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## Developing interior design briefs for health-care and well-being centres through public participation

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Public participation is an increasingly important part of the design process for health-care environments and services. Public participation often occurs towards the end of the design process, rather than at the start where the biggest influence is possible. This research used a variety of methods to enable public participation from the start of the design process. Its aim was to examine potential end users' expectations and needs for the physical environment to develop interior design briefs for a well-being centre. Fifty-three Trust members at a London NHS Hospital, UK, were involved in structured group workshops. These consisted of surveys and open discussions, table discussions, and 2D and 3D designing. Analysis identified four over-arching themes; atmosphere, initial points of contact, waiting experience, and health assessments. The results, in combination with existing evidence-based research, led to the development of an interior design brief consisting of 26 design recommendations for a well-being centre. These may form the basis for any health-care and well-being centre, thereby adding to the growing body of evidence informing the design of future health-care physical environments.

**Keywords:** design brief; health-care centre; health-care design; participatory design; public participation; well-being

### Background

“Environments in which we live and work have a profound influence on our physical and psychological wellbeing” (Waller & Finn, 2004, p. 7). It is therefore vital that the physical design of health-care environments is supportive of people's well-being, as it can affect patients' healing processes (Devlin & Arneill, 2003), patients' and visitors' perceptions of the health-care experience (Ulrich et al., 2008), as well as staff morale and well-being (Payne, Potter, & Cain, 2014; Phiri, 2006). As public participation in health research is of intrinsic value (Barber et al., 2011) and patient-centred environments can improve safety, efficiency, and clinical outcomes (Ulrich, 2006), the public should be included in the process of designing health-care environments. This research is the result of a UK National Health Service (NHS) hospital's interest in the impact the physical environment may have on the success of its new service, a Wellbeing Centre. In particular, the hospital desired a public participation approach to enable future end users of the centre to participate in the design of its interior environment. Examining end users' expectations, preferences, and needs from health-care physical environments, can lead

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to the development of interior design briefs applicable for well-being centres and similar ambulatory health-care centres. Public participation often involves dialogues between different stakeholder groups about personal experiences of health care, specifically how services and environments might be improved (Crawford et al., 2002; Huisman, Morales, van Hoof, & Kort, 2012). However, involving the public in *designing* the environment helps to ensure a consideration of the end user from the start of the design process, not just in post-occupancy evaluations. Additionally, involving end users in the design process from the beginning ensures their needs and preferences can help determine the important environmental design features and attributes. These should then be included in the initial project design briefs to create a positive experience of health-care environments. Indeed, briefing should be inclusive and continuous, with end users as well as other stakeholders included (Jensen, 2011). For example, through interviewing end users, architects, and facilities management can understand the architectural qualities that end users appreciate (Nordwall & Olofsson, 2013). This can help result in environments that are user- and patient-centred focused and thus fit for purpose (Waller & Finn, 2004). Therefore, a public participatory approach can assist in the creation of design briefs and result in subsequent designs that match the specific needs of future end users.

An evidence base for appropriate health-care environment designs is also important and being established. This has included reviewing the relationship between a number of design features and attributes (e.g. presence of doors, windows, art, plants, floor/wall/ceiling coverings, offering privacy, etc.) and their impact on patient and staff outcomes (BMA Science & Education, 2011; CAGE, 2004; Devlin & Arneill, 2003; Dijkstra, Pieterse, & Pruyn, 2006; Payne et al., 2014; Phiri, 2006; Ulrich et al., 2008). Broadly, design features that provide access to daylight, views of nature, and reduced sound levels produce positive outcomes for patients and staff in health-care environments, such as reduced pain, improved sleep, reduced stress, and depression (Ulrich et al., 2008). To ensure these *proven* effects and not just *perceived* effects are taken into account, it is important to consider this evidence alongside public suggestions.

Creating environments from evidence-based designs and using patient-centred approaches can improve patient outcomes (Aiken et al., 2012) through increasing the efficacy and use of a health service (Douglas & Douglas, 2005). Thus, measures have been developed to ascertain health-care users' perceptions, interpretations, and evaluations of the environment and its design features and attributes (Andrade, Lima, Fornara, & Bonaiuto, 2012). This enables comparisons between designs by monitoring the success of environmental features during and after use. However, providing a new health service within a new environment prevents making such comparative assessments. Similarly, interviews may be difficult for end users when discussing an environment and service that does not exist. Instead, a variety of verbal and physical prompts may be appropriate to help to engage future end users in design discussions. Additionally, evidence-based research highlighting the importance of features within hospital wards may not be transferrable to ambulatory services. Therefore, it would be beneficial to develop interior design briefs for health-care and well-being centres by combining existing evidence-based research with public participation approaches.

