

**THE PSYCHOLOGY OF WAITING:  
DESIGNING FOR SATISFACTION IN EMERGENCY DEPARTMENT  
WAITING ENVIRONMENTS**

by

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A practicum submitted to the Faculty of Graduate Studies of  
The University of Manitoba  
in partial fulfillment of the requirements of the degree of

**MASTER OF INTERIOR DESIGN**

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## **ACKNOWLEDGEMENTS**

I would like to start by thanking my committee members: Dr. Cynthia Karpan, Dr. Shauna Mallory-Hill and Dr. Wes Palatnick for your guidance and expertise throughout the duration of this practicum.

To my parents, thank you for your encouragement and continual support throughout my education. I wouldn't be where I am today without you both.

Justin, thank you for your unwavering support and patience. You have been my rock throughout this journey.

**ABSTRACT**

This practicum project investigates current emergency department waiting room models and explores how the psychology of waiting can be applied to positively influence the waiting experience. This culmination of research, coupled with concepts of evidence-based design (EBD), precedent research and regional site visits result in an understanding of emergency department waiting that challenges current emergency department design. This knowledge led to the formulation of a theoretical framework and hypothetical design proposal that aims to uncover, identify, and integrate design concepts known to influence emergency department waiting environment satisfaction.

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## **CHAPTER 1: INTRODUCTION**

### 1.1 PROJECT DESCRIPTION

In Canada, waiting for health care services may be inevitable, but it does not mean that long and stressful wait times are acceptable. Media reports highlight the increasing concern over lengthy wait times, overcrowding and allegedly insufficient staffing prevalent in Canadian emergency departments (Kusch, 2015; Marcoux, 2015; The Canadian Press, 2015). In fact, wait times have been identified as one of the most common causes of emergency department dissatisfaction (Wellstood, Wilson, & Eyles, 2005). Emergency departments in Winnipeg, Manitoba, specifically, have been identified as having some of the longest waiting times across the country (Canadian Institute for Health Information, 2015a). The main intent of this practicum is not to reduce waiting times; instead it is meant to improve the waiting experience and increase satisfaction. However, by adhering to the design principles outlined in this practicum project, efficiencies may be gained in the emergency care process.

This practicum project investigates current emergency department waiting room models in Canada and the United States of America (USA) and explores how the psychology of waiting (through the conceptualization of users perceptions and expectations) can positively influence perceptions of wait time and the overall waiting experience. This culmination of research, coupled with concepts of evidence-based design (EBD), result in a profound understanding of emergency department waiting that could challenge current emergency department design. This led to the formulation of a theoretical framework and hypothetical design proposal that aim to uncover, identify, clarify and integrate concepts known to influence emergency department waiting room

satisfaction.

## 1.2 PROJECT OBJECTIVES AND RATIONALE

Waiting is perhaps one of the most dominant human activities experienced by individuals (Bournes & Mitchell, 2002). Our technologically influenced society however, has resulted in individuals who have impulsive desires and who are very impatient (Rosen, 2004). Simply put, people today are impatient waiters.

For an impulsive and impatient society, the combination of psychological stressors elicited by the body in a process of waiting and a secondary situational precursor like pain or physical discomfort can result in a perceived intolerable wait (Hall & Press, 1996). Considering the following definition of the word “wait”, it is not difficult to understand why technologically influenced people today perceive waiting as intolerable.

Wait \ˈwāɪt\ (verb)

1. to remain temporarily neglected or unrealized;
2. to remain stationary in readiness or expectation;
3. to delay serving (Merriam-Webster, 2016).

There are a number of reasons why the emergency waiting room provides an appropriate context for innovative interior design. First, emergency waiting rooms provides interior designers with the unique challenge of designing environments that could actually help alleviate stress and result in positive perceptions and satisfaction of the waiting experience. This makes interior design an appropriate approach to the redesign of emergency waiting rooms as the profession of interior design is about “finding creative design solutions for interior environments while supporting the health, safety and well being of occupants and enhancing their quality of life” (Interior Designers

of Canada, 2016).

Second, there has been increasing concern over lengthy wait times and dissatisfied emergency department users that have predominantly been publicized through public media (Kusch, 2015; Marcoux, 2015; The Canadian Press, 2015). The topic of emergency department waiting rooms, waiting times and emergency care are hot topics right now, not only to the health care community, but also to the public in general. The profession of interior design, although unable to remedy actual wait times, could offer creative design solutions that go beyond internal management strategies and provide restructuring to emergency department waiting environments. For these reasons, the implementation of interior design strategies is an appropriate and optimistic direction to explore for the redesign of emergency waiting rooms.

### 1.3 QUESTIONS OF INQUIRY

1. What psychological concepts could lead to increased satisfaction for people in Winnipeg emergency department waiting areas?
2. What physical aspects of EBD could apply to a Winnipeg emergency department waiting area?
3. How can theories from the psychology of waiting be incorporated into a design that could potentially increase patient satisfaction in Winnipeg emergency department waiting areas?

### 1.4 DOCUMENT OVERVIEW

Chapter 1 introduces the project principles and provides a brief background on the underlying project framework. It also provides an understanding of why incorporating the psychology of waiting (through the conceptualization of users perceptions



and expectations) in addition to EBD may aid in producing satisfaction in waiting environments.

Chapter 2 considers the level of dissatisfaction felt among those waiting in the emergency department on both a national and regional level. Information here is presented in a statistical format and includes general demographic data and approximate waiting times per region. This information provides a background on the type of “waiters” most commonly seen in Winnipeg emergency departments and is later used to inform programming of the proposed design.

The second section of Chapter 2 explains why users wait and how they receive treatment in Canadian emergency departments. The Canadian Institute for Health Information (CIHI) waiting model is described in further detail and identifies which waiting period this practicum project addresses specifically. An overview of the Canadian Triage and Acuity Scale (CTAS) provides a general understanding of the five levels of acuity and how those levels of acuity are ranked with regard to time sensitive administered care. This information is important to understand, as emergency department waits are not first-come, first-served as is typical with many other waiting situations.

Chapter 3 addresses the physical and psychological aspects of waiting. The chapter begins with a brief overview of relevant EBD as outlined by Ulrich et al. (2008). Those principles that will be incorporated within the proposed design are identified. This brief overview is meant to provide a background of existing EBD research and acts as a supplement to the main portion of the chapter: the psychology of waiting.

The second section of Chapter 3 addresses the psychology of waiting. This portion of the literature review extrapolates one model of satisfaction as proposed by David H.

Maister. The satisfaction formula is:  $S=P-E$ , where S represents satisfaction, P represents perception and E represents expectation (Maister, 2005). Each component of the formula is described in detail and then formulated into a conceptual framework for design that provides design guidelines and implementations for each of the principles.

Chapter 4 is an analysis of existing waiting room precedents. The precedents represent examples of change within emergency department culture and design in Canada and the USA and describe models that have had both success and failure in their associated contexts.

Chapter 5 outlines the detailed design program of the project and begins with an explanation of the project scope and limitations. This practicum project differs from most in that the proposed design is to be understood as a hypothetical base model with prospective application to Canadian emergency department waiting rooms in general. There is no predetermined site, nor building that the proposal is designed for, however the resulting design illustrates one attempt at reevaluating the emergency department waiting room. This section includes an analysis of human factors, aesthetic, spatial and functional requirements of the proposed emergency department and waiting room.

The literature review, precedent research and site visits culminate in the proposed design solutions presented in Chapter 6. This chapter also includes detailed descriptions of the resulting waiting spaces and how they were informed through the research.

Chapter 7 revisits the questions of inquiry presented in Chapter 1 and explains how they are presented in the design solution. The chapter concludes with further recommendations for research and design.

## **CHAPTER 2: UNDERSTANDING CANADIAN EMERGENCY DEPARTMENTS**

### **2.1 THE CANADIAN WAIT TIME EPIDEMIC**

The Canadian health care system, known informally as Medicare, is supported by both Federal and Provincial Governments of Canada and provides Canadians with access to necessary medical services (Health Canada, 2010). While Medicare facilitates the overall health of Canadians, its widespread coverage is currently overwhelming health care facilities across Canada (Canadian Institute for Health Information, 2005).

The Canadian Institute for Health Information (CIHI) is a non-profit organization that collects data on the Canadian health care system (CIHI, 2016a). Within CIHI, the National Ambulatory Care Reporting System (NACRS) collects and summarizes ambulatory health care information from participating provinces across Canada. Data collected by NACRS represents demographic, administrative and treatment specific data from day surgeries, emergency departments and all other ambulatory care visits (CIHI, 2016b). The data from this system can then be used to understand where improvements can be made to Medicare as a whole and, in relation to this practicum, can help to contribute to the understanding of emergency department wait times and causes.

Submission of relevant data from the emergency department facilities to NACRS is not mandatory, with the estimated emergency department coverage in NACRS for 2014-2015 ranging from 0% in Newfoundland and Labrador, New Brunswick, Quebec, Northwest Territories, and Nunavut to 100% submission in Ontario and Alberta. Manitoba is in the middle with an estimated 45% emergency department coverage in NACRS for 2014-2015. Only 8 facilities in Manitoba, all in the Winnipeg Regional Health Authority (WRHA), contributed to this system (CIHI, 2015a).

