

DESIGN AND EVALUATION: THE PATH TO BETTER OUTCOMES

THE FINAL REPORT ON THE BRIDGEPOINT ACTIVE HEALTHCARE
PRE AND POST OCCUPANCY EVALUATION

Celeste Alvaro, PhD | Deyan Kostovski, AMA | Andrea Wilkinson, PhD | Paula Gardner, PhD





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Authors

Celeste Alvaro, PhD
Research Scientist, Bridgepoint
Collaboratory for Research and Innovation
Adjunct Professor, Department of
Architectural Science, Ryerson University
Research & Evaluation Consultant, Methologica

Deyan Kostovski, AMA
Knowledge Translation & Communications
Strategist, Strongbow Strategies

Andrea Wilkinson, PhD
Postdoctoral Fellow, Bridgepoint
Collaboratory for Research and Innovation

Paula Gardner, PhD
Assistant Professor, Health Sciences,
Brock University
Affiliate Scientist, Bridgepoint Collaboratory
for Research and Innovation

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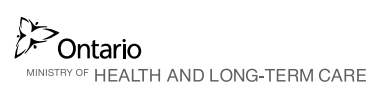
Contact

Dr. Celeste Alvaro
E: celeste@methologi.ca



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| EXECUTIVE SUMMARY



INTRODUCTION AND RATIONALE

Managing and treating patients with complex chronic disease is arguably the most pressing healthcare challenge of our generation. Extraordinary advances in acute care have led to the creation of a patient population that is living longer and living with multiple health conditions. The advances of modern medicine, coupled with the population demographics of the baby boom era, clearly illustrate that the complex rehabilitation and continuing care patient population will continually grow.

A significant concern in responding to this challenge is the inadequate infrastructure to support chronic disease management across Ontario. The present day hospital infrastructure is based on the acute care model. However, building more acute care facilities cannot be the answer to managing and treating patients with multiple complex health conditions.

Better design, both in hospital infrastructure and inpatient programming, is the optimum way to ensure the proper delivery of care for patients with chronic disease. We need to invest wisely and ensure that what we build will work.

The dilemma is that very little empirical evidence exists on how building design can foster better health outcomes for a population that typically represents extensive clinical challenges, high costs and care burdens for the system and Canadian families.

THE OPPORTUNITY: A NEW BRIDGEPOINT HOSPITAL

The focus of the study is the new Bridgepoint Hospital that opened in April 2013. The central design intentions of Bridgepoint Hospital were to enhance a patient's connection to the community, nature and urban environment and to include features that will increase social interaction and inspire physical activity. The design intentions were to be accomplished with the introduction of a series of innovative features that included: meaningful views of the city skyline, Riverdale Park and the surrounding community, communal dining spaces, multiple outdoor destinations, and the abundance of natural daylight.

The central idea was that the collection of the design features would eliminate the psychological obstacles to healing, boost spirits and morale and motivate patients to re-engage in life. The research concentrated on assessing whether or not these design elements achieved their intended outcomes and objectives.

Bridgepoint Hospital is the newest purpose built facility to cater to patients with multiple health conditions and those in need of rehabilitation. The new hospital replaced a deteriorating facility that was built in 1963. At the time, it was designed and built to cater to a different patient population than it was treating when the facility closed in April 2013. Although it has now been demolished, the distinct half round hospital plays an important role in the research project. The opportunity of collecting and comparing data from the two Bridgepoint Hospitals allowed for a unique research design that provides greater ability to attribute outcomes to design.

THE METHODOLOGICAL APPROACH

The data collected for this post occupancy evaluation (POE) was sourced from three facilities, a pretest sample of patients and staff at the old half-round Bridgepoint Hospital that was analyzed in comparison to posttest samples of patients and staff from the new Bridgepoint Hospital. A third location, West Park Healthcare Centre, acted as a control site. The pre and posttest data collected from this location was analyzed against the data collected from the two Bridgepoint Hospitals.

The typical Bridgepoint patient is in their mid-sixties and they are living with approximately five complex health conditions, such as diabetes, cancer, arthritis and are in need of neurological or musculoskeletal rehabilitation. Although the specific illnesses vary, commonalities typically exist in the physical symptoms such as pain, weakness, daily living restrictions in terms of mobility and activity, depression and mental health symptoms.

An important element to this study was to find the most compatible hospital and patient population to act as a control site. Based on a variety of factors West Park Healthcare Centre was selected. It is a public hospital in Toronto that offers specialized rehabilitation, complex continuing and long term care services. In an effort to improve compatibility with Bridgepoint, only a targeted group of West Park patients were included in the data collection phase. This group was the most similar to the patient population at Bridgepoint and facilitated a more realistic comparison.

Quantitative and qualitative methods were used to collect the data. Quantitative patient and staff surveys measured impressions of the hospital design with questions that gauged: how connected they feel with the community, city or neighbourhood, if they considered the facility as a place of wellness, did they feel isolated or are there ample opportunities to socialize with others, what areas in the hospital do they visit and how often, impressions of these areas and what do they do in these spaces. The surveys also measured patient satisfaction, workplace satisfaction, depressive symptoms, general well-being, and optimism, along with patient and staff characteristics.

The qualitative methods were used to better understand the context of usage. Using naturalistic observation, researchers covertly monitored patterns of behaviour and recorded how staff and patients used the different hospital spaces and how they interacted with each other. More overt techniques included go-along interviews, where a researcher follows a test subject and interviews them while they are going about their daily routine.



DESIGN INTENTIONS: HITS AND MISSES

Staff impressions of the new Bridgepoint Hospital proved to be consistent with the overall design intentions as they viewed the facility as a place of wellness and not a place of illness. Staff felt safe, comfortable, cheerful and connected to the natural surroundings, neighbourhood and city. There were two areas where staff impressions were inconsistent with the overall design intentions. Staff responded less favourably to questions concerning wayfinding and opportunities to visit with others.

Patient impressions of the new Bridgepoint Hospital were more favourable than those at the former Bridgepoint Hospital. It was expected that patients would feel more connected to the neighbourhood. However, given that the outdoor pathways and other exterior design features are not yet in place, it is anticipated that these impressions will change once the entire redevelopment has been completed. As expected, there were no differences at West Park pre and post.

Patients’ sense of belonging to the city and nature is elevated at the new Bridgepoint relative to the former facility. Whereas patients expressed greater connection to nature at West Park relative to the former facility, no differences were found between the new Bridgepoint and West Park. A sense of belonging to the city and neighbourhood were higher for patients at the new Bridgepoint facility relative to West Park.

There has been a mixed response to the various hospital destinations. The west side terrace, communal dining areas and patient lounges have not been as popular

destinations as the rooftop, cafeteria and seating areas by the hospital entrance. Both patients and staff respond more positively to spaces that are welcoming and have significant levels of animation. That sense of activity can be organic or achieved through hospital and social programming.

The well-being related outcomes produced some expected and unexpected findings. Contrary to what was anticipated and after moving into the new hospital, staff experienced no changes in general well-being or optimism. Surprisingly, patients’ depressive symptoms did not diminish nor did their sense of optimism increase.

The predicted staff outcomes that materialized included an increase in workplace satisfaction and enhanced workplace interactions. Patients experienced an increase in satisfaction, displayed greater self-efficacy in mobility and increased perceptions of improvements in their mental health at the new Bridgepoint relative to the old hospital and West Park.

Measuring impressions are important because it was discovered that favourable impressions lead to favourable outcomes. Both staff and patients who reported favourable impressions of the building design or of particular spaces and destinations showed improvements in various well-being related outcomes.

Patients and staff that considered the hospital as a place of wellness experienced perceived improvements in physical health and lower burnout, respectively.

FUNCTIONAL HEALTH AND ORGANIZATIONAL OUTCOMES

Traditionally, the evaluation of healthcare facilities has been limited to the empirical understanding of the effects of the healthcare environment on safety, efficiency and clinical outcomes. They have been largely atheoretical, methodologically inconsistent and limited in their ability to infer causality.

Up until now POEs have focused on select outcomes that were guided by government ministries, hospital scorecards or those targeted areas where administrators hope to see reductions or improvements. Though incredibly important, these criteria are often independent of the building design intentions. Consequently, any observed changes in these variables cannot be directly attributed to design.

Nevertheless, the underlying belief was that if a patient can overcome the psychosocial challenges associated with their hospital stay,

they would be in a more advantageous position wherein, in theory, they would respond more positively to treatment and demonstrate improved health outcomes. With respect to hospital staff, it was envisioned that the design of the new Bridgepoint Hospital would foster a more promising work environment and lead to a more efficient and productive workforce.

To determine if these intended outcomes actually materialized, data for all patients and staff one year before and one year after the move – April 14, 2013 – were examined. Patient measures included functional health outcomes, such as, mobility, pain, level of physical function and stability of condition and organizational efficiency that included discharge rates, length of stay and critical incidents. Staff efficiency measures looked at employee turnover, sick days, critical incidents and workplace injuries.

Complex Care Patients MDS Datasets

- Measures of Mood
 - Behaviour
- Activities of Daily Living (ADL) Function
- Overall Change in Care Needs

Rehabilitation Patients NRS Datasets

- Age of Patient
- Length of Stay (LOS)
- Functional Independence Measure (FIM)*
- Admission FIM/Discharge FIM
- LOS Efficiency**

* FIM scores are based on data collected by the FIM instrument which contains 18 items
** Is calculated as the change in FIM total function score from admission to discharge divided by the LOS



RECOMMENDATIONS

Patients were separated into two user groups: complex care and rehabilitation patients. Their health indicators were analyzed using the Minimum Data Set (MDS) and National Rehabilitation Survey (NRS) datasets, respectively.

For patients, no statistical difference was observed between the pre and post period for 911-transfers to acute care, code yellows (missing patient), critical incidents, falls, infections or patient feedback. When differences were identified it produced a surprising split. Rehabilitation patients in the old Bridgepoint Hospital had a better FIM change score than patients in the new hospital and the length of stay efficiency was significantly higher in the old hospital too. Conversely, the complex care patients are faring much better in the new hospital with considerably lower lengths of stay compared to patients in the old hospital. No differences were detected for changes in mood, behaviour, ADL function or overall care needs of the complex care patients between the two study periods.

In summary, the evidence has revealed that rehabilitation patients fared better at the old Bridgepoint, while complex care patients are doing much better at the new Bridgepoint.

The only substantial difference for staff was that they had a lower mean number of sick hours and sick pay in the new hospital. This conversion had two notable benefits one being workplace continuity and the other being a cost savings on staff salaries.

The Bridgepoint Active Healthcare POE is one of the largest ever conducted for a healthcare facility in Canada. The findings not only provide us with an invaluable roadmap on understanding what design elements have the greatest impact on health outcomes, but it also establishes a process on how to conduct future POEs on any healthcare or public facility. The following are a series of recommendations that address the importance of POEs and how they should be conducted.

I. Building Towards Better POEs

Post occupancy evaluations need to be mandatory and standardized for all hospital infrastructure projects

In Ontario, billions of dollars have already been earmarked for future hospital redevelopment projects and as with any sizable financial commitment, investors are always trying to identify the potential return on their investment.

It is vital that we move beyond the simplistic evaluation of whether a project was built on time and on budget. These are two very important factors, but it does not tell the entire story. It is time to embrace a more innovative approach to evaluating capital investment projects. Mandatory POEs will provide researchers and designers with the ability to draw on past experiences and identify what design features – both intended and unintended – were successful, and what design features required further support and

animation before their objectives were achieved. It is important to understand what design features work best for the different user groups and why they were successful. These findings can only be discovered through post occupancy evaluations. The same framework, methods and metrics should be used to harvest the data and the same format should be used to present the data to facilitate comparison across redevelopment projects.

Post occupancy evaluation information and outcomes need to be stored in a database

A consistent approach would facilitate the proper integration of information in a database containing information collected from previous POEs.

Over a period of time this valuable resource would be able to generate statistical comparisons across projects and increase our knowledge of what designs work and which user group experiences the greatest benefit – patients, staff, or the community. It would offer the added advantage of being able to cross reference the type of facility – acute care hospital, emergency room, mental health facility, rehabilitation centre or a complex continuing care centre.

Many stakeholders would benefit from the creation of a database sustained by the incorporation of POE data – researchers, academics, students, designers, clinicians, patient advisory groups, and most importantly it would provide ongoing research evidence and assist with the decision making process on capital investment projects at the Ministry of Health and Long Term Care.





The selection of independent third party evaluators

In order to guarantee the integrity of the data, the evaluators must have research expertise in methods and measurement, superior data analysis skills, research ethics that are beyond reproach and a sizeable human resources network that is capable of conducting the field research.

Furthermore, the most essential factor is that the evaluators are unbiased and lack a vested interest in the outcome. An established partnership with the hospital under study and the architects responsible for the facility design is essential to the POE. However, a fundamental concept in evaluation research is to ensure that it is conducted by an independent third party that is not beholden to the hospital or architectural firm.

Post occupancy evaluators are to be included from the onset of the redevelopment project

Although it is a post occupancy evaluation, pre-move and post-move assessments are required to better establish a cause and effect relationship between architectural design and health outcomes. Moreover, it is essential that the evaluators are present and active from the inception.

The methods and tools that have been developed can be used in the early planning and design stages of redevelopment. This process will capture

the patient, staff, and stakeholder experiences – insights that will better shape and identify the optimal design outcomes. Simply by participating as a control site, the West Park Healthcare Centre’s redevelopment project will gain invaluable data that will help shape their final redevelopment plans.

This stage of the design process will only increase in significance, as the new requirements in Requests for Proposals (RFPs) from Infrastructure Ontario mandate user experience, in addition to POE as required research. Therefore, the involvement of researchers in the early phases of design is as important as their involvement in the POE.

Allowing for easier access to patients

Every research project requires test subjects. One of the most challenging issues with the implementation of the POE was the recruitment of patients. There would be many advantages to improving the process of how researchers can access and invite patients to participate in the study. A set of administrative changes would have a profound impact on the overall implementation of the POE. Time and money would be saved, resulting in a greater number of patients participating in the study.

The suggested administrative changes could be incorporated into the admitting process where patients could opt into the research study and provide their consent.

The research group would then be provided with the patient profile and determine their eligibility to participate. If all of the criteria are met and the patient is deemed eligible, hospital staff working in cooperation with patient care managers and therapists would book a time for them to conduct the survey. At the predetermined time the researcher and, if needed, a volunteer translator would arrive and complete the survey.

The financial sustainability of POEs

In addition to standardizing the evaluation methods, archiving of the research findings in a database and developing a consistent protocol for the recruitment of research participants, it is paramount that the

financial sustainability of POEs be ensured. A funding formula can be incorporated into the Request for Proposals (RFPs) process with the various stakeholders involved in the design, build and maintenance of the facility being responsible for contributing their equitable share into a POE fund.

Financing for this project was tied to the hospital redevelopment budget. As a consequence, the POE was conducted under a very condensed timeline, beginning shortly after the opening of the hospital. Traditionally, POEs are conducted at least a year after a facility has been occupied or deemed fully operational.





II. Design Recommendations

It was envisioned that the collection of the design features would eliminate the psychological obstacles to healing, boost spirits and morale, and motivate patients to re-engage in life. The following are three design recommendations that are based on the findings of this POE.

Patients need a view of their own

The findings illustrate that patients thoroughly enjoy the meaningful views in the hospital. It is of significant importance when we consider the access to natural sunlight and meaningful views in a patient's room. It is recommended that future hospitals be designed following the Bridgepoint model, where each patient bed - whether in a private or semi-private room and regardless of whether or not the privacy drapes are drawn - be positioned to ensure a direct sightline to the outdoors.

Quality outdoor spaces, not quantity

Outdoor spaces are very popular, but the results are showing that the quality of the space is more important than the quantity of spaces that are available to patients and staff.

In addition to meaningful views and access to nature, outdoor destinations require a certain level of animation to attract users. The spaces require furniture to encourage patients, staff and visitors to gather, and some element of hospital or social

programming. Moving forward, it is recommended that quality outdoor spaces be included in hospital designs and that they are supported with proper levels of animation and positioned in locations that have agreeable environmental conditions.

Strategic placement of social spaces

There needs to be greater consideration on where social spaces are positioned in the hospital. To foster sustained usage by a variety of users these spaces should be close to hubs of activity. The social areas that have demonstrated high volumes of usage are the cafeteria and the seating areas located by the entrance to the hospital. Over and above food consumption, the cafeteria is a location that serves a variety of uses and the diversity of the user groups is remarkable. In this space, senior hospital leadership, front line staff, visitors and patients all interact in the same location. The seating areas also exhibit the same diversity of user groups and offer a vantage point to observe activity and engage with others.

There are some social spaces that are considerably under used. This could be a consequence of the sheer size of the hospital; it is twice as large in building area, four times as large in building volume and occupies a footprint two times larger. Not only is the new facility that much bigger, but it also has far fewer staff. A completely separate building serves as the hospital's administrative centre. It is estimated that over 100 staff work in a refurbished pre-confederation building that is connected to the hospital with an enclosed walkway.

CONCLUSION

In the past, the impression was that hospital redevelopment projects were monitored according to whether they were built on time and on budget. Very little effort was invested in evaluating the final product and determining if what we built worked and produced the intended results.

This study represents a new era in healthcare.

This exercise has created a framework which enables us to standardize the approach to evaluating the design features of healthcare

facilities. It is also leaving a lasting legacy with the creation of a POE instruction manual. This rich resource POE tool kit consisting of templates, computer software, methodological protocols, and experienced evaluators can be used to evaluate healthcare facility design in any environment, be it acute care, rehabilitation or chronic care hospitals.

With this application, we have the potential to consistently gauge the effectiveness and improve upon the investments in new hospital infrastructure in Ontario.

By knowing more, we can do more.

By building better, we can achieve better.





