

Create Streets
Briefing Paper



Why we should build beautiful hospitals and how to do it

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Executive summary

On 30th September 2019, the Health and Social Care Secretary, Matt Hancock announced the largest hospital building programme in a generation, as part of the new Health Infrastructure Plan. And, based on recent announcements, this seems set to be an important part of the post-COVID infrastructure expenditure.

The Government intends to invest £2.8 billion in the construction of six large new hospitals, to be delivered by 2025. This news followed the earlier announcement of a £1.8 billion capital funding commitment for 20 hospital upgrades and other NHS critical infrastructure improvements.

In line with the increasingly robust data on environmental psychology, patient wellbeing and public health, this note argues that the six new hospitals should be calming and green, restful and beautiful inside and out and that key elements of their public design should be conducted in conjunction with the communities in which they will sit for decades and hopefully centuries to come. There are three key reasons for this;

- Patients recover more quickly in beautiful surroundings;
- People work more effectively in beautiful surroundings; and
- Beautiful buildings support civic pride which is good for neighbourhoods.¹

We therefore propose three key principles for the design of the NHS's six new hospitals.

1. Create hospitals for healthy patients;
2. Create hospitals that staff love to work in; and
3. Create hospitals that communities can be proud of.²



Royal London Hospital, Whitechapel. Before (top) and after (bottom)³



Al Mansur Qalawun Complex, Cairo, 1284-8. The complex, which included a hospital, reflected its importance through visual displays of beauty.⁴

Historical context

A hospital provides a 'deep sense of reassurance' to the community it serves. Many historic hospitals in different centuries and cultures designs recognised this, striving to reflect their important purpose through public displays of architectural quality. These cultural tenants held during the nineteenth century as, slowly and painfully, modern scientific medicine based on empirical observation was born.

During the twentieth century, however, this principle was gradually abandoned. Instead of proclaiming their high moral purpose to their surroundings, hospitals' measurable functionality and, above all, cost became an architectural feature in itself, transforming the hospital as a building type.



Hospital de Santa Cruz, Chile with a sequence of courtyards⁵

Not only did this change profoundly affect the aesthetic nature of the buildings, it also negatively affected the quality of care – despite the huge wider advances made in scientific healthcare. In striving for readily provable efficacy we forgot that humans are not machines. We threw out the baby with the bathwater. As one of the pioneers of the study of hospital's effect on their patients' health, Professor Roger Ulrich, put it; *'This desire for functional efficiency, together with the pathogenic conception of disease and health, has helped to produce healthcare facilities with environments starkly institutional, stressful, and detrimental to care quality.'*⁶

The NHS's new hospitals should not make this mistake. Here's how.

1 Create hospitals for healthy patients

What does the evidence suggest makes for healthier and happier patients?

Create gardens that patients can see and use. The evidence suggests very strongly that hospitals should integrate gardens and greenery into their design. There is mounting evidence that gardens are especially effective and beneficial settings for fostering restoration for patients, family members, and staff.

- Clare Cooper Marcus and Marni Barnes research of four healthcare gardens in the San Francisco Bay area in 1995 found a clear correlation between stress and gardens. Interviewing 143 users they found that 78 per cent of respondents felt calmer and less stressed when exposed to a pleasant garden.⁸
- A carefully controlled study of 46 patients in two hospital wards found that gallbladder surgery patients assigned to a room with a window view of a garden or natural setting had shorter postoperative hospital stays as compared to patients in similar rooms with windows facing a brick building wall (7.96 days, compared with 8.70 days).⁹

Patients also self-report the same phenomenon.

- A 2001 study in San Diego found that users of a children's hospital garden disliked and avoided areas having a high percentage of concrete ground surface and starkly built features.¹⁰
- A 2005 San Francisco study found 59 per cent of the 143 patients that used the hospital's garden, 59 per cent found trees and plants were the most important factors in improving wellbeing and calming senses.¹¹
- There is also evidence from Britain. The Horatio Garden at the Duke of Cornwall spinal treatment centre at Salisbury District Hospital offers an exemplary facility. In a recent survey about the flower rich rooftop garden, 100 per cent of participants said that it improved their sense of wellbeing. *'You can see the earth, and you can see sky overhead, and just all these things are so much part of the life that I had before'*.¹²



St Thomas Hospital, Lambeth. Before (top) and after (bottom)⁷



*The Khoo Teck Puat Hospital,
Singapore¹³*

They may not have had modern carefully controlled studies but over many centuries, even millennia, those who create hospitals have instinctively known this to be true. In the Middle East, South America and North Africa, the traditional design of a central court yard provided not only shade from the harsh sun, but also a calm and relaxing environment for patients to enjoy. In the UK, during the first world war, the important function of gardens was recognised in the rehabilitation of patients. Greenery was an essential feature for many auxiliary hospitals and convalescent homes providing injured soldiers with a sense of place and serenity after the horrors of the war.