NACRS estimates that there were 16 million emergency department visits across Canada in 2014-2015 with data from 10 million of those visits being contributed to NACRS (CIHI, 2015b). Ninety percent of emergency department visits in Canada in 2014-2015 were completed in 7.6 hours or less, with a median length of stay of 2.5 hours. Of the emergency departments that contribute to NACRS, the median length of stay ranges from a low of 1.5 hours in Yukon to a high of 4.1 hours in Manitoba. This length of stay encompasses the time from initial registration or triage through to discharge from the health care facility.

Across Canada, the length of stay in the emergency department for those patients on the higher levels of the Canadian Triage and Acuity Scale (CTAS) (level IV-V) is longer than those patients on the lower level of the CTAS (level I-III). In Canada the median length of stay for patients admitted as CTAS levels I-III was 1.7 hours in 2014-2015 compared to a median length of stay of 3.1 hours for patients admitted as CTAS levels IV-V. Manitoba had the highest difference in length of stay between patients admitted as levels I-III and levels IV-V with a median of 3.2 hours and 5.0 hours, respectively (CIHI, 2015a). A more detailed explanation of the CTAS is provided later in this chapter.

The WRHA is responsible for providing health care regulation to over 700,000 residents within the city of Winnipeg as well as the surrounding rural regions of East St. Paul, West St. Paul and Churchill. The WRHA is one of the largest health regions in Canada. In addition to providing specialized referral programs to the Winnipeg region, the WRHA extends referral programs and services to Ontario and Nunavut. More than 200 health focused services and programs are organized and funded by the WRHA and operate out of hospitals, health centers, mental health facilities, personal care homes,

community-based health facilities and aboriginal health services (Winnipeg Regional Health Authority, 2016a).

According to WRHA (2016b), the responsibilities of the emergency department are to complete initial diagnostics, assign patients to subsequent wards for further care, and treat all urgent health care needs of the general public. Emergency department staff see a variety of acuity levels ranging from severe chest pain and car accident victims to cold and flu symptoms, insect bites and fevers as well as mental health issues.

In 2014-2015, the WRHA reported 278,638 visits to emergency departments within the WRHA with 13% of those visits being admitted. The WRHA has identified current emergency room wait times as a significant issue as the number of visits to emergency departments has steadily increased over the past five years (WRHA, 2015). The WRHA has developed a public website that displays real-time information on the number of patients waiting, average wait time, and the longest wait time of several Winnipeg emergency departments. This helps to guide the public to which waiting room offers the shortest wait time in Winnipeg (WRHA, 2016c). The WRHA has also developed a survey program for those that have visited emergency departments to quantify the quality of care people believed they received in WRHA emergency departments. In both of the years that this survey has been conducted, the number of people who gave the emergency department a positive score has remained below the national average (WRHA, 2015). The pressure on Winnipeg hospitals to improve satisfaction rates has been headlined in media coverage, which illustrates the importance of this issue to the public (Kusch, 2015; Marcoux, 2015; The Canadian Press, 2015).

## 2.2 UNDERSTANDING WAIT TIMES:

CTAS was implemented in 1999, as a standardized model to be used in all Canadian hospitals (CIHI, 2012). According to the Canadian Association of Emergency Physicians (CAEP) (2016), CTAS is to be used as a tool enabling Canadian emergency department nurses and physicians to prioritize patients based on care requirements, ultimately ensuring that the sickest patients are seen first. This becomes particularly important when emergency rooms are crowded or reach capacity due to limited access to other health care services. The model is outlined in Table 1 and consists of five levels of acuity. CAEP assigns each level with a recommended ideal response time. These response times are not established care standards but are ideals based on how long developers of the model determined that a patient should wait with a particular problem (Beveridge et al., 1998). In recognition that these ideals cannot always be met, each ideal response time is also assigned a fractile response objective. A fractile response percentage describes how often an established care time ideal is met within each CTAS level. For example, patients presenting with level III (urgent) conditions should be seen within 30 minutes or less according to CAEP, however, this may only occur 90% of the time due to limited departmental resources (i.e. 2 or more level III patients arriving together, or a more severe level II patient arriving). This means that although those patients falling into the level III acuity bracket should be seen within 30 minutes or less these patients may have to wait over the 30 minute ideal (Beveridge et al., 1998).

Once registered as a patient of the emergency department, the total duration of the wait should be understood as a series of waits. CIHI (2012) outlines these potential waiting periods under three headings, noting that the total wait time will change based

on whether or not the patient is admitted to the emergency department, or discharged post treatment. The first wait is described as “Time Waiting for Physician Initial Assessment” and implies the period of time a patient waits to be assessed by a physician. The second wait is described as “Time to Disposition” and implies the time between the patient being assessed, to the time when a decision is made by the health care provider to admit or discharge the patient to the emergency department. The third waiting period is described as “Time Waiting for Inpatient Bed” and applies only to those patients being admitted to the department. This wait implies the time from the decision to admit the patient to the emergency department, to the time the patient is transferred from the emergency department to another inpatient unit within the hospital or other health care facility. Figure 1 illustrates these waiting periods. This practicum projects aims to improve the first waiting period, the “Time Waiting for Physician Initial Assessment” (CIHI 2012).

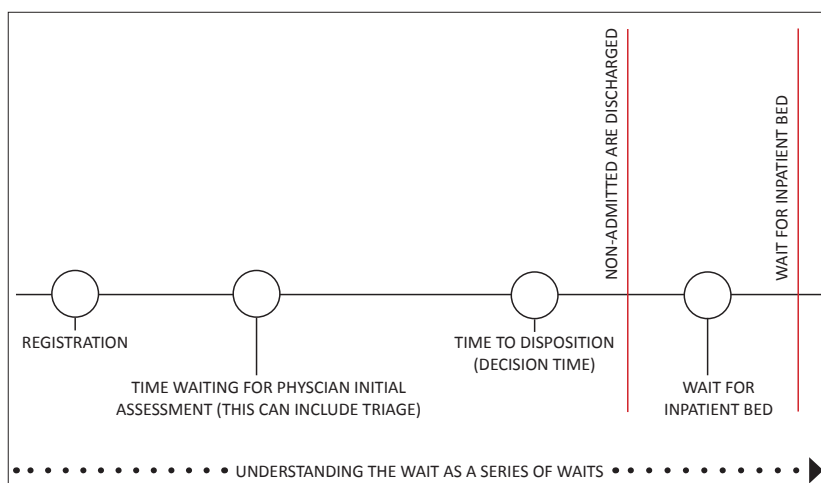


Figure 1: Series of waits in the emergency department. Adapted from CIHI, 2012.

Traditionally, emergency waiting rooms were designed as one large space to accommodate patients and their accompanying family or friends during various points of

waiting throughout the entire emergency care process. Typically, plastic chairs are ganged together around the perimeter of the space, lighting (natural or artificial) is minimal, and occasionally a television is provided for distraction. Typically emergency department waiting rooms provide little accommodation for those waiting. Confusion ensues, as there is little to no organizational structure to the waiting room and little direction on how to approach care when entering the emergency department. Traditional emergency department waiting rooms do not offer any kind of privacy for those waiting. In recent years, trends have been emerging to address some of these issues, but this practicum project aims to explore this issue further through understanding the psychology of waiting.



Table 1: CTAS levels. Adapted from CIHI, 2012.

		<b>Ideal Response Time by Emergency Department</b>	<b>Fractile Response Time</b>
<b>High Acuity</b>	<b>Level I (Resuscitation):</b> Conditions that are a threat to life or limb and requiring immediate aggressive medical interventions. Examples include: cardiac arrest, heart attack, major trauma, loss of consciousness, severe respiratory distress.)	Immediate (<5 minutes)	98%
	<b>Level II (Emergent):</b> Conditions that are a potential threat to life, limb or function requiring rapid medical intervention. Examples include: moderate respiratory distress, vomiting blood, altered level of consciousness, severe high blood pressure.	15 minutes or less	95%
	<b>Level III (Urgent):</b> Conditions that could potentially progress to a serious problem requiring emergency intervention. May be associated with discomfort or affect ability to function at work and with activities of daily living. Examples include: mild respiratory distress, high blood pressure with no symptoms, abdominal pain, headache.	30 minutes or less	90%
<b>Low Acuity</b>	<b>Level IV (Less Urgent):</b> Conditions that are less urgent and would benefit from interventions or reassurance within 1-2 hours. Examples include: urinary tract infection, minor laceration, injured limb, sore throat.	60 minutes or less	85%
	<b>Level V (Non Urgent):</b> Conditions that may be acute but are non – urgent or chronic conditions with or without evidence of deterioration. Interventions for these conditions can be delayed or even referred to other areas of the hospital or health care system. Examples include: medication requests, minor scrapes and bites, dressing changes, mild nausea and diarrhea.	120 minutes or less	80%

## **CHAPTER 3: LITERATURE REVIEW**

Since wait times are considered to be a major predictor of patient satisfaction in the emergency department (Soremekun et al., 2011), a review of literature on the psychology of waiting is warranted. Psychology of waiting literature suggests that managing the perception of wait times through design intervention and customer service strategies, may be more effective (and cost efficient) in creating patient satisfaction than reducing actual wait times (Fottler & Ford 2002; Soremekun et al., 2011; Trout, Magnusson, & Hedges, 2000; Wellstood et al., 2005).