II. INTRODUCTION



FINAL REPORT

This final report is a presentation of findings from a multi-year and multi-method research project. At issue is an examination of the new Bridgepoint Hospital in Toronto, Canada and how its architectural design impacts the psychosocial well-being and health of its patients and the staff who care for them.

The study used a quasi-experimental research design that compared patient, staff and organizational outcomes across three facilities: the former Bridgepoint Hospital built in 1963, the new Bridgepoint Hospital that opened in 2013, and a comparison facility, West Park Healthcare Centre.

The study had a set of goals and objectives, one was to heighten our understanding of the relationship between architectural design and well-being. This was accomplished by using

mixed (quantitative and qualitative) methodologies. The other goal was to standardize the approach of evaluating design features in healthcare facilities. This was realized through the development of customized tools for evaluation that included computer assisted software, methodology protocols, training manuals, patient recruitment guidelines, analytical tools, and standardized reporting templates.

An essential element of the study was an examination of the user experience and their impressions of the building design. Participants were asked questions that assessed impressions of the overall building design, sense of belonging and connectedness, use and impressions of destination locations and the ability to support workplace interactions and collaborations.

TEAM EFFORT

The team behind this project is a distinguished group consisting of academic researchers, high level decision makers, principal architects in the field of healthcare facility design, healthcare directors and prominent researchers.

As part of the multi-year approach to this initiative, team members were actively involved in all phases of the research, early conceptualization, research design and measure development, as well as the creation of the knowledge translation plan.

This plan recognizes the importance of promoting and sharing the research findings, recommendations and best practices for the benefit of both private and public sectors, and ultimately for improving patient care.

FUTURE USE

This study is a valuable resource in assessing whether or not our investments in hospital infrastructure and programming are achieving their intended outcomes. It helps us better understand what works, for whom and in what context.

It also highlights the importance of being able to influence future development projects by retrieving archived information on the effects of hospital design on patient well-being.

For an overview of the research approach, see: Alvaro, C., & Atkinson, C. (2013, July). Healthcare facility design, psychosocial wellbeing and health: A scientific approach to assess impact. *World Health Design*, 6 (3), pp. 60-67.



AMBULATORY CARE ENTRANCE AND THE ENCLOSED WALKWAY CONNECTING THE TWO BUILDINGS. TOM ARBAN

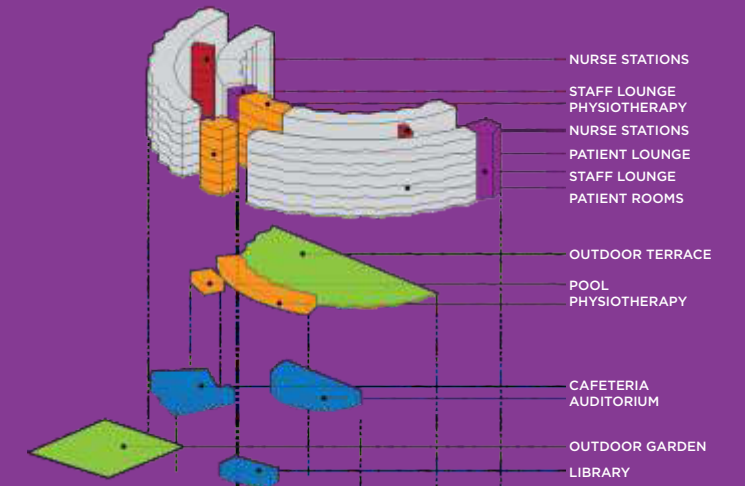


INSPIRING VIEWS AND PATIENT ACTIVITY ON THE ROOFTOP TERRACE. WILLIAM SUAREZ.

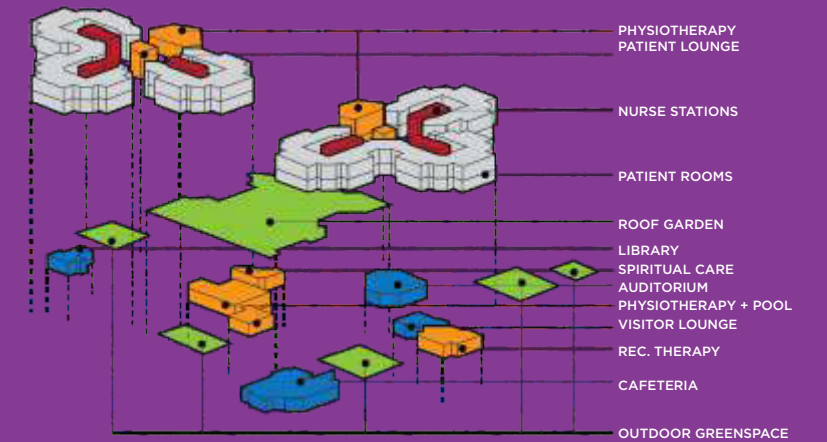


III. METHODOLOGICAL APPROACH

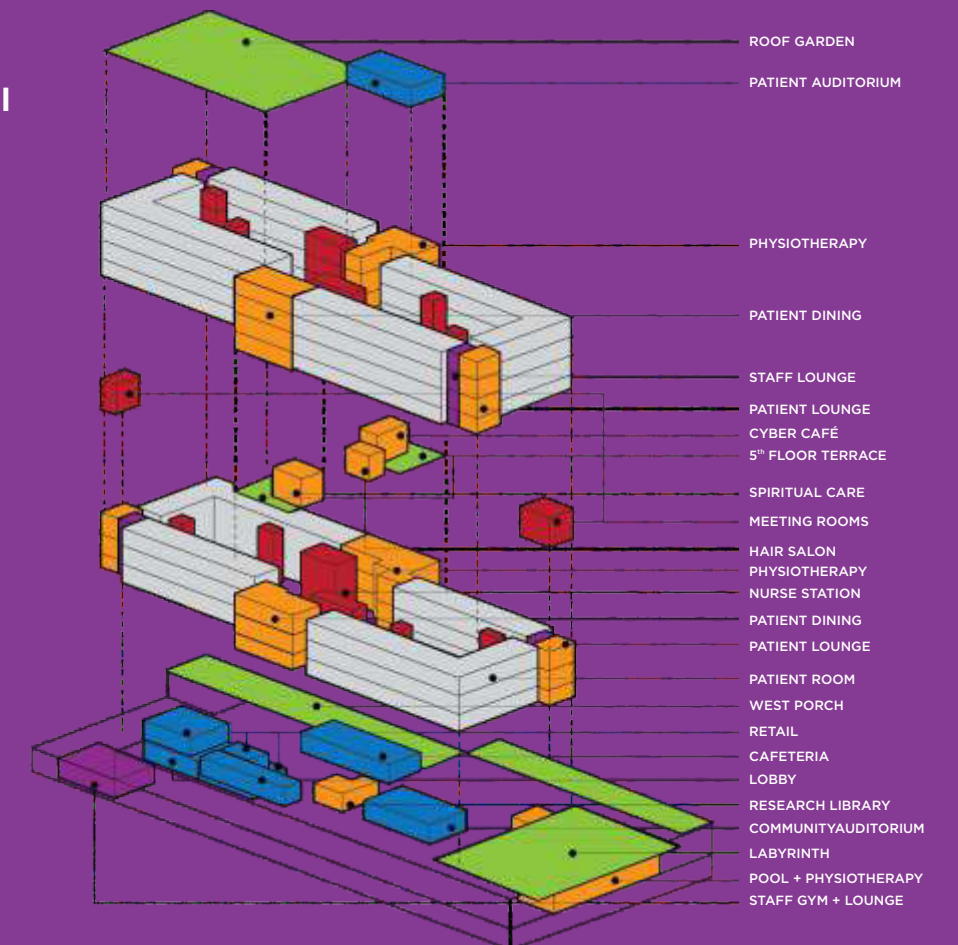
1963 Bridgepoint Hospital



West Park Healthcare Centre



2013 Bridgepoint Hospital





Overall, this POE is based on a pre and posttest quasi-experimental research design to compare patient, staff and organizational outcomes across three healthcare facilities: the former Bridgepoint Hospital, the new Bridgepoint Hospital, and West Park Healthcare Centre as a comparative control group.

This research design has three key outputs: it enables the evaluation of interventions when the randomization of patients and staff to facilities is not possible, it enhances the ability to infer causality between an intervention and an outcome, and it enables the comparison across facilities over time.

METHODOLOGY DOs AND DON'Ts

DO

- use **pretest-posttest quasi-experimental research** to infer causality between design and outcomes
- use **quantitative and qualitative methods** to capture user experience
- include a **comparison facility**
- select a comparison facility that is **compatible** with users and design intentions
- work with an expert to develop **custom measures** unique to your redevelopment project

DON'T

- **sacrifice** research rigour for speed of data collection
- let **bias or vested interest** influence outcomes. The POE needs to be conducted by an independent party
- **limit your POE** to measuring established hospital metrics. Let theory, design intentions and users guide the selection of outcomes
- **underestimate** the value of relationship building and user engagement in the collection of data during the POE

TEST SITES

The typical Bridgepoint patient is in their mid sixties and they are living with approximately five complex health conditions, such as diabetes, cancer, arthritis and are in need of neurological or musculoskeletal rehabilitation. Although the specific illnesses vary, commonalities typically exist in the physical symptoms such as pain, weakness, daily living restrictions in terms of mobility and activity, depression and mental health symptoms.

An important element to this study was to find the most compatible hospital and patient population to act as a control site. Based on a variety of factors West Park Healthcare Centre was selected. It is a public hospital in Toronto that offers specialized rehabilitation, complex continuing and long term care services.

In an effort to improve compatibility with Bridgepoint, only a targeted group of West Park patients were included in the data collection phase. This group was the most similar to the patient population at Bridgepoint and facilitated a more realistic comparison.

Bridgepoint Hospital is located in the Riverdale neighbourhood of Toronto. Conveniently located near the intersection of Broadview and Gerrard, the hospital is nestled between a residential area and Riverdale Park. It is visually and physically close to the downtown core, Lake Ontario, the Don River and the Don Valley Parkway.

The new Bridgepoint Hospital welcomed its first patients on April 14, 2013 and was built adjacent to the old half-round. The most obvious distinction between the new and

former hospital is the significant difference in both size and scale. While serving roughly the same number of inpatients as the former hospital, the new Bridgepoint is twice as large in building area, four times as large in building volume, and occupies a footprint two times larger.

West Park is accessible by car or shuttle bus and located in the Ukrainian Canadian Memorial Park. It is remotely located in a park like setting near the Humber River and surrounded by three suburban parks Raymore, Fergy Brown and Eglinton Flats.

The complex consists of two T-shaped buildings that are three stories high.

RESEARCH METHODS

Mixed quantitative and qualitative methods were embedded within the overall research design.

Innovative applications of traditional methods included:

- Quantitative surveys using a variety of delivery methods including computer assisted, online and paper/pencil formats 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 behaviour and interactions within the built environment.

Patterns of use, social interactions and activities were captured without disrupting naturally occurring behaviour.

- Go-along interviews which combine focused interviewing with participant observation. Researchers accompanied participants on their natural outings and actively explored their physical and social practices by asking questions, listening, and observing.
- Database extraction allowed for the comparison of data from hospital administrative databases pre and post-move to the new facility.
- Architectural documentation allowed for the comparison of design elements across the three facilities under study.

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.



QUANTITATIVE METHODS

Quantitative research methodologies are necessary to attribute cause and effect. The quantitative surveys were conducted to assess the impact of the architectural design on psychosocial well-being, and the perceived health of patients and staff.

Surveys

Surveys were administered to patients and staff. Taking into account the complexity of the patient population, the patient surveys were conducted in tandem with a research assistant. The data was collected via an interview format using a bespoke software platform. The software was selected for its ability to present images, randomize question order, create visual response options, and directly enter the responses into a computer. Staff was also given the option to complete the survey electronically using a similar software program developed for the administration of online surveys.

A paper-and-pencil version was also available to staff and patients. This option allowed for a mass distribution and self-completion.

Measures

Given the unique approach to POE in this study, wherein design intentions informed the selection of outcomes to be assessed, several custom measures were created. 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 belonging; and perceived improvement among patients. Measurement scales were crafted to enable the detection of subtle differences in responses.

Our team also developed customized patient and staff satisfaction surveys based on previously identified care needs for this unique patient population (Malik, Alvaro, & Kuluski, in preparation).

Established and adapted measures from the literature were used to assess depressive symptoms (CESD-10; Andresen, Malmgren, Carter, & Patrick, 1994), perceptions of improvement (adapted from McFarland & Alvaro, 2000), optimism (Scheier, Carver & Bridges, 1994), self-efficacy in mobility (adapted from Fliess-Douer et al., 2011), general well-being (Diener, 2010), workplace satisfaction (custom measures developed by Alvaro & Kuluski, unpublished), and workplace burnout (MBI-R; Maslach, Jackson, & Leiter, 1996).

The staff survey mirrored the patient version, with a few modifications. Demographic information was collected in both patient and staff surveys.

Recruitment

Staff.

All eligible staff from Bridgepoint and West Park were invited to participate in the study (paper-and-pencil or web-based).

Promotional materials such as posters, encouraging participation and recruitment, were placed in high traffic areas and strategically beside survey stations that included blank hard copies of the survey, pencils, drop boxes and prize ballots. Electronic communications including emails, newsletters and prominent placement on the website and staff intranet supplemented the

poster awareness campaign. During the posttest phase, an online version of the survey was made available and all electronic communications included a link to the survey that participants could easily access with one simple click.

Within each site respondents were matched from pretest to posttest on many critical demographic variables, including age range, gender, position, job status, position outside of the hospital, cultural background, number of tobacco smokers and number of individuals with asthma.





Patients.

To be eligible for participation, patients had to be able to provide informed consent and be cognitively and physically able to complete the survey. They needed to demonstrate the cognitive ability to manage and articulate their responses to a survey - when required, guidance from a trained interviewer was provided.

From a physical perspective, they needed to be able to answer questions with a trained interviewer for at least 20 minutes at a time.

Care managers or assigned nursing staff identified patients on their respective units who they believed would be eligible candidates. A researcher would then meet with the patient and provide them with the study details and consent form. If it was confirmed that the patient met all of the required criteria and they agreed to participate, a date and time for the interview was scheduled.

Patients were also given the option to complete the survey using the paper-pencil version, had this been preferred.

Within each site, respondents were matched from pretest to posttest on many demographic variables, including first stay, marital status, mean age, age range, gender, education, cultural background, financial stability, medical conditions and allergies.

Database Extraction

A common approach to POE involves the comparison of data from hospital administrative databases pre and post-move to the new facility. While this method limits the ability to attribute observed outcomes to differences in facility design, it was included as a sub-study within the Bridgepoint POE. Existing clinical and administrative data sources were used to examine differences in functional health and organizational efficiency outcomes related to patients while controlling for patient characteristics.

Information from patient administrative databases was extracted at each site at pretest (spring 2013) and posttest phases (spring 2014). Measures included functional health outcomes and organizational efficiency and quality outcomes for patients. As a parallel to the patient database extraction, existing administrative data sources were used to extract information on staff health.

Staff Characteristics

	Bridgepoint		West Park	
	Pretest	Posttest	Pretest	Posttest
Total Number of Participants	125	194	142	185
Male Participants	18	21	23	25
Female Participants	104	126	117	121
Full Time Status	106	115	106	115
Part Time Status	13	23	28	26
Permanent Staff	109	138	135	128
Temporary Staff	9	10	6	21

Patient Characteristics

	Bridgepoint		West Park	
	Pretest	Posttest	Pretest	Posttest
Total Number of Participants	94	109	64	66
Male Participants	39	46	25	28
Female Participants	55	60	39	38
First time hospital stay: Yes	78	92	49	58
First time hospital stay: No	16	17	11	8
Mobility: Walking without assistive	11	16	10	6
Mobility: Walking with assistive	40	44	34	26
Mobility: Wheeling using a manual wheelchair	28	36	15	33
Mobility: Wheeling using a motorized wheelchair	7	9	4	1
Mobility: Does not walk or use wheelchair	4	2	1	0





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.

Go-Along interviews were used to emulate the patient experience of various spaces in the hospital.

NATURALISTIC OBSERVATIONS

The Method

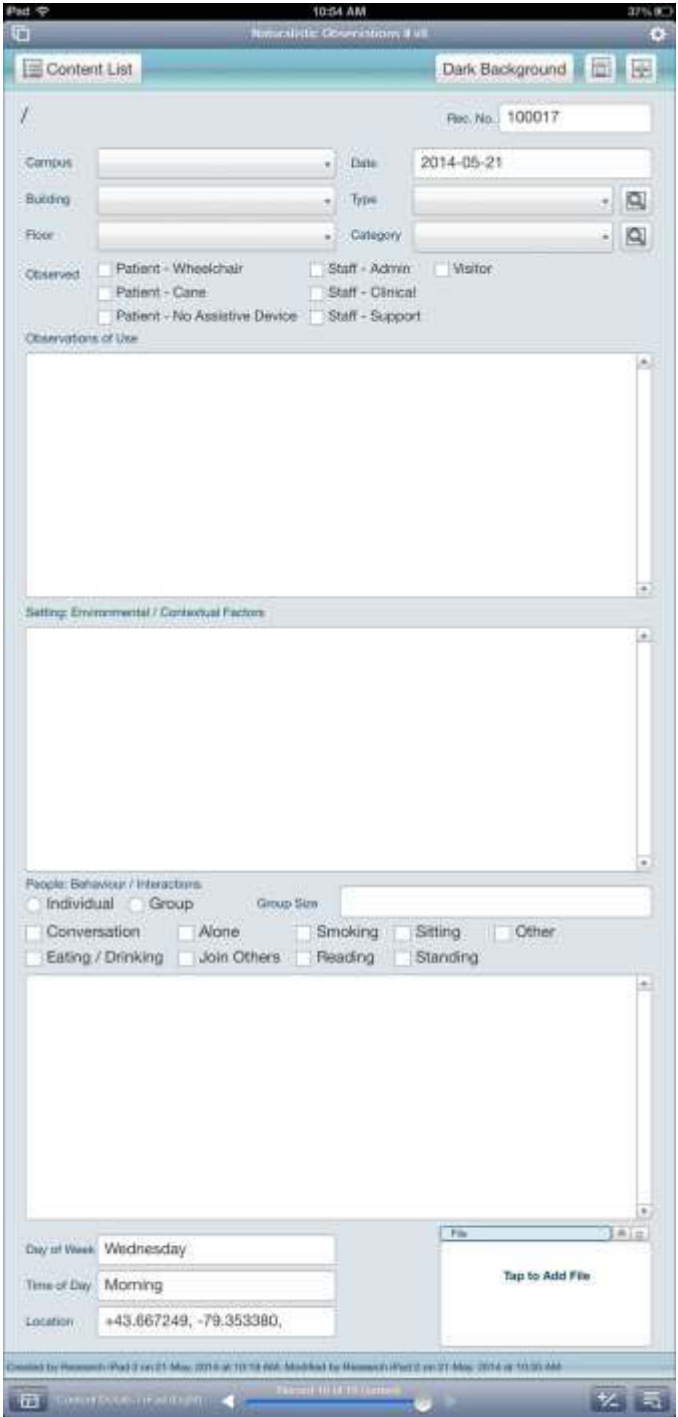
Naturalistic observation is a research method that involves observing people in natural settings without their awareness. The covert approach is necessary because people often change their behaviour if they know they are being watched. In naturalistic observation, researchers “blend in” without being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

In the study we used naturalistic observation 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 “watching people”. 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.

