



# Meeting Patient Expectations During Hospitalization: A Grounded Theoretical Analysis of Patient-Centered Room Elements

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## Abstract

**Objectives:** To identify patient needs and expectations that can be utilized to inform the design or renovation of medical–surgical patient rooms in a hospital. **Background:** There is an increased interest in supportive room design to increase patient satisfaction and improve the healing process. **Methods:** Patients’ and family caregivers’ reactions were elicited to intentional room elements embedded in a set of five full-scale simulated room prototypes. Small groups of patients and caregivers toured two of the five rooms and provided verbal and written evaluations of room features. A grounded theory approach was employed to generate a codebook, identify the frequency of codes, and to group codes and memos into emerging themes. Insights from emergent themes were compared with findings from written surveys on the importance of various room design elements completed at the beginning of each session. **Results:** A theoretical design framework was generated, showing patients expect a hospital room that provides them with the core components of comfort to support healing, facilitates a strong sense of connection to people and the outside world, enables quick and independent access to the patient’s things, and offers suitable levels of control to the patient throughout their hospital stay. **Conclusions:** The implications for assisting architects, healthcare planners, and interior space designers are described using this framework, as well as its potential for design guidance. In addition, the connection between patient-centered room elements and relevant survey questions in publicly reported patient satisfaction scores for hospitals is discussed.

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## Keywords

hospital room, patient experience, infection control, patient safety, patient satisfaction, grounded theory, patient-centered care, hospital room design, acuity adaptable

To develop hospital patient room designs that, to the greatest extent possible, provide a supportive environment for hospital-based treatments and healing, it is important to understand the unique perspectives of patients and caregivers. In this article, we present the findings from a set of room concept evaluation sessions with patients and family caregivers, wherein each group of participants evaluated two rooms from a set of five room design concepts. The five concepts were designed based on data from prior research that investigated the ways in which the design of medical–surgical (med/surg) rooms could be improved in order to meet the needs of the full complement of staff who work in these rooms (Lavender et al., 2015). The overall goal of this line of research is to develop room design concepts that facilitate the work of staff members and provide a supportive healing environment for patients and families.

*To develop hospital patient room designs that, to the greatest extent possible, provide a supportive environment for hospital-based treatments and healing, it is important to understand the unique perspectives of patients and caregivers. In this article, we present the findings from a set of room concept evaluation sessions with patients and family caregivers, wherein each group of participants evaluated two rooms from a set of five room design concepts.*

Supporting patients through hospital room design is critically important to many people. Tens of millions of patients in the United States stayed overnight during a hospitalization within the last year, with an average length of stay of 4.8 days (Centers for Disease Control and Prevention, 2016). An estimated 65.7 million people are caregivers in the United States (National Alliance for Caregiving & AARP, 2009), which equates to 29% of the adult population providing some level

of care to another adult or child; many of these caregivers also stay for long periods of time, including overnight, during hospitalizations of the care recipient. With a trend toward increased acuity of hospitalized patients in traditional med/surg hospital rooms, one concept that has emerged is the acuity-adaptable room, which has sufficient space to support adding critical care equipment and staff (Gallant & Lanning, 2001). In addition, there has been a trend toward the use of single-patient rooms in the construction of new hospitals and when remodeling existing patient rooms, primarily with the goals of reducing hospital-acquired infections, increasing patient satisfaction (Maben et al., 2015), and protecting patient privacy (van de Glind, de Roode, & Goossens, 2007). Another important trend has been the designation of a “family zone” in the patient’s room, which allows a family member or other caregiver to stay overnight with the patient (see Kotzer, Zacharakis, Reynolds, & Buenning, 2011).

Supportive room design is believed to reduce patient stress and increase coping, ultimately improving the healing process. Based on a review of 214 publications, evidence was found for beneficial effects from well-designed acoustic environments, ventilation and air conditioning systems, the thermal environment, lighting, views of nature, ergonomic conditions, and furniture (Salonen et al., 2013). In one study, Keep, James, and Inman (1980) compared the response of patients in rooms with and without windows located in intensive therapy units. Those with windows, more accurately remembered their admission and discharge, were more oriented during their stay and had fewer sleep disturbances, hallucinations, and delusions. Devlin and Arneill (2003) identified that patient control had an important role in patient outcomes, including control over the sound, light, and art in patient rooms. Inpatient falls have been linked to lighting concerns, floor surface texture, and other environmental resources (Hignett & Masud, 2006).

Some design guidelines already exist that could support patients' needs and expectations. Ulrich (1991, 2000) and Ulrich, Zimring, Quan, & Joseph (2004) offered guidelines for architects to incorporate into their design, including fostering the occupants' sense of control over the physical surroundings, promoting social support, and providing access to daylight and other positive distractions such as pleasant music, artwork, and fountains. Lindheim (1985) argued that social connectedness, self-esteem, meaning, and control are all characteristics that can help an environment accommodate a range of needs for all types of individuals.

The intention of the current research is to identify opportunities to better meet the needs and expectations of patients who stay multiple days in hospital patient rooms. It is believed that med/surg hospital room designs, informed by this grounded approach, could result in an improved patient experience during overnight hospital stays. Additional benefits could include a more personalized delivery of health care, promoting the healing process by reducing anxiety and stress, reducing demands on hospital staff, and improving patient safety by reducing the risk of patient falls. What makes this research unique is that the stimuli that elicited the patients' needs and expectations were full-scale room design concepts that were substantially influenced by the needs of hospital staff members for whom patient rooms are the work environment.