Steps have been taken recently in the UK to improve access to greenery. However, efforts still appear to fall behind best practice elsewhere. The Khoo Teck Puat Hospital in Singapore integrates greenery into design at a monumental level. In total, there are 15 gardens across the site, with planters offering over 700 species of native plant and a continuous green view for patients and staff. *'I felt so relaxed'* said one patient.¹⁴

Create wards with windows not just piped air. According to the architectural historian Jeanne Kisacky, up until the 20th century, every single room within a hospital typically had access to the outdoors.¹⁵ By the late 19th century and early 20th-century this changed. Advances in germ theories and technological advances of artificial ventilation models and later air conditioning systems, meant that the window no longer played the irreplaceable role it once did.¹⁶

However, there is a growing body of work to suggest that

these artificial systems are in fact not better for patients.

- In 2012, research by Oregon University found that although keeping a window open increased the range of bacteria in a room, the level of harmful bacteria was actually higher in hospital rooms where windows remained sealed.¹⁷
- A 2007 study from Lima, Peru also found wards built more than 50 years ago, with large windows and high ceilings, had better ventilation than modern rooms. When analysing the spread of Tuberculosis (TB) within hospitals, the study estimated that in mechanically ventilated rooms, 39 per cent of susceptible people would become infected after 24 hours of exposure to an untreated TB patient. This compared to a 33 per cent infection rate in modern rooms with windows open and 11 percent in a pre-1950-style room.¹⁸
- This 20th century thinking also failed to recognise the wider benefits windows offer. Research by the Department of Neuropsychiatric Sciences at the University of Milan found that patients with bipolar disorder assigned to brighter, east-facing rooms with morning sunlight had hospital stays nearly four days shorter than those with west-facing rooms.¹⁹

Create variety in a pattern. Too many modern hospital layouts are bland and sterile. Not only are all the rooms the same but the corridors that lead to them and the doorways that give entrance to them are normally undifferentiated. The sensory and aesthetic experiences of patients are not held to be crucial to their treatment for or recovery from illness. However, the evidence suggests that this is a mistake.

- Studies suggest that environments that lack positive distractions causes patients to focus increasingly on their own worries, fears or pain.²⁰ 'Positive' distractions can take a number of different forms from art, internal layout, furniture and even the use of colour on walls. For example, research at the Chelsea and Westminster Hospital found that over four fifths of 50 women undertaking colposcopy (cervical) examinations said that having visual art present "greatly improved their anxiety and experience."²¹



28%

*lower infection rates
in hospital wards built
with large windows
and high ceilings*



*Maggie's Centre, Lanarkshire*²³

- A 2000 study by Romedi Passini from the University of Montreal found links between the local environment and the behaviour of patients with Alzheimer's disease. Four of the six participants experienced difficulties, in finding their own room, when corridors and doors all looked similar. The research highlighted that monotonous interiors reduced patients' ability to navigate a space, increasing anxiety. In contrast, a simple, yet 'articulated' environment, with frequent visual reference points, improved their navigational abilities.²²
- However, complexity can go too far. Though not in a hospital setting, a 1981 study into the relationship between humans and their environments is instructive. It compared 73 students' ability to navigate in two buildings at Michigan University. Participants' ability to comprehend and navigate interior spaces was enhanced by regular geometric shapes. 40 per cent got lost in the chaotic and unstructured Chemistry Building. Only 13 per cent did in the Modern Languages Building which was more structured without being sterile.²⁴

