The Architectural Healthcare Environment and its Effects on Patient Health Outcomes

2003

STATUS IN WALES

INFORMATION
The Architectural Healthcare Environment and its effect on Patient Health Outcomes

A REPORT ON AN NHS ESTATES-FUNDED RESEARCH PROJECT
Professor Bryan Lawson and Dr Michael Phiri
School of Architectural Studies, University of Sheffield

in collaboration with

John Wells-Thorpe

© Copyright NHS Estates 2003
# Contents

1 Introduction  
2 Executive summary  
3 Research methods  
4 Background and the literature  
5 Patients’ reactions to their architectural environment  
6 Patient health outcomes  
7 Architectural factors responsible for these effects  
8 Costs  
9 Opportunity  

page 2  
page 3  
page 4  
page 5  
page 6  
page 10  
page 13  
page 19  
page 21
Most hospital patients may get the personal attention of a doctor for only a few minutes a day and slightly longer periods of personal care from nurses and therapists. However they may remain in bed or, if they are more fortunate, sit for many hours with little to do. This may well make them even more susceptible to the environment and more sensitive to it. It is reasonable, therefore, to assume that their environment may be a contributory factor to their sense of well-being and actual recovery. So we ask here whether the architectural environment of the hospital can contribute to the treatment of patients and significantly influence their health outcomes. The study clearly indicates that the answer is “yes”. It goes on to show how this effect works and what factors might be chiefly responsible.

This is the report of a series of three one-year funded projects conducted over a four-year period finishing in December 2001. The main research work was conducted by the University of Sheffield directed by Professor Bryan Lawson. The research group worked in close collaboration with two NHS trusts at Poole Hospital and South Downs Health in Brighton. A steering committee overseeing the work was chaired throughout by John Wells-Thorpe, who originated the study.

The study examines the effects of the architectural environment on the lives of patients and to some extent staff in two NHS hospitals, one each in the general medical and the mental health sectors. We examined patients’ reactions to the environment and the health outcomes that resulted from their treatment in it. A huge amount of data was collected in this study. This report only illustrates a small proportion of this data, much of which is very detailed. As a result of this work we have also established a very large database of references in the literature which are relevant to the major question under investigation. This database is being made available separately in electronic searchable form.

This work has already been published in part in a number of journals and books. Further, more detailed research publications are planned.
• Patients are sensitive to and articulate about their architectural environment in hospital. They are able to discriminate between poor and good environments and to tell us clearly what they like and dislike about them.

• Patients appear to make significantly better progress in the new purpose-designed buildings than in their older counterparts.

In the mental health sector patient treatment times were reduced by about 14%.

In the general medical sector non-operative patient treatment times were reduced by about 21%.

• There is considerable evidence that an overall improved atmosphere and quality of life may be one of the benefits of better places.

Patients rate 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 the general medical wards patients required significantly reduced levels of class A analgesic medication.

• Most of the architectural features apparently responsible for these benefits appear to be generic place-making features rather than hospital-specific factors.

Patients feel very strongly about the issue of community versus privacy and have strong preferences for either single- or multiple-bed accommodation.

Patients in the kind of accommodation they prefer appear to do significantly better than those who are not.

Having a view of the world outside seems very important.

Not only being comfortable, but having personal control over their immediate environment, is important.

Cleanliness and tidiness are given a high priority by patients.

• Our results may be conservative. Neither of our new ward designs was ideal in terms of the architectural features described above. In particular:

Poole had less single-bed accommodation than might be optimal.

Views could have been improved for many patients at both Poole and Brighton.

Noise remained a significant problem at both Poole and Brighton.

Neither design gave patients much control over their environment.

The cleaning regime at Poole was below what patients expect.

• Costs do not appear to be significantly higher in the new accommodation.

Capital costs were less than the relevant benchmark figures for each type of building.

Service delivery costs show no significant differences between old and new wards.

Over the life-cycle of the buildings we have studied, they are likely to save their respective trusts money compared with continuing to operate the previous buildings.
3 Research methods

The main study consists of a field investigation of wards at two hospitals, one in general medicine (Poole) and one in mental health (South Downs Health in Brighton). Both trusts had development programmes and were building new accommodation which was opened during our study. In both cases the new wards were to take patients with the same pattern of referral and who underwent the same treatment regimes as those in the older accommodation.

Poole Hospital Trust was refurbishing a series of existing 1960s general wards. In the original wards there were 6 four-bed bays and 6 one-bed bays, with lavatories at each end of the ward. In the refurbished unit there are 16 single bedrooms and 3 four-bed bays. The new bedrooms have a clean, simple interior using natural timber and have en-suite bathrooms (Figure 1).