## Method

### Participants

Room concept evaluation participants consisted of patients and family caregivers who met the inclusion criteria of the patient having a minimum 3-day stay in the hospital in a med/surg unit in the last 12 months. The 15 evaluation sessions included 61 participants (37 patients and 24 family caregivers), of which 20 were males and 41 were females. One participant was under 30-years old, 12 were 30–45-years old, and 48 were over 45-years old. Fifty participants were White, seven were African American, and four did not indicate a racial category.

### Procedures

Approval for the study was obtained from an Institutional Review Board. Upon arrival, all participants reviewed and signed an informed consent document and completed a demographics form. The moderator then reviewed the purpose of the study, the agenda for the session, and asked the participants to complete a survey using a 5-level response scale (1 = *not important* and 5 = *very important*) on the relative importance of 12 general design characteristics of med/surg patient rooms, such as "The staff sink can be seen by patient in bed." The survey was based upon the design characteristics identified in prior research from a mixed-methods study that engaged individuals from 23 occupations in homogeneous focus groups ( $n = 95$  participants) and interviews ( $n = 36$  participants) to learn about the work challenges and impediments encountered due to patient room design characteristics (Lavender et al., 2015). Once the survey was completed, the moderator introduced the participants to a top-view layout diagram of the first of the two rooms they would evaluate. The order of the two room design concepts viewed by the groups of participants was sequential (e.g., Room 1 to Room 2, Room 2 to Room 3, etc.). The participants were then taken into the simulated room. The moderator provided a guided tour explaining the furnishings and other items in the space and any unique features of that room design concept. The two printed room layouts were provided on a clipboard to aid comparison of layout differences while in the room. Following the walk through, the participants returned to the conference room where the moderator engaged the group in a discussion by asking "What did you like best about the room?" and then "What did you dislike most about the room?" This process was then repeated for the second room design concept. The entire session was audio-recorded and the recordings were professionally transcribed.

### Description of the Room Design Concepts

All rooms were 28 m<sup>2</sup> (300 ft<sup>2</sup>) with a width of 4.6 m (15 ft) and a depth of 6.1 m (20 ft). Room

size and dimensions were informed by prior research (Hendrich et al., 2004; Hignett & Lu, 2007). The door to the hallway was on one of the short walls and the window on the opposite wall. Each room had the same family zone location near the window, patient furnishings (bed, overbed table, recliner, and storage closet with locking safe), visitor furnishings (sofa that converted to a single bed, small table, and folding visitor chairs), staff furnishings and equipment (computer workstation, mobile seating, mobile supplies storage, staff sink, paper towel dispenser, hand sanitizer dispenser, gloves, waste disposal cans, and dirty linen basket), patient care equipment (IV pole and compression pump on the end of bed), electronics (multipurpose control pendant in bed, television, radio, and electronic whiteboard), and utilities (numerous right height outlets in strategic locations for use by staff, patients, and family members, independent lighting controls with dimmers for multiple areas of the room, and nightlights). The bathroom, located within the room space, included a high toilet, sink, patient storage, and a shower with direct entry without a “lip”. Rooms differed with respect to bathroom location (three inboard and two outboard), size and type (swinging, sliding, and breakaway) of doors to the hospital room and bathroom, the relative locations of zones (patient, family, clinical, and hygiene/bathroom), the relative placement of the bed relative to the entryway, staff workspace, and bathroom door, room contents, window size, the type, amount and location of horizontal surfaces and storage units for staff and patients, and a medical gas boom and number and location of privacy curtains.

Table 1 provides a list of intentional, patient-centered design features that were included in all of the room design concepts. Inclusion of these features was based on the belief that they would be beneficial for patients. This belief stemmed from earlier interviews about challenges with hospital patient rooms for patients and family caregivers.

## Data Analysis

For survey questions, response frequency counts and median values are reported. Grounded theory

analysis of the verbal protocols was conducted using a Straussian approach (Strauss & Corbin, 1998). The first level of data analysis was to complete line by line coding of transcripts from interview sessions with former patients. This procedure of axial coding gave way to the development of initial category (parent) and subcategory (child) codes in a large codebook. It was through this process that the team was able to look for structure by collectively sharing and confirming the output. The codebook was iteratively and collaboratively expanded by having two independent coders to analyze the same transcript and share their parent and child codes. The team reviewed all codes and came to consensus on existing and missing codes (see Table 2). This demonstrated our team’s interplay between researcher and the data (Strauss & Corbin, 1998).

Researchers used the formative codebook to analyze the transcripts from the patient and caregiver room evaluation sessions. Subsequently, all printed transcripts were coded and all memos generated by investigators were shared and discussed to confirm and continue building a solid base for further analysis. When insufficient information was provided to select a specific child code, the parent code was used. Moving forward, the codes were clustered into groups based upon memos and representative quotes. This process is formally known as conceptual ordering, which helps to form an overarching explanatory scheme (Strauss & Corbin, 1998). As the analysis grew, the ordered clusters were reviewed using a comparative analysis technique. The analytic clustering was inductively mapped onto hospital room areas generated by the team of investigators: entry zone (13 codes), clinical (and patient bed) zone (25 codes), from bed to bathroom (3 codes), bathroom (15 codes), storage (6 codes), information (6 codes), and tray/overbed table (4 codes).