In this chapter, perception and expectation are explored as catalysts for satisfaction. As psychological constructs, both perception and expectation are influenced through environmental cues and can be leveraged to increase satisfaction (Maister, 2005). This practicum proposes that the merging of psychology of waiting theory and evidence-based design (EBD) principles can result in a higher degree of patient satisfaction in Canadian emergency departments.

### **3.1 EVIDENCE-BASED DESIGN**

EBD is defined as, “the deliberate attempt to base building decisions on the best available research evidence with the goal of improving outcomes and of continuing to monitor the success or failure for subsequent decision-making” (Malkin, 2008).

This approach has become prevalent in health care design resulting in spaces that improve patient outcome, increase user satisfaction, decrease anxiety and stress and improve safety (Ulrich et al., 2008). EBD did not begin with health care explicitly, but was adapted from evidence-based modeling in other fields that used research to inform decision making (Goetz et al. 2010). In 1984, Roger Ulrich began bridging the gap

between research and design when he published a study on the effects of views from a hospital window in patients recovering from surgery (Ulrich, 1984). The study showed that patients who had a view of trees, rather than a brick wall, required significantly less pain medication, experienced a shorter stay in the hospital and recorded fewer negative comments in the nursing care evaluations (Ulrich, 1984). Since this study, researchers have continued to study the effects of design on wellbeing within health care environments. These research efforts culminated in Ulrich's (2008) report that is considered the foundation for health care EBD. The report compiled hundreds of studies from peer-reviewed journals that examined the effect of the environment on health. As a result, Ulrich's report (2008) is the primary resource used to inform EBD within this practicum project.

The report is organized into three areas of study: patient safety, staff outcomes and other patient outcomes. Areas of research within the patient safety section include the spread of infection (airborne and physical contact), reducing patient falls and medical errors. The staff outcomes research includes staff satisfaction, social support, privacy, communication, work efficiency, injuries and stress. Other patient outcomes includes research data on spatial orientation, stress, depression, pain, sleep, length of stay and overall satisfaction (Ulrich et al., 2008).

The report reveals that EBD principles, carefully implemented through physical design features, are important for creating safer and more psychologically nurturing hospitals for patients and staff. The report findings and recommendations, along with the ever-growing body of EBD research, can be understood as standard when designing health care projects today and are illustrated in Table 2.

Table 2: Relationship between design factors and health care outcomes (Ulrich et al., 2008)

Healthcare Outcomes	Design Strategies or Environmental Interventions										
	Single-bed rooms	Access to daylight	Appropriate lighting	Views of nature	Family zone in patient rooms	Carpeting	Noise-reducing finishes	Ceiling lifts	Nursing floor layout	Decentralized supplies	Acuity-adaptable rooms
Reduced hospital-acquired infections	**										
Reduced medical errors	*		*				*				*
Reduced patient falls	*		*		*	*			*		*
Reduced pain		*	*	**			*				
Improved patient sleep	**	*	*				*				
Reduced patient stress	*	*	*	**	*		**				
Reduced depression		**	**	*	*						
Reduced length of stay		*	*	*							*
Improved patient privacy and confidentiality	**				*		*				
Improved communication with patients & family members	**				*		*				
Improved social support	*				*	*					
Increased patient satisfaction	**	*	*	*	*	*	*				
Decreased staff injuries								**			*
Decreased staff stress	*	*	*	*			*				
Increased staff effectiveness	*		*				*		*	*	*
Increased staff satisfaction	*	*	*	*			*				

The design strategies and environmental interventions outlined in Table 2 are discussed in further detail in this chapter as they relate to emergency department waiting environments. The design strategies or environmental interventions considered in this practicum project are: single-bed rooms, access to natural lighting or appropriate artificial lighting, views of nature, family zones in patient rooms, noise reducing finishes,

and nursing floor layout. The design strategies that will not be considered within this practicum project are ceiling lifts and acuity-adaptable rooms, as they do not apply to emergency waiting environments.

Single-bed rooms. The incorporation of single-bed rooms in hospital design has been linked to reduced hospital acquired infections through the isolation of patients. The increased privacy in single-bed rooms has also been linked to improved patient sleep due to noise reduction and has been found to be more beneficial when administering care because patients are more willing to disclose personal information and in turn allow for more accurate diagnosis and better treatment. This reduces stress on both staff and the patient ultimately leading to increased patient satisfaction. Single-bed rooms also allow for increased social support from family members and friends as the privacy encourages and accommodates family visits. It is important to note that Ulrich et al. (2008) is mainly referring to single-bed rooms in the context of admitted patients on inpatient wards.

Although the “single-bed room” design strategy cannot be represented directly in the redesign of emergency waiting environments, the concepts can be extrapolated to better accommodate those waiting. Design solutions allowing for increased privacy may offer those waiting with a more satisfying overall experience. Privacy concerns within waiting environments can be addressed on a macro to micro scale beginning with the separation and division of waiting environments offered (separation of waiting environments is discussed further in section 5.1.1 An Evolution of Waiting). Following this separation, each proposed waiting environment, can be assessed for the level of privacy required to accommodate user satisfaction (Table 3). The materiality of the waiting environment should be considered for its role in creating audio and visual privacy

to users. This includes seating, flooring materials, wall coverings, operable wall systems, unique design features, window glazing and volume of the space (Table 3).

Access to natural light or appropriate artificial lighting. The quality and quantity of natural light in health care facilities has been associated with numerous factors influencing satisfaction for patients and staff.

Building orientation is one of the most important design features to consider when designing for natural light. The amount of natural light occurring within a health care environment has been linked to both positive and negative patient and staff outcomes. Ulrich et al. (2008) recommends that the amount of light and the timing of light (either natural or artificial lighting) should be carefully considered based on the activities taking place. For example, increased natural light in patient rooms has been found to reduce pain levels, depression and the length of patient stay. Adequate natural and artificial lighting levels also impact staff and patient satisfaction and reduce staff incurred medical errors such as medication counting and dispersion. Lighting exposure has been shown to play an important role in normalizing the circadian rhythms of staff and patients within health care facilities. Patients who were exposed to an abundant amount of natural light during the day and relatively little artificial lighting at night had improved sleep quality and healing time. Morning sun exposure, specifically, has been linked to faster healing times for patients. Lighting that mimics natural circadian rhythms has also been proven to increase staff satisfaction. Conversely, research shows that counseling areas, or areas where communication between patients and families occurs benefits from lower levels of lighting as the dimmer lighting calms patients and in turn promotes lengthier conversations and visits (Ulrich et al., 2008).

Incorporating a variety of lighting options to suit the satisfactory needs of waiters within the emergency department will be carefully considered within this practicum project. One feature that may offer significant improvement to emergency department waiting environments is the integration of lighting (either natural or artificial) that follows the pattern of natural circadian rhythms. The emergency department is a facility that is never closed and patients arriving at night may appreciate more subdued lighting as opposed to the traditional fluorescent. Implementing lighting solutions that carefully consider and correlate with the condition of those waiting may be another strategy with potential to increase satisfaction while waiting. For example, a patient arriving at the emergency department for the treatment of a urinary tract infection, may respond positively to a waiting environment that allows users to look outside, sit in the warmth of natural sunlight, have adequate lighting for reading or watching television. Conversely, a patient with a migraine may benefit from a darker space away from sunlight and bright fluorescent lighting. As was mentioned previously, five levels of acuity, ranging from resuscitation to minor ailments, characterize the Canadian Triage and Acuity Scale (CTAS). Due to the fact that there are numerous ailments that fit within each of those levels, each waiting environment should consider the implementation of brighter, more highly illuminated areas and darker, more subdued areas in the attempt to accommodate satisfaction of all users.

Views of nature. Similar to lighting, views to natural or simulated nature have been proven to affect physical and psychological variables of patients and staff in health care facilities. Views to nature have been shown to reduce the perception of pain, stress and anxiety in patients within health care settings. Additionally, auditory sounds of nature

in conjunction with views have been linked to patients reporting lower pain levels. There is also evidence to suggest that staff benefit from views to nature in that they find natural gardens or a view to the outdoors a reprieve while working long shifts (Ulrich et al., 2008). Although the research is limited, increased exposure to views of nature have been linked to a shorter stay for patients recovering from surgery (Ulrich et al., 2008).

Views to nature will be considered similarly to lighting in the redesign of emergency waiting environments. The two concepts can be directly related as the incorporation of natural lighting would potentially result in a view to nature. This principle is, however, also tied to the climate, context and typology surrounding the hospital to which the emergency department is situated in and will involve significant analysis. Since Winnipeg has a harsh winter climate, views to simulated nature should be part of a design solution to allow users a connection to nature. Outdoor courtyards or patios may be a less feasible design feature due to the short summer although smoking areas are a consideration of waiting areas and require a nearby outdoor area to facilitate this activity.

Family zone in single-patient room. As mentioned above, single patient rooms have been shown to have a considerable effect on patient and staff wellbeing within a hospital setting. However, for some of the benefits to be fully realized, the incorporation of a family area is also required. These areas encourage family visits and interaction, which in turn provide the patient with more social support and potentially less stress and anxiety. Additionally the increased presence of visitors may reduce the occurrence of patient falls (Ulrich et al., 2008).

