The Reality of Wellbeing-Focused Design in Dementia Care –

A Case Study of Acute Dementia Wards in the UK

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Executive Summary

Design for wellbeing is an approach that considers both the psychological and physiological impacts of architecture on its occupants, in order to create built spaces that promote wellbeing and enhance health. This study seeks to investigate the adoption of wellbeing-focused design in dementia wards, by comparing a theoretical background to real-world practice. Firstly, by investigating a 'best-practice' model, derived from existing theory, a benchmark is established against which functioning wards are appraised during a series of observational visits to wards in the UK. The first-hand observation of National Health Service (NHS) dementia-specialist, acute facilities, and discussion with medical staff, provide valuable insight into the environments in which patients are being cared for, as well as the opportunity to gauge the perception of design for wellbeing amongst care providers. This approach means that the subject is discussed not only from an architectural perspective, but from a care-provision, management and operational stance, taking into account the practicalities and obstacles that exist in this field – looking beyond the theoretical ideal, and towards the reality of current practice and standard for healthcare design.

List of Implications for practice

- The study evaluated design for wellbeing as a strategy for improving aspects of the built environment to support clinical treatment in dementia wards.

- First-hand observations of existing wards provided an insight into how design for wellbeing is being implemented in the NHS.

- Interviews with patient-facing clinical staff led to discussion of design principals from a medical standpoint, demonstrating the perception of wellbeing-focused design as a means to assist care.

- The testing of dementia wards against a best-practice framework uncovered limiting factors for it's widespread adoption.

Abstract

Objective. The study explored design for wellbeing within dementia-care by investigating the adoption of wellbeing-focused design in real-world practice, through observing NHS wards.

Background. Design for wellbeing is an approach that considers the psychological and physiological effects of architecture to improve health and wellbeing. The high psychological care requirement for dementia patients makes them a significant group to study in the evaluation of current hospital facilities.

Methods. A literature review was conducted, to frame the current theoretical perception of the key characteristics of a good environment for dementia care. A framework was generated to summarise, and used as an assessment tool in a series of observational visits to NHS wards. Interviews with clinical staff focused on care outcomes and practicalities of implementing wellbeing-focused design, considering the historical and economical context. Key findings from the observations and interviews were analysed for recurring themes.

Results. The ward observations and interviews provided insight to the current progression of wellbeing-led design in NHS hospitals in England. The research highlights key areas of success, and factors that inhibit further progression.

Conclusions. The case studies showed a good degree of ambition to utilise wellbeing-focused design, with belief among staff that the physical environment has a substantial role in the health and wellbeing of patients. Staff also felt that this approach is most effective for those in the less advanced stages of dementia. Despite the high level of support, the current degree of implementation appears to be varied.

1.0 Introduction

Wellbeing-focused design is an approach that enables considered design decisions through recognition of the impact of the built environment on physical and mental health. It is applicable to all sectors, but has a strong affiliation to hospitals given their function to restore, maintain or improve health. The field has grown largely from Evidence Based Design; a movement begun in the 1980s which sought to test architectural elements for measurable benefits, such as by monitoring stress indicators. Generating evidence means project costs can be evaluated against results, providing financial justification for well-designed hospitals. This is significant in the UK since public healthcare means costs are scrutinized, typically resulting in healthcare design that is focused on function and necessity. Described by then Royal Institute of British Architects (RIBA) president, "hospital architecture has become isolated as a specialist field, lagging behind the most inventive and progressive developments in the art and science of architecture" (Prasad, 2008, p3).

While improving hospital architecture is complex and political, the benefits to health from appropriate design choices are perhaps significant enough to justify a departure from the minimum-standard approach (Ulrich, Quan, Zimring, Joseph, Choudhary, 2004). These include; a faster healing process, therefore shorter admission period, and reduced exposure to hospital-borne disease; a higher pain threshold leading to reduced medication; and, reduced need for transfers due to secondary illness or bed-blocking (Berry et al., 2004). Better environments also improve staff satisfaction, which in turn increases team stability, and reduces clinical errors through better working culture and facilities (Ulrich et al., 2004; Hamilton, 2006). The cumulative effect is a long-term cost saving, which helps justify an increased initial spend (Berry et al., 2004; Francis, 2006). It is expected that improvements to the quality of building stock would increase user satisfaction. This is an increasingly important consideration in the UK following the introduction of NHS Choices, which gives patients

greater control in selecting their treatment facility. As hospitals adjust to this change in the patient/provider dynamic it is a critical time for review.

There have been several areas of the hospital to embrace wellbeing-focused design; maternity units have developed 'home from home' care, patient-led and focused on reducing stress. Cancer care units have utilized homely environments, optimizing social support as an aid to healing. Recently, dementia has become a focus of patient-led care and design, with significant investigation into the role of the care environment as part of treatment (The King's Fund, 2013; Marquardt, Bueter & Motzek, 2014). This is partially due to the classification of dementia as a national priority since 2007 (DoH, 2015) with around 850,000 people diagnosed in the UK currently (Harwood & McCulloch, 2017). Hospitalization can be particularly difficult as the change in environment can heighten symptoms, especially if the patient is suffering from delirium. The potential for design to reduce this impact is significant, and this study investigates the adoption of wellbeing-focused design in dementia wards, through three case studies in NHS hospital wards.