The frequency of the presence of confirming and disconfirming evidence for parent codes was tabulated and reported as a percentage of all of the room concept evaluation sessions. All parent and child codes in the codebook, which were not used, were individually reviewed to ensure that evidence confirming or disconfirming the code

**Table 1.** Intentional Patient-Centered Features of Rooms Designed by Interdisciplinary Teams of Hospital Personnel.

Short Description	Detailed Description	Rationale
Room layout	Patient in bed can see people entering the room, TV, and window without assuming an awkward position	Facilitates views of interest for patients, addresses limited movement abilities of some patients, and affords more comfortable positions for patients
Privacy curtain	Privacy curtain at room entry and between bed and family zone	Provides privacy for patient from people in the hallway and from visitors in the family zone
Technology	Universal remote control that controls entertainment, lighting, window blinds, temperature, nurse call, and privacy curtain	Provides patient some control of environment components without staff assistance
Information technology	Electronic whiteboard with photos of care providers and other hospital staff that could be entering the room	Patients and family want to know which staff members are assigned to them and what is scheduled for them each day (therapy, treatment, scans, etc.)
Outlets	Numerous outlets at waist level and on bed	Many patients and visitors bring a number of electronic devices that they want to use during a hospitalization and convenient outlet locations within reach of the patient reduce risk of patient falls.
Room layout	Bed close to bathroom	Quick access to toileting facilities and shorter path of travel may reduce risk of the patient's falling
Bathroom door	Sliding bathroom door	Compared to a hinged door, sliding door movement requires less space, tends to be easier for patients with mobility or strength limitations to negotiate and operate, and tends to not block the paths of travel when the door is open
Staff sink	Staff sink in view of patient	Patients can confirm that staff members are washing hands
Shower chair	Shower chair is a built-in bench with handheld shower head	Bench is readily available and can be folded away if not needed and shower head can be used while seated
Lighting	Nightlight	Reduces confusion and risk of the patient falling
Toilet type	Floor-mounted, elevated toilet	Floor-mounted toilet supports heavier patients and elevation facilitates sit-to-stand and stand-to-sit transitions
Storage for toiletries in bathroom	Dedicated bathroom storage for patient's toiletries, vertical location is between sink and patient head height	Vertical location of storage means patients do not have to bend over or reach up high and this would reduce risk of falling and dedicated storage keeps personal items (toothbrush, comb, etc.) separate from toileting-related items (wipes, etc.)
Storage for patient's clothing	Direct view of closet that can accommodate hanging clothes, coat, and shoes includes a safe (sized for laptop computer and purse)	Safe and secure storage of personal items and valuables while in and away from the room
Storage for visitor chairs on the wall	Folding visitor chairs with designated storage location in the room	Chairs are readily available for visitor comfort and provide opportunity for eye level conversations between patient and visitor

**Table 2.** Example of Parent/Child Codes and Quotes Grouped by Hospital Room Area.

Room Area	Parent Code	Child Code	Example Quote
Entry zone	PEZ6. Get to the hallway easily	<ul style="list-style-type: none"> <li>a. Without having to maneuver around stuff</li> <li>b. Bed-oriented close to hallway</li> </ul>	PEZ6b: "I really liked, also, the bed because it was centrally located as far as the door . . . . It made it very conducive to move around and be able to get from your bed to the door."
Clinical (and patient bed) zone	PCZ3. Be able to see without turning my head or assuming a posture that is uncomfortable for me (sitting, lying flat, problem posture will be patient-specific)	<ul style="list-style-type: none"> <li>a. Window</li> <li>b. Whiteboard</li> <li>c. TV/TV not too high</li> <li>d. Clock</li> <li>e. Visitor</li> </ul>	PCZ3c: "Something I've hated in all hospital rooms is the fact that the TV is—you have to crane your neck to see them."
From bed to bathroom	PBB1. Easily open and get through bathroom doorway	<ul style="list-style-type: none"> <li>a. With assistive devices</li> <li>b. In a wheelchair</li> <li>c. With an IV pole</li> <li>d. Door should not be too heavy to push open</li> <li>e. Can operate door with one hand</li> <li>f. Automatically open</li> </ul>	PBB1c: "It (IV pole) can go in front of you because with that sliding door right there, there is not a door you have to go around that's blocking."
Bathroom	PB8. Have useful and appropriate lighting in the bathroom	<ul style="list-style-type: none"> <li>a. Automatically on/off</li> <li>b. Dimmer</li> <li>c. Night light</li> </ul>	PB8b: "That's important for the middle of the night. If it's pitch dark you need more than that light, but you don't want way bright lights."
Storage	PS3. Have a place to securely lock away my valuables	<ul style="list-style-type: none"> <li>a. Safe for laptop</li> <li>b. A place near bed I can put my purse, where I can reach and secure</li> <li>c. Big enough to lock a laptop and a purse at the same time</li> </ul>	PS3b: "Where am I going to put my purse?"
Information	PIT5. Watch TV	<ul style="list-style-type: none"> <li>a. Without disturbing the family member</li> <li>b. Without turning my head</li> <li>c. Without looking up</li> <li>d. Without the staff hitting their heads on it</li> </ul>	PIT5c: "I like the lower TV."
Tray/overbed table	PTT3. Have dedicated, separate tables	<ul style="list-style-type: none"> <li>a. For personal items</li> <li>b. For food tray</li> <li>c. For flowers and cards</li> <li>d. On wheels</li> </ul>	PTT3b: "Having a separate table for your meals . . . especially if I had a . . . urinal sitting on my table."