Similar to the single-bed rooms principle above, the concept of a family zone in a single-patient room is intended for a treatment room on an inpatient ward. The concepts



taken from this principle will be extrapolated to suit emergency waiting environments. Since not all users of the emergency department are ill or require medical attention (i.e. family or friends of patients), a different kind of waiting environment is required to result in a more satisfying wait. Designers must consider that the perceptions and expectations of “public waiters” are much different than those waiting for medical care. Similarly, this concept applies to the progression of waiting environments a patient takes when receiving care. It is common for a family member or friend to accompany a patient throughout the course of treatment. Knowing well that this social support decreases stress and anxiety for the patient, waiting environments should be designed to accommodate one family member or friend accompanying the patient through the internal waiting environments.

Noise reducing finishes. Interior finishes are very important in hospital design, specifically those finishes that reduce the spread of infections and those that reduce noise (Ulrich et al., 2008). The implementation of noise reducing interior finishes, such as acoustic ceiling tiles has been shown to benefit patient sleep, privacy, stress and overall satisfaction. Additionally, patients who were able to properly hear their health care providers due to acoustical intervention reported their caregivers to be more attentive, qualified and caring. Similarly, staff that work in health care facilities where sound reducing finishes have been incorporated have reported less stress, lower perception of work demands and work pressure and increased overall satisfaction with their working environment (Ulrich et al., 2008).

This principle should be considered in all waiting environments throughout the emergency department in the form of materiality including seating, wall coverings,

spatial volumes, flooring material and acoustic paneling. Additional noise reducing finishes should be considered in areas where physicians meet with patients and their accompanying family or friends such as family rooms or inner consultation rooms.

Table 3: Design recommendations and guidelines from EBD

<b>EBD CONCEPT</b>	<b>DESIGN RECOMMENDATIONS/ GUIDELINES</b>
<b>SINGLE-BED ROOMS</b>	Privacy/ confidentiality (includes audio and visual) Infection control Noise reduction
<b>ACCESS TO NATURAL LIGHT OR APPROPRIATE ARTIFICIAL LIGHTING</b>	Building orientation Circadian rhythms (timing and amount of light – can be natural or artificial lighting) Lower lighting levels for private conversational areas or counseling Creating environments that offer lighting options (darker areas/ brighter areas) as well as user controlled or operable lighting levels (could include operable window shades, or dimmable lighting)
<b>VIEWES OF NATURE</b>	Natural or simulated nature (includes audio or visual forms) Physical access to nature. Full expression of this principle is dependent on climate and location of project. Nature can be brought in through textures (furniture, wall coverings) and through design features replicating nature (pictures, art, frosted glass nature motifs).
<b>FAMILY ZONE IN SINGLE-PATIENT ROOM</b>	Encourages more social support Decreased stress and anxiety for patient Consider this principle for all patient waiting environments. Allow accommodation of one family member or friend per patient waiting
<b>NOISE REDUCING FINISHES</b>	Improves privacy, stress and overall satisfaction Important to consider in design of emergency department waiting environments In general, but specifically inner consultation rooms, and family rooms (areas of patient and staff interaction). Impacts staff satisfaction as well.

## 3.2 THE PSYCHOLOGY OF WAITING

### 3.2.1 A MODEL FOR SATISFACTION

David H. Maister, is considered one the world's most influential authorities on service management strategies for professional practice (Maister, 2016). Maister (2005) published a model that would be pioneered as one of the primary theoretical approaches on the psychology of waiting. The model employs perception and expectation as a means of measuring satisfaction rates among those in waiting situations. Although Maister's formula was originally intended for waiting lines within service industries, the model can be applied to emergency department waiting experiences (Soremekun et al., 2011). The model is defined as:

$$\text{Satisfaction (S)} = \text{Perception (P)} - \text{Expectation (E)}$$

Where perception is defined as, "the psychological processing by which an individual interprets and understands available sensory information" (Soremekun et al., 2011, p.687) and expectation is defined as, "a strong belief that something will happen, or the belief that someone or something should achieve something" (Oxford Dictionary, 2016) Satisfaction is therefore at its highest when the range between perception and expectation is greatest, or the perception of the situation exceeds expectation (Soremekun et al., 2011; Maister, 2005). A basic demonstration of this formula could be presented when going out for dinner. Based on word of mouth, a recommendation or restaurant advertising, customer expectation is that the experience will present great food in an upscale setting. On a scale of 1-10, the customer mentally marks expectation at a 9/10. However, upon arrival to the restaurant, the atmosphere is noisy, crowded and had minimal parking. The customer now perceives the experience to be a hassle as

they wait among others for the meal. Even without having tasted the food, the customer lowers overall perception of the experience, ranking it at a 5/10. Therefore, the perceived level of service has not exceeded expectation, ultimately leading to an unsatisfied customer. In a health care environment, if a patient expects to wait for 4 hours in the emergency department for treatment of a non-urgent ailment, but receives treatment in 2 hours, Maister's (2005) formula would suggest this experience would result in satisfaction. This example only uses time as a satisfaction variable, however if the patient was not accommodated physically or psychologically during the 2 hour wait, the patient may not be satisfied with the overall emergency department experience.

### 3.2.2 PERCEPTION

Sensory information is interpreted through visual cues within the service environment as well as information directly and indirectly communicated through service representatives. The sensory information gathered ultimately convinces a person of the level of service they will receive. To improve perceptions, the service must manage both the sensory cues a person receives as well as the psychological effects of those cues (Soremekun et al., 2011). Numerous health care studies rely on sensory information to determine what factors influence patient satisfaction (Bruce, Bowman, & Brown, 1998; Bursch, Beezy, & Shaw, 1993). One example of how sensory information can impact satisfaction is through the establishment of sight lines from waiting patients to staff. In a study done by Bruce, Bowman, & Brown (1998) only 11% of those in the waiting room felt satisfied with the watchfulness of emergency department staff. The combination of the feelings of angst and fear that ensue when customers perceive uncertainty (Maister, 2005) coupled with the fact that patients commonly do not have a strong understanding

of health care practice (American College of Emergency Physicians, 2008; Williams, Weinman, & Dale, 1998) can cause something as rudimentary as poor sight lines to cause significant distress and magnify dissatisfaction with the service being provided.

Wait time is inherently subjective by nature, meaning that individual perception will deviate between people in the same situation. As such, patients are not accurate in their estimation of perceived or actual waiting times (Thompson, Yarnold, Adams, & Spacone, 1996) with the majority of patients overestimating their wait time. Thompson et al. (1996) found that only 22% of patients in hospital emergency departments can accurately estimate their wait. These differences in perceptions are also noted when assessing patient satisfaction since an individual may estimate wait time based on personal satisfaction level. For some individuals, overall satisfaction can be influenced by numerous factors, both environmentally and psychologically, such as verbal communication of treatment, length of time to see the physician, emotional state of others in the waiting environment, and access to natural light, among others. The individual then balances all of the sensory cues to determine a level of satisfaction. Others will assess the level of satisfaction based on a halo effect, meaning that one positive (or negative) event occurring within the waiting process will offset all other perceptions of the experience, ultimately leading to satisfaction (or dissatisfaction) (McMillan, Younger, & DeWine, 1986).

With the variation in patient satisfaction and inconsistency in the estimation of waiting time, understanding interventions that may influence perception become important in the redesign of emergency waiting environments. Improving patient perception requires the management of both physical and psychological variables.

Psychology of waiting research lists numerous concepts that impact both the physical and psychological variables of perceptions management (Maister, 2005; Norman, 2008; Baker & Cameron, 1996; Rafaeli, Barron, & Haber, 2002). Those concepts having the most profound impact on the waiting environment have been explained in the following section. Following the descriptions of these concepts, design implications resulting from each principle are outlined.

Emotions dominate. Emotional state is considered to be one of the most critical aspects affecting the perception of wait time (Norman, 2008). This results from the fact that an individual's emotional state affects not only the current waiting situation and their reactions to it, but follows through to impact overall satisfaction, how the situation is remembered and can even influence expectations (Soremekun et al., 2011; Norman, 2008). By definition, an emotion is "an intense, relatively short-term affective reaction to a specific environmental stimulus" (Barsade, 2002, p.646). Therefore individual emotional states, or moods, can be strong indicators of the conditions presented within a particular environment. Moods differ from emotions in that they are generally less intense in initial effect, however they ensue a lengthier unstable emotional response in the individual. The transfer of an emotional state from one individual to another is known as emotional contagion. Theoretical research on emotional contagion indicates that individuals are largely oblivious to the infectivity of positive or negative emotions present in group situations and that this oblivion could lead to serious problems for service organizations (Hatfield, Cacioppo, & Rapson, 1994). Waiting in the emergency department of a hospital can elicit some of the most unfavorable circumstances. Negative emotional states can arise from a number of situational precursors such as lack of information, design of the

physical environment, and mannerisms of staff or others waiting. Individuals may also be uncomfortable or in pain, scared or worried about their health and anxious as to when they will be seen. Since emergency waiting environments can be associated with negative emotional states, one negative individual waiting among a group of others may be enough to sway the entire group into feelings of apprehension, anger or frustration with the overall situational experience. It has been found that contagion of negative mood is equally powerful as the contagion of positive moods (Hatfield, Cacioppo, & Rapson, 1994). Similarly, emotional contagion from frustrated or overworked emergency department staff could transfer to those waiting in the emergency waiting environment.