At South Downs Health NHS Trust in Brighton the original accommodation for the mentally ill comprised 15-bed wards in typical Victorian brick institutional buildings with characteristically high ceilings. These were replaced with a new medium secure mental healthcare building designed by Powell and Moya using only single rooms and now known as Mill View Hospital Hove (Figure 2).

We therefore studied four samples of patients, consisting of a sample in each hospital in the old wards and one in the new wards. Inevitably the samples of patients in the new buildings cannot have been perfectly identical to those in the old, but we are confident that they were as similar as could reasonably be hoped for in real practice. The patterns of referral, treatment regimes and other factors were substantially the same and in many cases the staff were also the same. Sample sizes were approximately 140 in Poole General Hospital where patients typically stayed for 9 or 10 days, and about 75 in the Brighton Mental Health units where patients typically stayed rather longer, about 35–40 days. In the case of the two samples in the new accommodation, several months were allowed to elapse and the whole system to settle down after moving in before we began our study.

In addition to the normal literature review we conducted a series of focus groups with key people as a first step in defining the detailed investigation. Focus group meetings were held with groups of staff in each of the two hospitals. We also held a focus group with invited healthcare design specialists. A postal study was done of the views of NHS trust Directors of Estates.

Together with the literature review this work enabled us to compile meaningful questionnaires to be completed by patients in our surveyed hospitals. This also structured the health outcome data that the trusts gathered for the same samples of patients.

The questionnaires were completed by patients themselves in the general medical wards and with the help of their carers in the mental health wards. The questionnaires were administered at the end of the period of hospital treatment.

Finally we conducted a number of studies to test the comparability of our samples. These include the levels of staffing, treatment patterns, service delivery costs and the capital costs of the buildings. We looked at the size and timing of our samples and other such methodological factors that might have influenced results. We also closely inspected the data to see whether any unusual patterns of patient symptoms such as major infections, admissions factors and the like might be responsible for any of the results.

Various sections of the research work reported here have already been published in journals, and the reader wishing to see more details of the data, statistical tests, levels of significance and research methodology may find these useful.1

---

The idea that our environment can contribute to our well-being is perhaps not extraordinary, and yet has received relatively little attention in the literature. However, the general literature on the psychology of the architectural environment is growing steadily. In a very widespread literature review we have found many suggestions that this might be the case in hospitals, and this is recently well summarised by Peter Scher, whose suggestions are certainly confirmed by our data. However, very little hard evidence has been gathered, and almost none of it in strictly controlled comparative studies such as this. There is remarkably little research of this kind of a holistic nature, but a number of more detailed studies have been published. Roger Ulrich concluded that patients in accommodation with a view were more likely to be released from hospital more quickly than those without. Interestingly, Florence Nightingale had already suggested the importance of this a century earlier, simply based on her own personal observations! Another study shows that sunny aspects have a better effect than dull ones. Others have looked at the organisation of space and the arrangement of furniture, for example in mental health. Other more recent work has looked at the effects of music and art in hospitals.

We shall not here review the whole of the extensive more detailed literature which may be brought to bear on this issue. A database of that literature is being made available separately.

---


5 Patients’ reactions to their architectural environment

In our focus group held with experienced healthcare design specialists we were somewhat surprised and rather depressed to encounter some views that suggested this study was unlikely to be successful. One member of the group was very explicit about this:

*I think we waste a lot of effort asking people in that state (ill in hospital) what they think of the architecture. It’s vain of us and we don’t actually find out very much.*

The suggestion here was that patients in hospital have so much on their mind about their illness that they are unable to focus on the architecture and may not even really notice it. Our study has very clearly shown this to be false as a generalisation. Of course there may well be some very seriously ill patients for whom this is true, but the vast majority of our samples were sensitive to and highly articulate about their architectural surroundings in hospital. Perhaps this is hardly surprising, for while they may see a doctor once a day and a nurse several times a day, they see their surroundings all day. It is worth noting that in general, levels of expressed satisfaction were lower for the mental health patients than for those on general wards. This is probably understandable given the nature of the problems these patients have. What is important here is that the trends between old and new buildings were the same in both sectors.

**APPEARANCE AND OVERALL DESIGN**

Patients in the newer buildings expressed significantly more satisfaction with the appearance, layout and overall design of their wards. When asked about appearance at Poole about 73% of the patients on the new wards gave them the highest possible rating, compared with only about 37% on the old wards (Figure 5). At Brighton these figures were both lower, at 41% and 20%. Clearly the designs are both considerable improvements, not just in their appearance but also functionally. When asked about the overall design at Poole about 65% of patients gave the highest rating to the new wards compared with only 35% on the old wards. Similarly we saw figures of 47% against 14% at Brighton.