Note. IV = intravenous; TV = television.

was not missed. It was through this constant comparative process that emerging themes were identified by the research team. As further analysis developed, the team was able to determine relationships. This act of constructing relationships between the clusters of codes associated with room area categories facilitated the team's ability to begin theorizing about what matters most to patients in a hospital room (Strauss & Corbin, 1998). The analysis concluded when the team felt that each emerging cluster within the room area category reached saturation. Specifically, minimal new data were emerging, categories appeared to be well developed, and the relationships between categories seemed to be well connected (Strauss & Corbin, 1998). The research team analyzed and discussed the identified parent and child codes in the room concept evaluation session transcripts, in order to synthesize the numerous codes and categories of codes into a smaller number of major categories of patients' needs and expectations. These major categories were organized by corresponding room zone and preliminary themes were allowed to emerge at this stage. These emerging themes were identified for each emerging cluster grouped by room area and subsequently visually displayed in a theoretical design framework. As a large group, all of the emergent themes from the categories were verified to be included in the theoretical design framework at a level of prominence which was concordant with the weight of the evidence generated by the multiple methods.

## Results

Based on the transcript analysis of the sessions with patients and visitors evaluating two of five room design concepts, the 10 most frequently used parent and child codes (i.e., more than nine sessions were represented in the parent/child family) are provided in Table 3 along with representative quotes from patients. Many of the codes related to supporting the patient in independently accessing room elements (e.g., bathroom, tray table, outlets, and whiteboard) from the head of the patient bed. Similarly, visibility of the hallway and exterior space via the window

was found to be important from the head of the patient bed.

The findings from the survey are displayed in Figure 1. The responses with the highest medians, those rated as most important, involved providing access to room controls (lighting and entertainment center), providing visual privacy, and being able to read the whiteboard from the patient bed. Responses that were rated to be the least important were visibility of the staff sink from the patient bed and having the bathroom door located near the hallway door. The response rate was 98.4% based on 60/61 participants. One participant did not fill out the survey due to a late arrival to the evaluation session. Four participants each did not fill out one individual question about the patient handling (lifting) device, with two participants noting "don't know" and "NA" (not applicable) above the missing response.

The emerging findings from the grounded analysis of the patient room evaluation sessions are displayed in Table 4. The "patient needs/expectations" column represents a summary of all the parent/child codes (in contrast to the top 10 codes that are shown in Table 3). The leftmost columns show how each of the expectations is categorized by the area of the patient room as well as the particular aspect of that area. The "rationale" column describes why the needs and expectations are important to the patients. The emerging themes are shown in the rightmost column. For the entry zone, the design element focusing on visibility and noise stemmed from the patients' desire to have a sense of control over the entryway to the room. When in bed, patients want to be in a position to readily see who is entering the room, as this provides a sense of safety and security. Related to this need is a desire to avoid being disturbed by noise and activity from the hallway. There were mixed responses on this issue. Some study participants liked being able to view activity in the hallway to reduce boredom, but even in this situation, they wanted to have control over whether the room door was open or closed, even when a privacy curtain was used to block the entry way. Survey responses to item 10 in Figure 1 ("While in bed, the patient can see into the hallway if the door is open") confirmed the mixed perceptions on this

**Table 3.** The 10 Most Frequent Parent and Child Codes Grouped by Hospital Room Area.

Area	Parent Code	Child Codes	Representative Quote
Entry zone	Not be seen	By people in the hallway when having procedures done, by staff when staff are not working on patient, by people in the hallway when I am using the bedside commode, and when patient is getting dressed in or near the bed	"The thing I dislike most about this room is being visible from the hallway."
Hygiene zone (patient bathroom)	Easily open and get through bathroom doorway	With assistive devices, in a wheelchair, with an IV pole, door should not be too heavy to push open, can operate door with one hand, and automatically open	"It looks like the shortest possible distance for a patient who's trying quickly to get to the John and dragging an IV pole. Because by that fifth day with that IV and it's sore."
Patient zone	Control from the bed	Call button (for PCA or RN), window coverings (blinds, sunshade, and curtains), overhead lights, room temperature, TV, music, reading lights, visitor light, privacy curtains, and hallway door	"You can control the blinds and the temperature from your bed. That's huge. The last five times I was in, I'm hooked up to the IV and a heart monitor, too. And I can't physically get up to open the blinds. So I have to call somebody."
Patient zone	Have accessible outlets	Use/charge electronic devices from the bed, use/charge electronic devices from the recliner, and many throughout the room	"I like all the outlets. The outlets are important. You don't even know until you're in here . . . just to have them where they need to be. They were everywhere. That was a good thing."
Patient zone	Have a place to put my things where I can look at them from the bed	Cards, flowers, photos, and religious items	"If you're in the hospital for a week, I know from experience, it's not that big of a deal. But, if you're in there for 3 weeks, it's really nice to have a lot of room to put the cards, or put things to remind you that there is a world outside of the one you're living in right now."
Patient zone	Be able to see without turning my head or assuming a posture that is uncomfortable for me (sitting, lying flat, problem posture will be patient-specific)	Clock, TV/TV not too high, visitor, window, and whiteboard	"Something I've hated in all hospital rooms is the fact that the television is—you have to crane your neck to see them."
Tray table	Have a tray table that works for me	Easily adjustable (up and down, forward and back, close to and away from bed, or turn), has enough space, wheels don't get stuck under bed, reachable, four-way wheels for tray table, food tray slides out, place for computer, ridge so things don't slide off table, separate surfaces for food and other things, cup holder, and has curved shape to proximal side to fit my body	"We'd like the top of the tray to swivel away so that when they're finished eating, they can get their dirty dishes out of the way until somebody can clear it for them."

