

## **The Effect of the Hospital Environment on the Patient Experience and Health Outcomes.**

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### **Trust Initiative**

When self-governing NHS Trusts were set up a decade ago they were given a surprising amount of autonomy. Hitherto, capital projects had been subject to supervision by Regional architects and others further up the line, with local input being confined to detail. All of a sudden the whole process of design procurement became freer and, being one of the first formed, South Downs Health NHS Trust decided to review completely how it handled its ongoing construction programme. Through deft financial stewardship and the sale of surplus property the Trust was able to fund new projects independently with only supplementary help from other quarters.

In these circumstances it was relatively easy for its first chairman, John Wells-Thorpe to devise a new design approach that was more responsive to perceived clinical need and patient welfare, not least of all because he was himself an architect. A number of limited competitions were launched with the help of the RIBA Competitions Office covering, in the first instance, a new clinic in Brighton and thereafter a hospital for the elderly physically and mentally frail at Newhaven. In inviting architectural competitors emphasis was placed on at least fifty per cent participation by younger practices who would not have fallen into the category of established hospital architects. The benefit of this approach was immediate. At briefing stage a fully inclusive dialogue engaged local users at each level and their input was maintained throughout each project to ensure a sense of ownership with the finished building, working alongside an enthusiastic design team.

Due to the scale and speed of the new capital programme, which subsequently involved a new medium secure mental healthcare building to be known as Mill View Hospital Hove, the Trust adopted a 'competition by interview' procedure to save time and for this project Powell and Moya were selected as architects. And to conclude the entire programme, MacCormack Jamieson Pritchard were selected for the new rehabilitation centre for severely physically injured children at Chailey, East Sussex.

### **Building the research team**

The building of Mill View Hospital involved the transfer of a group of mental healthcare patients from an existing, converted Victorian workhouse to a brand new setting and it seemed too good an opportunity to miss to try and measure the therapeutic benefit which would probably ensue through moving to an enhanced environment. Coincidentally, Poole Hospital Trust in the acute sector had moved patients from old to new accommodation and had also made a bid for research funding from NHS Estates, so when South Downs Health made its bid to cover a more comprehensive study it was suggested the two Trusts collaborate. At that stage it was clear that a leading research- orientated

University needed to be involved as the third member of the team and, after a shortlist had been drawn up, Sheffield University School of Architecture was appointed for this task under the direction of Professor Bryan Lawson, an architect and psychologist. It was significant that Poole and South Downs were represented by a consultant anaesthetist and psychiatrist respectively alongside their managers to underline the importance clinicians were giving to the possible outcome of this study.

We were keenly aware of the pressing need for hard evidence to prove what until then had been only accepted anecdotally, namely that a well-designed environment could enhance recovery rates and reduce dependence on analgesics. NHS Estates provided active support and everyone was also encouraged that the relatively uncharted area of mental health was being included in the study. At long last the opportunity had arisen to examine what many distinguished figures outside healthcare had already said for so many years, not least Sir Winston Churchill who had always asserted that “We shape our buildings and afterwards our buildings shape us” (Churchill 1943) .

### **Background**

While in hospital patients spend a great deal of time with perhaps rather less purpose than in their normal lives. This may well make them even more susceptible to the environment and more sensitive to it. A patient in hospital may get the personal attention of a doctor for only a few minutes in a day and slightly longer periods of personal care from nurses and therapists. However they lay in bed, sit, get pushed or walk around in their environment for many hours. It is reasonable therefore to assume that this environment may be a contributory factor to their sense of well-being and actual recovery. Over a century ago Florence Nightingale had noted the importance of their surroundings to her patients (Nightingale 1860). This work explores those ideas empirically.

There is remarkably little research of this kind of a holistic nature, but a number of more detailed studies. Roger Ulrich concluded that patients with a view were more likely to be released from hospital more quickly than those without (Ulrich 1984). Another study shows that sunny aspects have a better effect than dull ones (Beauchemin and Hays 1996). Others have looked at the organisation of space and the arrangement of furniture, for example Baldwin’s work in mental health (Baldwin 1985). Other more anecdotal work has looked at the effects of music and art in hospitals.

