# Harmonizing Health Services by Design at Providence Care Hospital

## User Experience and Design Evaluation Before and After the Redevelopment

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Images: Providence Care Hospital

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Providence Care Hospital

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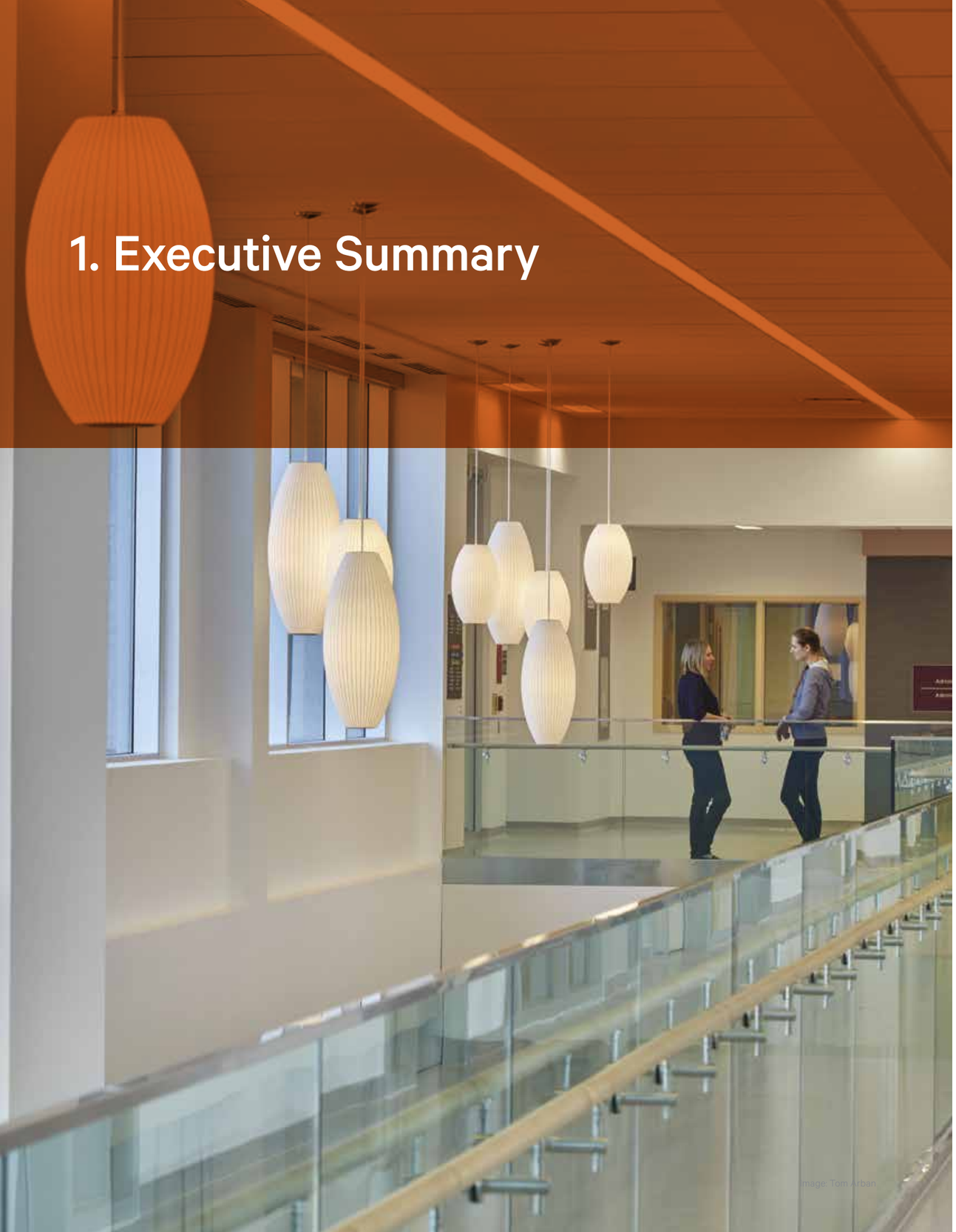
# 1. Executive Summary



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## Background and Rationale

Time, opportunity and strategic planning have allowed for a new chapter to be written in the illustrious history of Providence Care. An inspiring redevelopment project, Providence Care Hospital (PCH), now provides a 270 bed state-of-the-art lakeside care environment for patients. Moreover, it offers a contemporary and enhanced work environment for physicians, staff and volunteers.

The redevelopment plan unites the two pre-existing buildings of St. Mary's of the Lake Hospital (SMOL) and Mental Health Services (MHS) into one cohesive, modern and patient centred hospital on the lake front. With an increasingly interprofessional approach to care delivery, it was a logical progression in the redevelopment of the site to unite the two buildings and provide rehabilitation, complex continuing care, specialized geriatrics, palliative care and mental health programs at the same location.

At the new PCH facility, patients have private single rooms and access to touchscreen technology that offer the potential to customize their care environments. Patients enjoy the benefits of a variety of amenities: patient and visitor lounges, kitchenettes and dining rooms, outdoor gardens, courtyards and terraces as well as modern therapy and treatment spaces. The new PCH features on-site clinics for inpatients and outpatients as well as enhanced teaching, learning and research facilities to support Providence Care's role as a centre for health education and research.

The PCH redevelopment team demonstrated tremendous leadership and foresight by allocating and protecting dedicated resources for a pre and post occupancy evaluation. The strategic approach for the pre and post occupancy evaluation (herein referred to as a user experience and design evaluation) was to use the design intentions for the new PCH as the theoretical basis against which to assess user experience, well being and health related outcomes across the pre-existing facilities as well as the newly constructed facility.

The overall user experience and design evaluation employed a quasi experimental pretest posttest evaluation design with mixed quantitative and qualitative methods to assess the impact of the hospital facility design on patient, staff, visitor and, to some extent, community outcomes.

### Context of Care

PCH is a leading healthcare environment that provides a balanced and integrated care program for long-term mental health, physical rehabilitation, complex medical care and palliative care. The hospital has 120 specialized mental health beds, 100 complex continuing care beds and 50 rehabilitation beds and robust ambulatory care and outpatient programs. The defining feature of PCH is the concept of patient and family centred care. The spirit of collaboration is evident in how integrated teams of formal and informal caregivers work together to meet the physical, emotional, social and spiritual needs of each person.

### Design Intentions

The context of care along with evidence in best practice and design was fully embedded in the PCH redevelopment project vision and design intentions. To identify and define the design intentions and their anticipated impact on outcomes, Methologica embarked on a series of interactive stakeholder engagement workshops with the Planning Design and Compliance architects (HOK Architects) Functional Programing team (Agnew Peckham), and the Design Build Finance Maintain architects (Parkin Architects Ltd.). Separate engagement workshops were held with the PCH redevelopment team, senior leadership, program directors and managers.

The design intentions for the new PCH, as specified in the design excellence parameters defined by HOK and integrated into the design by Parkin Architects are: to promote recovery and transition; to foster connection and connectivity with people and their surroundings; to create a healing environment; to enhance the staff; patient experience; to enhance comingling (of staff, patients, visitors and community); and to reduce stigma.

## Methodology

The design intentions and anticipated outcomes were used to guide the development of hypotheses to be tested and, as a consequence, determined the methodological approach best suited to the user experience and design evaluation.

A defining feature of the PCH user experience and design evaluation was the opportunity to assess the impact of design in integrating two diverse patient populations - mental health and complex care rehabilitation along with the staff who provide their care - within one facility relative to their previous isolation at separate facilities on different sites. The user experience and design evaluation focused on assessing the impact of the design intervention to integrate care delivery in one facility for both mental health and complex care rehabilitation populations.

A pretest posttest quasi experimental evaluation design with mixed quantitative and qualitative methods was used to assess the impact of the PCH design on patients, staff and visitors before and after the redevelopment as well as assessing the integration of the two sites into one facility.

Methods were selected on the basis of the design intentions, specific design features that were the focus of study, the research questions and hypotheses to be addressed, the anticipated outcomes to be assessed along with their operationalization, the desired conclusions to be made and the ability to attribute causality. Whereas quantitative methods allow for the attribution of causality and enable generalization, qualitative methods allow for the contextualization and documentation of the lived user experience and offer potential explanations for the observed pattern of findings that result from the quantitative methods. The methods that were selected and tailored for the PCH user experience and design evaluation enable the assessment of both anticipated and unanticipated user experience and outcomes as a consequence of the building design.

## Specific Design Elements

During Methologica's early stakeholder engagement workshops, hospital leadership and the architects identified a collection of specific design elements that were to be included in the user experience and design evaluation. They are: open care desks, recessed storage cabinets, patient room technology, and patient lifts. These were not the most essential design requirements or the signature elements of the overall design however, they were chosen because of their unique application as design solutions at the new PCH.

### Open Care Desks

The design of the former care desks featured a glass window. This separation created a physical barrier between patients and staff as well as anyone else who approached the care desk. At the new PCH the desks are defined by an open concept, a barrier free workspace with a larger desk area that increases the distance between staff and those on the opposite side of the counter. The motivation behind this drastic design change was to create a care desk that was open and accessible for patients without compromising the safety of staff.

On a scale from 1 to 10, where 10 is more favourable, patients and staff were asked to rate their impressions of the care desk on the following attributes: accessible, safe, calm, approachable, brave, trustful, visible and whether they felt acknowledged.

The most notable outcome resulting from the design of the open care desk at the new PCH when compared to the former SMOL and MHS facilities is the difference in behavioural interactions between patients and staff as well as professional colleagues. Consistent with the design intentions, patients and staff alike rate the open care desk at the new PCH the highest on the following three dimensions: accessible (patients = 8.67; staff = 8.32), visible (patients = 8.51; staff = 7.94) and safe (patients = 8.49; staff = 7.64).


Image: Tom Arban



The open care desk design consisted of a delicate balance of accessibility and approachability for patients without compromising safety for staff. The fourth highest patient impression of the care desk is its approachability (patients = 8.47). Staff impressions of safety are significantly greater at posttest (PCH staff = 7.64) relative to the enclosed care desks at pretest (MHS staff = 5.70; SMOL staff = 6.76). The data reveals that a successful balance was achieved and that open care desks are achieving their design intentions.

Moreover, this data dispels the notion that staff require a physical separation in order to feel safe. This is a direct contrast to prevailing concerns (without an evidentiary basis) about critical incidents involving aggressive patient behavior. The existence of a glass barrier may in fact serve to increase patient aggression.

### Recessed Patient Storage Cabinets

The recessed patient storage cabinets are located immediately outside of each patient room. Their inclusion in the design was motivated by a desire to reduce clutter in the hallways and to provide staff with a practical resource to support care.

On a scale from 1 to 10, where 10 is more favourable, staff were asked to rate their impressions of the storage cabinet on the following attributes: convenient, whether time is saved or wasted, whether travel distance is increased or minimized, if workflow and patient care is disrupted or enhanced.

The design intervention was met with success. Staff rate the recessed patient storage cabinets the highest (though not overwhelmingly so) on convenience 7.33. Staff ratings are also well above the neutral point when asked about the extent to which recessed patient storage cabinets allow for saving time 7.06, minimizing travel distance 7.11, enhancing workflow 6.97, and enhancing patient care 7.09.

### Patient Room Technology

New and emerging technology features prominently in a variety of locations at the new PCH. Two examples are included in and around the patient room. Screens that are located outside the patient room, for the most part, display generic information about the hospital and are, on occasion, reprogrammed to post information about the status of the patient. Most notably, these screens advise those entering the room about any precautions and personal protective equipment requirements (e.g., when it is mandatory to wear a mask and gown when entering the room). Inside the patient room, a touchscreen known as the Integrated Bedside Terminal (IBT) is fixed to an adjustable wall mount with an arm extension. The IBT enables patients to watch television, make phone calls and control the room temperature as well as the window blinds.

On a scale from 1 to 10, where 10 is more favourable, patients and staff were asked to rate their impressions of the technology on the following attributes: useful, informative, whether patient care is enhanced, whether time is saved or wasted, if workflow is disrupted or enhanced, convenience, comfort, confusing, amount of time spent with patients, quality of interactions with patients, usefulness in delivery of care, how it enhances the hospital experience, and adaptability to changes in care.

The response from both patients and staff offer promise for the implementation of future enhancements to the touchscreen technology features.

Interestingly, when comparing patient scores with staff, the patient scores are higher on all attributes. Patient impressions of the touchscreen technology are most favourable in terms of the ease of use (patients = 7.01), convenience (patients = 6.94) and comforting (patients = 6.82). Staff impressions of the touchscreen technology are the highest on comforting (staff = 6.18), useful (staff = 6.16) and convenience (staff = 6.10).


Image: Providence Care Hospital

Whereas the potential of patient room technology has not yet been fully realized, its inclusion in the design shows promise for the future. It has the ability to adapt and be reprogrammed to include new functions. Continued investments and expanded use of technology in patient rooms is arguably inevitable.

### Patient Lifts

Patient lifts are operated by staff as a mechanism to assist care delivery and minimize workplace injuries. Whereas patient lifts are typical in complex care and rehabilitation hospital environments, patient lifts are uncommon in mental health facilities. Inspired by a desire to reduce staff workplace injuries and better serve patients, PCH is among the first facilities to feature patient lifts in mental health facility design.

On a scale from 1 to 10, where 10 is more favourable, patients and staff were asked to rate their impressions of the patient lifts on the following attributes: safe, comfortable, helpful, whether time is saved or wasted, if workflow is disrupted or enhanced, if care is disrupted or enhanced and level of increased risk of injury to staff and patients.

Given that patient lifts are intended to make patient care easier and minimize physical strain on staff, it is not surprising that staff impressions of the patient lifts are more favourable than those of patients. In particular, staff impressions of the patient lifts are rated highest relative to patients on all items, most notably in terms of being safe (staff = 7.07; patients = 6.61), helpful (staff = 7.07; patients = 6.76), reduce the risk of staff injury (staff = 7.00; patients = 6.22) and reduce the risk of patient injury (staff = 7.00; patients = 6.24).

Due to limitations in access to critical incident data for patients and staff, Methologica is unable to determine a direct link that the inclusion of patient lifts reduces the risk of injury (for both patients and staff). Ideally, this could be addressed in future user experience and design evaluations by allowing the evaulation team access to the hospital administrative data and anonymously linking that data to patients and staff who participated in the user experience and design evaluation. Nevertheless, it is comforting that the data reveal top impressions for both staff and patients in terms of being safe and helpful - a result that is in line with the design intentions for this enhanced patient room feature.

## Notable Trends in User Experience and Behaviour

Human interactions and outcomes are greatly influenced by the design of the built environment. Depending on the design aspirations, these effects can be subtle or obvious. Nevertheless, the environment that we are in can impact how we feel, what we do and how we do it.

The pattern of findings reveals how the new PCH design impacts the way people perceive the building as facilitating their movement and activity throughout the facility, supporting their well being, and enabling staff to carry out their work. Moreover, the findings highlight how impressions and user experience of the building design positively predicts well being related outcomes.

User experience and behavior data was harvested for travel distance, wayfinding, self efficacy in mobility, coping with health conditions, patient satisfaction, staff satisfaction and burnout. Additionally, included in this section you will find information on optimism, depression, stigma, collabortion and workplace well being.

### Optimism

Similar to the coping literature, published research has documented the positive benefits of an optimistic outlook over the course of illness. Optimism is associated with better physical health outcomes (Rasmussen, Scheier, & Greenhouse, 2009) and buffers against the negative impact of stress (Howell, Kern, & Lyubomirsky, 2007).

Optimism was assessed using the 10-item Revised Life Orientation Test (Scheier et al. 1994). The optimism score was calculated by summing the 6 target items rated on a 5-point scale, with negatively framed items reverse scored prior to summing (0 strongly disagree to 4 strongly agree; wherein higher numbers reflect greater optimism).

Staff report greater optimism relative to patients across all sites including the earlier SMOL (staff = 17.17; patients = 16.76) and MHS (staff = 17.91; patients = 13.16) facilities and the new PCH (staff = 16.64; patients = 15.47). Interestingly, the difference in optimism between staff and patients is attenuated at the new PCH relative to the previous MHS facility, suggesting a trend toward enhanced optimism for the mental health patient population at the new PCH facility relative to pretest.

### Depression

Depressive symptomology was measured using the Center for Epidemiologic Studies Depression (CESD) scale (Andresen et al. 1994). To simplify response options for the patient population under study, the CESD scale was modified from the original 4-point rating to a 5-point rating: 1 = never (0 days), 2 = rarely (1 day), 3 = sometimes (1-2 days), 4 = often (3-4 days), and 5 = always (5-7 days). Scoring was based on the original scale, such that “never” and “rarely” responses were grouped together. Negatively framed items were scored 0 to 3 (never/rarely to always), whereas positively framed items were reversed scored (3 to 0). All 10 items were then summed to yield a total depressive symptomology score, with higher scores representing increased depressive symptoms.

Patients report greater depressive symptoms relative to staff across all sites including the earlier SMOL (staff = 5.32; patients = 6.58) and MHS (staff = 5.90; patients = 12.32) facilities and the new PCH (staff = 5.63; patients = 7.73).

When we compare the depressive symptoms of patients only, the pattern wherein mental health patients report greater depressive symptoms than complex care rehabilitation patients holds. However, the difference is somewhat attenuated at the new PCH.

### Stigma

One of the overarching design intentions for the new PCH was to decrease stigma. An established measure of stigma was adapted for its application / generalizability to both mental health and physical health conditions. Participants were asked to rate the extent to which they agreed with various statements relating to one’s perspective on life and their decision making process (1 = strongly disagree and 9 = strongly agree; higher scores are more positive attitudes and, therefore, decreased stigma).

Overall, staff reveal greater stigma towards those with health conditions relative to patients across all sites including the earlier SMOL (staff = 6.95; patients = 7.45) and MHS (staff = 6.57; patients = 6.62) facilities and the new PCH (staff = 6.93; patients = 7.03). Interestingly, the difference in stigma between staff and patients is attenuated at the new PCH relative to the previous MHS facility, suggesting a trend toward decreased stigma among staff at the new PCH facility relative to pretest.

When we compare patient populations across sites, mental health patients express greater stigma towards those with health conditions relative to complex care rehabilitation patients at pretest (SMOL = 7.45; MHS = 6.62) and the new PCH (CCR = 7.42; MH = 6.02).

Interestingly, whereas staff at the previous MHS show increased stigma towards those with mental or physical health conditions (6.57) relative to staff at SMOL (6.95), the difference disappears at the new PCH (CCR = 6.75; MH staff = 6.88).

### Collaboration & Workplace Well Being

Advances in modern medicine has led to the creation of a patient population that is living longer and with multiple health conditions. The patient population at PCH is an excellent example of this new reality, both mental health and complex care rehabilitation patients are diagnosed with having multiple health conditions. The response is a care plan that is rooted in teamwork and interprofessional collaboration. Staff were asked to rate from 1 (not at all) to 5 (extremely well) the extent to which the facility design allows for interaction amongst staff, teamwork and collaboration on several aspects, including team meetings, communication among staff from different professional backgrounds, interactions with patients and visitors, contact with patients, practitioners and visitors and professional development.

The interprofessional collaboration composite score is highest at the new hospital 3.40 relative to MHS 3.26 and SMOL 3.10.

One would have expected or hoped for a more significant change for staff in the new hospital but there were very little differences amongst the three sites, whatever differences that were documented were generally positive just not to the extent where they would be considered statistically relevant.

Image: Tom Arban

## Top Moments in Design

Based on the collective interpretation of data gathered from all methods, naturalistic observation, participant surveys and moving interviews the top moments of design were determined by considering impression scores, frequency of use, and user experience and outcomes. Therefore, the results indicate that the top moments of design are the main entrance area, outdoor pathways and patient rooms.

The main entrance is a central feature in the hospital's overall design and a contributing factor for the realization of many of the anticipated outcomes. Over and above being a welcoming and practical space with volunteers and staff ready to assist, the design permits active and passive use, social activity and comingling. It is a point of arrival, a transition area and an end destination. It also incorporates many subtle wayfinding cues such as unobstructed sightlines. Upon entry users can easily orientate themselves by looking left, right, and up - the open atrium allows for a view to the upper level.

An underlying theme that ties several of the design elements together was the ambition to replicate a homelike or neighbourhood feel. Sidewalks and pathways connect neighbours in residential areas, and they perform the same function at PCH. The outdoor pathways provide those crucial connections to Lake Ontario Park, the Waterfront Trail and hospital gardens.

After completing a series of user experience and design evaluations, the Methologica team has discovered an increasing importance of quality outdoor spaces. When done properly outdoor areas will see a diversity of users and a diversity of use. Currently, staff, patients and community are frequenting the outdoor areas for both active and passive use. The effective use of the outdoors is a way for people to comingle, stay connected, expand therapy sessions and reinvigorate oneself. The outdoor pathways are playing an exceptional role in enhancing the user experience and establishing connections to nature and surrounding areas.

It would be expected that scrutiny and curiosity would follow the decision to become the first hospital in Ontario to have all private patient rooms. The pressure to succeed with this change was high and PCH delivered. The patient room impressions are high for both patients and staff. Patients enjoy their privacy, the room amenities and the introduction of technology provides a foundation for future adaptation and growth.

The homelike feel, particularly for patients with extended stays, is reinforced by their ability to personalize their room with items from home and the adjacency of the kitchenette provides some independence where they can store food items and access them when desired.

Design aspirations can transcend many spaces throughout the hospital. For example, investments to increase comingling and reduce stigma were made on unit, off unit and in outdoor areas. Selective areas may be more successful than others in achieving these outcomes but overall these aspirational outcomes are materializing. Similarly, the use of windows and natural light is generating, as expected, very positive impressions and outcomes. Windows improve patients' moods; they feel more satisfied and content. Staff also seek out spaces in the hospital with views and natural light and report similar positive benefits: feeling safe, cared for, and happier. Meaningful views and natural light are favourite aspects of the hospital among all users.

Thanks in part to these top moments in design, the human experience at PCH is an increasingly positive one. These moments included clinical and non clinical areas, however, the non clinical spaces have higher impressions, which support the belief that social spaces are drivers to improve the social construction of design. Future hospital designs can no longer consider non clinical spaces as being less important than clinical ones. Achieving that proper balance is instrumental to the realization of the design intentions and anticipated outcomes.

## Ancillary Outcomes: Benefits of Positive Impressions & Experience

The mechanism by which architecture and design interventions influence outcomes is dependent on the interaction between design and the person (e.g., subjective variables including: place of wellness, inspiring and place of hope) or another variable (e.g., objective variables such as: a care desk or an outdoor space). In other words, the impact of the design on an outcome of interest typically depends on the moderating variable. These are referred to as interaction effects. The impact of design on outcomes may be masked or attenuated if measurement techniques lack sophistication or are inadequate. As a consequence, failure to measure an anticipated moderating variable results in the attenuation or masking of the outcome and may lead to erroneous conclusions about the impact of design on the outcome of interest and, therefore, affect decision making.

When we considered the moderating role of favourable impressions and experience of the design interventions on outcome variables an interesting pattern of results was revealed. Patients and staff with favorable impressions of the building design (across all attributes including a place of wellness, safe, inspiring, hopeful) expressed decreased concerns over distances and decreased challenges in wayfinding at the new PCH relative to the previous SMOL and MHS facilities.

Patients and staff with favorable impressions of the social spaces at the new PCH experience various positive outcomes. For patients their self efficacy in mobility and coping are enhanced, while staff experience an increase in workplace satisfaction.

Similarly, patients and staff who expressed a strong sense of connection showed positive outcomes for coping, optimism, satisfaction, stigma, collaboration, and burnout.

## Design Recommendations

### Design Theme 1: Creating a Sense of Place

Several aspects of the PCH design were found to enhance the sense of place and the relationship between spaces and the fluidity between various destinations. In a building of this scale and particularly for the PCH patient population, both on and off unit destinations become important. The following are recommendations on how to enhance, exaggerate and support a design that aims to create a sense of place.

**Consider Building Height:** Minimizing the building height was important on many fronts. The height and massing needed to be a suitable balance for the cultural heritage of the site and the surrounding properties. Furthermore, it complemented the strategy of establishing connections to nature, exposure to natural light, promoting transition and recovery as well as normalization. A low rise healthcare facility was seen to be more aligned with Kingston neighbourhoods and supported the homelike and community philosophy that the design was meant to achieve.

**Personalization of Patient Rooms:** Admittance to the hospital is a critical time for patients. At this time, they are required to adjust to their new identity of being a patient, this coincides with new limitations and changes in their sense of self, their confidence and self-efficacy. To ease this transition, we recommend allowing patients to personalize their rooms with pictures for the wall, desktop trinkets, and other items that remind them of home. It is important to understand the balance between creating a comfortable and welcoming environment that fosters autonomy and thus improves overall health, while at the same time preventing the hospital from becoming a destination where patients don't want to leave.

**Intentional Placement of Patients:** PCH is designed with many beautiful spaces and access to many meaningful views. In light of the data emerging from the PCH user experience and design evaluation, patients and staff should be taking advantage of the experiences resulting from these areas. Currently, many patients are being placed in areas out of convenience for staff instead of utilizing spaces like the sunrooms where patients can benefit from meaningful views. This also provides an opportunity to socialize with others. If patients need to be continuously

supervised there is a solution to balancing supervision and utilizing space that is designed to enhance their experience and overall well being. Healthcare providers can increase their use of mobile work stations, with this modification in staff behaviour, they can accommodate the placement of patients in spaces further from the central nursing station, be just as productive and maintain visuals on patients.

**Additional Furniture:** To increase use, PCH needs to add a variety of new furniture to the sunrooms, outdoor patios, and porches. Some of the sunrooms could benefit from a higher table, this would make the room more usable allowing staff to conduct patient meetings or take phone calls in this space. Apart from the Limestone Terrace, the outdoor patios need protection from the sun. Therefore, adding umbrellas or other shaded furniture will help encourage patients and staff to use these spaces on warmer days. Lastly, many of the porches don't have any furniture at all. The perception of patients and visitors is that the porches are unwelcoming and are not considered as a usable space. Adding a variety of comfortable seating and table options to the porches should help increase their use.

### Design Theme 2: Optimizing Social Interaction and Well Being

Healthcare facility design is increasingly focused on enhancing the human condition and fostering greater well being on many fronts; psychologically, socially, spiritually and physically. Inherent in the PCH design was particular consideration to how the site could foster comingling among the distinct patient populations and the staff who provide their care. Here are some concepts on how to optimize social interaction and well being.

**Social Dining:** The creative challenge to designing a multigenerational space is the ability to foresee the needs of future generations and how their unique context and characteristics might shape essential design requirements for their experience of a hospital setting. Millennials are more familiar with the current trend towards food halls and meal delivery services such as "Uber Eats". Future hospital designs need to factor in cultural habits that are evolving to the point where a plethora of variety is a standard either in the physical form of a food hall or in the virtual world of food delivery apps. This cultural shift is not only about food consumption but a reflection of how our social dining experience is shifting towards being able to eat anywhere, with anyone and everyone, at any time. With these changing dynamics, we need to question the future role of cafeterias, dining rooms and retail zones in hospital settings.

**Balance of Private and Communal Spaces:** Most well designed neighbourhoods have a greenspace or a park, a cafe and/or farmer's markets, all of which are places to promote interaction with neighbours and foster a sense of community. With the addition of 100% private patient rooms, designing for aesthetically pleasing, welcoming, and functioning communal spaces both on and off unit becomes even more important. Private rooms can make it a challenge to motivate patients (especially those who are paranoid or anxious) to socialize and explore other areas of the hospital. Currently at PCH, many of the communal spaces (dining room, patios, café, cafeteria) are unwelcoming, underfurnished, too small or too far away. Patients are looking for places where they feel included and a sense of belonging without "being in the way". This can be achieved by purposefully designing third places (i.e., favourite places) and threshold zones (e.g., spaces adjacent to patient rooms or destinations – space just inside or outside of these places). Threshold zones become significant spaces where patients linger, are given permission to spend time, maintain a sense of engagement in life, and search out social interaction. These places provide patients and staff with the opportunity to both sit back and observe others or to participate in social interactions and activities.

**Community Engagement:** If they are not going for treatment or visiting someone who is, what would motivate someone to frequent a hospital? It appears that a beautiful emerald green park is one reason. The best example at PCH of community engagement is the integration of the hospital's green space with the Waterfront Pathway and Lake Ontario Park. This


Image: Tom Arban



is a prime example of how to foster a sense of community. This integration not only provides positive effects on patients and maintains their connection to nature, community and others, it also helps reduce the stigma surrounding mental health. Healthcare facilities see the value of community use and Methologica has seen many invest in programming to drive community use of hospital space, PCH has a collection of small scale outdoor basketball courts that are being used sporadically. In lieu of having small scale courts, considerations should be given for the inclusion of a full sized court that can be used by local Kingston basketball leagues. A full court would not only drive community use, enhance animation but also provide entertainment and activity for patients. Community users add density and animation to the hospital environment, it is paramount that future hospital designs find innovative ways to encourage, sustain and support community use.

### Design Theme 3: Adapting for Future Flexibility

Advances in modern medicine, new technologies and new discoveries have all played a part in transforming patient care. These changes were inspired by evidence based decision making, and has also influenced the design of hospitals. Whereas hospital administrative data such as slips and falls, infection rates and length of stay unquestionably contributed to these changes, new data being collected through a series of user experience and design evaluations across multiple facilities should also be considered as evidence for change. This section provides some insights on how to prepare for future flexibility.

**Welcoming Patients to the Hospital:** For patients and families the admissions process is an exercise in prioritizing. Information deemed essential is identified and retained while less important matters are placed on the backburner. This includes awareness of their surroundings and hospital amenities. It is recommended that the Hospital Handbook be reintroduced to patients and families a few days after their admission. Part of the reintroduction could include a tour led by a volunteer. The tour would also assist with awareness and wayfinding, two areas that need improvement at PCH. These first steps in an individual's hospital experience are critical to making them feel welcome, cared for, and respected.

**Consider Distance:** The placement of amenities need to be proximal and strategic. If they are too far to reach, they will go underused or not used at all. Better use of these distances would be to provide more seating or break spaces along the long corridors, as for many, these distances are intimidating and exhausting. Special consideration should be given to the placement of offices for those who work hospital-wide positions, as they are often expected to be moving throughout the building on a typical day.

Image: Tom Arban

**Challenging the Status Quo:** It is impossible to innovate if the tradition of including certain spaces or services continues because they have always been featured in a hospital design. For example, data from multiple design evaluations is showing a trend of decreased use of on unit patient visiting areas. As more and more hospitals opt for full private patient rooms one can conclude that this trend will be further entrenched. It becomes our responsibility to ask what role if any does a patient visiting area play in future hospital designs? Can that space be allocated to augment a different area or service? Or from a cost savings perspective would it be prudent to eliminate the space and reduce the overall footprint?

**Flexible Design for Mulitpurpose Space:** Flexible design can be described as achieving multipurpose use of a space through the malleability of its design. The patient dining rooms are prominent examples of flexible design. The programming in the morning has nothing to do with food, it is recreational

therapy or other group sessions. Afternoon programming can include socials such as tea and talk, group trivia and music presentations. Food consumption plays only a small role in the overall activity of what occurs in this space. Founders' Hall is another example of flexible design. It is an open space with natural light and views to the surrounding area. Staff take full advantage of hosting meetings, information sessions and social gatherings in the hall. The design of a multipurpose space is traditionally simple, the success and use is reliant on the creativity of hospital staff on what they envision for the space and the support from leadership to make that happen. Moving forward for future hospital designs, architects should examine underused spaces and consolidate those services into one multipurpose room. This approach will save costs, create one vibrant animated space and free up opportunities to further invest or enhance other spaces with proven success.

**Expanding Technology in Patient Rooms:** The terminals in the patient room could have the added feature of determining when it might be most suitable to partake in an activity on unit, visit destinations throughout the hospital or, weather permitting, take advantage of the outdoor courtyards, gardens and pathways. Outside the room over and above its current use of displaying generic hospital information or infection prevention and control notifications, PCH leadership needs to explore what else can be done with this resource. The screens outside the patient room offer an opportunity to display the patient's schedule - including any special appointments or treatments, rehabilitative physical therapy, occupational therapy, social activity, medication and meal schedules. Furthermore, they can be programmed to be an active message board, that allows the patient to post their whereabouts when leaving the room with messages as simple as "I've gone to the cafeteria" or "I'm outside watching the kids play basketball".

**Digital Wayfinding:** When people enter a hospital for the first time the experience can be overwhelming. They are unsure of their surroundings, unfamiliar with the nomenclature used on directional signs and it is very probable that they are experiencing abnormally high stress levels. An effective wayfinding strategy will ease these feelings by helping users and clearly guide them to where they need to go. Currently, none of the large digital screens are used for wayfinding. Programmable digital wayfinding screens can be interactive where the user enters their end destination and very similar to Google Maps the digital screen identifies the most efficient route forward. Or it can be a static screen that displays real time information, for example if that digital screen typically provides directional information to the cafeteria but if it is now after hours and the warm food services are now closed the sign could change to say "Cafeteria food service is now closed". With the advantage of being able to manipulate the content, design and layout, programmable digital signage allows the hospital to control how information is displayed and when it is broadcasted. New hospital redevelopments as well as facilities that are in need of refreshing their wayfinding system should invest in programmable digital screens, the benefits of customization, adaptability and future use should far exceed immediate cost concerns.

## Policy Considerations

In anticipation that user experience and design evaluations become a standard and a required component of hospital redevelopments it is important to highlight some of the fundamental principles as to who are credible authorities to perform the user experience and design evaluations and what should be included.

The evaluation team must have proven research experience in methods and measurements, superior data analysis skills, research ethics that are beyond reproach and the human resources capacity to conduct field research over multiple years and multiple sites.

Furthermore, it is essential that the evaluation team is impartial, objective and lacks a vested interest in the outcome. Questions of bias and access to the findings could arise if the evaluation is conducted by in house research teams. Ideally, user experience and design evaluations should be conducted by an independent third party that is not beholden to the architectural firms or hospital.

New facilities are putting just as much emphasis on design features and elements that fall outside of the clinical and functional programming parameters. Architects and hospital redevelopment teams are including design intentions that address concepts such as promoting transition and recovery, increasing privacy, reducing stigma, creating animated concourses, maximizing natural light and connections to nature, simplified wayfinding and enhancing the user experience.

In recent years the attitude towards research and evaluating redevelopments has progressed from the rudimentary standards of, was the project built on time and on budget, to operational efficiencies and obtaining LEED status. This attitude needs to fully mature and place equal importance to the essential design intentions, listed above, as it does for the traditional clinical and functional requirements. This can be confirmed with their inclusion into the user experience and design evaluations standard that is currently being developed by the Canadian Standard Association (CSA).

As part of the CSA standard it would be prudent to take the next bold step of allowing evaluation teams to anonymously link data back to patients. This would facilitate a higher probability of directly linking health outcomes to design. With each healthcare facility user experience and design evaluation, Methologica has recommended that where possible it would be advantageous to include de-identified patient and administrative data and link it to the survey data on the basis of matching variables that do not violate privacy regulations.

Recognizing that there are challenges to this approach (e.g., it takes a bit of extra time), it is feasible and there is some progress. As the Design Evaluation lead on the HOK Planning Design and Compliance team, for the West Park Healthcare Centre (WPHC) redevelopment, Methologica presented this suggestion to the WPHC redevelopment team and it is our understanding that this recommendation was accepted and will be a part of their user experience and design evaluation.

## Conclusion

Harmonizing two sites and creating one modern, welcoming and inclusive hospital was an ambitious undertaking. The PCH design needed to fully integrate long-term mental health programs with complex care, rehabilitation and palliative care, the first for a publicly funded hospital in North America. The design intentions were formidable, however the data uncovered that although certain areas of the design are more successful than others, the overall design intentions are producing their anticipated outcomes.

This user experience and design evaluation identifies aspects of the hospital design that are achieving their intended outcomes as well as highlighting areas that are underperforming. Discoveries regardless of being positive or negative are extremely valuable. For only through robust, exhaustive and engaging design evaluations are we able to understand what works, for whom, and in what context. Knowing what works is equally as important as knowing what did not.

Population health trends are evolving and so too is patient care delivery. Architects, hospital leadership and government funding partners are investing in new hospital designs that address these changing dynamics. Hospitals have become much more than patient rooms, clinical areas and functionality, hospitals are community, places of wellness and a reflection of society. They are also living organisms that over time need to adapt to the changing landscape. User experience and design evaluations help us understand how that adaptation can occur, confirm what is working, optimize underperforming areas, and provide a roadmap for future projects. Change is inevitable, but research, knowledge and evidence-based decision making give us the tools to shape, manage and affect change.

# 2. Introduction


Image: Tom Arban

## Background and Rationale

Historically, Providence Care and its predecessors have treated a variety of patient populations across a myriad of locations. With the emergence of new medical challenges, caregivers and healthcare practitioners did their best to respond and maintain a commitment to the best possible care provision. Inherent in the response was the modernization of equipment and medical care provision techniques. Most recently, Providence Care was challenged with dated infrastructure at both St. Mary's of the Lake (SMOL) and the Mental Health Services (MHS) buildings.

Designed and built in an era for a different patient population, SMOL no longer offered an environment that was responsive to patient needs. Wheelchair accessibility was an issue as the original design did not account for this type of patient mobility. Rooms were inaccessible, corridors were narrow, storage space was at a premium and the physiotherapy gym was inadequate.

Similarly, patient rooms at the MHS buildings were designed for a different era in the delivery of care for mental health - a time when wards were common with up to eight patients per room and shared washrooms were considered the norm. Today's patient centred approach to mental health, recovery and the preservation of dignity is very different from the ward style approach of years gone by. To this end, facilities require a design to best capture the unique needs of the patient population and complement current models of care delivery.

In response to these infrastructure challenges, Providence Care embarked on a massive redevelopment to enhance and integrate complex continuing care, rehabilitative care, adult mental health, seniors' mental health and forensic mental health patient populations and those who provide their care. The redevelopment united both locations into one state-of-the-art care environment that was built on the shores of Lake Ontario. To facilitate the construction of the new facility, the MHS buildings were demolished, and the historic SMOL property was decommissioned.

The new 270 bed Providence Care Hospital (PCH) includes 120 specialized mental health beds, 100 complex continuing care beds and 50 rehabilitation beds. Robust ambulatory care programs take advantage of the rehabilitation gym, therapy equipment, indoor walking tracks and outdoor therapeutic spaces.

The private single bed inpatient rooms are equipped with touchscreen technology. Although the capabilities of the technology that is located both inside and immediately outside of the patient room have not yet been optimized at the new PCH, the inclusion of this design element was intended to adapt to future customization and enhancement of the patient and caregiving experience. Patients at the new PCH enjoy the benefits of a variety of amenities such as family lounges, kitchenettes and dining spaces, outdoor gardens and terraces as wells as modern therapy and treatment spaces.

Executing a user experience and design evaluation before and after the PCH redevelopment contributes to understanding the value and potential return on the investment. In addition to assessing whether the new hospital design successfully enhanced the intended outcomes - directly or indirectly, the evaluation enables us to ascertain what areas are underperforming and how they can be remedied on the basis of the results gleaned for the successful design interventions, interactions between the users and their experience of the design in specific spaces as well as how design can be optimized to improve health and well being outcomes. Furthermore, the user experience and design evaluation serves as a legacy report from which others can learn and use as a resource to influence future projects and perhaps guide future interventions at the existing facility.

Post occupancy evaluation (POE) has been defined as the systematic evaluation of newly constructed buildings after they have been occupied for at least one year (Preiser, 1998; Preiser & Vischer 2005). POEs of hospital buildings emerged in the 1990s to assess the effects of healthcare environments on safety, efficiency, and clinical outcomes (Ulrich, 1991) with limited focus on outcomes related to psychosocial well being (Kagan & Levi, 1975; Ulrich, 1991; Ulrich, 1993). Despite the acknowledgement of POE as standard practice (Forbes, 2013) and the burgeoning literature on evidence based design, there are very few industry standards, guidelines, or established

methodologies for conducting user experience and design evaluations of healthcare facilities (Victorian Government Health Information Capital Development Guidelines, 2010; NHS Scotland Scottish Capital Investment Manual – Project Evaluation Guide, 2012; University of Westminster Guide to Post Occupancy Evaluation, 2006).