Data Collection

A special acknowledgement is merited for Jack Ranieri, Director of IT at Bridgepoint, who developed a customized application for iPad to document our findings. By using the app we were able to document in real time what space was being observed, who was using that space and what they were doing. Text boxes facilitated the input of field notes on the expected and unexpected uses of the space as well as the observed social interactions. The multifaceted app allowed us to capture photographs, video, and audio to use in our analysis.

Use of the iPad also masked the true intentions of the researcher. Those under observation would have easily concluded that the individual was either surfing the internet, reading an ebook or playing a game. All the while and unbeknownst to them they were under direct observation.





SELECTED SPACES FOR OBSERVATION

Bridgepoint Hospital 1963

(Former Building)

- Outdoor patio (2nd Floor) (closed evenings)
- Outdoor terrace (smoking area)
- Parkside cafeteria
- Patient library/resource centre (main floor)
- Family/visitor/patient lounges on all floors (randomized)
- Entrance/seating areas and information desk (ground level)
- Transition space: Main elevators on main floor
- Outdoor pathways

Bridgepoint Hospital 2013

(New Building)

- West side terrace – facing the DVP
- 10th floor rooftop terrace
- Outdoor terrace/ambulatory care entrance (smoking area)
- Cafeteria
- Labyrinth
- Patient library/resource centre (main floor)
- Internet café (5th floor)
- Family/visitor/patient lounges on all floors (randomized)
- Entrance/seating areas and information desk (ground level)
- Shared dining area on all floors (randomized)
- Transition space: Main elevators on main floor
- Feature Staircase: At Ambulatory Care entry to upper/main floor
- Narrow staircase to pool
- Outdoor staircases/ramps etc. (around perimeter of hospital)

West Park Healthcare Centre

(Comparison Site)

- Rooftop garden/courtyard area
- “Front” paved pathway connecting buildings
- Presse café
- Patient library/resource centre (main floor)
- Individual lounges/small rotunda areas on floors (randomized)
- Entrance/seating areas and information desk (entrance of main building)
- Main large rotunda on main floor
- Outdoor pathways

ENTRANCE



OUTDOOR TERRACE



CAFETERIA





GO-ALONG INTERVIEWS

As part of the larger research study, 32 in-depth qualitative interviews were conducted with patients using the go-along interview method. The purpose of the go-along interviews was to provide context and a deeper understanding of the patient experience including ‘how’ and ‘why’ participants may be feeling or responding to particular spaces in the hospital.

The Method

The go-along interview combines in-depth interviewing with participant observation so that researchers accompany participants on their natural outings and actively explore the physical and social practices by asking questions, listening, and observing. This method, which can be described as interviewing on the fly in the midst of daily living guided tours, has been shown to be effective for studying the implications of surroundings on health and well-being.

With a focus on the impact of facility design on health, in this study the go along method was used to explore how, and in what ways, does architectural design influence the health and well-being of patients and what elements of facility design are most significant to the patient experience?

Recruitment

Using a purposeful sampling strategy, eight patients were recruited at each of the study sites, Bridgepoint and West Park, at pretest and at posttest phases for a total of 32 participants. Participants were recruited from the larger study sample; after the completion of the computer assisted survey, participants were asked if they would be willing to participate in a second interview which would take place at a later time and involve ‘guiding’ a researcher around the hospital to a place or places that they normally go such as the cafeteria or outdoor patio.

In addition to the larger study eligibility criteria, to participate in the go-along interviews patients had to first be mobile, not restricted to their bed and able to get out of their hospital room and second, agree to be photographed and audiotaped.

Beyond these criteria, maximum variation was sought according to gender, age, hospital unit, and type of mobility aid used. A rolling recruitment strategy was used to allow for continuous data collection and to ensure participants were interviewed before they were discharged.

Data Collection

The go-along interviews consisted of a hospital journey that began from the patient’s room and followed routine travel routes to key places of interest. Those areas

represented important sites in the hospital which corresponded to the spaces observed during naturalistic observation and the locations included in the patient and staff surveys. Comparable sites were identified at West Park and in the new Bridgepoint that matched as closely as possible to the destinations that were studied in the original half-round facility.

The mode of travel, either walking or wheelchair, and the sites visited were decided by the participants. Patients acted as tour guides, researchers observed, listened and asked questions with the goal of witnessing – through their eyes – the patients’ experience navigating and interacting with the hospital environment.

The data was harvested through visual, auditory and textual means. Photographs, audio recordings as well as field notes and interview transcripts were collected and organized into groups that corresponded to the areas under study beginning from the patient’s room, through the transition spaces of the hallways and elevators, to the intended destination that included ‘work’ spaces such as therapy gyms and the pool or social spaces like the cafeteria and seating areas.

Architectural Documentation

Similarities and differences in architectural design elements were documented across the three facilities under study. In doing so, our ability to attribute any observed

differences in impressions of the building design, use of space, and well-being related outcomes across test sites to variation in architectural design elements is enhanced.

See the reference list for the link to the architectural documentation report prepared by Atkinson (2014).





IV. USER EXPERIENCE



IMPRESSIONS OF THE HOSPITAL DESIGN

This section contains a series of noteworthy findings for patients and staff. These user experience examples are being highlighted in this report, because the data showed clear and overwhelming evidence that the design intentions were either achieving their intended outcomes or they were unsuccessful in producing their intended results.

Staff

Staff impressions of the new Bridgepoint Hospital proved to be consistent with the overall design intentions as they viewed the facility as a place of wellness. Staff felt safe, comfortable, cheerful and connected to the natural surrounds, neighbourhood and city. There were two areas where staff impressions were not consistent with the overall design intentions. Staff responded less favourably to questions concerning wayfinding and opportunities to visit with others.

Although the responses were less favourable, these two aspects of building design are most amenable and can be modified to remedy this challenge.

For the most part, staff impressions at West Park were more favourable than those at the former Bridgepoint Hospital. However, once staff experienced their new surroundings the results changed and staff impressions of the new hospital surpassed the staff impressions of West Park on most attributes.

Measures Assessing Impressions of the Hospital Design

Negative	1	2	3	4	5	6	7	8	9	10	Positive
Place of illness						Place of wellness					
Not part of the neighbourhood / community						Part of the neighbourhood / community					
Not part of the natural surroundings						Part of the natural surroundings					
Not part of the city						Part of the city					
Unsafe						Safe					
No opportunities to visit with others						Opportunities to visit with others					
Difficult to find my way						Easy to find my way					
Not comforting						Comforting					
Not cheerful						Cheerful					
Overall Index (average across all items)											

IMPRESSIONS OF THE HOSPITAL DESIGN DOs AND DON'Ts

DO

- **continuously** obtain impressions of the design throughout the entire design process
- through design, attempt to enhance users' impression of the hospital as being a place of **wellness, that is safe, comfortable, and cheerful**
- attempt to foster a connection to the surrounding areas: **nature, neighbourhood and city**

DON'T

- **underestimate the value** of creating opportunities for staff to interact with others
- create **obstacles** to wayfinding
- **underestimate the relationship** between favourable design impressions and its impact on well-being and satisfaction levels

Patient and Staff Impressions of the Hospital Design

			Bridgepoint		West Park	
			Pretest	Posttest	Pretest	Posttest
Wellness	Patient	<i>n</i>	94	109	64	66
		<i>M</i>	5.82 _{a1}	7.57 _{b1}	7.39 _{a2}	7.17 _{a1}
	Staff	<i>n</i>	122	194	139	183
		<i>M</i>	5.42 _{a1}	7.59 _{b1}	6.53 _{a2}	6.33 _{a2}
Part of the neighborhood	Patient	<i>n</i>	93	108	64	66
		<i>M</i>	5.17 _{a1}	5.83 _{a1}	5.88 _{a1}	5.42 _{a1}
	Staff	<i>n</i>	122	194	142	183
		<i>M</i>	6.42 _{a1}	7.20 _{b1}	6.18 _{a1}	5.57 _{b2}
Part of nature	Patient	<i>n</i>	93	108	64	66
		<i>M</i>	6.32 _{a1}	7.81 _{b1}	8.02 _{a2}	7.82 _{a1}
	Staff	<i>n</i>	122	194	142	182
		<i>M</i>	6.87 _{a1}	7.94 _{b1}	8.07 _{a2}	7.64 _{a1}
Part of city	Patient	<i>n</i>	93	109	63	66
		<i>M</i>	6.03 _{a1}	8.00 _{b1}	5.30 _{a2}	5.77 _{a2}
	Staff	<i>n</i>	122	194	141	183
		<i>M</i>	7.05 _{a1}	8.15 _{b1}	5.16 _{a2}	4.90 _{a2}
Safe	Patient	<i>n</i>	94	109	64	66
		<i>M</i>	8.03 _{a1}	9.21 _{b1}	8.84 _{a2}	9.21 _{a1}
	Staff	<i>n</i>	122	194	142	183
		<i>M</i>	7.08 _{a1}	7.89 _{b1}	7.11 _{a1}	6.89 _{a2}
Opportunities to visit	Patient	<i>n</i>	94	109	64	66
		<i>M</i>	7.22 _{a1}	8.68 _{b1}	8.17 _{a2}	8.12 _{a1}
	Staff	<i>n</i>	122	193	142	183
		<i>M</i>	7.38 _{a1}	6.47 _{b1}	7.16 _{a1}	6.85 _{a1}
Easy to find your way	Patient	<i>n</i>	93	109	64	66
		<i>M</i>	7.29 _{a1}	7.68 _{a1}	7.92 _{a1}	7.98 _{a1}
	Staff	<i>n</i>	122	194	141	183
		<i>M</i>	7.11 _{a1}	6.36 _{b1}	6.76 _{a1}	6.30 _{a1}
Comforting	Patient	<i>n</i>	94	109	64	66
		<i>M</i>	6.72 _{a1}	8.42 _{b1}	7.97 _{a2}	7.62 _{a2}
	Staff	<i>n</i>	122	194	141	184
		<i>M</i>	5.83 _{a1}	7.27 _{b1}	6.52 _{a2}	6.37 _{a2}
Cheerful	Patient	<i>n</i>	94	109	64	66
		<i>M</i>	6.33 _{a1}	7.94 _{b1}	7.66 _{a2}	7.53 _{a1}
	Staff	<i>n</i>	122	193	142	184
		<i>M</i>	5.74 _{a1}	7.17 _{b1}	6.39 _{a2}	6.18 _{a2}

Note. 1 to 10 scale, 1 = negative impression and 10 = positive impression. Within rows (i.e., pretest vs. posttest comparisons, separately for each site), means with different subscript letters are significantly different at $p \leq .05$. Within columns (i.e., Bridgepoint vs. West Park comparisons within the same period, separately for each user group), means with different subscript numbers are significantly different at $p \leq .05$. Post hoc paired comparisons based on Fisher's LSD.



Patients

Patient impressions of the new Bridgepoint were more favourable than those at the former Bridgepoint. It was expected that they would feel more connected to the neighbourhood, however, given that the pathways and other design features are not in place, it is anticipated that these impressions would change once the entire redevelopment has been completed. As expected, there were no differences at West Park pre and post.

With the exception of three dimensions – connection to the neighbourhood, connection to the city, and wayfinding - patient impressions of West Park were more favourable than those at the former Bridgepoint.

At the new Bridgepoint, impression ratings escalated to the same level as West Park; with patients at the new Bridgepoint feeling more connected to the city and greater comfort than those at West Park.

The Impact of Impressions of the Hospital Design on Optimism (Patients and Staff)

User	Overall Impressions of Hospital Design	Total	
		n	M
Overall	Low	434	16.44 ₁
	High	419	17.26 ₂
Patients	Low	120	14.87 ₁
	High	178	16.65 ₂
Staff	Low	314	17.04 ₁
	High	241	17.71 ₂

Note. Within columns, means with different subscript numbers are significantly different at p ≤ .05. Post hoc paired comparisons based on Fisher’s LSD.

SENSE OF BELONGING

Maintaining a user’s connection to the city, neighbourhood and natural surroundings was a deliberate design intention. Therefore, it was unexpected that staff at the former Bridgepoint facility felt more connected to the neighbourhood relative to the new facility. Furthermore, at pretest, West Park staff responded more favourably to being connected to nature than staff at the former Bridgepoint facility. However, the posttest results showed a remarkable change in scores with staff at the new Bridgepoint indicating stronger connection to the neighbourhood and equivalent levels of connection to nature relative to the West Park staff.

When comparing the pre and posttest results at West Park, no differences were expected. However, staff did feel more connected to the neighbourhood and nature at the pretest phase relative to the posttest findings.

The patient’s sense of belonging to the city, neighbourhood and nature is elevated at the new Bridgepoint relative to the former facility. Whereas patients expressed greater connection to nature at West Park relative to the former facility, no differences were found between the new Bridgepoint and West Park. A sense of belonging to the city and neighbourhood were higher for patients at the new Bridgepoint facility relative to West Park.

Measures

Please place a checkmark beside ONE of the four images that best represents how much you feel like you are part of the neighbourhood [nature / city]



Custom measure developed by Celeste Alvaro, Ph.D., adapted from sense of belonging measures by Hagerty & Williams, 1999; Lee & Robbins, 1995; and the inclusion of other in the self scale by Aron, Aron, & Smollan, 1992

Sense of Belonging

	User	Site	Pretest		Posttest	
			n	M	n	M
Neighbourhood	Patient	Bridgepoint	90	2.10 _{a1}	105	2.43 _{b1}
		West Park	63	2.17 _{a1}	66	1.98 _{a2}
	Staff	Bridgepoint	124	2.90 _{a1}	182	2.69 _{b1}
		West Park	139	2.73 _{a1}	179	2.41 _{b2}
Nature	Patient	Bridgepoint	91	2.71 _{a1}	105	3.09 _{b1}
		West Park	62	3.18 _{a2}	65	2.98 _{a1}
	Staff	Bridgepoint	125	2.74 _{a1}	181	2.75 _{a1}
		West Park	138	3.14 _{a2}	180	2.90 _{b1}
City	Patient	Bridgepoint	92	2.29 _{a1}	105	2.97 _{b1}
		West Park	62	2.23 _{a1}	65	2.12 _{a2}
	Staff	Bridgepoint	125	2.86 _{a1}	180	2.85 _{a1}
		West Park	139	2.12 _{a2}	177	2.27 _{a2}

Note. Within rows, means with different subscript letters are significantly different at p ≤ .05. Within columns, means with different subscript numbers are significantly different at p ≤ .05. Post hoc paired comparisons based on Fisher’s LSD.





WAYFINDING AND MOBILITY

Wayfinding

A deliberate design feature was to use the site and its meaningful views as cues for direction and wayfinding. The design was also intended to allow for “intuitive wayfinding”, yet, the survey results were surprising as they indicated otherwise. The posttest staff survey at the new Bridgepoint Hospital took place over a three-week period in October 2013, six months after the move. The results showed that staff had an easier time finding their way in the old hospital.

While it is reasonable to expect that an adjustment period is needed when moving into a space that is twice the size, having completely new work stations, office space and a new routine, it is surprising, that after six months in their new surroundings and with the majority of

staff present on a daily basis, people were still experiencing difficulty in wayfinding.

This becomes of increasing importance when one considers the wayfinding impact on patients and visitors. This user group spends less time in the hospital - inpatients range from two weeks to ninety days - and visitors and outpatients are in and out after a few hours. Wayfinding becomes increasingly important as this undesirable experience has the potential to impact patients by adding an unnecessary burden to the management of their illness.

Surprisingly, the patient data is in contrast to the staff data, as patients did not report any differences in the ease with which they could find their way around the new Bridgepoint compared with the old.

Wayfinding is important and needs to be clear upon entry to the building and at various points where the user experiences a break in the flow or circulation patterns. Patients and visitors experience stress upon entering a hospital and their sense of being lost amplifies stress.

One can argue that although the hospital is fully operational the redevelopment has yet to be fully completed as the main entrance doors are off limits. Therefore, forcing users to access the hospital via the ambulatory care entrance may be the cause of some of the wayfinding challenges. However, that does not fully explain the challenges users may be experiencing when accessing the building via the underground parking lot.