**THE IMMEDIATE PERSONAL OR PRIVATE BED AREA**

We are aware that there is a considerable debate to be had about the nature of the private accommodation that should be offered to patients in hospital. Some clearly
feel that all patients should have private rooms, and there is an increasing tendency to provide this. We shall return to this question later in the report. However, here we report that patients in general in both our hospitals reported substantially higher levels of satisfaction in the new wards than the old. In fact, at Poole 72% gave their personal bed area the highest rating on the new wards compared with only 38% on the old wards. Similarly, the figures for Brighton were 51% compared with 16%. This improvement holds true both for patients in single rooms and patients in multiple-bed bays (Figure 6).

ENVIRONMENTAL COMFORT

We asked patients quite detailed questions about the environmental quality in terms of lighting, temperature, air quality and noise. Again, in both the newer wards these showed improvements, but relatively small ones, and most of them either not statistically significant or only marginally so. In fact the patients giving the highest rating for environmental comfort factors rose only to 55% from 46% for temperature, for example. The figures for Brighton did not show significant improvement. Taken together with more detailed questions this data clearly indicates that our newer wards were perceived by patients as significant improvements in spatial and visual terms but only marginally better in terms of environmental comfort (Figure 7). We had many complaints about noise. Our hospitals, it seems, are generally pretty noisy places. This may well be in part exacerbated by the hard reflective surfaces that seem common. However, for those in open wards the levels of background noise can be hard to escape. Patients frequently mentioned the sources of noise to us in the open-ended sections of the questionnaire. The results accord with other work done on noise annoyance. It may not necessarily be the absolute physical level of noise but more its meaning that can be annoying.9 For example, patients frequently complained about nurses chatting as they change over shifts at night. Such noise levels are probably very low in real terms, but none the less annoying for that!

ENVIRONMENTAL CONTROL

Why is it the case, with all our contemporary technology and understanding of environmental comfort and the systems needed to deliver it, that we still find such room for improvement? One clue to this lies in the degree to which patients have control over their environment. In fact the data makes very depressing reading here. Although in both hospitals patients seemed to have more control over lighting, they report having very little control over temperature and air quality, blinds and curtains, and noise (Figure 8). One of the most powerful pieces of anecdotal data to support our empirical work came from a nurse in one of our focus groups. She suddenly and unexpectedly became a patient in her own hospital and was for a while entirely bed-bound. She remembered vividly lying in bed with the sun falling directly on her face. She could see blinds on the windows but could not operate them from her bed. Knowing how busy nurses are, only after some time, and then reluctantly, did she press the nurse call button. After another period of 5–10 minutes a nurse came and closed the blinds. With the inevitable capriciousness of

the English summer, the sun soon went in and now she was left in darkness and unable to see clearly enough to read. She recalled feeling unable to bother the nurse again and told how she “simply lay there getting angry”.

We suspect that the costs of bedside controls for natural and artificial light and for temperature and ventilation are very small in terms of the overall capital budget but would pay off hugely in terms of patient satisfaction. Moreover, we would argue that the idea of one set of environmental conditions being suitable for all, and at all times, is frankly absurd in the light of the literature on environmental comfort. Somehow, giving patients control is still seen as an expensive luxury on the one hand and likely to lead to management problems on the other. We would hope these attitudes would be reconsidered as a matter of some priority, at least in the specification of new buildings.

**PATIENTS’ REACTIONS TO THEIR TREATMENT IN THE NEW ARCHITECTURE**

We also asked our patients if they thought that the architectural environment had helped to make them feel better. In general again, both newer wards showed higher ratings. At Poole this was a significant
improvement, with 85% on the newer ward feeling the environment helped them compared with only 68% on the old ward. Again we saw lower but comparable figures at Brighton of 68% compared with 39% (Figure 9). In both general medicine and psychiatric care, then, patients clearly see the environment as playing a role in their care, just as many researchers and designers in healthcare have believed.

However, perhaps more remarkably and interestingly, we found that patients on the newer wards also gave higher ratings to both the treatment they received and the staff who delivered it. These differences were inevitably very small at Poole, since all patients showed very high levels of approval for their care even in the old wards. However, at Brighton some 56% of patients in the newer building were pleased with their treatment compared with only 39% in the old buildings (Figure 10). Similarly, doctors, nurses, therapists and ancillary workers at both Poole and Brighton attracted higher scores from the patients in the new buildings. The improvements in the doctors’ ratings are the most dramatic of these, but again this is because patients think so highly of their nurses even on the older wards. None of these improvements are sufficiently large to be statistically significant and, standing alone, might be discounted. However, taken together with all our other data, we see a clear overall picture of the patients in the newer buildings being happier in their surroundings and feeling this has helped.