Start strong, end strong, because the memory of an event is more important than the experience. This principle suggests that the beginning and end of an experience are the most important factors in forming a memory of the total experience (Norman, 2008). Perception and expectation are factors that are established at the beginning of an event or experience while the memory of an event is generally established at the end. Adding something positive to the end of a lengthy wait can positively influence the memory of the entire situation, even if the wait was exceedingly long (Norman, 2008). A common example of this would be how pediatricians often provide children with candy at the end of an examination, or dentists give patients toothpaste and a toothbrush.

Occupied time feels shorter than unoccupied time. This proposition encompasses the meaning behind the colloquial saying, "a watched pot never boils". Maister (2005) suggests that the attempt to fill time should not only offer benefit to the individual waiting, but be related in some way to the service encounter. This proposition is commonly demonstrated in a restaurant setting. If there are no tables available,

individuals are escorted to the bar, or given a menu to look at while they wait. Not only does this reduce the perceived waiting time by introducing a pleasant social distraction for the customers, but it also reduces the actual service time once a table has been cleared (Maister, 2005). Disney World offers another good example of how the occupied time feels shorter than unoccupied time principle can be addressed. One of the popular attractions at Epcot features large interactive screens where visitors waiting can burst virtual balloons to reveal information about the attraction they await (Pawlowski, 2008). In this case, Maister's (2005) suggestion has been extrapolated to alleviate potential stress, anger or annoyance, therefore offering benefit to the individual in general, as well as offering an interactive activity that subtly hints about what is about to come, or relating the waiting experience to the service encounter. Although these examples are directed towards queuing psychology situations where patrons are assembled in a standing line, the principles can be adapted to occupy non-acute patients in an emergency department waiting environment. In a health care waiting situation, the anger and annoyance can be replaced with fear and anxiety about what will come next. As a result, it may not be feasible to occupy waiting time with procedure related activities (Maister, 2005). In fact, in many health care circumstances, a conscious attempt is made to distract the patient from their situation through the use of televisions, magazines or Wi-Fi access. Filling out health related surveys, brochures related to overall well being or filling out medical history information have also been found to reduce perceived waiting time (Soremekun et al., 2011).

People want to get started. Maister (2005) hypothesized that people waiting to make their first contact with a service organization would be more impatient than those



who have already made contact in some way. This has been supported by numerous studies that show it can affect overall satisfaction and perception of wait time (Bolton, 1998; Bursch et al., 1993). When consumers experience negative interactions early in the service transaction, the perception of wait time increases. Not surprisingly, the opposite effect is experienced when a positive experience greets consumers at the beginning of a service transaction. In a study on repeat service transactions, favorable early interactions were found to positively affect the collective satisfaction of an individual (Bolton, 1998). Health care waiting situations magnify this effect when early encounters are simply not possible due to staffing limitations and overcrowded emergency departments. The Expectations section (3.2.3) provides greater detail on expectations in health care situations.

Uncertain waits are longer than known, finite waits or similarly, unexplained waits are longer than explained waits. Uncertain waits are one of the largest predictors of anxiety and dissatisfaction while waiting (Soremekun et al., 2011). The psychology behind this principle relates to the honesty between the service organization and the customer to manage expectations properly. When patients are given vague information about the duration of the wait, it causes them to enter a state of anticipation that is not easily relaxed thereafter. If patients in a crowded waiting environment are repeatedly told that the doctor will see them shortly, this only adds more stress to the situation because not only are the patients being forced to wait for the inevitably appearing doctor, they are not being dealt with which can lead them to believe that the duration of the wait has no known limit (Maister, 2005). Although difficult to predict, some emergency department's now provide those who will be waiting with an estimated wait time. In Winnipeg, the

Winnipeg Regional Health Authority (WRHA) website updates current emergency department and urgent care wait times every 5-10 minutes. The site lists the 7 major Winnipeg hospitals and 1 urgent 24 hour care facility available, the number of people that are currently waiting, the average wait time and the longest non-acute wait times (WRHA, 2016c). Making this information available allows the public to make informed decisions about their current health care situation when selecting a care option. This concept allows patients to have knowledge of approximate wait times, and come into the waiting situation more informed and prepared for the wait ahead, which can potentially lead to a more satisfying overall experience.

Unfair waits are longer than equitable waits. The emergency department of a hospital does not abide by the first-come, first-served principle as is typical in most waiting situations. Patients are ranked according to acuity level, and although most patients realize that sicker patients should receive care first, this could potentially lead to feelings of frustration over the fact that someone has taken their place in line, or the feeling they have been forgotten. In a non health care waiting situation, these circumstances are managed in ways that most evidently align with the customers' sense of equity (Maister, 2005). Some facilities employ a system of taking a number, where by peace is kept by serving in a sequential order. This also allows customers to estimate potential waiting time and feel that the method of serving was fair (Maister, 2005). There are however, alternatives to the first-come, first-served policy. Supermarkets use a different kind of policy, where those with only a few items can use an express line to avoid the wait of those with many items (Maister, 2005). The consensus in this case is that the wait was fair because customers with more items expect to wait longer. It is

extremely important in the service industry to understand what customers will consider acceptable or equitable and for the service to adjust their governing rules accordingly. For example, airports physically separate check in counters for first class passengers and regular passengers to avoid conflict between parties (Maister, 2005), understanding that conflict may arise when one customer is seen as favored over the other. These scenarios operate around the service providers understanding of a customer's tolerance to wait, finding that people are more likely to wait for higher quality service (Pawlowski, 2008). While this principle is important to understand and remember, hospital emergency departments abide by the acuity scale, tending to the sickest patients first. In the emergency department, information could be better relayed to those patients who endure the lengthiest waits (non-acute) in order to increase understanding of the total situation and manage expectations with respect to their wait.

Solo waits feel longer than group waits. There is mixed evidence to support Maister's (2005) original proposition, solo waits feel longer than group waits, due to the fact that this was referring to waiting lines in service environments. Undoubtedly so, those waiting in a line will express their frustration collectively when they turn to one another to figure out what is happening. In this situation, the presence of fellow waiters may console the individual through the feeling that they are not alone, or through the initiation of a conversation that passes the time (Maister, 2005). Although it could be questioned in its own right, the act of waiting in an emergency waiting environment provokes opposing reactions based on considerable situational circumstances. Social Facilitation Theory predicts the outcome of the behavior as a consequence of the presence of other individuals either in the exact same situation, or acting as passive

bystanders (Pruyn & Smidts, 1999). The context of an emergency department waiting environment can elicit both outcomes as patients are typically simultaneously engaged in the same activity, in full view of one another. Studies have shown that when the wait is long, the presence of others waiting make the wait intolerable and wait times are inaccurately perceived (Pruyn & Smidts, 1999). Conversely, when the wait is relatively short, patients are more apt to accept, or even prefer waiting with others. Similarly, patients who were anxious about their situation or felt uncertain about the duration of the wait preferred waiting with others as opposed to alone (Pruyn & Smidts, 1999). Therefore, a more contemporary proposition would state that the presence of social interaction during waiting time influences the acceptability of the wait either positively, or negatively (Pruyn & Smidts, 1999).

### 3.2.3 EXPECTATION

During the waiting experience, expectation can be understood as the level of service the user thinks they will receive. This level of expectation then acts as a standard to which the actual service or experience is compared (Hamer, Liu, & Sudharshan, 1999). Referencing Maister's (2005) formula for understanding satisfaction ( $\text{Satisfaction} = \text{Perception} - \text{Expectation}$ ) if the perception of the transaction is greater than what is expected, satisfaction will result. However, if the perception of the transaction is less than expected, customers are dissatisfied. Understanding expectations can allow the service to manage customer expectations, ultimately leading to increased satisfaction. In a study looking at how changing expectations can affect perceived service quality, two main types of expectations were identified, normative and predictive (Barbeau, 1985).

Normative expectations are considered to be those expectations that would result

from an optimal service transaction and are somewhat idealistic in nature. Normative expectations remain consistent over time, and are therefore difficult to alter through environmental stimuli. Since normative expectations are so high, when and if they change expectation would only increase. Normative expectations represent expectations developed through comparison. The comparison level is the best alternative available. The expectation is not necessarily compared to an existing product, experience or standard, but is more of a mentally constructed ideal or deserved level of standard that the current product or experience is then compared to (Barbeau, 1985). In the case of emergency department waiting environments, an individual arriving for care would have the normative expectation that he or she will be tended to immediately.

Individual-specific variables fluctuate between individuals. This explains why two individuals may perceive different levels of service despite being in a similar situation. Individual-specific variables are influenced by personal beliefs or preconceived notions about what the service should entail to include factors such as psychological needs of the individual, cultural beliefs or previous experiences. Individual-specific variables are likely to affect normative expectations (Hamer et al., 1999).