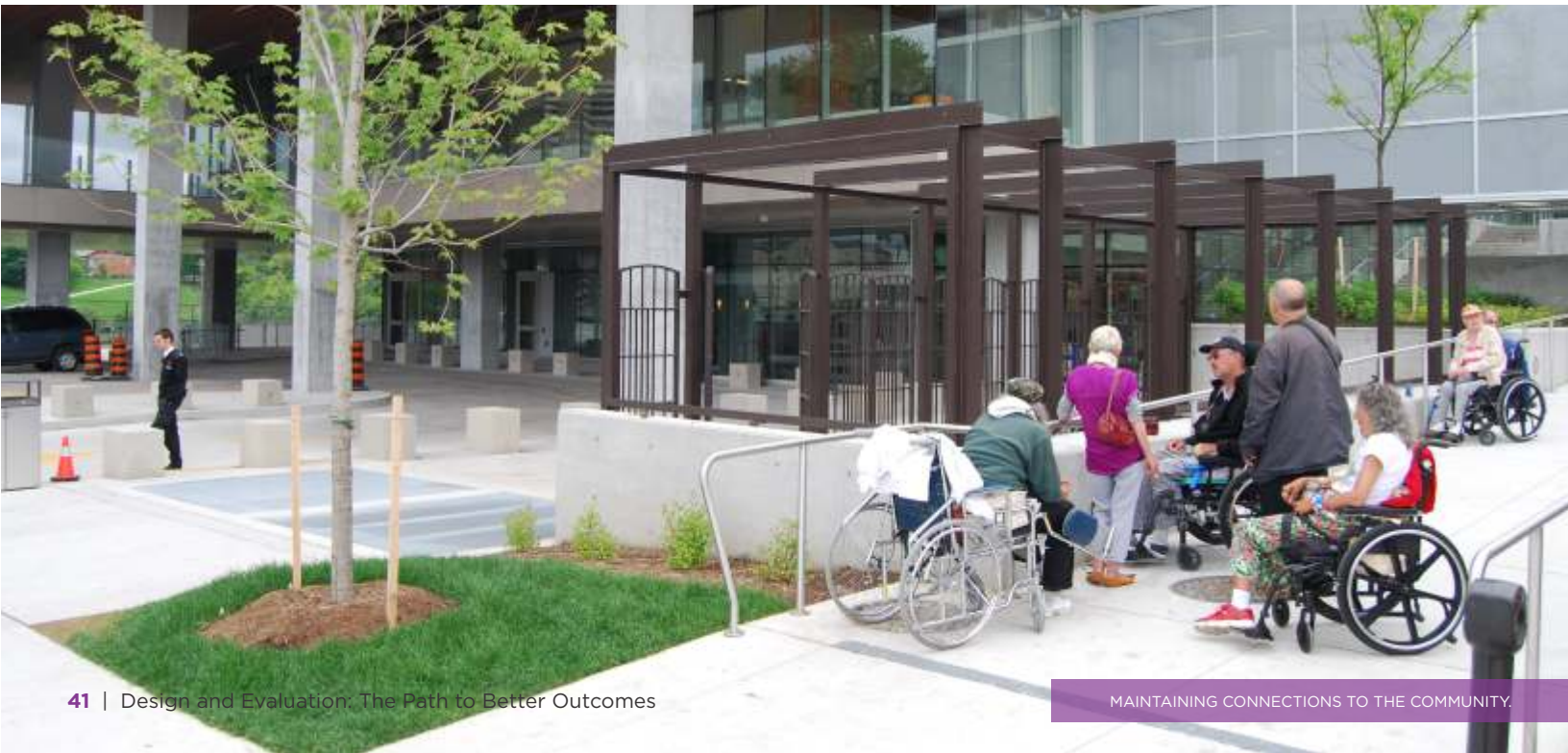
WAYFINDING DOs AND DON'Ts

DO

- introduce wayfinding systems at logical transition points throughout the hospital – entrances, parking garage, elevator bays

DON'T

- confuse people, use clarity in sign labels
- rely on intuitive wayfinding in the hospital context
- assume the wayfinding system will work for all users, test various options in simulation exercises throughout the design process





Mobility

When relocating to different parts of the hospital for their rehabilitation or therapy sessions patients are accompanied by their caregiver. However, in due course, patients develop the strength, curiosity and willingness to leave their rooms. Patients at the new Bridgepoint reported greater self-efficacy in mobility than those at the old Bridgepoint. In essence, be they in a wheelchair, on crutches, using a walker or cane, patients felt noticeably more confident moving about on their own.

This is consistent with the design intentions of the building, where patients are drawn out of their rooms and lured towards the various amenities and open spaces.

This gradual confidence building measure reinforces the spirit of the design intentions that motivate patients to get back out there. These positive results are not exclusive to, but, can be

Self-Efficacy in Mobility
(adapted from Fliess-Douer, et al. 2011)

	Pretest		Posttest	
	n	M	n	M
Bridgepoint	89	67.46 _{a1}	97	73.81 _{b1}
West Park	54	75.78 _{a2}	60	78.20 _{a1}

Note. Data based on the answer to the following question: “For each statement, please select one number that best describes how confident you are concerning your mobility.” 1 to 10 scale, 1 = Not at all, 10 = Extremely. Total score = sum of all item ratings. Higher scores represent greater self-efficacy in wheeled mobility. Within rows, means with different subscript letters are significantly different at p ≤ .05. Within columns, means with different subscript numbers are significantly different at p ≤ .05. Post hoc paired comparisons based on Fisher’s LSD.

“I can find means and ways to be independently mobile, in everyday life”

“When I am confronted with obstacles to mobility, I can find solutions to overcome them”

“I can motivate myself to carry out a difficult and challenging mobility skill”

“I can learn new mobility skills by myself”

“While moving around the hospital, I can usually handle whatever comes my way”

attributed to the following factors: the increased number of destinations and open spaces, straight and clutter free hallways or transition spaces, and less crowded patient rooms.

Obstacles and Opportunities for Patient Ambulation

NEW BRIDGEPOINT

- Clutter free and straight hallways
- Spacious rooms facilitating easier manoeuvrability
- Multiple outdoor destinations to choose from
- Retail spaces for shopping

OLD BRIDGEPOINT

- Curved and intimidating hallways
- Crowded patient room (at times 4 per room)

Comparing Levels of Confidence

	Old Bridgepoint	New Bridgepoint
I can find means and ways to be independently mobile every day		
When I am confronted with obstacles to mobility, I can find solutions to overcome them		
I can motivate myself to carry out a difficult and challenging mobility skill		
I can learn new mobility skills myself		
While moving around the hospital, I can usually handle whatever comes my way		



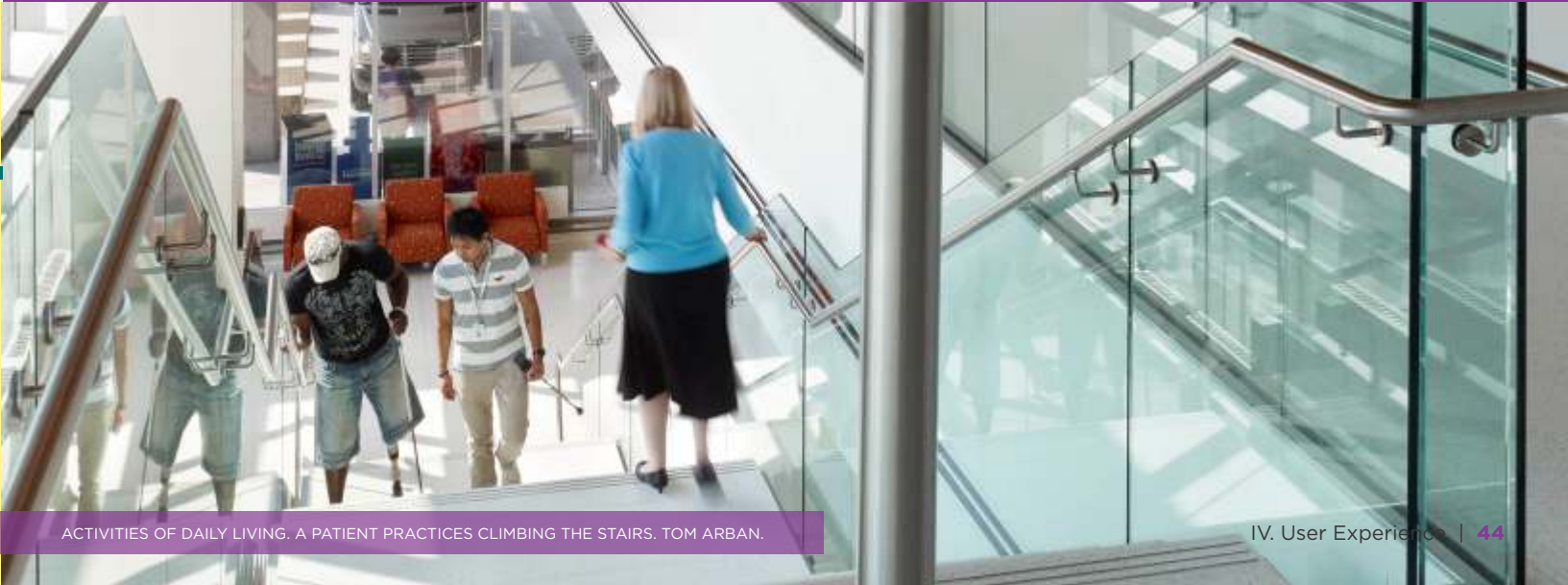
MOBILITY
DOs AND DON'Ts

DO

- provide **uncluttered** corridors for patients to ambulate to hospital destination points
- provide users with **information** on all of the hospital amenities and destination points
- consider **transition zones** – hallways – as end destination points for patients

DON'T

- introduce **barriers to mobility** – steep inclines, narrow staircases, posts, curved hallways
- underestimate the power of watching others succeed in being mobile, patients should have **a sightline to observe others**





WELL-BEING RELATED OUTCOMES

Mental Health

An essential element of the healing and recovery process is finding that positive mindset that you will get better. For this reason, the design intentions of the hospital aimed to remedy the psychosocial challenges that patients encounter when they are admitted to hospital.

The design intentions were to inspire optimism and hope, create an environment of wellness, and motivate patients to re-engage in life. Furthermore, implicit in the collection of the design intentions – connection to the city, community and nature was the anticipated benefit to mental well-being. Therefore, it was rewarding to discover that patients at the

new Bridgepoint Hospital reported significantly greater improvements in their mental health, as compared to the patients at the old Bridgepoint Hospital.

This finding becomes even more noteworthy when you consider that Bridgepoint patients during the pretest data collection phase in the old hospital scored noticeably lower compared to patients at West Park when describing their present mental health status. The comparative posttest data shows a complete reversal with Bridgepoint patients now scoring higher than West Park patients with a much more positive perception of mental health.

However, the positive impact observed in patients’ mental health status, did not

directly translate into perceived improvements in a patient’s overall health.

In fact, across all three facilities, Bridgepoint new and old, and West Park there were no differences in perceptions of improvement in overall health, which included physical health, social health – having the perceived social support network to help you get through your recovery, and financial health – having sufficient finances to pay for your recovery and offset any lost earnings.

This result was surprising as it was expected that the positive psychosocial outcomes would initiate perceived improvements in overall health. Moreover, the belief was that if patients felt better they could recover quicker and be discharged earlier. To date, this has yet to materialize, as evident in the examination of the hospital administrative databases.

Patients Perception of Improvement Compared to one year ago, how would you rate...

	1 Much worse	2 Somewhat worse	3 About the same	4 Somewhat better	5 Much better
Site					
		Pretest		Posttest	
		n	M	n	M
Overall Health	Bridgepoint	91	2.79 _{a1}	100	2.85 _{a1}
	West Park	55	2.82 _{a1}	61	2.49 _{a1}
Physical Health	Bridgepoint	91	2.54 _{a1}	100	2.63 _{a1}
	West Park	55	2.80 _{a1}	61	2.44 _{a1}
Mental Health	Bridgepoint	90	2.98 _{a1}	98	3.30 _{a1*}
	West Park	55	3.15 _{a1}	61	2.98 _{a1*}
Social Health	Bridgepoint	91	3.65 _{a1}	98	3.60 _{a1}
	West Park	54	3.57 _{a1}	61	3.77 _{a1}
Financial Health	Bridgepoint	90	2.89 _{a1}	99	2.87 _{a1}
	West Park	55	2.73 _{a1}	61	2.67 _{a1}
TOTAL	Bridgepoint	90	2.96 _{a1}	97	3.04 _{a1}
	West Park	54	2.99 _{a1}	61	2.87 _{a1}

Note. Within rows, means with different subscript letters are significantly different at p ≤ .05. Within columns, means with different subscript numbers are significantly different at p ≤ .05. Post hoc paired comparisons based on Fisher’s LSD. 1*, p = .057

Well-Being Outcomes

No Differences	Improved Outcomes
Staff	Staff
General well-being (Diener, 2010)	Workplace satisfaction (Alvaro & Kuluski, custom)
Optimism (Scheier, Carver & Bridges, 1994)	Workplace interactions
Burnout (MBI-R; Maslach et al., 1996)	
Patients	Patients
Depressive symptoms (CESD-10; Andersen et al., 1997)	Satisfaction (Malik, Alvaro & Kuluski, in preparation)
Optimism (Scheier, Carver & Bridges, 1994)	Perceptions of improvement in mental health (adapted from McFarland & Alvaro, 2000)
	Self-efficacy in mobility (adapted from Fliess-Douer et al., 2011)



SOCIAL INTERACTION

Opportunities to Visit With Others

With a much smaller footprint, approximately half the size of the new hospital, the former Bridgepoint facility afforded greater density and increased the likelihood of serendipitous encounters with colleagues. The number of staff and patients remained the same, and yet the footprint doubled in size, unit locations were dispersed and reorganized, and some programming to support new operations in the hospital were slow to develop. These factors contributed to the staff impression that the hospital is less populated making it difficult to visit with others.

Workplace Interactions

These earlier measures were designed to illicit an “automatic” or “first impression” reaction to the building design. In contrast, when staff

was asked more direct questions about working in teams “Much of the work we do involves working in teams. Often these teams are interdisciplinary teams - those with three or more types of professionals working together. We would like to know how well the space promotes interactions with other professionals,” staff impressions of the new Bridgepoint Hospital design ranked higher than the pretest findings of the old Bridgepoint in facilitating workplace interactions.

The findings on this measure are encouraging, but not surprising. There was considerable input from clinicians and care providers in the design consultation process with the architects to inform them of the functional programming needs for the new hospital. This is the part of healthcare architecture design that receives the greatest attention.



Workplace Interactions

			Bridgepoint		West Park	
			Pretest	Posttest	Pretest	Posttest
Team meetings	Staff	<i>n</i> <i>M</i>	122 3.00 _{a1}	173 4.14 _{b1}	141 3.03 _{a2}	171 3.34 _{b2}
Communication among staff from different professional backgrounds	Staff	<i>n</i> <i>M</i>	121 3.11 _{a1}	178 3.72 _{b1}	142 3.08 _{a1}	170 3.32 _{b2}
Interaction among staff	Staff	<i>n</i> <i>M</i>	122 3.16 _{a1}	178 3.44 _{b1}	142 3.32 _{a1}	174 3.53 _{b1}
Interaction among patients and visitors	Staff	<i>n</i> <i>M</i>	122 3.26 _{a1}	174 3.82 _{b1}	142 3.42 _{a1}	171 3.50 _{a2}
Contact with practitioners	Staff	<i>n</i> <i>M</i>	120 3.20 _{a1}	174 3.65 _{b1}	142 3.11 _{a1}	169 3.41 _{b2}
Contact with patients	Staff	<i>n</i> <i>M</i>	121 3.47 _{a1}	173 3.91 _{b1}	142 3.54 _{a1}	168 3.82 _{b1}
Contact with visitors	Staff	<i>n</i> <i>M</i>	121 3.16 _{a1}	172 3.71 _{b1}	142 3.14 _{a1}	165 3.42 _{b2}
Professional development	Staff	<i>n</i> <i>M</i>	120 2.76 _{a1}	173 3.29 _{b1}	141 2.62 _{a1}	169 2.77 _{a2}
Overall¥	Staff	<i>n</i> <i>M</i>	118 3.13 _{a1}	161 3.72 _{b1}	140 3.16 _{a1}	154 3.39 _{b2}

Note. Data based on the answer to the following question: “Please rate the extent to which you agree that the [insert site] facility design allow for...”; 1 to 5 scale, 1 = not at all and 5 = extremely well; Overall = average across all domains. ¥ = Cronbach Alpha equal to .898. Within rows (i.e., pretest vs. posttest comparisons, separately for each site), means with different subscript letters are significantly different at $p \leq .05$. Within columns (i.e., Bridgepoint vs. West Park comparisons within the same period), means with different subscript numbers are significantly different at $p \leq .05$. Post hoc paired comparisons based on Fisher’s LSD.



USER SATISFACTION

Staff Satisfaction

A customized workplace satisfaction survey was developed and served as a parallel to the patient satisfaction survey. The overall staff satisfaction levels were noticeably greater in the new Bridgepoint in comparison to the old hospital. Scores directly related to the building design proved to be very enlightening as staff responses showed they were significantly more satisfied with their workspace, the building and the hospital setting. These positive indicators were also present when they responded to questions related to their social interactions in the new hospital.

Staff was more satisfied in dealing with conflict resolution, communicating within the organization, evaluating their work/life balance and the timeliness of responses by their supervisors.

As with the patient satisfaction survey, the staff survey was complemented by a series of questions that analyzed their behavioural tendencies. Considerably more staff indicated that they would recommend the new Bridgepoint, if a friend or loved one required care, as compared to the old hospital. Furthermore, this positive behaviour response reappeared when staff indicated that they would be more likely to recommend the new hospital to a friend or colleague who was searching for new employment, as contrasted to the old hospital.