Among the published research, there has been variable methodological rigour and limited comparability of measurement and outcomes across user experience and design evaluations. Moreover, they often lack a true pretest comparison. To date, relatively few research studies have compared pre and post construction facilities to assess the impact of design elements on well being and health outcomes, thereby limiting the ability to attribute causality of outcomes to differences in architectural design (see Alvaro & Atkinson, 2013).

The World Health Organization definition of health extends beyond traditional clinical and/or physical health to include the built environment and social determinants of health (e.g., income, education, housing, etc. (WHO, 1946)). Recognizing the importance of the built environment beyond the functional program, essential design requirements as endorsed by the Ministry of Health and Long Term Care (MOHLTC) or other funding agencies, include non-clinical areas and concepts. In response to their inclusion there is a growing trend and desire from hospital redevelopment teams to evaluate their performance and outcomes in tandem with more traditional clinical and functional program areas; as evident in the Canadian Standards Association's commitment to the development of a standard for design research and evaluation by the end of 2020.

Among the essential design requirements for the PCH redevelopment, as defined by the HOK Planning Design and Compliance architects and integral to the Parkin Architects design concept, were: transition and recovery, normalization and stigma. These essential design requirements provide insight into the well documented and well adopted evidence that the impact of architecture on clinical outcomes is indirect - it is the result of the interplay between design and the users.

To clarify, architecture (and design) can and does influence clinical outcomes. However, the mechanism by which architecture exerts its influence is often by way of a moderating variable that has an impact on the person (via behaviour, psychology, or other human factors) that influences a clinical health and/or well being related outcome (e.g., length of stay, readmission, adherence to treatment). Given this well documented evidentiary basis, Methologica uses bespoke research methods and measurement approaches to assess aspects of design, such as transition and recovery, normalization and stigma, that were previously considered too abstract for evaluation, and determine their causal impact on outcomes – including clinical outcomes.

As a step above mere post occupancy evaluation and the assessment of performance indicators before and after a redevelopment, Methologica's novel approach to user experience and design evaluation, first developed for the exemplar Bridgepoint Hospital redevelopment and adapted in subsequent projects, uses the design intentions for the new healthcare facility as the theoretical basis against which to assess outcomes across existing and to-be-constructed facilities (see Alvaro & Kostovski, 2015; Alvaro, Kostovski, Elliott, & Gardner, 2018; Alvaro, Kostovski, & Wilkinson, 2016a; Alvaro, Kostovski, Wilkinson, Gallant, & Gardner, 2015a; Alvaro, Kostovski, Wilkinson, & Gardner, 2015b; Alvaro, Wilkinson, Gallant, Kostovski, & Gardner, 2016b). In addition to clinical outcomes, this approach incorporates psychosocial well being and the user experience among the set of outcomes – a departure from the more traditional approaches to user experience and design evaluation which tend to focus solely on clinical and functional health outcomes and can be fraught with limitations in causal inference. Methologica's approach enables a greater attribution of outcomes to actual design interventions.

Building on the academic Canadian Institutes of Health Research (CIHR) and MOHLTC funded program of research, Methologica is engaged with the Canadian Standards

Image: Providence Care Hospital



Association (CSA) and the Canadian Centre for Healthcare Facilities (CCHF) in the establishment of a standardized approach to healthcare facility design evaluation (Alvaro & Kostovski, 2015; Alvaro et al., 2015a). This collaboration is a direct response to a specific need for standardized facility evaluation and performance methods with the promise for application across Canada and internationally.

The user experience and design evaluation of the PCH redevelopment provides an opportunity to further contribute to the evidence based design literature. It builds on the existing set of evaluation frameworks and executed user experience and design evaluations alongside those completed for Bridgepoint Active Healthcare, St. Catharines Site Niagara Health System, West Park Healthcare Centre, St. Michael's Hospital and the Centre for Addiction and Mental Health (CAMH) Phase 1C. Moreover, the data will contribute to the ongoing repository of outcome measures to be considered across all healthcare redevelopment projects and those that are unique to each redevelopment project and allow for the identification of what works, for whom and in what context when it comes to healthcare facility design.

Providence Care has demonstrated remarkable leadership in recognizing the value of user experience research and design evaluation. PCH leadership were active in the following: early engagement with the design research and evaluation consultants, interest in learning about ongoing design research and evaluation projects, participation in key events such as conferences hosted by the CCHF and other continuing education opportunities to optimize their own facility design and outcomes. Engagement in these activities prior to the call for proposals for its own redevelopment and protecting funds to execute a user experience and design evaluation has placed Providence Care in an extraordinarily advantageous position to gather evidence of design attributed outcomes – both for their own future and that of upcoming healthcare redevelopment projects. This foresight, leadership and commitment to research have been recognized by the Methologica team. As stakeholders across the healthcare redevelopment spectrum begin to familiarize and educate themselves on the process of conducting user experience and design evaluations, they will be recommended to follow the trailblazing steps initiated by the team at PCH.

PCH demonstrated an early commitment to research and evidence based decision making, they are a team that is collaborative, engaged and trusting to work with external consultants and recognize how these findings have the potential to impact future redevelopment projects throughout the province, the country and beyond.

## Context of Care

PCH is a leading care facility that provides a balanced and integrated care program that includes long-term mental health, physical rehabilitation, complex medical care and palliative care.

### Mental Health

The Adult Mental Health program supports patients who are 16 years of age and older, medically stable and have a primary diagnosis of severe mental illness such as Schizophrenia, Schizoaffective Disorder, Mood Disorders (Bipolar I or II), or a major depressive disorder. The Forensic Mental Health inpatient unit serves patients living with mental illness who have been in conflict with the law, who are at risk of committing violent acts and are unable to be accommodated in the general mental health system. The third mental health program is Seniors Mental Health. Typically, inpatients are over 65 with dementia, experiencing severe and frequent responsive behaviors or age-related psychological symptoms that cannot be managed on their own.

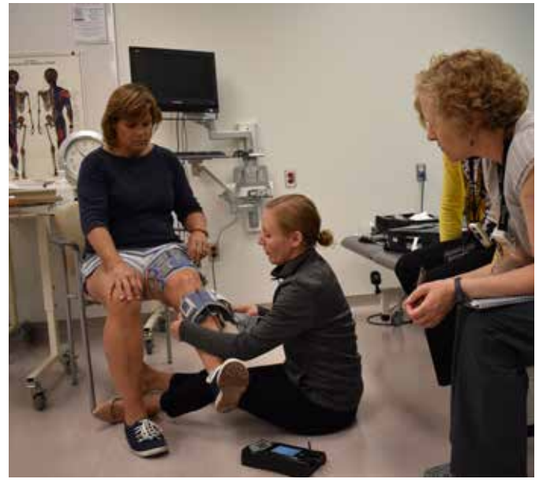


Image: Tom Arban

Throughout this report repeated references will be made to findings of mental health patients. This reference is a classification that includes all the mental health patients who are receiving care at PCH, regardless of the unit or program they are admitted to.

### Physical Rehabilitation

There are two physical rehabilitation programs at PCH. The Restorative Rehabilitative program treats patients over the age of 16 who require extended periods of rehabilitation that cannot be achieved through a short stay visit at an acute care hospital. The Seniors Rehabilitative Care program provides inter-professional care delivery to seniors with complex health needs. In both programs patients have experienced a life-altering disability such as a stroke, spinal cord injury (SCI), acquired brain injury (ABI), musculoskeletal, respiratory, amputee or neuromuscular issues and require a period of intensive rehabilitation.

### Complex Medical Care

Typically, patients who are admitted to the Complex Medical Care units in the hospital have long term illnesses, co-morbidities and disabilities. The objective is to avoid further loss of function, to increase activity tolerance and to support the transition home or to an appropriate care destination within the community.

Throughout this report repeated references will be made to findings of complex care rehabilitation patients. This reference is a classification that combines patients from the complex medical care units and physical rehabilitation. In essence, they are all the remaining patients who are neither mental health patients nor palliative care patients.

### Palliative Care

For patients with a life-limiting illness at the end stage of life, both short-term and long-term palliative care services are offered at PCH. Short-term palliation, serves patients with an expected prognosis of less than four months, whereas, long-term palliation, serves patients with a life expectancy of four to 12 months. Considering the delicate circumstances surrounding palliative care patients, a conscious decision motivated by respect was made to exclude this patient population from the user experience and design evaluation.

# Participants

There are many contributing factors to executing a successful user experience and design evaluation. Construct measurement is critical to the evaluation as it ensures that validity, reliability and generalizability are maintained in the operationalization and measurement of variables – both those being manipulated via a design intervention and those that are being measured as outcomes. Sampling technique and sample size are also essential to the success of an evaluation effort. Once they are in the field, the evaluation team works steadfastly with the on-site unit hosts to ensure a minimum threshold sample of representative participants are recruited on the basis of an informed consent process. A robust sample size, balanced among type of participants where possible, ensures both the rigour and generalizability of data analysis to test the evaluation hypotheses.

For the PCH user experience and design evaluation data was collected in two stages. The pretest phase was completed between August and October 2016. During this phase data was harvested from two facilities, SMOL and MHS. Two years later, approximately one year post occupancy, the posttest phase occurred from August to October 2018, during this phase data was only harvested at the new PCH.

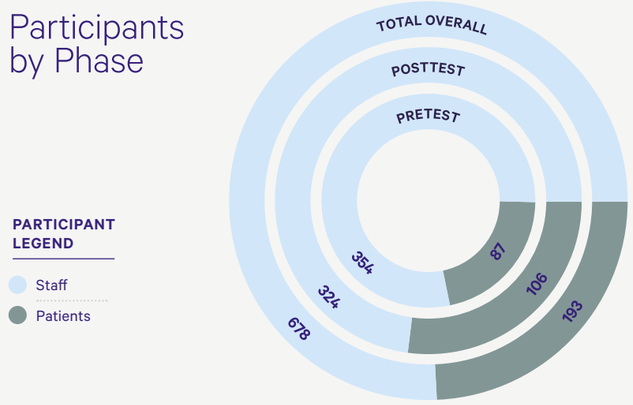
Image: William Suarez



## Participants

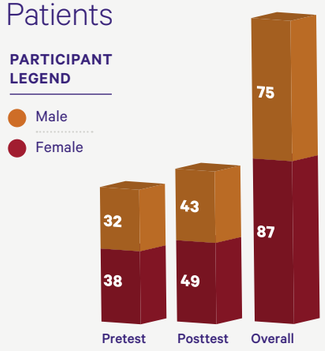
A grand total of 887 participants (678 staff, 193 patients including 145 inpatients, 26 outpatients and 22 proxies, and 16 visitors) were engaged in the user experience and design evaluation. 449 participants (354 staff and 87 patients) were recruited at the pretest phase and 438 participants (324 staff and 106 patients) were recruited at the posttest phase. Unfortunately, the 16 visitors represented too small of a sample size and were therefore, excluded from the analysis.

### Participants by Phase

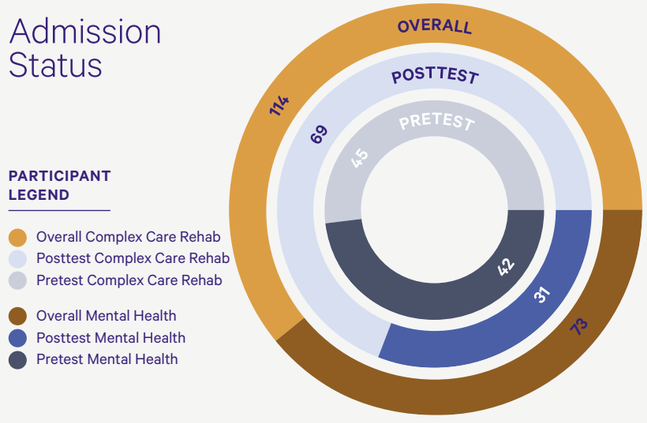



## Patient Characteristics

### Gender Patients




### Admission Status



### Patients

Participation in the study was determined by a short list of eligibility criteria. Patient eligibility was conditional on having the cognitive ability to carry on a conversation and be able to answer questions about themselves, their health and their use of and experiences with the spaces in the hospital. Furthermore, they were required to confirm their physical and mental ability to participate in an interview that could range from 30 to 45 minutes. Recognizing that a significant number of the patient population at PCH may not have the mental ability to participate in an interview, opportunities were created for proxy participation. In this scenario individuals who were familiar with the ineligible patients, either a spouse, family member or close friend completed the interview on their behalf. This typically occurred with seniors mental health patients.

### Staff

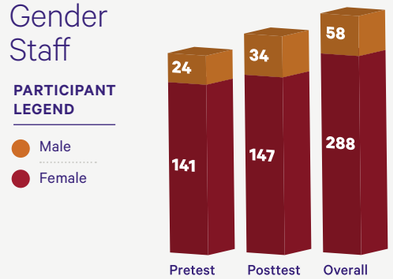
All PCH staff were invited and encouraged to participate in the user experience and design evaluation. For the purposes of this endeavor staff are defined as people who are on site to work or perform a function, this would include paid staff, as well as physicians and volunteers. During the pretest and posttest phases, online versions of the staff survey were made available and were accessible via a link that was shared through email. In a deliberate attempt to be as inclusive as possible, mobile computer labs were provided for those staff who do not require a computer to perform their duties. The mobile labs were scheduled with department managers and located in an accessible and convenient area for the targeted staff.

## Note: Participant Categories and Data Analysis

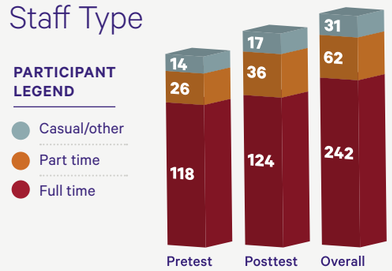
Given the low sample size for outpatients and proxies, comparative analysis across inpatient and outpatient populations were not possible. Therefore, patients include: inpatients, outpatients and proxies. Visitors were excluded from the analyses due to low sample size.

## Staff Characteristics

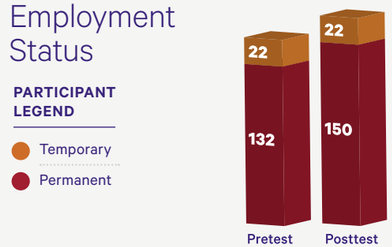
### Gender Staff



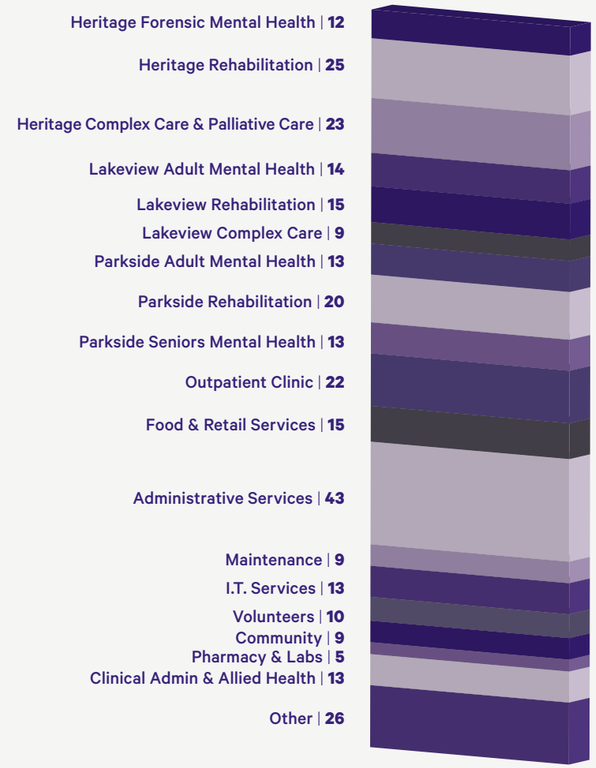

### Staff Type




### Employment Status




### Staff by Department Posttest Only



# Design Intentions

In a novel approach to user experience and design evaluations, Methologica uses the design intentions for a new healthcare facility as the theoretical basis against which to assess outcomes. To be able to fully identify what the design intentions are and their anticipated outcomes, Methologica embarked on a series of interactive, multidisciplinary and seasonal workshops. These early stakeholder engagement workshops were held with the Planning Design and Compliance team (HOK Architects, Agnew Peckham) and the Design Build Finance Maintain team (Parkin Architects) and separately with the PCH redevelopment team.

During these sessions we were able to review the new PCH facility design and affected areas, gain valuable insight into the similarities and differences in design across all three facilities, clarify the timing of the various phases of redevelopment, identify the overarching design intentions and anticipated outcomes, consider the spaces of greatest significance to the design and the anticipated use, experience and outcomes for these spaces and the facility overall.

## The design intentions are:

- to promote recovery and transition
- to foster connection to others
- to enhance the connection to nature and the surroundings
- to create a healing environment
- to optimize the staff and patient experience
- to promote comingling
- to reduce stigma



# Capturing Experience & Outcomes

There was an era when ward rooms, shared bathrooms and little or no views to the outside were normal. However, design is not static. Inspired by research, feedback from staff and patients, and having to respond to the changing demands of the patient population healthcare facilities are constantly in search of an exemplary design to better serve patients and create an environment for staff to provide the best care possible and thrive in both their professional practice and their well being.

## User Experience & Outcomes

- Travel Distance
- Wayfinding
- Self Efficacy in Mobility
- Coping
- Optimism
- Depression
- Stigma
- Collaboration & Workplace Well Being
- Staff Satisfaction & Burnout
- Patient Satisfaction

PCH is symbolic of the need for design interventions to respond to the demands of a changing and increasingly complex patient population. As a hospital that cares for sizable mental health, complex medical care and rehabilitation patient populations, PCH is responding to seismic shifts in the healthcare industry. A transformative approach to mental health has seen billions of dollars pledged for new services and care facilities. Furthermore, advances in modern medicine and the aging baby boomer generation has created a patient population that is living longer and with multiple heath conditions. There is a clear and present demand for mental health, complex care and rehabilitation facilities. PCH is a catalyst for change in healthcare delivery that not only co-locates patient populations in one facility, but also encourages the comingling of these groups and the staff who care for them.

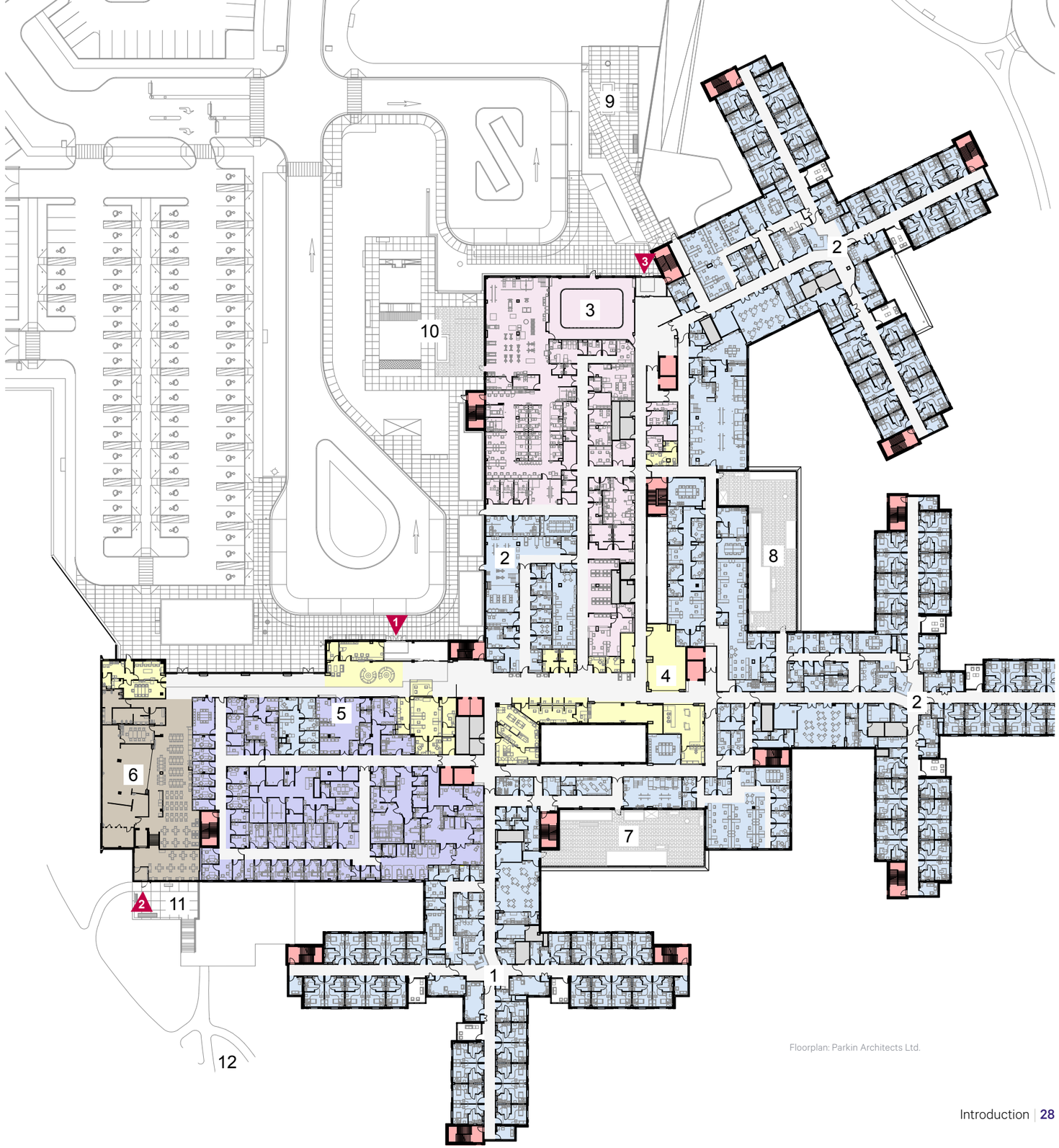
Being one of the first facilities to implement this model comes with great pride and perhaps, some uncertainty. Will it work, and how can we ensure that it works? By conducting design research evaluations, you can capture the user experience and identify what is working and what is not. These findings have the power to influence the facility under evaluation by improving any identified underperforming areas, as well as being a beacon of light and hope so that other facilities can avoid pitfalls, while replicating and enhancing high performing spaces and design features.

# Spaces Under Study

## Providence Care Hospital - Level 1

A hospital is more than a collection of patient rooms and clinical areas.  For the design intentions to fully materialize investments must be made in key areas and spaces that are instrumental in providing the opportunities for the design intentions and anticipated outcomes to flourish.

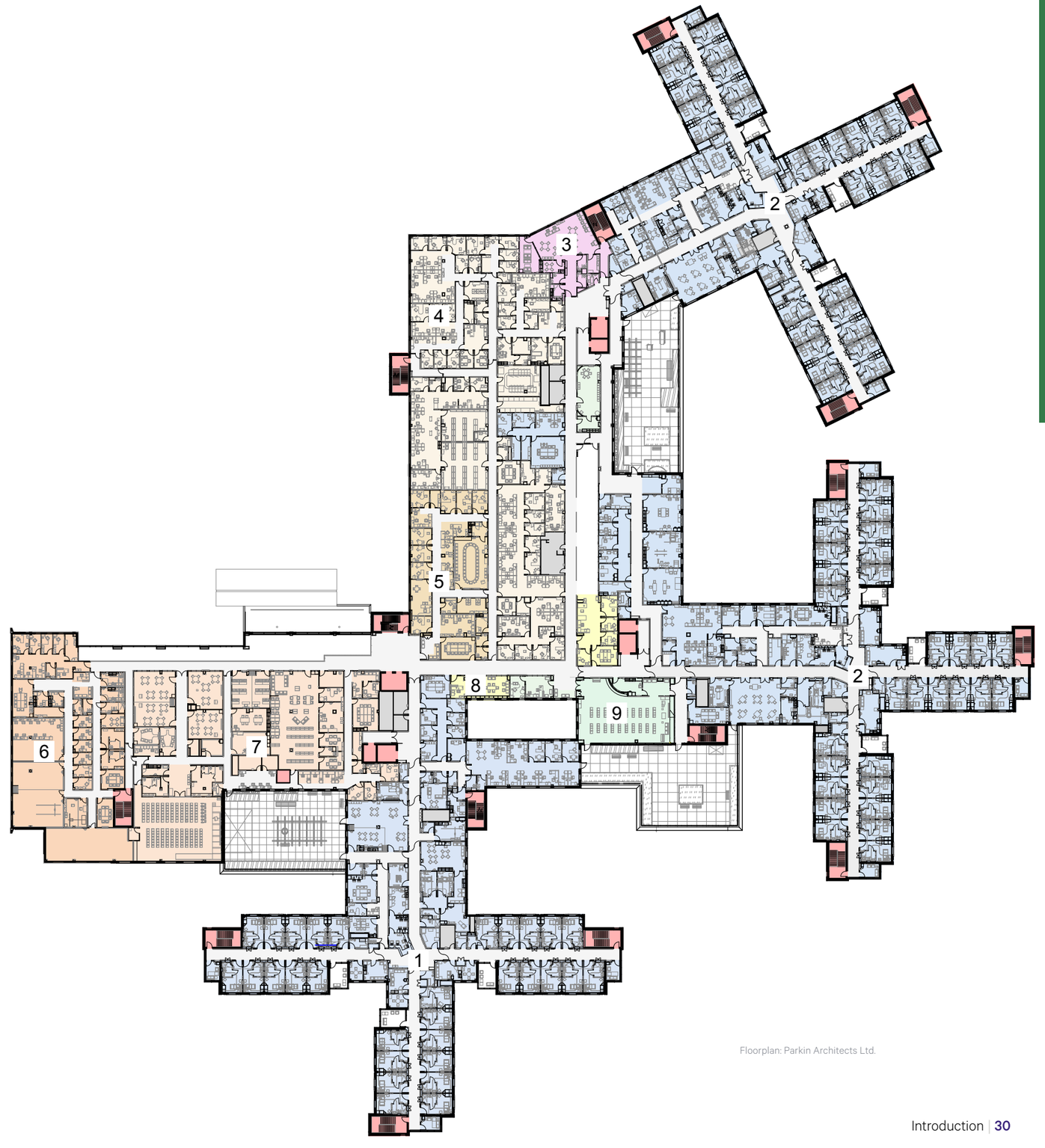
- Main Entrance
- Lobby & Circulation Corrridors
- Central Registration
- Central Rehabilitation Area
- Cafeteria
- Limestone Terrace
- Outdoor Courtyards
- Healing Garden
- Unit Rehabilitation Area
- Patient Rooms
- Dining Rooms
- Patient Visiting Areas
- Staff Lounges
- Workspace
- Porches




Floorplan: Parkin Architects Ltd.

## Providence Care Hospital - Level 2

- Outdoor Courtyards
- Unit Rehabilitation Area
- Dining Rooms
- Patient Visiting Areas
- Staff Lounges
- Workspace
- Worship Centre
- Meditation Room
- Founders' Hall
- Porches




Floorplan: Parkin Architects Ltd.

# 3. Evaluation Design & Methodology

## Evaluation Design and Methodology

A defining feature of the PCH user experience and design evaluation was the opportunity to assess the impact of integrating diverse patient populations, mental health, complex continuing care and rehabilitation, along with the staff who care for them within one facility relative to their previous isolation in separate facilities at different sites. The user experience and design evaluation allowed for an assessment of the relative impact of the design and the integration of the patient populations.

A pretest posttest quasi experimental evaluation design with mixed quantitative and qualitative methods was used to assess the impact of the PCH design on patients, staff and visitors before and after the redevelopment and integration of two sites (SMOL and MHS) into the new facility.

Due to the nature of the patient population and the average length of stay, the posttest research team was in a unique position to include and evaluate individuals who participated during the pretest evaluation. Pretest and posttest contributions from staff participants typically occur, however it is very rare to have this phenomenon transpire with patients.

The methods were selected based on the following: the root of the research questions to be addressed, the construct to be assessed and the desired conclusions to be made. Whereas quantitative methods allow for the attribution of causality and enable generalization, qualitative methods allow for the contextualization and documentation of the lived experience. The selected methods enable the assessment of both anticipated and unanticipated uses as well as the consequences of the building design.

### Methods

- Quantitative computer assisted surveys were crafted to assess perceptions and experience of facility design and well being among patients and staff.
- Unobtrusive naturalistic observation to enable covert observations of user behavior and interactions within the built environment. Patterns of use, social interactions and activities were captured without disrupting naturally occurring behavior.
- Moving interviews which combine focused interviewing with participant observation.  Researchers accompanied participants, both staff and patients on their natural outings and actively explored their physical and social practices by asking questions, listening, and observing.
- Hospital administrative outcomes allowed for the comparison of data from hospital administrative databases between April 2016 to November 2018.

## Quantitative Methods

Quantitative research methods are necessary to attribute cause and effect. Quantitative surveys were designed to assess the impact of the architectural design on psychosocial well being and the perceived health of patients (directly or via proxy), staff, and where possible, visitors.

### Surveys

Computer assisted surveys were administered to patients. Taking into account the complexity of the patient population, the patient surveys were primarily conducted in tandem with a researcher. The data was collected via an interview format using a bespoke software platform. The software was selected for its ability to present images, create visual response options, and directly enter the responses into a computer.

Staff completed a web based self-administered survey that was posted on a secure website. This was the only noticeable difference between the two surveys, whereas the staff completed the survey on their own, patients completed the survey with a researcher.

In an effort to be as inclusive as possible a proxy survey was created to allow for the participation of patients who otherwise would not have been able to share their experiences of the hospital design. The ideal proxy is a close family member, loved one or friend who is able to respond on behalf of or from the perspective of the patient. This survey was most commonly utilized with the senior's mental health population. The survey is identical to the patient version with slight wording modifications.

### Measures

Using Methologica's unique approach to user experience and design evaluation, wherein design intentions inform the selection of outcomes to be assessed, several custom measures were created for the PCH user experience and design evaluation (Alvaro, in prep; Alvaro & Atkinson, 2013; Alvaro & Kostovski, 2015; Alvaro et al., 2018, 2016a, 2016b, 2015a, 2015b; Atkinson, 2014).

Custom measures included impressions of the overall building design, the experience of the building, its setting, and designated spaces; affective reactions to various spaces throughout the hospital; sense of connection; and perceived improvement among patients. Measurement scales were crafted to enable the detection of subtle differences in responses.

To facilitate the comparison of outcomes across healthcare redevelopment projects, there was some overlap across a set of measures developed for previously executed user experience and design evaluations (e.g., Bridgepoint Active Healthcare, West Park Healthcare Centre, St. Catharines Site Niagara Health System). Moreover, in the event that sufficient data could be captured to compare new patient or staff experience at PCH with their experience at the previous sites participants were asked if they had been transferred from or worked at SMOL or MHS. Unfortunately, the sample size of patients and staff who experienced both facilities was too low and did not meet the minimum threshold required to enable a subset analysis of these findings.

## Qualitative Methods

Whereas quantitative methodologies enable causal inference, generalizability and replication, qualitative methodologies are used to contextualize and describe the phenomena under study.

Naturalistic observation was used to understand how people use and interact with the spaces both inside and outside of the hospital.

Moving interviews were used to emulate and understand the patient and staff experience of the hospital design as a whole as well as various spaces in the hospital. The approach was initially adapted from the go-along interview (Carpiano, 2009) but it was later uniquely tailored by Dr. Paula Gardner for use in capturing the user experience of the built environment in tandem with other qualitative and quantitative methods (see references by Dr. Alvaro and colleagues from 2013-2018 listed at the end of this report).

### Naturalistic Observation

Naturalistic observation is a research method that involves observing people in natural settings without their awareness. The covert approach is necessary because people often change their behaviour if they know they are being watched. In naturalistic observation, researchers "blend in" without being noticed and observe the behaviour and social interactions of people in various settings.

In the study naturalistic observation is deployed to better understand how people use and interact in various spaces both inside and outside of the hospital - social spaces, areas for quiet contemplation or rest and outdoor destinations.

Executing natural observation techniques cannot be described as simply "people watching".

The selection of spaces and our observations were informed by socio behavioural theories, monitoring expected and unexpected uses of the spaces, and tracking the expected and unexpected users. In particular, observations focused on patterns of use and behaviour across the spaces targeted for study including but not limited to social interaction, activity, type, circulation, and wayfinding.

When possible, patients, staff and visitors were unobtrusively followed to track the number of times they appeared lost and where they were located in the hospital when this experience occurred, as well as what activities they engaged in along the way.

Image: William Suarez

### Moving Interviews

Patient moving interviews consisted of a hospital journey that began in the patient's room or central meeting place (i.e., cafeteria) and followed self-identified travel routes to key places of interest for the evaluation including private, public and transitory spaces within the hospital. The mode of travel (e.g., walking or wheelchair) and the site(s) visited (e.g., cafeteria or outdoor pathways) were decided by the participants. Patients were asked to take us to a favourite or most-used space in the hospital. Data collection focused on patient's impressions, experiences and knowledge of these places with attention to the design intentions of the facility, ease of navigation and wayfinding, patient mobility needs, barriers, and supports, and finally their overall experience of the facility design.

Staff moving interviews involved a journey as they engage in their work and negotiate spaces that are integral to their role. In essence, it was a form of shadowing with selected prompts to understand staff impressions, experiences and knowledge of spaces of greatest importance to their workday. Particular attention was paid to the design intentions of the facility, how the design facilitates and/or hinders their performance and function in the workplace and, lastly their overall experience of the facility design.

Image: Tom Arban

## Hospital Administrative Data: Pre and Post Occupancy

A common approach to user experience and design evaluations involves the comparison of data from hospital administrative databases before and after the redevelopment (i.e., pre and post move to the new facility). This method limits the ability to attribute observed outcomes to differences in facility design. The direct link can be established through a unique case control method and custom survey data. This approach was presented to hospital leadership and the Ministry of Health and Long Term Care however, it was not permitted due to hospital data policies. Administrative data between April 2016 to November 2018 were retrieved from PCH to examine whether there were any changes in hospital metrics, such as number of clinic visits and infection control, before and after patients moved to the new building in April 2017. For comparison purposes, data from the fiscal year 2016/17 (April 2016 to March 2017) were used as baseline, and data between April 2017 to November 2018 were considered post-redevelopment measures.

Measures included length of stay, wait times, clinic visits, medication incidents, use of restraints, patient falls and infection rates.

Image: Providence Care Hospital

# 4. Naturalistic Observation

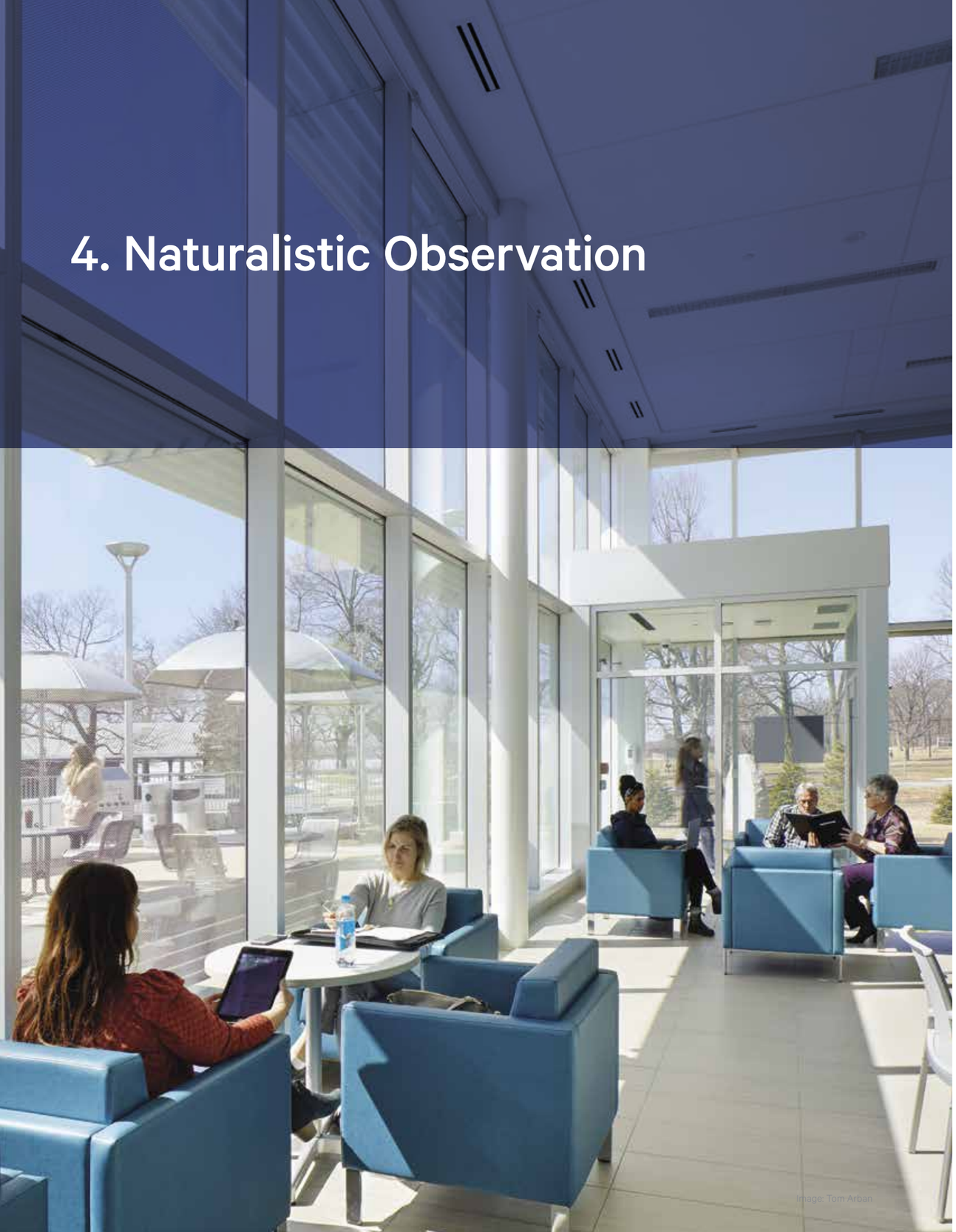


Image: Tom Arban

## Naturalistic Observation Zones

| OBSERVATION ZONE | ST. MARY'S OF THE LAKE | MENTAL HEALTH SERVICES | NEW PROVIDENCE CARE HOSPITAL |
|---|---|---|---|
| Entrances | > Main Entrance<br>• Exterior upon arrival<br>• Pick up and drop off<br>• Interior upon entry | > Main Entrance<br>• Exterior upon arrival<br>• Pick up and drop off<br>• Interior upon entry | > Main Entrance<br>• Exterior upon arrival<br>• Pick up and drop off<br>• Interior upon entry<br>> Staff Entrance<br>> Entrances off courtyards |
| Main Lobby Circulation Corrridor | > Main lobby entrance<br>> Information desk<br>> Registration area<br>> Seating areas<br>> Circulation corridors<br>> Retail areas<br>> Day Clinics | > Main lobby entrance<br>> Information desk<br>> Seating areas<br>> Circulation corridors<br>> Day Clinics<br>**No Registration Area* | > Main lobby entrance<br>> Information desk<br>> Central registration<br>> Clinics<br>> Seating areas<br>> Circulation corridors<br>> Retail areas |
| Cafeteria | > Canteen<br>> Servery<br>> Seating and dining area | > Canteen<br>> Servery<br>> Seating and dining area | > Servery<br>> Vending machine area<br>> Seating and dining area |
| Outdoor Areas | > Outdoor courtyards<br>> Outdoor pathways<br>> Circulation to the building | > Outdoor courtyards<br>> Outdoor pathways<br>> Circulation to the building | > Limestone Terrace<br>> Healing garden<br>> Outdoor courtyards<br>> Outdoor pathways<br>> Worship Centre terrace<br>> Benches and seating areas<br>> Outdoor activity areas<br>> Circulation to the building |
| On Unit Areas | > Care desk<br>> Inpatient unit configuration<br>> Patient & family lounges<br>> Staff lounges<br>**No dining rooms* | > Care desk<br>> Inpatient unit configuration<br>> Patient & family lounges<br>> Staff lounges<br>> Dining rooms | > Care desk<br>> Inpatient unit configuration<br>> Patient visiting areas<br>> Staff lounges<br>> Dining rooms<br>> Sunrooms<br>> Porches<br>> Unit rehabilitation areas |
| Worship Centre | > Chapel<br>> Seating area & adjacencies | > Chapel<br>> Seating area & adjacencies | > Chapel<br>> Seating area & adjacencies |

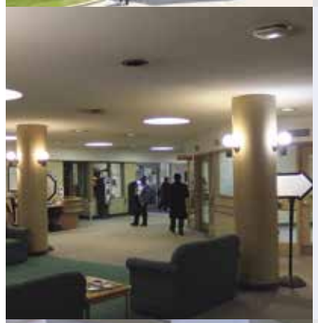
## Entrances

**WHO** Patients (with mobility devices of all types), staff, visitors, and community members.

**WHAT** The main pick-up and drop-off location for patients, they can often be found sitting and waiting for a ride, staff are seen entering and exiting chatting with others and bringing in coffee and snacks.