2.0 Methodology

To enable assessment of wards, the characteristics of a good environment for dementia care needed to be established. To facilitate this, a literature review was conducted to identify principals of design that are beneficial for the health and wellbeing of dementia patients. This was approached by splitting the hospital into four zones based on use: Arrival, Clinical, Non-Clinical, and Exterior. The zones are derived from the 'Patient-Led Assessment of the Care Environment' (PLACE), (NHS England, 2016) with the addition of Arrival, which is the only aspect of the hospital experience shared by all users, as they navigate the hospital to get to their destination. By considering these zones the spatial, functional, physical and psychological requirements of both patients and staff were explored iteratively. As key design principals and spatial features were highlighted in the literature, they were compiled into a framework of

criteria which was structured following assessment guidance and observation-categories from existing tools, the 'Design Quality Indicator' (DQI) (Construction Industry Council, 2015) and 'NHS Overall Patient Experience Scores' (NHS England, 2015). These tools provided eight areas for assessment.

Observational visits were carried out to test wards against the framework and conduct interviews. Three wards in NHS hospitals, managed by different trusts but with similar funding structures, were selected and visited in a three-month period (December 2015 - February 2016). The wards were in elderly care units, and provided dementia services with dedicated beds for medium to advanced stage patients. They represented a range of scores in Care Quality Commission (CQC) and NHS Choices Performance Data evaluations. While the wards had been refurbished, none were purpose built, so had to adapt to existing constraints which is common in the UK. Each case study is reflective of its history regarding service provision, staff attitudes, and management strategy. However, they form part of a national framework with the same policy, so the unique challenges of each case were not the focus. Instead, common issues and themes that emerged were identified, which provided a greater understanding of the wider, national situation.

Each visit lasted approximately 2 hours, including observations of patient rooms, staff areas, social spaces, and the wider hospital. This was followed by 15-20 minute semi-structured interviews (refer to List of Interview Questions) with members of clinical staff, including the ward manager, as per Table 1. The interviews helped illustrate medical opinion regarding design for wellbeing in the NHS, and gave opportunity to question the validity of criteria in the framework.

Table 1 - List of Interviewees

Location	Title	Reference Code	Interview Type
Hospital 1	Ward Manager	WMH1	Semi-structured, transcribed
Hospital 1	Senior Dementia Care Nurse	SNH1	Informal
Hospital 2	Ward Manager	WMH2	Semi-structured, transcribed
Hospital 2	Clinical Care Advisor	CAH2	Semi-structured, transcribed
Hospital 2	Geriatric Specialist Doctor	GDH2	Semi-structured, transcribed
Hospital 3	Ward Manager	WMH3	Semi-structured, transcribed
Hospital 3	Estates R&D Officer	EOH3	Informal

Note. The anonymity of the interviewees, as well as that of the hospitals visited, is maintained in line with the information collection protocol.

3.0 Literature Review

Dementia is caused by brain damage and is a term used to describe symptoms including problems with memory, concentration, language, visuospatial skills, and orientation. It is progressive and can cause behavioral changes and issues such as muscle weakness, weight loss, and loss of sleep (Harwood & McCulloch, 2017). Treatments typically focus on slowing the rate of progression and reducing risk of injury. Design for wellbeing offers opportunity for the built environment to aid medical treatment by introducing patient-group specific elements with the aim of alleviating psychological and physical symptoms. In this context literature was reviewed focusing on design principals that relate to the four zones identified by PLACE.

Zone 1 - Arrival; access and approach. A patient's first impression is shaped by their entrance and navigation within the hospital site. If well designed, this can provide reassurance by displaying competence. If unclear, unwelcoming, noisy, or crowded this can cause stress and confusion and patients can feel alienated and dissatisfied (O'Connor et al., 2012). Typically, additions over time to meet short-term needs have resulted in a jarring collection of buildings with little regard for overall planning and aesthetic. This can cause difficulties with navigation, and lead to poor environmental conditions internally, with insufficient daylighting and overheating (Marcus, 2006; Short, Lomas, Giridharan & Fair, 2012). For dementia patients, a successful arrival relates to measures such as non-slip, consistent surfaces, handrails, and rest points, to minimize risk of falls. Use of consistent finishes has two key benefits; it

eliminates changes in color and reflectance at thresholds, which can be perceived as steps and cause unsteadiness (Buxton, 2015), and increases patient confidence when moving around the hospital as there is a familiarity.

Low-rise, small scale buildings have access to good natural light, and visual and physical connections outside, which is important for orientation and preventing alienation. However, there can be issues if the size of the hospital results in many such buildings with connecting corridors, as this repetitive sprawl becomes counterproductive. Ideally, wayfinding should be intuitive, guided by multi-sensory clues that prevent overuse of signage. Visual clues such as color-coded zoning, and combined text and symbols should be used (Marquardt, Bueter & Motzek, 2014).

Main circulation routes should be subdivided to a human scale, eliminating double loaded corridors and incorporating large windows and break-out spaces. Long corridors often lead to many rooms which can be overwhelming, especially if inaccessible to patients. The building form should make the space instantly readable since the symptoms of dementia, heightened by anxiety, can make it difficult to retain complex directions (Marquardt & Schmieg, 2009). A reception desk should be clearly identifiable, accessible, and free of clutter, and positioned with an overview of the ward for orientation. It must also function as a security point, as it may not be safe for patients to leave the ward unsupervised. However, the guidance warns that "safety features and barriers can lead to frustration and agitation" (Department of Health, 2015, p25). This can impact both a patient's sense of dignity and staff/patient relationships, as staff enforce security. The layout must enable patients to move independently but encourage them not to leave, without being restrictive.

To combat a daunting arrival experience, some architects introduce familiarity by borrowing design concepts from hotels and shopping centers, since these similarly large building typologies are designed to be welcoming, intuitive, and display quality. Some new

healthcare facilities bear little resemblance to traditional hospitals, as clinical functions take place behind the scenes and public areas are free from medical association. However, this can be considered inappropriate as the nature of a hospital means very serious, and often life-changing events occur, which the hospitality industry does not deal with. There is a risk that by aligning with other building typologies, hospitals will be unequipped for supporting people experiencing strongly emotional or traumatizing events (Malkin, 2006). In addition, for dementia patients there is an expectation of what hospitals look like, and misplaced typologies can prevent recognition or cause confusion, mistrust and heighten unwanted behavioral symptoms (Torrington & Tregenza, 2007).