This research used a London, UK, NHS hospital as a case study for future health-care and well-being centres. The provision of a new health service, within a new centre, intends to support hospital patients, carers, and staff on wider lifestyle issues relating to physical and mental health, such as smoking, drinking, physical activity, domestic violence, and disability benefits. The Wellbeing Centre aims to support behaviour change, offer psychological support, provide basic health checks, and signpost people to available services. The desire is to allow visitors to be able to complete computer-based health assessments alone (self-assessment) or alongside health professionals, or have private consultations. The Centre also wishes to address health inequalities and provide a service to those who "walk in" as well as those arriving

through hospital referrals. This description of the Centre and its planned service was considered part of the strategic brief, resulting from stage 0 in the Royal Institute of British Architects (RIBA) plan of work (Sinclair, 2013).

### **Aim and objectives**

Using a public participatory approach alongside evidence-based research, this study aimed to develop a series of design recommendations to create an interior design brief for health-care and well-being centres. Its purpose was to establish end users' expectations and needs for the physical environment of future well-being centres. To achieve this, the objectives of the study were to:

- (1) establish the important environment design features and attributes for future well-being centres from the perspective of end users.
- (2) examine the relationship between important environment design features and attributes and the spatial location and functions of service provisions within future well-being centres.
- (3) examine evidence-based research alongside end users' expectations and needs.

### **Setting and participants**

The London, UK, hospital's Trust Members and an existing Steering Group were invited by email to participate in the study. These members are patients, carers, employees, or local people interested in the hospital. To satisfy the NHS ethical board, no demographic data were collected, but from observation, this convenience sampling resulted in older adults and no staff members. Three group workshops were held at the hospital during weekdays with participants sitting four or five to a table. There were two tables in the first workshop ( $n = 9$ ), six tables in the second workshop ( $n = 26$ ), and four tables in the third workshop ( $n = 18$ ).

### **Research design**

Facilitated by the research team, group workshops lasted two hours, commencing with a description of the proposed service and location of the Centre (strategic brief) by the hospital's Public Health Specialist Registrar. Group workshops consisted of three sequential activities; (i) survey and open discussion, (ii) table discussions, and (iii) 2D and 3D designing with table discussions. Each task built on the perspectives developed and discussed in the previous activities. Participants were encouraged to ask questions and share thoughts. Dictaphones recorded all discussions.

### **Survey and open discussions**

A large display screen at the front of the room presented a survey consisting of multiple choice questions. Researchers emphasized that there was no correct response. Participants gave their opinion by pressing A, B, C, etc. on a wireless response device (Turning Technologies Audience Response System). This meant that their opinions were anonymous, unless they openly discussed them with the group.

Questions related to potentially important design features and attributes for the Centre as identified by the existing literature (Devlin & Arneill, 2003; Dijkstra et al., 2006; Phiri, 2006; Ulrich et al., 2008), such as atmosphere, ergonomics, waiting experience, and physical privacy for health assessments. Three to six response options were provided per question, and three questions were supplemented with images (Table 1). After each question, the software immediately displayed the group results to show the varied or similar views held and to encourage discussions.

Table 1. Multiple choice questions and response options.

Question	Response option	(Image description)
What atmosphere should the Wellbeing Centre have?	Traditional	(Rows of plastic chairs, plain colours)
	Homely	(Colourful cushions, landscape pictures, natural light)
	Modern	(Colourful, minimalist, natural light)
How long would you wait to see a health professional?	5 minutes	
	10 minutes	
	15 minutes	
	30 minutes	
	unsure	
If waiting to talk to a health professional would you want ...	Health information on the wall and stands to read	
	Art on the wall to view	
	An informative activity to do	
	Shop magazines and newspapers to read	
	The chance to start a self-assessment health check	
	To go elsewhere and be told what time they will be free	
How important is privacy in a Centre like this?	Very important	
	Quite important	
	Neutral	
	Quite unimportant	
	Very unimportant	
How should the Wellbeing Centre be organized?	Open plan	(No dividers)
	Half dividers	(Dividers that people can look over when sat down)
	Windowed dividers	(Floor to ceiling dividers with a window)
	Full dividers	(Floor to ceiling dividers, no window)

### Table discussions

Researchers asked participants to discuss their preferences for design features and attributes with other people on their table. To get the discussion going, exemplar design features and attributes were presented by the research team; atmosphere, privacy, comfort, waiting time, colour, sound levels, lighting, location, access, and relaxing. Participants were also encouraged to include others. Participants could write their most and least important design features and attributes for well-being centres on post-it notes and place them on the appropriate sheet of paper (most or least).