Predictive expectations are known to increase or decrease quickly. These are the expectations that customers think they will actually receive, and are easily influenced by the sensory environment (Hamer et al., 1999). A predictive expectation is formed from information about the product, service or experience itself. This may include information based on past experiences with the same product or similar situation and the context in which it currently exists (Barbeau, 1985). For example, a patient seeking care in the emergency department of a hospital desires to be seen by the doctor right

away, but from past experiences with the emergency department, the individual knows that isn't feasible. The individual might be comfortable waiting 10-15 minutes, but feel they deserve to be seen within that 10-15 minute window. Realistically, the individual predicts to be seen by the doctor in 1-2 hours, knowing that the ailment will not be an immediate priority for the emergency department. Although satisfying normative expectations may be difficult, predictive expectations are more malleable and can be influenced from changes in the environment. Identifying and understanding the pre-encounter expectations of patients, emergency department staff and those designing the emergency department waiting environment may allow for the adjustment of the intra-encounter expectations of patients and consequently increase overall satisfaction through the management of predictive expectations (Soremekun et al., 2011).

Pre-encounter variables can be biased or unbiased since they are formulated by an individual prior to the service encounter. For example, advertisements or websites about a particular service may lead a consumer to have predetermined expectations about the kind of experience they should receive upon arrival. This is considered to be a biased expectation. Unbiased expectations are sources of pre-encounter information that do not come from marketing the service has created for itself. Unbiased variables could include word of mouth or neutral third party information such as newscast (Hamer et al., 1999).

Intra-encounter variables are variables that occur within the process of a service encounter. Helpfulness of service staff, design of the environment and other customers are examples of variables that affect intra-encounter expectations. Since pre-encounter and intra-encounter variables can be considered situational, they are likely

to affect predictive expectations (Hamer et al., 1999), but not normative expectations. Situational factors may not always be under the control of the service establishment and because normative expectations remain relatively stable over time, variables occurring situationally are unlikely to have effect on normative expectations (Hamer et al., 1999).

### 3.3 A CONCEPTUAL FRAMEWORK FOR DESIGN

Table 4 summarizes information from the literature review on the psychology of waiting and provides a thorough outline of design considerations and recommendations to be considered in the redesign of the emergency waiting environments.

Table 4: Design recommendations and guidelines from psychology of waiting

PSYCHOLOGY OF WAITING PRINCIPLE	RESEARCH FINDINGS SUMMARY	DESIGN RECOMMENDATIONS/ GUIDELINES
<p><b>EMOTIONS DOMINATE</b></p>	<p>One of the most critical aspects affecting perception of wait time</p> <p>Emotions/ Moods are strong indicators of environmental conditions presented within a particular environment</p> <p>Influences current situation, overall satisfaction, memory and expectations</p> <p>Emotional contagion: ability to alter the emotional state of others in a similar situation:</p> <ul style="list-style-type: none"> <li>• Can occur between patients waiting or between staff and patients</li> <li>• Contagion of positive mood is as powerful as contagion of negative mood</li> </ul> <p>Emergency waiting rooms have a stereotypical negative connotation</p>	<p>Design should consider both individual and group emotional states:</p> <ul style="list-style-type: none"> <li>• Question the relevance of current singular external waiting rooms</li> <li>• Separation and division of emergency waiting environments (as they follow a procedure/ treatment path of user) may aid in controlling emotional contagion</li> <li>• Understand the user group per waiting area and design specifically for their satisfaction.</li> <li>• Consider factors most commonly associated with negative emotional states within waiting rooms (including fear, angst, anxiety, pain, discomfort, uncertainty – and what causes them) and design to alleviate them (i.e. creating clear sight lines from staff to patients waiting – improves emotional state of both staff and patients)</li> </ul> <p>Consider relevant EBD concepts to aid in positively influencing the emotional states of those waiting:</p> <ul style="list-style-type: none"> <li>• Consider access to natural light/ outdoor space, lighting, colour, support of a family member or friend in waiting areas</li> </ul> <p>Spatial considerations/ Design elements:</p> <ul style="list-style-type: none"> <li>• Within each waiting environment, design with privacy levels in mind as it relates to users and their respective activities. Allow users the choice and the option to wait alone or wait among others.</li> <li>• Areas of privacy and refuge (family rooms, family consult rooms, areas to talk on the phone) within more public spaces. This applies more to public waiting areas than patient waiting areas. Patients must have a clear sight line to staff at all times while waiting (and visa versa).</li> <li>• Consider volumes of spaces (for example, sight lines from staff to patients.</li> <li>• Consider materiality and variety of seating options; materiality of patient treatment areas (privacy levels), local materials to Manitoba</li> <li>• Consider design features offering those waiting a sense of control. Operable window shades, seating type and location, levels of privacy, lighting levels</li> </ul>



PSYCHOLOGY OF WAITING PRINCIPLE	RESEARCH FINDINGS SUMMARY	DESIGN RECOMMENDATIONS/ GUIDELINES
<p><b>START STRONG, END STRONG BECAUSE THE MEMORY OF AN EVENT IS MORE IMPORTANT THAN THE EXPERIENCE</b></p>	<p>The beginning and end of an experience are the most important factors to the formulation of memory</p> <p>Perception and expectation are formed at the beginning of an event (or before an event)</p> <p>Memory is formed during or at the end of the event</p> <p>Future expectations will be based on the memory of an event</p>	<p>Consider wayfinding, colour coding and signage to eliminate confusion, potential unknowns and stress especially when entering the emergency department to “start strong”</p> <p>Potential for memorable design features to be incorporated into the design. Could be in the form of seating or access to nature/ outdoors, natural light, art pieces, lighting, volume of the space. Something eye catching and memorable about the design of the space to “end strong” and establish memory.</p>
<p><b>OCCUPIED TIME FEELS SHORTER THAN UNOCCUPIED TIME</b></p>	<p>Watched pot never boils principle</p> <p>Traditionally the distraction or activity offers benefit to those waiting and relates to the service encounter in some way</p> <ul style="list-style-type: none"> <li>• Concept not feasible in emergency waiting</li> <li>• There is often a conscious effort made to distract the patients from procedure related details, fear or anxious feelings</li> </ul>	<p>The separation and division of waiting areas throughout the emergency department may satisfy this principle. By allowing waiting patients to move from one waiting area to the next following their progression of treatment, the perception of wait time can be reduced since the movement becomes occupied time.</p> <p>Technological implications should be considered in the design of this principle:</p> <ul style="list-style-type: none"> <li>• The use of cellphones is becoming an issue in some facilities due to privacy concerns, as is the use of magazines (infection control), so the incorporation of technological implication would be dependent on what is acceptable in the facility.</li> <li>• Incorporation of Wi-Fi, data ports, cell phone charging stations (could potentially be in the seating)</li> <li>• Brochures, magazines, posters, TV’s featuring skill testing questions or popular television shows</li> <li>• Large signs explaining how the emergency department works and the various acuity levels – this then serves two principles (occupying time and uncertain waits – allows people to become more informed about the wait</li> </ul>

PSYCHOLOGY OF WAITING PRINCIPLE	RESEARCH FINDINGS SUMMARY	DESIGN RECOMMENDATIONS/ GUIDELINES
		<p>Considering the various ways in which people occupy themselves should be carefully considered – could include seating styles, food and drink, talking to friends/ family members.</p> <ul style="list-style-type: none"> <li>• Various seating options offering comfort and mobility should be considered</li> <li>• Soft vs. hard seating (recline or sit, open, semi-private – sleep, eat, talk, read)</li> <li>• Seating at a table (could incorporate a café)</li> <li>• Ability to move outside</li> <li>• Must keep smoking areas in consideration</li> </ul>
<p><b>PEOPLE WANT TO GET STARTED</b></p>	<p>Emergency department wait is a multi-process service transaction. Waiting is simply a consequence of a process of treatment.</p> <p>People who are waiting to make their first contact with a service (emergency department registration and triage areas) are more impatient than those who have already made contact in some way – proven to affect perception of experience and overall satisfaction</p> <p>Timing is important</p> <ul style="list-style-type: none"> <li>• Negative interaction at beginning of experience increases the perception of the waiting length</li> <li>• Positive interaction at the beginning of the experience decreases</li> </ul>	<p>Movement from one waiting environment to another (following the course of treatment) will increase the perception of care being provided and decrease the perception of waiting time because the patient feels they are being immediately acknowledged and taken care of. If a patient walks in they will be registered and likely wait in the triage waiting area for a time, then called to be assessed and then filtered into the appropriate internal waiting area. Even though they may not receive actual treatment right away, the movement will allow them to perceive the experience is underway and they are important and being cared for.</p> <p>Division of spaces at point of patient access. Triage waiting separate from public waiting areas. Makes things clearer for staff as well.</p> <p>Design should be clear and straightforward/ easy to understand.</p> <p>Registration/ reception desk should be visible and immediately in front of entry doors to eliminate confusion.</p> <p>Clear division between public waiting and patient waiting areas.</p>