### **Methodology**

Having identified two hospitals where construction was planned we set out to compare patients’ opinions and health outcomes in the old and new buildings in each case (Lawson and Phiri 2000). The Poole project involved the refurbishment of existing 1960s general wards. In the original ward there were six four-bed bays and six one-bed bays. There were lavatories at each end of the ward. In the refurbished unit there are 16 single bedrooms and three four-bed bays. The new bedrooms have a clean simple interior using natural timber and have ensuite bathrooms.

The Brighton project involved the replacement of two 15-bed wards in the Freshfield Mental Health Unit of Brighton General Hospital which were housed in Victorian brick buildings with typically high ceilings with a new purpose built mental health unit. The new Mill View Hospital that replaced these wards is a 32 bed unit with single rooms with ensuite facilities.

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. Samples 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 for about 35-40 days.

We first held focus groups with a series of people involved in the commissioning, management, design and daily use of these kinds of buildings. We wanted to know what the clients' expectations were, what the design teams' intentions were, and what experienced users of such buildings thought important.

From these focus groups we were able to establish questionnaires that would be administered to patients at the end of their stay in hospital. We asked them for their reactions to the building, to the treatment they had received and for assessments of staff who had been looking after them. We decided in conjunction with our clinical colleagues that in the case of the mentally ill patients we would administer the questionnaires through their carers. The patients on the general wards completed their own questionnaires. At this point is worth noting that the patients were in general very happy to take part in this study and remarkably forthcoming and articulate about their environment.

### **The Patient Experience**

The patients in the newer buildings expressed more satisfaction with the appearance, layout and overall design of their wards. At Poole hospital 72% of the patients in the new unit gave the highest rating they could for overall appearance compared with only 37% of the patient in the old unit. At South Downs these figures were both lower with 41% giving the highest rating in the new unit compared with only 20% in the old. (fig. 1) The generally lower satisfaction figures in the case of mental health patients is not surprising. What matters in this study however is not the difference between physical and mental health patients but in each case the differences between the old and new buildings. A series of other questions on the overall design and the extent to which the facilities met the patients' needs revealed similar responses. In all cases there was a highly statistically significant difference in favour of the newer building.

Particular spaces in the newer buildings were also more highly praised. The most significant differences were in the patients' assessment of their own private area whether in a multiple bed bay or a single room.

We asked patients much more detailed questions about the physical environmental conditions such as lighting, temperature, air quality and noise. Again in both sets of samples the new building tended to fare better than the old. These differences were less marked than those for the overall design and spatial organisation of the wards. Next we asked what levels of control patients had over their environment and here we found remarkably disappointing results. Patients generally reported low levels of control over their environment whether in the old or new buildings.

Next we asked our patients quite explicitly if they thought the environment had helped them to feel better. Both hospitals showed a significant increase in the patients' assessments of this. We had also asked patients to assess the quality of their overall treatment and to rate the staff who had cared for them during their stay. In all cases we found an improvement in these ratings in the newer buildings although these differences were not always statistically significant. There are so many of these figures that even though there is a lack of strict statistical significance they seem to paint a remarkably consistent picture. In the newer environments patients thought they had received better treatment and that their doctors, nurses and therapists were more helpful and attentive.

We asked our respondents to tell us in their own words what features of their environment were either particularly good or bad. There are two major groups of factors that we commonly see in 'architectural psychology'. The first and most obvious concern the direct relationship between people and their environment. Such factors would include the colours of surfaces or the temperature of rooms. However the second group of factors concern the way the environment mediates the relationships between people (Lawson 2001). Such factors would include matters of privacy or how spaces enable people to establish community or maintain 'personal space'.

It is often falsely assumed that the value of good design lies largely in the first category. Whilst this may be true for designers with heightened senses of aesthetics, in fact it is more often the second which matters more to ordinary people. This study is no exception! The most commonly raised issue amongst all four of our patient samples was that of privacy. That is not to say that all our respondents were asking to be entirely private; they were most definitely not. However the way the environment enabled them to be either private or not as they wished seems to be of the greatest importance.

