸ sets out targets and a checklist for sustainable design.

The benefits of regeneration

It is becoming increasingly important to consider the context in which health buildings are located and not to think of them as isolated and self-contained entities. Developments can generate value by supporting and encouraging working and social communities and account for the impact on the local community by considering issues such as land use,

employment and community development, for example placing local people into local jobs and local economy links to supply chain networks. This means both getting the most value from the site while also thinking about how to harness creativity and involvement of local people in the development, and in future operation.

The location of health buildings is crucial from two aspects. First, the potential to provide a focus for community development and integration. Secondly, a proximity to public transport systems would ease access to the hospital for both staff and patients, which also supports a greener transport policy.

The way forward

Although there is no single or robust methodology yet in place to appraise all aspects of the value of design for healthcare, there are clearly some significant studies and practices from which evidence, measures and toolkits are emerging.

As the link between user benefits and the environment comes into focus, so it is necessary to distinguish between the needs of different users:

- for patients to be comfortable and convenient
- for staff to be safe, functional, and morale raising
- for trusts to be efficient and to reduce running costs
- for operators to be economic, adaptable and robust
- for the immediate community to be a responsive local resource
- for society to be a sustainable development that respects global resources.

This briefing has pulled together a number of diverse issues and highlighted some gaps; there may be further transferable ideas from other sectors and viewpoints yet to be sought. But a number of potential developments have been articulated and highlighted to take the case forward:

- the need for an integrated strategic review of projects at pre-SOC (strategic outline case) stage to cover a wide range of issues including whole-system planning,

service redesign with integrated IT and workforce plans, design quality, sustainability and regeneration

- development of costing frameworks to take account of the capital and revenue costs of the buildings in environmental and social terms as well as more traditional economic factors
- development of economic protocols to evaluate the patient benefits of design options⁹
- improvements to the briefing process alongside the cultivation of the informed client to inject optimum information on operational and physical requirements from the start. The development and support of the informed client to evaluate proposals made by designers and consortia
- evaluation of projects and buildings in use to give informed feedback for future projects. The development of demonstration projects to pursue specific issues in relation to ongoing projects. The dissemination of findings in the public realm
- development of methodologies for user involvement in this initiative.

References

- ¹ CABE (2002) *The value of better health buildings*
- ² University of Sheffield (1998/01), *The architectural healthcare environment and its effects on patient health outcomes*
- ³ Chelsea and Westminster Hospital Arts for the Kings Fund (2002/03), *A study on the effects of the visual and performing arts in health care*

⁴ AEDET Toolkit available from NHS Estates

⁵ *Building a safer NHS for patients.* Department of Health 2001.

⁶ CIRIA (2002) *Sustainable accounting in the construction industry*

⁷ *M4I KPIs for Sustainability*

⁸ NEAT Toolkit available from NHS Estates

⁹ E- Health ACCA, London, May 2003 available from accaglobal.com

The Future Healthcare Network is a learning network which is addressing the large gap between our current state of knowledge about the shape of healthcare and what will be required by 2010 and beyond. The FHN is made up of organisations that are at the leading edge of thinking about future developments of health services in the UK. The FHN welcomes acute trusts, PCTs and 'whole-system' members who are facing system change and/or major capital investment.

The FHN is part of the NHS Confederation which represents the majority of NHS organisations across the UK. Membership of the FHN is only available to members of the Confederation.

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