So are the doctors and other staff better in the newer architecture, and is the medical treatment superior? Well, as we reported in the methodology section, many if not most of the staff were actually the same people. They certainly reported to us their intention to provide the same treatment regimes. However, of course, staff are likely to respond to better environments just as are patients. As we shall see later, patients are significantly more cheerful in the new wards and again staff are likely to react to that – after all, they are only human!

It seems likely to us that we are seeing a double effect here, albeit a small one. Patients themselves are happier in the better architectural settings and may transfer this feeling of well-being to their judgements of the whole situation, including their assessments of staff and treatment. In turn staff are more positive and indeed communicate this to their patients. It is a virtuous circle or upward spiral of effect.
So far, we have reported empirical evidence to support our argument about the effect of architecture on patients, and most of it is statistically significant. However, it still remains largely subjective. Two questions remain. First, do the patients actually benefit from this in real health outcomes?; and secondly, what are the major contributory architectural factors responsible?

The two health trusts involved monitored the patients and provided us with a mass of data about their progress while in hospital. Measuring patient progress is not as simple a matter as it might seem, since there are many potential indicators, with perhaps the most obvious being the length of treatment.

In fact many patients in both our acute hospital and mental hospital samples were released significantly more quickly from the new wards than from the old ones. Non-operative acute patients showed a significant reduction of some 21% (Poole) in treatment times, and mental health patients a reduction of 14% (Brighton; Figure 11). Those patients at Poole who underwent operations were not released more quickly. This seems to be due to particular circumstances relating to their pre-operative period, which was on average almost twice that on the old wards. As far as we can tell, the reasons for this have nothing to do with the design or operation of the new ward.

At this point it is worth reporting that we have taken considerable trouble to search for other medical and circumstantial factors that might be influencing these results. For example, we have checked that there was no uneven distribution of syndromes presented at either Poole or Brighton. We have checked for cases of MRSA and other complications that might have caused perturbations in the data. Whilst there may be minor variations, we have been quite unable to discover any major significant differences in our samples that might explain this variation in treatment times.

There are also other interesting indicators that further contribute to the picture. In our acute hospital, analgesic medication is largely taken on demand within prescribed limits. There was a dramatic reduction in the amount of analgesic medication taken by the patients on the new wards. On the newer wards the average number of days on which Class A pain-killing drugs were administered was reduced by 22%. Moreover, the number of doses applied on these days reduced by 47% (Figure 12). We recorded the total quantity of drugs used in each of the

---

**Figure 10** Patients’ assessment of their overall treatment (Brighton)
three classes, A1 morphine, A2 oramorph and A3 codeine phosphate. In fact codeine phosphate was not used on either ward, but some 55% less morphine and 86% less oramorph was used on the newer ward. Although these figures sound very dramatic, some caution should be applied to them, as the standard deviation in the quantities was quite large. To slightly offset this data there was a slight increase in the amount of orally-taken Class C drugs on the newer wards. Effectively, here we see patients requesting less pain-killing medication in the new hospital ward environments than in the old. We can only conclude that as a result of their environment, patients were less aware of, or at least less prone to complain of, their pain.

At Brighton we also had staff record the rate of progress they thought their patients were making. In the new wards significantly more patients were judged to be making good rather than slow progress (Figure 13). In a mental health hospital it is normal to record many items of patient behaviour including all instances of verbal abuse, physical violence towards others and physical self-harm. These records were studied and the results were quite remarkable. Whilst the number of incidents of verbal and physical abuse remained largely the same,
their severity dropped quite significantly in the new wards. The number of instances of patients injuring themselves was dramatically reduced by two-thirds (Figure 14). Patients who become particularly distressed and are considered a danger to themselves are normally put for a period into seclusion in a safe room with intense supervisory care. The amount of time for which this was necessary was reduced by a remarkable 70% in the new unit, with an average reduction of 9 days, from 13 to 4, in a typical stay (Figure 14).

A clear and consistent picture emerges from a very complex set of data. Patients in the new buildings seem to spend less time in hospital and appear to feel less physical pain or to be psychologically calmer. In addition to making life better for patients, this must in turn make life easier for the staff, certainly in the mental hospital.
Of course the new wards are just that. They are new! Some might suggest that our results may purely be the result of this, and that as the buildings age, the effects will disappear. We cannot be sure this will not happen, but there are some reasons to doubt that pure newness is responsible for the effects we have recorded. First, other studies we have done show that if asked about architecture in general, most patients are more likely to prefer old buildings to new ones. In fact we would expect there to be more tolerance of new architecture amongst younger patients, but they form a minority in our samples. However, secondly and much more importantly, the patients in our samples were able to tell us quite clearly what features of the new wards they felt made them better places. Thirdly, we were able to analyse our results in terms of some variation in one important architectural factor, that of the design of the private bed space. Patients’ evaluation of this area gave the highest overall correlation with their general levels of satisfaction. This has turned out to be both important and complex, so we now devote considerable space to this issue here.