Following on from privacy came the matter of view. The most common complaint made to us was the lack of view. Nurses and others working in hospitals also mentioned this problem, not just for themselves but also on behalf of the patients. Again however this factor should not be interpreted as a purely aesthetic matter. There was no evidence that in general patients wanted classically beautiful views. If anything it is views of everyday life that seem in demand here. Views in which something happens seem desirable, and views that enable conversation between patients of the events unfolding; perhaps children leaving school.

The next most frequent aspect of the environment to be mentioned was that of the bathroom/shower/toilet areas available in hospital. Yet again the same message was

repeated. Patients commonly raised this in connection with the two specific factors of privacy and cleanliness. Of course patients were concerned about hygiene, or more commonly the perceived lack of it when such places were dirty. However also important seemed to be the symbolic value of a lack of cleanliness. What this seemed to be signalling to patients was the lack of care, pride and concern that the authorities showed for the environment. In turn of course this sends worrying signals to patients who find themselves forced to stay in such a place!

Next come the two obvious issues of appearance and noise. Appearance is inevitably a highly personal matter, but again whatever peoples' taste they do appreciate an environment that at least appears cared for. Again not all patients want an entirely silent ward. What matters most here seems to be to have some degree of control. Our respondents mentioned this about such things as heating, the lighting, windows and blinds as well as noise. In fact the newer designed wards continued generally to offer relatively low levels of patient control of these matters. There is a long way to go it seems in convincing both clients and designers of their relative importance!

With privacy being such an important issue and our newer wards showing higher levels of provision in single bed accommodation we decided to investigate this matter in much more detail. We had already found that the levels of satisfaction with treatment were higher for those patients in single bed accommodation. At first sight this might suggest that this is therefore generally more desirable. However this data it turns out was masking something more subtle and important. A further study was done at Poole hospital involving a sample of 473 patients on this particular question.

In fact some 54% actually expressed a preference for multiple bed space accommodation. 43% voted for single beds and the rest expressed no preference. This majority in favour of multiple accommodation may be slightly misleading. We found a majority of patients expressed a wish to be in the same kind of accommodation as they were occupying at the time. This may be partly due to patients getting their wish from the hospital and partly due to them not being able to imagine the alternative. Two common reasons were given for preferring multiple bed spaces. They were the wish for company and others to chat to, and a feeling that they were more likely to be given attention by nurses and might be forgotten about if isolated in their own room.

Now some 22% of patients were moved during their stay in hospital. Often this was against their wish and to satisfy the needs of another patient. Such a move was not infrequently made during the night in response to some emergency.

Our data shows very clearly that patients who are in the sort of accommodation they prefer and are left there, express significantly higher levels of satisfaction than others. (fig.2) They regard their treatment as better, rate the staff more highly and consider the overall design of the hospital to be superior. They are also more satisfied with their level of control over the environment, although this is most particularly true for patients in single bed rooms. Such patients however did not express any higher levels of appreciation of the appearance of hospital.

This data confirms two interesting conclusions. Firstly being able to decide what levels of privacy and community you want is extremely important to people. Secondly being able to control the environment is also very high on the agenda. Finally not only does meeting these needs of people in the design lead to higher levels of satisfaction it also transfers significantly to their general feeling about their treatment. Whilst it would clearly be foolish to advocate neglecting the appearance of the environment, this data unequivocally demonstrates that matters of privacy versus community and personal control over the environment are much more fundamental and of far greater significance.

### **Health Outcomes**

Our study also looked at the actual health outcomes of the patients. These data were recorded in the normal way by the clinical staff and extracted for us and associated with the patient questionnaires. We looked at a number of measures that might indicate improvements in health outcomes. The most obvious of these is length of stay.

In fact both our physical hospital and mental hospital patients were released significantly more quickly from the new wards than the old ones. In the general medical wards at Poole, patients who did not undergo operations were released on average one and a half days earlier from the new wards. This represents a reduction of about 21% in the average stay of just over a week. Patients who underwent operations showed no reductions in the length of their stay post-operatively although there were differences in the pre-operative stage. The reasons for this seemed unrelated to our study and are not reported here. In mental health stays in hospital are normally longer with an average stay of over a month, so the reductions in length of stay of 6 days seems even more dramatic but actually represents a reduction of about 14%.