In summary, an ideal space for arrival will provide reassurance by displaying competence through consistency, familiarity, and quality, and have intuitive, multi-sensory wayfinding with clear zoning, good surfaces, and rest points to prevent falls. Further, external views aid orientation, and entrances should be readable, and able to monitor security with a clear point of contact.

Zone 2 - Clinical Spaces; treatment and sleeping areas. Unfamiliar clinical areas arguably give rise to the greatest requirement for psychological care. To counter any negative impact they must consider comfort, privacy and dignity; although efficiency and safety must be optimized. Typically, budgets are derived from minimum standards however, these often fail to recognize individual needs. Wards providing personal environmental control offer not just physical comfort, but also allow the patient a sense of choice. The exclusion of individual controls from 'best-practice' guidance like the Health Building Note (HBN) 08-02, (Department of Health, 2015) means that such measures become an often unaffordable, retrospective addition.

A study conducted in the USA found ward noise levels regularly exceeded the acceptable level of 35db, reaching 45-68db. This is detrimental to sleep, raises blood pressure

and causes stress; slowing recovery (Ulrich et al., 2004). Noise in sleeping areas typically comes from other patients and staff, or medical equipment. The spread of noise generated by people is closely linked to patient privacy, and an optimal acoustic design focuses sound towards the patient around the bed-head, reduces spread to adjacent beds, and dampens background noise (O'Connor et al., 2012). This can be achieved with acoustic baffles, however acoustic materials can be difficult to use due to infection concerns, this relates to the use of soft materials and textured or perforated surfaces as these can all be difficult to clean. Noise from equipment can be reduced by concealing items that do not require regular use, a strategy which can improve behavior (Marquardt, Bueter & Motzek, 2014) and has the additional benefit of decreasing clutter and reducing a clinical aesthetic. Concealing equipment also helps shift the focus away from technology, which can dominate, and encourages more interaction with patients (O'Connor et al., 2012).

Lighting is also important, sunlight has been shown to reduce the need for pain medication, whereas a lack of natural light can cause patients to become withdrawn and increase the chance of depression - a risk patients are already exposed to due to increased stress and potential sleep deprivation. (Beauchemin & Hays, 1996). Exposure to high levels of natural or artificial light is crucial for regulating circadian rhythms, and has been shown to improve behavioral symptoms, reducing agitation and aggression, as well as cognitive improvements, such as increased verbal competence and functional performance (Marquardt et al., 2014). Care needs to be taken to minimize direct and reflected glare which can cause discomfort and lead to falls if perception of space is affected (Torrington & Tregenza, 2007), and the potential increase in patient activity must be met with measures to reduce risk of falls. Designers should consider artificial lighting from the bed position to avoid glare from fixtures, and general lighting should be accompanied by adjustable task lighting for the patient, and to ensure adequate light for staff to reduce inaccuracies. Motion sensors and lux monitors can help to

ensure good lighting levels are maintained throughout the day, although light must equally be minimized at night, to avoid sleep disturbance.

A demand for privacy has resulted in widespread adoption of single occupancy rooms, which have been trailed in the NHS. Single rooms can reduce exposure to infection, and eliminate patient movement between wards, since all rooms offer the same services. Other benefits include less noise and disruption, increased individual control and reduced stress (O'Connor et al., 2012). However, social interaction is greatly reduced which can impact the immune system and result in higher rates of depression or violent behavior (Isaksson, Astrom, Sandman & Karlsson, 2009). For dementia patients, it is important to maintain verbal communication as an indicator of the disease, therefore shared-occupancy rooms are appropriate, although to retain some of the advantages of single rooms, low-occupancy, single-sex rooms are preferable. Limiting the compartmentalization of a ward also offers environmental benefits, as cross ventilation opportunities are utilized as an effective measure to reduce overheating (Giridharan, Lomas, Short & Fair, 2013).

An optimal clinical area must therefore be adaptable to preferences in terms of light, sound, and visual exposure. The space should promote patient choice, and allow privacy and social opportunity. Ventilation, lighting, and acoustics are all critically important and must be optimized for care outcomes, not just to meet a comfort factor.

Zone 3 - Non-clinical Spaces; social, relaxation, and visitor facilities. Social spaces have considerable potential to reduce stress and improve outcomes. Space away from the bed provides distinction between public and (semi)private, allowing social activity to occur in a setting with familiar behavioral rules. However, efficiency of space and cost, alongside the historic separation of mental health services and hospitals have meant provision is often lacking.

Non-clinical areas should be open, homely, and welcoming, for spaces which can be used transiently. This is best achieved with informal areas that have distinct functions since multi-use spaces present problems with recognition, and may not evoke the intended response (Torrington & Tregenza, 2007). Spaces should be available to visitors, with opportunity for privacy and socialization. For example, Maggie's Centers have a large, central kitchen/dining area which is highly social and familiar, allowing users to carry out simple tasks, such as making a cup of tea. The familiarity of everyday rituals allows patients to observe or engage comfortably (Jencks, 2010). This idea can be taken further, with the provision of a wide variety of spaces in response to the broad range of emotional situations that arise in a hospital. This could include spaces to sit in a peaceful, private and supportive environment, or talk quietly in gardens, balconies, or reading rooms. More social areas such as parks or exhibition spaces could encourage interaction, or even help prepare patients for leaving hospital (Swaan, 2006). By giving occupants a selection of such non-clinical spaces, they can use them as desired, depending on their needs.