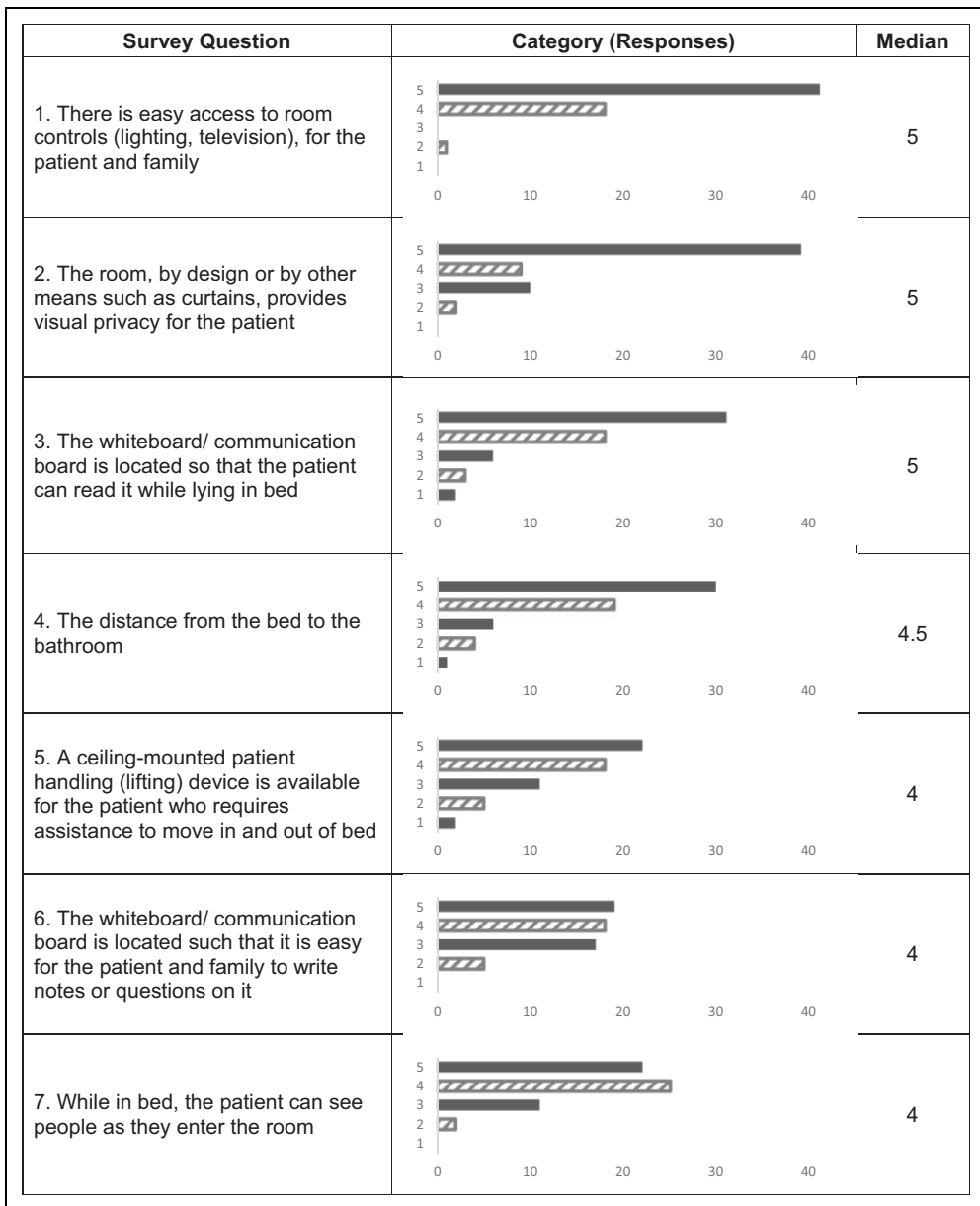
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**Table 3.** (continued)

Area	Parent Code	Child Codes	Representative Quote
Tray table	Have places to put stuff I need to use within reach while I am in bed/be able to store items on tray table	Balloons attached, Bible, lip balm, cellphone and charger, dentures, eye drops/contact lens stuff, eyeglasses, flowers, food, hand lotion, hearing aids, laptop/computer, mirror, makeup, magazine/newspaper/book, menu, note pads, paperwork that is accumulated during stay, tablet room telephone, snacks, stationery, stuff used a lot (e.g., pen/pencil), towel/washcloth, water, remote, tissues, urinal, magazine, and help patient feel empowered	"Yes, I want it all in front of me, not reaching in either direction."
Whiteboard	Have a whiteboard that is useful and readable	Without putting on eyeglasses, see photos of staff who are working today, housekeeper's name on whiteboard, up-to-date whiteboard with correct information, be able to write on the whiteboard, and by staff from the doorway	"My thing is that (the whiteboard) is very important because if you know who is supposed to be in your room, when you see somebody that's not supposed to be in there, you can immediately say you're in the wrong room . . . especially if it's not a visitor or whatever because nobody should be in your room other than what's on there because if you need to go somewhere to have this done, they give you a schedule and it's on the board also . . . I do know people come in your room because I've had them come in my room."
Window	Have a window	That I am able to look out of, that has natural light, that is big, and that I can sit near	"The window makes a big difference. Whether you're getting a little piece of window or a big view . . . to me, anyway, the more view you get, the better you feel, the more sun you get, the more view of outside life rather than being cramped and looking inside all day . . . to me, that was a big thing."

Note. PCA = patient care associate; RN = registered nurse.