PSYCHOLOGY OF WAITING PRINCIPLE	RESEARCH FINDINGS SUMMARY	DESIGN RECOMMENDATIONS/ GUIDELINES
	<p>perception of the waiting length</p> <p>Early interactions in health care situations are not always possible due to patient volumes and staffing</p> <p>If patients are not immediately acknowledged within the experience, feelings of fear, frustration and stress can occur leading to dissatisfaction</p>	
<p><b>UNCERTAIN WAITS ARE LONGER THAN FINITE WAITS</b></p> <p><b>Similarly – UNEXPLAINED WAITS ARE LONGER THAN EXPLAINED WAITS</b></p>	<p>Largest predictor of anxiety and dissatisfaction while waiting</p> <p>WRHA provides a website that shows approximate wait times and the number of people in each hospital emergency waiting room in Winnipeg</p> <p>Affects expectations</p>	<p>Design of waiting environments should allow users to gain an understanding of or perception of the amount of time to be spent there through the use of furniture, materiality, light and amenities. This allows users to create an informed perception of waiting time.</p> <p>This principle addresses two issues of uncertainty felt during waiting. The first being uncertainty about your own or a family member/friends medical condition, potential diagnosis and testing. The situation may be frightening or inflict discomfort for the individual. Secondly, uncertainty about the actual waiting time will occur. How long will it take to be seen? How many patients are ahead?</p>
<p><b>UNFAIR WAITS ARE LONGER THEN EQUITABLE WAITS</b></p>	<p>Patients are seen and treated according to acuity levels as outlined in Chapter 2.</p> <p>First-come, first-served principle does not apply. Acuity and departmental capacity are the only factors that move patients</p>	<p>Design needs to represent an understanding of what the public finds acceptable with regard to the waiting duration and what they find to be equitable.</p> <p>Potential for this principle to be addressed through educational design implementation:</p> <ul style="list-style-type: none"> <li>• Large signage explaining how the acuity based treatment works, what to expect while waiting, the services offered to patients waiting</li> </ul>

PSYCHOLOGY OF WAITING PRINCIPLE	RESEARCH FINDINGS SUMMARY	DESIGN RECOMMENDATIONS/ GUIDELINES
	<p>In other typologies this is dealt with in a number of ways:</p> <ul style="list-style-type: none"> <li>• Supermarket express lines for customers with only a few items</li> <li>• Government situations (i.e. passport renewal) requires patrons to take a number</li> <li>• Airports offer separate check in counters for first class passengers to avoid conflicts with regular passengers</li> </ul>	<ul style="list-style-type: none"> <li>• This will allow people to gain an understanding about the wait and may change their expectations or thoughts about fairness</li> </ul>
<p><b>SOLO WAITS FEEL LONGER THAN GROUP WAITS*</b></p>	<p>Mixed evidence surrounding Maister's original principle  Social Psychology explains how and why the behavior of one individual affects another  Social Facilitation theory predicts the outcome of the behavior as a consequence of the presence of (a) other individuals in the exact same situation or (b) other individuals acting as passive bystanders. Both situations occur in the emergency department waiting environment  Long waits – presence of others becomes intolerable</p>	<p>Understanding patients' preferences about waiting alone versus waiting with others allows the built environment to respond to these needs even before they arrive. For example, within each waiting space, areas of refuge should be provided for those who wish to wait alone, open areas where noise is more accepted (café, large seating areas) are appropriate for those who prefer interaction or have anxiety levels lessened by fellow waiters.</p>

## **CHAPTER 4: PRECEDENTS**

### 4.1 PRECEDENT 1: NANAIMO REGIONAL GENERAL HOSPITAL

Location: Nanaimo, British Columbia, Canada

Architect: Stantec

Completed: September 2012

In 2011, the Nanaimo Regional General Hospital Emergency Department underwent redevelopment to accommodate the growing community. The redevelopment expanded the existing emergency department by 3200 square meters. The project was recognized for its innovative design aimed at improving the health and quality of life of its users while making advancements within the health care profession. The project was awarded the Generative Space Award in 2014 (Stantec, 2014), and received LEED Gold certification in 2014. The project has since become a precedent for other Canadian emergency departments considering redevelopment (Leung, 2014).

The Nanaimo Regional Hospital project was considered to be one of the first hospital emergency department redevelopments where patient experience and satisfaction informed the design direction and decisions. Architects and designers utilized evidence-based design (EBD) principles as outlined by Roger Ulrich (an industry leader in health care EBD) to ensure both employee and patient satisfaction, making note that the two are interrelated (Stantec, 2014). Architectural mock-ups were created allowing staff to rehearse potential emergency situations within the proposed space and provide feedback to designers (Leung, 2014). The resulting design was as an attempt at re-

imagining the entire operation of the standard emergency department.

Post-occupancy review completed one year after opening revealed that the number of common infectious diseases was reduced by half, while 90% of users surveyed about care received and overall experience fell within the “very satisfied” category. Additionally, sick time for staff was found to have been significantly reduced (Leung, 2014).

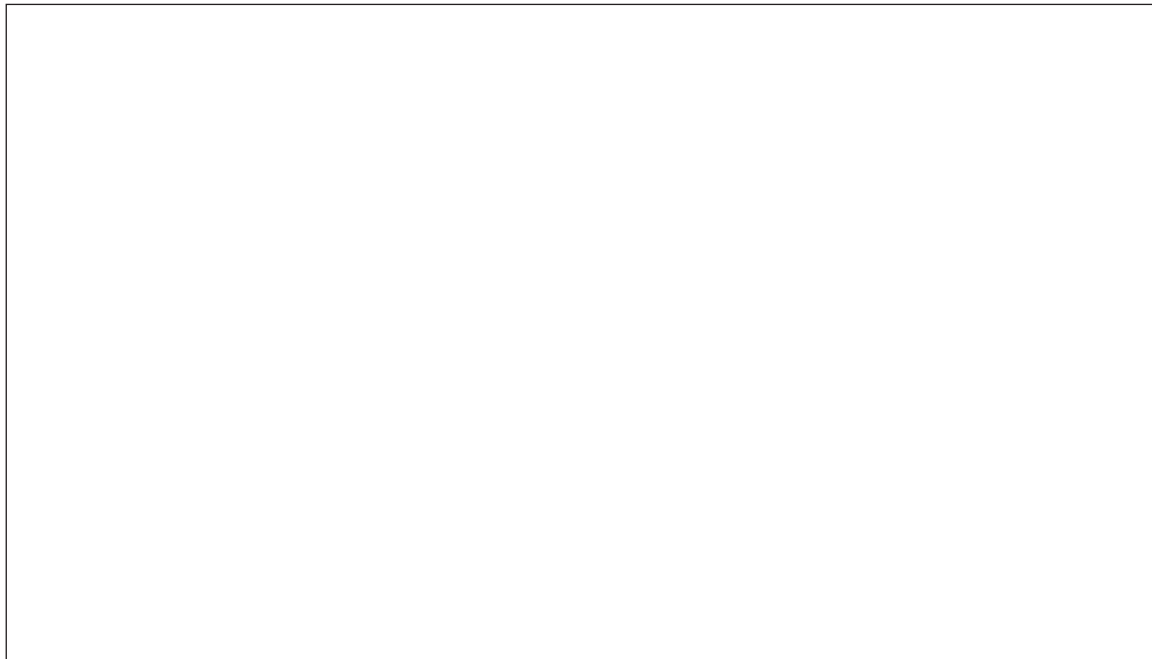


Figure 2: Nanaimo Regional General Hospital Emergency entrance (Stantec, 2016).

A large timber canopy on the exterior façade marks the entrance to the emergency department. This design feature acts as a focal point allowing users to clearly identify entry access while also tying in the surrounding west coast environment (Stantec, 2014). Inside, triage and registration areas were combined to eliminate the need for patients to describe their ailments twice as well as eliminating a potential waiting period

between the two activities (Leung, 2014). This space features high ceilings and small reception lobby with regional artwork lining the walls (Stantec, 2014).

Once registered and triaged, patients are divided into separate waiting areas based on their present medical condition. The 5 waiting areas are organized around a centralized nursing station which ensures clear sight lines from staff to those waiting. Individual courtyards expand off each waiting area allowing patients and their accompanying family or friends access to exterior gardens, and natural light (Leung, 2014). These courtyards act not only as a place of refuge for those waiting but also allows the interior to be flooded with natural light, ultimately reducing operational electrical costs. Nanaimo Regional General Hospital was one of the first emergency departments in world to implement natural courtyards within patient waiting and treatment zones (Stantec, 2014).

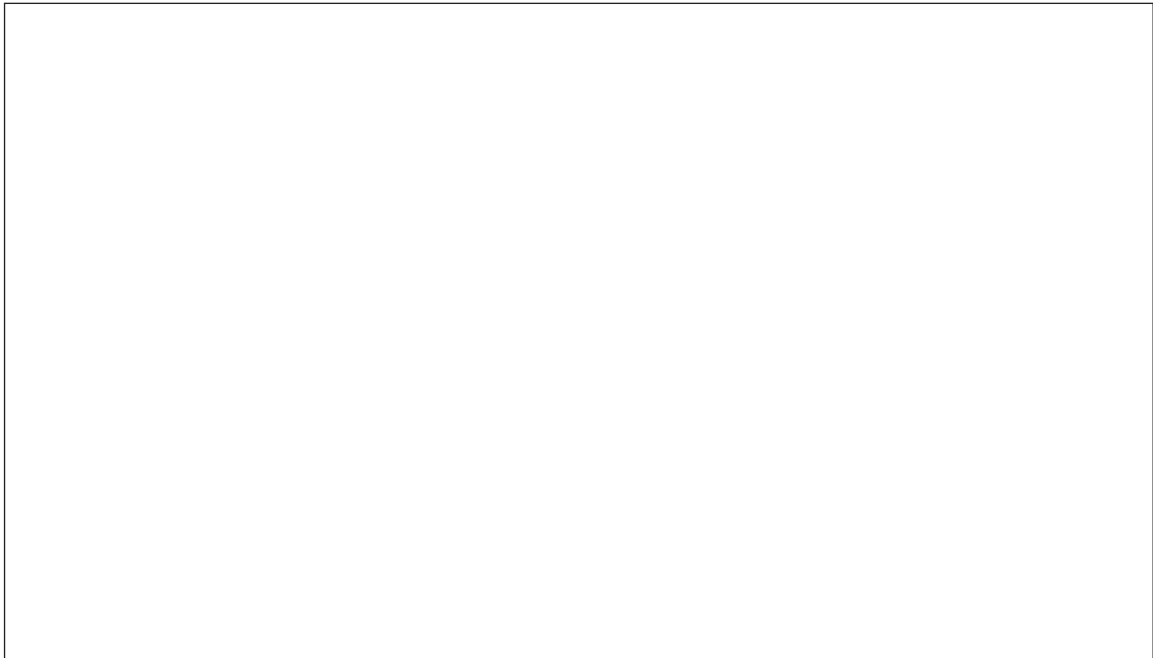


Figure 3: Nanaimo Emergency waiting room (Stantec, 2016).