### 2D and 3D designing

Each participant received a scaled (1:33) 2D architectural paper plan of the case study Wellbeing Centre (Figure 1, left). In addition to the plans, the researchers provided each table with a scaled (1:33) 3D architectural model of the physical structure of the case study Wellbeing Centre (Figure 1, right). The external walls and doors of the model Centre were not alterable, however, additional wall dividers and moveable furniture, such as tables, chairs, and sinks,

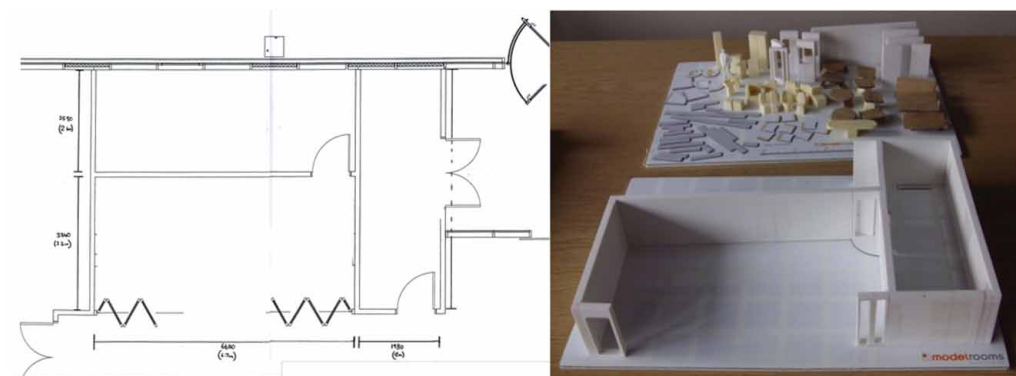


Figure 1. Designing layouts: 2D models (left), 3D drawing plans (right).

were provided. Researchers took Polaroid photographs of completed 3D models which participants annotated to explain their design. This was to aid the analysis process after the workshops.

Using the plans and models, participants drew or created their preferred layout and arrangement of features they considered necessary for well-being centres. Exemplar features to potentially incorporate into the designs were presented (desks, seats, computers, waiting seats, receptionist desk, printer, scales, height charts, storage of equipment, and sink for health professionals). Two different formats (2D/3D) were used to account for varied spatial abilities and preferences for visualization tasks (Hoffler, 2010). Dictaphones recorded the discussions people had during this activity.

### Analysis

Numerical counts and percentages from the survey responses were calculated. All participant discussions were transcribed verbatim. Comments made during the survey's open discussions were content analysed. All table discussions and written information on post-it notes were coded independently in NVIVO by authors SP and JM using a semantic approach of theoretical thematic analysis (Braun & Clarke, 2006), before arriving at a common agreement. The 2D plans and 3D annotated photos were content analysed by examining the presence, position, location, and terminology for all features.

Participants were free to choose their level of involvement, thus participant sample sizes vary throughout the results. Documented survey responses range from 13 to 46 participants (in part due to software issues), an unknown number were involved in table discussions (the only count could be trying to determine different voices on Dictaphone recordings), 35 participants completed 2D plans, and 7 tables produced a 3D model. Analysis from the three activities was combined due to the large overlap in discussions held across the activities. This places the focus of the study and this paper on developing interior design briefs rather than an examination of the success of each activity as a participatory tool. Large quotations are referenced to the participant's group workshop number (1, 2, or 3), followed by the activity occurring when the quote was made (survey and open discussions = S; table discussions = T; or 2D/3D designing = D), and their table number (1–6).

### Results and discussion

Four over-arching themes were identified from the triangulated data; atmosphere, initial points of contact, waiting experience, and health assessments. These compare with two factors identified in



ambulatory health-care servicescapes (Lee, 2011); ambient and serviceability factors. The ambient factor contains the same aspects as the atmosphere theme, namely, acoustics, visual attractiveness, lighting, and furniture. The serviceability factor contains aspects relating to the initial points of contact theme (e.g. convenience in the layout, communicating with staff) and the health assessment theme (e.g. cleanliness, communication, and privacy). This study therefore adds to the serviceability factor by including the waiting experience theme and its aspects of choice.

The four identified themes are discussed below, in turn, in relation to their importance and spatial location as environmental design features and attributes for health-care and well-being centres. Design recommendations resulting from each theme are provided, which together create an interior design brief.