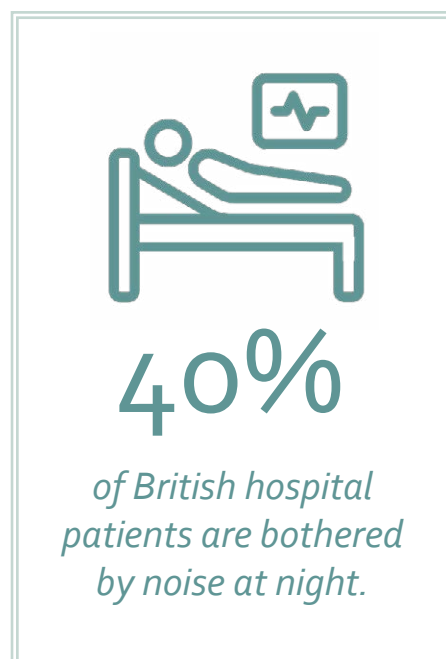
We should create hospital interiors with variety in a pattern. Maggie's Cancer Care Centres, for example, have been designed to be as un-institutional as possible, with light, art, space and warmth. The heart of the centre is always the informal kitchen area.²⁵

Create calmer and quieter environments. In the UK, 40 per cent of hospital patients are bothered by noise at night, according to in-patient surveys.²⁶ This is far too high.

- Most findings suggest that noise detrimentally affects at least some outcomes, for example producing sleeplessness and elevating heart rate. Several studies have focused on infants in intensive care units, finding that higher noise levels elevate blood pressure, increase heart and respiration rate, and worsen sleep.²⁷
- Similarly, there is growing evidence to suggest that private rooms save more money than they cost. They reduce noise, decrease bacterial infections by half and reduce the length of patients' stays in hospital by 10 percent.²⁸
- Furthermore, studies suggest that the increased cost of single-occupancy rooms is more than offset by the money saved due to fewer infections. The Department of Design and Environmental Analysis at Cornell University evaluated the financial feasibility of this type of investment, calculating the net financial gain (or loss), taking into account all resources invested and amounts gained over the five-year analysis period. Invested resources included the money for building the single-bed rooms, along with their annual operating expenses. The amounts gained included the costs avoided each year by reducing nosocomial infections. The research found a cost savings from the reduction of nosocomial infections in single-bed rooms in this case substantially outweighed additional construction and operation expenses. The mean value of internal rate of return over a five-year analysis period was 56.18%.²⁹



Charing Cross Hospital, London³⁰





Former Buxton Hospital,
Derbyshire³¹

2 Create hospitals that staff love to work in

It is very easy to focus too heavily on patients' needs, forgetting the people that actually use the space on a daily basis. Doctors, nurses and other health professionals need to be healthy too. What does the evidence suggest makes for healthier and happier staff? The good news is that the type of environment which is good for patients seems to be pretty good for those work in the hospital as well.

Staff need greenery too. The need for greenery is just as relevant for a doctor or nurse as it is for a patient.

- Evidence has begun to appear showing that hospital gardens increase staff satisfaction with the workplace, and may help hospital administrators in hiring and retaining qualified personnel.³²
- One study in Norway, undertaken in an X-ray ward, reported the impact of installing 25 groups of green plants along with full spectrum daylight bulbs. This intervention was associated with reductions in sick leave (25 per cent), tiredness (32 per cent), headaches (45 per cent) and sore throats (31 per cent.)³³

The good news is that we are starting to do this. At Great Ormond Street Hospital for example, gardens have been specifically designated for staff members in order to optimise stress reduction.

Create calmer and quieter environments. Just as patients respond to natural conditions, so do staff. It is not uncommon for doctors and nurses to have to work 12-hour shifts. This highly pressured role means therapeutic environments are crucial. Sadly, the evidence is that too many of the hospitals that we have built over the last few generations have failed badly at this task. As one doctor working in Charring Cross Hospital (built in 1973) told us: *'There were some days when I felt physically unwell just from being in the hot stuffy doctors' room with no window, no air, and horrible smells.'*

This is supported by a growing range of evidence.

- In a research project undertaken at Akdeniz University Hospital in Antalya, Turkey, staff with more than three hours of daylight exposure during their shift had higher job satisfaction and less stress than staff with less daylight exposure.³⁴
- Noise levels are also recognised as a distraction and stressor for staff, resulting in reduced productivity. One study of 100 nurses within a critical care unit revealed that noise induced stress could account for 6 per cent of headaches at work, as self-reported by nurses in critical care areas. The results indicated that telephones, alarms in equipment, and the beeping of monitors for patients were identified as annoying.³⁵

In short, whether it's a garden or comfortable break room, staff should have somewhere where they can escape briefly from the demands and stresses of the workplace.

Architecture matters. The physical environment around us plays a role in our behaviour and wellbeing whose importance is increasingly being recognised by academics and in public debate.³⁶ This matters in hospital design as well. As one NHS doctor put it to us; *'The building I currently work in is really run down and depressing It would definitely help with happiness and well-being if it were nicer'*.