Within patient areas the ability to personalize space has benefits for aiding recognition and reducing anxiety (Marquardt et al., 2014). Personalization can give patients a sense of ownership, which increases their likelihood of manipulating the environment to suit them, such as turning on the lights (Torrington & Tregenza, 2007). Personal items, reminiscence photos, artwork (Eekelaar, Camic, & Springham, 2012), and music (Anderiesen, Scherder, Goossens & Sonneveld, 2014) can stimulate patients, trigger memories and enable social interaction, which can help establish better bonds between staff and patients. Combined with tactile and olfactory stimuli, this can help reduce agitation and improve care outcomes. However, an overarching design intent needs to unify elements to avoid overstimulation, which can have the reverse effects (Marquardt et al., 2014).

Corridors have a hybrid clinical/non-clinical function. Clinically they need to be clear and accessible, but they also provide space for exercise, interaction, and access to staff. They should be safe and promote independence with handrails and elimination of trip hazards. Seating areas are important for patient mobility and independence, but can be problematic as they can block access or encourage people to gather. This means corridors must be considered at an early design stage, to provide seating accommodation that does not impede ward access. They should also be planned to provide several nurses' stations, to distribute staff and equipment. This increases visibility and reduces walking distances (Ulrich, 2006), which equates to more time with patients and less tired staff, and in turn helps to reduce clinical errors.

To summarize, dedicated non-clinical space is important for patient quality of life and should include multiple areas for social and independent activities, which engage patients' senses and consider emotional needs. These must be easy to access, welcoming, and integral to the ward.

Zone 4 - External Areas; Gardens, views, and access to the exterior. A study of patients with natural or unnatural views found that those with a view of trees had a faster recovery time by several days with an increased ability to deal with pain (Ulrich, 1984). It was found that views of scenes trigger routes along the brain where endorphin releasing nodes are highly concentrated, this increases when there are greater variances in light, movement, and color, so natural scenes trigger a significant boost (Sternberg, 2009). Hospital gardens offer several other health benefits, including exposure to sunlight which activates skin cells to produce vitamin D, and normalizes circadian rhythms, as discussed in relation to interior lighting, which regulates sleep hunger cycles and reduces risk of depression or loss of cognitive ability (White, Ancoli-Israel & Wilson, 2013).

A well-designed garden can instill a sense of control by providing choice of route, opportunity for exercise, or space for privacy. Gardens provide positive visual distraction and

offer opportunity for all the senses to be engaged through texture, artwork, water features, and scented planting. Daily and seasonal changes offer a contrast to the constant of the interior, and a study found 95% of respondents (staff, patients and visitors) felt an improvement in mood after time in a garden (Marcus, 2006). Despite this, there is a lack of guidance concerning external spaces in hospitals, for example, there is no HBN, suggesting that either gardens are not commonplace in UK hospitals, or are not regarded at the same level as the interior. This could be due a shortage of space, budget constraints, a view of gardens as a luxury, or the UK weather.

Measures can usually be taken to incorporate nature internally with green roofs, or internal planting. Benefits can also be achieved through use of imagery, as nature based artwork can significantly reduce stress, with similar psychological effects as visiting a garden (Ulrich, 2006). Organic forms and natural materials can evoke a feel of the outdoors, while new technologies can replicate sunlight or create a more dynamic experience for those unable to access the outside. However finishes should always be selected with consideration for cultural and symbolic references. Age appropriateness must be considered also, as interventions with an extensive use of technology may be unfamiliar to a patient and could alienate them, outweighing other advantages.

An ideal hospital for wellbeing will therefore have good provision of outdoor space, which should engage all the senses with interest points for visual stimulation, and routes to promote movement. Elements should be replicated internally to benefit those who cannot access gardens.

Considering the above discussed key design principals from the four zones, the key characteristics and features of spaces that are beneficial to dementia patients and their treatment within the hospital environment were proposed in an assessment framework, as shown in Table 2.

Table 2 - Framework of criteria for wellbeing-focused design for dementia patients

1 - Access	2 - Use	3 - Space	4 - Performance	5 - Character and Innovation +	6 - Form and Materials	7 - Internal Environment	8 - Urban and Social Integration
Easy to access with minimal or no assistance *	Clear point of contact and work areas to disperse staff *	Quickly readable and understandable space *	Design features that limit stress and anxiety*	Display competence through high-quality finish	Well planned and intuitive circulation routes *	Individually controllable local environment *	Good provision of usable outdoor space *
Ability to monitor entry and exit for security	Provide space to facilitate both social and independent activities *	Not overwhelming in scale	Optimised building design for passive health and healing *	Conducive to privacy and social interactions as desired	Suitable surfaces to assist access and mobility	Maximised use of natural light and sunlight	Provide connections to nature (real and imagery)
Provision of rest points to assist mobility and access	Appropriate design for the building/ward function, with visual cues to identify its use.	Visual interest and positive distractions. Ideally engaging of all the senses.	Enable easy patient monitoring for observation and security	Provide reassurance and a welcoming aesthetic	High quality materials to reflect level of care	Provision of acoustic privacy	External views and access for orientation and connection to outside world
	Unified design and equal consideration for all zones	Clear zoning to demonstrate different functions	Promote movement and exercise for any ability	Promote sense of dignity and scope to personalise patient area			Positive addition to local area with appropriate scale

Note. Criteria marked with asterisk (*) = character noted as particularly significant, i.e having the greatest impact in the creation of an ideal ward environment for wellbeing.

Column 5 – Character and Innovation, is highly connected to personal perception and whilst a judgement can be made as to whether a ward is well kept and pleasant, the full impact of the character of the ward will vary patient to patient.