### *Atmosphere*

Atmosphere was defined to participants as the ambiance created by an environment's physical features and includes the décor, furniture, sounds, and lighting. A homely ( $n = 23$ ) or modern ( $n = 21$ ) feeling atmosphere was preferred by respondents of the survey compared to a traditional health environment ( $n = 2$ ). Participants wanted the environment to be "homely" and to "break down the formality of a normal hospital" (2D1). The need for a "relaxing, comfortable, inviting" (2T6) and "cheerful" environment was enthused, with a sense of "informality" given this Centre's services. This matches the growing trend in hospital designs to provide homely environments and hotel-like features (Bromley, 2012) in non-clinical spaces.

### *Décor*

Artwork was "not important" for some participants but freely suggested by others, while "colour's nice but it's not crucial" (3D4). The perceived lack of importance for these design features may have been because participants felt the "higher priority" service aspects for this Centre still needed to be determined, therefore, art and colour were momentarily inconsequential. Prior research however has identified art and colour, particularly blue and green, as important for achieving a friendly and welcoming atmosphere that looks interesting for patients, staff, and visitors (Dalke, Littlefair, & Loe, 2004).

Planting was discussed by participants during the workshop ( $n = 6$ ) and included on their 2D designs ( $n = 7$ ), as they would help achieve a "cheerful", less clinical look and are "healthful + relaxing". Their inclusion would help in providing a homely atmosphere, and natural elements can reduce stress and promote relaxation (Grinde & Patil, 2009; Kaplan, 1995; Ulrich et al., 1991). Therefore, hospital regulations permitting, plants would be ideal for contributing to an atmosphere suitable for health-care and well-being centres.

### *Furniture*

When designing layouts, participants included a number of areas for seats to be located rather than all positioned in one specific area ( $n = 12$  out of 35). The desired interaction level with fellow visitors dictated the arrangement of the seats, as face-to-face scenarios made some feel uncomfortable; "everyone just sits in a row looking at each other feeling embarrassed" (1D2). Therefore, circular seating where people face outwards was desirable as "seating in curves and groups not in straight rows [*was said to*] add to comfortable informality" (3T2). Additionally, low tables in consultation areas were preferred rather than desks because it is "off-putting if somebody's sitting at a desk ... [*as it*] ... makes it feel more formal" (3D3).



“Movable” chairs were desired by some including for access; “we don’t want rows of chairs where you can’t move them, so if there’s someone with a wheelchair ...” (1D2). Moveable chairs allow visitors some form of control over their environment. This enables visitors to create their desired personal space and feel at ease, thereby, preventing an increase in anxiety resulting from a lack of control (Ulrich, 1991). Instead of choosing one type of seating style a variety was desired, as highlighted by the terminology participants used on their 2D designs; bench, settee, sofa, seat, seating, chair, casual chair. Usability issues were often mentioned; requests for “good seating” that is “easy to get out of – higher” (2T2) were made. Overall, participants regarded the type of furniture available as important in making well-being centres inclusive for all potential visitors.

### *Sounds*

Participants sought a “peaceful environment” and a “quiet place” as “you need to be relaxed in a centre like this, so you don’t want it to sound like Paddington [train] Station” (2D1). Unfortunately, excessive sound levels are often found in health-care environments (Akansel & Kaymakci, 2008; Busch-Vishniac et al., 2005; Okcu, Ryherd, Zimring, & Samuels, 2011), which can make it “very hard to hear specific advice if background noise is high, especially for elderly” (2T3). Adding music was considered by some – “you could go in for soft music; not too loud, I mean quality music” (2D1). However, as differences exist between younger and older health-care users in the definition of relaxing or quality music (Liu & Tan, 2000), its successful incorporation is difficult.

### *Lighting*

“Two things that are important, lighting, natural lighting” (2D5). Natural lighting in particular was preferable as florescent lighting was potentially “very depressing” and participants said avoid “harsh” lighting. Existing research also shows the importance of daylight on people’s moods and perceptions of the environment, while exterior window views reduce stress and quicken the healing process (Dalke et al., 2004; Devlin & Arneill, 2003). Positioning lighting at low levels as well as high up helps end users who are visually impaired, or in wheelchairs, as well as children’s navigation of an environment (Dalke et al., 2004). Overall lighting was seen as “very important” and effective lighting design may enhance the perception of the environment, waiting experience, and influence views of the service (Pruyn & Smidts, 1998).