**Figure 1.** Patient and family caregiver participant members’ ratings of the importance of 12 general features of a hospital room. 1 = not important, 2 = slightly important, 3 = moderately important, 4 = quite important, and 5 = very important.

issue, with nearly as many participants rating this statement as not important or slightly important as compared to quite important or very important. Even in situations where patients could control whether a room door was open or closed, they expressed a desire to have a privacy

curtain, particularly for when clinical procedures were performed in the room, in order to be shielded from the view of anyone passing by in the hallway or entering the room while the procedure was underway. As supporting evidence, 80% of participants rated the following

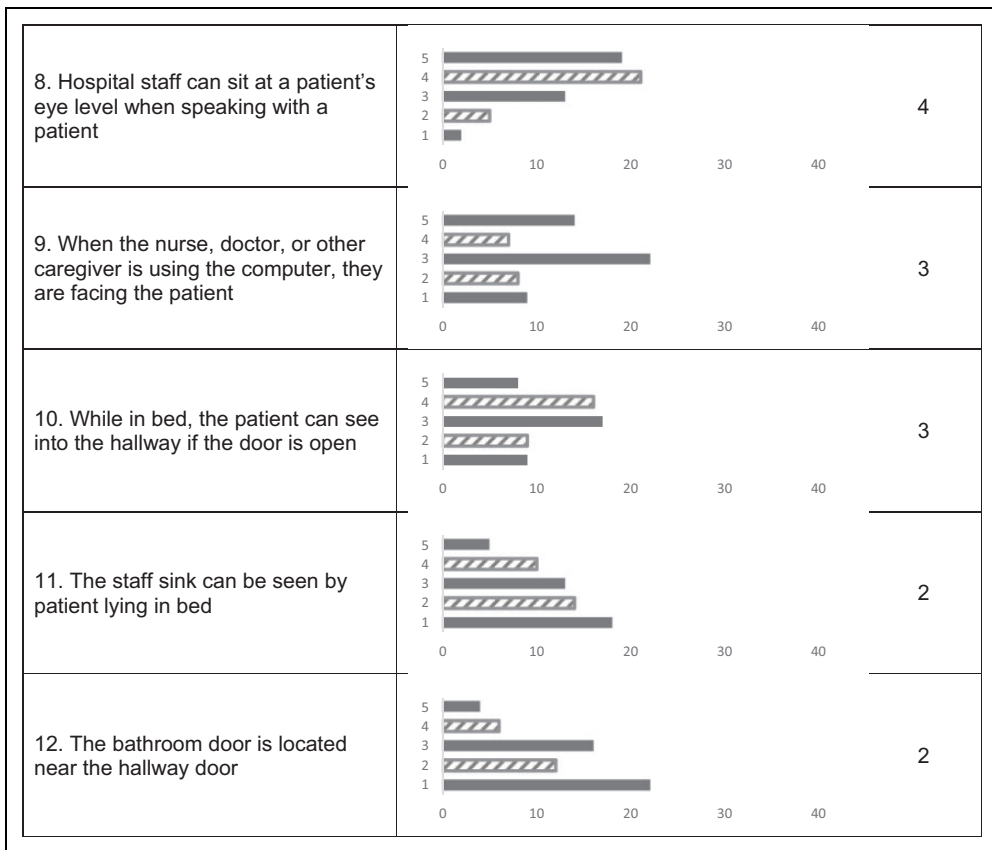


Figure 1. (continued).

statement as quite important or very important: “The room, by design or by other means such as curtains, provides visual privacy for the patient” (#2, Figure 1).

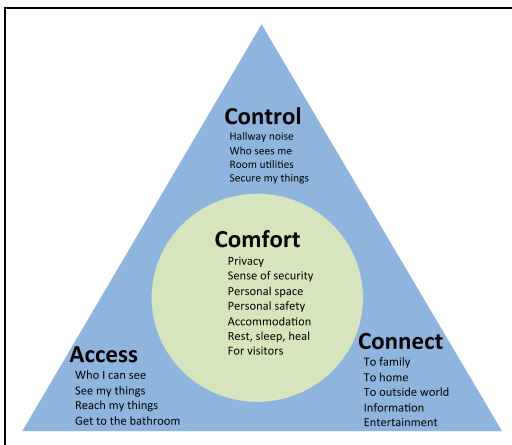
### Converging on a Theoretical Design Framework for What Matters to Patients in the Hospital Room Experience

Using a process of comparison of the grounded analysis of the patient and family caregiver room concept evaluation sessions together with the survey data results allowed for building confirming and disconfirming evidence. Quotes were retained and tabulated as part of this process to continue moving to the construction of a proposed theory about what matters to patients

in the hospital room experience. It was through this constant comparative method of triangulating the higher level grounded data that we are able to propose the following grounded theory of what really matters to patients in an ideal hospital room: Patients expect a hospital room that provides them with the comfort needed to support healing and with the perception of connection to the outside world. The hospital room should provide them with quick and independent access to their belongings and offer increasing levels of control throughout the course of their hospital stay. The theory is embodied in a theoretical design framework that is visualized in Figure 2. The ideal patient room experience unfolds over time as the patient transitions from a state of dependence to a state of independence as the patient heals and prepares to go home.