**WHEN** Morning, afternoon, and evening with busiest times in the afternoon.

**CONTEXT** Minimal (MHS) to no seating (SMOL) is available at the entrance, patients often use their mobility devices (wheelchairs and walkers) to sit and wait for their ride.



## Main Lobby & Circulation

**WHO** Patients (with mobility devices of all types), staff, visitors, and community members.

**WHAT** Few patients are seen in the MHS lobby and staff pass by on their way to other areas. The SMOL lobby is highly animated with patients gathering around the sofas and TV area, visitors stopping for directions at the information desk, and staff transitioning through the space to the nearby elevator bay.

**WHEN** Morning, afternoon, and evening; busiest morning and evening.

**CONTEXT** The MHS lobby is bright and airy with high ceilings and big windows. The SMOL lobby has less natural light but feels more homey and communal with ample seating and a large TV.

## Cafeteria

**WHO** Patients, staff (groups of 1-8), visitors, and community members sitting together.

**WHAT** A place for eating, drinking, and socializing during mealtimes, outside of peak hours mental health patients use this space for a change of scenery, while the SMOL cafeteria is used for activities (e.g., arts and crafts).

**WHEN** Morning to evening with busiest times at 10am and 1pm (SMOL). Cafeteria is only open from 11-1:30pm (MHS).

**CONTEXT** MHS is bright and quiet with lots of seating at rows of tables. SMOL is dim and loud (at lunch) with lots of seating available at rows of tables.

## Outdoor Courtyards

**WHO** Patients (with mobility devices of all types), staff, visitors, and community members.

**WHAT** Patients use this space to interact with each other, smoke, or to take a stroll, staff use this space for a change of scenery and a quiet break alone.

**WHEN** Morning, afternoon, and evening with the busiest times in the afternoon and early evening.

**CONTEXT** A variety of outdoor seating options are available (gazebo, benches, bus shelters, picnic tables) in the surrounding of both sites, some were placed in green space while others were in cement.





## Entrances

**WHO** Patients (unassisted, assisted by attendant, with mobility devices of all types), staff, visitors, service providers. Individuals, pairs, and small groups of 2 to 3 people.

**WHAT** A patient drop-off and pick-up spot often filled with family cars, taxis, paratransit buses or shuttles. The first and last friendly exchanges of the day occur between staff and patients as they enter and exit the building.

**WHEN** Morning, mid-day, afternoon, late afternoon to early evening (quiet after 5 pm).

**CONTEXT**: Benches are scattered along the front entrance, some in direct sunlight and others in shaded areas beneath the canopy. The sidewalk is wide and sounds of nearby traffic can be heard.


## Main Lobby & Circulation

**WHO** Patients (unassisted, assisted by attendant, with mobility devices of all types), staff, visitors, and community members. Individuals, pairs, and small groups of 2 to 3 people.

**WHAT** It is a central and animated main thoroughfare with all types of people using this space on their own, offering tours, on their way to meetings, on route to the cafeteria, and in their daily work on site.

**WHEN** Morning, mid-day, afternoon, late afternoon to early evening (quiet after 5 pm).

**CONTEXT** Two-storey ceiling height at grade, abundance of natural light permeates the space, information desk staffed with volunteers, sightlines to activity along the corridor leading to the cafeteria to the right, registration, clinics and cafe to the left, and the 2nd floor mezzanine above.

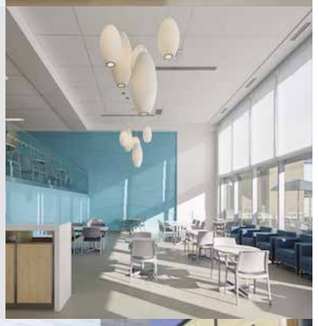

## Cafeteria

**WHO** Patients (unassisted, assisted by attendant, with mobility devices of all types), staff, and visitors. Individuals, pairs, small groups (2-3 people), and larger groups (4-6 people).

**WHAT** Chatter permeates at lunchtime when patients, staff, and visitors use the space for eating, drinking, and socializing, as well as a main access way to the outdoor pathways.

**WHEN** Morning, mid-day, afternoon, late afternoon to early evening (quiet after 5 pm). Busiest time is between late morning and lunchtime.

**CONTEXT** A relatively quiet and airy space with an abundance of natural light from the big windows that look out to the outdoor terrace and beyond.



## Outdoor Courtyards Adjacent to Patient Units

**WHO** Patients; minimal use.

**WHAT** Mostly unoccupied, a disengaged patient sitting on a bench proximal to the building alone.

**WHEN** Morning, mid-day, afternoon, late afternoon to early evening (quiet after 5 pm).

**CONTEXT** Courtyards are enclosed by a fence with no shaded areas or protection from the sun. Some courtyards have multiple seating options, green space, and activity zones.

## Visiting Lounges

**WHO** Patients (with mobility devices of all types), staff, visitors.

**WHAT** Patients gather in groups but very little interaction occurs among them, they silently watch TV, read the paper, or make phone calls, staff behave similarly while on a break.

**WHEN** Morning, afternoon, and evening.

**CONTEXT** Natural light varies dependent on site, more at SMOL and less at MHS, a variety of seating options are available (couches and chairs) and almost always the noise of the TV can be heard.

## Staff Lounges

**WHO** Staff (mostly nursing) in medium sized groups (5-8).

**WHAT** Staff use this space for eating (preparing food and using the microwave), drinking, resting (laying down on a sofa), and charting on a WOW.

**WHEN** Morning and afternoon (11am – 4pm); breaks and lunchtime.

**CONTEXT** Small space with a central table and limited seating, extra chairs are brought in from other rooms when there are no empty seats available.

## Care Desk

**WHO** Staff are mostly seen at the care desks with a few patients and visitors walking or sitting nearby.

**WHAT** Highly animated spaces where staff work individually or interact with each other and patients who are placed nearby for easy observation.

**WHEN** Morning, afternoon and evening.

**CONTEXT** Care desks are enclosed with glass panels for staff and patients to see in and out, many desks cluttered in a small space.

## Chapel/Spiritual Care

**WHO** No observed users.

**WHAT** The chapels were not in use during any of the observation times.

**WHEN** Morning, afternoon, and evening.

**CONTEXT** The MHS chapel is bright, airy and very clean with big windows; the SMOL chapel has dim lighting and is located far from the animation of the rest of the hospital.





## Visiting Lounges

**WHO** Patients (individual or small groups of 2-3 people).

**WHAT** Staff, predominantly social workers, use these rooms for meetings while patient use includes watching TV, resting, and sleeping on the couches with blankets.

**WHEN** Morning, afternoon, and early evening. High use in the late morning and afternoon.

**CONTEXT** Partial glass enclosed rooms that vary in size with TVs, couches, and small kitchenettes.

## Staff Lounges

**WHO** Individual staff members sitting, standing, eating, or drinking.

**WHAT** A private space for staff to use amenities (e.g., kettle, sink, refrigerator, etc.) and engage in quick conversations before returning to work.

**WHEN** Morning, afternoon, and evening (very quiet after 4 pm), with the most traffic around lunch.

**CONTEXT** Kitchenettes with a small table for 3-4 to sit, enough space for the amount of traffic it appears to see.

## Care Desk

**WHO** Staff (individuals, pairs, or random gatherings) and patients (individuals or groups gathered in wheelchairs).

**WHAT** Staff work, flow in/out of adjacent charting areas, chat with clinical or allied health staff, and visitors. Patients are often placed around the desk with their mobility devices to improve sightlines.

**WHEN** Morning and afternoon.

**CONTEXT** Open care desks are located mid-unit with a view to most areas down the corridor.

## Worship Centre

**WHO** Patients accompanied by staff in small groups of 2-3 or large groups of patients for programmed events.

**WHAT** The space has very little use apart from programmed events with few therapy sessions or visits occurring on the terrace.

**WHEN** Morning, mid-day, afternoon, and early evening, mostly in use during programmed events.

**CONTEXT** An open and airy space with a soft colour palette, water wall feature, labyrinth, and wall-to-wall windows with an unobstructed view to nature.

Images: Providence Care Hospital, Tom Arban, Methologica

## St. Mary's of the Lake

### Registration

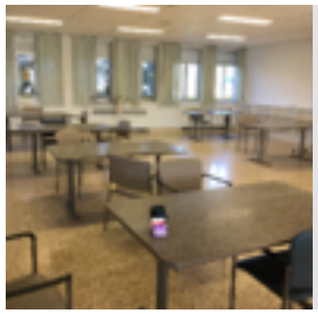
**WHO** Patients (unassisted, with canes and walkers), few staff and at times a visitor or two.

**WHAT** Several kiosks may be open at once. At times patients wait in chairs across the corridor before a clerk can assist them in registering and directing them to their corresponding clinic.

**WHEN** Mid-morning and early to mid-afternoon appear to be peak registration times.

**CONTEXT** Separated registration kiosks line the main corridor to the left of reception, allowing patients to register while keeping their final destination private. Registration area at SMOL is an enclosed, small space located near the lobby.

## Mental Health Services



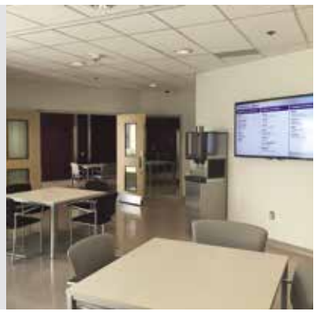
### Dining Rooms

**WHO** Patients in groups.

**WHAT** Patients arrive on their own or by porters for lunch and dinner, the space fills as they find their table and staff begin serving their meals, outside of meal time this space is quiet and used for programmed group sessions (recreation therapy).

**WHEN** Noon and early evening.

**CONTEXT** The largest communal spaces on each unit with a TV, kitchenette, views to nature, and many tables and chairs that are moveable and accessible to all mobility types. Dining rooms at MHS are loud with lots of seating and very little natural light.



## Spaces Unique to the New Providence Care Hospital

### Terrace Adjacent to the Cafeteria

**WHO** Patients (unassisted and in wheelchairs, individuals, pairs or small groups of 2-4), staff (alone or in small groups of 2-3), and visitors.

**WHAT** A few individuals or groups enjoy lunch on both the upper and lower level of the terrace, although the majority of users are drawn to this area for physical activity and continue along to the pathways.

**WHEN** Morning, mid-day, afternoon, late afternoon to early evening (quiet after 5 pm).

**CONTEXT**: An upper and lower level with metal tables, chairs, and umbrellas for shade.

### Terrace Adjacent to the Worship Centre

**WHO** Patients (individuals or in small groups of 2-3) and staff (accompanying patients).

**WHAT** The space is very quiet with minimal users being recreational/occupational therapists and their patients who utilize the gardens and seating areas.

**WHEN** Morning and afternoon.

**CONTEXT** Beautiful views to nature beacon you to the terrace but with limited clean and shaded seating options few people stay for very long.



## New Providence Care Hospital

## Spaces Unique to the New Providence Care Hospital

### Healing Garden

**WHO** Patients (unassisted and in wheelchairs, individuals, pairs or small groups of 2-4), staff (alone or in small groups of 2-3), and visitors.

**WHAT** On warm weather days staff are the primary users of this space, they meander through the garden, enjoy the scenery, and stop for quiet conversations along the paths or in the gazebo.

**WHEN** Morning, mid-day, afternoon, late afternoon to early evening (quiet after 5 pm).

**CONTEXT** An abundance of green space, grass, trees, flowers, and shrubs of mixed height and blooming season offer a habitat for butterflies, bees, and birds.

### Sunrooms

**WHO** Staff and patients (alone).

**WHAT** The sunrooms generally go unused except for family meetings or as an alternative meeting space to the patient room.

**WHEN** Noon and mid-afternoon.

**CONTEXT** Small sunrooms can be found at the end of each unit corridor with beautiful views to nature, lounging chairs and couches, the space is tight and may not accommodate large wheelchairs.

### Porches

**WHO** No observed users.

**WHAT** The porches were not in use during any of the observation times.

**WHEN** Morning, noon, late afternoon and early evening.

**CONTEXT** The concrete, darkness, and often-locked doors make these areas uninviting relative to others.

### Outdoor Recreation Therapy

**WHO** One or 2 patients.

**WHAT** Few patients use these areas; the mental health courtyards have the most use with patients sitting on benches or running around the track.

**WHEN** Morning, afternoon, and late afternoon.

**CONTEXT** These areas vary slightly, with basketball half-courts, canopies, benches, views to green space and the lake, courtyards are fenced in for the forensic mental health areas.

### Rehabilitation Gyms

**WHO** No observed users.

**WHAT** The gyms were not in use during any of the observation times.

**WHEN** Morning, noon, and late afternoon.

**CONTEXT** Unit rehabilitation areas are small spaces with windows bringing in natural light and a variety of gym equipment scattered throughout the room.

Images: Providence Care Hospital, Tom Arban, Methologica

# 5. Moving Interviews

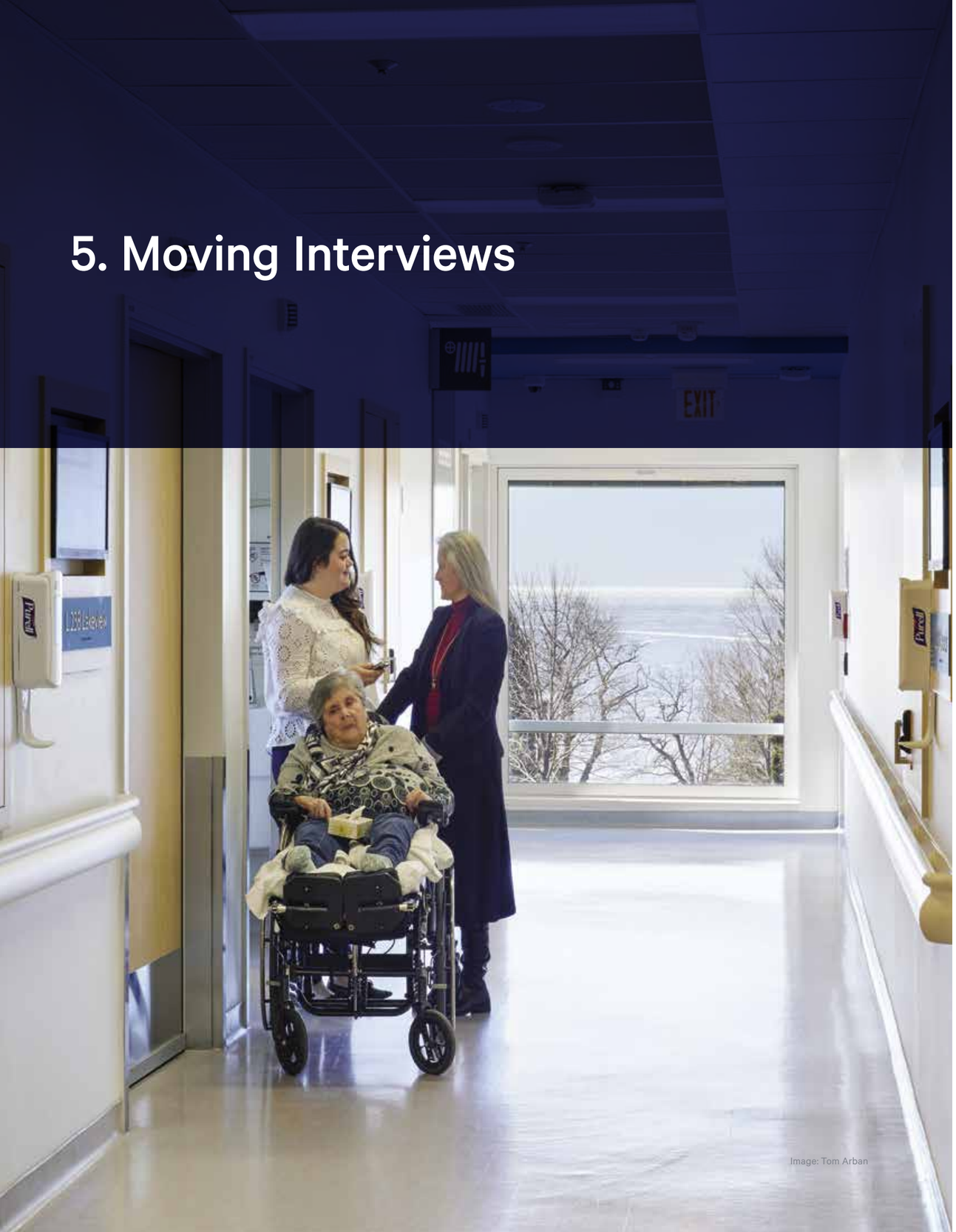



Image: Tom Arban

## Moving Interviews

### Participants

**Patients - 8 total**

- Heritage 1 | 2
- Heritage 2 | 1
- Lakeview 1 | 1
- Parkside 1 | 1
- Parkside 2 | 3

**Staff - 8 total**

- Physician | 1
- Social Worker | 2
- OT / PT Assistant | 1
- Technical Analyst | 1
- Recreation Therapist | 1
- Psychologist | 1
- Financial Analyst | 1

Patients used a variety of mobility devices including manual wheelchairs and highback reclining wheelchairs.

### Data Analysis

Trip diaries were compiled from excerpts of transcripts, field notes, and key photos. The process of selection for these documents included all relevant sections of each interview's transcript, and field notes and photos related to the content of the transcript. A qualitative researcher reviewed the 16 trip diaries then analyzed and compiled important codes and themes from the data. Analysis of these 16 documents revealed several key findings, they are organized into two thematic content areas: 1) places and aspects of design that are seen to be working to promote good health (i.e., health promoting design) and, 2) places and aspects of design that are seen to be working against good health (i.e., health hindering design). Each section includes a detailed discussion along with various examples.

### Health Promoting Design

Analysis illustrates several hospital spaces where design is seen to be "working" to promote good health. Key to these spaces are places with meaningful views, that act as destinations rather than transitory zones, offer privacy, comfort, and autonomy, as well as function to serve many purposes and populations.

**Windows and Natural Light:** The significant amount and placement of windows around the hospital positively enhances the hospital experience noted by almost all patients and staff. Windows in patient rooms and on units connect patients to the outside world and to nature and brighten their spaces with natural light.

The lake, animation in the park, and community heritage buildings peak patients' interests and offers distraction from their hospital experience. Windows improve patients' moods; they feel more satisfied and content. Staff also seek out spaces in the hospital with views and natural light and report similar positive benefits: feeling safe, cared for, and happier. Meaningful views and natural light are favourite aspects of the hospital among all users.

**Outdoor Spaces:** Outdoor spaces are no longer seen as just transitory zones but as destinations. The amount of outdoor space and type of landscaping (e.g., lakeside, park side, and heritage views) are positive aspects of this hospital site. The desire to experience a natural environment is universal. We all look for the multisensory experience as we search for space where we can access natural light, view greenery, smell fresh air and feel the warmth of the sun. Patients and staff in the hospital are not an exception, and indeed may be the most in need of this experience. Even though the new PCH was constructed on the same land as the old MHS site the use of outdoor space has increased significantly.

This is due to the creation of more accessible and desirable outdoor spaces (i.e., patios, gardens, labyrinth, pathways, benches, basketball courts) as well as the addition of the SMOL patient and staff population who are new to these surroundings.

Outdoor areas are used as break spaces for a change of scenery from the staff's day-to-day experience, a chance to socialize with colleagues from across the hospital (i.e., BBQ Thursdays), for teaching, and for family meetings. Patients use outdoor areas to stay in touch with nature, for group therapy, sensory gardens, and just to take a break. When staff and patients have the time and ability to utilize the outdoor spaces they are more connected, relaxed, and happy.

**Animated Spaces.** Animated spaces are places of action, places to interact and observe interaction among others, places that draw you in, stimulate your mind and elevate your mood. An animated space positively influences psychosocial health and well being. Designing for animation in a hospital setting is a challenge. Some animated spaces are hubs of activity but they are noisy due to equipment, patient outbursts, their placement as transition corridors, patient and equipment transfers and contribute to additional sensory discomfort as a result of odour and harsh disinfectants.

These spaces are often designed for clinical functionality and advanced levels of clinical care but they can detract from the user experience of patients, visitors, and staff resulting in adverse effects on well being. Designing animated spaces that create opportunities to distract from worry, pain, or boredom are a mechanism by which patient and staff outcomes – including clinical, psychological, behavioural and social outcomes - can be optimized in a hospital context.

**Sense of Community and Comingling.** A central feature of the new PCH design is its integration with the neighbouring Lake Ontario Park. The physical setting in the park has been advantageous for creating positive animation and a sense of community. The seamless flow between the park, outdoor pathways around the perimeter of the hospital and external courtyards and terraces that provide a point of access to and from the hospital allow for patients, staff, and visitors, as well as dog-walkers, basketball players, and kids in summer camp to mingle and share the space. The observed and documented comingling has positive effects on patient well being and physical health by allowing them to feel a part of their community rather than feeling isolated in the hospital and thereby boosting their mood and ability to cope with their health conditions (Alvaro, in prep; McFarland & Alvaro, 2000). The integration of the hospital within the park and adjacent community zones was optimized by a deliberate design strategy to reduce stigma about mental health and, in many cases, physical health complexities as well as a hospital's role in the community. To the extent that comingling occurs among patients, visitors, staff and community – the perception of who is a patient and who is not can be obscured and result in a more private and dignified hospital experience.

**Private Patient Rooms:** One of the most significant changes for both the patients and staff from the old sites to the new PCH is the private patient rooms. All patients, regardless of unit, have their own room with a private bathroom, television, phone, and window.

Private rooms offer patients the opportunity to remove themselves from situations if they are feeling anxious or irritated and retreat to their room alone, this is especially important for many mental health patients (Koivisto, Janhonen, & Vaisanen, 2004). Private rooms also allow patients to have private meetings and conversations with their healthcare providers without having to relocate to alternative space. Patients enjoy being able to personalize their space (i.e., lock their drawers, turn the lights on and off from their bed, place pictures and other items on their desks) without having to consult their roommates.  Private rooms make patients feel important, secure, autonomous, and experience feelings of luxury. Staff find private rooms easier to provide care to their patients.

**Spaces That Feel Like Home:** Patients, particularly those on extended stays (greater than 6 months), appreciate aspects of their hospital stay that mimic their life at home, outside of the hospital. These can be as simple as colourfully painted walls, which make the patient feel warm and cozy when they wake up or utilizing areas like a kitchenette where they can store their own food and retrieve it whenever they like.

The hospital takes on the role of home for long-term patients and the ability to personalize their space and visit areas that feel like life outside of the hospital positively influence their well being by enhancing autonomy and independence as well as providing opportunities to preserve their identity.

Image: Providence Care Hospital

**Multipurpose Space:** Designing for effective and efficient multipurpose space can be a challenge. Often times the adaptation of a space for a use other than what it was originally intended leads to a less than optimally functioning space. However, at the new PCH spaces like Founders' Hall, the Worship Centre, and the on unit dining rooms illustrate flexible design and a good use of space. Staff appreciate being able to host a wide range of staff workshops, meetings and events in a beautiful space like Founders' Hall, it allows them to feel connected with the entire hospital community through an efficient use of space. Staff comment on using the Worship Centre as an area of reprieve, regardless of religious affiliation they find this space to be designed in a way that is calming and uplifting. Allied staff also noted the use of dining rooms for programming outside of meals such as group trivia, musical presentations, and other group therapy.



## Health Hindering Design

Analysis illustrates hospital spaces where design is seen to be "working" against good health. Key to these environments are distance as a barrier to exploration, difficulties with wayfinding, a lack of communal gathering spaces, underused space, and poor accessibility.

**Distance:** Distance between parking, departments, and inpatient units and public spaces impedes the use and enjoyment of these spaces. In such a large building the placement and proximity of spaces to units is key. It is not enough to have the space; it has to be proximal to the user population. For example, portering from the units to the "neighbourhood" where the therapy takes place can be a long distance depending on the unit and often cuts into their therapy time causing frustration and decreased efficiency. The distance from the parking lot to the entrance is a barrier to visiting the hospital for many family members and friends, especially those with mobility issues.

Something new to consider when amalgamating two sites is how the increased size of the building will affect the staff positions that are hospital-wide, it takes much longer for these individuals to move through the hospital again decreasing their efficiency, slowing their work-pace, and affecting their communication. Overall distance is a barrier to exploring and using space within the hospital.

**Wayfinding:** Patients, visitors, and even staff have difficulty navigating their way around the hospital. Analysis of patient and staff data highlights three main issues: there is a lack of signage, the signage that is available is confusing, and they need more colour-coding. Patients and staff often commented that they rely on their peers rather than the signs to get to where they are going or to find new spaces within the hospital. Many staff emphasized the confusion they felt trying to navigate the "behind the scenes" hallways with very few signs and no colours. The lack of effective signage in all areas of the hospital leads to confused and frustrated patients, visitors, and staff.

**Few Communal Spaces:** There are few communal gathering spaces both on and off unit for patients. With the change of 100% private patient rooms at this new hospital finding opportunities and spaces for socialization becomes increasingly important. Where patients used to have roommates to talk and engage with they now have to venture out of their rooms to find spaces to socialize, unfortunately there aren't many to be found.

The dining room is one of the only on-unit spaces for large groups to mingle, however many patients find the dining room to be cold and uninviting or not large enough to get the whole unit together participating in an activity. If patients want to venture off unit to see patients from other units, like they used to do at the old sites, their options are the café, cafeteria, or various outdoor spaces. However, the café is small and becomes quickly crowded with a few wheelchairs often intimidating to others not very confident in their mobility skills. The cafeteria and other outdoor spaces are often too far for many of the inpatients to venture on their own. This leads to patients remaining on unit and mostly in their rooms by themselves, socially isolated and disconnected from the people around them.

**Underused Spaces:** There are many spaces on-unit that are underperforming and therefore underused by both patients and staff.

The sunrooms are beautifully designed spaces with picturesque views of nature however they are rarely ever used. Patients and staff cite reasons for this to be the kind of furniture in these rooms makes it hard to take notes or be on phone calls and because of the equally beautiful views from the patient rooms they are less motivated to use the sunroom.

The outdoor patios on the unit lack protection from the sun and poor seating options making it less enticing for patients and staff to utilize this space. The outdoor patios are also designed with patio stone flooring which makes it uncomfortable and unsafe for many patients with wheelchairs and walkers.

Lastly, the on-unit porch, a unique indoor-outdoor space, has poor drainage, which often makes patients nervous, a lack

of furniture and because of the screened in aspect is often too muggy or too cold for patients and staff to enjoy.

**Accessibility:** Physical accessibility is a determinant of the patient, staff, and visitor experience. For patients negotiating space with new mobility devices, staff caring for and transferring patients throughout the hospital, as well as visitors moving through unfamiliar space, accessibility plays a significant role in their experience.

For the most part the hospital was designed with strong consideration to accessibility (i.e., wide hallways, large elevators, railings along the corridors) however there are a few spaces where accessibility could be improved. On Parkside 2 all of the patients are stationed around the nursing station for most of the day in their large reclining wheelchairs making it very challenging for patients or staff to navigate this space especially if using a walker or wheelchair themselves.

Image: Melanie Elliott

Throughout the hospital most of the doors open automatically, however the pattern of opening, towards or away from you, is inconsistent. This makes navigating these doorways confusing, alarming, and at times unsafe for all users. Lastly, the door thresholds between the dining room and patio, and upon entry and exit of the hospital are a challenge for patients and visitors in walkers and wheelchairs as they are not aligned completely flush to the other flooring causing a slight obstacle requiring extra force, this can intimidate patients with new mobility devices and discourage them from utilizing these spaces.

## Site Comparisons: Pretest to Posttest

One of the intriguing aspects of the PCH user experience and design evaluation is the amalgamation of two sites into one. Not only is the physical building a new experience for everyone but the comingling of the different patient and staff populations is a new additional layer. Although many were sad to leave their old sites because of the history of those buildings (and the free parking) the new site has offered a variety of new opportunities.

Sharing resources and bouncing ideas off of new staff members in the new interprofessional office spaces has become a highlight for many staff. Patients are also benefiting from sharing spaces like the therapeutic pool and the Westwood School.

Typically the therapeutic pool would be intended for use by the rehabilitation patients however, now that they are in a shared building some mental health patients have been benefiting from this kind of therapy as well. Previously, the Westwood School was operating out of the MHS site and if patients from SMOL wanted access they would have to be shuttled to that location. Now that both patient populations reside in the same building many more complex care rehabilitation patients are benefiting from the programming offered by the Westwood School.

Image: Providence Care Hospital

In addition to these overall changes the comparison of the pre-test moving interview report from the SMOL and MHS sites (2016) to the posttest moving interview findings from the new PCH site has revealed that many of the health hindering design factors from the old sites have become health promoting design factors at the new site.

Not only have the old concerns been addressed but they have come to be some of the key health promoting design findings. At the old sites there was a lack of space and storage however now with a much larger new site the size of spaces in the hospital have increased, and with the addition of 100% private patient rooms patients no longer have difficulty finding private space, in fact their private rooms have become one of their favourite aspects of the hospital. Lack of storage still remains a concern for some allied health members however improvements from the old site have been seen in this area.

Spaces that were designed purely for function and did not take into account aesthetics or the user population were concerns at the old sites. At the new site most spaces have been designed with function as well as aesthetics in mind. One of the most common pieces of feedback we received from patients and staff was how beautiful the new site is and thus how proud this makes them feel. There are still some spaces (patient rooms and bathrooms), particularly on Parkside 2, that don't function as well as they should for that specific user population (larger, reclining wheelchairs) and could benefit from some more personalization of this unit.

Transitory spaces (small elevators, crowded hallways, and transition pieces) were cause for concern at the old sites. The elevators and hallways are large and wide at the new site making it much easier for patients and staff to navigate. Some transition pieces (from the dining rooms to the patios and the hospital entrance) are still concerns at the new site particularly for those new to using mobility devices.

Multipurpose space was seen as a health hindering design factor at the old site because of the poor scheduling, communication and cleanliness of these spaces, which lead to inefficient use. At the new site multipurpose space has actually become a health promoting design factor. With the flexible design these spaces are being used by a variety of populations and are effectively serving many different purposes.

At both of the old sites (SMOL and MHS) there was a lack of accessible green space for use by both patients and staff. Additionally there were few windows with meaningful views of nature and the surrounding community, leaving patients and staff feeling uninspired and unmotivated. At the new site there is plentiful, accessible outdoor spaces along with many windows with meaningful views of the lake, park, and heritage buildings. By far the views and natural light are the favourite aspect of the new site for both patients and staff.

| Health Promoting Design | |
|---|---|
| **Pre-Test Findings** | **Post-Test Findings** |
| Sense of normalcy (hospital store, personalizing patient rooms) | Windows and natural light |
| Sense of intention (therapy equipment placement) | Outdoor spaces |
| Sense of pride (office space that is welcoming) | Private patient rooms |
| | Spaces that feel like home (coloured walls, kitchenette) |
| | Multipurpose space |
| **Health Hindering Design** | |
| **Pre-Test Findings** | **Post-Test Findings** |
| Lack of space and storage (size of space, lack of private space, lack of storage) | Distance |
| Design for function (bathrooms, heavy closet doors) | Wayfinding |
| Transitory spaces (small elevators, transition pieces, crowded hallways) | Few communal spaces |
| Need for green space (inaccessible, lack of windows) | Accessibility (crowded nursing stations, inconsistent automatic doors, transition pieces) |

## Patient Room

Patients typically begin their day in their private room. The privacy allows patients to have meetings with their healthcare providers, personalize their space, and retreat when they're in need of alone time. The overall favourite aspect of the room are the windows which provide views of the lake and heritage buildings, as well as animation in the park. These views offer distraction from their hospital experience.

## Outdoor Pathways

After their morning routine, and weather permitting, patients and visitors can often be found wandering the outdoor pathways and spaces. The integrated design of PCH with the neighbouring Lake Ontario Park has promoted the comingling of various groups. This has positive effects on the patients and their health by allowing them to feel a part of their community and boost their mood.

## Dining Room

At midday patients can be found returning to the unit for lunch in the dining room. On some afternoons the dining room is also host to a variety of recreational therapy activities such as live music or trivia.

## Accessibility

For a change of scenery patients might venture from the dining room to its adjacent outdoor patio. However, many will encounter obstacles in doing so. The threshold in the doorways between inside and outside as well as the uneven patio stones make this experience inaccessible, uncomfortable, and unsafe for many patients.

## Sensory Garden

For those patients who are able to safely make their way outside to the patio, they use this space to stay in touch with nature, for group therapy, sensory gardens, and just to take a break. When patients have the time and ability to utilize the outdoor spaces they are more connected, relaxed, and happy. Some caveats to the use of this space are the lack of protection from the sun and poor seating options.

## On Unit Kitchenette

Some patients end their day with a late night snack from the on-unit kitchenette. Patients, particularly those on extended stays (greater than 6 months), appreciate aspects of their hospital stay that mimic their life at home, outside of the hospital. The ability to store their own food and retrieve it whenever they like enhances their autonomy and independence.

# PATIENT JOURNEY

# STAFF JOURNEY

## Workstation

Most staff members begin their day in their office or at their central workstation. The unanimously favourite aspects of these spaces are the windows and natural light. Staff believe the views add value to their work environment and make them feel safe, cared for, and happier.

## Circulation & Distance

Once they've gotten settled, checked their emails, and are ready to start their day many staff members have to leave their designated workspace to travel to other parts of the hospital. This is especially evident for those positions that are hospital-wide. With a much larger site it takes longer for these individuals to move through the hospital, decreasing their efficiency, slowing their work-pace, and affecting their communication.

## Founders' Hall

Some staff members can be found spending their morning attending hospital-wide workshops or training in Founders' Hall. Staff appreciate being able to host a wide range of events in such a beautiful, multipurpose space, it allows them to feel connected with the entire hospital community.

## Outdoor Courtyards

For the majority of the year many staff can be found taking their lunch break on the outdoor cafeteria patio. At the new site the use of outdoor space has increased significantly. Outdoor areas are used as break spaces for a change of scenery from the staff's day-to-day experience, a chance to socialize with colleagues from across the hospital (i.e., BBQ Thursdays), for teaching, and for family meetings.

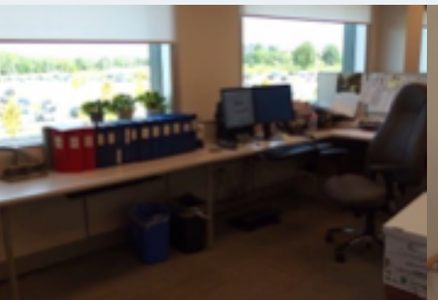
## Wayfinding

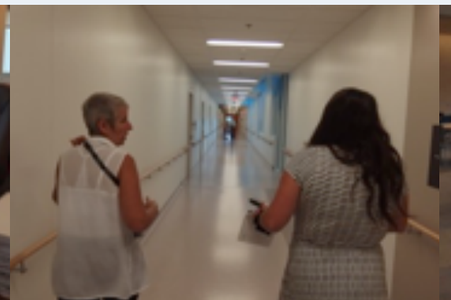
After lunch staff often head off to afternoon meetings, which sometimes require them to use the back corridors of the hospital. Many staff emphasized the confusion they felt trying to navigate these hallways with very few signs and no colours. Staff often commented that they rely on their peers rather than the signs to get to where they are going or to find new spaces within the hospital.

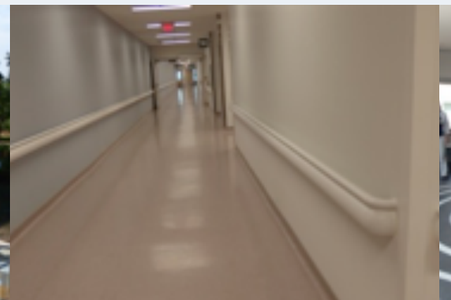
## Worship Centre

At the end of a long day staff can be found searching for a moment of reprieve in the Worship Centre. Regardless of religious affiliation they find this space to be designed in a way that is calming and uplifting, a perfect space to reflect and collect their thoughts before heading home.

Images: Methologica







# 6. Impressions of the Hospital Design

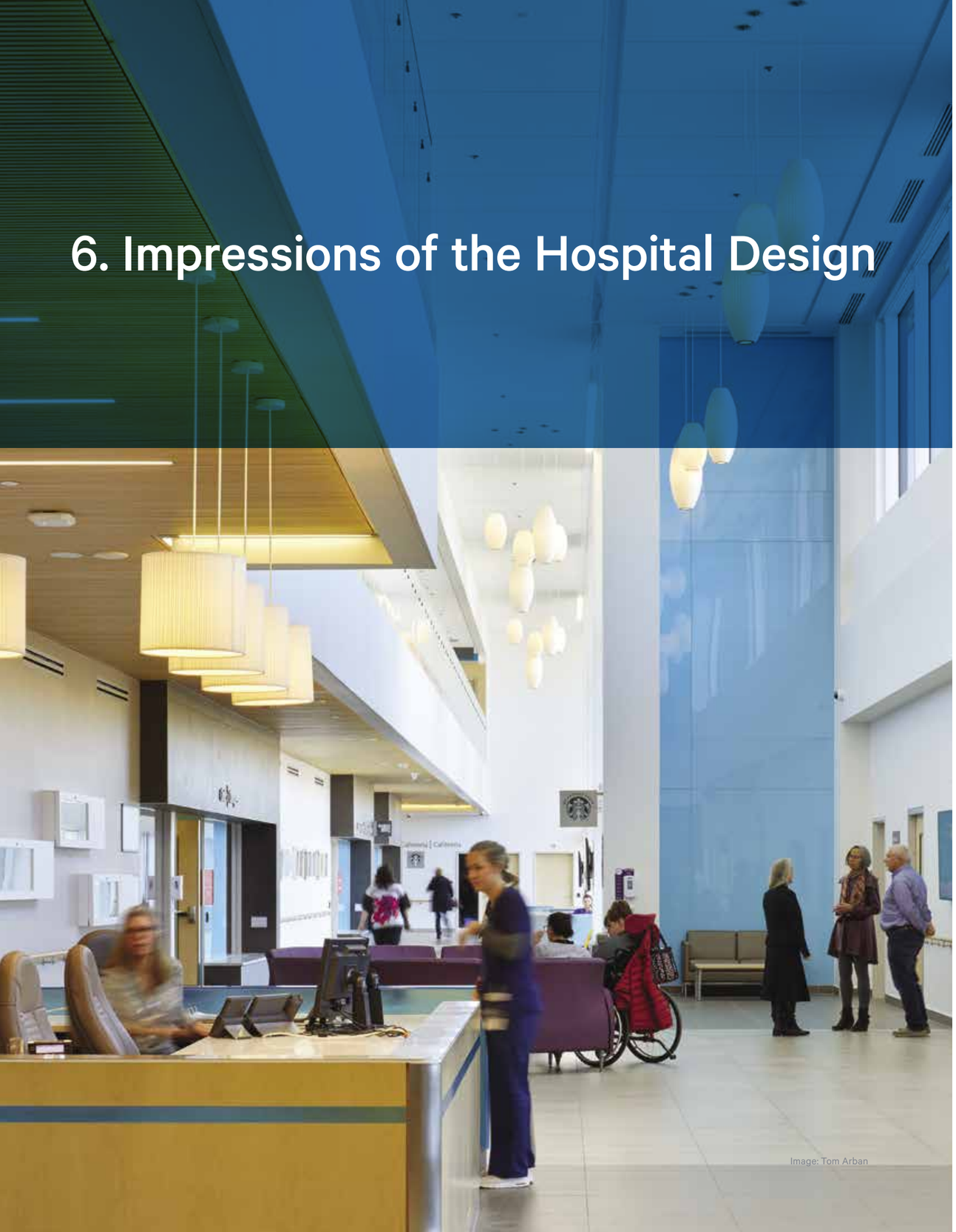


Image: Tom Arban

## Impressions of the Hospital Design

Impressions of the hospital design were assessed on the basis of concepts that align with the design intentions. Using a semantic differential scale ranging from 1 to 10 where lower numbers represent negative impressions and higher numbers represent favourable impressions, participants were asked to rate their impressions of the hospital design on the following attributes: a place of wellness, wayfinding, safety, inspiration, hope, connection to nature, community, city and others.