Finally, staff at the new hospital felt they were positively influencing people’s lives, they could easily create a relaxed atmosphere and that they accomplished worthwhile things in the job to a much greater degree relative to staff at the old Bridgepoint. Human resources specialists would find the preceding statements of interest as it directly ties into workplace burnout and intention to quit.



Staff Satisfaction

			Bridgepoint		West Park	
			Pretest	Posttest	Pretest	Posttest
Interactions with co-workers	Staff	n	125	156	142	155
		M	4.82 _{ai}	4.88 _{ai}	4.61 _{ai}	4.67 _{ai}
Resolution of conflicts	Staff	n	125	157	142	156
		M	4.30 _{ai}	4.76 _{bi}	4.12 _{ai}	4.12 _{az}
Workload	Staff	n	124	155	142	155
		M	3.71 _{ai}	3.72 _{ai}	3.94 _{ai}	3.96 _{ai}
Communication within the organization	Staff	n	124	156	142	156
		M	3.63 _{ai}	4.03 _{bi}	3.66 _{ai}	3.56 _{az}
Communication with my supervisor	Staff	n	125	157	142	156
		M	4.57 _{ai}	4.64 _{ai}	4.30 _{ai}	4.22 _{az}
Involvement in decision making	Staff	n	125	157	142	156
		M	3.94 _{ai}	4.18 _{ai}	3.78 _{ai}	3.82 _{az}
Work/Life balance	Staff	n	125	156	141	156
		M	4.02 _{ai}	4.37 _{bi}	4.33 _{az}	4.37 _{ai}
Cleanliness of the hospital	Staff	n	125	157	141	156
		M	3.48 _{ai}	5.25 _{bi}	4.25 _{az}	3.96 _{az}
Timely response by supervisors	Staff	n	124	156	141	155
		M	4.23 _{ai}	4.67 _{bi}	4.14 _{ai}	4.10 _{az}
Safety	Staff	n	125	157	141	153
		M	4.42 _{ai}	4.91 _{bi}	4.74 _{az}	4.58 _{az}
Treated with respect and dignity	Staff	n	124	156	141	156
		M	4.68 _{ai}	4.87 _{ai}	4.37 _{az}	4.29 _{az}
Treated in culturally appropriate manner	Staff	n	125	156	141	156
		M	4.91 _{ai}	4.99 _{ai}	4.84 _{ai}	4.72 _{az}
Your Workspace	Staff	n	125	155	141	156
		M	4.01 _{ai}	4.54 _{bi}	3.91 _{ai}	3.81 _{az}
The building	Staff	n	125	156	142	154
		M	3.47 _{ai}	4.81 _{bi}	4.11 _{az}	3.86 _{az}
Hospital setting / surroundings	Staff	n	124	154	141	153
		M	4.33 _{ai}	4.97 _{bi}	4.94 _{az}	4.95 _{ai}
Satisfaction: Composite score [¥]	Staff	n	122	145	140	147
		M	4.16 _{ai}	4.66 _{bi}	4.26 _{ai}	4.19 _{az}
Satisfaction: Facility [§]	Staff	n	124	151	141	149
		M	3.94 _{ai}	4.92 _{bi}	4.39 _{az}	4.22 _{az}

Note. Data based on the answer to the following question: “Please indicate the extent to which you are satisfied with the following aspects of your work.”; 1 to 6 scale, 1 = completely dissatisfied, 6 = completely satisfied; Satisfaction: Composite Score = average of all 15 items; ¥ = Cronbach’s Alpha = .910; Satisfaction: Facility = average of cleanliness, safety, room, building, setting / hospital surroundings. § = Cronbach’s Alpha = .802. Within rows (i.e., pretest vs. posttest comparisons, separately for each site), means with different subscript letters are significantly different at $p \leq .05$. Within columns (i.e., Bridgepoint vs. West Park comparisons within the same period), means with different subscript numbers are significantly different at $p \leq .05$. Post hoc paired comparisons based on Fisher’s LSD.



Patient Satisfaction

It is often said you do not get a second chance to make a first impression. This is true on many levels for individuals and, as demonstrated in this POE, the same effect can occur when entering buildings and rooms. A customized survey was used to measure patient levels of satisfaction across many fields, the findings left very little for interpretation as they were overwhelmingly positive.

Patients at the new Bridgepoint Hospital reported significantly higher levels of satisfaction on areas related to their admission, for example, information provided upon their arrival at the hospital, explanations provided by caregivers, the level of their involvement in the decision making process about their care, the cleanliness of the hospital and their room.

It was the same admitting staff servicing the patients at both hospitals and yet the scores were so much higher in the surroundings of the new hospital. The cleaner, brighter and more spacious environment appears to have had a psychosocial impact on the patients, better equipping them to receive and retain new information.

If I ever get sick again, and I hope I don’t, but if I do, I will be coming straight here and nowhere else.

Levels of satisfaction were also measured across other domains such as explanation of medications including potential side effects, staff response time, receiving respectful care and treatment, and their ability to be mobile and move throughout the hospital. As a collective the overall satisfaction rating of patients at the new Bridgepoint Hospital was significantly higher than the patients at the old Bridgepoint Hospital.

In an exercise to better understand how patient satisfaction scores influence patient behaviour, patients were asked an additional series of questions. From a scientific perspective the behaviour intention measures are more accurate indicators of satisfaction.

The results showed that in comparison to the old Bridgepoint Hospital, patients at the new Bridgepoint Hospital were significantly more likely to recommend the hospital to others for care and come back to the hospital should they require care in the future. They also expressed greater opposition to travelling to another hospital instead of returning to Bridgepoint. These sentiments were echoed by a previous patient who participated in the official opening of the new hospital when they said “If I ever get sick again, and I hope I don’t, but if I do, I will be coming straight here and nowhere else.”

Patient Satisfaction

			Bridgepoint		West Park	
			Pretest	Posttest	Pretest	Posttest
Information provided upon first arrival	Patient	n M	91 3.98 _{a1}	99 4.74 _{b1}	54 4.85 _{a2}	60 4.30 _{a1}
Explanation by care providers	Patient	n M	91 4.51 _{a1}	99 4.96 _{b1}	54 5.02 _{a2}	60 4.87 _{a1}
Involvement in decision-making	Patient	n M	90 4.14 _{a1}	99 4.71 _{b1}	54 4.83 _{a2}	60 4.80 _{a1}
Information provided when leaving	Patient	n M	86 4.06 _{a1}	98 4.39 _{a1}	54 4.57 _{a2}	60 4.44 _{a1}
Care by physicians	Patient	n M	91 4.71 _{a1}	99 4.94 _{a1}	54 5.13 _{a1*}	60 5.10 _{a1}
Care by nurses	Patient	n M	91 4.90 _{a1}	99 5.15 _{a1}	54 5.13 _{a1}	60 5.12 _{a1}
Care by therapists	Patient	n M	90 5.13 _{a1}	98 5.37 _{a1}	54 5.54 _{a2}	60 5.38 _{a1}
Care by social / recreational care providers	Patient	n M	91 4.63 _{a1}	96 4.90 _{a1}	53 4.83 _{a1}	59 4.53 _{a1}
Treatment and services	Patient	n M	91 4.55 _{a1}	96 5.02 _{b1}	54 5.22 _{a2}	60 5.02 _{a1}
Explanation of medications	Patient	n M	91 4.11 _{a1}	98 4.84 _{b1}	54 5.00 _{a2}	60 4.83 _{a1}
Cleanliness of the hospital	Patient	n M	91 4.24 _{a1}	98 5.56 _{b1}	54 5.09 _{a2}	60 4.85 _{a2}
Timeliness of response by staff	Patient	n M	91 3.86 _{a1}	98 4.58 _{b1}	54 4.87 _{a2}	60 4.93 _{a1}
Your safety	Patient	n M	91 4.95 _{a1}	98 5.53 _{b1}	54 5.31 _{a2}	60 5.40 _{a1}
Treated with respect	Patient	n M	91 4.93 _{a1}	98 5.51 _{b1}	54 5.28 _{a1}	60 5.28 _{a1}
Acknowledging and respectful care	Patient	n M	91 4.98 _{a1}	99 5.48 _{b1}	54 5.41 _{a2}	60 5.27 _{a1}
Your room	Patient	n M	91 4.09 _{a1}	97 5.49 _{b1}	54 4.78 _{a2}	60 4.95 _{a2}
The building	Patient	n M	91 4.34 _{a1}	98 5.45 _{b1}	54 4.87 _{a2}	60 5.15 _{a1}
Setting / surroundings	Patient	n M	91 4.59 _{a1}	98 5.46 _{b1}	54 5.00 _{a2}	60 5.20 _{a1}
Opportunities to practice moving around	Patient	n M	90 4.38 _{a1}	98 5.10 _{b1}	54 4.91 _{a2}	60 4.87 _{a1}
Overall satisfaction: Single item	Patient	n M	91 4.71 _{a1}	97 5.42 _{b1}	54 5.24 _{a2}	60 5.33 _{a1}
Satisfaction: Composite Score [¥]	Patient	n M	86 4.50 _{a1}	93 5.13 _{b1}	53 5.04 _{a2}	59 4.97 _{a1}
Satisfaction: Facility [§]	Patient	n M	91 4.44 _{a1}	97 5.51 _{b1}	54 5.01 _{a2}	60 5.11 _{a2}

Note. Data based on the answer to the following question: “Please indicate the extent to which you are satisfied with the following aspects of your hospital stay”; 1 to 6 scale, 1 = completely dissatisfied, 6 = completely satisfied; Overall satisfaction: Single item = “How would you rate your overall satisfaction with your experience at [insert hospital name here]?” Satisfaction: Composite Score = average of all 19 items, except for Overall satisfaction: Single item; ¥ = Cronbach Alpha equal to .949; Satisfaction: Facility = average of room, hospital cleanliness, safety, building, setting / surroundings; § = Cronbach Alpha equal to .869. Within rows (i.e., pretest vs. posttest comparisons, separately for each site), means with different subscript letters are significantly different at *p* ≤ .05. Within columns (i.e., Bridgepoint vs. West Park comparisons within the same period), means with different subscript numbers are significantly different at *p* ≤ .05. Post hoc paired comparisons based on Fisher’s LSD. 1*, *p* = .057



Patient Room

Evidence collected via go-along interviews and surveys

When asked to describe their individual patient rooms, a reoccurring first response from patients was their immense satisfaction with their view to the outdoors. The windows provided positive impressions for the patients increasing their comfort levels and creating an environment of wellness.

Patients reported therapeutic benefits of seeing into both nature and cityscape views - people taking their dogs for a walk, observing wildlife in the park, following traffic flow on the streets, and witnessing construction and demolition activity. Being able to have visual access to the outdoors positively enhanced the patient experience and health. Windows are a rehabilitative strategy and tool for optimism. They keep people feeling positive despite the fact that they are in the hospital. The views from the windows remind and motivate patients about what their daily routine was like before they were admitted, and encourages them to get back out there.

The size of their room and adjoining washroom spaces was frequently noted as a positive aspect, it was perceived to be designed well, offering adequate space for everyday living needs. An interesting finding was that patients positively responded to their ability to have some control over their environment.

As a patient, your daily routine is very structured and regulated: you are told when to eat, bathe, sleep, and go to therapy. Anything that allows patients some control and gives them a sense of autonomy enhances their psychosocial health and well-being. The ability to perform daily living activities such as washing their hands, eating and accessing washroom facilities were seen as particularly important to maintaining a sense of control. The size of the room and their ability to rearrange the furniture to their liking was also seen as a positive benefit. However, the inability to control everyday items like side tables and the soap dispenser in washrooms was frustrating to patients. It reduced their sense of control and negatively impacted their psychosocial well-being.

Impressions of the Patient Room

Bridgepoint Posttest (n = 109)			West Park Posttest (n = 66)		P
Patient Room	n	M	n	M	
Accessibility	94	8.86	60	8.13	.020*
Wayfinding	97	9.33	60	9.13	.344
Safe	98	9.34	60	8.90	.024*
Inspired	95	8.41	60	7.40	.004*
Content	96	8.95	60	7.83	.001**
Proud	95	8.71	60	7.60	.001**
Calm	97	9.05	60	8.57	.067
Brave	95	8.81	60	8.18	.029*

Note. 1 to 10 scale, 1 = negative impression and 10 = positive impression. * = p value ≤ .05. ** = p value ≤ .001. p values are from independent t tests comparing the new Bridgepoint hospital to West Park at posttest.

PATIENT ROOM
DOs AND DON'Ts

- DO

 - ensure that patients while in bed have a **direct sightline to the outdoors**
 - provide greater ability to control the levels of **natural sunlight**
 - provide **multiple lighting options** – bedside, overhead
 - allow for a greater ability to **control in-room temperature**
 - offer ample space in patient **bathrooms**
 - introduce features that enhance a patient’s sense of **controllability**
- DON'T

 - have a one size fits all approach to **sinks, soap and paper towel dispensers** consider access for patients in wheelchairs
 - be too limiting on **storage space options**, use larger wardrobes and bedside tables
 - **over furnish the room**, allow the patient some flexibility in arranging chairs and tables





INDOOR HOSPITAL CLIMATE

Using an established measure from the evidence based design literature (Andersson, 1998), staff and patients were asked to indicate their impressions of the indoor hospital climate, which included their response to various characteristics of the environment, for example, noise levels, air quality, temperature settings and lighting levels. Both user groups had very similar responses as they both reported being noticeably less bothered by environmental conditions such as the room temperature being too hot, stuffy or bad air quality, unpleasant odours, noise as well as dust and dirt.

The most interesting contrast in the results is that patients in the new Bridgepoint Hospital are more bothered by natural light as compared to patients in the old hospital. At a quick glance this finding may be interpreted as negative, however, upon further examination

the contrasting findings may not be all that surprising when you consider that the old hospital had very little natural light and thus, one would expect few to be bothered by it. Conversely, the new hospital design attempts to capture as much natural daylight as possible.

One area of improvement that can be derived from this finding is to provide patients with a more robust ability to control the exposure to natural sunlight in their room. Currently, the blinds in the patient rooms are not that effective in toning down the intensity of natural light that is entering the room and the blinds can only be manipulated manually. Introducing a more restrictive blind that can be operated via remote control can be a cost-effective way to remedying this challenge.

COMPARING USER EXPERIENCES

The new Bridgepoint Hospital has deliberately blurred the lines between public and private spaces. The design intentions revolved around three user groups, patients, staff and community. Time constraints rendered it impossible to include the community user group in this POE, the importance of this user group and the rationale for its exclusion can be found in the Missed Opportunities chapter.

However, in addition to analyzing each of the user groups separately, this POE includes a comparative examination of the patient and staff user experiences.

The chart below compares the old and new Bridgepoint Hospitals and lists the user group that responded most favourably to the various scenarios.

DESTINATION AND USER EXPERIENCE DOs AND DON'Ts

DO

- provide destinations with differing levels of light
- ensure noise levels are minimized, consider auditory masking options
- allow for access to outdoor destinations
- enhance outdoor spaces with furnishings that create a sense of warmth and invite users
- provide sightlines to animated areas outside the hospital

DON'T

- assume that nature is the only meaningful view, consider cityscape and neighbourhood views
- overlook transitions areas as final destinations for sitting and gathering
- design for one purpose, create spaces for a variety of users and uses

Patient Mean Ratings for Impressions of the Indoor Hospital Climate at the Former versus New Bridgepoint Hospital

Natural Light	Bridgepoint Pretest (n = 94)		Bridgepoint Posttest (n = 109)		p
	n	M	n	M	
	90	2.89	99	2.75	.041*

Note. Data based on the answer to the following question: “Have you ever been bothered at the hospital by [insert item here]?” Average ratings were based on 1 = Yes, often (every week), 2 = Yes, sometimes, 3 = No, never. Higher numbers represent a more positive impression.
* = p value ≤ .05. ** = p value ≤ .001. p values are from independent t tests comparing the old Bridgepoint to the new Bridgepoint.

Biggest Complaint Regardless of User (Patients and Staff)

	Bridgepoint Pretest	Bridgepoint Posttest	West Park Pretest	West Park Posttest
Room Temperature is too low	(-.23)	(-.59)	(-.49)	(-.39)

Note. An overall median score was calculated across all indoor hospital climate items separately for each period and site (collapsed across user). Using one-sample t tests, the average score for each indoor hospital climate item was compared against the overall median separately for each site and period. Negative scores represent items that fall below the median (i.e., “more bothered”). Results suggest that the biggest and most consistent complaint across site and period (collapsed across patients and staff) is the room temperature being too low (cold).

Comparing User Experiences

	Old BP	New BP
Who felt more comforted?	Patients	Patients
Who felt more bothered by the indoor climate?*	Staff	Staff
Who felt more connected to the city of Toronto?	Staff	Staff
Who felt more connected to the neighbourhood and community?	Staff	Staff
Who had a stronger sense of belonging to nature and the landscape?		Patients
Who felt like they had more opportunities to visit with others?		Patients
Who had more favourable impressions of the overall hospital design?		Patients
Who felt more cheerful?		Patients
Who had more favourable impressions for wayfinding?		Patients

*draft, room temperature, air quality, noise, natural and artificial lighting levels



THE ANCILLARY EFFECTS OF POSITIVE IMPRESSIONS

It can be argued that the absence of a significant finding can in itself become a significant finding or noteworthy result. This is the case when patient depressive symptomology and optimism levels were compared between the new and old Bridgepoint Hospitals. Surprisingly, there were no differences in the depressive symptomology and the optimism levels of patients in both hospitals.

There were specific expectations about how the design would affect a patient's psychosocial well-being. The design features, among other things, were to boost spirits and morale.

Although the desired uptake in levels of optimism did not present itself, a deeper examination of the findings revealed a supplementary pattern on how patients and staff responded to various design elements. In circumstances where the design intentions resonated with patients and staff residual benefits were detected.