SINGLE VERSUS MULTIPLE BED SPACES

In our initial study it appeared that the type of accommodation a patient is in might be an important factor. However, we also suspected that a more important question might be whether or not patients are in the type of accommodation they preferred, but we had not recorded this. We were also aware that a substantial number of patients get moved, and that this event itself and the type of accommodation involved may be significant. We therefore conducted a special new study to examine these factors.

Two types of accommodation are considered here, all in wards in Poole General Hospital. They are single-bed spaces and multiple (always in this case four-bedded) spaces. Some 473 patients were interviewed. Of these 106 (22%) were moved during their stay. They answered a questionnaire mainly consisting of five-point scale and open-ended questions.

Of the patients who remained in one type of accommodation throughout their stay, 24% were in single-bed spaces and 76% were in four-bedded spaces. The two groups of patients appear to have very similar gender balances and age distributions and to have stayed in hospital for roughly the same amount of time. In fact the patients in single-bed spaces were released on average fractionally but not significantly earlier than those in multiple-bed spaces.

When asked about their overall ward experience, their overall treatment and whether the environment helped them to feel better, the two groups gave almost identical responses. However, the group in single-bed accommodation were significantly more impressed by their bed area or private space, with 71% giving it the highest rating compared with only 33% in the multiple-bed spaces. They also rated their bathroom and toilet area significantly more highly (48% against 26%).

PREFERENCES FOR SINGLE- OR MULTIPLE-BED ACCOMMODATION

Overall 54% of patients actually expressed a preference for multiple-bed space accommodation, with 43% preferring single and the rest not feeling any preference. However, this figure alone does not fully reveal the picture. Of the patients who stayed in one type of accommodation, the great majority expressed a preference for it. Of the patients in multiple-bed spaces 76% said they preferred them, while as many as 93% of the patients in single-bed spaces said they preferred them. Whether this is because the hospital had done an excellent job matching patients to their preferences or whether patients simply come to like and see the benefits of the accommodation they are in, we can only guess. One clue to this might be from a patient who wrote about the issue in the final open section. “The last two times I was here I was in the multi-bed wards and I did not think I would like the single room, but it was a better environment once I became used to it.” Clearly this patient would have previously been one of those voting for multi-bed spaces but this time voted for the single-bed space. However, there were also examples of exactly the reverse happening.

Of the patients who were not moved during their stay and expressed a preference for one type of accommodation, 80% preferred the accommodation they were in, while 20% would have preferred to be in the other type. If we examine their assessment of the ward and the experience of patients in their preferred
type of accommodation, we can see that they were significantly happier than those patients who would have preferred the other type of accommodation. In fact this one factor alone appears to be the most important one in determining overall assessments.

Significantly, the group who were in their preferred accommodation type thought the environment helped them to feel better, with 42% giving this the highest score compared with only 26% of those in their non-preferred spaces (Figure 15). They described the facilities as meeting their needs significantly better, with 52% awarding the top score compared with 34%. They rated their overall ward experience significantly more highly, with 78% giving it the highest rating compared with only 55%. They also rated their overall treatment more highly (81% compared with 68% giving the highest rating).

If we look to see what it was about their situation that caused this significantly higher assessment, we can see a clear indication. They felt their overall environmental comfort was higher, with 48% giving the top score compared with 25%. However, none of the individual environmental factors were actually significantly more highly rated. They did, however, feel they had significantly more control over their environment. They awarded no higher scores for the appearance of the ward or the overall design, nor did they feel they could find their way around any more easily. Clearly, then, the overall design of the ward is not the factor causing the result. However, they assessed their bedroom or private area significantly more highly, with 49% giving the top score compared with 34%. They also rated the toilet and bathroom area more highly (36% against 25% for the top score), but were no more impressed with the lounge area.

The issue, then, seems to come down largely to two factors. It is a personal choice between privacy and community, with the single-bed accommodation having the added advantage of offering more environmental control. Of all the extra comments patients made in their questionnaires this came up most frequently after comments about the staff. Two examples from each side of the argument illustrate the choice perfectly. “If you could choose the other patients, the multi-bed bay would be excellent.” This contrasts with “The single-bed room is far better due to the nature of the illness, it’s not so embarrassing.” However, a couple of comments also in favour of the multi-bed spaces suggest that access to nursing staff is thought to be more frequent and easier there. Many readers may feel, as do we, that they would prefer single rooms. However, we are convinced from this study that there are a significant number of people who prefer to be in multiple-bed accommodation. However, our study may well be overestimating the size of this group. The two main reasons given by such people are “having others to talk to and not being lonely”, and “I am more likely to see a nurse than I would tucked away in a room by myself.” Whatever the reality about the latter, this is clearly the perception for some at least.