### *Atmosphere design recommendations*

Participants wanted health-care and well-being centres to have an atmosphere of modernity and comfortable “homeliness”. The following specific design requirements were produced and are presented in the order of importance:

- A1. Maximize natural lighting and use artificial lights carefully.
- A2. Include lighting positioned at a low level to help the visually impaired (Dalke et al., 2004).
- A3. Manage sound levels so that a quiet, peaceful centre is created by:
  - considering the room acoustics (arrangement of physical structures and materials),
  - considering the position of each functional area,
  - exercise caution in adding unrelated sound sources (e.g. TV or music),
  - provide auditory privacy in health assessment areas.

- A4. Soft, comfortable, informal, furnishings with a variety of ergonomic seating styles are recommended rather than confrontational, formal chairs and desks.
- A5. Add plants if hospital regulations permit.
- A6. Use tonal colours to provide contrast for those with impaired vision (Dalke et al., 2004).
- A7. Avoid strong colours, which can be over stimulating for those with mental health problems (Phiri, 2006).

### Initial points of contact

Initial points of contact related to access to and within health-care and well-being centres, their entrances, and receptions. First, to ensure inclusive access to these services the centre “must be easy to locate and reach” (3T1) and “accessible for both disabled and able users” (2T3). This included providing large doors, space to manoeuvre within the centre, and movable seats by the computer terminals to accommodate wheelchairs and pushchairs.

The entrance for the case study Wellbeing Centre was largely positioned in the 2D and 3D designs in its existing location by the concertina entrance doors ( $n=18$  and 4, respectively; Figure 2). A few participants located a new entrance at the side ( $n=8$  and 1) of their 2D and 3D designs to make access easier from the main hospital entrance (Figure 3), or as an extra entrance to a separate private consultation area. A reception was frequently located on participants’ 2D and 3D designs close to their entrance ( $n=19$  and 2, respectively), as “surely you want to go to reception first?” (3D4) as “somebody’s got to see you when you come in” (1D1). They considered its location important because “putting it in the corner ... people won’t want to walk across into it” (2D1). Participants viewed reception desks as potentially “intimidating” and “better to have [at] eye levels” (2D1) for staff–visitor interactions to create a welcoming feeling. Additionally, as reception desk areas are prone to queues and congestion (Vos, Groothuis, & Van Merode, 2007), a location near the entrance may prevent the internal areas

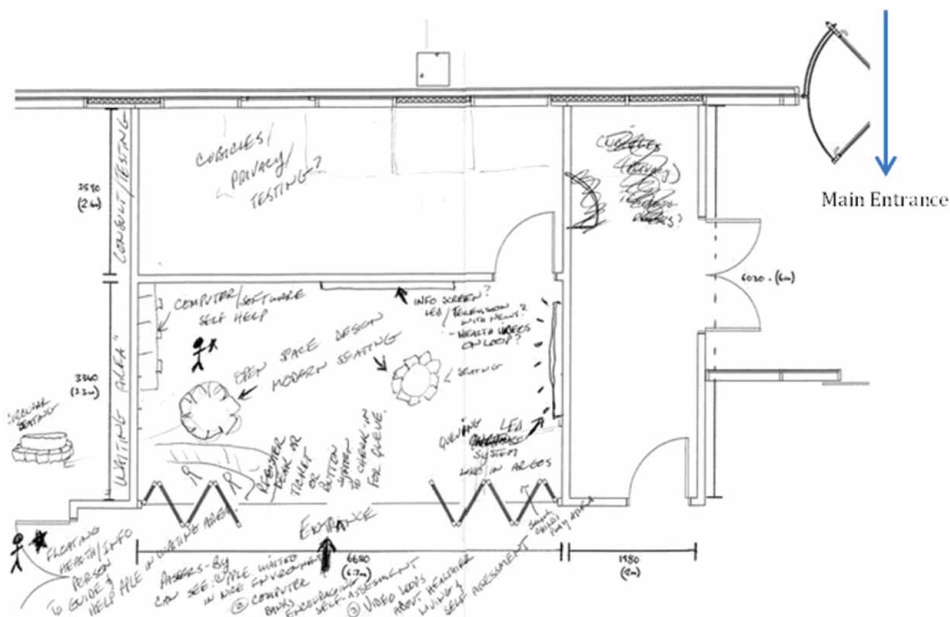


Figure 2. Location of the entrance at the existing location (3D4).