4.0 Overview of Case Study Wards

Three NHS wards, that had undergone refurbishment with wellbeing-focused design principals, were analyzed against the framework (Table 2). Tables 3 and 4 illustrate hospital and ward profiles.

Table 3 - Profiles of visited hospitals

Descriptions	Hospital Number		
	1	2	3
Founded	1897	1902	1979
Size (approx. Bed number)	400	600	500
Population Served	270,000	-	320,000
CQC Assessment Band*	2 (assessment year 2015)	1 (assessment year 2015)	3 (assessment year 2014)
Visitor Satisfaction	80%	84%	95%
Staff Satisfaction (Care Provision)	75%	68%	87%
Staff Satisfaction (Place of Work)	63%	49%	73%
Hospital Type	NHS Trust	NHS Foundation Trust	NHS Foundation Trust/Private

Note. * The CQC scores are generated from a detailed assessment of all wards in the hospital and consider many factors including management, care-giving and administration. Scores are; 1(inadequate), 2(Requires Improvement), 3 (Good) and 4(outstanding).

Table 4 - Profiles of visited wards

Description	Hospital Number		
	1	2	3
Date Visited	18/12/2015	01/03/2016	10/03/2016
Staff Interviewed	Ward Sister/Senior Dementia Care Nurse	Ward Manager/Clinical Care Advisor/Elderly Care Doctor	Ward Manager/Estates R&D Officer
Number of Beds	20	24	24
Dementia Specialist Beds	20	8	10
Building Age	50+ Years	30+ Years	30+ Years
Most recent refurbishment	2013 (2 Wards)	2014	Ongoing (incremental)
Refurbishment Cost	£500,000 (2 Wards)	Unknown	£200 - £500 regularly
Funding Source	Government/National Funding	Charitable	Charitable
Brief Description	A female elderly care ward, specially designed for dementia with guidance from the Kings Fund. The ward has 5 bed bays, several staff areas and social areas in former side-rooms.	The elderly care ward contains a sub-unit for dementia, typically used by advanced stage patients. It has two specialist bays and a lounge.	The elderly care ward contains two dementia bed bays. Several small projects have been undertaken to improve wellbeing through design.

Hospital 1 had an extensive refurbishment following formal procedures with hospital leadership and external design team. Work included replanning of bed-bays, conversion of side room to lounge, and new staff bases, reception, fixtures (doors, ironmongery, plumbing, seating) lighting, ventilation, bedhead trunking, and finishes throughout. The ward manager, WMH1, reflected positively saying, "It certainly has improved people's health, we had 130 serious falls in the year before we started the work and in the year since we finished it's been around 60. We have found that our patients can be more independent now and that makes them happier and more engaged." Table 5 shows patient incident rates before and after the project.

Table 5 - Incident report following ward refurbishment, hospital 1

Incident Type	Reported Number of Incidents in 4 month Period (1st Jan-30th April)			
	2013 (Pre-Refurbishment)	2014 (Immediately following refurbishment)	2015 (Post-Refurbishment)	Overall Percentage Change
Incidents resulting in no harm	60	31	26	-57%
Incidents resulting in low harm	24	25	16	-33%
Moderate incidents	9	2	2	-78%
Severe incidents	3	2	2	-33%
Total number of incidents	96	61	46	-52%

The results have been measured and provided by the ward staff.

Hospital 2 was charitably funded with a smaller refurbishment, but underwent similar administrative procedures to Hospital 1. Work included some upgrades of fixtures and finishes, and a conversion of side room to lounge. The ward manager, WMH2, described work as having lost its ambition along the way, and partially attributed this to bureaucracy. She did not view the result as a meaningful improvement saying, "I don't see that the environment has much impact on the patient's wellbeing," based on a lack of improvement for patient outcomes since completion.

Hospital 3 was also charitably funded, but at a very small scale, making incremental changes such as introducing seating or activity areas, or updating finishes, without organizational intervention. Consequently, over time facilities have been considerably improved, without loss of funds and effort through bureaucratic processes. However, this approach is slow, and restricts the scope of work to minor, typically aesthetic adjustments, as substantial upgrades that involve altering layouts, facilities, and services require greater funds and organizational input.

The refurbishments had a significant impact for staff. Speaking about improvements to the working environment WMH3 said, "this is the main reason I think our falls are down, because we have a good team that is working together and are happy working here so they take the time to care properly." Conversely a lack of enhancement over time can demoralize. WMH2 explained, "I have been in this ward for 10 years and we have done nothing to change the layout, just decoration for the dementia rooms. We do not crave for better because we know it will not change." Environmental improvements appear to be important for staff satisfaction. They could be seen as a demonstration of care from the hospital, however it is important that changes are meaningful, as the underachievement of the work at Hospital 2 left staff demoralized, despite some enhancement.

For patients, there was skepticism about the ability of design to improve wellbeing or care outcomes across the whole patient group. Doctor GDH2 felt, "some patients with very advanced dementia won't know where they are so the ward design will not make much difference in that case, but in patients with mild or moderate dementia the environment can have a very big impact on their life and recovery." It is important to consider such staff views, which may highlight a bias or show design limitations. To investigate this greater post-occupancy analysis is required. This was only undertaken at Hospital 1, where it was required

as a funding condition. Such analysis would ideally be standard, made available to designers and health-care providers as a resource.

5.0 Analysis and discussions based on assessment criteria

A summary of findings against the framework is presented in Table 6. Further summary of criteria articulated by staff for a good environment for dementia patients is shown in Table 7.