What causes these preferences for either single- or multiple-bed accommodation? We might expect this to be a function of personality, but it might also be related to age, gender and socio-economic grouping. We have no data on personality, but did collect data on age and gender and also domestic postcode. Gender and age
both turn out to be no indication at all. We have been unable to do the analysis on postcodes. Such factors may modify the percentage preferring private spaces and enable trusts to predict more accurately the balance of preference.

PATIENTS WHO WERE MOVED DURING THEIR STAY

So far we have only considered those patients in the same accommodation throughout their stay, but some 22% of our sample patients were in fact moved. What are their views on the factors considered above?

First, those who stayed in one place thought that the environment helped them to feel better significantly more than those who were moved. They also gave higher scores for their overall ward experience and their overall treatment, although these differences were not statistically significant. Again, none of these differences was statistically significant. Overall, however, these results fairly strongly suggest that being moved is in itself not a positive experience.

WINDOWS, NATURAL LIGHT, SUNLIGHT, VENTILATION AND VIEWS

After the question of privacy versus community the next most frequently mentioned concern was that of views, or more often the lack of them. In our study the window was the most frequently mentioned building element. It cropped up in our focus groups and was very frequently mentioned by patients in the free response parts of our questionnaire. Quite simply patients, and for that matter staff too, like to have windows and to be able to see out of them. This is perhaps best summed up by one of our focus group nurses. "I think there’s something desirable about natural light and ventilation." She was of course repeating an opinion expressed confidently by her illustrious predecessor Florence Nightingale.

Perhaps it is time for us to take more seriously this kind of anecdotal evidence from those who are in daily contact with hospitalised patients. In fact there is a growing body of empirical work in the literature supporting the idea that both natural lighting and sunlight have therapeutic qualities.

The window also has the potential to offer views out of the building. We continue to be surprised at the lack of

10 Over a hundred years ago, Florence Nightingale mentioned light and views and colour as being “second only to fresh air” in this regard. Nightingale, F. (1863). Notes on Hospitals (3rd edition), London.

11 Beauchemin, K. M. and Hays, P. (1996). ‘Sunny hospital rooms expedite recovery from severe and refractory depressions,’ J of Affective Disorders, 40, 1996, 49–51. Study of psychiatric inpatients with depression in a hospital in Edmonton, Alberta, Canada (n = 174). Finding – Patients in sunny rooms stayed an average of 16.9 days, whereas those in “dull” rooms stayed an average of 19.5 days. The difference was consistent over all seasons during a period of two years (October 1993–September 1995).

attention to this that we detect in much recent hospital architecture. Again patients raised this with us very frequently, either commenting favourably on the view they had or bemoaning the lack of a view. A nurse in one of our focus groups was in no doubt about the therapeutic value of the view. “You know that if you sit in front of a view for a long time watching the clouds you forget what you’ve been worrying about and you think of other things, and you know that that’s doing you good.” Equally another nurse worried about the lack of views in her hospital. “You can get very depressed when you can’t see past your own door.” The specific need to see the outside world, feel in touch with it and see what is going on is stressed by all groups, but particularly by the caring staff. This is no longer just a matter of such anecdotal data. In a now well-known study Ulrich has claimed evidence of the actual therapeutic value of the view through hospital windows. Our data very strongly supports this finding. However, we must be careful here not to romanticise the content of the view. In fact we have no evidence that patients in general desire conventionally beautiful landscapes, for example, and there is certainly no demand for the view onto the ubiquitous hospital courtyard, however ingeniously landscaped. In fact what evidence we have suggests that what is most desirable here is a view of the world beyond the hospital and of life going on in the normal way. It may well be that one of the benefits of the natural lighting that comes through the window is the way it assists in defining the diurnal rhythm. A view itself may well further anchor the patient in the daily pattern of life, with such events as the postman making his rounds, children going to school and the evening rush-hour home. We would argue that the patient may feel less cut off from their normal world and indeed may be less cut off from ordinary life... You're not really going to promote your recovery . . . You're not really going to promote independence and good coping skills when you are removing the patient from reality and the real world.”

There is one final point that came very dramatically and directly from our data in this study. We must not only have good design principles, but also realise them well in actual designs. Our hospital at Poole had potentially splendid views over Poole harbour, and they were much appreciated by patients would could see them. However, the sill heights of the windows and bed arrangements in some rooms prevented bedridden patients from seeing them. Such patients commented quite angrily about this, and one can hardly blame them! Yet again the strength of their feeling reinforces the importance of view for hospital patients.