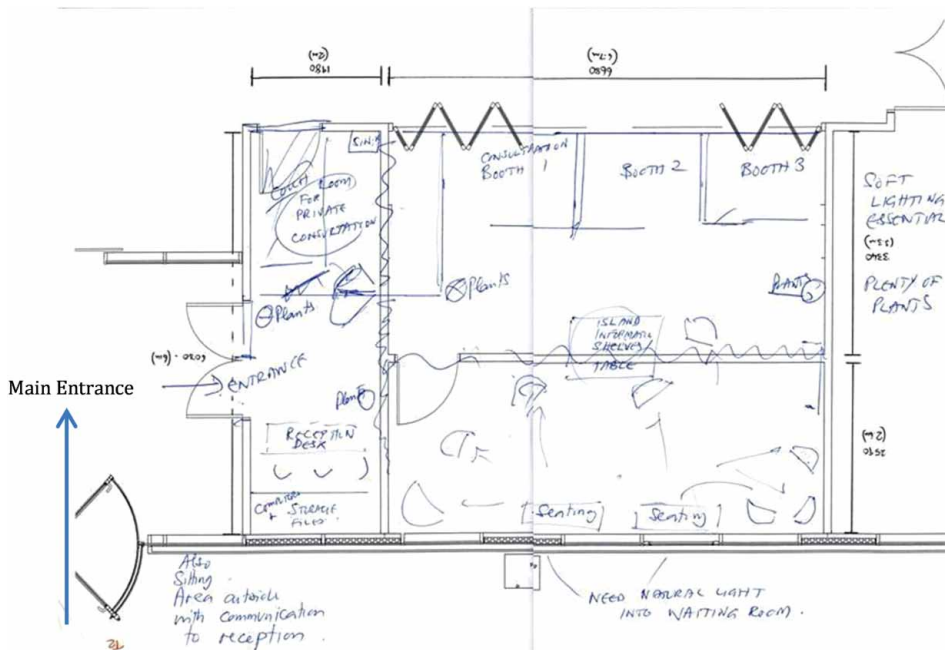


Figure 3. Location of the entrance adjacent to the main hospital entrance (3D2).

from becoming crowded. However, it also needs to be in a suitable position so that it does not disrupt the flow of people in and out of well-being centres or adjacent corridors (NHS Estates, 2004).

Participants acknowledged queuing for services was inevitable at times, but information on waiting times was important. During discussions and in participants' 2D designs ( $n=4$ ), an entrance-based queuing system that also provides information on waiting times was identified; "otherwise she [the receptionist] is going to be interrupted constantly" (2D1). Participants believed that this would produce an efficient process that would decrease waiting times.

#### *Initial points of contact design recommendations*

The following specific design requirements were produced:

- IC1. Suitable doors and sufficient space to enable easy access for wheelchairs and pushchairs.
- IC2. Provide a visible reception, located a short distance from the entrance.
- IC3. Provide a visible and clear queuing system that communicates waiting times and is visible from the reception and waiting areas.
- IC4. Furnishings should encourage staff-visitor interactions to occur at the eye level.

#### *Waiting experience*

In participants' 2D designs, the waiting area was located in the internal section of the case study Wellbeing Centre ( $n=30$  out of 36), rather than by the windows despite natural lighting being preferred. However, seats were positioned next to the large glass concertina entrance doors in some of these designs ( $n=7$ ). This position would offer an extended viewpoint into the hospital,

thus, providing a feeling of expansiveness rather than claustrophobia. Participants also suggested an “overflow waiting area” (2D2) immediately outside this Centre.

Participants completing the survey were generally unsure of the length of time ( $n = 5/13$ ) they would wait to see a health professional, as it would depend on their health scenario. However, 8 out of 10 tables considered waiting time as an important factor; “time is precious” (2T4) and “long waiting times can make one inpatient” (3T2). Frustration and avoidance of the service (“I’d walk out I think” 3T1) were said to arise from long waiting times (>30 minutes). Existing studies suggest 11–30 minutes is an acceptable waiting time for health services (Pruyn & Smidts, 1998).

A “comfortable” and “relaxing” waiting experience without the feeling of “being crowded and squashed” (3D1) was desired by participants. The opportunity for “waiting in a nice environment” (3D4) also increases the chance of people staying to use the service, while unpleasant waiting areas and long waiting times result in negative emotions and decreases the perceived quality of a service (Pruyn & Smidts, 1998). During design discussions, participants suggested important features to help in creating a pleasant waiting experience, including a café or refreshment area ( $n = 5$ ), as “people feel more comfortable and they’ve got something to do... if you’ve got to wait. Just sort of calm yourself down” (3D3). Another suggested a small child’s play area. There was variation in participants preferred things to do or see while waiting; “you could sit and do your own thing or you could gather information. So there are different ways to wait” (2D1). Initially, during the survey though, many participants wanted to go elsewhere while waiting for their appointment ( $n = 7$  out of 16), while others would start a self-assessment ( $n = 3$  out of 16), as this “would cut down on the waiting time” (2S4).