### Overall Impressions of the Hospital Design

An overall impression index was created as a composite score of all nine impression ratings. In line with the design intention to enhance the staff and patient experience, overall impressions of the hospital design were more favourable at the new PCH (6.49) relative to the MHS (5.10) facility.

### Impressions of the Hospital Design as a Function of Specific Design Intentions

Design intentions for the new PCH were to promote recovery and transition and to create a healing environment – essentially, to inspire wellness, inspiration and hope. The data shows that patients and staff are responding well to these concepts and are in line with the anticipated outcomes.

Patients expressed more favourable overall impressions of the new PCH relative to staff (patients = 7.12; staff = 6.26). For staff, impressions are more favourable for subjective attributes (e.g., a place of wellness, inspiring, a place of hope; 6.84) than objective attributes (e.g., wayfinding, safety; 6.61). The opposite is true for patients (subjective attributes 7.54; objective attributes 7.68). Interestingly, connection to others had the lowest ratings for both patients and staff combined (patients = 6.53; staff = 5.65). The largest discrepancy between patients and staff were reported for objective impressions (e.g., wayfinding, safety; patients = 7.68 vs staff = 6.61).

### Complex Care Rehabilitation vs. Mental Health Patients

A central design intention was to foster connection with people and their surroundings and enhance opportunities for comingling. Connection to others was rated the lowest by mental health patients (5.73) relative to complex care rehabilitation patients (6.83) and, therefore, contrary to design intentions for the mental health patient population at the new PCH.

Complex care rehabilitation patients report more favourable overall impressions (7.51) than mental health patients (6.15). Subjective impressions (e.g., a place of wellness, inspiring, a place of hope) are higher for complex care rehabilitation patients (8.07) relative to mental health patients (6.28) at the new PCH.

The largest change in impressions between the new PCH and the former facilities is observed on subjective impressions (e.g., a place of wellness, inspiring, a place of hope) for mental health patients (PCH = 6.28; MHS = 5.05).

All impressions for complex care rehabilitation patients are more favourable than those of mental health patients across all sites (SMOL = 7.02; PCH CCR = 7.51; MHS = 5.11; PCH MH = 6.15).

Patient impressions of connection to nature (PCH = 7.16; MHS = 4.55; SMOL = 5.92), connection to community (PCH = 6.50; MHS = 4.16; SMOL = 6.08), and inspiring (PCH = 7.49; MHS = 4.79; SMOL = 7.48), are more favourable at the new PCH relative to the previous sites. There is one slight decline, wayfinding was perceived to be somewhat more difficult at the new PCH (6.88) relative to the previous SMOL site (7.65; trend only, approaching significance).

Safety is the highest impression rating reported by complex care rehabilitation patients at the new PCH (9.09). The lowest impression rating reported by mental health patients at the new hospital is connection to the city – with an average impression below the neutral point at 4.90.

The largest change observed in impressions of the new PCH relative to the previous sites is connection to nature, with mental health patients reporting a greater connection to nature (6.23) at the new PCH relative to MHS (4.55).

This finding is particularly noteworthy as attributed to design given that the new PCH facility and the former MHS facilities are located on the same property. The new facility features more accessible and enticing outdoor spaces and views to nature (both proximal and distal) including the lake, the walking path, flora and fauna, and the sky.

### Complex Care Rehabilitation vs. Mental Health Staff

Objective impression ratings (e.g., wayfinding, safety) are more favourable among staff at the previous SMOL (7.31) and MHS (6.03) facilities relative to complex care rehabilitation (6.06) as well as mental health staff (6.00) at the new PCH; with complex care rehabilitation staff expressing more favourable objective impressions than mental health staff.

Subjective impressions (e.g., a place of wellness, inspiring, a place of hope) among staff at the new PCH are more favourable (6.84) than staff at the previous SMOL (6.77) and MHS (4.93) facilities.

The highest impression ratings, though not overwhelmingly so, are reported for subjective impressions among complex care rehabilitation staff at the new PCH (6.71). Contrary to design intentions to enhance comingling, connection to others (5.46) received the lowest ratings among mental health staff at the new PCH.

Complex care rehabilitation staff express more favourable impressions than mental health staff across all facilities on only two attributes: safety (PCH CCR staff = 7.09; SMOL staff = 7.06; PCH MH staff = 6.45; MHS staff = 5.38) and place of hope (PCH CCR staff = 6.9; SMOL staff = 6.67; PCH MH staff = 6.62; MHS staff = 5.55).

Staff at the new PCH report more favourable impressions than the previous SMOL and MHS facilities for a place of wellness (PCH = 6.89; SMOL = 6.64; MHS = 5.09), connection to nature (PCH = 6.54; SMOL = 4.95; MHS = 4.74) and inspiring (PCH = 6.63; SMOL = 6.46; MHS = 4.39). Interestingly, staff at the new PCH show a decline in wayfinding ability (5.75) relative to staff at SMOL (7.43).

Safety is the highest impression rating for complex care rehabilitation staff at the new PCH (7.09). Conversely, connection to the city is the lowest for mental health staff at the new PCH (4.62). The largest change in impression ratings at the new PCH relative to the previous sites is connection to nature among complex care rehabilitation staff (SMOL staff = 4.00; PCH staff = 6.72)

### Patients vs Staff

Patients at the new PCH have more favourable impressions on all attributes than staff.

During pretest, MHS staff reported more favourable impressions on all attributes than patients, at SMOL, connection to nature is the only rating where patients had more favourable impressions than staff (SMOL patient = 2.82; SMOL staff = 2.11).

When comparing patients across all sites, patients at the new PCH report more favourable impressions across all attributes with the exception of connection to others where they are lower than impressions at SMOL but higher than their impressions at MHS. A staff comparison across all sites reveal that staff at the new PCH have less favourable impressions on all attributes relative to MHS and SMOL, with the exception of connection to nature (PCH staff = 2.24; MHS staff = 2.06; SMOL staff = 2.11).

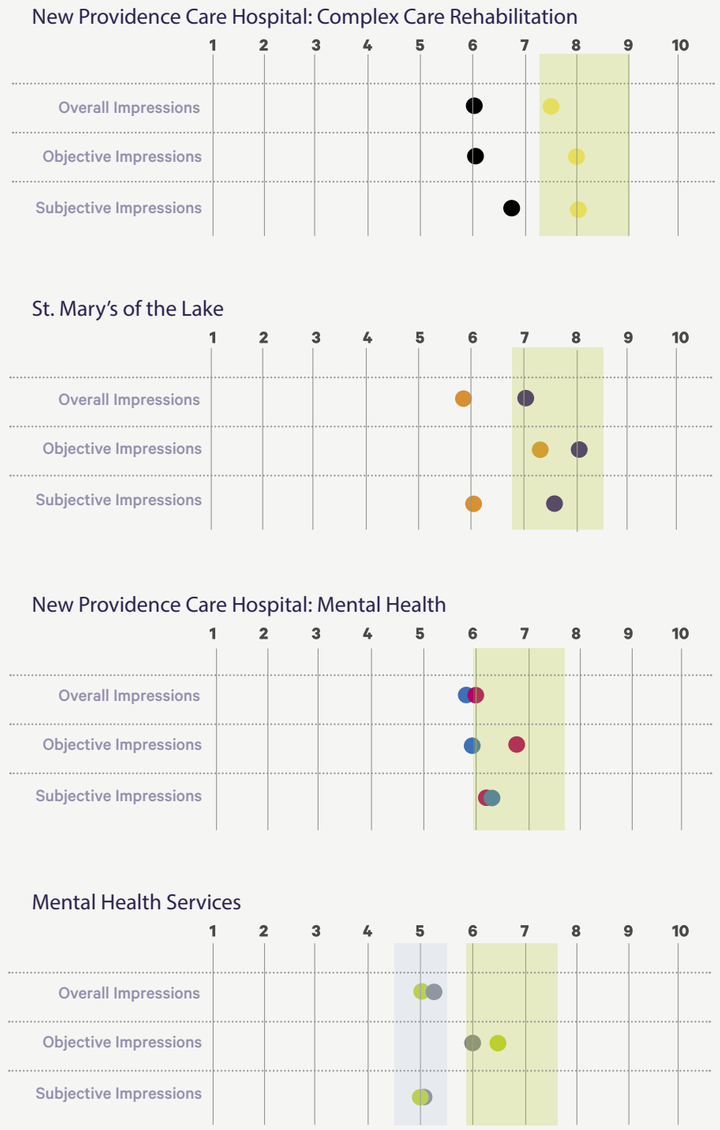
Impression ratings for safety are the highest relative to all other attributes for both patients and staff (PCH patient = 8.49; PCH staff = 7.46). Connection to the city is rated as lowest relative to all other attributes for both patients and staff (PCH patient = 5.61; PCH staff = 5.03), falling somewhat short of the aspiration to enhance connections to the surroundings (though not the city explicitly). The greatest difference between patient and staff ratings is for connection to others, with patients reporting a greater connection to others than staff (PCH patient = 6.84; PCH staff = 5.54).

Image: Melanie Elliott



## Impressions of the Hospital Design

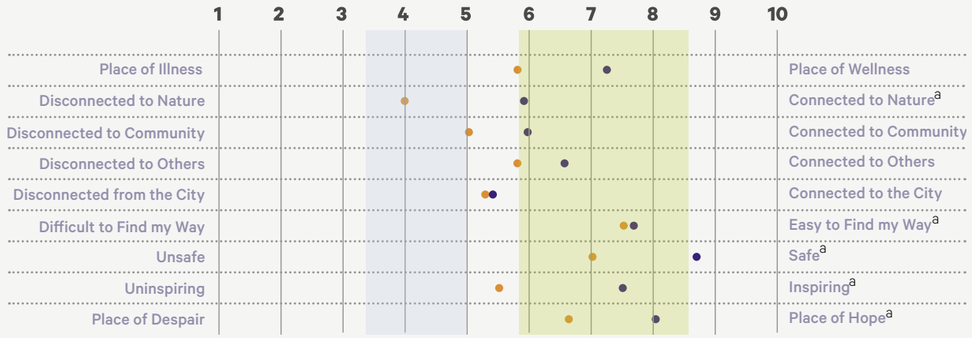
**COMPOSITE INDEXES**



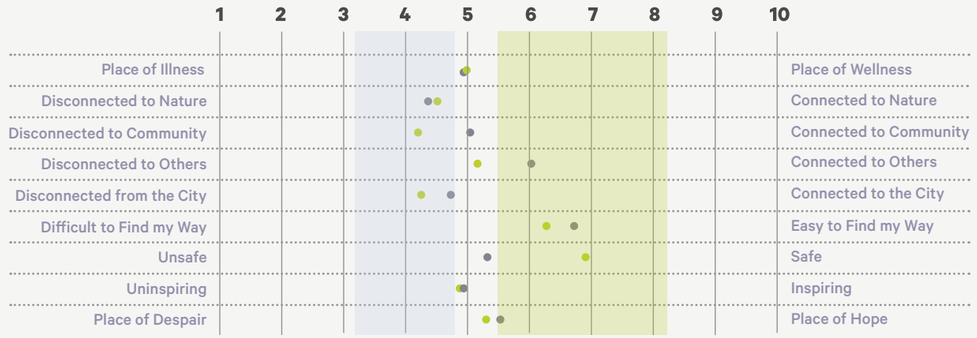

Across each composite index, patient impressions are significantly higher than staff impressions ($p<.05$). For overall impressions, the pattern of findings is qualified by an interaction effect wherein at posttest patient impressions are significantly higher than staff relative to pretest. Overall and subjective impressions are significantly higher at posttest than pretest ($p<.05$). At all sites, pretest and posttest, complex care rehabilitation patients have significantly more favourable impressions than mental health patients ($p<.05$). Complex care rehabilitation (SMOL) staff have significantly more favourable objective impressions than mental health (MHS) staff at pretest only.

# Impressions of the Hospital Design: Pretest

## St. Mary's of the Lake




## Mental Health Services




**PARTICIPANTS**

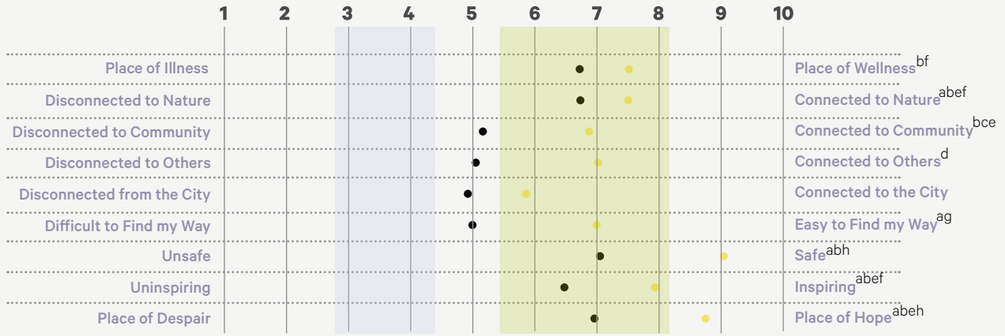
- PCH CCR Patient 68
- PCH CCR Staff 92
- SMOL Patient 39
- SMOL Staff 36
- PCH MH Patient 31
- PCH MH Staff 53
- MHS Patient 37
- MHS Staff 29

The following statistically significant differences ($p < .05$) were observed:
At both pretest and posttest, complex care rehabilitation patient impressions are significantly higher than mental health patients for all items.
a. At both pretest and posttest, patient impressions are significantly higher than staff impressions.
b. At posttest, impressions on items with the superscript b are significantly greater than at pretest.
c. At posttest only, patient impressions are significantly higher than staff.
d. At posttest only, staff impressions are significantly higher than patient impressions.
e. Posttest (CCR and MH) PCH patient impressions are significantly higher than pretest (SMOL and MHS patients) patient impressions.
f. At posttest, staff impressions are greater than pretest staff impressions.
g. At pretest, SMOL complex care rehabilitaion staff impressions are greater than posttest new PCH complex care rehabilitation staff.
h. Complex care rehabilitation staff impressions are greater than mental health staff impressions at both pretest (SMOL and MHS) and posttest (new PCH).

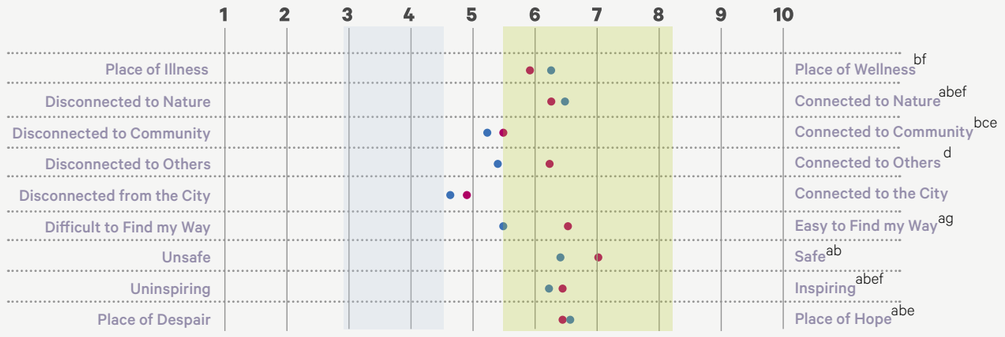


# Impressions of the Hospital Design: Posttest

## Providence Care Hospital: Complex Care Rehabilitation




## Providence Care Hospital: Mental Health



# Sense of Connection

One of the overarching design intentions was to foster connection with people and their surroundings - connection to others, nature (lake, greenspace, walking path), city and community. It was hypothesized that enhancing the connection with people and their surroundings would enhance comingling and reduce stigma.

A bespoke sense of connection measure was developed by the first author and inspired by Hagerty and Williams (1999) as well as Aron, Aron, and Smollan (1992) in which participants were presented with a set of four images with a small circle representing themselves which were placed in various distances from a larger circle representing the community, nature, others or the city. Participants indicated the extent to which they felt connected to each of these settings (1 = not connected to 4 = completely connected) while at the hospital. This visual analog scale was designed to elicit an automatic response that captured participants' first impressions. These scales were also intended to counter any fatigue associated with participating in the survey, given the complexity of the patients' medical conditions and the demands on staff.

### Sense of Connection: St. Mary's of the Lake vs Mental Health Services vs the New Providence Care Hospital

In general, patients report a greater overall sense of connection relative to staff when combined across the three facilities. However, this effect was largely attributed to patients reporting a greater overall sense of connection relative to staff at the new PCH (patients = 2.74; staff = 2.18). No significant differences in overall connection were reported across patients relative to staff at the previous SMOL or MHS facilities (SMOL patients = 2.76; SMOL staff = 2.54; MHS patients = 2.12; MHS staff = 2.31).

Connection to nature is greater for patients and staff at the new PCH (patients = 2.92; staff = 2.24) relative to patients and staff at the previous SMOL (patients = 2.82; staff =2.11) and MHS (patients = 2.03; staff = 2.06), with connection to nature reported as greater for patients relative to staff at the new PCH (patients = 2.92 ; staff = 2.24). Connection to nature is rated more favourably by complex care rehabilitation patients than complex care rehabilitation staff only at the new hospital (patients = 3.17; staff = 2.19).

There is an interesting interaction between participant type and site (previous vs new). Staff tended to report a greater sense of connection to community than patients at the previous SMOL and MHS facilities (SMOL staff = 2.50; SMOL patients = 2.44; MHS staff = 2.03; MHS patients = 1.73). In contrast, the pattern is reversed with patients reporting a greater sense of connection than staff at the new PCH (patients = 2.55; staff = 2.06).

Patients report a greater sense of connection to the city relative to staff at the new PCH (patients = 2.33; staff = 1.91). No significant differences in connection to the city are reported across patients relative to staff at the previous SMOL or MHS facilities (SMOL patients = 2.21; SMOL staff = 2.29; MHS patients = 1.86; MHS staff = 2.05).

Staff tended to report a greater connection to others than did patients at the previous SMOL and MHS facilities relative to the new PCH (SMOL staff = 3.13; SMOL patients = 2.95; MHS staff = 2.85; MHS patient = 2.54). By comparison, patients report a greater sense of connection to others relative to staff at the new PCH (patients = 2.93; staff = 2.49). Staff ratings of connection to others were greater at the previous SMOL and MHS facilities relative to the new PCH.

### Sense of Connection: Patients

Complex care rehabilitation patients at the new PCH as well as the previous SMOL facility report a greater overall sense of connection across all contexts (nature, community, city, others) relative to mental health patients at the new PCH and those at the previous MHS facility (PCH CCR patients = 2.94; SMOL patients = 2.76; PCH MH patients = 2.32; MHS patients = 2.12).

Patients report a stronger sense of connection to nature at the new PCH relative to the previous SMOL and MHS facilities (PCH = 2.92; SMOL = 2.82; MHS = 2.03). The increased connection to nature (PCH CCR patients = 3.17; PCH MH patients = 2.50) and to community (PCH CCR patients = 2.68; PCH MH patients = 2.26) is reported for both complex care rehabilitation and mental health patient populations; however, the reported increase was greater for complex care rehabilitation patients relative to mental health patients.

### Sense of Connection: Staff

There is a decrease in overall sense of connection reported among staff at the new PCH relative to the staff at the previous SMOL and MHS facilities (PCH = 2.18; SMOL = 2.54; MHS = 2.31).

Staff report a greater sense of connection to nature at the new PCH relative to the previous SMOL and MHS facilities (PCH = 2.24; SMOL = 2.11; MHS = 2.06).

There was a trend for staff to report a greater sense of connection to the community at the previous facilities relative to the new PCH; however, the trend was greater for complex care rehabilitation staff than mental health staff (PCH = 2.06; SMOL = 2.50; MHS = 2.12; PCH CCR = 2.06; PCH MH = 1.92).

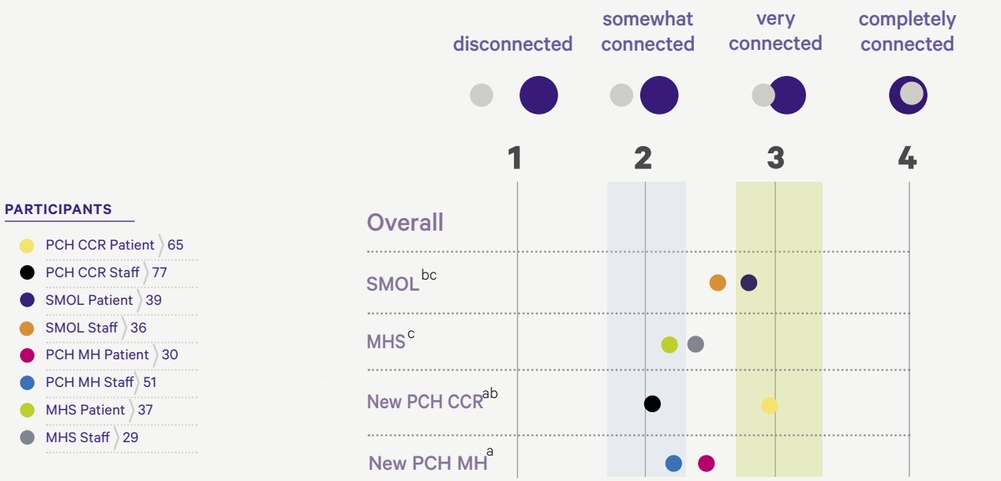
Interestingly, staff reported a greater sense of connection to the city (PCH = 1.91; SMOL = 2.29; MHS = 2.05) and to others (PCH = 2.49; SMOL = 3.13; MHS = 2.85) at the previous SMOL and MHS facilities relative to the new PCH.

The increased sense of connection to nature at the new PCH, experienced by both patients and staff, can be explained by the beauty of the surroundings and plethora of outdoor destinations. Connection to nature has a positive impact on patient and staff well being that can influence attitude, recovery, job performance, and employee retention.

Sense of connection to others, particularly for staff, continues to be a challenge at the new PCH. Design intentions aimed to foster this connection and enhance comingling, however due to a much larger site where density and spontaneous interactions among staff is reduced these have not been realized. The lack of communal spaces proximal to units as well as uninspiring staff lounges may be contributing factors to decreased sense of connection. Attempts to remedy this challenge and optimize the use of space has been seen during the summer barbeques and hospital wide events at Founders' Hall. To increase sense of connection among staff it would be a worthy investment to plan these types of activities year round and in different locations throughout the hospital.

Image: Providence Care Hospital

# Sense of Connection

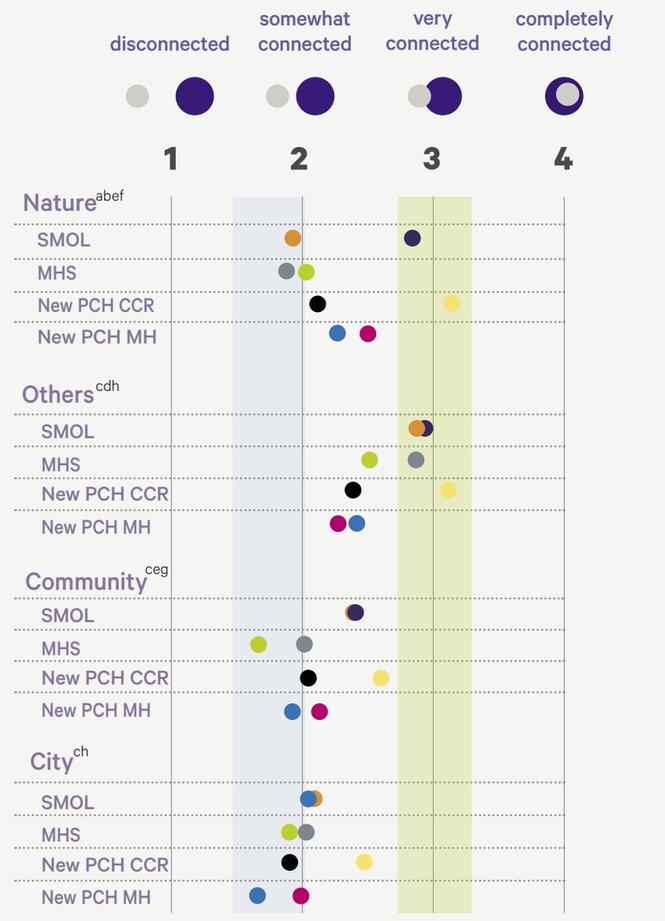



The following statistically significant differences ($p < .05$) were observed:
a. Sense of connection is greater for patients relative to staff at posttest only.
b. Sense of connection is greater for complex care rehabilitation patients (both PCH and SMOL) relative to mental health patients (both PCH and MHS).
c. Sense of connection is greater at pretest (both SMOL and MHS) relative to posttest (PCH) for staff only.

Image: Melanie Elliott



# Sense of Connection




The following statistically significant differences ($p < .05$) were observed:

Sense of connection is greater for complex care rehabilitation patients relative to mental health patients at both pretest (SMOL and MHS) and posttest (PCH).

a. Sense of connection is greater at posttest (PCH) relative to pretest (SMOL and MHS) for both patients and staff.

b. Sense of connection is greater for patients relative to staff at both posttest (PCH) and pretest (SMOL and MHS).

c. Sense of connection is greater for patients relative to staff at posttest (PCH) only.

d. Sense of connection is greater at pretest (SMOL and MHS) relative to posttest (PCH) for staff only.

e. Sense of connection is greater for patients at posttest (PCH) relative to pretest (SMOL and MHS).

f. Sense of connection is greater for staff at posttest (PCH) relative to pretest (SMOL and MHS).

g. Sense of connection is greater for complex care rehabilitation staff relative to mental health staff at both pretest (SMOL and MHS) and posttest (PCH).

h. Sense of connection is greater for staff at pretest (SMOL and MHS) relative to posttest (PCH).


# 7. Use and Impressions of Spaces

Image: Tom Arban

## Use and Impressions of Spaces

The design intentions of PCH are not all linked to clinical or functional outcomes. Some are geared towards social interaction, such as connection to others, enhancing the user experience and improving opportunities for comingling. As a result, it was important to the user experience and design evaluation to examine spaces that extend beyond clinical and functional outcomes and include spaces that are designed to foster social interaction.

Impressions of the following spaces were assessed on the basis of concepts that align with the overall design intentions. Using a semantic differential scale ranging from 1 to 10 where lower numbers on the scale represent negative impressions and higher numbers represent positive impressions, participants were asked to rate their impressions of the spaces on the following attributes: accessibility, wayfinding, safety, inspiration, feelings of content, pride, calmness, bravery, hope, feelings of being cared for, connected to nature and others, and independence.

When measuring frequency of use, participants were asked how often they visit a space from 1 = never or once a year or less, to 8 = several times a day.

### Approach and Arrival

First impressions inform the lens of how we experience a person, space or interaction. In the context of the PCH user experience and design evaluation, the first impressions that shape user engagement and their healthcare experience are defined upon entry to the hospital - the main entrance. The main entrance is comprised of a series of design features that were incorporated to address various design intentions; particularly those aimed at creating a healing environment, enhancing the user experience and reducing stigma.

### Main Entrance

Apart from the main entrance, there are additional entry points to the hospital which include the patient admitting area, a less obvious staff entrance as well as a shipping and receiving area. However, for all intents and purposes, the hospital design was conceived as having one principal entrance that was to be used by everyone, staff, visitors, patients and community.

Multiple outcomes were anticipated as a result of having one clearly defined principal entrance for all users. As an alternative to segregating mental health and complex care rehabilitation patient populations to separate entrances, a principal entrance for all was anticipated to contribute to stigma reduction. It was hypothesized that the main entrance would enhance patient privacy. As all enter from the same area, it is difficult to determine if those entering the building are suffering from mental health conditions versus complex care challenges; if they are accessing the site for outpatient therapy or physical rehabilitation; or if they are staff, visitors or members of the community.

Both patient and staff impressions of the main entrance are positive. When comparing pretest data at the former SMOL and MHS facilities and posttest data at the new PCH, the greatest improvements in impressions of the main entrance were reported among mental health patients relative to complex care rehabilitation patients. Most notably, mental health patients reported more favourable impression ratings at the new PCH main entrance than the former MHS main entrance on the following items: proud (MHS = 5.35 to PCH = 7.48), content (MHS = 5.48 to PCH = 7.52) and hopeful (MHS = 6.00 to PCH = 8.00); whereby, impressions on these attributes increased by at least two points. Impressions of the main entrance among complex care rehabilitation patients did not increase by the same magnitude as those of mental health patients from pretest to posttest; however, complex care rehabilitation patient impressions of the main entrance at the new PCH relative to the previous SMOL facility were notable on the following attributes: independence (SMOL = 6.84; PCH = 8.52), proud (SMOL = 7.00; PCH = 8.67), content (SMOL = 7.16; PCH = 8.73) and inspired (SMOL = 7.29; PCH = 8.61).

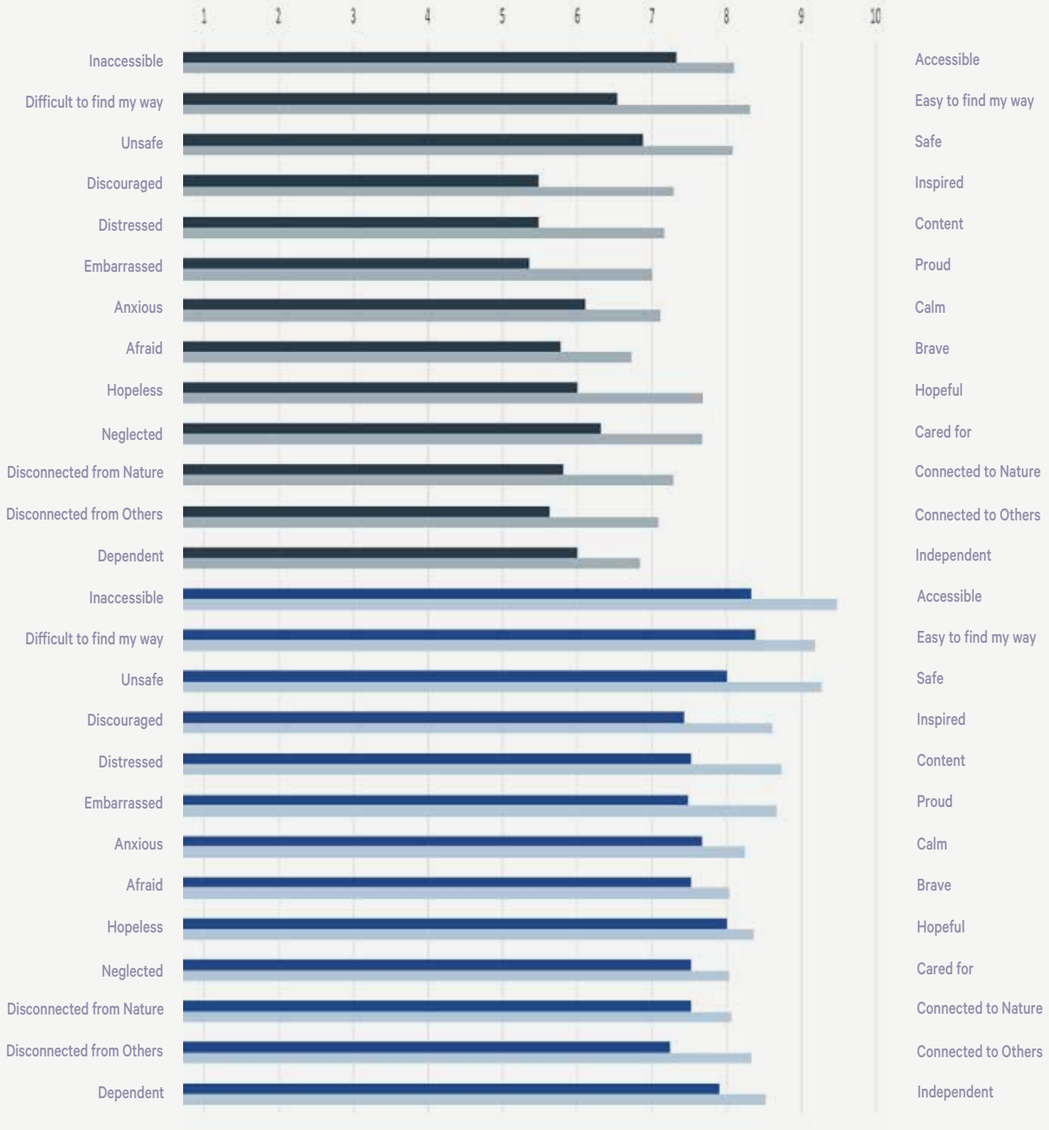
With significant increases in patient impressions of the new PCH main entrance relative to the former sites on attributes such as inspired, content, proud, calm, brave, hopeful and independent it can be a harbinger that the design of the main entrance is having an impact on creating a healing environment, enhancing the user experience and reducing stigma.

It is encouraging that feeling inspired at the main entrance is one of the more substantial improvements in impressions among both mental health and complex care rehabilitation staff, with impression scores elevating from 5.03 for MHS staff to 6.95 for PCH MH staff and 5.53 for SMOL staff to 7.52 for PCH CCR staff; respectively. These do not represent the highest impression scores; rather, they are examples of the most substantial improvement in impressions of the main entrance for complex care rehabilitation staff and the second most improved impression rating of the main entrance for mental health staff. It is reasonable to extrapolate, on the basis of extant evidence (Alvaro et al., 2018, 2016a, 2016b, 2015a, 2015b; Steele Gray et al., 2015), that staff may experience enhanced workplace performance, psychological well being and even physiological shifts in markers of stress as a consequence of feeling more inspired walking through the main entrance.

The main entrance serves as an entry point, a transition area and a destination. It was detected during naturalistic observation that patients tend to congregate when the climate is agreeable outside the main entrance and when it is less pleasant just inside. While some are waiting to be picked up, others are just as likely to linger and observe the comings and goings. Warm interactions are noticed at the main entrance with people greeting each other in passing and/ or wishing them well as they leave the hospital for the day or upon completion of their care.

It is reasonable to deduce that the observed activity and interactions that occur at the main entrance, and most importantly how the area has been designed to promote these observed interactions, accounts for the elevated impressions of feeling more connected to others. When compared to the previous SMOL and MHS, patient (SMOL patients = 7.08; MHS patients = 5.63; PCH patients = 7.85) and staff (SMOL staff = 6.24; MHS staff = 5.24; PCH staff =7.23) impressions at the new PCH showed the greatest improvements in feeling connected to others at posttest relative to pretest.


## Impressions of the Main Entrance




**PARTICIPANTS**

- SMOL Patient 36
- MHS Patient 31
- PCH CCR Patient 33
- PCH MH Patient 21

The following statistically significant differences ($p < .05$) were observed:
Impressions of the main entrance are greater at posttest (PCH) relative to pretest (SMOL and MHS).
At pretest, impressions of the main entrance are greater for complex care rehabilitation (SMOL) relative to mental health (MHS) for all items except independent.

## Lobby and Circulation Corridors

Immediately upon entry, and the first point of contact for everyone entering the hospital, is the reception area. Volunteers and staff are there to welcome people as they arrive, help, give direction and answer questions for those who require assistance. As the main thoroughfare, the lobby reception area is a central and animated space. Everyone in the hospital will transverse this area at some point - including patients, staff and visitors. The lobby reception area is a bright, airy and open space. The expanse of floor to ceiling windows that are featured along the length of the wall facing the exterior arrival and parking areas serve to infuse the lobby with light and offer meaningful views to the animated point of arrival. The open atrium enables the sunlight to illuminate the second floor mezzanine level and penetrate to adjacent areas as well as the main corridor on the first floor. The lobby is an area where people orient themselves upon arrival. It is where they begin their journey throughout the facility. The lobby is also an ideal meeting point where staff gather and visitors wait for patients they are there to see, or simply escape for a moment to enjoy a beverage, read a book, or simply watch passersby.

The positive impressions that are experienced by all users at the main entrance carry through to the lobby and corridor. The lobby and circulation corridor is an area that is achieving its design objectives. Both patients and staff have exceptionally high overall impressions of the lobby and circulation corridor at the new PCH (patients = 8.46; staff = 7.78) relative to the former SMOL and MHS sites (SMOL patients = 6.99; SMOL staff = 6.67; MHS patients = 6.54; MHS staff = 6.15). When compared against each other, patients scores are greater than staff at the new PCH (patients = 8.46; staff = 7.78). When these two groups are further refined, it is revealed that complex care rehabilitation patient impressions of the lobby and circulation corridor (CCR patients = 8.68) are greater than mental health patients (MH patients = 8.17); whereas there is very little difference when comparing complex care rehabilitation (CCR staff = 7.52) and mental health (MH staff = 7.53) staff impressions.

The lobby and circulation corridors at the previous SMOL and MHS facilities were a stark contrast in their design, layout and adjacencies. The lobby area at SMOL had low ceilings, a central hub and spoke design to adjacent areas and artificial light was relied upon as a source of illumination. It was furnished with large plush seating options, a television and tables. The activity was fueled by the adjacencies of the cafeteria, retail spaces and the regular pop up tables that provided important information for staff or that supported fundraising efforts organized by foundation volunteers. It was not just a transition area but a hub of activity that was clearly a destination for those seeking a change of scenery or social engagement with others – via passive or active interaction.

In contrast, the elevated ceilings and upper windows that were prominent in the MHS lobby provided an abundance of light that translated into a bright and airy feel. The MHS lobby was furnished with a collection of chairs and a table, upon entry and to the right was an information desk where staff worked behind a glass wall. There was some interaction between staff and passersby, but in general it was more of a transition space with very little animation; consequently, it was not a destination worth seeking out in the hospital.