Table 6 - Summary of findings for the satisfaction of criteria during observational ward visit

1 - Access	2 - Use	3 - Space	4 - Performance	5 - Character and Innovation [+]	6 - Form and Materials	7 - Internal Environment	8 - Urban and Social Integration
Easy to access with minimal or no assistance	Clear point of contact with work areas to disperse staff	Quickly readable and understandable space	Design featured that limit stress and anxiety*	Display competence through high-quality finish	Well planned and intuitive circulation routes	Individually controllable local environment	Good provision of usable outdoor space
Not generally achieved, often lengthy and unclear arrival route	Reception seen as beneficial, but not always easy to locate	Good in small wards, relates to entrance and reception positions	Attempts to create homely environment and support for theory	Varied by ward, consistent overall design works best	Simple layouts but not always easy to navigate	Generally not provided, only control of local lighting, staff reliant	Not achieved in any ward visited
Ability to monitor entry and exit for security	Provide space to facilitate both social and independent activities	Not overwhelming in scale	Optimised building design for passive health and healing	Conducive to privacy and social interactions as desired	Suitable surfaces to assist access and mobility	Maximised use of natural light and sunlight	Provide connections to nature (real and imagery)
Mixed results, layouts not optimised for security	Social spaces provided in all wards, activities dependent on staff	Wards all good size, perception of scale from understanding of space	Layouts not optimised for health, noise and light key factors	Privacy issues in all cases, difficult to change conditions	Varied, some poor floor surfaces seen	Not achieved in any ward visited	Imagery used in all wards but varied impact
Provision of rest points to assist mobility and access	Appropriate design for the building/ward function, with visual cues to identify its use.	Visual interest and positive distractions. Ideally engaging of all the senses.	Enable easy patient monitoring for observation and security	Provide reassurance and a welcoming aesthetic	High quality materials to reflect level of care	Provision of acoustic privacy	External views and access for orientation and connection to outside world
Seating in corridors provided in all wards	Medical typology used, dementia-specific design attempted	Not many positive distractions, but some decoration	Observation difficult due to some layout issues	Use of colour and staffed desk attempted, varied results	Dependant on funding and clear design strategy	Not achieved in any ward visited	No access in any ward visited, views generally poor
-	Unified design and equal consideration for all zones	Clear zoning to demonstrate different functions	Promote movement and exercise for any ability	Promote sense of dignity and scope to personalise patient area	-	-	Positive addition to local area with appropriate scale
N/A	Existing layouts meant non-clinical facilities often a clear addition, not integral	Social zones shown, but little further differentiation	Corridors with handrails but not always clear of equipment	Not generally seen, highly standardized bed areas but attempts to make personal	N/A	N/A	Buildings not related to surroundings, large campus hospitals

Key

☐ Framework Criteria
☐ Note of Observations Made

Table 7 - Criteria articulated by staff for a good environment for dementia patients

Criteria	Raised by Interviewee				
	GDH2	WMH1	WMH2	CAH2	WMH3
A 'homely' or non-clinical feel	Y	Y		Y	Y
Ability to display personal items	Y	Y	Y		Y
Visual stimulation (pictures and artwork)	Y			Y	Y
Relaxing atmosphere	Y	Y			
Open plan or non-compartmentalised	Y	Y		Y	
Good lighting	Y	Y		Y	Y
Good ventilation	Y				
Promote social interaction	Y	Y		Y	Y
Prioritise medical function	Y				
Enable good supervision	Y	Y	Y	Y	Y
Measures to prevent falls	Y	Y	Y	Y	Y
Overall small scale ward/building	Y				
Ability to play music on the ward	Y				Y
Good flooring (for first impression and fall prevention)		Y			
Encourage mobility		Y		Y	
Rest points		Y			Y
Uncluttered and tidy		Y	Y		
Good acoustics		Y	Y	Y	
Dedicated quiet room		Y		Y	Y
Promote independence		Y			
Improve staff morale		Y	Y		
Use of color coding		Y		Y	Y
Dedicated reception area		Y			
Multiple nurses stations		Y		Y	Y
Large spaces/not cramped			Y	Y	
High privacy level			Y	Y	Y
Individual rooms			Y		
Shared bed bays				Y	Y
Views outside to nature				Y	Y
Garden Access				Y	
Consistency of overall aesthetic					Y
Good signage					Y

These criteria are from the 5 out of 7 interviews that were recorded and transcribed

Access. Upon arrival in all three hospitals, the scale and arrangement of multiple buildings presented issues for locating the correct site and entrance. Subsequent routes to the wards were lengthy and complex, with only Hospital 3 having clear, color-coded, consistent signage. While this helped satisfy the criteria *'easy to access with minimal or no assistance'*, the existence of extensive signage was symptomatic of the fact the buildings are not intuitive. Since patients could have memory loss, visual impairment or reduced mobility, this was a considerable shortfall.

The criteria *'ability to monitor entry and exit for security'* was discussed most at Hospital 1, where the agitation caused by security measures was attempted to be overcome with a lounge near the entrance to provide an alternative focus to the door, which they found patients would be drawn to. Additional seating at reception further allowed patients to be near the door, without causing obstruction. While this was reasonably successful, an alarm sounded when patients got too close the door, which was distressing to some and highlighted their restrictions as a patient.

Use. Operational success was found to be largely dependent on the position of the staff-base, relating to a *'clear point of contact and work areas to disperse staff'*. In Hospital 1 there was a reception which was staffed during the day, and separate from the clinical touch-down bases in the corridor. The reception meant access was monitored, and visitors had an immediate point of contact. WMH1 felt, "the reception area is a big success, we used to come in and arrive into clutter and madness but now that is much better and there is a proper area to speak to people." In the other two wards the nurse's station served visitors alongside performing a clinical role. In Hospital 2 there was no clear view of the door from the nurse-station, with patient rooms accessible between the entrance and station. This caused security issues, and the location formed a bottleneck, limiting staff dispersal and reducing visual presence across the whole ward, as shown in figure 1.