The wider evidence suggests he is not alone in feeling this. In 2004, the Commission for Architecture and the Built Environment (CABE) conducted a research project into the role of hospital design in the recruitment,



35%

of nursing directors regard the reputation and design of a hospital as a major consideration for nursing staff when deciding where to work.

retention and performance. The surveying of 265 directors of nursing, across the UK, found that 35 per cent of respondents regarded the reputation and design of a hospital as a major consideration (very important or important) for nursing staff when deciding where to work. During this review some thought that low-rise hospitals were better than high-rise ones. While nurses also discussed the concept of the 'village atmosphere' in which nurses felt part of the bigger corporate body rather than just a unit within the body.³⁷

3 Create hospitals that communities can be proud of



University College Hospital before³⁸ (top) and after³⁹ (bottom). Leisure centre or hospital? - A PFI legacy

What does the evidence suggest on what type of hospitals communities prefer and on what hospitals should mean to their town or neighbourhood? And how should we work with neighbourhoods to create them?

Carve hospitals with civic pride. "Why can't they make them like this anymore?" one NHS professional told us, talking about Warneford Hospital, East Oxford, built in 1826.

Somehow, somewhere, we have lost not just the ability but even the desire to create public buildings of beauty and moral worth. The issue was starkly highlighted by the evidence that Anna Mansfield gave the Building Better Building Beautiful Commission.⁴⁰

'I was working on a PFI project ten years ago, and we were told by the contractor to put in a more expensive material that looked cheaper, because there was real sensitivity about anything in the NHS looking expensive.'

This is ridiculous. A hospital is a noble building built for a noble purpose. It should not be built to look disposable and cheap. We should rediscover the confidence and ability to create hospitals, indeed all public buildings, of popular beauty and civic pride. This is why Living with Beauty found consistent praise for the quality of Victorian as opposed to more recent civic buildings.



The former Exe Vale Hospital, Exminster⁴¹

- Deborah Davidson in her research into the community value of hospitals states that they 'engendered a deep sense of ownership and connectedness, because they were embedded in community history, civic pride, family values and personal significance: *'I was born on this land here where the hospital is now sited [. . .] and I've lived here ever since'*.⁴²
- These places are highly important not only for their personal significance but what that actually means to us as human beings. Neurotheological research by Dr Andy Myers on behalf of the National Trust has established that people's brains respond positively to meaningful places. Of the 20 participants tested 78 per cent reacted strong under an fMRI scanner to places with meaning. 65 per cent of those surveyed said these places made them feel calm, providing an escape from everyday life.⁴³

Why is it therefore that we fail to recognise this significance in contemporary hospital design? Traditional designs such as the former Exe Vale Hospital (above) embodying this immense importance through outward displays of architectural quality, created both a sense of place and an institution of which communities can be proud.

Let function follow form. How should we design hospitals? Research by Elizabeth Bromley, for the University of California, into hospitals in the US exposed some key fundamentals, 'the beauty of the architecture is, there's nothing "hospital" about it'. A hospital should be an 'impressive and prestigious building' on a 'human scale' to 'project hope, healing and human-ness.'⁴⁴ This should be the mantra for any new hospital instead of merely

"I was working on a Private Finance Initiative project ten years ago, and we were told by the contractor to put in a more expensive material that looked cheaper, because there was real sensitivity about anything in the NHS looking expensive."

copying cheap and disposable design models developed for cheap hotels and shopping malls, the architectural quality should reflect the highly prized community asset that it is.

Design places with human scale, coherence and complexity, variety in a pattern and some symmetry. Too many contemporary hospitals are bland and monotonous. However, there is now a growing body of neuroscientific work to help us understand exactly what type of environments we prefer – and why. We prefer engaging and varied buildings that are recognisable, have some level of symmetry, meaning and coherent complexity. We need variety but not chaos, structure but not obsessive repetition – variety in a pattern. To cite just a few studies;

Create engaging facades. Research by Colin Ellard and the BMW Guggenheim Laboratory in 2011 established a link between engaging architecture and excitement levels. When testing 134 participants, through 'galvanic skin response', the research found that people were, on average, more excited around engaging and varied facades (2.8 out of 5) in comparison to long blank facades (2.1 out of 5).⁴⁵

Create symmetry. As human beings, we are naturally drawn to symmetry. A 2006 study by Michigan State University, in cognitive science and neurology, used functional MRI to investigate the relationship between symmetry and aesthetic preferences. Both metabolic and behavioural findings showed that 66 per cent of the symmetric items were judged to be beautiful compared to 42 per cent for non-symmetric items.⁴⁶ This idea of symmetry was a hallmark of much 18th and 19th century hospital design. Architectural features were designed to be symmetrical offering engaging and pleasant environment at a human scale.