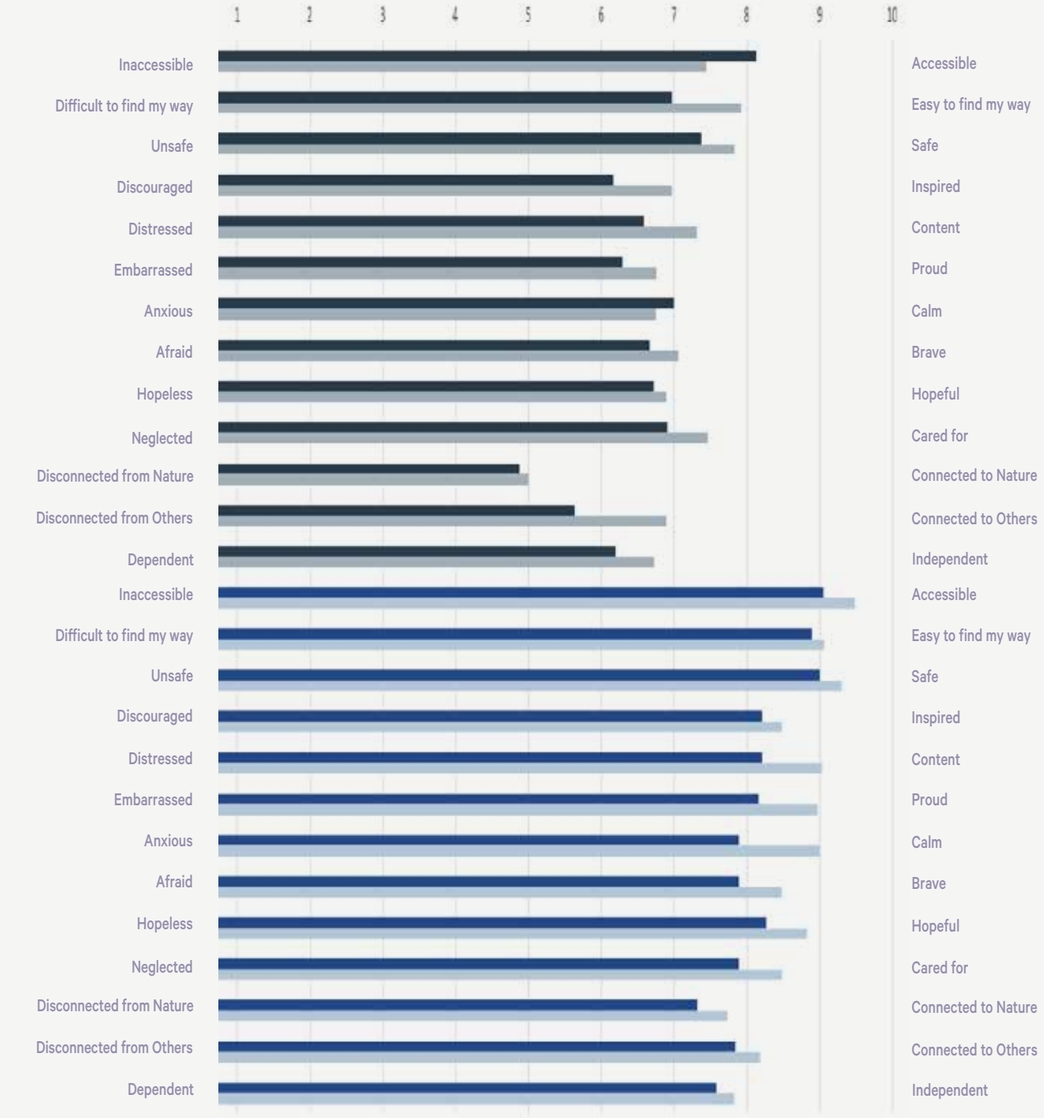
It is, therefore, not surprising that the frequency of use for the lobby and corridor were highest at SMOL (6.42) relative to MHS (4.42) and the new PCH (6.24). Thus, it is important to consider the role that adjacencies can play in the animation of a space. At MHS, the lobby was surrounded by corridors



Images: Methologica and Providence Care Hospital



## Impressions of the Lobby & Circulation Corridor




**PARTICIPANTS**

- SMOL Patient 36
- MHS Patient 31
- PCH CCR Patient 33
- PCH MH Patient 19

The following statistically significant differences ($p < .05$) were observed:
Impressions of the lobby and circulation corridors were greater at posttest (PCH) relative to pretest (SMOL and MHS) for all items.

and offices – choose a corridor and wish for the best in wayfinding – there were few adjacent spaces or people to use as wayfinding cues or with whom to interact.

At SMOL, the lobby was a central hub with the adjacent cafeteria and retail outlets, and in some cases waiting areas for those awaiting clinic appointments, contributing to the liveliness of the space. At the new PCH, upon passing the reception area and adjacent central registration area for outpatient clinics to the left of the registration area, there is a small patient run café that facilitates mostly on the go purchases along with a retail area (e.g., gift shop, mobility devices, etc.).

Efforts to boost activity in the lobby and corridor include fashion shows that are organized by the retail stores. Volunteers model merchandise and use the corridor as their runway. This is a great example of how creative use of resources – adding a human element – can enhance design outcomes.

Either as a patient or as a visitor, entering a hospital is not always an easy process. It is, therefore, reassuring that the collection of design features and programming of services that comprise the main entrance, lobby and circulation corridors at the new PCH sets the stage for defining the users' positive first impressions and lays the groundwork for realizing the design intentions of promoting recovery and transition, facilitating connection to others, creating a healing environment, enhancing the user experience, providing opportunities for comingling, and reducing stigma.

## Navigation Through the Corridor

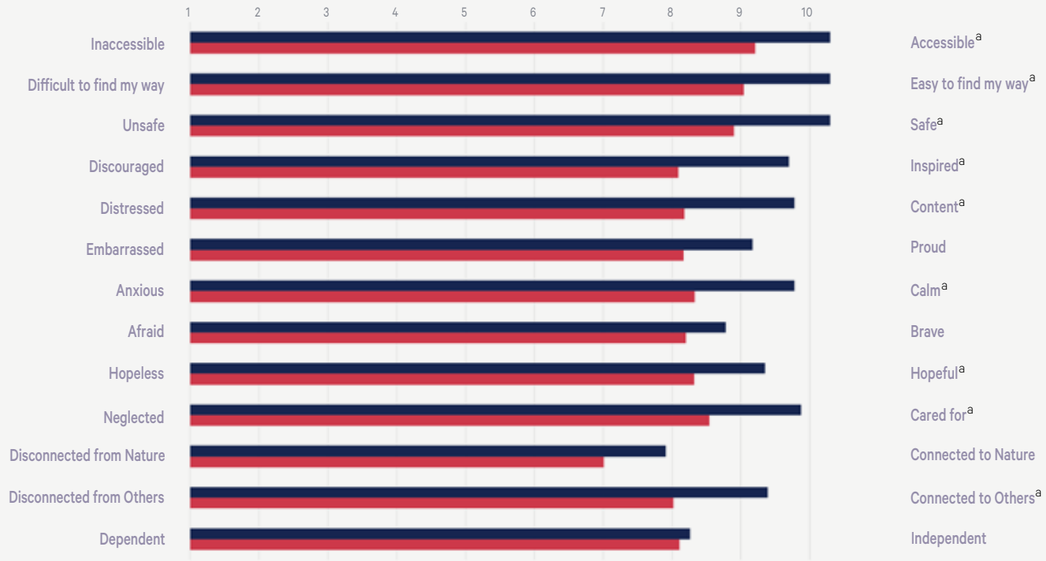
The corridor is a lively thoroughfare that connects therapy, social and retail spaces. The main corridor including the central registration and rehabilitation areas is mostly a transition zone that guides users to their end destination. However, the activity in that area creates a hot spot for spontaneous interactions between users.

## Central Registration

The design intentions of enhancing user experience and reducing stigma are prevalent in the layout, function and design of the main registration area. This area is situated in the main circulation corridor only a few steps to the left of the entrance. Whereas the four registration kiosks are not always in operation simultaneously, partitions between each registration kisosk provide separation and offer privacy to outpatients as they check in for appointments.

The principal design objective for the main registration area was to offer a non-descript registration process where patients would check in at one central location and then be directed to their relevant clinic or treatment area. Inherent in the design is to conceal the nature of the patient's visit and the clinic to which they are being directed – as the clinics are also identified by letter rather than nomenclature to denote the outpatient services that are offered at each clinic.


## Impressions of the Central Registration Area




**PARTICIPANTS**

- PCH Patient 23
- PCH Staff 82

The following statistically significant differences ($p < .05$) were observed: At pretest, impressions of the main entrance are greater for complex care rehabilitation (SMOL) relative to mental health (MHS) for all items except independent.
a. Impressions of the central registration area are greater for patients relative to staff.

The main registration area at the new PCH is rated favourably by patients – with ratings all above 6.91 on a 10 point scale. Consistent with the design intentions, patients report that they feel cared for (PCH = 8.87), calm (PCH = 8.78) and connected to others (PCH = 8.39); with both patient and staff impressions of the registration area being the highest on accessibility (PCH patients = 9.30; PCH staff = 8.21), ease of wayfinding (PCH patients = 9.30; PCH staff = 8.04) and safe (PCH patients = 9.30; PCH staff = 7.90). Therefore, the design of this area has been met with success in ensuring a positive registration process.

Images: Methologica and Providence Care Hospital

Image: Providence Care Hospital

## Central Rehabilitation Area

Strategically located on the first floor, the central rehabilitation area includes a therapy area, a basketball court, a track and activities of daily living equipment. The greatest discrepancy in pretest and posttest complex care rehabilitation patient impressions is observed in their impressions that this space makes them feel calm (SMOL patients = 7.34 to PCH CCR patients = 9.00), independent (SMOL patients = 6.58 to PCH CCR patients = 8.20) and proud (SMOL patients = 7.79 to PCH CCR patients = 8.60). The highest impression ratings for staff are safe (8.54), inspired (8.14), and accessible (8.12).

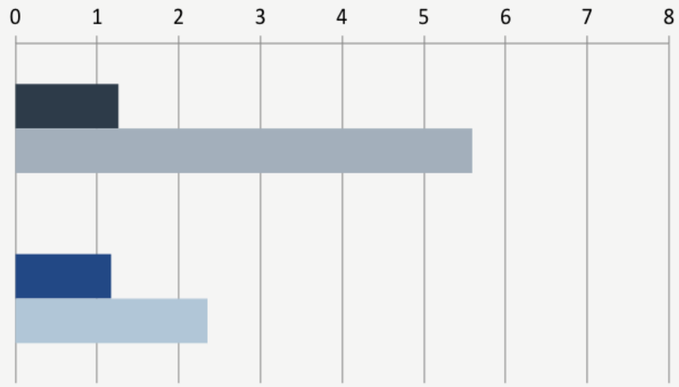
Whereas the patient and staff impressions are favourable and exceed those of the pre-existing facilities, the reported frequency of use of the central rehabilitation area has declined at the new PCH relative to the previous sites. In particular, the central rehabilitation area was reportedly visited an average of a few times per month up to once per week at SMOL relative to once per year or less at the new PCH.

In light of the favourable impression ratings of the central rehabilitation area at the new PCH, the contrasting finding of diminished use may be due to factors other than the design – for example, choice, options available, and disparities in the length of stay at the new PCH relative to the former facilities. SMOL offered one central rehabilitation area; however, the new PCH design features on unit rehabilitation areas in addition to the central rehabilitation area. Another factor could be the limited participation of outpatients, as this space is primarily designed for them the frequency of use numbers could be influenced by inpatients who prefer on unit rehabilitation areas for their convenience as they limit travel distance for patients and staff and offer similar rehabilitation options (see On Unit Clinical Areas).



Images: Providence Care Hospital

## Frequency of Use: Central Rehabilitation Area




Complex care rehabilitation patients have a significantly higher frequency of use than mental health patients at posttest only (PCH). Complex care rehabilitation patients have a significantly higher frequency of use than mental health patients at both pretest (SMOL and MHS) and posttest (PCH); ($p < .05$).

**PARTICIPANTS**

- SMOL Patient 37
- MHS Patient 35
- PCH CCR Patient 65
- PCH MH Patient 29

## Social Spaces

Contemporary hospital designs now invest just as much time, energy and real estate to social and communal spaces as they do with clinical and functional program spaces. There is an expectation that social spaces shape and influence the experience for multiple user groups, patients, staff and visitors. When successful these spaces provide opportunities for comingling, respite, alternative work locations and of course socialization.

## Cafeteria

Upon entering the hospital and continuing to the right along the lobby corridor just around the corner you will find the cafeteria. It offers a hot food service area, prepared and/or packaged refrigerated food items as well as vending machines. Indoor seating options include an at grade area with tables and chairs, descending the stairs to the lower level seating area which again includes tables and chairs as well as more comfortable club chairs proximal to the window facing the lake. A signature feature of the seating area are the double height floor to ceiling windows that reveal meaningful views to the outdoor terrace, walking paths, gardens and lakefront.

Our observations reveal that the space is being used by all of the intended user groups – patients, staff and visitors; and it is an excellent example of a space that promotes comingling among those who visit and pass through the cafeteria. Although not as often as staff, patients from mental health and complex care rehabilitation units frequent the cafeteria, some come alone, while others are accompanied by visitors or caregivers. Patient activity is less about food consumption but more about social interaction, engaging in conversations or card games with their guests, while some patients use their visit as an opportunity for reading or merely observing the activity of passersby.

Staff activity does involve food consumption, either purchased from the cafeteria or a meal that was prepared at home. It is common to see staff congregate in small to medium sized

Image: Tom Arban



Images: Methologica and Tom Arban

| 40 patients indicated that they do not use the Cafeteria. Here are the top reasons why. | | |
|---|---|---|
| | % of Respondents | Number of Respondents |
| No Need | 55.00% | 22 of 40 |
| Too Far Away | 25.00% | 10 of 40 |

groups where they eat together and socialize. Sometimes these interactions are planned and yet there are times when the interactions are spontaneous. Staff also use the cafeteria as an alternative work station where they complete paperwork.

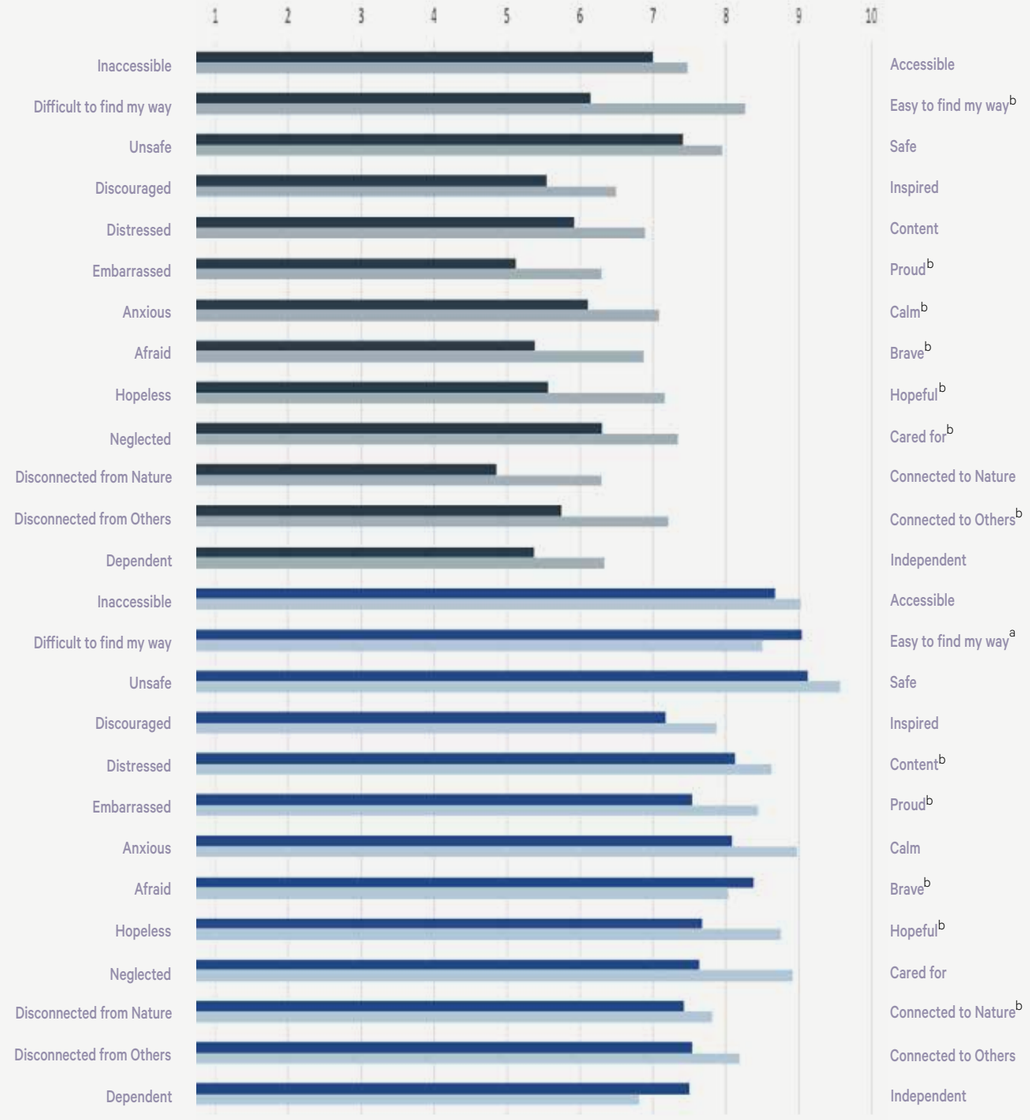
Overall, patients have more favourable impressions of the new PCH cafeteria than staff on all attributes (patients = 8.26; staff = 7.49), with the exception of the new PCH cafeteria leading to feelings of independence (patients = 7.16; staff = 7.54). Both patient and staff impressions of the cafeteria are most favourable in terms of safety (patients = 9.37; staff = 8.39), accessibility (patients = 8.98; staff = 7.80) and easy to find their way (patients = 8.81; staff = 8.14).

When comparing impressions of the new PCH cafeteria with the cafeteria at both SMOL and MHS, impressions of the new PCH are significantly higher than those at the previous facilities. For both patients and staff, impressions of the SMOL cafeteria were slightly higher than those of the MHS cafeteria; however, impressions of both SMOL and MHS were overwhelmingly negative in terms of connection to nature – that is, users felt disconnected to nature (SMOL staff = 3.83; MHS patients = 4.85; MHS staff = 4.09) relative to the new PCH (patients = 7.65; staff = 7.43).

The comparative impressions of the cafeteria for mental health and complex care rehabilitation patients from pretest (SMOL and MHS) to posttest (PCH) reveal an intriguing finding. At the pretest phase, complex care rehabilitation patient impressions of the cafeteria were higher on all attributes relative to mental health patients. However, once both patient populations were integrated in the new PCH, on certain attributes mental patient scores are higher than complex care rehabilitation patients. Most notably, mental health patients at the new PCH have higher impressions than complex care rehabilitation patients on independent (PCH MH patients = 7.50; PCH CCR patients = 6.81), brave (PCH MH patients = 8.38; PCH CCR patients = 8.03) and easy to find their way (PCH MH patients = 9.04; PCH CCR patients = 8.50).

An enhanced connection to nature was the most improved impression rating of the cafeteria for staff at the new PCH relative to the former SMOL and MHS facilities. When asked if they feel disconnected or connected to nature when they visit the cafeteria, staff from both SMOL and MHS facilities had a negative score. Staff at the previous facilities felt disconnected from nature (SMOL = 3.83; MHS = 4.07). At the new PCH, staff impressions of the cafeteria jump from below neutral to well above favourable (PCH CCR staff = 7.04; PCH MH staff = 7.33). This increase can be attributed to the large bay windows and beautiful views to the surrounding green space at the new PCH. In contrast, windows at the the previous SMOL and MHS facilities were small and views to nature were nonexistent.

## Patient Impressions of the Cafeteria




**PARTICIPANTS**

- SMOL Patient 〉36
- MHS Patient 〉25
- PCH CCR Patient 〉32
- PCH MH Patient 〉24

The following statistically significant differences ($p < .05$) were observed:

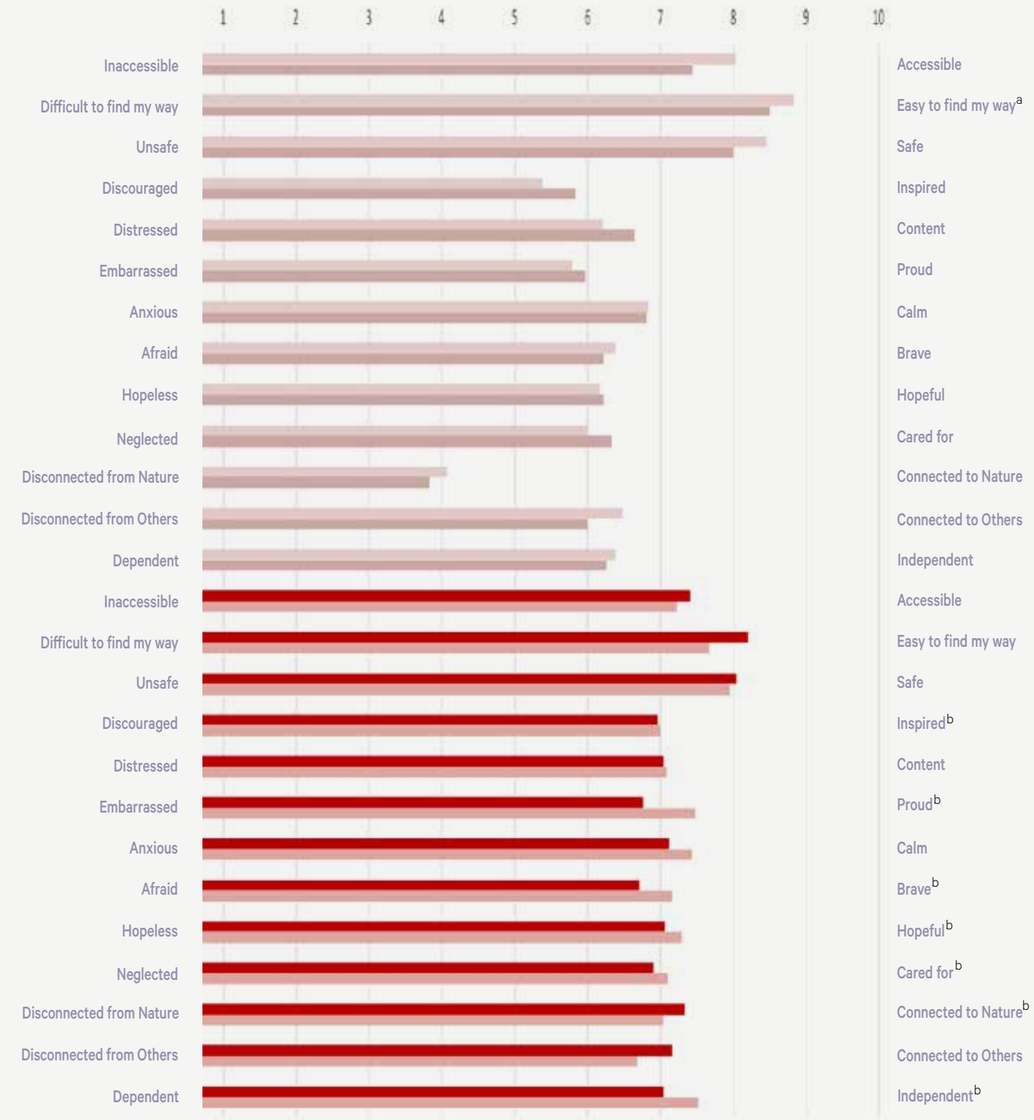
Impressions of the cafeteria are greater at posttest (PCH) relative to pretest (SMOL and MHS) for all items except easy to find my way.

a. Impressions of the cafeteria are greater at posttest (PCH) relative to pretest (MHS) but only for mental health patients.

b. Impressions of the cafeteria are greater for complex care rehabilitation patients relative to mental health patients.



## Staff Impressions of the Cafeteria




**PARTICIPANTS**

- SMOL Staff 〉106
- MHS Staff 〉118
- PCH CCR Staff 〉79
- PCH MH Staff 〉49

The following statistically significant differences ($p < .05$) were observed:

a. Impressions of the cafeteria are greater at pretest (SMOL and MHS) relative to posttest (PCH).

b. Impressions of the cafeteria are greater at posttest (PCH) relative to pretest (SMOL and MHS).

## Outdoor Spaces

Greater investments are being made to outdoor spaces and they are incresingly seen as valuable tools to shape and influence the experience for multiple user groups, patients, staff and visitors. When successful these spaces provide opportunities for comingling, respite, socialization and of course establish and maintain connections to nature and surrounding areas.

## Limestone Terrace

Over and above being a place for food consumption and social interaction, the cafeteria is being used as a preferred gateway to the outdoors. Patients, staff and visitors use the cafeteria as a transition space to access the park, gardens or pathways. The Limestone Terrace is located immediately outside the cafeteria – and can be seen from the indoor seating areas. The Limestone Terrace is a relatively under used space that is frequented more by staff than by patients and visitors. Apart from organized summer barbeque lunches and other events, activity at the Limestone Terrace is limited. Given its proximity to the indoor seating area, it may be perceived as too close to the building when users may prefer to venture futher into the park for privacy and to be closer to nature and the water.

For those who use the space, impressions of the Limestone Terrace are very high. Patients impressions of the terrace are higher than staff impressions (patients = 8.57; staff = 7.82); where even the lowest patient impression ratings are well above neutral in terms of feeling cared for (patients = 8.09), brave (patients = 8.09) and the highest impression rating being safe (patients = 9.21). Staff impressions are slightly lower than those of patients. However, overall staff impressions of the Limestone Terrace are also very positive with the lowest staff impression on brave being rated well above neutral (staff = 7.40) and connection to nature being rated at the higher end of the scale (staff = 8.74).

**64 patients indicated that they do not use the Limestone Terrace. Here are the top reasons why.**

| | % of Respondents | Number of Respondents |
|---|---|---|
| **No Need** | 35.94% | 23 of 64 |
| **Lack of Awareness** | 18.75% | 12 of 64 |

The Limestone Terrace is furnished with tables and umbrellas giving users options on where to sit with some protection from the sun. For those who favour the outdoors but have limited time to visit the gardens, parks or the waterfront, the Limestone Terrace is a welcomed and much enjoyed amenity.

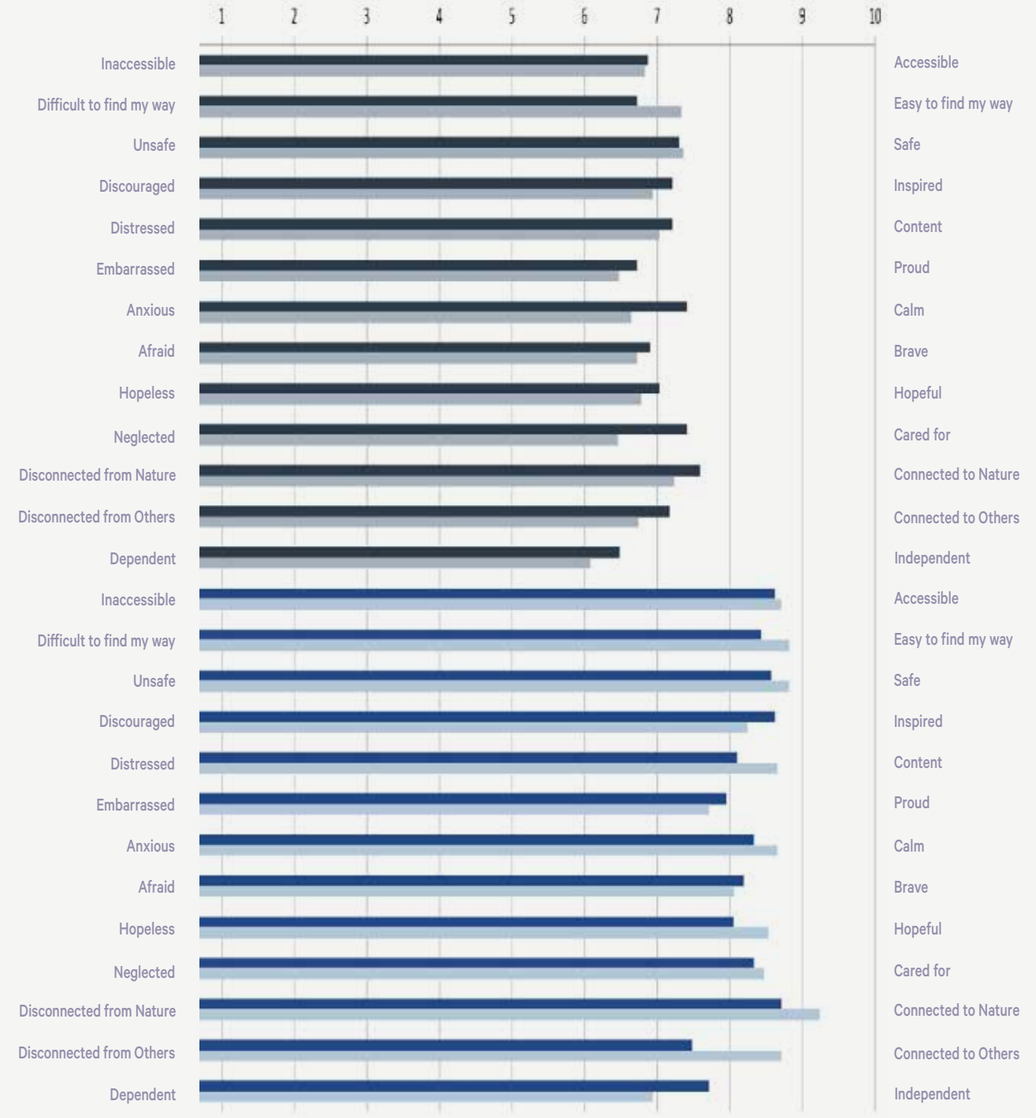
## Outdoor Courtyards

Despite being located on the same real estate as the MHS site, the new PCH design and layout optimized the proximity to Lake Ontario Park, the greenspace, and the water; thereby transforming the area. The quality and quantity of outdoor space along with the integration of the hospital with the natural landscape is enhanced at the new PCH. Among the most prominent design features are the 14 courtyards. Consequently, these areas yield increased use by staff and mental health patients at the new PCH relative to the previous facilities. For those who use the courtyards, impressions are noticeably high; with patient impressions of the courtyards being greater than staff impressions (patients = 8.32; staff = 7.46). The highest impressions are mirrored by both patients and staff for: accessible (patients = 9.02; staff = 8.32), easy to find their way (patients = 8.82; staff = 8.30) and safe (patients = 8.73; staff = 8.02).

In a thought provoking contrast to the favourable impressions of the outdoor courtyards among mental health patients and staff, the moving interviews revealed that complex care rehabilitation patients are hesitant to use the spaces. Complex care rehabilitation patients describe the outdoor courtyards as inaccessible, uncomfortable and unsafe; particularly if they use

> “The other part that’s nice here is the outdoor patio because previously there was no real place to sit outdoors for staff, so that’s really appealing for staff and families.”

## Patient Impressions of the Outdoor Courtyards




**PARTICIPANTS**

SMOL Patient 35 | PCH CCR Patient 17

MHS Patient 29 | PCH MH Patient 21

Posttest impressions are significantly higher than pretest impressions for all items except independence ($p<.05$).

a mobility device. The reportedly problematic areas are rooted in the selection of flooring materials. In many circumstances, the door thresholds are too much of a barrier for complex care rehabilitation patients to overcome on their own. Once outdoors, the patio stones prove to be the next barrier that is very difficult to safely navigate. For patients using a walker the rough surface can create balance obstacles and it can be a painful experience for those in wheelchairs.

This contrasting finding illustrates the importance of having both quantitative and qualitative methods for collecting user experience data. Mixed methods allow for the triangulation of data and more depth of analysis to allow for a greater understanding and contextualization of the results. As a result, enhancing the potential for refined design solutions to optimize outcomes. If we rely only on the quantitative survey data, we might conclude that the outdoor spaces are a success. Upon closer examination of the qualitative data, we gain the understanding that what works, on average for most, does not meet the needs of a unique patient population. A finding that may otherwise have gone undiscovered if the moving interview method was not included in the design evaluation.

As further evidence, when comparing pretest and posttest survey data of the courtyards, complex care rehabilitation patient impressions at posttest are higher on all attributes (PCH CCR patients = 8.43) than pretest (SMOL patients = 6.86). In fact, with connection to nature being among the most favourable impression of the courtyards at the new PCH - almost topping the scale (PCH CCR patients = 9.24), the next highest impressions for complex care rehabilitation patients are easy to find my way and safe (PCH CCR patients = 8.82 for both ratings) while accessible and connected to others follow closely (PCH CCR patients = 8.71 for both ratings).

With respect to the frequency of use, complex care rehabilitation patients are the only user group who use the courtyards less often at the new PCH than at SMOL (PCH CCR patients = 2.06; SMOL patients = 2.95). Mental health patients and staff, as well as complex care rehabilitation staff use the courtyards in greater frequency at the new hospital than they did at the old sites (PCH MH patients = 4.14; PCH MH staff = 3.20; PCH CCR staff = 3.32; MHS patients = 3.74; MHS staff = 2.24; SMOL staff = 2.56).

The quantitative findings of reduced use as discovered in our survey data are the only cues to support the qualitative findings that complex care rehabilitation patients are experiencing challenges when using or attempting to use the outdoor courtyards.

**57 patients indicated that they do not use the Outdoor Courtyards. Here are the top reasons why.**

| | % of Respondents | Number of Respondents |
|---|---|---|
| **No Need** | 47.37% | 27 of 57 |
| **Not Accessible** | 21.05% | 12 of 57 |
| **Lack of Awareness** | 15.79% | 9 of 57 |

Images: Methologica and Providence Care Hospital



> The only thing that absolutely everybody hates about this space is that they put in this cobblestone floor, it is unsafe for everybody with a walker, they can't come out on their own. It's so bumpy for people in wheelchairs that they don't like being pushed along it because it hurts. We'll have people who really want to go outside but they can't come out here because it hurts them or it's not safe for them.

Image: Methologica

## Healing Garden

To maximize the beauty of the site, the new PCH design includes a variety of outdoor spaces and amenities. Some are transition spaces like the pathways, some are active spaces like the basketball courts and some are passive spaces like the healing garden. The signature design element of the healing garden is a labyrinth that is surrounded by a walkway, benches, a wooden pergola and a gazebo.

Consistent with additional spiritual spaces (as described later), overall patient and staff impressions of the healing garden at the new PCH are high (patients = 8.33; staff = 8.13); whereas, frequency of their use is low (patients = 1.46; staff = 1.48). It is no surprise that patient and staff impressions of their connection to nature are the highest (patients = 9.00; staff = 8.96) relative to other attributes. The next highest patient impressions of the healing garden are: easy to find my way (patients = 8.71), followed by safe, and hopeful (patients = 8.65 for both ratings). The ensuing highest impressions for staff are clustered and very close in range; with staff feeling most inspired (staff = 8.45), followed by content and calm (staff = 8.40 for both ratings).

The majesty of this site is both an advantage and a challenge. There are numerous picturesque outdoor destinations on hospital property and additional public spaces that are in close proximity, a benefit for the hospital community. Factors contributing to the limited use of the healing garden can include the scale of the facility, the multitude of available amenities and awareness of the space.

The evidence on the benefits of nature are overwhelmingly clear. Nature, including meaningful views and/or direct access, can reduce stress – both self reports of stress and physiological measures of stress – enhance mood, and enhance quality of life (Ulrich 1993). Moreover, beyond the benefits of having access to nature and meaningful views, outdoor spaces contribute to the homelike feel that the design was hoping to achieve. It is also a welcomed distraction from the many reminders that one is in a hospital and offers opportunities to connect with others. Moreover, some outdoor spaces further facilitate the extentsion of rehabilitation and therapy sessions.

## On Unit Clinical Areas

During the functional programming stage of the design process focus groups consisting of various stakeholders provide their input on the design and function of the programs and services that will be available in the new facility. This includes but is not limited to patient flow, space requirements and the placement of treatment areas on unit.

## Unit Rehabilitation Area

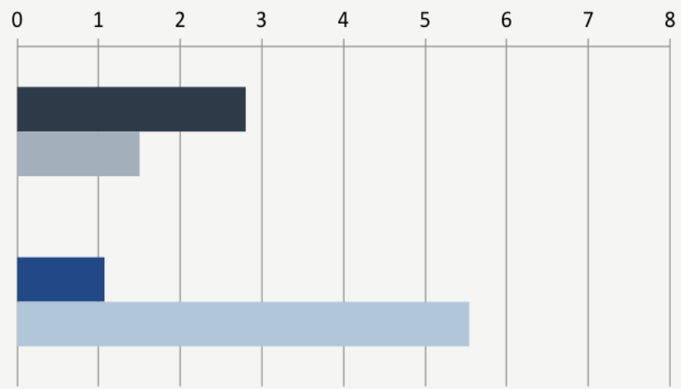
Inpatient rehabilitation areas at the new PCH are decentralized and located on specific units closer to patient rooms. A remarkable transformation occurred in shifting to the design of the new PCH on unit rehabilitation areas. Patient impressions of unit rehabilitation areas soared at the new PCH (patients = 8.55) when comparing their impressions of the pretest unit rehabilitation areas at SMOL (patients = 5.35) and MHS (patients = 5.72). Significant improvements were recorded on all attributes.

In addition to meaningfully elevated impression scores, the unit rehabilitation areas are used in greater frequency at the new PCH (4.08) than they were at the previous two sites (SMOL = 1.50; MHS = 2.86). In fact, patients use the unit rehabilitation area twice as often (4.08) as the central rehabilitation area (2.04). The unit rehabilitation areas are well designed, strategically located and used with great frequency. It is a very successful space that is achieving its design objectives.

| 78 patients indicated that they do not use the Healing Garden. Here are the top reasons why. | | |
|---|---|---|
| | % of Respondents | Number of Respondents |
| Lack of Awareness | 50.00% | 39 of 78 |
| No Need | 24.36% | 19 of 78 |
| **181 staff indicated that they do not use the Healing Garden. Here are the top reasons why.** | | |
| No Need | 44.75% | 81 of 181 |
| Lack of Awareness | 20.99% | 38 of 181 |

Image: Providence Care Hospital

## Frequency of Use: On Unit Rehabilitation Area




Mental health patients have a significantly higher frequency of use than complex care rehabilitation patients at pretest. Pretest has a significantly higher frequency of use than posttest for mental health patients. Complex care rehabilitation patients have a significantly higher frequency of use than mental health patients at posttest. Posttest has a significantly higher frequency of use than pretest for complex care rehabilitation patients.

**PARTICIPANTS**

- SMOL Patient 〉38
- MHS Patient 〉35
- PCH CCR Patient 〉65
- PCH MH Patient 〉29



## Impressions of the Unit Rehabilitation Area


**PARTICIPANTS**

- SMOL Patient 〉35
- MHS Patient 〉27
- PCH CCR Patient 〉53

No statistically significant differences.

## Patient Rooms

Becoming the first hospital in Ontario to have all private patient rooms for both complex care rehabilitation and mental health is arguably the most monumental change for both patients and staff at PCH. All patients, regardless of unit, have their own room with a private bathroom, television, phone, and window.

Having a sense of autonomy in the hospital is very important for patient psychosocial well being, especially for those patients on extended stays. The hospital environment is regimented, patients are limited on where they can provide input, their room is prearranged and assigned, there are predetermined meal times, and scheduled therapy sessions. Any opportunity to exercise their agency is a welcomed and appreciated one. For example, patients enjoy being able to personalize and decorate their room with personal items brought in from home. Furthermore, the absence of a roommate allows for greater independence and personalization. There is no requirement to compromise on music or television choices, lighting levels, furniture layout or visits to the bathroom.

As anticipated, patients have more favourable impressions of their rooms at the new PCH (patients = 8.33) when compared to their rooms at MHS (patients = 6.77) and SMOL (patients = 7.59). Consistent with other findings, complex care rehabilitation patient impressions of the patient rooms are greater than mental health patients at the new PCH (CCR patients = 8.64; MH patients = 7.53).