**Table 4. Emerging Findings From Transcript Analysis Regarding Patients' Expectations, Rationale, and Emerging Themes Grouped by Room Zone.**

Room Zone	Patients' Needs/Expectations	Rationale	Emerging Themes
Patient room <i>in toto</i>	<ul style="list-style-type: none"> <li>A single patient room that is adequately sized, comfortable, and comforting for patient and visitors</li> <li>A room that accommodates patient's physical limitations</li> </ul>	<p>Promotes patient movement and supports visits by family and other visitors</p> <p>Benefits include:</p> <ul style="list-style-type: none"> <li>A room that is more comfortable for the patient;</li> <li>Patient can experience a higher level of control and independence</li> <li>Patients desire visual privacy.</li> <li>They want to be able to control the level of the noise for rest and for stimulation.</li> <li>The entry way needs to provide a sense of safety/security.</li> </ul>	<p>Comfort for patient</p> <p>Comfort for visitors</p> <p>Accommodation</p> <p>Comfort</p> <p>Accessibility</p> <p>Visual access</p> <p>Visual privacy</p> <p>Noise control</p> <p>Rest</p> <p>Stimulation</p> <p>Sense of security</p> <p>Privacy</p> <p>Personal space</p> <p>Personal safety</p>
Entry zone	<p>An entry way design that:</p> <ul style="list-style-type: none"> <li>Affords control over visual privacy and hallway noise;</li> <li>Enables patient to see who is entering the room</li> </ul>		
Clinical zone	<ul style="list-style-type: none"> <li>Desire to have private conversations with clinical staff when needed</li> <li>Buffer to separate patient from staff as desired</li> <li>Recognize and observe authorized staff in room</li> </ul> <p>A room design that:</p> <ul style="list-style-type: none"> <li>Affords control over visual privacy</li> <li>Enables patient to see: <ul style="list-style-type: none"> <li>Who is entering the room</li> <li>Staff hand hygiene practices</li> <li>Outside the room (window, hallway)</li> </ul> </li> </ul> <p>Easy access to:</p> <ul style="list-style-type: none"> <li>Power: many accessible electrical outlets</li> <li>Current information (staff and labs)</li> <li>Entertainment</li> <li>Means to easily control the room environment (lighting and temperature) and other electronic room components</li> </ul>	<p>Supports a range of interactions that occur between patients and staff, from the most serious, personal conversations to just acknowledging an authorized staff member is in the room to perform tasks that do not involve the patient.</p> <p>Controls visual access (to see and be seen)</p>	<p>Visual access</p> <p>Visual privacy</p>
Patient zone	<p>Desire to be in an uplifting environment that is conducive to rest/sleep</p> <p>Organized places to put things that patient can reach without assistance</p> <p>Visible and secure patient storage within reach or view:</p> <ul style="list-style-type: none"> <li>A place to display items (cards, photos, flowers, etc.)</li> <li>A clean place for personal items</li> </ul> <p>Hygiene zone (patient bathroom)</p> <ul style="list-style-type: none"> <li>A close bathroom that is easy to access, even with IV pole, wheelchair, walker, and so on.</li> <li>Safe toilet access day and night</li> <li>Barrier-free shower access</li> <li>Privacy in the bathroom</li> </ul>	<ul style="list-style-type: none"> <li>Accessible outlets support keeping cell phone at hand, which supports communication and connection.</li> <li>Patients want to know who is taking care of them today; who should be in the room.</li> <li>Easy to use, multi-function remote control supports comfort, control, and independence of patient.</li> </ul> <p>Promotes healing</p> <p>Empowerment and self-sufficiency</p> <p>Enables peace of mind and inspiration</p> <p>Easily accessible bathroom can somewhat offset mobility impairments of patient; supports safety, independence, and control</p>	<p>Sense of security</p> <p>Information</p> <p>Communication</p> <p>Entertainment and stimulation</p> <p>Control</p> <p>Independence</p> <p>Connection to outside</p> <p>Patient can rest</p> <p>Patient can sleep</p> <p>Patient can heal</p> <p>Comfort</p> <p>Patient can reach his/her things</p> <p>Access</p> <p>Independence</p> <p>Patient can see his/her things</p> <p>Belongings are safe</p> <p>Connection to home</p> <p>Easier, safer access to bathroom</p> <p>Privacy</p> <p>Access</p>



**Figure 2.** Theoretical design framework for the patient room experience.

*Patients expect a hospital room that provides them with the comfort needed to support healing and with the perception of connection to the outside world. The hospital room should provide them with quick and independent access to their belongings and offer increasing levels of control throughout the course of their hospital stay.*

The framework highlights the center of the ideal hospital room experience which is the patient's need for comfort. Comfort is central in the sense that it is the most important need. It is also the need that stays sharply in focus throughout the entire hospital room experience. The secondary needs (i.e., connect, access, and control) vary in importance according to the unique situation of each patient. Patients need to connect to others such as family members and friends. The need for connection expands over time to include connections to the outside world such as connections to home, to nature, and to what is going in the world. As the patient heals, the need for access becomes more evident. Access includes visual access (Can the patient: See who is entering the room? See the flowers that their loved ones have given them?) and physical access (Can the patient: Reach their phone? Charge their laptop? Get to the bathroom safely?). The need for control becomes stronger throughout the patient

journey as well. Patients want to be able to control the room environment components such as the temperature, lights, window coverings, as well as the television. They want to control the security of their belongings. Patients would also like control over the noise and visual access from the hallway outside their room (Can the patient: Obtain a quieter environment, including having less noise from the hallway? Prevent strangers from looking into the room and seeing them in bed?). The relevance of the needs outside of the comfort core will vary according to factors such as: How sick is the patient? How long is the hospital stay? Are family and friends visiting often? How much does the patient rely on a communication technology device to stay connected?