For example, patients and staff that considered the hospital as a place of wellness also experienced perceived improvements in physical health and burnout, respectively. The patients who felt a strong connection to the neighbourhood, city and nature, demonstrated greater overall satisfaction with their stay at Bridgepoint and patients who felt a strong connection to the neighbourhood and the city demonstrated greater self-efficacy in mobility.

These positive outcomes were echoed with patients who felt safe and comfortable.

The staff results proved to be very similar. Staff who felt a strong connection to the neighbourhood, city and nature demonstrated higher levels of satisfaction and general well-being. These responses reappeared with staff who felt comfortable and cheerful in the workplace. Staff who felt safe also demonstrated greater levels of satisfaction.

It would be rudimentary and inaccurate to conclude that these results are a by-product of the participants simply being more positive in their outlook and attitude. When tested on these metrics the results proved negligent, therefore, this response should be attributed the effectiveness of the hospital design.

Enhanced Sense of Belonging & Associated Outcomes

		Outcome
Neighbourhood	Patient	Increased satisfaction (overall and facility specific)
		Increased satisfaction (overall and facility specific)
	Staff	Enhanced workplace interactions
		Decreased burnout
		Decreased intention to quit
Nature	Patient	Increased satisfaction (overall and facility specific)
		Increased optimism
		Perceived improvement in mental* and health overall
		Greater self-efficacy in mobility
	Staff	Increased satisfaction (overall and facility specific)
City	Patient	Increased satisfaction (overall and facility specific)
		Perceived improvement in financial health
		Greater self-efficacy in mobility
	Staff	Increased overall satisfaction
		Enhanced workplace interactions

The inclusion of an established scale to assess Outlook on Life (optimism vs pessimism; Scheier, Carver & Bridges, 1994), enabled us to run analyses to examine whether individuals who are more naturally inclined to be optimistic, those that have an optimistic personality disposition, fare better on any or all of the outcomes of interest in our study, satisfaction, perceived improvement, self-efficacy in mobility and so on.

If the results described above were a by-product of participants having a more positive outlook on life as a general personality trait, we would expect that optimistic people should have correspondingly better outcomes on all of those other measures, satisfaction, perceived improvement, and self-efficacy in mobility. That did not occur, what was discovered was that favourable impressions of the building design and enhanced sense of belonging are responsible for the observed differences described above.

For patients across all sites – the new Bridgepoint Hospital, the former Bridgepoint Hospital, and West Park.

So What if Impressions are Favourable? Some examples...patients

	Overall health	Physical health	Mental health	Social support	Finances
Wellness		✓			
Connection to neighbourhood		✓	✓		
Connection to city					✓
Impressions: Overall			✓		

For patients at Bridgepoint Hospital only

So What if Impressions are Favourable? Some examples...Bridgepoint patients

	Overall health	Physical health	Mental health	Social support	Finances
Wellness		✓	✓		
Connection to neighbourhood		✓	✓		
Connection to city				✓	
Wayfinding				✓	
Cheer		✓		✓	
Impressions: Overall		✓		✓	
Impressions: Surroundings	✓			✓	



V. PUBLIC SPACES



The qualitative and quantitative data both confirm that the opportunity to explore and have access to a wide variety of spaces enhances patients’ psychosocial well-being.

Variety can be created through the flexibility of the space – is it a fixed space or can it be animated in different ways with the use of dividers, movable tables and other furniture? Variety can also be created with the availability of different spaces, indoor or outdoor, active or passive, large or small, private or public, and through a mixed use space for patients, staff and community. The availability of choice leads to a better match with the varied patient needs and interests.

Cafeteria

One destination that is proving to achieve its design intentions is the new Bridgepoint cafeteria.

Its attractiveness is based on the variety that it offers, variety in user groups and activities. Individuals are drawn to active spaces and the cafeteria has been successful in creating the density and diversity of users. It is a welcoming space that is shared between patients, visitors, hospital executives, and front line staff. It is not simply about food consumption; users are drawn to the cafeteria for a variety of reasons including game playing, reading, taking a break, causal team meetings,

enjoying the view of the city scape, and participating in hospital wide or community events such as book sales and farmers’ markets.

The challenge with the cafeteria is that the servery closes at 3pm and although the space continues to be in use the level of animation significantly decreases in the late afternoon.

Further evidence of patients having positive impressions of the cafeteria was discovered in the quantitative survey results, with the most favourable scores being attributed to a sense of belonging. In fact, patients who felt a greater sense of belonging in the cafeteria also proved to be more optimistic and have positive perceptions of improvement in their physical health and financial health. Moreover, when examining a patient’s overall impression of the cafeteria it was easily identified that those who had higher affective impressions were also more satisfied with their hospital stay and felt more efficient in their movements throughout the hospital.

Favourable staff impressions of the cafeteria and their supplementary effects were also noteworthy. Those that reported favourable overall impressions of the cafeteria also revealed a higher level of workplace satisfaction, more favourable workplace interactions and lower intention to quit.

Patient and Staff Impressions of the Cafeteria

			Bridgepoint		West Park	
			Pretest	Posttest	Pretest	Posttest
Accessibility	Patient	n	88	92	55	61
	Staff	M	7.56 _{a1}	8.65 _{b1}	7.75 _{a1}	7.95 _{a2}
Wayfinding	Patient	n	122	160	139	160
	Staff	M	7.30 _{a1}	9.04 _{b1}	7.51 _{a1}	8.41 _{b2}
Safe	Patient	n	90	95	57	61
	Staff	M	7.91 _{a1}	8.79 _{b1}	7.84 _{a1}	8.25 _{a1}
Inspired	Patient	n	123	166	139	165
	Staff	M	8.50 _{a1}	9.17 _{b1}	8.00 _{a2}	8.59 _{b2}
Content	Patient	n	91	94	57	61
	Staff	M	7.78 _{a1}	9.01 _{b1}	8.32 _{a1}	8.56 _{a1}
Proud	Patient	n	123	165	138	164
	Staff	M	8.01 _{a1}	9.16 _{b1}	8.28 _{a2}	8.71 _{b2}
Calm	Patient	n	91	94	57	61
	Staff	M	6.68 _{a1}	7.87 _{b1}	7.18 _{a1}	7.75 _{a1}
Brave	Patient	n	123	166	139	165
	Staff	M	5.71 _{a1}	7.28 _{b1}	6.20 _{a1}	6.21 _{a2}
Calm	Patient	n	91	94	57	61
	Staff	M	6.99 _{a1}	8.38 _{b1}	7.82 _{a2}	8.11 _{a1}
Brave	Patient	n	123	166	139	163
	Staff	M	5.93 _{a1}	7.51 _{b1}	6.54 _{a2}	6.64 _{a2}
Calm	Patient	n	91	94	57	61
	Staff	M	6.56 _{a1}	7.99 _{b1}	7.23 _{a1}	7.89 _{a1}
Brave	Patient	n	123	165	139	164
	Staff	M	5.53 _{a1}	7.49 _{b1}	6.37 _{a2}	6.24 _{a2}
Calm	Patient	n	91	93	57	61
	Staff	M	7.00 _{a1}	8.55 _{b1}	7.81 _{a2}	8.20 _{a1}
Brave	Patient	n	122	166	138	165
	Staff	M	6.34 _{a1}	7.52 _{b1}	6.71 _{a1}	6.76 _{a2}
Brave	Patient	n	91	94	57	60
	Staff	M	7.00 _{a1}	8.23 _{b1}	7.86 _{a2}	8.05 _{a1}
Brave	Patient	n	122	163	136	164
	Staff	M	6.62 _{a1}	7.57 _{b1}	6.67 _{a1}	6.76 _{a2}

Note. 1 to 10 scale, 1 = negative impression and 10 = positive impression; Within rows (i.e., pretest vs. posttest comparisons, separately for each site), means with different subscript letters are significantly different at p ≤ .05. Within columns (i.e., Bridgepoint vs. West Park comparisons within the same period, separately for each user group), means with different subscript numbers are significantly different at p ≤ .05. Post hoc paired comparisons based on Fisher’s LSD.

Staff and Patient Feedback of the Cafeteria

	PATIENTS	BOTH: PATIENTS & STAFF	STAFF
LIKE	• Accessible • Opportunity to people watch • Clean • Ample seating • Inviting	• Spacious • Great view • Opportunity to socialize • Open	• Well-organized • Bright
DISLIKE	• Wish it was bigger • Needs more colour	• Not welcoming • Feels institutional • Cold Atmosphere • Sterile	• Noisy during peak times • Lacks privacy • Difficult to find seat during peak times



Outdoor Spaces

This theme of patients and staff having higher affective impressions of a specific space and then experiencing supplementary positive effects re-presented itself when the rooftop and seating areas were examined. Remarkably, in all locations and for both of the user groups the findings were almost identical.

Patients who had higher overall impressions and a greater sense of belonging (with the exception of the rooftop on this measure) across all spaces also demonstrated elevated levels of optimism and greater satisfaction with their hospital stay. Staff too displayed higher levels of workplace satisfaction and increased workplace interactions. Lower intention to quit was found in staff with higher overall impressions of the rooftop and seating areas.

What is most telling about these findings is the importance of designing not simply for functionality or efficiency, but to understand the impact that human interaction has in these spaces. The cafeteria is not just a place where people eat, the seating area is not just a place where people wait, and the rooftop is not just a place where people can enjoy the sunshine, each space has multiple user groups participating in a variety of activities. Creating a welcoming, animated and engaging space where people

genuinely feel that they belong does have a resounding influence on how we feel physically and mentally. Design features that place a priority on human interaction yield better outcomes for all user groups.

The outdoor destinations that were under study at the new Bridgepoint had some contrasting results with very different levels of usage. The labyrinth and west facing terrace - both located on the main floor - were underused. Narrow accessibility, inadequate animation and environment can all be contributing factors to the limited use of the space.

During the observations, it was noted that only one door could be used to access the west terrace. When users tried to open the other doors, they quickly discovered they were locked and did not attempt to open any of the other doors. Locked doors also limited access to the labyrinth. Furthermore, the lack of animation limited the use of the space, providing infrastructure in the form of furniture and shade can help build the required density that would attract users.

Finally, both destinations have noteworthy environmental challenges. Being situated above the Don Valley Parkway, the west side terrace is consistently noisy and the labyrinth experienced strong wind conditions at all observation times.

Staff and Patient Feedback of the West Side Terrace

	PATIENTS	BOTH: PATIENTS & STAFF	STAFF
LIKE	- Nice space to take visitors - Safe - Open	- Great views - Fresh air	- Close to nature - Well-lit
DISLIKE	- Smells - Difficult to access	- Very noisy due to highway traffic - Too gray and concrete	- Lacks direct sunlight - Lacks privacy - Not enough green space



Staff and Patient Feedback of the Labyrinth

	PATIENTS	BOTH: PATIENTS & STAFF	STAFF
LIKE	Meditative Quality	- Relaxing - Great view - Fresh air - Spacious - Sunny	- Calming - Promotes holistic/spiritual well-being - Safe
DISLIKE	- Doesn't make sense - Lack of awareness - didn't know it was there - Not easily accessible	- Lacks seating - Lacks shade	- Not interested - Too much concrete - Too much noise from the highway





Rooftop Terrace

The rooftop terrace is the outdoor destination that is achieving its design intentions. It is the most coveted spot in the building with a variety of users and a variety of uses. When you consider these findings, it is a surprise to learn that this is an amenity that almost never made it to fruition. The original hospital design called for an eleven floor hospital with a green roof. However, the feedback from the Ministry of Health and Long Term Care included a request to reduce the overall size of the project, and as a result of value engineering, a floor and a half was removed. The south end of the top floor was transformed into an outdoor space taking advantage of the breathtaking views of the city and surrounding parks and neighbourhood.

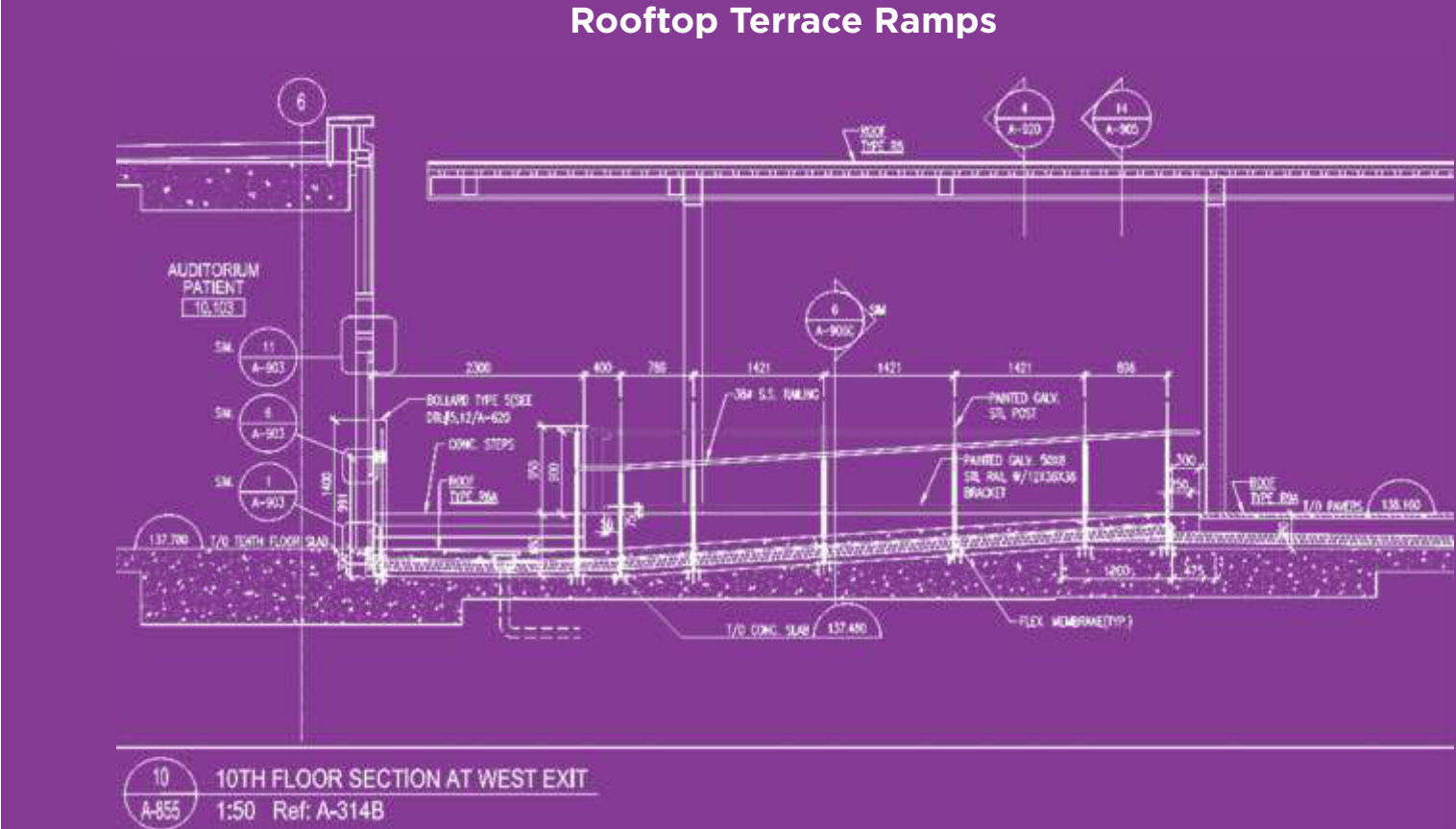
Staff, patients, visitors and community neighbours frequent the rooftop on a regular basis. Their activities range from lounging in the sun, enjoying the views and landscape and visiting with others. Although hospital policy prohibits food and drinks, it has been regularly noticed that users enjoy having a meal or

beverage on the rooftop. It is both a social and contemplative place.

For patients, the rooftop terrace has produced some intended and unintended uses. Recreational therapy allows patients to participate in a gardening program where they plant and tend to their flowers. But a desire for continued rehabilitation produced some interesting findings.

Having opportunities to pursue voluntary or self-directed rehabilitative activities enhances a patient's psychosocial well-being. Patients expressed a desire to keep working and "get back out there". The challenge was to find opportunities to continue their rehabilitative exercises and activities outside of therapy hours.

Patients were on a journey to find publicly available, easily accessible and known practice spaces, such as ramps, railways, hallways, and stairs. The rooftop terrace was equipped with all of these resources and transformed into a physical therapy destination for patients.



CODE REQUIRES THAT WHEELCHAIR RAMP BE A RATIO OF 1 IN 12, FOR EXAMPLE, ONE INCH UP FOR EVERY TWELVE INCHES HORIZONTAL. BOTH RAMP ON THE ROOF GARDEN ARE SHALLOWER, THEY ARE 1 IN 16. THIS RESULTS IN A LESS STEEP SLOPE THAN REQUIRED BY CODE, HOWEVER AS A RESULT OF THIS GRADE THE RAMP INCREASES IN LENGTH AND MAY BE ONE OF THE CAUSES FOR DIFFICULTY OF USE. WILLIAM SUAREZ.

Staff and Patient Feedback of the Rooftop Terrace

	PATIENTS	BOTH: PATIENTS & STAFF	STAFF
 LIKE	- Feeling of Freedom - Plenty of seating options	- Open space - Great view - Fresh air and sunlight - Garden	- Quiet and relaxing - An "escape" from the work environment
 DISLIKE	- Difficult to access - only one set of doors - Lack of awareness - did not know of the space	- Ramp too steep - see opposite - Not easily accessible	Food prohibitions - unable to bring food outside



Seating Areas

Our ability to maintain a connection is dependent on proximity. To that end hospital entrances and waiting areas have demonstrated to be spaces that attract both active and passive users.