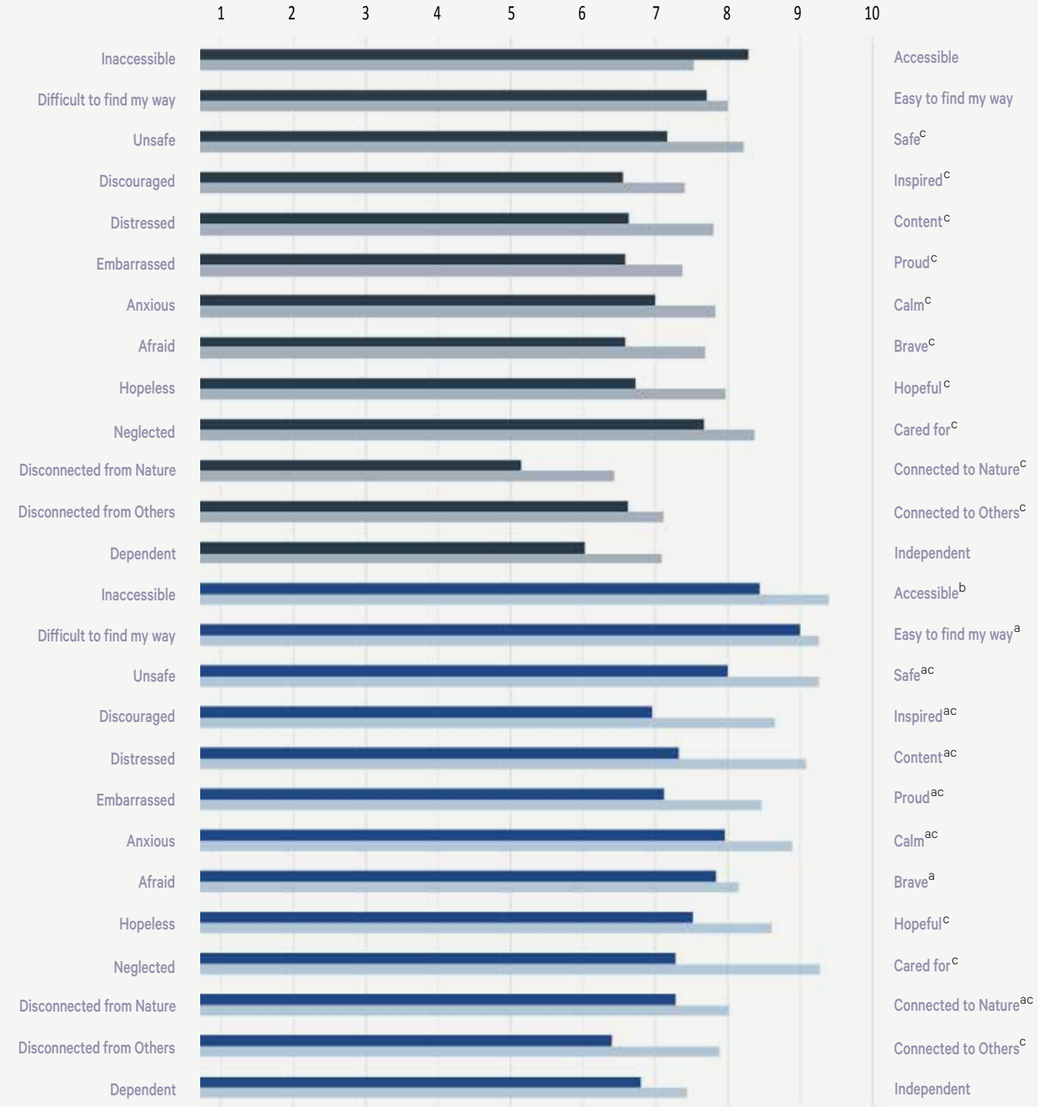
A common challenge in transitioning from wards to private rooms is the perception that there are reduced levels of care. In a ward, patients regularly see staff as they check in on patients – interacting with all of the patients in one room. Conversely, in a private room, staff visits and interaction are less frequent as they tend to one patient and have many patients to visit on their rounds. In previous hospitals evaluated by Methologica, despite no changes to the level of care, patients expressed a concern of experiencing less support in private rooms relative to shared rooms. However, this pattern is not occurring at the new PCH. Patient impressions of their room are the highest among complex care rehabilitation patients in terms of accessible (PCH CCR patients = 9.40) and feeling cared for (PCH CCR patients = 9.27); an increase from their impressions of feeling cared for at SMOL (SMOL patients = 8.37).

The other top ranking impressions of the patient room for CCR patients are safe (9.26), easy to find my way (9.26) and content (9.08). The top ranking impressions for mental health patients at the new PCH are easy to find my way (9.00), accessible (8.44), safe (8.00) and calm (7.96).

An additional benefit that mental health patients are experiencing is the ability to seek refuge in their room when they are experiencing anxiety and feeling irritated. Correspondingly, PCH has documented a slight reduction in the use of restraints as well as a reduction of incidents of aggressive behavior. This is supported by research in the area of mental health care (Koivisto et al., 2004).

Image: Tom Arban

## Impressions of the Patient Room




The following statistically significant differences ($p < .05$) were observed:
a. Impressions of the patient room are greater at posttest (PCH) relative to pretest (SMOL and MHS).
b. Impressions of the patient room are greater at postest (PCH) relative to pretest (SMOL) for complex care rehabilitation patients only.
c. Impressions of the patient room are greater for complex care rehabilitation patients relative to mental health patients at both pretest (SMOL and MHS) and posttest (PCH).

## Unique Design Features

The patient rooms at the new PCH also include a series of unique design elements that previously did not exist at SMOL or MHS.

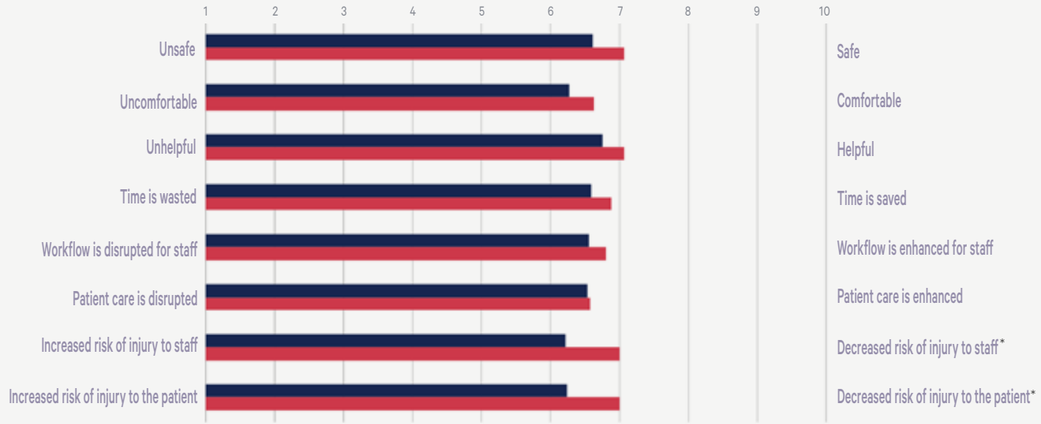
## Recessed Storage Cabinets

The recessed patient storage cabinets are located immediately outside of each patient room. Their inclusion in the design was motivated by a desire to reduce clutter in the hallways and to provide staff with a practical resource to support care delivery.

On a scale of 1 to 10, where 10 is more favourable, staff were asked to rate their impressions of the storage cabinet on the following attributes: convenience, whether time is saved or wasted, whether travel distance is increased or minimized, if workflow is disrupted or enhanced and finally, if patient care is disprupted or enhanced. The design intervention was met with success. Staff rate the recessed patient storage cabinets the highest (though not overwhelmingly so) on convenience 7.33. Staff ratings are also well above the neutral point when asked about the extent to which recessed patient storage cabinets allow for saving time (7.06), minimizing travel distance (7.11), enhancing workflow (6.97) and patient care (7.09).

Image: Tom Arban

## Impressions of the Patient Lifts




**PARTICIPANTS**

- PCH Patient 59
- PCH Staff 215

The following statistically significant differences ($p < .05$) were observed:
*Staff impressions are significantly higher than patient impressions ($p < .05$).

## Patient Lifts

Patient lifts are operated by staff as a mechanism to assist care delivery and minimize workplace injuries. Whereas patient lifts are typical in complex care and rehabilitation hospital environments, patient lifts are uncommon in mental health facilities. PCH is among the first to feature patient lifts in mental health facility design.

On a scale of 1 to 10, patients and staff were asked to rate their impressions of the patient lifts on the following attributes: safe, comfortable, helpful, whether time is saved or wasted, if workflow is disrupted or enhanced, if care is disrupted or enhanced and the level of increased risk of injury to staff and patients. Given that patient lifts are intended to facilitate patient care by staff and minimize physical strain it is not surprising that staff impressions of the patient lifts are more favourable than those of patients. In particular, staff impressions of the patient lifts are rated highest relative to patients in terms of being safe (staff = 7.07; patients = 6.61), helpful (staff = 7.07; patients = 6.76), and reduce the risk of patient injury (staff = 7.00; patients = 6.24). Interestingly, the top three patient impressions of the patient lifts resonate with the top three staff impressions of the patient lifts, with one exception – that patient lifts also save time (patients = 6.59; staff = 6.88).

Due to limitations in accessing critical incident data from the hospital database for patients and staff who participated in the user experience and design evaluation, Methologica was unable to determine the extent to which the inclusion of patient lifts directly mitigate the risk of injury for both patients and staff. But, it is comforting that the data reveals top scores for both staff and patients in terms of being safe and helpful - a result that is in line with the design intentions for this enhanced patient room feature.

## Typical Inpatient Room Layout

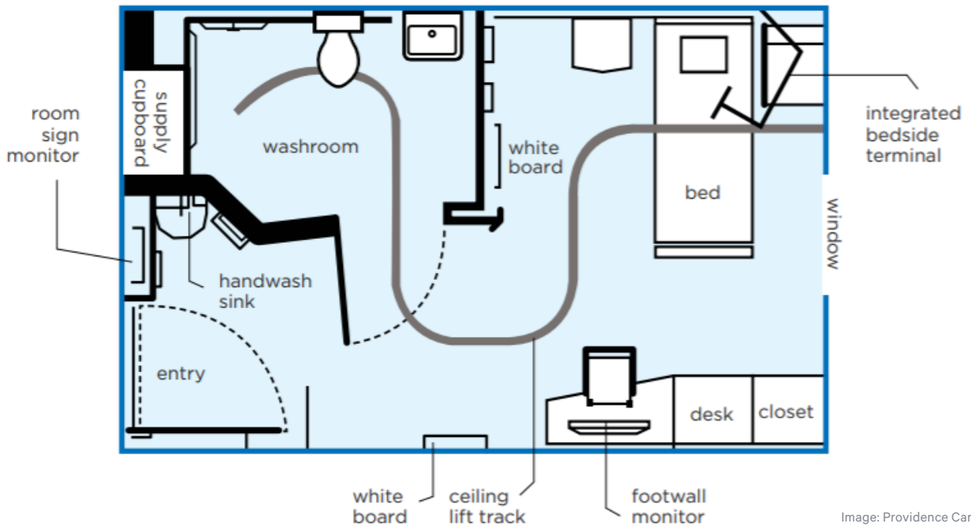



Image: Providence Care Hospital

## Patient Room Technology

New and emerging technology features prominently in a variety of locations at the new PCH. Two examples are included in and around the patient room. Screens that are located outside the patient room, for the most part, display generic information about the hospital and are, on occasion, reprogrammed to post information about the status of the patient. Most notably, these screens advise those entering the room about any precautions and personal protective equipment requirements (e.g., when it is mandatory to wear a mask and gown when entering the room). Inside the patient room, a touchscreen known as the Integrated Bedside Terminal is fixed to an adjustable wall mount with an arm extension. The IBL enables patients to watch television, make phone calls and control their room environment including the temperature and window blinds.

On a scale of 1 to 10, patients and staff were asked to rate their impressions of the technology on the following attributes: useful, informative, whether patient care is enhanced, convenience, comfort, confusing, amount of time spent with patients, usefulness in care delivery, how it enhances the hospital experience, and adaptability to changes in care.

The response from both patients and staff offer promise for the implementation of future enhancements to the touchscreen technology features. Interestingly, when comparing patient scores with staff, the patient scores are higher on all attributes. Most notably, patient impressions of the touchscreen technology are most favourable in terms of the ease of use (patients = 7.01), convenience (patients = 6.94) and comforting (patients = 6.82). Staff impressions of the touchscreen technology are the highest on comforting (staff = 6.18), useful (staff = 6.16) and enhancing patient care (staff = 5.94); with scores hovering just above the neutral point.

Patients often feel a decreased sense of control when faced with a complex chronic illness (Kuluski et al., 2013). The simple ability to control their environment - including lights, window screens and temperature settings with their IBT can reassert their sense of control, independence and confidence. Although the capabilities of touchscreen technology have not yet been fully optimized at the new PCH, its inclusion in the design shows promise for the future.



Image: Tom Arban

## Care Desks

The design of the former care desks featured a glass window. This separation created a physical barrier between staff and patients as well as anyone else who approached the care desk. At the new PCH the desks are defined by an open concept, a barrier free workspace with a larger desk area that increases the distance between staff and those on the opposite side of the counter. The motivation behind this drastic design change was to create a care desk that was open and accessible for patients without compromising the safety of staff.

On a scale of 1 to 10, patients and staff were asked to rate their impressions of the care desk on the following attributes: accessible, safe, calm, approachable, brave, whether they felt acknowledged, trustful and visible. The most notable outcome resulting from the design of the open care desk at the new PCH when compared to the former SMOL and MHS facilities is the difference in behavioural interactions between patients and staff as well as professional colleagues.

Consistent with the design intentions, patients and staff alike rate the open care desk at the new PCH the highest on the following four dimensions: accessible (patients = 8.67; staff = 8.32), visible (patients = 8.51; staff = 7.94), approachable (patients = 8.47; staff = 7.48) and safe (patients = 8.49; staff = 7.64). In contrast, for the former SMOL site the ratings were accessible (patients = 8.26; staff = 5.69), visible (patients = 8.39; staff = 6.46), approachable (patients = 7.74; staff = 5.29), and safe (patients = 8.00; staff = 6.29). For the former MHS site the ratings were accessible (patients = 6.74; staff = 6.03),



Images: Methologica and Tom Arban

visible (patients = 6.77; staff = 6.38), approachable (patients = 6.48; staff = 5.72), and safe (patients = 7.26; staff = 6.76).

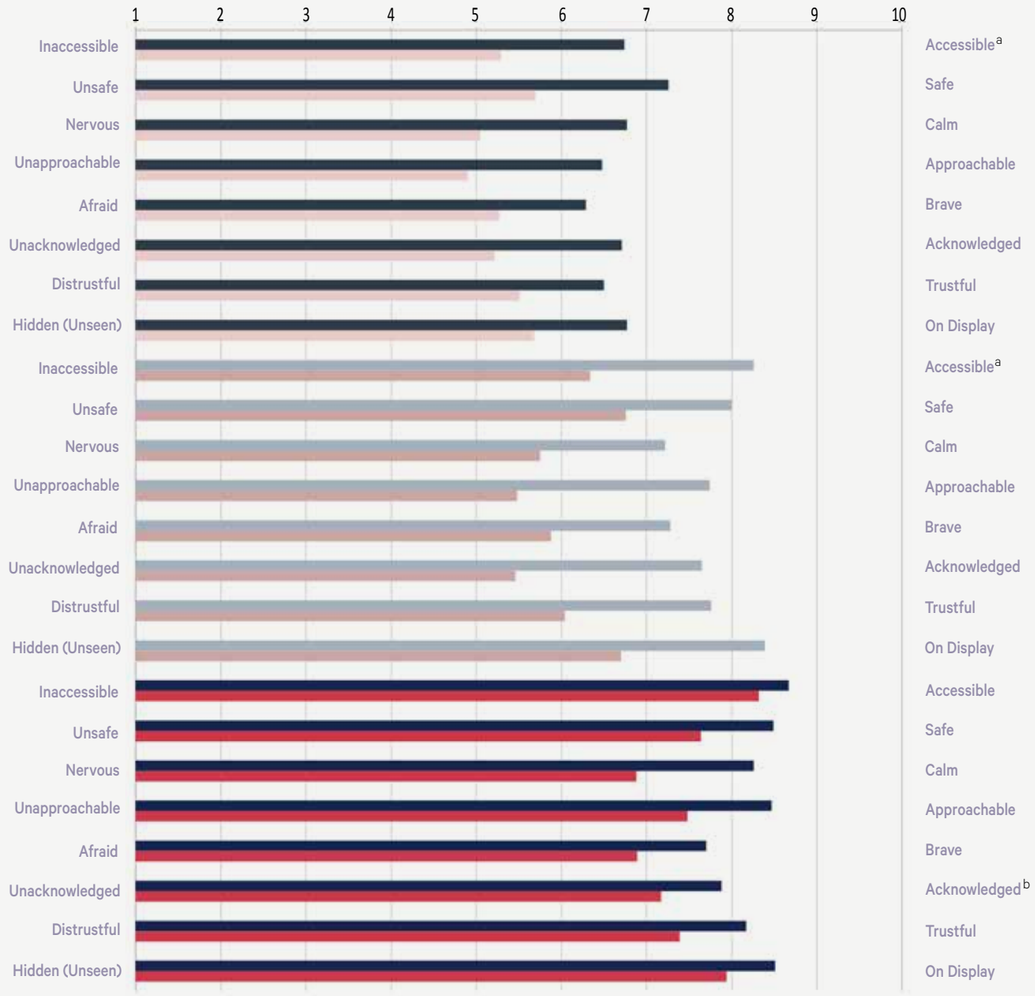
A successful open care desk design needed a delicate balance of being accessible and approachable for patients while not compromising safety for staff. The fourth highest patient impression is approachable (patients = 8.47) and staff impressions of safety are significantly greater at posttest (PCH staff = 7.64) relative to the enclosed care desks at pretest (MHS staff = 6.76; SMOL staff = 6.29).

The data reveals that a successful balance was achieved and that open care desks are achieving their design intentions. These findings thereby dispel the notion that staff require a physical separation in order to feel safe. Interestingly, a reduction in critical incidents involving aggressive patient behavior have been documented at the new PCH relative to the previous sites.

It was believed, without an evidentiary basis, that the glass partitions in the old care desks protected staff from outbursts and aggression (Southard et al., 2012). What has been discovered is that aggression can be mitigated through design, encouraging interaction and personable staff (Affairs, 2010; Doherty & Sell, 2011).

Image: Tom Arban

## Impressions of the Care Desks




**PARTICIPANT SAMPLE SIZE**

- MHS Patient 31
- MHS Staff 100
- SMOL Patient 37
- SMOL Staff 85
- PCH Patient 96
- PCH Staff 224

The following statistically significant differences ($p < .05$) were observed:
Impressions of of the care desk are greater at posttest relative to pretest for all items except acknowledged.
Impressions of the care desk are greater for patients relative to staff for all items except accessible.
a. Impressions of the care desk are greater for patients relative to staff at pretest only (SMOL and MHS).
b. Impressions of the care desk are greater for staff relative to patients at posttest only (PCH).

## On Unit Non Clinical Areas

A hospital is more than a collection of patient rooms, clinical spaces and functional programming areas. There are many areas throughout the hospital that serve important roles such as points of entry, outdoor areas and social spaces. Additional spaces, with purpose and function outside of delivering care, also exist on unit.

## Dining Rooms

A concept that previously existed only at the MHS site can now be found on every unit at the new PCH. The patient dining rooms are multipurpose. Whereas breakfast is offered in patient rooms, for those who are mobile, lunch and dinner are served in the dining rooms. In the mornings, dining rooms are programmed for group sessions and recreational therapy. Staff also use the space to refill their water bottle or use the kettle.

There is a significant difference when comparing staff and patient impressions of the old dining rooms in MHS (MHS patients = 6.51; MHS staff = 5.20) with those in the new PCH (PCH patients = 8.11; PCH staff = 7.25). At the previous MHS facility, staff had multiple negative impressions of the dining rooms, with the lowest being that they felt disconnected from nature (MHS staff = 3.66), and discouraged (MHS staff = 4.86).

In contrast, staff impressions of the dining rooms at the new PCH are favourable, with negative impressions of the dining rooms at the previous MHS facility now changing to feeling connected to nature (PCH MH staff = 5.94), feeling cared for (PCH MH staff = 5.79) and proud (PCH MH staff = 5.88) at the new PCH.

The pretest patient impressions of the dining rooms are not as low as the staff; however, there is a similar jump in numbers when comparing patient impressions of the MHS dining rooms to the new PCH dining rooms. At MHS the most favourable patient impressions were easy to find their way (MHS patients = 8.41), safe (MHS patients = 7.72) and accessible (MHS patients = 7.57). The lowest scores hovered around neutral on impressions of feeling connected to nature (MHS patients = 5.17), independent (MHS patients = 5.39) and proud (MHS patients = 5.85).

The posttest numbers tell an ever more positive story. The three most favourable impression ratings of the dining rooms are for the same attributes just in a slightly different order: accessible (PCH patients = 9.08), easy to find their way (PCH patients = 9.04) and safe (PCH patients = 8.90). The lowest scores from pretest that hovered around neutral have grown at posttest: connected to nature (PCH patients = 7.14), independent (PCH patients = 7.15) and proud (PCH patients = 7.79).

Image: Tom Arban

## Patient Impressions of the Dining Room


**PARTICIPANTS**

- MHS Patient 25
- PCH CCR Patient 54
- PCH MH Patient 24

The following statistically significant differences ($p<.05$) were observed:
Impressions of the dining room are greater for complex care rehabilitation patients relative to mental health patients for all items except easy to find my way and independent.

A contributing factor to the increased favourable patient impression of the dining rooms is the inclusion of complex care rehabilitation patients at posttest. At the new PCH when comparing the two patient populations the complex care rehabilitation patient scores are consistently higher by a significant amount. This difference elevates the average patient impressions of the dining rooms. However, it is important to note that the mental health patient impressions at posttest are also elevated relative to their impressions at pretest. Therefore, both patient populations are reporting an overall increase in their impressions of the dining rooms; albeit an attenuated increase for mental health patients relative to complex care rehabilitation patient impressions at the new PCH.

Given that depression and anxiety may be more prevalent among the mental health patient population, one might expect that the two patient populations have different scores; and thus anticipate that the complex care rehabilitation impressions would be higher than those of mental health patient impressions. The same expectation would not necessarily be anticipated for staff impressions. Interestingly however, the complex care rehabilitation staff impressions of the dining rooms are consistently more positive than mental health staff impressions of the dining rooms.

The dining rooms are being used as intended. This is a testament to good design and to exemplary staff. From the onset, hospital leadership and front line staff were well prepared to program this new space for lunch and dinner service and develop a plan to maximize the use of the room through group sessions and recreational therapy. The dining room doubles as a social destination drawing patients out of their private rooms and into the only on unit communal space capable of hosting larger groups.

> “Sometimes we meet one-on-one or in little groups with people in the dining room because it’s a close space to the floor where we don’t have to take people a long distance and it’s a great little quiet area in the afternoon.”

Image: Tom Arban

## Patient Visiting Areas

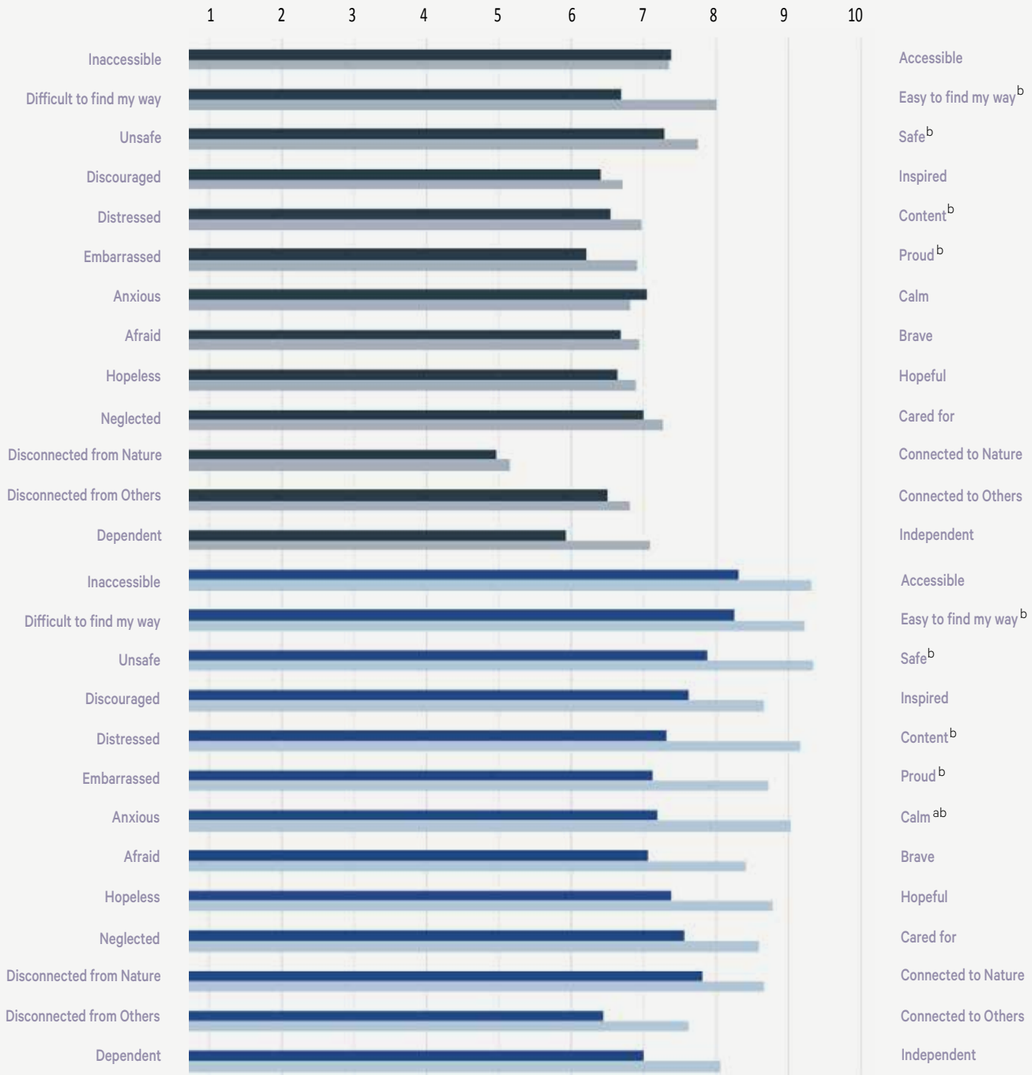
With the trend towards more and more private rooms the debate is simmering as to the utility of on unit patient visiting areas. Data from previous user experience and design evaluations show that in private rooms patients have enough space to house their visitors, talk openly about their treatment plan and are less likely to use the patient visiting area. Furthermore, if they are to leave their room either on their own or with a visitor, they are motivated by a desire to experience a change of scenery. Patient visiting areas at the new PCH include both sunrooms (located at the end of each on unit corridor) and the seating areas attached to the kitchenettes (located at the centre of each unit).

Staff impressions of the patient visiting area at the new PCH are positive (PCH staff = 7.53) and reflect a noticeable change from their pretest impressions of the MHS patient visiting area (MHS staff = 4.87) where many of the findings were either negative or neutral. The SMOL staff impressions were better than MHS staff but far from being a ringing endorsement of the space (SMOL staff = 5.93).

There is less of a discrepancy between complex care rehabilitation and mental health staff impressions of the patient visiting area in the new PCH (CCR staff = 7.49; MH staff = 7.18). With the exception of their impressions of easy to find my way (CCR staff = 7.78; MH staff = 7.96), all the remaining complex care rehabilitation staff impressions of the patient visiting areas are greater than their colleagues from mental health. It is important to share staff impressions of this space because during naturalistic observations it was revealed that, despite the intent to have a designated patient visiting area, it is used by staff as well as patients and their families. Although not often,

Image: Providence Care Hospital

## Impressions of the Visiting Areas




The following statistically significant differences ($p<.05$) were observed:
Impressions of the visiting area are greater at posttest (PCH) relative to pretest (SMOL and MHS) for all items except for calm and connected to others.
a. Impressions of the visiting areas are greater at posttest (PCH) relative to pretest (SMOL) for complex care patients.
b. Impressions of the visiting areas are greater for complex care rehabilitation patients than mental health patient at both pretest (SMOL and MHS) and posttest (PCH).

staff were witnessed to have meetings with patients in the sunroom or spend a few moments alone.

Patient activity is somewhat predictable in these areas. Patients watch television and read. An unanticipated finding is that patients also use the visiting area to rest and take a nap on the sofa, with some patients even bringing blankets to keep them cozy. Patient impressions of the patient visiting areas at posttest are greater than their pretest scores (PCH patients = 8.31; SMOL patients = 6.95; MHS patients = 6.46). At the new PCH, the highest impressions of the patient visiting areas are: accessible (patients = 9.00), easy to find their way (patients = 8.90) and safe (patients = 8.88).

A deeper dive into the data reveals some notable changes in patient impressions. For mental health patients the most intriguing changes occurred in the following attributes: connected to nature (MHS patients = 4.96; PCH MH patients = 7.81), independent (MHS patients = 5.92; PCH MH patients = 7.00) and inspired (MHS = 6.40; PCH MH patients = 7.62). Complex care rehabilitation patient impressions have more pronounced changes with the top three being connected to nature (SMOL patients = 5.15; PCH CCR patients = 8.66), calm (SMOL patients = 6.82; PCH CCR patients= 9.03), and content (SMOL patients = 6.97; PCH CCR patients = 9.16).

Despite having more favourable impressions of the new patient visiting areas, patients use it less frequently at the new PCH (3.34) relative to the previous two sites (SMOL = 4.26; MHS = 3.78). It is difficult to ignore the impact that private rooms are having on the patient visiting areas. At SMOL and MHS there were multiple patients per room, as a result, patients needed a more private space on unit, now at PCH this is no longer the case. During pretest and posttest if a patient indicated that they do not use the visiting area they were asked why. At SMOL 3 of 12 patients or 25% said they had no need to use the space, at MHS the percentage numbers increased a little with 4 of 13 patients or 31% also reported they had no need to use the space. At PCH those numbers dramatically increase. Of the 47 patients who said they do not use the space 30 or 64% declared they have no need to use it. There are other reasons that can account for the reduced use of the visiting areas, such as more choice of indoor destinations, an increase in the quality of outdoor destinations or a lack of awareness. But the main contributing factors for the reduced use is most likely the introduction of private patient rooms.

The patient visitor lounge has been consistently included in hospital designs for decades. With the rise of private patient rooms and a growing understanding that patients seek animation or a change of scenery when they leave their room. The visiting areas offer neither of these two, therefore, we must consider the merits of continuing to include this space when the trend is showing a decrease in demand and use.

> “It’s nice that each [patient] room is private, you can talk to the patient and not have the other person hearing about their schedule change or what’s going on with their therapy that day. We don’t need to go anywhere for privacy.”

## Staff Lounge

People can become creatures of habit where they develop a routine that is rarely strayed from. These routines can be part of your morning as you prepare for work, or how you prepare to send your children off to school. A steady routine can also become a part of work habits and tendencies, it can influence where and how you spend your breaks.

One option on where staff can take their breaks is the staff lounge, the pretest scores of these spaces at MHS and SMOL were not very positive. Many scores were below five and no impressions were ranked above seven. It was fascinating to compare the pretest scores for inspired, content, calm and brave despite being in two different facilities there was negligible differences between staff at MHS and SMOL.

The posttest findings showed more favourable impressions of the lounge when comparing results from pretest, however they were far from a resounding endorsement of the space. The highest two impression scores are safe 7.47 and easy to find my way 7.01 in contrast the two lowest scores are where staff expressed that they feel disconnected from nature 3.75 and disconnected from others 4.78.

A sense of disconnection could be a contributing factor explaining the low frequency of use, while there is an increase of use from pretest the current usage is low with respondents saying they use the space between a few times a year or once a month or less. Staff may be choosing to spend their breaks in areas with greater animation where they feel more connected to others, or in one of the many outdoor areas or locations with views to the outdoors. An additional explanation could be a desire to spend time off the unit and experience a physical and psychological break from their immediate working environment.

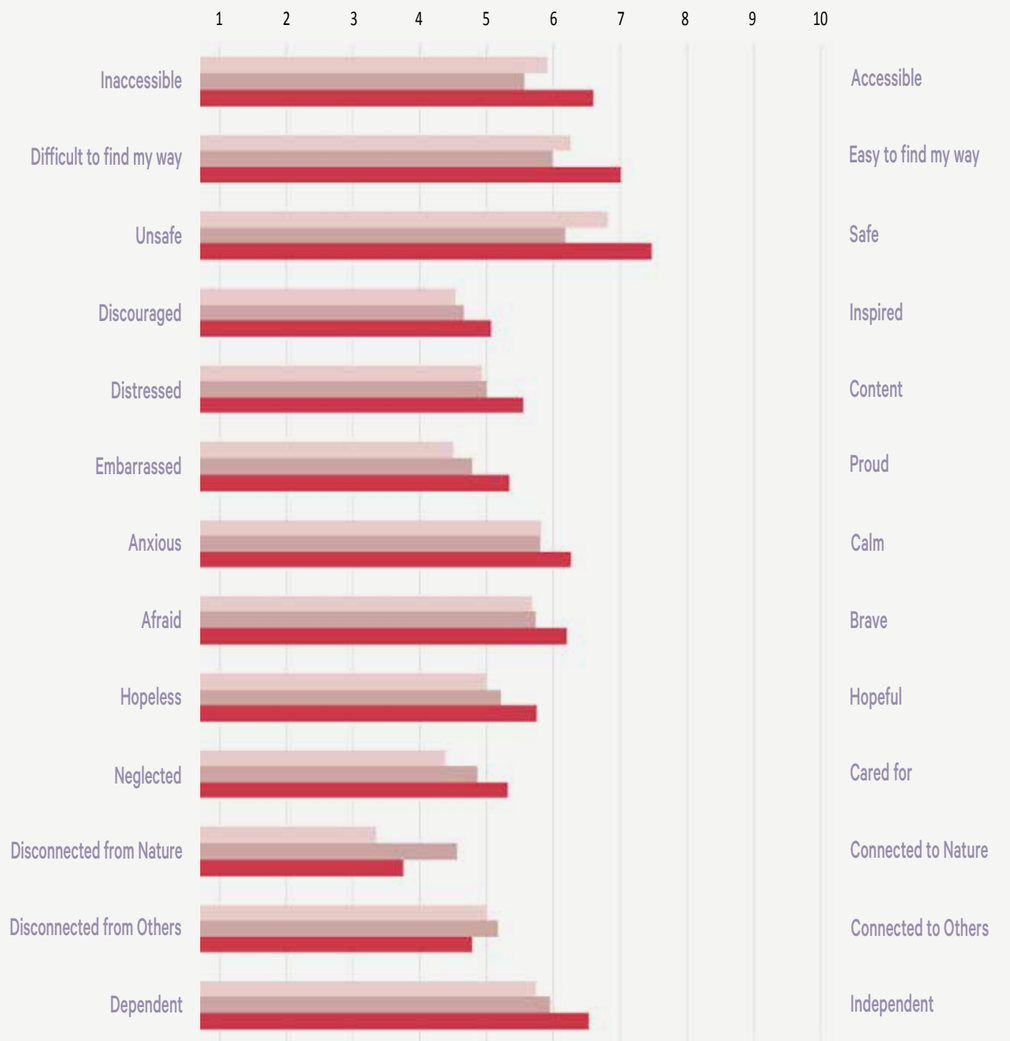
Our naturalistic observations revealed that the most common activity that occurs in the lounge are quick stops that facilitate snacking or meals. That would include using the kettle for a tea or coffee, picking up something from the fridge or reheating a meal in the microwave. The most activity occurs around the lunch hour with some traffic in the mornings, but activity drops significantly after lunch with little or no activity until the next morning.

The staff lounge has the potential to be impacted with the continued discussion of the value of the patient visiting areas. If future hospital designs exclude that space, can those forfeited resources then be reallocated to improving the staff lounge experience. Investing in a new design that creates a welcoming and relaxing environment could yield greater results that could increase frequency of use and be a place that is more than a quick stop to facilitate snacking.

| 85 staff indicated that they do not use the Staff Lounge. Here are the top reasons why. | | |
|---|---|---|
| | % of Respondents | Number of Respondents |
| **No Need** | 63.53% | 54 of 85 |
| **Poor Design** | 20.00% | 17 of 85 |

Images: Methologica

## Impressions of the Staff Lounges




**PARTICIPANTS**

MHS Staff 〉97
SMOL Staff 〉81
PCH Staff 〉138

The following statistically significant differences ($p<.05$) were observed: Impressions of the staff lounge are greater at posttest (PCH) relative to pretest (SMOL and MHS) for all items except inspired, connection to nature and connection to others.

## Work Space

During the pretest phase of data collection 104 MHS staff and 93 SMOL staff answered questions about their work area, at the posttest phase 217 staff answered the same series of questions. Apart from easy to find my way (PCH staff = 7.81; MHS staff = 7.92), safe (PCH staff = 7.70; MHS staff = 7.95), and calm (PCH staff = 6.76; MHS staff = 6.77) MHS staff impressions of their workspace are lower than their counterpart mental health staff at the new PCH; posttest staff overall impressions of their workspace are more favourable (PCH staff = 6.80) than at pretest (SMOL staff = 6.20; MHS staff = 6.57).

Among the highest staff impressions of their workspace at the new PCH are: easy to find my way (staff = 7.81), safe (staff = 7.70) and accessible (staff = 7.69). One of the lower staff impressions of their workspace at the new PCH was observed in feeling connected to others (staff = 6.36), it is a negligible increase when compared with pretest scores on the same attribute (SMOL staff = 6.18; MHS staff = 6.34). With enhancing comingling as one of the overall design intentions and an increasing trend towards interprofessional care models, work spaces can benefit from additional support and interventions. It would be advantageous to enhance staff feelings of being more connected to others from professional as well as social perspectives.

In addition to the evidence that social interaction is beneficial for patient well being, staff are also under stress, at risk of burnout and depression. As social beings, and given the benefits of interprofessional collaboration, interventions might focus on efforts to enhance comingling and serendipitous interactions among colleagues in addition to offering an effective and quiet work space.

Image: Tom Arban

> „...The trade-off is the clients got very good, private space which is a delight for them, you know their own bedroom, bathroom, they can close, they can even lock the door from the inside, the staff can unlock it but for a few of them they really want that security... The flip side is that it's not been stunning for a lot of the staff."



## Spiritual Areas

Tradition has it that certain types of services and spaces are always included in hospitals. While it is a given that many of them would be clinical or related to care delivery, some spaces that are regularly included are driven by neither clinical nor social factors. Spiritual spaces are consistently included in modern healthcare facilities, these spaces can manifest in different areas, sizes and with different names. At the new PCH there are two indoor spiritual areas the worship centre and meditation room.

## Worship Centre

Located on the second floor, the worship centre at the new PCH is an open and airy space. The large wall to wall windows allow for an abundance of natural light with views of the lake and views to the surrounding greenspace. In the main area, the worship centre includes a labyrinth as a prominent design element that is complemented by a large water feature and the use of a soft colour palette. The worship centre has a modern feel that does not contain any overt religious symbols.

Impressions of the worship centre represent some of the largest increases relative to other spaces when comparing pretest (SMOL patients = 5.87; SMOL staff = 6.85; MHS patients = 6.65; MHS staff = 7.35) and posttest findings (PCH patients = 8.95; PCH staff = 8.51). The gains are most noticeable for complex care rehabilitation patients, when comparing their impressions of the worship centre the posttest scores are more than three points higher on all impressions (PCH CCR patients = 9.00; SMOL patients = 5.87). On a scale from one to ten, a three point increase is remarkable. The only impression of the worship centre that did not improve by more than three points is hopeful (SMOL patients = 5.94; PCH CCR patients = 8.81).

The mental health patient and staff impressions also had noticeable improvements; however, they were not of the same scale as complex care rehabilitation patients (MHS patients = 6.65; PCH MH patients = 8.81; MHS staff = 7.26; PCH MH staff = 8.21).

The worship centre has some of the highest impression scores than any other space in the hospital. Despite having the potential of being a multipurpose space, it remains one of the most underutilized rooms in the hospital. Staff tend to

Image: Melanie Elliott

use it as a transition space to access the outdoors; however, very few staff stay to visit the worship centre itself. When users were asked how often they use this space the response was underwhelming.

The worship centre does have regular scheduled programs that include Sunday mass and weekly hymn sing sessions.

However, it is such a beautiful room with an adaptable layout, strong considerations must be made on how to bolster use, particularly in the winter months when you can take advantage of the natural light and views to the outdoors; and in the summer months when the adjacent terrace can be optimized to host events and gather people.

| 64 patients indicated that they do not use the Worship Centre. Here are the top reasons why. | | |
|---|---|---|
| | % of Respondents | Number of Respondents |
| No Need | 50.00% | 32 of 64 |
| Lack of Awareness | 35.94% | 23 of 64 |
| **90 staff indicated that they do not use the Worship Centre. Here is the top reason why.** | | |
| No Need | 64.44% | 58 of 90 |

Image: Tom Arban



## Meditation Room

This room is a new addition to the hospital that previously did not exist at MHS or SMOL. It draws many similarities with the worship centre, it has high impressions from both patients and staff (patients = 8.15; staff = 8.15), but is used less frequently than the rarely used worship centre (1.63).