## Discussion

Our major findings are that patients expect a hospital room that provides them with the core components of comfort needed to support healing, facilitates a strong sense of connection to people and to the outside world, enables quick and independent access to the patient's things, and offers suitable levels of control to the patient throughout the course of their hospital stay. This research confirms patients' needs and expectations for privacy, rest, and interaction with family caregivers. Bonuel and Cesario (2013) found that benefits of single-bed rooms included improved privacy, communication with patients and families, social support, and sleep. Bäck and Wikblad (1998) similarly found that patients had a preference for single rooms due to the ability to talk with physicians privately without other patients or their visitors overhearing the conversations. Choi and Bosch (2013) found that having a family zone area as part of a patient-centered unit was associated with more time spent by family members in the room and increased interaction with patients while in the room as compared to a traditional design. The findings from the current research also extend what is already known about patients' needs. New findings include the patients' desire to control the entryway via visibility of who is entering the room, including knowing the role of the person, and the use of a privacy curtain, having independent access to personal care items,

reading items, and electronic devices and associated electrical outlets from the patient bed, and include suggestions for having safe access to toileting and bathing facilities.

More importantly, the theoretical design framework offers a holistic perspective on what really matters to patients in the hospital room. The framework was developed from the grounded theoretical analysis of the data from a number of converging perspectives. It is the first theoretical framework of the patient room experience derived directly from the perspective of patients and family caregivers. The framework can be used to drive the design and development of patient rooms and room components that meet the expressed needs and expectations of patients. Healthcare designers, planners, and interior space designers can use the framework for what the room needs to offer in support of the ideal patient experience.

Patient experience is a subjective phenomenon that takes place over time as the patient moves from a state of dependence, through the healing process, to a state of independence. The patient's perception of comfort is the most critical part of that experience throughout the entire journey. Healthcare designers need to acknowledge that the core need for comfort is the critical path on the patient journey and need to provide the environment that makes the patient feel that they have privacy, a sense of security, safety, and personal space. The environment needs to support the patient's ability to rest, sleep, and heal as well as provide comfort for their family. The importance of the secondary needs of the patient experience (i.e., connect, access, and control) will vary according to the patient situation, but all of these needs will increase in importance as the patient moves from dependence to independence. Thus, satisfaction with the patient experience in the room will rely on meeting all the needs across the timeline of experience. Design methods and tools that are commonly used today in user experience design, such as the iterative development of alternative personas and future scenarios of use (Adlin, Pruitt, Goodwin et al., 2006), are needed to address the complexity of this design challenge. It is no longer sufficient for healthcare design teams to rely on their prior experiences

and award-winning precedents in the design of hospital rooms. Alternatively, taking a codesigning approach to the design of the hospital room (i.e., designing *with* former patients and family members) is a more reliable way to ensure that what really matters to patients will be delivered. The traditional design approaches of the past have resulted in hospital rooms that do not reliably deliver what really matters to the patient.

*Patient experience is a subjective phenomenon that takes place over time as the patient moves from a state of dependence, through the healing process, to a state of independence. The patient's perception of comfort is the most critical part of that experience throughout the entire journey.*

In addition, with the increasing financial reliance on patient satisfaction scores in the United States, the status quo for hospital room designs is no longer sufficient. Meeting the needs and expectations of patients is anticipated to improve responses to 13/18 (72%) of questions on the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey. The HCAHPS results for hospitals in the United States have been publicly reported since 2008 and recently reduced hospital reimbursement for care provided to Medicare and Medicaid patients in the United States based on performance on the measure. The HCAHPS survey is administered to a random sample of adult patients between 48 hr and 6 weeks after discharge. The patient-centered room elements which are anticipated to improve the HCAHPS score would facilitate staff avoiding the use of the patient's tray table or bed as a work surface, providing sufficient space for chairs near the bed which support eye level conversations, providing a whiteboard to use for explaining concepts to patients visually that is easy to view from the patient bed, making it easier to keep the room and bathroom clean, and making it easier for patients to access the bathroom from the bed with minimal assistance. In addition, summative survey questions might improve by reducing the perception of pain and

need for pain medication, increasing the perception that patient and family preferences are taken into account, and increasing the willingness of the patient to recommend the hospital to friends and family.

There are a number of limitations with this research. First, the study participants may not be representative of all patients, and in particular patients with severe mobility challenges, cognitive challenges, or challenges due to obesity. Although demographic data are reported to provide context for interpreting the findings, insufficient data were collected to identify differences correlated with gender, age, or race. Thus, there might be additional opportunities to make hospital rooms meet the needs of special needs populations, such as morbidly obese patients or patients with cognitive impairments, which were not uncovered through this research. Second, expectations identified during prior group discussions which were not found in these evaluation sessions could have been missed with this methodology due to the lack of stimuli for triggering discussions about expectations and opportunities, for example, to augment lighting options, improve smells, and reduce background noise such as bed exit alarms. Finally, each study participant evaluated only two of the five room design concepts due to time limitations. Therefore, insufficient data were collected in order to identify the room or combination of room elements most preferred by a majority of participants.

In summary, important insights were gained from the needs and expectations expressed by patients and family caregivers that were elicited from exposure to a set of five hospital patient room design concepts, concepts that were based on collaborative efforts of hospital staff members who created rooms that would facilitate their work. To create hospital patient rooms that are also supportive of the needs of patients, patients and caregivers were asked to evaluate the features of room design concepts. Their responses were analyzed using a grounded theory approach, which ultimately produced a novel theoretical design framework of patients' needs and expectations that can be easily understood and utilized to design new med/surg patient

rooms. It could also be used to address current unmet needs and improve patient satisfaction in the existing facilities.

## Implications for Practice

- Support comfort by enabling privacy, a sense of security, and personal space and safety.
- Empower patients to control noise levels, visual privacy, room utilities, and provide access to storage units.
- Facilitate connections to family, home, the outside world, information, and entertainment.
- Enable independent access to names and roles of clinical staff, personal belongings, and the bathroom.

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