On our general medical wards at Poole there was also a dramatic reduction in the amount of analgesic medication taken by the patients on the newer wards. On the newer wards the average number of days on which Class A pain killing drugs were administered was reduced by 22% and the number of doses applied on these days reduced by 47%. To slightly offset this data there was a slight increase in the amount of Class B drugs taken on the newer wards.

At Brighton in the new Mill View mental health unit patients were judged by staff as significantly less aggressive, making fewer verbal outbursts and showing fewer instances of threatening behaviour. The number of instances of patients injuring themselves was reduced by two thirds. Most dramatically the amount of time patients needed to spend in intensive supervisory care was reduced by 70% from 13.1 days to 3.9 days. Finally, staff assessed some 79% of patients as making good progress with their condition compared with only 60% in the old buildings. Taken together this paints a picture of a far calmer and less hostile environment with patients making better progress and being released earlier. (fig.3)

### **Conclusions so far**

It seems worth returning to the question of what aspects of the environment were most correlated with satisfaction and improved health outcomes. We have shown them to be largely universal rather than specific architectural factors. That is to say they could be seen to apply to all environments rather than being specific to the hospital. They concern such general matters as privacy and community, view, environmental comfort and control of the environment. Whilst they also inevitably involve the appearance of buildings these factors seem very much more a matter of personal preference. However where the appearance communicates other more fundamental issues these factors again seemed important and generic. Untidiness and a lack of cleanliness, when they occurred seemed important to all our patient samples. These are taken by people to indicate a lack of care, attention or even love of the place by those responsible for it. The communication of such values, or lack of them, is clearly disturbing and upsetting to patients. Perhaps patients are asking themselves; 'if the place is not loved and cared for, what about the inhabitants?' What this work has shown is that design in the form of good place making can benefit staff and patients and probably save the NHS money at the same time!

### **The last stage**

The research programme now enters its final year and includes three important related tasks. The first focuses on obtaining a clear idea of the relative costs involved to assist our understanding of the value of environmental features, particularly in capital and operating terms. The second task makes accessible the contents of the research via a database for those commissioning and designing the estate, whilst the third task concentrates on how best practice can be disseminated throughout the NHS community and indeed, overseas where a great deal of interest in our work had already been shown, particularly in Scandinavia and the United States.

We were confident that clinical corroboration of our work could release appropriate funding to build-in the characteristics that seemed to be critical in any new building. Similarly, cost effectiveness in outlay and maintenance would attract the serious attention of estates and facilities managers who, with one or two distinguished exceptions, were often ambivalent about the purpose and nature of the proposed research.

It has been pointed out by psychologists that social interaction in a hospital can be just as important a determinant as environmental factors, but there is an obvious link where spatial arrangements themselves can either facilitate or inhibit such interaction. The other key factor frequently emphasized was how, in design terms, one must try and give back to patients a measure of control they lost immediately over such aspects as heat, light, ventilation and sound once they were put into a bed.

There emerged, of course, related considerations, which will inevitably support and enhance the benefits of this research. The first is in giving serious priority to post-occupancy appraisals; and the second is in encouraging better practice and fuller understanding of the briefing process at the beginning of a project. To date, both of these aspects have, by and large, been seriously neglected

### Applying the research at last

One of the ripple effects of the research already undertaken is that others working broadly in the same area in U.K. and Scandinavian universities can now build on what we have done. Their interest in architectural psychology has helped to focus on the way that certain design choices and configurations using colour, light, texture, space and view can confer *predictable* therapeutic benefit. A key issue here is to understand more fully the nature of ‘distraction’ and the part that it plays in the healing process for any sick person and moreover, how it can be designed-in.

After nearly five years it is encouraging to see at last active support now being given by political and clinical leaders, who openly support the concept of environmental intervention as central to the patient’s recovery. At the recent Prince’s Foundation launch of the new joint initiative between NHS Estates, the Commission for Architecture and the Built Environment, and the Prince’s Foundation, Secretary of State Alan Milburn said: “Hospital design has to pay attention to the impact the patient environment has on the individual patient – their state of mind, their prospects of recovery, their sense of well-being”. This political imperative is timely because it has already been echoed from the clinical side by Sir Kenneth Calman and a whole array of distinguished consultants, some of whom are involved with the new Centre for Medical Humanities at University College London, which can provide yet another springboard for disseminating good practice.

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