The meditation room has very high ceilings with no views to the outside; however, natural light permeates from the windows located on the ceiling above. The meditation room includes a mounted TV monitor, a decorative back lit glass wall fixture and a patterned compass on the flooring. There are no fixed furniture pieces but a collection of chairs that can easily be arranged or re-arranged depending on the gathering.

Both the meditation room and worship centre are designed to be a place of sanctuary with soft lighting and sound reducing elements in the interior, creating an environment that is conducive to primarily spiritual fulfillment. Despite having the same goals, the two spaces were created and motivated by a desire to show compassion and respect for diverse religious, spiritual and cultural beliefs and practices. Despite not having any overt religious symbols the worship centre is seen by many as being a non denominational space, whereas the meditation room design includes a pre-worship ablution room and ventilations provisions that are traditionally used by Muslims and Aboriginals respectively.

The common ties that bind the spiritual spaces are overwhelmingly positive impressions contrasted with infrequent use. A strong argument can be made that the meditation room and worship centres are an unnecessary duplication thus diluting the frequency of use but even combined both spaces have disappointing levels of use.

In times of need people seek out spiritual spaces, at PCH that spiritual connection could occur in the worship centre, meditation room, or any place where an individual can access their inner peace. To increase use of the designated spiritual areas hospital leadership could make further investments in their wellness program and encourage meditation classes, yoga and other mindfulness exercises. They could even draw inspiration from a Snoezelen room to modify the existing spaces with selected scents, light, and music.

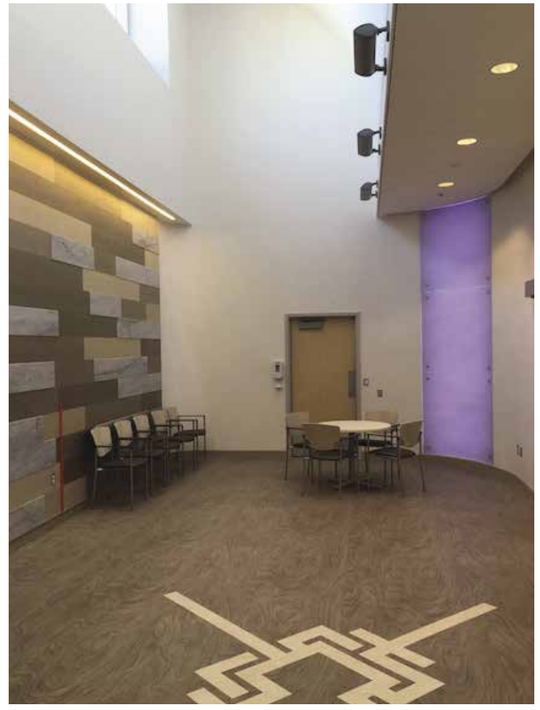


Image: Parkin Architects Ltd.

| 85 patients indicated that they do not use the Meditation Room. Here are the top reasons why. | | |
|---|---|---|
| | % of Respondents | Number of Respondents |
| Lack of Awareness | 47.06% | 40 of 85 |
| No Need | 40.00% | 34 of 85 |
| **176 staff indicated that they do not use the Meditation Room. Here are the top reasons why.** | | |
| No Need | 61.36% | 108 of 176 |
| Lack of Awareness | 12.50% | 22 of 176 |

# 8. Experience and Well Being Outcomes


Image: Tom Arban

## Experience and Well Being Outcomes

Human interactions and outcomes are greatly influenced by the design of the built environment. Depending on the design aspirations, these effects can be subtle or obvious. Nevertheless, the environment that we are in can impact how we feel, what we do and how we do it.

The impact of architectural design or a design intervention on clinical outcomes, in most cases, is indirect. The mechanism by which architecture and design interventions influence outcomes (particularly clinical outcomes in the context of healthcare facility design) is dependent on the interaction between design and the person. This was recognized and embedded as essential design requirements by the HOK PDC architects and integral to the Parkin Architects design of the new PCH.

This chapter explores the consequences of user experience and impressions on well being and health related outcomes. The pattern of findings reveals how the new PCH design impacts the way people perceive the building as facilitating their movement and activity throughout the facility, supporting their well being, and enabling staff to carry out their work. Moreover, the findings highlight how impressions and user experience of the building design positively predicts well being related outcomes.

## Travel Distance

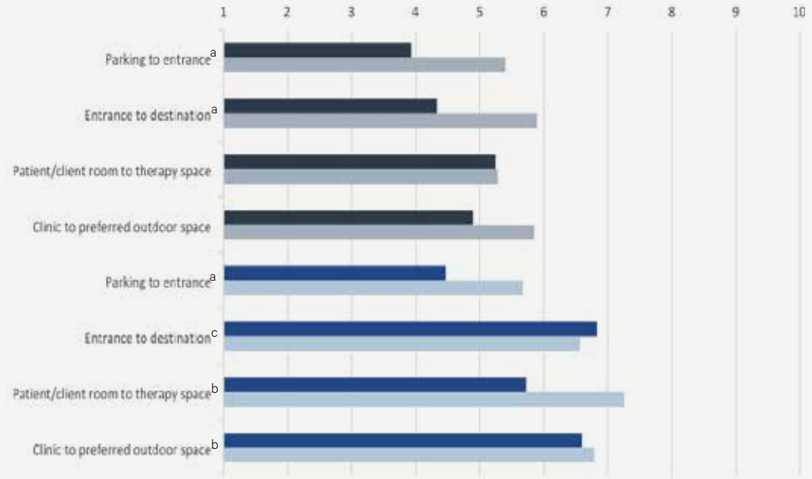
The consolidation of two patient populations, the implementation of all private patient rooms and the introduction of new amenities and spaces could only have been possible through the construction of a much larger facility. The new PCH is much more than just the combination of MHS and SMOL.

A hospital site of this size can produce some challenges, especially in the amount of time it takes to navigate the site and arrive at desired destinations. On a scale from 1 (very far) to 10 (very close), participants were asked to rate the perceived travel distance to and from various locations in the hospital. The travel distance composite is a combined average score across all destinations. At the new PCH, patients' perception of travel distance has decreased (PCH patients = 6.88) relative to patients' perceptions of travel distance at SMOL and MHS (SMOL patients = 5.68; MHS patients = 4.44; where higher numbers represent greater proximity). Despite the increased scale of the new PCH relative to the former SMOL and MHS facilities, patients feel their travel time in the new hospital is less and that the new PCH design allows them to reach their destinations in less time than at the previous facilities.

Overall, perceived travel distance for staff at the new PCH is below the neutral point (PCH staff = 4.89). It is not surprising that the two distances that are perceived to be the farthest for both patients and staff at the new PCH are from the bus stop to entrance (PCH patients = 2.74; PCH staff = 1.75) and from the parking lot to entrance (PCH patients = 5.11: PCH staff = 3.45). Once inside the hospital, perceived travel distance improves. The placement of the main elevator bay within a few steps of the entrance is a sensible design decision as the perceived travel distance from the entrance to the elevators is closest, relative to other destinations, among patients and staff at the new PCH (PCH patients = 8.43; PCH staff = 7.55), a welcome relief after travelling a great distance to reach the hospital.

The placement and proximity of spaces to the units is a delicate balancing act – particularly in a facility the size of the new PCH. Travel distance has a corresponding impact on the frequency of use of spaces and amenities. To reap the anticipated and observed benefits of the new PCH design, patients, staff and visitors have to experience the spaces. To experience the spaces, people require a simplified route and ease of access. Staff at the new PCH experience challenges with distance when leaving their on unit work area to get to the cafeteria (PCH staff = 4.05), from their work area to amenities (PCH staff = 4.34) and from their work area to their preferred outdoor destination (PCH staff = 4.70). Relative to staff, patients at the new PCH experience fewer challenges with distance across the same destinations. Specifically, when it comes to leaving the patient room to get to the cafeteria (PCH patients = 5.76), from the patient room to amenities (PCH patients = 7.34) and from the patient room to their preferred outdoor destination (PCH patients = 6.45).

## Perceived Travel Distance




The following statistically significant differences ($p < .05$); were observed for patients:

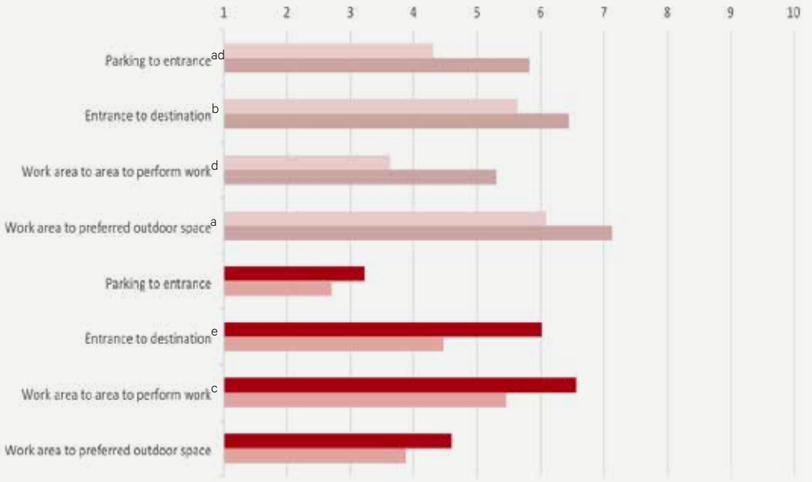
a. Complex care rehabilitation patient impressions of travel distance are greater than those of mental health patients.

b. Perceived travel distance is greater at posttest relative to pretest.

c. Perceived travel distance is greater at posttest (PCH) relative to pretest (MHS) for mental health patients only.

**PARTICIPANTS**

- SMOL Patient 31
- MHS Patient 21
- PCH CCR Patient 14
- PCH MH Patient 17




The following statistically significant differences ($p < .05$); were observed for staff:

a. Perceived travel distance is greater among staff at pretest (SMOL and MHS) relative to posttest (PCH).

b. Perceived travel distance is greater among complex care rehabilitation staff at pretest (SMOL) relative to posttest (PCH).

c. Perceived travel distance is greater among mental health staff at posttest (PCH) relative to pretest (MHS).

d. Perceived travel distance is greater among complex care rehabilitation staff relative to MHS staff at pretest only (SMOL).

e. Perceived travel distance is greater among mental health staff relative to complex care rehabilitation staff at posttest only (PCH).

**PARTICIPANTS**

- SMOL Staff 32
- MHS Staff 26
- PCH CCR Staff 74
- PCH MH Staff 41



Whereas the geographic distances for patients and staff are approximately the same, perceptions of time and distance can vary as a function of the fluidity of a patient's schedule and the rigid nature of staff break times, which therefore, account for the differences in perceived travel distances. Staff may opt to remain on unit rather than visit a rewarding destination because they may not have adequate time to enjoy the space before they need to return to carry out their work. Conversely, whereas patients may experience challenges in their health condition, patients have fewer time constraints when venturing out to enjoy an off-unit destination.

As revealed during the moving interviews, time has impeded the process of patient transfer (in the case where assistance is required) or independent passage (when patients are able to manage on their own) to and from the "neighbourhood" where they receive therapy, which results in either late arrivals or unsupervised early drop offs.

## Time and Distance Impede Use

| Location | Reason | % of Respondents Expressing that Reason | Total Number of Respondents Not Using the Space |
|---|---|---|---|
| **Staff** | | | |
| Cafeteria | Too Far | 41.67 | 12 |
| | No Time | 41.67 | |
| Limestone Terrace | Too Far | 32.31 | 65 |
| | No Time | 49.23 | |
| Outdoor Courtyards | No Time | 33.75 | 80 |
| Worship Centre | No Time | 28.89 | 90 |
| Meditation Room | No Time | 32.39 | 176 |
| Healing Garden | To Time | 38.67 | 181 |
| | Too Far | 13.26 | |
| **Patients** | | | |
| Cafeteria | Too Far | 25.00 | 40 |
| Limestone Terrace | Too Far | 15.63 | 64 |

> "They have to be portered here and then if we're not here yet they have to wait in the hall, so if for any reason we're running late or because of portering times to get everyone here for a certain group time, some people are coming ten minutes early, some are coming a bit late, that's a bit frustrating because they're so far away from us and they're so far away from the unit."

## Wayfinding

An effective navigation system requires a harmonized balance of navigation cues. Wayfinding is not just about the strategic placement of placards. That is just one tool that is to be used in combination with colour patterns, clear language, lighting levels, symbols, ceiling heights, and floor finishes.

In addition to intuitive wayfinding guided by the views to the natural landscape, the wayfinding system at the new PCH incorporates visual cues that are inspired by the surroundings. Each unit name is paired with a corresponding colour and symbol. Lakeview is a pale blue with a sailboat to reflect its adjacency to the lake. Parkside is light green with a leaf to reflect its proximity to the park. Heritage is orange with the dome atop Kingston city hall to reflect the heritage and architecture of the city and as an homage to the former heritage buildings on the site.

Participants were asked on a scale of 1 (difficult) to 10 (easy) to rate their ability to find their way to and from the same destinations they previously considered in terms of perceived travel distance. These wayfinding questions are unique to posttest, as wayfinding measures were not assessed during pretest. When comparing composite scores in perceived wayfinding of patients and staff at the new PCH, patients find it easier to get around the hospital than staff (PCH patients = 8.56; PCH staff = 7.05; where higher numbers indicate a greater ease of wayfinding).

Staff experience the greatest challenges in wayfinding when leaving their work area and to access amenity spaces (PCH staff = 6.59), their preferred outdoor destination (PCH staff = 6.63) and to the cafeteria (PCH staff = 6.76). During our moving interviews staff provided other examples of where they experience ease or difficulty in wayfinding. One noteworthy example is an expression of the value of using colour as a cue for wayfinding.

Many staff emphasized the confusion they feel in navigating the corridors which are predominantly used by staff because they do not feature the blue, green or orange colours and corresponding symbols that are associated with different units. This confusion is compounded by the placement of fewer signs in these areas relative to public corridors, thereby contributing to increased difficulty for staff to orient themselves in the interior corridors of the building.


Image: Tom Arban



> I find getting to... Lakeview 1 and 2, the nursing areas are good. When you get beyond into that little area in the back there where you got receiving, there seems to be a little lack of signs, lack of colour, it all looks the same and you can easily, I think I spent 40 minutes down there looking for a room one day.

Interestingly, patients find it easier to travel through the hospital than staff. When comparing perceived ease of wayfinding in the patient journey beginning from their room to off unit destinations their scores are significantly higher than staff, reflecting a greater ease of wayfinding: from the patient room to amenities (PCH patients = 8.52), patient room to their preferred outdoor destination (PCH patients = 8.12), and the patient room to the cafeteria (PCH patients = 8.45).

This could be because patients are often taken to places versus having to travel on their own. Or patients who are independently mobile have more time to explore the hospital and familiarize themselves with their surroundings.

Even though patients at the new PCH perceive a greater ease of wayfinding than staff, they do share a common strategy when venturing out and exploring the hospital. When comparing findings from our moving interviews it was discovered that both patients and staff regularly consult and rely on their peers rather than using the signs when they are going to find new spaces within the hospital.

## Self Efficacy in Mobility

Promoting recovery and transition is one of the hospital's primary design intentions. An indicator of success rests in patients' confidence of their ability to leave their rooms and ambulate throughout the hospital. The 10-item Self-Efficacy in Wheeled Mobility Scale (Fliess-Douer, Van Woude, & Vanlandewijck, 2011) was adapted to include all types of mobility. The scale was modified from the original 4-point rating to a 10-point confidence rating (1 = not at all to 10 = extremely) to ensure a more sensitive measure to the expected variation in responses of patients with varying levels of mobility. The 10 items were summed to yield a total score, with higher scores indicative of increased self efficacy in mobility.

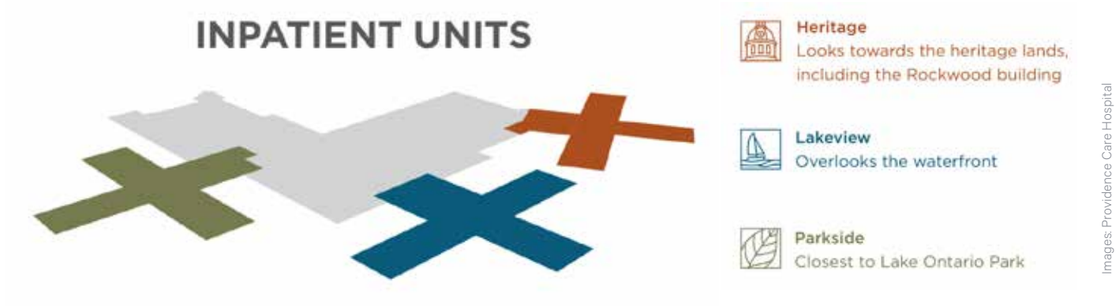
When comparing patient self efficacy in mobility across all three facilities, patients are more confident at the new PCH relative to the previous SMOL and MHS facilities. Overall self-efficacy in mobility (a composite score comprised of the average of all items) is elevated at the new PCH (PCH patients = 7.51); and, an increase when compared to the previous facilities (SMOL patients = 7.01; MHS patients = 7.06).

Overall, patients at the new PCH are confident in their ability to be mobile throughout the hospital. On all items, the scores range from the lowest on being mobile without the support of my family and friends (PCH patients = 7.11) to the highest on overcoming barriers and challenges (PCH patients = 8.00).

Self efficacy in mobility tends to be greater (if not significant) among complex care rehabilitation patients (PCH CCR patients = 7.60) than mental health patients (PCH MH patients = 7.16); however, there is no statistical difference between the two patient groups on several of the individual statements that they are asked to assess.

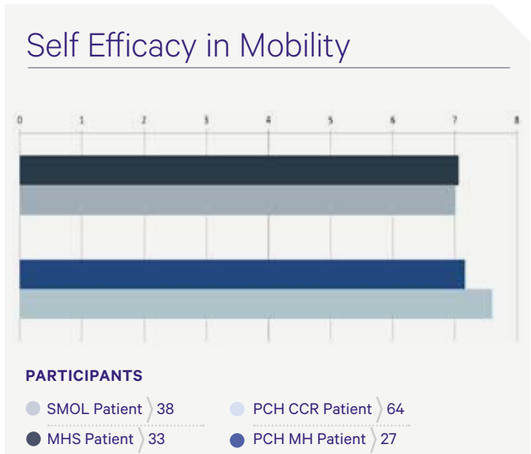
During the moving interviews, patients generated specific examples of the obstacles they face when ambulating through the hospital and observations corroborated the examples.

Throughout the new PCH, most of the doors open automatically; however patients are unable to predict the pattern, or direction, in which they will open - towards them or away from them. Consequently, navigating doorways can be confusing, alarming, and at times unsafe for all users.




Images: Providence Care Hospital

Another example stems from doorway thresholds that bridge the flooring between the dining room and the adjacent patio, as well as the flooring transition that occurs at the main hospital entrance. The threshold is raised and, therefore, represents a challenge for those who use walkers and wheelchairs - a little extra force is required to overcome the obstacle.




## Coping

Perceiving that one has the ability to cope with health conditions is evidence of a positive outlook. Both perceptions of improvement during the course of illness and perceptions of coping ability contribute to favourable health trajectories – including compliance with medications, adherence to therapeutic protocols, decreased likelihood of readmission and other health benefits (Rosenberger et al., 2004).

As a measure of coping and adaptation to health conditions (adapted from McFarland & Alvaro, 2000's perceptions of improvement measures), patients rated the extent to which they feel: inspired to improve their health, confident in their ability to manage their health condition, optimistic about their recovery, comfortable interacting with others, comfortable leaving their room without assistance, and that they can manage activities of daily living (e.g., eating, bathing, dressing, toileting) on a scale ranging from 1 = not at all to 10 = extremely. Domains were selected on the basis of an earlier patient needs assessment (Kuluski et al., 2013). All 5 items were then summed to yield a total coping score, with higher scores representing increased perceived ability to cope with health conditions.

At both pretest and posttest, the complex care rehabilitation patient population is demonstrating greater confidence in their ability to manage their health conditions relative to the mental health patient population (PCH CCR patients = 8.12; PCH MH patients = 7.03; SMOL patients = 7.98; MHS patients = 6.89). Relative to mental health patients, complex care rehabilitation patients report being more inspired to improve their health

Image: Providence Care Hospital



(PCH CCR patients = 8.84; PCH MH patients = 7.37; SMOL patients = 8.63; MHS patients = 7.61), confidence in their ability to manage health conditions (PCH CCR patients = 8.12; PCH MH patients = 6.81; SMOL patients = 7.37; MHS patients = 6.66), optimism about their recovery (PCH CCR patients = 7.97; PCH MH patients = 6.70; SMOL patients = 7.82; MHS patients = 6.21), comfort in interactions with others (PCH CCR patients = 8.89; PCH MH patients = 7.41; SMOL patients = 8.42; MHS patients = 6.39), and ability to manage activities of daily living (PCH CCR patients = 7.03; PCH MH patients = 6.89; did not ask at pretest).

Interestingly, at the new PCH both complex care rehabilitation as well as mental health patients report increased comfort in their interactions with others (PCH patients = 8.45; PCH CCR patients = 8.89; PCH MH patients = 7.41; SMOL patients = 8.42; MHS patients = 6.39). Similarly, comfort in interactions with others is rated more favourably by complex care rehabilitation patients at the new PCH relative to complex care rehabilitation patients at the previous SMOL (PCH CCR patients = 8.89; SMOL patients = 8.42). In light of the design intentions to promote comingling combined with proven the benefits of social interaction, well being and overall health, comfort in interacting with others is an important indicator of wellness. This is important for all patients, but more so for mental health patients as they typically experience deficits in social relationships.

Mental health patients score the lowest (MHS = 6.21; PCH MH 6.70) when asked about optimism regarding their recovery. By comparison, complex care rehabilitation patients score the lowest (PCH CCR = 7.03) when it comes to managing activities of daily living relative to other measures of coping.

The attenuation of perceived coping ability on these items may be reflective of the complexities of each unique patient population. For example, complex care rehabilitation patients may experience more physical challenges in activities of daily living. In contrast, mental health patients are typically experiencing greater depressive symptoms which may limit their optimistic outlook. Notwithstanding the pattern of results, the positive impact of the new PCH design on perceived coping ability persists and is noteworthy.

Published research has documented the positive benefits of perceived improvements over the course of illness. Most notably, adherence to medical treatment regimes and protocols, compliance with prescribed medications, decreased length of stay and earlier discharge from the hospital.

Given challenges inherent in obtaining access to patient charts to determine a link between perceived coping ability and documented recovery rates as well as other medical administrative patient data we were unable to make the statistical link. However, given the evidence already amassed in the coping literature, we can confidently attribute the enhanced ability to manage health conditions - or coping - to the increased likelihood that those who perceive having an enhanced ability to cope with their health conditions will fare better than those who do not (Aspinwell, 2005; Aspinwell & Tedeschi, 2010; McFarland & Alvaro, 2000; Rosenberger et al., 2004).

## Coping with Health Conditions

| | SMOL | MHS | PCH CCR | PCH MH |
|---|---|---|---|---|
| **Overall** | 7.98 | 6.89 | 8.12 | 7.03 |
| **I am inspired to improve my health (to "get better")** | 8.63 | 7.61 | 8.84 | 7.37 |
| **I am optimistic about my recovery** | 7.82 | 6.21 | 7.97 | 6.70 |
| **I am comfortable interacting with others** | 8.42 | 6.39 | 8.89 | 7.41 |
| **I am comfortable leaving my room without assistance** | 7.66 | 7.66 | 7.84 | 7.00 |
| **I am confident in my ability to manage my health condition** | 7.37 | 6.66 | 8.12 | 6.81 |

Perceived ability to cope with health conditions is greater among complex care rehabilitation patients relative to mental health patients for all items except comfortable leaving my room without assistance ($p<.05$).

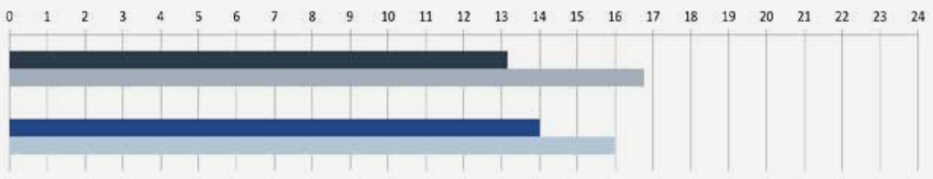
## Optimism

Much as coping is indicative of the design intention to promote recovery, optimism enables perseverance in the face of health challenges (Aldwin & Park, 2004; Carver, 1998; Newth & Delgonis, 2004; Rosenberger et al., 2004; Scheier, Carver, & Bridges, 1994; Stein & Rotheram-Borus, 2004; Strack, Schwarz, & Gschneidinger, 1985). Optimism is associated with better physical health outcomes (Rasmussen, Scheier, & Greenhouse, 2009) and buffers against the negative impact of stress (Howell, Kern, & Lyubomirsky, 2007).

To determine the extent to which the PCH design enhanced optimism, it was assessed using the 10-item Revised Life Orientation Test (Scheier, Carver, & Bridges, 1994). The optimism score was calculated by summing the 6 target items rated on a 5-point scale, with negatively framed items reverse scored prior to summing (0 = strongly disagree to 4 = strongly agree). Staff report increased optimism relative to patients across all sites including the earlier SMOL (staff = 17.17; patients = 16.76) and MHS (staff = 17.91; patients = 13.16) facilities and the new PCH (staff = 16.64; patients = 15.47). Interestingly, the difference in optimism between staff and patients is attenuated at the new PCH relative to the previous MHS facility, suggesting a trend toward enhanced optimism for the mental health patient population at the new PCH facility relative to pretest. Given the vast evidence on psychological and objective health benefits of an optimistic outlook, there has been a growing interest in interventions, including those in the built environment, to promote positive thoughts and experiences to optimize health and well being (Aldwin & Park, 2004; Carver, 1998; Newth & Delgonis, 2004; Rosenberger et al., 2004; Scheier, Carver, & Bridges, 1994; Stein & Rotheram-Borus, 2004; Strack, Schwarz, & Gschneidinger, 1985).

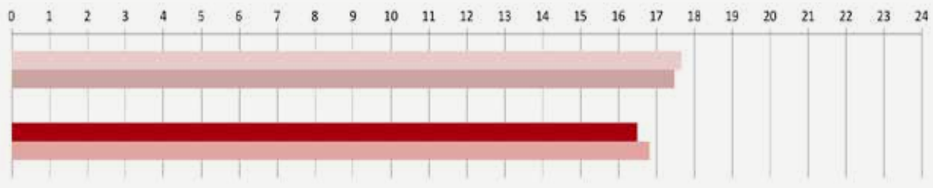
Image: Providence Care Hospital

### Optimism: Patients




Patients: Optimism is greater among complex care rehabilitation patients relative to mental health patients ($p<.05$).

### Optimism: Staff




No statistically significant differences.

**PARTICIPANTS**

- SMOL Patient 37
- MHS Patient 32
- PCH CCR Patient 66
- PCH MH Patient 27
- SMOL Staff 36
- MHS Staff 29
- PCH CCR Staff 68
- PCH MH Staff 39



## Depression

Depressive symptomology was measured using the Center for Epidemiologic Studies Depression (CESD) scale (Andresen et al. 1994). To simplify response options for the patient population under study, the CESD scale was modified from the original 4-point rating to a 5-point rating: 1 = never (0 days), 2 = rarely (1 day), 3 = sometimes (1-2 days), 4 = often (3-4 days), and 5 = always (5-7 days). Scoring was based on the original scale, such that "never" and "rarely" responses were combined. Negatively framed items were scored 0 to 3 (never/rarely to always); whereas, positively framed items were reversed scored (3 to 0). All 10 items were then summed to yield a total depressive symptomology score, with higher scores representing increased depressive symptoms.

Patients report greater depressive symptoms relative to staff across all sites including the earlier SMOL (staff = 5.32; patients = 6.58) and MHS (staff = 5.90; patients = 12.32) facilities and the new PCH (staff = 5.63; patients = 7.73).

When we compare the depressive symptoms of patients only, the pattern wherein mental health patients report greater depressive symptoms than complex care rehabilitation patients holds. However, the difference is somewhat attenuated at the new PCH (PCH MH patients = 10.70; PCH CCR patients =6.71).

At the new PCH relative to SMOL and MHS a positive trend wherein a decline of depressive symptomology is most pronounced among the mental health patient population. Further analyses indicate that a stronger sense of connection at the new PCH is responsible for the attenuation of depressive symptomology (see the analyses pertaining to The Interaction Between Design Impressions and Well Being Outcomes).

### Depressive Symptoms: Patients


Depressive symptomology is greater among mental health patients relative to complex care rehabilitation patients ($p<.05$).

### Depressive Symptoms: Staff


No statistically significant differences.

**PARTICIPANTS**

- SMOL Patient 37
- MHS Patient 32
- PCH CCR Patient 66
- PCH MH Patient 27
- SMOL Staff 36
- MHS Staff 29
- PCH CCR Staff 68
- PCH MH Staff 38

## Stigma

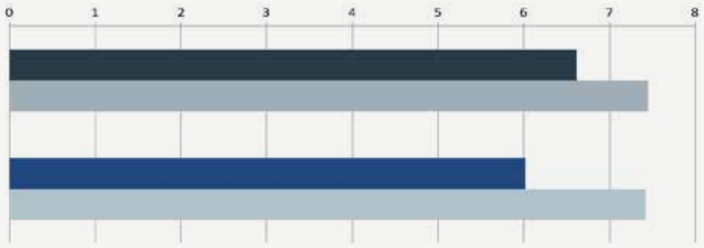
One of the overarching design intentions for the new PCH was to decrease stigma. An established measure of stigma was adapted for its application / generalizability to both mental health and physical health conditions. Participants were asked to rate the extent to which they agreed with various statements relating to one's perspective on life and their decision making process. (1 =strongly disagree and 9 = strongly agree; higher scores are more positive attitudes and, therefore, decreased stigma).

Overall, staff reveal greater stigma towards those with health conditions relative to patients across all sites including the earlier SMOL (staff =6.95; patients = 7.45) and MHS (staff = 6.57; patients = 6.62) facilities and the new PCH (staff = 6.93; patients = 7.03). Interestingly, the difference in stigma between staff and patients is attenuated at the new PCH relative to SMOL, suggesting a trend toward decreased stigma among staff at the new PCH facility relative to pretest.

When we compare patient populations across sites, mental health patients express greater stigma towards those with health conditions relative to complex care rehabilitation patients at pretest (SMOL = 7.45; MHS = 6.62) and the new PCH (CCR = 7.42; MH = 6.02).

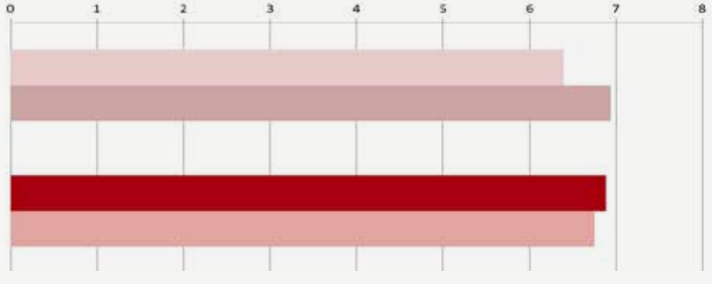
Interestingly, whereas staff at the previous MHS show increased stigma towards those with mental or physical health conditions (6.57) relative to staff at SMOL (6.95), the difference is minimized at the new PCH (CCR staff = 6.75; MH staff = 6.88).

### Stigma: Patients




Mental health patients report having greater stigma towards those with health conditions relative to complex care rehabilitation patients.

### Stigma: Staff




Complex care rehabilitation staff report having less stigma towards those with health conditions at pretest relative to posttest; marginally significant.

**PARTICIPANTS**

- SMOL Patient 38
- PCH CCR Patient 66
- SMOL Staff 36
- PCH CCR Staff 71
- MHS Patient 33
- PCH MH Patient 27
- MHS Staff 29
- PCH MH Staff 39



## Collaboration and Workplace Well Being

Advances in modern medicine have led to the creation of a patient population that is living longer and with multiple health conditions. The patient population at PCH is an excellent example of this new reality, both mental health and complex care rehabilitation patients are diagnosed with having multiple health conditions. The response is a care plan that is rooted in teamwork and interprofessional collaboration.

To assess whether hospital design enhanced opportunities for interprofessional collaboration, 8 adapted items were selected from the Attitudes Towards Health Care Teams Scale (Heinemann, Schmitt, Farrell, & Brallier, 1999): team meetings, communication among staff from different professional backgrounds, opportunities for interaction among staff, opportunities for interaction among patients and visitors, contact with practitioners, contact with patients, contact with visitors, and opportunities for professional development. Items were rated on a 5-point scale (1 = not at all to 5 = extremely well) and averaged together to form an overall index.

The interprofessional collaboration composite score is highest at the new PCH (PCH staff = 3.40) relative to SMOL (SMOL staff = 3.10) and MHS (MHS staff = 3.26).

One would have expected or hoped for a more significant change for staff in the new hospital; however, there were few differences across the three sites. The differences that were documented were generally positive, although, perhaps not to the extent to which they are considered significantly relevant.

Image: Providence Care Hospital

### Workplace Interactions

| | SMOL | MHS | PCH |
|---|---|---|---|
| Team Meetings* | 3.12 | 3.49 | 3.75 |
| Communication among staff from different professional backgrounds | 2.95 | 3.33 | 3.37 |
| Opportunities for interaction among staff | 3.11 | 3.49 | 3.36 |
| Opportunities for interactions among patients and visitors | 3.37 | 3.17 | 3.43 |
| Contact with practitioners | 3.13 | 3.30 | 3.35 |
| Contact with patients | 3.50 | 3.40 | 3.60 |
| Contact with visitors | 3.16 | 3.18 | 3.37 |
| Opportunities for professional development / career advancement* | 2.49 | 2.77 | 2.93 |
| Interprofessional Collaboration Composite Score* | 3.10 | 3.26 | 3.40 |

*The extent to which staff perceive the hospital design fosters interprofessional collaboration is greater at posttest (PCH) relative to pretest (SMOL and MHS).

## Staff Satisfaction

When people speak about their work environment, they tend to refer to the office culture or the team dynamic and fit. The work place design is the common thread that is consistent and present in all of these references. The space that we are in influences our behavior, our ability to work and the quality of the outcome.

For staff, a 15-item satisfaction scale was created (validated in the Bridgepoint Active Healthcare evaluation and subsequent user experience and design evaluation efforts) as a parallel to the patient satisfaction scale. They were informed by ongoing staff concerns, as identified in existing hospital staff satisfaction scales in place at the time of the study. Staff rated the extent to which they were satisfied using a 6-point scale (1 = completely dissatisfied to 6 = completely satisfied) with: interaction with coworkers, resolution of conflict, workload, communication within the organization, communication with supervisors, involvement in decision making, work–life balance, cleanliness of the hospital, timely response by supervisors, safety, treatment with respect and dignity in the workplace, treatment in a culturally appropriate manner in the workplace, workspace, the building, and hospital setting. An overall workplace satisfaction index was calculated using an average rating across these 15 items.

When comparing staff responses from their experience working at MHS and SMOL with the new facility there were only minor differences in staff satisfaction across many attributes. There are however, three areas where satisfaction levels significantly differ.  Staff at the new PCH are less satisfied with how the design contributes to interacting with coworkers relative to the previous SMOL and MHS facilities (PCH staff = 4.05; SMOL staff = 4.71; MHS staff = 4.56).

Staff at the new PCH also feel less satisfied with their workload - they believe that their workload has increased at the new facility (PCH staff = 3.59; SMOL = 3.90; MHS = 4.04). On a positive note, staff are much more satisfied with new PCH surroundings relative to their experience at SMOL and MHS (PCH staff = 4.64; SMOL = 4.04; MHS = 4.05).

The likelihood of recommending the hospital to others, a behavioroid measure of satisfaction, was assessed with 3 items: If someone I care about required care, I would recommend the hospital; If I had a negative experience at the hospital I would tell someone about it; Given the option I would take a job at another hospital. All items were rated on 5-point scale: 1 = definitely not, 2 = probably not, 3 = I am not sure, 4 = probably, and 5 = definitely yes. Items were reverse scored prior to analysis wherein higher numbers reflect greater satisfaction.

Positively, staff show no hesitation in recommending PCH to a friend or loved one who required care. Surprisingly, there were no significant changes in how the design impacted their desire to accept employment elsewhere.

## Workplace Burnout

Staff were asked about the extent to which the PCH design impacts their workplace health and well being using the established Maslach Burnout Inventory-Revised 22 item survey (Maslach, Jackson, & Leiter, 1996). Items were rated on a 7-point scale: 1 = never, 2 = a few times a year, 3 = once a month or less, 4 = a few times a month, 5 = once a week, 6 = a few times a week, and 7 = every day, and the items were scored based on the original scale (0 = never to 6 = every day). Items were averaged to provide a measure of overall burnout, with positively framed items reversed scored prior to calculating the overall composite score and lower scores indicating burnout.

It was reassuring to learn that staff scores are very high: they can effectively manage problems (5.36), are empathetic with patients (5.17), they feel they are positively influencing people's lives (5.09), and they deal with emotional problems calmly (5.02).

When comparing the pretest and posttest overall burnout scores there are no significant changes (SMOL = 1.53; MHS = 1.58; PCH = 1.53), furthermore, there are no significant changes for the personal accomplishment subscale (SMOL = 40.38; MHS = 38.31; PCH = 40.31) and the emotional exhaustion subscale (SMOL = 20.64; MHS = 21.23; PCH = 21.01).

## Intention to Quit

Intention to quit was assessed on the basis of 4 items on a 7-point scale ranging 1 = never to 7 = everyday: I think of leaving [former hospital or new hospital], I reflect on my reasons for working at [former hospital or new hospital], I regret my decision to join [former hospital or new hospital], and I look for a new job. These items were averaged to index intention to quit.

In all three facilities the staff indicated that they are not looking for a new job and responded probably not when they were asked if they would accept a job at another hospital.

Despite indicating that they are not as satisfied with their workload at PCH, as they were in the previous SMOL and MHS facilities, as noted from the staff satisfaction scale,  their dissatisfaction has not triggered any concerns related to burnout or intention to quit.

## Staff Satisfaction

| ITEM | MHS | SMOL | PCH |
|---|---|---|---|
| Interactions with coworkers | 4.56[a] | 4.71[a] | 4.05 |
| Resolution of conflicts | 3.99 | 3.98 | 3.74 |
| Workload | 4.04[a] | 3.9[a] | 3.59 |
| Communication within the organization | 3.59 | 3.4 | 3.44 |
| Communication with my supervisor | 4.51 | 4.24 | 4.18 |
| My involvement in decision making | 3.92 | 3.63 | 3.55 |
| Work-life balance | 3.98 | 4.19 | 3.85 |
| Cleanliness of the hospital | 4.35 | 3.82 | 4.49[b] |
| Timely response by supervisors | 4.26 | 4.08 | 4.14 |
| Safety | 4.21 | 4.31 | 4.36 |
| That I am treated with respect and dignity in the workplace | 4.29 | 4.19 | 4.17 |
| That I am treated in a culturally appropriate manner in the workplace | 4.86 | 4.88 | 4.72 |
| My workspace | 4.36 | 3.88 | 3.91 |
| The building | 3.52 | 3.71 | 4.1[b] |
| The setting/hospital surroundings | 4.05 | 4.04 | 4.64[b] |
| The patient room (i.e., how you can carry out your work functions in it, how it is equipped, how it meets your needs to care for the patient) | N/A | N/A | 4.04 |
| **Staff Satisfaction** | **4.17** | **4.06** | **4.06** |

The following statistically significant differences were observed (p<.05):
a. Staff satisfaction is greater at pretest (SMOL and MHS) relative to posttest (PCH).
b. Staff satisfaction is greater at posttest (PCH) relative to pretest (SMOL and MHS).