Figure 1 - The main reception and staff base, which is poorly located in a busy central area creating a bottleneck

As the wards were optimized for bed space, adding non-clinical areas was a common issue. Hospitals 1 and 2 converted a side room to a lounge, with Hospital 3 planning similar work, this aligns with the criteria *'Provide space to facilitate both social and independent activities'*. Hospital 1 had several such spaces; a lounge/TV room, a quiet room, and a corridor break-out space with projector screen. The break-out space was well-used, and patients could come and go freely as there was no door, which also allowed staff to monitor the area easily. Hospital 3 zoned part of each bed bay for activities. This had a table with tablecloth, flowers, and tea-set, an armchair, TV, record player, and sensory and reminiscence items. While small, the intervention was well used demonstrating how non-clinical space can be provided despite restrictions. A seating area in the corridor had bus-stop signage, with plans to add a road scene behind, see figure 2. WMH3 reported that this helped with agitation since some patients responded to the familiarity of the everyday activity of catching a bus. This adaption is age-appropriate, low cost, and has no requirement for additional space. It also fits with ward activities intended to maintain connections to the outside world. WMH3 felt social activity was paramount saying, "it is interaction mostly, it is so important for them. That's why we try so hard with the activities."

Figure 2 - A seating area with a small intervention of 'bus stop' signage to add interest, in an otherwise functional but cluttered corridor

Space. The requirement for *'quickly readable and understandable space'* relates to many points raised in access. Despite navigation issues with the wider context, each ward was clearly laid out with simple planning, assisted by their modest size and division into shared bed bays. Hospital 1 was most easily understood, with bed bays on one side of a linear corridor, and side-rooms, social areas, and offices on the other. From the entrance this arrangement was immediately clear, with the reception by the door allowing for a natural pause before going into the ward. Hospital 2 and 3 both had T-shaped wards, which were initially less clear, since you could not see the full extent of the space. There were few visual clues to show the use of the ward in any case, although good signage with color, text, and symbols in Hospitals 1 and 3 helped with orientation.

Performance. When asked to describe an ideal space for dementia patients, interviewees' responses (Table 7) focused on space that enabled good supervision and staff distribution, and interventions that promote mobility and prevent falls (5/5 respondents). Other common answers referred to a homely feel, social space away from the bed, good lighting, and space to display or keep personal items (4/5 respondents). These common suggestions align with the criteria for performance, and were often discussed in relation to *'design features that limit stress and anxiety'*. CAH2 said, "regardless of their cognitive state they want to be home. If we could make it more homely we might ease that distress." She explained the benefits for both patient and management since "anything you can do to make it nicer means people leave quicker, and getting patients out quicker has a financial impact – so why not spend the money in the first place, and the turnover would be better and the financial impact justifies it all." This is significant as any improvement to the ward environment must align with a business case.

The criteria for *'Optimised building design for passive health and healing'* was raised in relation to daylight (4/5 respondents) and external views (2/5 respondents). In each of the wards, the bed bays had windows adjacent to only two out of four or six beds in the room. CAH2 commented that a difference could be seen between the engagement of patients closest

and furthest from the windows, to the extent that those in beds closer to the windows were noted to leave faster. The reverse was noted with proximity to the nurse-station. Beds nearby were disrupted by noise, impeding sleep, however high-risk patients had to be close to the staff base for ease of observation.

It was highlighted by the interviews that provision of space alone is not enough to enhance wellbeing. Staff must commit to new spaces, particularly a non-clinical areas, as part of a patient care plan. In Hospitals 1 and 2 the lounges were underused by patients independently, and were instead typically used with visitors. WMH2 felt, "having these areas is sometimes a good idea but they don't always get used if patients aren't mobile." She explained that the additional time needed to assist patients was a demand that could not be met. This raises a management issue, and a review of training or job role must accompany physical upgrades, in order to achieve the desired results.

Character and Innovation. Aesthetics were perceived as significant by nearly all staff, who cited reduction of clinical feel (4/5 respondents), color coding, and artwork (3/5 respondents) as important features. In Hospital 1, brightly colored walls marked the entrance to each bed bay, with a corresponding color scheme inside, see figure 3. WMH1 explained there were concerns during the design phase that the colors could be overstimulating. She was, "worried at first about too many bright colors but every bay being a different color helps with our management. Before, everyone seemed lost, I think because all the bays were the same so you didn't know where you were. The color coding has really worked, for us, and the patients."

Figure 3 - Brightly color-coded walls in the corridor that assist with wayfinding, with continuing color scheme inside each bed bay

In the other two wards, bright colors were also adopted, but in small areas, such as door-frames. Among the rest of the ward this was too subtle, particularly in Hospital 2, where colors were also used that did not relate to the coding, as shown in figure 4. WMH2 recognized the lack of result, saying, "they had the colors on the doors so we can say to them that you are in the green room. It didn't really work well, I don't think it made much difference." This shows how a single concept can result in different outputs, and how a lack of design guidance from

parties with experience of design for dementia, can result in unforeseen results. While there is

a cost association to this, it should be balanced against the potential for misspent funds.

Figure 4 - An entrance to a bed-bay with color coded frame that lacks impact as it is not distinguishable from the surrounding decor

Form and Materials. Although the framework suggested the main criteria was for

'well planned and intuitive circulation routes' spatial planning was more discussed in access

and use. What was found to be more significant in the visits was the use of appropriate

materials, since there was a direct conflict between clinical requirements and design for

wellbeing. As materials must not pose an infection risk, difficulties were faced when trying to

provide a non-clinical aesthetic. In Hospital 1 WMH1 said, "It was difficult to get some of the

more homely and soft furnishings into the lounge, but it makes a big difference having that

look, not a clinical area." The lounge is shown in figure 5. While these finishes were resisted

during the design phase, their eventual approval sets precedent for future use.