The active users are passing through the space as part of their daily routine, entering, exiting or going outside for a coffee or cigarette break. The passive user sees this as an opportunity to maintain that connection to the outside community. They simply observe the comings and goings of others, gaze through the large windows and stay abreast of community activity. It is the passive users' attempt to maintain that sense of belonging and connection to the outside.

For non-patient users, transitory spaces go relatively unnoticed: they are a thoroughfare that leads to their final destination. But for patients, transitory destinations can be their final destination. When asked about their impressions of the seating areas, patient responses were overwhelmingly positive.

While all posttest Bridgepoint scores improved, the most significant increases were attributed to feeling safe, inspired and content. These are all positive reflections on the hospital design intentions of motivating patients “to get back out there”.



HUB OF ACTIVITY AT THE MAIN ENTRANCE. WILLIAM SUAREZ.

Patient and Staff Impressions of the Seating Areas

			Bridgepoint		West Park	
			Pretest	Posttest	Pretest	Posttest
Accessibility	Patient	n	87	94	56	61
		M	5.91 _{a1}	8.66_{b1}	7.71 _{a2}	8.44 _{a1}
	Staff	n	-	155	-	157
		M	-	9.05 ₁	-	6.43 ₂
Wayfinding	Patient	n	90	96	57	61
		M	7.46 _{a1}	8.61_{b1}	7.93 _{a1}	8.80_{b1}
	Staff	n	-	159	-	161
		M	-	8.97 ₁	-	6.61 ₂
Safe	Patient	n	89	96	57	61
		M	6.87 _{a1}	9.03_{b1}	8.39 _{a2}	8.89 _{a1}
	Staff	n	-	158	-	159
		M	-	8.85 ₁	-	7.18 ₂
Inspired	Patient	n	89	95	57	61
		M	5.64 _{a1}	7.86_{b1}	7.58 _{a2}	8.30 _{a1}
	Staff	n	-	158	-	157
		M	-	7.87 ₁	-	5.76 ₂
Content	Patient	n	89	95	57	61
		M	6.17 _{a1}	8.31_{b1}	7.98 _{a2}	8.59 _{a1}
	Staff	n	-	158	-	157
		M	-	8.01 ₁	-	6.03 ₂
Proud	Patient	n	89	95	57	61
		M	5.85 _{a1}	8.17_{b1}	7.81 _{a2}	8.11 _{a1}
	Staff	n	-	158	-	159
		M	-	8.00 ₁	-	5.81 ₂
Calm	Patient	n	89	96	57	61
		M	6.57 _{a1}	8.30_{b1}	8.11 _{a2}	8.64 _{a1}
	Staff	n	-	159	-	157
		M	-	8.11 ₁	-	6.18 ₂
Brave	Patient	n	88	95	57	61
		M	6.40 _{a1}	8.20_{b1}	7.86 _{a2}	8.52 _{a1}
	Staff	n	-	156	-	159
		M	-	7.96 ₁	-	6.02 ₂

Note. 1 to 10 scale, 1 = negative impression and 10 = positive impression; Within rows (i.e., pretest vs. posttest comparisons, separately for each site), means with different subscript letters are significantly different at $p \leq .05$. Within columns (i.e., Bridgepoint vs. West Park comparisons within the same period, separately for each user group), means with different subscript numbers are significantly different at $p \leq .05$. Post hoc paired comparisons based on Fisher's LSD.

Staff and Patient Feedback of the Seating Area

	PATIENTS	BOTH: PATIENTS & STAFF	STAFF
 LIKE	• Change of scenery • Opportunity to socialize and people watch • Use as waiting area	• Spacious • Comfortable	• Good space to take a break • Plenty of seating
 DISLIKE	• Feeling of wasted space • Lack of seating • Cold, uninviting, needs decor • Lacks privacy • No definition - feels like sitting in a hallway	[no common dislikes]	• Does not facilitate conversation



OPPORTUNITIES FOR SOCIAL INTERACTION DOs AND DON'Ts

DO

- provide opportunities for **serendipitous encounters** among staff throughout the hospital
- test the right balance of **scale and density** during the entire design process
- situate **social areas** near hubs of activity and foot traffic
- position **workspaces** in central hubs that encourage interdisciplinary teamwork and collaboration
- design seating areas with a **sightline** to indoor and outdoor activity, in proximity to entrances, reception areas, retail spaces and waiting areas

DON'T

- increase scale as the cost of **community density**
- **collocate** staff and patient lounges
- situate social spaces and lounges at the **ends** of corridors

Communal Dining Areas

One design feature that proved difficult to assess effectiveness in achieving its design intentions was the communal dining areas that are located on every patient floor.

At most observation times, the spaces were empty. When they were in use, it seemed to be a result of a specially scheduled recreational therapy activity.

For the design aspirations to be realized or evaluated fairly, the introduction of the originally intended hospital programing, of meal delivery service, to these areas needs to be implemented as soon as possible.

Furthermore, an awareness campaign needs to be created as many patients were oblivious to the existence of this space and its intended use.

Patient Feedback of the Communal Dining Areas



LIKE

- Very open and spacious
- Place for socializing and entertaining visitors
- Bright, large windows capture the sunlight
- Convenient
- Highly accessible
- Enjoy access to the appliances



DISLIKE

- Sterile looking in need of colour
- More seating and tables are needed
- Wasted space not used very often
- Lack of privacy



Staff and Patient Feedback of the Ambulatory Care Terrace



LIKE

PATIENTS

- Access to outdoors
- Nice view - access to greenery
- Wheelchair accessible
- Seating space
- Social space

BOTH: PATIENTS & STAFF

- Openness of space

STAFF

- Well-organized
- Not cluttered
- Accessible from street



DISLIKE

- No covered areas
- Doors not wide enough
- Too many smokers
- Unsafe - too much traffic

- No sitting areas
- Dirty, littered and unsightly
- No place for social interaction



PATIENTS ENJOYING THE WEST SIDE TERRACE. TOM ARBAN.



IMAGES ON THIS PAGE BY TOM ARBAN, WILLIAM SUAREZ, AND RESEARCHERS



Staff Feedback of the Staff Workspace



LIKE

- Spacious and bright
- Quiet
- Clean and organized
- Good view, if you have a window



DISLIKE

- No windows to the outside
- Lack of privacy – interruptions from patients/visitors
- Spaces are bland
- Isolated

Patient Feedback of the Patient and Visitor Lounge



LIKE

- Windows
- Access to a television
- Watching the scenery at night
- Comfortable and quiet



DISLIKE

- Furniture not complementary for patients with mobility challenges
- Can be loud



Staff Feedback of the Staff Lounge



LIKE

- Nice view to the park
- Quietness
- Comfortable and inviting
- Clean



DISLIKE

- Being next to the patient lounge staff often get disturbed during their break by patients
- Too small, over crowded

Patient Feedback of the Physiotherapy Gyms



LIKE

- Windows, bright and spacious
- Nice space, large and open
- Access to a variety of equipment
- Well laid-out
- The view



DISLIKE

- Doors close too fast
- Could use some colours
- Small
- Parallel bars could be longer





VI. MISSED OPPORTUNITIES



COMMUNITY USER GROUP

Despite being an integral part of the design intentions there was a key user group whose impressions of the hospital design were not captured in this study. In a conscious effort to draw in the community, there was a deliberate blurring of the boundaries between community and hospital spaces. It is envisioned that members of the community would frequent the retail spaces, enjoy the parks and gardens and take advantage of the city scape views on the west side terrace or rooftop terrace.

The two factors contributing to this exclusion is ultimately a result of timing. Although the hospital is fully operational, the completion of the entire redevelopment project is still a few phases away. While the researchers were in the field collecting data, the demolition of the old Bridgepoint Hospital was in its advanced stages. Once completed that very same space will be a welcoming civic piazza linking the hospital with the community.

The second challenge was the nature of the POE funding. With the financing being tied to the redevelopment budget, the POE was conducted within a very tight timeline commencing shortly after the move into the new building. Traditionally, POEs are conducted at least a year after a facility has been occupied or fully operational.

A RETURN VISIT

Once the redevelopment project has concluded, it would be a worthy investment to return and complete the POE and capture the community user group experience. This group plays a crucial role in how the design intentions are able to achieve their goals, particularly in maintaining that connection to the neighbourhood and community.

A subsequent evaluation of the site wouldn't be as rudimentary as simply determining whether or not the community is using the space and their impressions of it. The evaluation would focus on what is happening as a result of the community usage.

IMPACTS OF COMMUNITY USE

The community user group has the potential to impact both patients and staff, by validating and maintaining that connection to the community. Furthermore, their presence on site would add to the density of the hospital, which at times can seem quite barren. They also would affect the onsite retail stakeholders. If there is a significant community presence, would that translate to increased revenues for the existing vendors and attract new ones? Conversely, if the community user group fails

to materialize, would that make it less desirable for businesses to operate and lead to vacant retail spaces?

We know that patients and staff view Bridgepoint as a place of wellness and not illness, yet, we have no information about the community's impressions of the hospital. The piazza, retail spaces, outdoor amenities and emerald green parks were designed to entice the community to use and consider the hospital's public spaces as their own. However, one needs to consider whether these features are appealing enough to overcome an individual's innate instinct not to frequent a hospital if they aren't required to.

Continuing this POE at a later date and capturing the community user group experience would provide valuable answers and offer a more complete assessment of the hospital's design intentions.





VII. IMPROVING THE POE PROCESS



IMPROVING THE POE PROCESS

The POE of Bridgepoint Hospital is the largest ever conducted for a healthcare facility in Canada. The findings not only provide an invaluable roadmap to understand what design elements have the greatest impact on health outcomes, but, it also establishes a processes on how to execute future POEs on any healthcare or public facility. The following is a series of recommendations that address the importance of POEs and how they should be conducted.

A SYSTEMIC APPROACH TO POE

POEs need to be mandatory for all hospital infrastructure projects

In Ontario, billions of dollars have already been earmarked for future hospital redevelopment projects, and as with any sizable financial commitment, investors are always trying to identify the potential return on their investment. It is vital that we move beyond the simplistic evaluation of whether a project was built on time and on budget. These are two very important factors to a redevelopment project, but it does not tell the entire story. It is time to embrace a more innovative approach to evaluating these capital investment projects. We need to be able to understand what design features work best for the different user profiles and we need to be able to draw on past experiences and identify what design features - both intended and unintended - were successful and what design features required

further support and animation before their objectives were achieved. These findings can only be discovered through a post occupancy evaluation.

Being the first of its kind and scope, this project developed its own tools for evaluation that included computer assisted software, methodology protocols, training manuals, patient recruitment guidelines, analytical tools, and standardized reporting templates. This is just a sampling of the resources that were created to implement this study. One of the lessons learned from this evaluation is the importance of having standardized POE guidelines and practices.

Health capital investment projects differ in purpose as they cater to different patient populations. As a result, the design intentions, features and outcomes to be assessed will differ across healthcare redevelopment projects. Nevertheless, it is our recommendation that the process for conducting POEs be standardized. The same framework, methods and metrics should be used to harvest the data and the same format should be used to present the data.

POE information and outcomes need to be stored in a database

A consistent approach would facilitate the proper integration of information in a database containing information collected from previous POEs.

Over a period of time, this valuable resource

would be able to generate statistical comparisons across projects and increase our knowledge of what designs work and who experiences the greatest benefit - patients, staff or the community. It would offer the advantage of cross referencing the type of facility - acute care hospital, emergency room, mental health facility, rehabilitation centre or a complex continuing care centre.

Many stakeholders would benefit from the creation of a database sustained by the incorporation of POE data - researchers, academics, students, designers, clinicians, patient advisory groups, and most importantly it would provide ongoing research evidence and assist with the decision making process on capital investment projects at the Ministry of Health and Long Term Care.

Governments across Canada will continue to make worthy investments in hospital infrastructure and it is our recommendation that POEs be conducted at every facility and the findings be stored in a database. This combination of evaluation and information retrieval can only enhance the process and lead to better outcomes for users and better returns for investors.

The selection of independent third party evaluators

Equally important to the execution of the POE and to the storage of its findings is the question of who conducts the POE. In order to guarantee the integrity of the data, the evaluators must have research expertise in

methods and measurement, superior data analysis skills, research ethics that are beyond reproach and a sizeable human resources network that is capable of conducting the field research.

Furthermore, the most essential factor is that the evaluators are unbiased and lack a vested interest in the outcome. An established partnership with the hospital under study and the architects responsible for facility design is essential to the POE. However, a fundamental concept in evaluation research is to ensure that it is conducted by an independent third party that is not beholden to the hospital or architectural firm.

Evaluators are to be included from the onset of the redevelopment project

The findings of this POE not only provide an invaluable roadmap on understanding what design elements have the greatest impact and health outcomes, but it also establishes a process on how to conduct POEs on any healthcare or public facility.

Although it is a post occupancy evaluation, pre-move and post-move assessments are required to better establish a cause and effect relationship between architectural design and health outcomes. Moreover, it is essential that the evaluators are present and active from the inception.

The framework, methods and measures are as much a tool for the design process as they are tools for pre and post occupancy evaluation.



In the planning and design phase, it is customary for architects to conduct visioning sessions and engage with patients, staff and other user groups. The methods and tools we have developed can be used in these early planning and design stages of redevelopment. This process will capture patient, staff and stakeholder experiences, an insight that will better shape and identify the optimal design outcomes.

This stage of the design process will only increase in significance, as the new requirements in Requests for Proposals (RFPs) from Infrastructure Ontario mandate user experience as required research. Therefore, involvement of researchers in the early phases of design is as important as their involvement in the POE.

ALLOWING FOR EASIER ACCESS TO PATIENTS

In any research project, test subjects are required to produce data for analysis. One of the most challenging issues with the implementation of the POE was in the recruitment of patients.

Three areas that have been identified as priorities that need drastic improvement.

Access to patients - Hospital protocol required that patient care managers obtain

consent from patients before they are approached by the research team. This intermediary step produced unintended obstacles to the implementation of the study. Due to competing priorities, the responsibility was often delegated to another staff member with a limited understanding of the importance of the study or what type of patient met the criteria to participate. This resulted in lost time and resources pursuing approvals from patient care managers and pursuing patients who ultimately could not complete the survey.

Scheduling - Once a suitable patient was identified to participate in the survey, the next challenge was actually completing the survey in one sitting. Researchers were unable to coordinate with patient care managers and schedule times when patients would be available to conduct the survey. Conflicts often arose with a patient's therapy session and on several occasions they would be rendered temporarily unavailable due to just receiving their daily medications.

Communication - An inability to establish a free flowing interaction between a patient and a researcher quickly became a reoccurring theme. Failing to fully understand the intricate nature of the survey, patient care managers would recommend patients whose cognitive ability or language skills were not of the level to seamlessly complete the survey. Translators from volunteer services are in theory a valuable

resource to remedy this problem; however, due to the inability to set scheduled times, the volunteers were seldom on site when needed and thus, rarely ever used. A way to overcome these challenges is to incorporate an opportunity during the admitting process for patients to opt into the research study and provide their consent. The research group would then be provided with the patient profile and determine their eligibility to participate. If all of the criteria are met and the patient is deemed eligible, hospital staff working in cooperation with patient care managers and therapists would book a time to conduct the survey. Finally, at the predetermined time, the researchers and if needed, a volunteer translator would arrive and complete the survey.

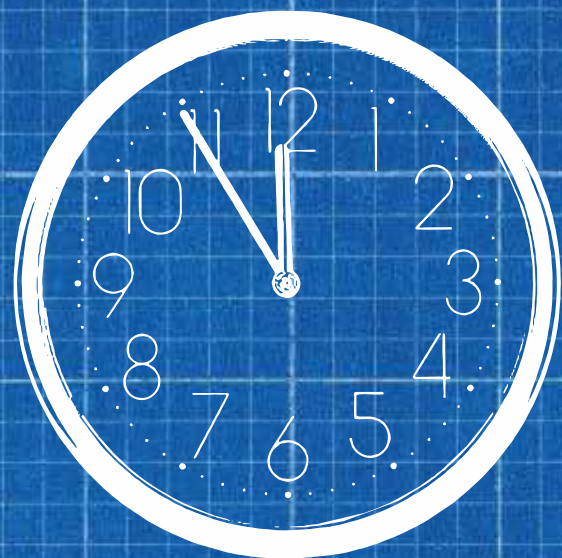
STANDARDIZING THE FINANCIAL SUSTAINABILITY OF POEs

The Health Capital Investment Branch of the Ontario Ministry of Health and Long Term Care approved \$318,872 in ancillary project funding to support the POE of the new Bridgepoint Hospital. These funds were successfully leveraged as partnered funding to secure over half a million dollars for this program of research via a Canadian Institutes of Health Research Partnerships for Health System Improvement grant as a novel contribution to the field. Moreover, the

Bridgepoint Collaboratory for Research and Innovation covered the costs of the lead scientists' salary and laboratory space over the course of the POE.

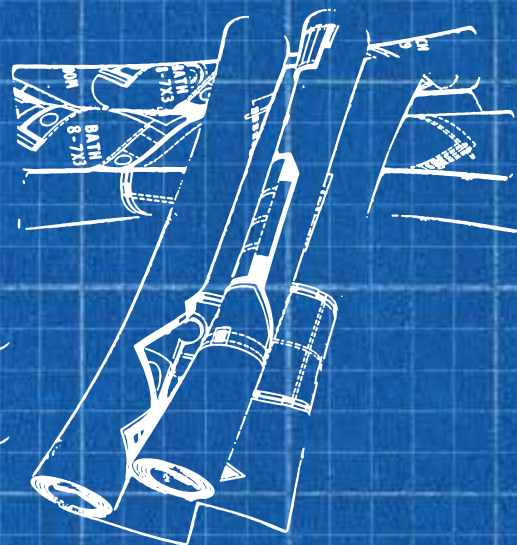
Funding is required to ensure the sustainability of POE research. In Ontario, all new Requests for Proposals (RFPs) mandate a required research component for hospital redevelopment projects. The required research includes research at various phases of the design process as well as POE. Other jurisdictions in Canada could either mirror Ontario's approach, or consider creating their own unique funding formula that would be incorporated into the RFP process. The concept could require the various stakeholders involved in the design, build and maintenance of the facility to be responsible for contributing their equitable share into a POE fund.