## Patient Satisfaction

Each of PCH's overall design intentions revolved around the patient. A customized 19-item patient satisfaction scale was developed by Malik, Alvaro, Kuluski, and Wilkinson (2016). Based on a literature review (e.g., Beach et al., 2005; Hocking, Weightman, Smith, Gibbs, & Sherrard, 2013; Kuluski et al., 2013; Martin, 2014; Ulrich et al., 2004), satisfaction was assessed on five domains: information (information provided when you first arrived at the hospital, explanation by care providers, involvement in decision making, and information about what to expect when you leave the hospital), care (by physicians, nurses, therapists, social and recreational care providers, and treatment and services to address your medical and physical needs), quality and safety (explanation of medications, cleanliness of the hospital, timeliness of response by staff, and safety), patient centeredness (respectful treatment, care received in an acknowledging, and respectful manner), and the healing environment / facility design (the patient room, the building, and hospital setting, that the hospital provided opportunities to move around as might be experienced outside of the hospital). All items were rated on a 6-point scale (1 = completely dissatisfied to 6 = completely satisfied). An overall satisfaction index was created by averaging the 19 items.

The composite scores for the five clusters clearly demonstrate that patients at the new PCH are very satisfied with how the design of the hospital influences their experience as all the scores hover around 5. From lowest to highest, patient satisfaction is as follows: general information they receive (PCH patients = 4.58), quality and safety (PCH patients = 4.98), care delivery (PCH patients = 4.99), healing environment (PCH patients = 5.09) and patient centredness (PCH patients = 5.11).

Image: Providence Care Hospital

All of the composite scores from the new hospital are higher than the same five clusters from MHS, general information they receive (MHS patients = 4.42), quality and safety (MHS patients = 4.63), care delivery (MHS patients = 4.76), healing environment (MHS patients = 4.27) and patient centredness (MHS patients = 4.92).

Similar to staff, patients were asked about the likelihood of their recommending the hospital to others, a behavioroid measure of satisfaction on four comparable items: If someone I care about required care I would recommend the hospital; If I required care in the future, I would come to the hospital; If I had a negative experience at the hospital I would tell someone about it; Given the option I would travel to another hospital instead of returning to this hospital. All items were rated on 5-point scale: 1 = definitely not, 2 = probably not, 3 = I am not sure, 4 = probably, and 5 = definitely yes.

When comparing the patient populations at the new PCH, complex care rehabilitation scores are more positive than mental health patients. When asked about recommending PCH to a friend or loved one the complex care rehabilitation score is 4.64, in contrast, the mental health patient score is 3.93. The results for the other two questions are; if I required care in the future, I would come to PCH (CCR = 4.65; MH = 3.89) and given the option, I would travel to another hospital (no matter how far), instead of going to PCH (CCR = 1.80; MH =2.30). The fourth finding referring to telling someone about a negative experience at PCH showed that mental health patients (4.07) are more likely to share a negative experience than complex care rehabilitation patients (3.23).



## Patient Satisfaction

| ITEM | MHS | SMOL | PCH |
|---|---|---|---|
| **Information[a]** | **4.42** | **4.92** | **4.58** |
| Information provided when you first arrived at the hospital[a] | 4.27 | 4.89 | 4.56 |
| Explanation by care providers in a way that you could understand, while in hospital | 4.82[b] | 5.28 | 5.01[a] |
| Your involvement in decision-making about your care, while in hospital[a] | 4.58 | 5 | 4.69 |
| Information about what to expect when you leave the hospital[a] | 4 | 4.5 | 4.06 |
| **Care[a]** | **4.76** | **5.34** | **4.99** |
| Care provided by physicians[a] | 4.7 | 5.43 | 5.06 |
| Care provided by nurses[a] | 4.87[b] | 5.49 | 5.05 |
| Care provided by therapists (e.g., physical therapists, occupational therapists, speech therapists)[a] | 4.76 | 5.54 | 5.27 |
| Care provided by social and recreational care providers (e.g., spiritual care, recreation therapy, social work, support groups) | 4.97 | 4.89 | 4.71 |
| Treatment and services to address your medical and physical needs (e.g., diagnostic procedures and medical rehab interventions)[a] | 4.48 | 5.3 | 4.85 |
| **Quality and Safety[a]** | **4.63** | **5.01** | **4.98** |
| The explanation of medications, including the potential side effects[a] | 4.47 | 4.86 | 4.48 |
| The cleanliness of the hospital[a] | 4.56 | 4.92 | 5.4[c] |
| Timeliness of response by staff when you needed them | 4.71[b] | 4.81 | 4.78[a] |
| Your safety[a] | 4.81 | 5.39 | 5.27 |
| **Patient Centeredness** | **4.92** | **5.28** | **5.11[a]** |
| That you were treated with respect | 4.81 | 5.24 | 5.16[a] |
| That you received care in an acknowledging and respectful manner | 5[b] | 5.32 | 5.06[a] |
| **The Healing Environment[a]** | **4.27** | **4.97** | **5.09** |
| Patient room (i.e., how you function in it, how it is equipped, how it meets your needs) | 4.36 | 4.77 | 5.15[ad] |
| The building (i.e., the overall feel, ease of navigation, equipped properly)[a] | 4.06 | 5.22 | 5.12 |
| The setting/hospital surroundings[a] | 4.44 | 4.94 | 5.47[c] |
| That the hospital provided opportunities to practice moving around in ways that are like what you might experience outside of the hospital | 4.42 | 4.92 | 4.6[c] |

The following statistically significant differences were observed ($p<.05$):
a. Patient satisfaction is greater among complex care rehabilitation patients relative to mental health patients.
b. Patient satisfaction is greater among mental health patients at pretest (MSH) relative to posttest (PCH).
c. Patient satisfaction is greater at posttest (PCH) relative to pretest (SMOL and MHS).
d. Patient satisfaction is greater at posttest (PCH) relative to pretest (SMOL) for complex care rehabilitation patients only.

# The Interaction Between Design Impressions and Well Being Outcomes

The World Health Organization (WHO) includes the built environment as a key determinant of health. As Canada grapples with an aging population and a heightened need to address complex care, rehabilitation and mental health, evidence on the impact of design on psychosocial health, well being and health outcomes becomes increasingly important to interventions in the built environment.

The concepts of psychosocial health and well being are integral to the design of the new PCH. To this end, our analyses examining the moderating role of impressions on well being revealed an interesting pattern of results. In circumstances where the design intentions resonated with participants – both patients and staff – more favourable outcomes were detected at the new PCH relative to the previous SMOL and MHS facilities as described below.

## Impressions Mitigate Perceived Travel Distance and Wayfinding Challenges Among Patients and Staff

Patients and staff with favorable impressions of the building design (across all attributes including a place of wellness, safe, inspiring, and hopeful) expressed decreased concerns over distances and decreased challenges in wayfinding at the new PCH relative to the previous SMOL and MHS facilities.

## Impressions of Social Spaces Predict Self Efficacy in Mobility and Coping Among Patients

Interestingly, relative to the former sites, favourable impressions of social spaces at the new PCH including the cafeteria, dining rooms, outdoor terraces, courtyards, worship centre, and visiting lounges are predictive of patients' self-efficacy in mobility as well as their perceived ability to cope with health conditions.

## Sense of Connection Predicts Coping, Optimism Satisfaction and Mitigates Depression, and Stigma Among Patients

A strong sense of connection (in particular a connection to nature, community and others) predicts patients' perceived ability to cope with health conditions, optimism and satisfaction. Note, a similar effect on patient satisfaction was observed at the previous SMOL facility; however, patient satisfaction was primarily predicted by sense of connection to others and to community at SMOL. Most noteworthy, a strong sense of connection mitigates depressive symptomology and stigma among patients at the new PCH relative to the previous SMOL and MHS facilities.

## Impressions of Social Spaces Mitigate Perceived Travel Distance, Wayfinding Challenges and Predict Workplace Satisfaction Among Staff

A similar pattern emerges when we examine the impact of favourable impressions of the building design and user experience of specific spaces on staff well being related outcomes. Staff who express favourable impressions of social spaces at the new PCH - including the cafeteria, dining rooms, outdoor terraces, courtyards, worship centre, exterior entrance, lobby, work area and visiting lounges, report less concerns about travel distance, decreased challenges in wayfinding, increased workplace satisfaction relative to staff at the previous SMOL and MHS facilities.

## Inspiring, Safe and Hopeful Design Fosters Connection to Others and Mitigates Burnout Among Staff

Staff who view the new PCH design as inspiring, safe and hopeful as well as staff who feel that the new PCH design fosters a stronger connection to others relative to the previous SMOL and MHS facilities report decreased burnout and decreased intention to quit.

## Sense of Connection Mitigates Perceived Travel Distance, Wayfinding Challenges, Stigma, Burnout and Predicts Collaboration, and Workplace Satisfaction

A strong sense of connection (in particular a connection to nature, community and others) is predictive of decreased concerns about travel distance, decreased challenges in wayfinding, decreased stigma, enhanced interprofessional collaboration, workplace satisfaction, decreased burnout, and decreased intention to quit.

## Establishing Cause and Effect

Taken together, we can confidently conclude that favourable impressions, and sense of connection moderate the effect of the PCH design on outcomes as described above for various indicators of user experience and well being. Unique to the PCH design evaluation, favourable impressions and experience of the social spaces appear to enhance confidence and coping ability - a truly remarkable finding - one anticipated by the architects as evident in the design intentions but also predicted by the coping literature presented earlier. The observed effect is particularly consistent with current trends towards "social prescriptions" to mitigate the effects of isolation (Alvaro, in prep).

In addition to existing Z8000 healthcare facility design standards developed by the Canadian Standards Association, a new standard for design research and design evaluation is in development. The forthcoming standard will eventually lead to mandated guidelines for the inclusion of design research and design evaluation for all major healthcare facility redevelopment projects.

There is mounting evidence both in the published research spanning architecture, public health, psychology and urban design as well as data that Methologica has amassed over the course of our engagement with interdisciplinary design teams that attests to the impact of design on well being and health outcomes (see the references authored by the Methologica team at the end of this document).

Importantly, as described herein, the impact of architecture and/or design on outcomes is indirect. Design affects subjective experiences, psychological variables, behaviours and physiology. These moderating or intervening variables are the mechanism by which architecture and, design more broadly, exerts its influence on outcomes. As such, it is our recommendation that all healthcare design research and design evaluation efforts include the measurement of potential moderating variables to enhance efforts to assess the impact on well being and health outcomes. Properly implemented, evidence based guidelines have the potential to enhance the healthcare environment.

Recent measurement standards for commercial and institutional buildings, like the WELL Building Standard, further attest to the importance of seemingly "fuzzy" concepts to healthcare facility design as well as measuring the resulting impact on well being outcomes. The data presented herein, and corroborated in other design evaluation efforts, offer a business case for improving the character, beauty and experiential quality of our built environment (see Atkinson, 2016).

# The Link Between Architectural Design and Tangible Outcomes: The Role of Fuzzy Concepts

# Hospital Administrative Outcomes Pre and Post Redevelopment

Administrative data between April 2016 to November 2018 were retrieved from PCH to examine whether there were any changes in hospital metrics, such as number of clinic visits and infection control, before and after patients moved to the new building in April 2017. For comparison purposes, data from the fiscal year 2016/17 (April 2016 to March 2017) were used as baseline, and data between April 2017 to November 2018 were considered post-redevelopment measures.

### Length of Stay and Wait Times

In comparison to 2016/17, there was an overall increase of the number of patient days for inpatients after moving to the new site, with the most changes observed in complex care rehabilitation patients. In addition, inpatients on average experienced longer wait times after the redevelopment than in the prior fiscal year. Increased wait time was most noticeable in services such as short term palliative care, seniors rehabilitative care, respiratory rehabilitation, adult mental health, and restorative rehabilitative care.

### Clinic Visits

For outpatients, there was a sharp decrease of clinic visit registrations after the move to the new site in comparison to the fiscal year 2016/17, particularly in visits to the mood disorder clinics and telemedicine. On the other hand, visit registrations for diagnostics and therapeutic services increased after redevelopment. In particular, there was substantial increase in transmagnetic stimulation visits.

### Medication and Behavioral Incidents

Relative to the fiscal year 2016/17, there was a general reduction in reported medication incidents in 2017/18 after redevelopment. In mental health services, there were also slight decreases in the use of restraints (e.g., physical/manual restraints), as well as reduction of incidents of aggressive behaviours after redevelopment. Number of patient falls varied greatly month to month during the observed period, and hence it is not clear whether number of falls changed after the redevelopment of the site.

### Infection Rates

In terms of infection rates, there was no substantial change in the nosocomial rates of Clostridium difficile, Staphylococcus aureus, and Vancomycin Resistant Enterococcus infections before and after moving to the new hospital building. All infection rates were below LHIN's target for 2017.

## Limitations

The trends discussed in this section are descriptive and are not based on statistical testing. Although there are changes in several hospital metrics before and after the hospital was redeveloped, it should be mindful that other factors could also contribute to changes in these rates. Nevertheless, the above trends could provide a richer context related to the happenings in the PCH during the redevelopment.

## Future Considerations

Experience has revealed that the database measures vary in quality and type across facilities and they do not lend well to interpretation with the bespoke user experience and design evaluation framework, unless they can be linked to participant survey data via patient charts or other approaches. Moreover, it is assumed that capacity exists at the healthcare facilities to identify relevant measures from existing data sources and examine any changes in these measures pre and post redevelopment.

To enhance the value of the user experience and design evaluation experts should be granted access to de-identified patient and staff data. Whereas the added step requires time, if data is de-identified but matched to participants without revealing their identity it does not violate privacy restrictions and conditions for access to administrative data are easily covered in a privacy/confidentiality agreement as per ethical conduct of research, including user experience and design evaluations.

Image: Providence Care Hospital

# 9. Design Recommendations

Image: Melanie Elliott

## From Design to Reality

The synthesis of data generated over the course of the mixed methods PCH user experience and design evaluation - including naturalistic observation, moving interviews, quantitative surveys and a comparison of administrative data - before and after the redevelopment can be categorized according to three design themes: Creating a Sense of Place, Optimizing Social Interaction and Well Being, and Adapting for Future Flexibility.

### Design Theme 1: Creating a Sense of Place

*"Your home will make your life happy"* (Frank Lloyd Wright, letter to a client). As an extension of this concept, creating a homelike environment (not necessarily literal), enhancing a sense of connection to community, vibrant neighbourhoods and placemaking contribute to psychosocial well being and health - as cited by the evidence on the social determinants of health (World Health Organization) and a plethora of interdisciplinary publications. Several aspects of the PCH design were found to enhance the sense of place, the relationship between spaces and the fluidity between various destinations. In a building of this scale and particularly for the PCH patient population, both on and off unit destinations become important. The following are recommendations on how to enhance, exaggerate and support a design that aims to create a sense of place.

**Consider Building Height:** Minimizing the building height was important on many fronts. It was determined that a two story building was the appropriate size where the height and massing would be a suitable balance for the cultural heritage of the site and the surrounding properties. Furthermore, it complemented the strategy of establishing connections to nature, exposure to natural light, promoting transition and recovery as well as normalization. A low rise healthcare facility was seen to be more aligned with Kingston neighbourhoods and supported the homelike and community philosophy that the design was meant to achieve.

**Personalization of Patient Rooms:** Admittance to the hospital is a critical time for patients. At this time, they are required to adjust to their new identity of being a patient, this often coincides with new limitations and changes in their sense of self, their confidence and self-efficacy. In addition to these internal struggles, patients are expected to become accustomed to their new physical surroundings.

As one can imagine this is an extremely overwhelming time. For many patients, it can last from months to years and often the initial anxiety and discomfort never goes away.

To ease this transition, we recommend allowing patients to personalize their rooms with pictures for the wall, desktop trinkets, and other items that remind them of home. With that being said, it is important to understand the balance between creating a comfortable and welcoming environment that fosters autonomy and thus improves overall health, while at the same time preventing the hospital from becoming a destination where patients don't want to leave. Therefore, distinguishing between short-term and long-term (those who may never leave) patients and allowing the latter to make small customizations to their rooms may make them feel more comfortable and improve their well being.

**Intentional Placement of Patients:** At home we all have our favourite spots, it could be the balcony, den, or solarium, PCH is designed with many beautiful spaces and access to many meaningful views. In light of the data emerging from the PCH user experience and design evaluation, patients and staff should be taking advantage of the experiences resulting from these areas. Currently, many patients are being placed in areas out of convenience for staff instead of utilizing spaces like the sunrooms where patients can have views of the lake, park, heritage buildings and the animation surrounding them. This also provides an opportunity to socialize with other patients and visitors. If patients need to be continuously supervised there is a solution to balancing supervision and utilizing space that is designed to enhance their experience and overall well being. Healthcare providers can increase their use of mobile work stations, with this modification in staff behaviour, they can accommodate the placement of patients in spaces further from the central nursing station, be just as productive and maintain visuals on patients.

**Additional Furniture:** Whether it is an area rug, armchair or a table, in every home furniture has a way of defining a room. To increase use, PCH needs to add a variety of new furniture to the sunrooms, outdoor patios, and porches. Some of the sunrooms could benefit from a higher table, this would make the room more usable allowing staff to conduct patient meetings or take phone calls in this space.

Apart from the Limestone Terrace, the outdoor patios need protection from the sun. Therefore, adding umbrellas or other shaded furniture will help encourage patients and staff to use these spaces on warmer days. Lastly, many of the porches don't have any furniture at all. The perception of patients and visitors is that the porches are unwelcoming and are not considered as a usable space. Adding a variety of comfortable seating and table options to the porches should help increase their use.

## Design Theme 2: Optimizing Social Interaction and Well Being

Humans are social beings (Aronson, 2004; Whyte, 1980). There is mounting evidence on social isolation in general but particularly among seniors and vulnerable populations – especially for those in complex care and mental health facilities. Studies show that vibrant neighbourhoods and community building can enhance well being – physically and psychologically. In fact, it is now common practice for physicians to administer "social prescriptions" to promote health (Alvaro, in preparation).

Healthcare facility design is increasingly focused on enhancing the human condition and fostering greater well being – psychologically, socially, spiritually and physically. Conceptualizations of the hospital of the future are an homage to the healthcare facilities of the past (Atkinson et al., 2016) with greater access to nature and the outdoors, opportunities for social interaction, and attention to the human spirit as much as to the restorative, physical, clinical and advances in medical healing. The most notable exemplar healthcare facility design, with documented evidence of its benefit to well being and health outcomes, is Bridgepoint Active Healthcare, (see references by Alvaro and colleagues).

Inherent in the PCH design was particular consideration to how the site could foster comingling among the distinct patient populations and the staff who provide their care. Here are some concepts on how to optimize social interaction and well being.

**Social Dining:** The creative challenge to designing a multigenerational space is the ability to foresee the needs of future generations and how their unique context and characteristics might shape essential design requirements for their experience of a hospital setting. Previous generations were predictable with their dining habits, households had dining rooms, schools had cafeterias and shopping malls had food courts. Millennials are more familiar with the current trend towards food halls and meal delivery services such as "Uber Eats".

Future hospital designs need to factor in cultural habits that are evolving to the point where a plethora of variety is a standard either in the physical form of a food hall that consists of multiple food vendors or in a virtual world where users order their meals via a food delivery app. New delivery services no longer need a fixed address, they can deliver your meal to a park using GPS. This cultural shift is not only about food consumption but a

> "The other thing they wanted to do with this space down here is because they took the fence down between us and Lake Ontario Park next door, they wanted it to be kind of seamless and that people would feel comfortable coming in and my offices are on the ground floor and you see out and you do see people coming in."



## 1928: Patients Enjoy Sailing and Social Activities

Image: Providence Care Hospital Archives Caption: Providence Care Hospital, Communications

Dr. C.K. Clarke and Dr. W. Metcalfe adpted the "hospital model of care" at Rockwood. This model of care was considered a progressive alternative to the asylum system. The two oversaw the transition of Rockwood from a place of incarceration, to one of recovery. As part of the care provided, clients could participate in social activities.

reflection of how our social dining experience is shifting towards being able to eat anywhere, with anyone and everyone, at any time. With these changing dynamics, we need to question the future role of cafeterias, dining rooms and retail zones in hospital settings.

**Balance of Private and Communal Spaces:** Most well designed neighbourhoods have a greenspace or a park, a cafe and/or farmer's markets, all of which are places to promote interaction with neighbours and foster a sense of community. With the addition of 100% private patient rooms, designing for aesthetically pleasing, welcoming, and functioning communal spaces both on and off unit becomes even more important.

Private rooms can make it a challenge to motivate patients (especially those who are paranoid or anxious) to socialize and explore other areas of the hospital. Visitors and caregivers of patients are also missing opportunities to socialize with other family members who are going through the same experience. These points of connection used to naturally occur in wardrooms but now that patients are isolated in private rooms family and friends must go looking for other places to engage and socialize during their visits.

Currently at PCH, many of the communal spaces (dining room, patios, café, cafeteria) are unwelcoming, under-furnished, too small or too far away. Patients are looking for places where they feel included and a sense of belonging without "being in the way".

This can be achieved by purposefully designing third places (i.e., favourite places) and threshold zones (e.g., spaces adjacent to patient rooms or destinations – space just inside or outside of these places).

Threshold zones become significant spaces where patients linger, are given permission to spend time, maintain a sense of engagement in life, and search out social interaction. Similarly, third places (places outside of patient rooms and "work" / therapy spaces) provide patients and staff with the opportunity to both sit back and observe others or to participate in social interactions and activities.

One of the most common third places for older adults and in hospital settings are the retail spaces, such as the cafés. We suggest the creation and purposeful placement of more threshold zones and third places that are dedicated observation spaces with the option for patients and staff to engage if and when they choose to.

**Community Engagement:** If they are not going for treatment or visiting someone who is, what would motivate someone to frequent a hospital? It appears that a beautiful emerald green park is one reason. As previously discussed in the moving interview section, the continuous flow from the park to the hospital and back has created an environment where patients, staff, and community interact.

Image: Providence Care Hospital



There are dog-walkers, joggers, bike riders, basketball players, kids in summer camp, staff on break, and attendees at a hospital picnic all using and sharing the same space.

The best example at PCH of community engagement is the blurred boundaries and the seamless transition from hospital to public property. The integration of the hospital's green space with the Waterfront Pathway and Lake Ontario Park is a prime example of how to foster a sense of community.

This integration not only provides positive effects on patients and maintains their connection to nature, community and others, it also helps reduce the stigma surrounding mental health. Healthcare facilities see the value of community use and Methologica has seen many invest in programming to drive community use of hospital space, where for example the therapy pool is used after hours for swimming lessons. PCH has a couple of small scale outdoor basketball courts that are being used sporadically.

In lieu of having a collection of small scale courts, considerations should be given for the inclusion of a full sized court that can be used by local Kingston basketball leagues. There is ample room to accommodate this idea. A full court would not only drive community use, enhance animation but also provide entertainment and activity for patients.

Community users add density and animation to the hospital environment, support on site retail stakeholders and help patients and staff maintain their connection to others. It is paramount that future hospital designs find innovative ways to encourage, sustain and support community use.

## Design Theme 3: Adapting for Future Flexibility

What was once a standard approach to treating a patient is no longer the norm. Advances in modern medicine, new technologies and new discoveries have all played a part in transforming the treatment plan. These changes were inspired by evidence based decision making, and have also influenced the design of hospitals, with the most obvious example being a shift from ward rooms to private patient rooms.

Whereas hospital administrative data such as slips and falls, infection rates and length of stay unquestionably contributed to these changes, new data being collected through a series of user experience and design evaluations across multiple facilities should also be considered as evidence for change. This section provides some insights on how to prepare for future flexibility.

**Welcoming Patients to the Hospital:** Entering an unknown space can be intimidating for anyone. Combine that with the fear of a new diagnosis and the feelings can be overwhelming. For patients and families the admissions process is an exercise in prioritizing. Information deemed essential is identified and retained while less important matters are placed on the backburner. This includes awareness of their surroundings and hospital amenities. It is recommended that the Hospital Handbook be reintroduced to patients and families a few days after their admission. Part of the reintroduction could include a tour led by a volunteer. The tour would also assist with awareness and wayfinding, two areas that need improvement at PCH. These first steps in an individual's hospital experience are critical to making them feel welcome, cared for, and respected.

Image: Providence Care Hospital

**Consider Distance:** When amalgamating two sites into one, a primary consideration must be the size of the new building. Naturally, the new site had to increase in square footage to accommodate both patient and staff populations under one roof. However, the placement and proximity of amenities to units and departments needs to be effective and efficient.

Just because the new building has all the requested amenities doesn't mean that they will be used. If they are too far from patients or visitors making it difficult or impossible, especially for those with mobility devices, to reach them they will go underused or not used at all. Better use of these distances would be to provide seating or additional break spaces in the long corridors, as for many, especially those with ill health, these distances are intimidating and exhausting. Special consideration should be given to the placement of offices for those who work hospital-wide positions, as they are often expected to be moving throughout the building on a typical day.

Challenging the Status Quo: Future hospital designs need to challenge the status quo. It is impossible to innovate if the tradition of including certain spaces or services continues because they have always been featured in a hospital design. For example, data from multiple user experience and design evaluations is showing a trend of decreased use of on unit patient visiting areas.

As more and more hospitals opt for full private patient rooms one can conclude that this trend will be further entrenched. It becomes our responsibility to ask what role if any does a patient visiting area play in future hospital designs? Can that space be allocated to augment a different area or service? Or from a cost savings perspective would it be prudent to eliminate the space and reduce the overall footprint?

**Flexible Design for Multipurpose Space:** Consistent with all hospital redevelopments, space is finite. Everyone involved in the design process is challenged to develop a robust plan where the hospital layout, programs and geographic footprint are all defined by certain parameters. When space is limited a flexible design can allow for a better use of space.

Flexible design can be described as achieving multipurpose use of a space through the malleability of its design. The ultimate goal would be to create a space that is multidimensional.

The patient dining rooms are prominent examples of flexible design. The programming in the morning has nothing to do with food, it is recreational therapy or other group sessions. Afternoon programming can include socials such as tea and talk, group trivia and music presentations. Despite being called the dining room, food service only occurs at lunch and dinner, and food consumption plays only a small role in the overall activity of what occurs in this space.

Founders' Hall is another example of flexible design. It is an open space with natural light and views to the surrounding area. The potential of this hall is only limited by the user's imagination. Staff take full advantage of hosting meetings, information sessions and social gatherings in the hall.

The design of a multipurpose space is traditionally simple, the success and use is reliant on the creativity of hospital staff on what they envision for the space and the support from leadership to make that happen. Moving forward for future hospital designs, architects should examine underused spaces and consolidate those services into one multipurpose room. This approach will save costs, create one vibrant animated space and free up opportunities to further invest or enhance other spaces with proven success.

Another example of decreased use across projects is the spiritual areas. Even though society is now more secular than in previous generations it may be considered an overstep to entirely remove these spiritual care spaces. However, a calculated response could be to avoid duplication and have one space devoted to spiritual fulfilment.

> "All these classrooms can be used for training and at Christmas they had a tea in here [with] the volunteers then they had a big gathering so yah. It's a great space. I think I did yoga in here one time for something, they did a fundraiser. So it's just a big open space."



A strong argument can be made that the worship centre and the meditation room at PCH are redundancies. Future sites should consider one multifaith space that is smaller and more intimate. For larger gatherings a flexible design space such as Founders' Hall could be transformed to host Sunday mass or Friday prayer.

**Technology:** With the advanced pace of technology is it encouraging that PCH has incorporated its use throughout the facility and created a framework that would allow for its expanded use. Large digital screens are prevalent on the main floor and in high traffic areas, while smaller screens are inside and immediately outside patient rooms. The hardware is already in place and we encourage PCH to develop a plan that includes software investments that can leverage the existing infrastructure to enhance the user experience.

**Expanding Technology in Patient Rooms:** Technology in patient rooms is an amenity that contributes to a multigenerational dynamic. While the baby boomer generation may not be too accustomed to use technology, it is fully embedded in younger generations and would be impossible to imagine life without it. The screens inside and outside patient rooms provide a foundation from which to build on and could lead to the introduction of smart boards that are currently used in schools. The terminals in the patient room could have the added feature of determining when it might be most suitable to partake in an activity on unit, visit destinations throughout the hospital or, weather permitting, take advantage of the outdoor courtyards, gardens and pathways.

Patients often feel a decreased sense of control when faced with a complex chronic illness (Kuluski et al., 2013). The simple ability to control their environment - including lights, window screens and temperature settings with their touchscreen can reassert their sense of control, independence and confidence.

Outside the room over and above its current use of displaying generic hospital information or infection prevention and control notifications (e.g., when it is mandatory to wear a mask and gown when entering the room), PCH leadership needs to explore what else can be done with this resource. The screens outside the patient room offer an opportunity to display the patient's schedule - including any special appointments or treatments, rehabilitative physical therapy, occupational therapy, social activity, medication and meal schedules. Furthermore, they can be programmed to be an active message board, that allows the patient to post their whereabouts when leaving the room with messages as simple as "I've gone to the cafeteria" or "I'm outside watching the kids play basketball".

**Digital Wayfinding:** Hospitals are large, complex spaces used by people who are particularly vulnerable. Often when patients, staff, or visitors are entering a hospital for the first time the experience can be overwhelming. They are unsure of their surroundings, unfamiliar with the nomenclature used on directional signs and it is very probable that they are experiencing abnormally high stress levels. An effective wayfinding strategy will ease these feelings by helping users know where they are, and clearly guide them to where they need to go.

Currently, none of the large digital screens are used for wayfinding. Programmable digital wayfinding screens can be interactive where the user enters their end destination and very similar to Google Maps the digital screen identifies the most efficient route forward. Or it can be a static screen that displays real time information, for example if that digital screen typically provides directional information to the cafeteria but if it is now after hours and the warm food services are now closed the sign could change to say "Cafeteria food service is now closed".

With the advantage of being able to manipulate the content, design and layout, programmable digital signage allows the hospital to control how information is displayed and when it is broadcasted. New hospital redevelopments as well as facilities that are in need of refreshing their wayfinding system should invest in programmable digital screens, the benefits of customization, adaptability and future use should far exceed immediate cost concerns.

# 10. Conclusion & Acknowledgements

## Top Moments of Design

Based on the collective interpretation of data harvested from all methods, naturalistic observation, participant surveys and moving interviews the top moments of design were determined by considering impression scores, frequency of use, and user experience and outcomes. Therefore, the results indicate that the top moments of design are the main entrance area, outdoor pathways and patient rooms.

### Main Entrance

The main entrance is a central feature in the hospital's overall design and a contributing factor for the realization of many of the anticipated outcomes. Over and above being a welcoming and practical space with volunteers and staff ready to assist, the design permits active and passive use, social activity and comingling. It is a point of arrival, transition area and end destination. It also incorporates many subtle wayfinding cues such as unobstructed sightlines. Upon entry users can easily orientate themselves by looking left, right, and up, the open atrium allows for a view to the upper level.

### Outdoor Pathways

An underlying theme that ties several of the design elements together was the ambition to replicate a homelike or neighbourhood feel. Sidewalks and pathways connect neighbours in residential areas, just as they do at PCH. The outdoor pathways provide those crucial connections to Lake Ontario Park, the Waterfront Trail and hospital gardens.

After completing a series of user experience and design evaluations, the Methologica team has discovered an increasing importance of quality outdoor spaces. When done properly outdoor areas will see a diversity of users and a diversity of use. Currently, staff, patients and community are frequenting the outdoor areas for both active and passive use. The effective use of the outdoors is a way for people to comingle, stay connected, expand therapy sessions and reinvigorate oneself. The outdoor pathways are playing an exceptional role in enhancing the user experience and establishing connections to nature and surrounding areas.

### Patient Rooms

It would be expected that scrutiny and curiosity would follow the decision to become the first hospital in Ontario to have all private patient rooms. The pressure to succeed with this change was high and PCH delivered. Impressions of the patient room are high for both patients and staff. Patients enjoy their privacy, the room amenities and the introduction of technology provides a foundation for future adaptation and growth.

The homelike feel, particularly for patients with extended stays, is reinforced by their ability to personalize their room with items from home. The adjacency of the kitchenette also provides some independence where they can store food items and access them on their own. The patient room is such a success that patients are challenging their discharge dates and lobbying for their continued admission.

### Outcomes That Transcend Space

Design aspirations can transcend many spaces throughout the hospital. For example, investments to increase comingling and reduce stigma were made on unit, off unit and in outdoor areas. Selective areas may be more successful than others in achieving these outcomes but overall these aspirational outcomes are materializing. Similarly, the use of windows and natural light is generating, as expected, very positive impressions and outcomes. Windows improve patients' moods; they feel more satisfied and content. Staff also seek out spaces in the hospital with views and natural light and report similar positive benefits: feeling safe, cared for, and happier. Meaningful views and natural light are favourite aspects of the hospital among all users.

Thanks in part to these top moments in design, the human experience at PCH is an increasingly positive one. These moments included clinical and non clinical areas, however, the non clinical spaces have higher impressions, which support the belief that social spaces are drivers to improve the social construction of design. Future hospital designs can no longer consider non clinical spaces as being less important than clinical ones. Achieving that proper balance is instrumental to the realization of the design intentions and anticipated outcomes.

# Policy Considerations

In anticipation that user experience and design evaluations become a standard and a required component of hospital redevelopments it is important to highlight some of the fundamental principles as to who are credible authorities to perform the user experience and design evaluation and what should be included.

Harvesting, analyzing and storing data are all integral steps to performing an ethical, accurate and scientific user experience and design evaluation. In order to guarantee the sanctity of this process, the evaluation team must have proven research experience in methods and measurements, superior data analysis skills, research ethics that are beyond reproach and the human resources capacity to conduct field research over multiple years and multiple sites.

Furthermore, it is essential that the evaluation team is impartial, objective and lacks a vested interest in the outcome. A professional relationship with the architects and the hospital redevelopment team is crucial to understanding the context of care, design intentions and anticipated outcomes. But questions of bias and access to the findings could arise if the evaluation is conducted in house by the architect's or hospital's research team. Ideally, the user experience and design evaluation should be conducted by an independent third party that is not beholden to the architectural firms or hospital.

After discussing who, we can shift the focus to what. Ontario is in the midst of a healthcare infrastructure renaissance, in the past few years new facilities have opened, several are under construction and many more are in the planning stages. The new developments are all responding to societal and health related transformations. With increased frequency populations are migrating to urban and suburban centres. This has triggered expansions of healthcare services in these areas and a consolidation of services in rural and remote areas. Patients in need of complex chronic care and rehabilitation is increasing exponentially, cancer diagnoses are now as high as one in two individuals, and there has been a philosophical change in the approach to treating mental health. All of these are contributing factors explaining why we are building new healthcare facilities and why we are designing them differently.

These new facilities are putting just as much emphasis on design features and elements that fall outside of the clinical and functional programming parameters. Architects and hospital redevelopment teams are including core design features that address concepts such as promoting transition and recovery, increasing privacy, reducing stigma, creating animated concourses, maximizing natural light and connections to nature, simplified wayfinding and enhancing the user experience. These concepts are recognized by the MOHLTC as being essential design requirements.

In recent years the attitude towards research and evaluating redevelopments has progressed from the rudimentary standards of, was the project built on time and on budget, to operational efficiencies and obtaining LEED status. This attitude needs to fully mature and place equal importance to the essential design requirements, listed above, as it does for the traditional clinical and functional requirements. This can be confirmed with their inclusion into the user experience and design evaluation standard that is currently being developed by the Canadian Standard Association (CSA).

As part of the CSA standard it would be prudent to take the next bold step of allowing evaluation teams to anonymously link data back to patients. This would facilitate a higher probability of directly linking health outcomes to design. With each healthcare facility user experience and design evaluation, Methologica has recommended that where possible it would be advantageous to include de-identified patient and administrative data to be linked to the survey data on the basis of matching to variables that do not violate privacy regulations. Recognizing that there are challenges to this approach (e.g., it takes a bit of extra time), our understanding is that West Park Healthcare Centre adopted our suggestion to do this, it was recommended during Methologica's involvement as the Design Evaluation lead on the HOK Planning Design and Compliance team.

# Conclusion

Harmonizing two sites and creating one modern, welcoming and inclusive hospital was an ambitious undertaking. The PCH design needed to fully integrate long-term mental health programs with complex care, rehabilitation and palliative care, the first for a publicly funded hospital in North America. The design intentions were formidable, however the data uncovered that although certain areas of the design are more successful than others, the overall design intentions are producing their anticipated outcomes.

Design elements such as the outdoor courtyards and gardens are playing a remarkable role on numerous fronts. They are key contributors to promoting recovery and transition, enhancing connections to nature and surroundings and creating a healing environment. The seamless integration with Lake Ontario Park and the Waterfront Trail is an extraordinary example of how the blurring of public and hospital boundaries can increase community use and have lasting positive impacts on optimizing the user experience for both patients and staff.

The introduction of all private patient rooms represents a seismic shift in organization, care delivery and philosophy. This design element touches on so many of the design intentions, a private patient room contributes to creating a healing environment, decreasing stigma and promoting recovery and transition. It also is a factor in reinforcing the homelike feel and gives patients some autonomy in an otherwise very rigid and scheduled environment.

This design evaluation identified aspects of the hospital design that are achieving their intended outcomes as well as highlighting areas that are underperforming. Discoveries regardless of being positive or negative are extremely valuable. For only through robust, exhaustive and engaging user experience and design evaluations are we able to understand what works, for whom, and in what context. Knowing what works is equally as important as knowing what did not.

Population health trends are evolving and so too is patient care delivery. Architects, hospital leadership and government funding partners are investing in new hospital designs that address these changing dynamics. Hospitals have become much more than patient rooms, clinical areas and functionality, hospitals are community, places of wellness and a reflection of society. They are also living organisms that over time need to adapt to the changing landscape. User experience and design evaluations help us understand how that adaptation can occur, it confirms what is working, helps optimize underperforming areas and provides a roadmap for future projects. Change is inevitable, but research, knowledge and evidence based decision making give us the tools to shape, manage and affect change.

Image: Tom Arban

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# About the Authors

## Celeste Alvaro, PhD

**Principal Design Research & Evaluation**

Dr. Celeste Alvaro is the Founder and Principal of Methologica, a user experience, design research and evaluation firm that specializes in assessing how the design of the built environment impacts human behavior, social interaction and well being.

As an experimental social psychologist, Celeste provides research and evaluation expertise on architecture teams and leads user experience, design research and the user experience and design evaluation of capital redevelopment projects that extend to a variety of settings.

Celeste's research focuses on the application of well established quantitative and qualitative research and evaluation methods along with measurement techniques in creative ways to understand the direct and indirect effects of the built environment on users.

Celeste's signature creation and execution of scalable design research and evaluation studies begins with establishing and engaging collaborative teams of leading international researchers, architects, designers, and stakeholders then continues with an animated group of field researchers conducting data collection and analysis.

## Melanie Elliott, MA

**Research Associate & Field Coordinator**

Melanie is passionate about community health. She uses place-based methods to understand the user experience and applies that knowledge to improve lives and well being. Her role on the team encompasses participation in early development workshops, liaising with the redevelopment teams and onsite management, preparation of ethics protocols, coordination of in-field researchers and evaluators, administration of both quantitative surveys and qualitative interviews as well as analysis of qualitative data. Melanie is the team lead for the moving interviews. This method combines in-depth interviewing with participant observation wherein the researchers accompany participants on their natural outings and actively explore their physical and social interactions with the built environment by asking questions, listening and observing.

## Deyan Kostovski, AMA

**Communications Strategist**

Deyan is a communications strategist with an expertise in developing knowledge translation campaigns, concept design initiatives and community outreach.  He is active throughout the project opening with stakeholder engagement and visioning sessions, liaising with the infield research teams and concluding by distilling and sharing the findings that are most relevant to the different stakeholders that are involved in the project. Deyan's stakeholder relations skills have been used to manage key relationships with the Ontario Ministry of Health and Long Term Care, the Canadian Standards Association, Partnerships BC, Ministry of Health in British Columbia, regional health authorities, project partners and architecture firms.

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## Notes

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