*The perfectly symmetrical Bethlem Royal Hospital, Beckenham*⁴⁷

The power of colour. The importance of colour should also play a role in the design of buildings both externally and internally. Professors Adams and Osgood conducted a study on 23 groups of 40 secondary school students, from 20 different cities around the world, to assess the 'mood music' of colour. It found that, on a scale from 0 (low) to 7 (high), blue was preferred and associated with positive feelings (such as familiarity). Blue had an average rating of 5 while red and yellow had average ratings of 0.1 and 0 respectively. By contrast, red was the highest rated in terms of activity, with an average rating of 4. Our brains find red exciting and arousing and blue relaxing, generating strong emotional reactions that can be related to our built environment.⁴⁸

Create reassuring enclosures. As we have mentioned earlier, enclosed courtyards are a popular design feature in Middle Eastern and North African hospital design and there is evidence to suggest why. More enclosed spaces tend to be more popular than less enclosed spaces. We also tend to feel safer and find them more attractive. Cognitive researchers have shown why. The parahippocampal (an area of the brain) is extremely responsive to enclosures. For example, in one study, seven adults were asked to look at the image of a checkerboard, with edges that were either clear or obscure. People were measurably more stimulated when they were looking at images with clearer edges, which they found more pleasant.⁴⁹

In principle, we have known what to do for a while but we have sometimes struggled to carry it out. As the architect John Weeks concluded '*physically a human hospital should be architecturally familiar, nicely decorated, and made of brick with a lot of flowers and wood inside and lawns and trees outside. It has a pitched roof and ordinary sized window.*'⁵⁰ He was right.

Design with communities not at them. Create Streets research shows that residents are more likely to support development if they can influence it. People's involvement in design makes for better places which are better anchored in and supported by their neighbourhoods.⁵¹

We should therefore re-discover civic pride in public architecture not just as an outcome but as a process. New

"Physically a human hospital should be architecturally familiar, nicely decorated, and made of brick with a lot of flowers and wood inside and lawns and trees outside. It has a pitched roof and ordinary sized window."

*The new Royal Liverpool Hospital,
Liverpool*⁵²



hospitals should be popular, and beautiful sources of civic pride. Their procurement process should:

- State clearly in their aims that beauty and popularity with the local population are key elements of the design brief;
- Involve charette co-design process following protocols described in the Building Better Building Beautiful Commission report, *Living with Beauty*;
- Involve polling on local popular design preferences; and
- Seek to make use of the emerging 'science of place' on the likely impact of different design approaches on metrics such as patients' health, resident happiness and air quality.

Throughout, public engagement, citizen involvement in scheme selection and data on local preferences should axiomatically underpin the process to avoid some of the major errors of the last 50 years in public sector procurement.

It is right that the government is parsimonious with public money. It is the tax-payers' not theirs. Nevertheless, it is possible to be penny wise and pound foolish. Many public sector procurement processes over-emphasise short term cost and under-emphasise lifetime costs. We believe that none properly factor in the long-term financial benefits of creating beautiful restful environments in which patients and staff can thrive and in which a local community can take pride. This should change.

Recommendations

In building the NHS's six new hospitals and in upgrading 20 more we should follow three key principles.

- Create hospitals for healthy patients;
- Create hospitals that staff love to work in; and
- Create hospitals that communities can be proud of.

Doing this will mean treating patients and health professionals as humans not as robots. Medicine and cleanliness are vital to recovery. But so are restful, reassuring and beautiful places. And so is working with communities not at them, engaging not only with users of a hospital, but also the communities that rely upon them. By doing this, hospitals should become true cornerstones to their communities and beacons of civic pride.

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Endnotes

1. You could also add that more beautiful places last longer and do not squander the carbon embedded in their construction.
2. This briefing paper is based on three main sources of evidence: a literature review of relevant papers in environmental psychology and public health; a review of evidence presented to the Building Better Building Beautiful Commission in 2019 and interviews with currently serving doctors and nurses.
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