Financing for this project was tied to the hospital's redevelopment budget and as a consequence the POE was conducted under a very condensed timeline. This tight timeline impacted data collection efforts at all three sites. Harvesting of data at the new and old Bridgepoint Hospitals was directly tied to progress on the construction site and the move date. Furthermore, the second data collection period at West Park Healthcare Centre (control site) occurred within six months of the initial data collection. Traditionally, POEs are conducted at least one year after a facility has been occupied or deemed fully operational and, ideally, the pre and post interviews at the control site would have been completed one year apart.



1 Scheduling the optimum time to initiate the process

2 Documenting the design intentions



3 Outlining the human resource needs, who does what and when



4 Inviting stakeholder participation

5 Determining the type of evaluation most suited for the project

VIII. PLANNING GUIDE

Identifying the quantitative research methods needed

6 + 7

Identifying the qualitative research methods needed



8 Categorizing data collection formats

9 Understanding the importance of measurements and scale

10 Itemizing the expected outcomes



11 Evaluating appropriate control or test sites

12 Developing knowledge translation exercises



PLANNING GUIDE
TOOL KIT

As governments across the country continue to invest in healthcare infrastructure, some forward thinking jurisdictions are mandating a required research component in their RFPs. Research teams will now be expected to work hand in glove with planning design and compliance teams.

In order to successfully complete their evaluation, research teams will be supported by an innovative, practical and publically accessible POE guide. This new guide will be a unique and instrumental resource for conducting research driven POEs. As healthcare infrastructure is modernized it is essential that we heighten our understanding of the full impact of how design affects health outcomes. We can only truly discover what works and what doesn't work, by analyzing evidence gathered from research and how it relates to the hospital environment. It is unacceptable to expect multi-billion dollar decisions to be based on anecdotes, gut instinct or intuition.

The planning guide is a key building block to guaranteeing the sustainability of POEs. The guide will assure the integrity and usefulness of the data that is collected, consequently, justifying the financing of the exercise. To create a useful evidence bank, you need comparable data that can be used to assess impact across redevelopment projects. The way to achieve this is to establish standardized guidelines for harvesting the information; it would include but not be limited to guidelines for the type of research design, the research methods to be used, the measures to be assessed and the ways to measure outcomes of interest.

The planning guide would essentially become a tool kit assisting the evaluators with some of the more rudimentary tasks as well as some of the more complex and sophisticated elements of conducting a POE. The key features of the planning guide are described on the opposite page.



1
SCHEDULING THE OPTIMUM TIME TO INITIATE THE PROCESS

2
DOCUMENTING THE DESIGN INTENTIONS

3
OUTLINING THE HUMAN RESOURCE NEEDS, WHO DOES WHAT AND WHEN

4
INVITING STAKEHOLDER PARTICIPATION

5
DETERMINING THE TYPE OF EVALUATION MOST SUITED FOR THE PROJECT

6
IDENTIFYING THE QUANTITATIVE RESEARCH METHODS NEEDED

7
IDENTIFYING THE QUALITATIVE RESEARCH METHODS NEEDED

8
CATEGORIZING DATA COLLECTION FORMATS

9
UNDERSTANDING THE IMPORTANCE OF MEASUREMENTS AND SCALE

10
ITEMIZING THE EXPECTED OUTCOMES

11
EVALUATING APPROPRIATE CONTROL OR TEST SITES

12
DEVELOPING KNOWLEDGE TRANSLATION EXERCISES

The publication of this resource is the next phase of this research project and will be made available to the public in 2015.

IX. DESIGN RECOMMENDATIONS



DESIGN RECOMMENDATIONS

The design intentions of the new Bridgepoint Hospital were to enhance a patient's connection to the community, nature and urban environment, and to include features that will increase social interaction and inspire physical activity. The intended goal was that the collection of design features would eliminate the psychological obstacles to healing, boost spirits and morale, and motivate patients to re-engage in life. The following are three design recommendations that are based on the findings of this POE.

Patients need a view of their own

The findings illustrate that patients thoroughly enjoy the meaningful views in the hospital. It is of significant importance when we consider the access to natural sunlight and meaningful views in a patient's room. It is recommended that future hospitals be designed following the Bridgepoint model, where each patient bed - regardless of whether their room is private or semi-private and regardless of whether or not the privacy drapes are drawn, be positioned to ensure a direct sightline to the outdoors.

Quality outdoor spaces not quantity

Outdoor spaces are very popular, but the results show that the quality of the space is more important than the quantity of spaces that are available to patients and staff. Whereas the rooftop terrace, west side terrace and labyrinth all have spectacular views of the city skyline and surrounding areas, only the rooftop terrace has agreeable environmental

conditions. As a result of being situated right above a very busy highway - the Don Valley Parkway - the west side terrace is noisy. The labyrinth experiences strong wind conditions on a regular basis and is void of shaded areas. These environmental challenges are attributing factors to their underutilization.

In addition to meaningful views and access to nature, outdoor destinations require a certain level of animation to attract users. This animation can occur through a variety of techniques, some quite simple and others perhaps more complex. For example, the solution could rest with furnishing an under used space that would allow people to gather and socialize, or hospital and social programming can be introduced to drive users to a particular space.

Having favourable environmental conditions is not the only reason why the rooftop is proving to be such a useful and popular outdoor destination. It has plenty of seating and includes recreational therapy exercises for patients. The gardening program has been so successful in that space that patients have shared their stories on how they would regularly revisit the rooftop simply to monitor the progress on their gardening endeavours. In contrast, the west side terrace and labyrinth were less successful in achieving the required levels of animation to attract potential users. On the west side terrace there was little in terms of furnishings and its placement seemed ad hoc or randomized at best. Hospital or social programming was non existent for both the west side terrace and labyrinth.

In future hospital designs and concepts, it is recommended that the quality of the outdoor space take priority over the quantity of spaces. Furthermore, the quality of a space is to be measured by level of agreeable environmental conditions and the ability to create and maintain proper levels of animation.

Social spaces need to be strategically located by hubs of activity

The social areas that have demonstrated high volumes of usage are the cafeteria and the seating areas located by the entrance to the hospital. With respect to the cafeteria, it would be too simplistic to conclude that users are there for food consumption only. In actuality, it is a location that serves a variety of uses over and above food consumption and the diversity of users is remarkable. In this space, senior hospital leadership, front line staff, visitors and patients all interact in the same location.

The seating areas also exhibit the same diversity of user groups. Located in proximity to the hospital entrance it is a thoroughfare

used by staff, patients, community members and visitors. The buzz of activity even attracts the most passive of users who simply want to observe the passers-by.

The internet café on the fifth floor and patient lounges are two examples of social spaces that are not attaining their intended levels of use. The internet café is located on a floor that houses most of the facilities mechanical equipment, staff meeting rooms, a teaching room and spiritual care. The patient lounges are located in isolation at the most northern and southern extremes of the patient units and in order to gain access patients need to navigate their way through a set of double doors. Their secluded locations and limited animation are all contributing factors as to why these locations are failing.

To foster sustained usage, future projects need to be more strategic in the placement of social spaces. They need to be located in closer proximity to hubs of activity and be able to generate acceptable levels of animation for active and passive users.



X. CONCLUSION & REFERENCES



CONCLUSION

This POE was led by a core team of 12 people and supported by 22 research trainees and collaborators. It lasted over 1,460 days, evaluated three facilities and included 333 patient and 646 staff respondents. The enormity of this task was equaled by the enthusiasm exhibited by all of those who participated in this trailblazing project.

The landscape in Ontario has created the conditions for a new normal. All future healthcare redevelopment projects will include mandatory POEs and research. As the Canadian population continues to evolve and the advances of modern medicine cure the once incurable, the healthcare needs of Canadians will change too. We encourage other provinces and regional health authorities to embrace that same spirit and include mandatory POEs and research in their own projects. It is never too late to introduce sound, responsible and effective policy.

We now have the ability to methodically evaluate healthcare redevelopment projects and the inherent responsibility of using the

findings to influence future designs and concepts. It is self-evident that West Park Healthcare Centre’s participation in this POE will produce sizable dividends for their redevelopment in the years to come. However, the future is now, and POEs can impact the present. This POE highlighted a variety of underperforming areas in the new Bridgepoint, but it also made a series of cost-effective recommendations on how to remedy and improve these deficient areas. Simple solutions can be found through the reanimation of space by introducing new furniture, shading or hospital programming. Not only do POEs provide inspiration for future projects, they help optimize the operations at existing hospitals.

The patient population is rapidly changing and the acute care system that was the bedrock and foundation of the healthcare system can no longer be relied upon to provide solutions for the patients of tomorrow. The future of healthcare will be one of inter-professional teams, specialized hospitals and community based care. POEs

will assess our response to the changing healthcare landscape and determine if we have appropriately responded to the challenge of establishing new models of care that accurately reflect the needs of the patient population.

The status quo is no longer a viable or sensible option. In this respect, Ontario is leading the way. Ontarians are witnessing a hospital infrastructure boom with POEs and research playing an integral role in ensuring that these investments deliver their expect returns. By failing to incorporate mandatory research and evaluation in their redevelopment projects other provinces and regional health authorities run the risk of

losing generations of valuable data that can be used to safeguard the sustainability and reliability of our healthcare system.

We are in a very fortuitous position where we can develop a new series of standards that are based on building design and not based on square footage or surface areas.

This innovative POE has broken new ground and has proven that we can dive deeper into the research and move beyond traditional approaches that evaluate hospital admissions and data points and into a different realm that includes a patient’s psychosocial well-being, user experiences, and the impact of natural light and social spaces.

This POE has shown us that patients are turning the page and believe that they are no longer going to a hospital because they are sick, but they are going to a hospital so that they can get better.





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WHILE IN THE PATIENT RESOURCE CENTRE, PATIENTS MAINTAIN THEIR VIRTUAL CONNECTION TO FRIENDS, FAMILY AND CURRENT EVENTS. WILLIAM SUAREZ



REHABILITATION POOL. TOM ARBAN.

TEAM ACKNOWLEDGEMENTS



Dr. Celeste Alvaro

Principal, Methologica (Formerly CARE)
an Applied Research and Evaluation Firm

Dr. Alvaro holds a Ph.D. in experimental social psychology from Simon Fraser University (2004). Upon completing her doctoral studies, she pursued a three-year post-doctoral fellowship at the Atlantic Health Promotion Research Centre, Dalhousie University, where she coordinated a multi-centre grant examining settings, communities, and the built environment. She then held a two-year limited term position as Assistant Professor (Research) in the Faculty of Health Professions at Dalhousie University. She was based at the Atlantic Health Promotion Research Centre (AHPRC), with a secondment to Public Health Services, Central District Health Authority to lead research development and research capacity building activities.

In January 2011, Celeste was recruited as a Research Scientist to lead a program of research on architecture and health at the Bridgepoint Collaboratory for Research and Innovation, Bridgepoint Active Healthcare. Celeste holds an appointment as Adjunct Professor in the Department of Architectural Science at Ryerson University, as of September 2011.

In building her team for this project, Dr. Alvaro's objective was to create a distinguished group consisting of academic researchers, high level decision makers, principal architects in the field of healthcare facility design, and healthcare directors.

The team members have been actively involved in all phases of the research, from early conceptualization, research design and measure development, as well as the creation of the knowledge translation plan. This plan recognizes the importance of promoting and sharing research findings, recommendations and best practices for the benefit of both, private and public sectors, and ultimately for improving patient care.

The Health Capital Investment Branch of the Ontario Ministry of Health and Long Term Care approved \$318,872 in ancillary project funding to support the post occupancy evaluation of the new Bridgepoint Hospital. The funds were requested in the Bridgepoint Health Redevelopment Final Estimate Cost (FEC) and supported by a business case submission. These funds were successfully leveraged as partnered funding to secure an additional \$504,018 for this program of research via a CIHR Partnerships for Health System Improvement grant.

ADDITIONAL CORE RESEARCH TEAM MEMBERS

Cheryl Atkinson, BArch, OAA, MRAIC

Assistant Professor, Department of Architectural Science, Faculty of Engineering and Architectural Science, Ryerson University

Gregory Colucci, OAA, MRAIC

Principal, Diamond Schmitt Architects

Stuart Elgie, OAA, MRAIC

Principal, Stantec Architecture

Paula Gardner, PhD

Assistant Professor, Department of Health Sciences, Brock University; Affiliate Research Scientist, Bridgepoint Collaboratory for Research and Innovation; Assistant Professor (Status), Dalla Lana School of Public Health, University of Toronto

Mitchell Hall, OAA, MRAIC

Principal, KPMB Architects

Clifford Harvey, BArch, MSc (HQ), OAA, FRAIC

Former Senior Architect, Health Capital Investment Branch, Ontario Ministry of Health and Long Term Care; current VP Planning, Facilities and Support Services, North York General Hospital

Tony Khouri, PhD, PEng

Former Chief Facilities Planning & Redevelopment Officer, Bridgepoint Active Healthcare; current VP Facilities and Capital Redevelopment, Mount Sinai Hospital

Deyan Kostovski, AMA

Knowledge Translation & Communications Strategist, Strongbow Strategies

Renée Lyons, PhD

Founding Chair and Scientific Director Emeritus, Bridgepoint Collaboratory for Research and Innovation; Professor, Dalla Lana School of Public Health and Institute for Health Policy, Management and Evaluation, University of Toronto

Andrea Wilkinson, PhD

Postdoctoral Fellow, Bridgepoint Collaboratory for Research and Innovation

Kate Wilkinson, RN, BScN, MHSc

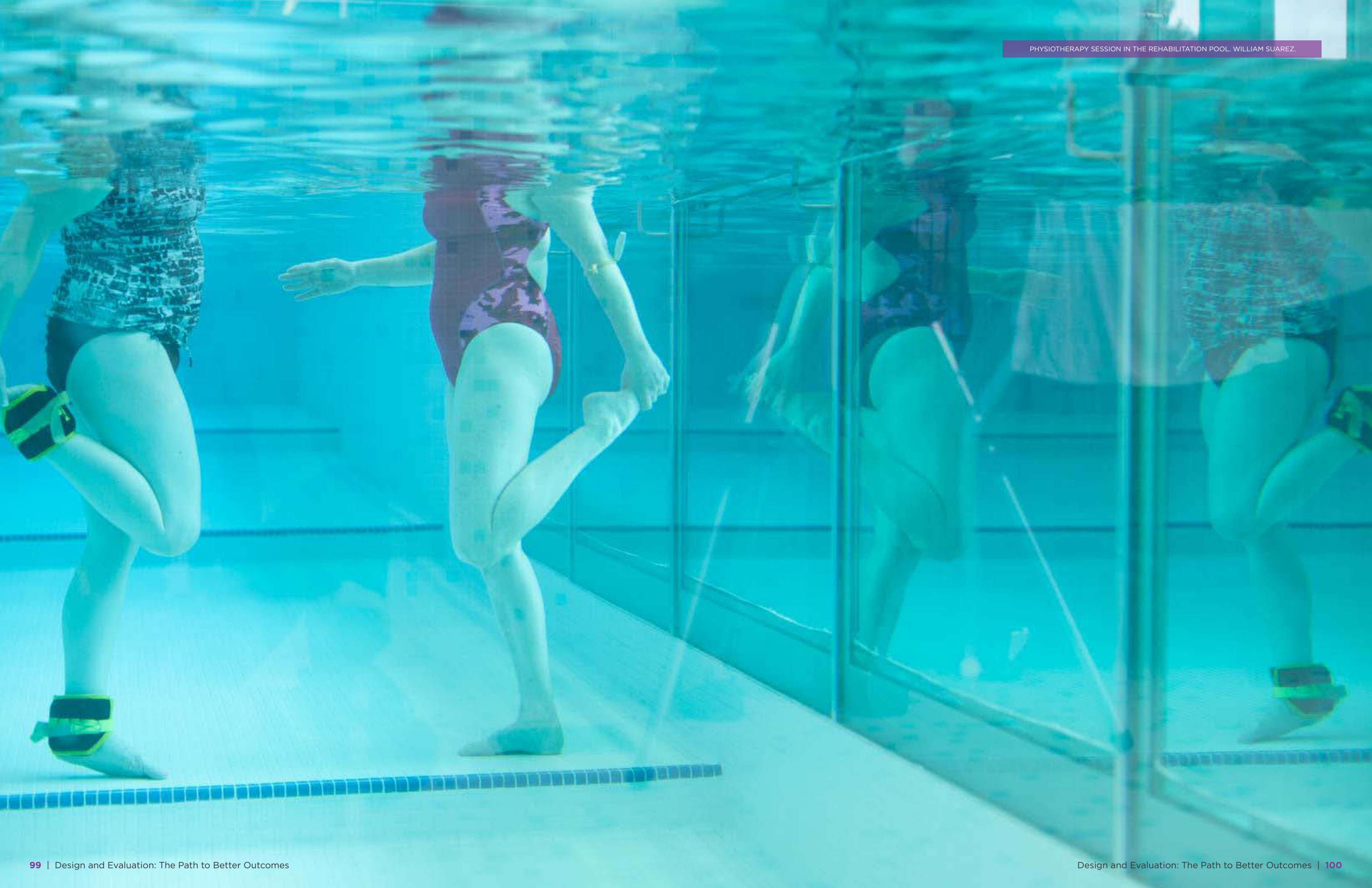
Former Director, Patient Quality and Safety, Bridgepoint Active Healthcare; Current Associate VP Patient Quality, Markham-Stouffville

RESEARCH TRAINEES AND COLLABORATORS

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