A CONTROLLABLE AND PERSONAL ENVIRONMENT

We have already seen in our earlier section how little control patients said they had over their environmental conditions. The general issue of how much control patients have over their immediate surroundings and the extent to which they can make them individual attracted the next largest group of comments from patients on questionnaires and from staff in focus groups. One member of the medical staff, reminiscing about also having recently been a patient, summed this up very well. “After the operation, well the second night, it was midsummer, and I couldn’t close the window. I could get out of bed but I hadn’t the strength to lean over the shelf and close the window. The call button wouldn’t work. I couldn’t get the curtains closed or anything and I couldn’t switch my light off. It wasn’t until about midnight when the staff came round and I was just lying there so irritated and so agitated.” This of course raises the possibility of bedside controls for patients, commonly found for many items in the modern hotel but seldom for the bedridden patient in hospital. Staff commented to us on the frequency with which patients’ relatives bring in bedside fans and other devices to try to remedy this deficiency. Even controls for staff to operate would in many cases be a remarkable improvement. Staff seemed to feel that such controls and consideration were generally missing, leaving them to improvise. “I wanted a muted light and we ended up hanging a pillowcase on it, which really!” It is worth pointing out here not only the negative frustration caused by a lack of control and wasted staff time,


but the denial to the patient of a more therapeutic environment.\textsuperscript{16}

Finally we return to our earlier discussion of single- and multiple-bed spaces in this section. What patients really seemed to be telling us here is the frustration and unpleasantness of not being able to control your privacy and community as you would normally and naturally do in everyday life. Choosing whether your door is open, ajar or shut, for example, is something we all do very frequently in the domestic and work environment, and yet the ability to do this is again normally denied to the bedridden patient.

A CLEAN, TIDY AND CARED-FOR PLACE – THE BATHROOM AND TOILET

Next we have grouped together a whole series of comments that initially might have seemed to be about different architectural features or service aspects. We believe they relate strongly to each other under the heading of a clean and tidy place that appears loved or at least cared for. Patients frequently mentioned the bathroom/toilet area to us. The overall score for the bathroom/toilet area was the lowest of all of the specific areas we asked about, and lower than for any of the general questions about appearance, design and the environment of the ward. This was true for both old and new wards. In this regard it is interesting to see that the ratings of the bathroom/toilet area correlate surprisingly strongly with the general assessments of the ward design. We see a correlation of 0.6 between the bathroom/toilet scores and both the “overall design”, and “how facilities meet my needs”. There is even a correlation of 0.4 with “does the ward environment help to make you feel better”.

These scores suggest the quality of the bathroom and toilet areas are highly influential in determining patients’ feelings about their experience. The number of patients who also made comments about this in the open-ended questions supports this. Some 48% of patients made negative comments about the issue, while 29% made positive ones. Of the negative comments by far the largest number were about a lack of cleanliness, while the next most frequent complaint was about lack of numbers of baths, showers or toilets. The lack of facilities obviously causes distress, as does a lack of privacy. This last issue was also mentioned by several patients as the worst feature of the ward design overall. It seems that this area is of great significance to patients and yet rather neglected by both the design and the management system.

Comments on bathrooms and toilets most often raised issues of the lack of privacy or cleanliness there. It is interesting that cleanliness featured most highly on both the positive and negative side of these comments, and this again indicates that it is a strongly-felt issue with patients. When doing this they frequently mentioned the actual process of cleaning. It seems that they are less focused on the problems of infection than on the quality and frequency of the act of cleaning. We interpret this to be more of a symbolic concern, “if in a hospital they cannot even keep this area clean,” they seem to be saying, “how much do they really care for this place?” The obvious next step in their argument is to question how well they will be cared for in such a situation.

In fact, in our focus groups one of the most frequent complaints made by designers was the lack of care taken in maintaining and managing the buildings for which they are responsible. The apparently haphazard way notices and pictures are put up, left to become out of date and dirty was a common complaint. This was also mentioned by patients, but again more in symbolic terms.

**APPEARANCE**

While there is considerable consensus about the above factors, appearance is more subjective. Patients obviously note and comment considerably on colour and decoration. In some cases at both the new wards these comments were favourable, but most comments about these matters were negative. Patients on the new ward at Poole commented favourably on the presence of pictures, but even here they did this by calling for more! Other comments asked for wallpaper and carpeting “to make a more homely appearance”. “Light” and “airy” were two adjectives frequently used to describe patients’ satisfaction with the feel of the place. Similarly, “dark” spaces were not appreciated. The rather bright and strong colours in the new wards at Brighton were clearly not to the liking of a considerable number of patients.