Information screens, stands, and leaflets were considered important during design discussions ( $n = 8$ ), with various positions suggested for the differing information. For example, a participant suggested placing information leaflets outside a well-being centre to clarify the aims of the service; “something like questions and answers, like you know the top 20 things ‘Will my records go to my GP?’” (3D3). This also acts as “something to sell it [*the centre*]” (2D1). Additionally, participants suggested a small promotional area that could change on a monthly basis, advertising health support groups, illnesses, and associated charities. To prevent overloading visitors with information displays, position different types of information in their own, appropriate area.

Opinions were divided on distraction activities, such as a TV; “don’t want television blaring” (2T2); “diversions, entertainment of any kind, [*should be*] avoid [*ed*] 100%” (3T1); “a TV room [*with*] a cushion area [*for*] sitting down and relaxing” (1D1). Although a TV can reduce perceived waiting times for some, it also negatively impacts on others’ waiting experiences (Pruyn & Smidts, 1998). Participants suggested information screens showing videos about “healthy living” though. This type of related information may be more acceptable to those who dislike TVs in communal areas. Disseminating related information while people are waiting is a recommended form of practice (Ajayi, 2002).

### *Waiting experience design recommendations*

The following specific design requirements were produced:

- WE1. Ensure waiting times are less than 30 minutes.
- WE2. Provide a comfortable and relaxing waiting area, possibly through the provision of refreshment facilities and a children’s play area where necessary.
- WE3. Clearly display waiting times by the entrance and waiting areas.
- WE4. Present different types of well-being information in different areas to avoid a cluttered and complex-looking environment.

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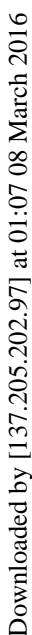
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area] offer shields when modesty is important?” (3T4). Similarly, providing privacy for weighing scales was also important for some participants, because “if they’ve got to weigh you or measure you and some people are coming for obesity problems they want privacy” (2D3). Indeed, for the 2D designs that included scales and height charts, half positioned them within the individual consultation rooms ( $n = 5$ ).

Auditory privacy was a greater concern as participants “would not like strangers to hear problems” (3T1) as “patient confidentiality must be respected” (2T3). In some instances, in order for the visitor to hear the health professional, the latter may need to talk louder, which results in other’s overhearing. Yet it is “important for people to feel free to talk about what may be very personal or intimate matters” (2T3) as “it might make you less likely to give your own information because you know other people are going to hear” (1S1). This could potentially result in the provision of inappropriate advice.

A number of solutions addressing these issues were suggested by participants, including (i) providing individual rooms; (ii) avoiding the sole use of curtains or screens, which only offer visual privacy; (iii) adequate sound proofing, including non-reflective surfaces and soft surfaces to absorb sound; and (iv) considering soft, quality, music. Indeed, closed private rooms can effectively reduce privacy breaches in emergency departments and other health-care environments (Olsen, Cutcliffe, & O’Brien, 2008; Ulrich, 2006).

### *Consultation and computer areas*

Participants were informed that the right-hand side of the planned location for the casestudy Centre was to be a private room. Despite knowing this, participants still incorporated more than one private area into their 2D or 3D designs. The majority of participants drew 4 or fewer rooms ( $n = 19$ ), some drew 5–7 rooms ( $n = 6$ ), and a few drew 8 or more rooms ( $n = 4$ ) in their 2D designs. The latter reflects a reduced comprehension in the scale of the plans provided but also hints at the expectation of the size of the service provision. Managing the expectations of potential visitors to new health-care and well-being centres is vital when communicating its aims, purpose, and function. Expectations are also important to manage when involving future end users in design processes, as it affects their design suggestions.

Participants located private rooms in areas furthest from the current entrance in their 2D and 3D designs. In contrast, self-assessment computer areas were located in the more public main area but along the back wall or in a corner, possibly to provide some level of privacy. Participants largely viewed the use of technology positively, as it would “get people in” (3T4).

Health self-assessment areas were described by some participants as an interactive area;

[*The self-assessment*] doesn’t have to be a kiosk it’s an area, you can jump on the scales, you can use a terminal, it’s got charts on the wall maybe I don’t know and then you can find out quite a lot about yourself. (3D4)

Others were concerned that these attractive features would be problematic, as someone may “keep putting their arm into the blood pressure machine and they don’t get up and let somebody else have a go” (2D2). Therefore, careful consideration of the positions of these instruments is necessary to ensure their optimum and appropriate use.