Figure 5 - A patient lounge with soft furnishings and decoration to evoke a sense of homeliness

Internal Environment. The criteria for an *'individually controllable local environment'* was evaluated for light, air, views, and privacy. None of these factors were optimized in the wards, although it should be considered that each was over 30 years old. However, little had been done to overcome shortfalls of the original design. Individual lighting was provided but only in the form of a single bedside lamp in each case, with no ability to control brightness. Ventilation and acoustics were not considered from the bed position and patients had no ability to alter conditions.

Urban and Social Integration. Accessible gardens were typically patio-style, while more decorative gardens were locked, for viewing only, such as the one in figure 6. This was attributed to reducing upkeep, limiting monitoring requirements, and security. None of the wards had direct access to gardens, and only Hospital 2 had a view, albeit to a simple hard-landscaped space. This meant there was little satisfaction of *'good provision of usable outdoor space.'* Hospital 2 had high potential since a low rise building with courtyards offered access or a view from all wards. However, these were hard-landscaped for minimal maintenance and rarely used. CAH2 valued external areas saying, "it would be lovely if they had outside space.

It would be much more homely, which would be good for wellbeing, agitation would be less and that helps people recover. Maybe they would eat or drink better – simple things, but they make a big difference." While this supports principals advocated in the literature, other staff did not refer to external space, perhaps due to questions about the 'ward' environment, and a perception that gardens are not part of this. If so, there is a risk gardens do not receive equal input from medical staff.

Figure 6 - A small landscaped courtyard garden which provides a natural view but is locked for access so cannot be fully benefitted from

6.0 Conclusions

Overall the wards had a varied satisfaction of the framework criteria. The wards each attempted to implement strategies across all assessment categories, with the following criteria met in all facilities: 1. Promote a variety of social and independent activities, 2. Not overwhelming in scale, 3. Provide rest points to assist mobility and access, and to a lesser extent, 4. Limit stress and anxiety, and 5. Provide connections to nature (real and imagery). The last two points were considered important however the implementation and results were not always successful. Significant shortfalls were also observed, and the following criteria were not met in any wards: 1. Easy to access with minimal or no assistance, 2. Individually controllable local environment, 3. Good provision of usable outdoor space, 4. Maximized

use of natural light and sunlight, 5. Provision of acoustic privacy, 6. External views and access for orientation and connection to outside world and, 7. (Building/hospital) Positive addition to local area with appropriate scale.

In principle, staff were generally supportive of design for wellbeing, although each ward had a different approach to its application. In all wards, projects were found to be driven by individual staff, rather than hospital leadership. Positive results yielded further support for the approach, or continued improvements, whereas when results were lesser, skepticism regarding its limitations was observed more evidently. It seems overreliance on individuals, and failures in overcoming the budget, time and staffing constraints faced by all wards, can lead to missed opportunities, a risk in the development of the wellbeing-focused design field.

In the four zones of the hospital that were initially considered it was found that Zone 1, Arrival, had lengthy entrance routes and unclear wayfinding. Zone 2, Clinical Areas, had most consistency, as medical protocol was most prescriptive here. Zone 3, Non-Clinical Areas, revealed inconsistent provision of space, a significant downfall as patients often have little opportunity for interaction away from the bedside, and in Zone 4, External Areas, a lack of provision and quality was seen, with gardens that did not maximize benefits, although there was use of internal imagery.

The application of wellbeing-focused design theory appears to be varied at present, partly due to inconsistent funding and expertise. Within the industry there is a need for further research and implementation, with greater sharing of successes, failures, and post-occupancy evaluation, to limit mistakes or wasting of resources. Outside of the design sector the following should be addressed if it is to be adopted as a typical approach. Firstly, the importance of the right personnel and dedication to new initiatives from staff. This is a critical part of forming regular improvements, which are made based on experience and feedback. Secondly, the gap between design guidance and building legislation. Minimum standards typically contain uniform values for all patient groups, and little consideration for qualitative aspects, patient-group specific needs, or non-clinical space. As budgets were determined from legislative standards, funds were inadequate for high quality, effective

design despite evidence of reduced long-term cost. To improve quality, charitable funds were relied upon. This system is a lottery, dependent on location, history, and ward type.

Despite an observed interest in wellbeing-focused design within the NHS, a baseline of implementation is not yet established. Inadequate funding, outdated building stock, a lack of reflective analysis, discouraged staff, and insufficient legislation for wellbeing, appear to be the major limiting factors. However, there is a good level of support for design for wellbeing in both architectural and medical fields, with a growing body of research to substantiate this. The result is an increasing number of wards that provide case studies, the results of which must be analyzed to help overcome such obstacles.

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List of Interview Questions:

- Can you describe the key features of a space that is good for the wellbeing of dementia patients?

- Do you consider this environment to be 'good'? If so, why?

- Do you believe the design of the ward can offer medical benefits? E.g. can a good layout reduce stress?

- Are these benefits (if any) significant?

- What kind of impact does patient privacy, comfort and dignity have on health and recovery? How important do you think design aimed at improving this is?

- Should this type of design take less, equal or greater priority versus more traditional healthcare design which may appear clinical but is functional?

- Some of the suggestions for healing design I have come across seem to come with drawbacks. For example, offering everyone more privacy can make it harder to observe the ward as a whole. Do you think that medical care can be hindered by focusing the design on patient experience? How significant is this risk?

- What is the best feature of the design of the ward now?

- What is the worst feature of the design of the ward now, or what do think it would be most effective to change?

- Any other comments or experiences of design for wellbeing.