There is some evidence that patients like to see a place that they consider “homely”. From the comments made, this seems to include having variety and texture in all matters. Variety is desirable in lighting, colour and materials. Having materials that are tactile and with which you can interact seems desirable. All these things run counter to the conventional appearance of a hospital, in which smooth, cleanable surfaces and uniform fluorescent lighting are commonplace.
We have conducted a very extensive review of all the costs associated with the construction and running of the new buildings in our sample, and compared these with both standard provisions and with the previous accommodation in each case. Such comparisons are not as easy to make as it may seem, and we have conducted many tests in order to discover any excessive expenditure that may in some way account for the improvements shown earlier in this report. In general our conclusions are that there were no excessive costs here either in construction or in the running of these new facilities.

**CAPITAL COSTS**

Our first test is to see whether the two facilities cost more than the appropriate benchmark figures for building work of their type. NHS Estates have calculated the benchmark (full business case) costs for similar units at current cost based on MIPS360 and including allowances for “Consumerism” as detailed in the Healthcare Capital Investment document.\(^{17}\) We have therefore converted these to the equivalent rates at the times of completion of our two projects, based on MIPS331.\(^{18}\) The Poole Hospital scheme is compared with a standard trauma unit of 90 beds based on Health Building Note 419 and its guidance recommendation for 50% single-bed rooms. The Brighton Hospital scheme is compared with a 53-bed acute mental health unit based on Health Building Note 35.\(^{20}\) Since the number of beds at Poole (84) and Brighton (54) slightly differ from these benchmarks we have arrived at a comparator price per bed.

On this per bed basis Poole cost 47.4% of its comparator benchmark price and Brighton cost 77.1% (Figure 18). Poole was of course a conversion with part new-build, and the significantly lower costs are probably largely explained by this. The overall higher costs at Brighton compared with Poole are also largely accounted for by the 100% provision of single en-suite bedroom accommodation. In addition to these benchmarks we also checked to see that the actual costs were comparable with other similar buildings constructed at around the same time.

**REVENUE COSTS**

These costs are largely made up from the staffing costs to operate the building and provide the service to patients. Here we have compared both Poole and Brighton with the costs actually incurred in the two older schemes which they replace. In our calculations we have included the costs of nursing, medical staff, administration, catering, housekeeping and maintenance. In the case of Poole we included charges for therapy, pathology, blood, drugs and tests. These figures were all calculated and supplied by the two trusts (Figure 18).

On this basis the new unit at Poole saved some 3.6% if we calculate the costs per ward, but cost some 2.6% more on a per bed-day basis. This is due to the slight reduction from 30 to 28 beds per ward in the new unit. By contrast, the new unit at Brighton cost some 9.5% more per ward but saved 4.7% per bed-day. This is explained by a rather higher bed occupancy rate of 97.4% in the new unit compared with 84.8% in the old.

**CONCLUSIONS ON COSTS**

We can find no evidence in these figures that the new buildings are lavish or expensive provisions. Indeed, in both cases they are below the target capital cost figures for buildings of their kind. Neither is there any evidence of increased levels of recurrent expenditure which could account for the improvements that patients and staff have reported to us and the enhanced health outcomes we have recorded in these two new schemes.

---


18 MIPS represents the Median Index of Public Sector Building Tender Prices and is a price index capable of correcting for inflation over time in the costs of such buildings.


One further set of statistics is worthy of mention here. It is often argued in the construction industry that clients in general and the public sector in particular place far too much emphasis on saving design fees and capital costs and not enough on life-cycle costs of buildings. It is worth noting that at Poole the revenue costs will exceed the capital costs in the second year of operation and at Brighton this will happen in the first year!

Earlier we reported savings in patient treatment time found in our data of 21% for non-operative patients (about half the patients we monitored) at Poole and 14% at Brighton. We suspect that there may be other savings to add to this of staff absenteeism, staff turnover and recruitment costs, particularly at Brighton, and some savings on drugs, particularly at Poole. However, the patient treatment time savings alone amount to annual revenue savings of nearly £2000 per bed-year at Poole and nearly £7000 per bed-year at Brighton. These compare interestingly with the annual capital charges (assuming depreciation over 25 years and 6% interest rates) of about £2800 per bed-year at Poole and about £4800 at Brighton. Of course we recognise that in practice such savings are hardly likely to occur, and the effect is much more likely to be increased throughput of patients.
Taken together, all these results demonstrate the importance and value of good design in the healthcare environment. This is not simply, as is so often assumed, a superficial matter, but rather one of real consequence to the quality of life of the patients, their visitors and carers, and the staff of our hospitals. Our report also demonstrates that good design alone is not enough, and that facilities must also be well managed and maintained.

What this report also shows is that, as well as making life pleasanter, good design contributes significantly to the health outcomes of patients. It can therefore have a real effect in financial terms too and, far from costing the health service money, good design will probably save it.