Hygiene concerns were also reflected in some participants’ discussions and designs; “in terms of health hygiene they really ... have to have a sink” (1D1), with 26% ( $n = 11$ ) of 2D and 3D designs including a sink. Hand hygiene is the most important single measure for preventing the spread of pathogens in health-care environments (Boyce & Pittet, 2002), and supportive design features may increase visitor confidence in the service.



### *Health assessment design recommendations*

The following specific design requirements were produced:

- HA1. At least, but preferably more than, one private consultation room is necessary. (This will also vary depending on expected visitor capacity of a service.)
- HA2. Incorporate a number of assessment areas with different levels of privacy.
- HA3. Consider auditory and visual privacy, through adequate sound proofing, including non-reflective and soft surfaces.
- HA4. Position computers to ensure privacy.
- HA5. Make practical health assessment equipment a visible, attractive feature if alternatives also exist in a private location and are clearly communicated and freely available.
- HA6. Use technology to attract people to health-care and well-being centres, but provisions for those less confident with technology is also necessary.
- HA7. Hygiene facilities are necessary, including sinks.
- HA8. Discuss the location of storage facilities with health professionals.

### **Conclusions**

A public participation approach with potential end users of a UK NHS Wellbeing Centre involved survey responses, table discussions, and, 2D and 3D models in group workshops. A comparison and combination of these outcomes with existing evidence-based research on the effect of environmental designs on end users, resulted in the development of an interior design brief for this, and future, health-care and well-being centres.

The interior design brief consists of 26 design recommendations specifically for health-care and well-being centres, arranged into four themes; atmosphere, initial points of contact, waiting experience, and health assessments. Overall, visual and auditory privacy were of primary importance, as was a feeling of choice and control over seating provisions and assessment areas. The environments need designing so that they are comfortable and informal, while being informative. Design features that allow natural light, minimize sound levels, provide privacy when desired, communicate related health information and queuing times were required. The environments need to be easy to “read”, thus, a visible reception was requested and intuitive self-assessment areas. Inclusive design, such as wheelchair access, was particularly important. This is especially relevant for the case study Wellbeing Centre as the hospital wanted the service to address health inequalities. Designers must consider these features and attributes to ensure all end users have a positive interaction with the environment of health-care centres, as this could affect the uptake and success of new services.

When designing ambulatory health-care environments such as well-being centres, it is important to focus on the conceptual components of environmental–person interactions, such as privacy, communication points, and a feeling of choice and control, rather than the physical features per se. This was also highlighted by previous research, which found that of the two factors, atmosphere and serviceability, it was the latter that was a predictor of the perceived quality of care, and the likelihood which people would recommend or return to the service (Lee, 2011). Furthermore, participant’s designs, discussions, and the resultant themes, largely reflected existing evidence-based research, thereby suggesting the limited participant sample size in this study does not hinder the transferability of the results.

By using a public participation approach in the design process, the specific needs for each of the psychological and behavioural aspects, from the viewpoint of the end user, were apparent and helped inform the interior design brief. Furthermore, by engaging the public throughout the whole



design process, via appropriate participatory methods, strengthens the likely success of the future service.

Public participation approaches and participatory design are however not without their limitations. For example, given the flexibility and innovation of the service provision within this case study Wellbeing Centre, participants generally discussed the presented suggestions for environmental design features and attributes and drew upon existing experiences of health-care environments. Additionally, the affect the environment has on an individual's experience may not necessarily be obvious, especially when the effects are subtle (Dijksterhuis, Smith, Van Baaren, & Wigboldus, 2005), thus laypeople may not be able to predict how the physical design of an environment may affect their behaviour and evaluations. Therefore, the approach taken in this research, of combining public participation approaches alongside evidence-based research to produce interior design briefs, is recommendable.

To maximize the success of designing future health-care centres a public participatory approach is useful in determining the key concepts to incorporate into design and service briefs. Moreover, to ensure the designs reflect desired elements continuing public participation throughout the complete RIBA "plan of work" (Sinclair, 2013) can help with the evaluation and amendment of designs as they progress. In addition to aiding the development of interior design briefs for the case study hospital, the results of this study are transferable to the design of other ambulatory health-care centres. Hopefully, they add to the call of developing health-care space standardization for similar service environments (Price & Lu, 2013) but from a patient perspective, rather than staff perspective. The research process encapsulated here identified themes and interior design briefs that add to the growing body of evidence informing future health-care physical environments to be patient-centred designs.

### Ethical approval

Ethical approval for the study was obtained from the West Midlands – Solihull NHS research ethics committee and the Royal Free NHS Foundation Trust Research and Development department. Public participation occurred in September 2012.

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