Inside the emergency department, state of the art features such as operable electronic glass walls replace outdated privacy curtains to better improve infection control as well as providing considerable sound barriers between treatment areas (Leung, 2014). Patient and staff confidentiality and comfort were at the forefront of the design of this project (Stantec, 2014).



Figure 4: Electronic glass walls (Leung, 2014)

#### 4.1.1 ANALYSIS AND OVERVIEW

The Nanaimo Regional General Hospital Emergency Department is a strong design precedent for other Canadian hospital waiting environments. It represents a current redevelopment project based on the research and information from EBD literature, the field of interior design and the mentality that change is needed in emergency departments waiting environments. Without explicitly stating, the resulting design addressed numerous concepts relevant to the psychology of waiting – specifically those involving perception. The design showed measurable increases of user satisfaction from both patients and staff. Although the design does not reference the satisfaction model by Maister (2005) ( $S = P - E$ ), post occupancy data reveals an increase of user satisfaction and



reduced wait times through a design that challenged emergency waiting environment standards in Canadian hospitals. The multidisciplinary team of architects, designers and hospital staff allowed the concepts of EBD and practical knowledge to come together to address users on both a psychological and physical level, reinforcing that both are important in addressing user satisfaction. Table 5 shows the relevant psychology of waiting concepts that were incorporated through design features present in the Nanaimo Regional General Hospital Emergency Department, and those to consider for future redesign.

Table 5: Analysis of Nanaimo Regional General Hospital

<b>PSYCHOLOGY OF WAITING PRINCIPLE</b>	<b>DESIGN INTERVENTION</b>	<b>SATISFACTION RESULTING</b>	<b>INITIAL DESIGN CONSIDERATIONS</b>
Emotions dominate/ emotional contagion	Separating patients based on acuity upon arrival to the emergency department	By separating patients based on acuity, emotional contagion is less likely to sway the entirety of the group.  Those of a lower acuity would have similar levels of anxiety or discomfort, and therefore be more likely to remain in a neutral emotional position	Those of a higher acuity would perceivably have higher levels of anxiety, and discomfort so there is a possibility for the waiting environment to address that. Ideally, those with higher acuities would endure shorter waiting periods, however some thought regarding privacy should be considered for future waiting environments
Start strong, end strong because the memory of an event is more important than the experience	Combining the registration and triage processes into one action Immediately separating patients into appropriate waiting areas based on acuity Open courtyard while waiting	Eliminates potential first wait Patients feel they are being acknowledged and taken care of Memorable design feature that relieves stress while waiting and challenges the institutional atmosphere	
Occupied time feels shorter than unoccupied time	Open courtyard to use while waiting	Access to views and nature are known to assist in healing time and reduce anxiety (Ulrich, 2008)	Technological implications – such as data ports, charging stations, Wi-Fi, TV, games, or magazines
People want to get started	Combining admitting and triage Separate waiting areas based on acuity	Patients feel they are being acknowledged and taken care of Moving patients from one area to the next in a series of waiting and treatment areas makes the wait seem faster and less enduring – perceive they are being processed faster	

<b>PSYCHOLOGY OF WAITING PRINCIPLE</b>	<b>DESIGN INTERVENTION</b>	<b>SATISFACTION RESULTING</b>	<b>INITIAL DESIGN CONSIDERATIONS</b>
Unfair waits are longer than equitable waits	Acuity based waiting spaces	At this point, the wait does become more equitable because all patients within each waiting area would have similar levels of acuity, so the first-come, first-served principle ensues making the wait more tolerable	Those of a higher acuity would perceivably have higher levels of anxiety, and discomfort so there is a possibility for the waiting environment to address that. Ideally, those with higher acuities would endure shorter waiting periods, however some thought regarding privacy should be considered for future waiting environments
Uncertain waits are longer than finite waits			Within each waiting area there could be an electronic bulletin board or information screen letting people know how many patients are occupying that waiting environment. As patients arrive they could take note of where they stand in line and make an accurate estimation of waiting time – this concept has the ability to affect expectations.
Solo waits feel longer than group waits			Within each waiting environment, and especially those with a higher level of acuity, areas of private refuge should be considered as patients in these environments may be in significant discomfort (even though the waiting duration may be shorter)

## 4.2 PRECEDENT 2: LEIGH VALLEY HOSPITAL – MUHLENBERG

Location: Bethlehem, Pennsylvania, USA

Architect: NBBJ Seattle

Completed: 2014

Leigh Valley Hospital – Muhlenberg underwent redevelopment in 2010 due to exceeding capacities and lengthy waiting times. The original design was completed in 1994 and accommodated 30,000 patient visits per year. The emergency department had since experienced considerable patient growth and struggled to properly accommodate patients. NBBJ Architects, along with a team of emergency department leaders, financial providers and hospital staff collaboratively developed the new concept for the emergency department. The resulting design was the development of a Rapid Assessment Unit (RAU) that would not only be more efficient in managing patient volumes and satisfaction rates, but also address internal operations from a management perspective. The RAU was constructed in what was the original footprint of the emergency department waiting room (Wheary, 2014).

The RAU designed for Leigh Valley Hospital – Muhlenberg allows for a continuous flow of patients from one space to another, keeping the RAU beds available for incoming patients. Upon entry to the emergency department, a team comprised of a nurse and a registration clerk assesses patients and either treats the patient immediately or moves the patient to another section of the emergency department for further care. This model allows patients with lower acuities to be seen immediately, decreasing – and in some

cases eliminating the wait time altogether (Wheary, 2014).

Unique to the RAU design at Leigh Valley Hospital – Muhlenberg was the development of what has been defined as ‘vertical patient flow’ and ‘horizontal patient flow’. This means that upon initial assessment (by nurse and registration clerk), the unit decides if a patient would be better served and treated by remaining in their seat (vertical), or if they would be better served and treated on a stretcher or bed (horizontal). This technique limits the number of non-acute patients taking up stretchers or patient beds unnecessarily. The area where non-acute patients wait for treatment or test results has been labeled the internal disposition area thereby eliminating the term ‘waiting room’ altogether (Wheary, 2014).

The post occupancy results of this design redevelopment reveal its success. The time for patients to see a physician has decreased from 60 minutes to 20 minutes even though patient volumes have increased by 5% and continue to grow. Satisfaction surveys revealed that overall satisfaction with the emergency department experience (including waiting time) increased from 40% to 90%. The number of patients who leave without being seen by a physician decreased from 2.4% to just 0.2% and the number of diverted ambulances due to emergency department overcrowding has been eliminated completely (Wheary, 2014).

Before analyzing the design of the Leigh Valley Hospital – Muhlenberg, it should be noted that it is located in the United States of America (USA) and operates differently than the universal coverage of Medicare in Canada. The USA does not have an all-inclusive national health care system paralleling Medicare in Canada, however they do have the Affordable Care Act (Medicaid, 2016) that is now mandating American citizens

to make subsidy payments for health insurance. Many USA hospitals are privately owned and operated, where hospitals compete for business and citizens ultimately pay for their quality of care. Therefore, design budget allowances for Canadian hospitals can be smaller than their USA counterparts, leading to differences in design features that may affect patient comfort and aesthetics.

#### 4.2.1 ANALYSIS AND OVERVIEW

The Leigh Valley Hospital – Muhlenberg was considered as a precedent for this practicum project because its resulting redevelopment challenged stereotypical waiting room functionality. The project exists as a redevelopment onto an existing emergency department, but instead of expanding outwards as many facilities do when under redevelopment, the project turned its attention inward and questioned the use of interior space. Although the project lacks any design description, the project illustrates that patient satisfaction can be a result of innovative thinking, challenging standard practices and smart interior design solutions. By creating smaller, more individualized zones within the emergency department, the conventional patient treatment process is replaced with the more efficient method of the RAU. John F. Wheary, the site director for the department of emergency medicine at Leigh Valley Hospital – Muhlenberg stated, “simply expanding the size of an inefficient and outdated emergency department may only lead to greater inefficiency” (Wheary, 2014). Vancouver based architect, Bruce Raber who is the lead on health care design at Stantec concurs with Wheary’s statement by saying that the perception by many is to match or expand current waiting rooms, but in reality “one of the biggest mistakes that hospitals make is continuing to build massive waiting areas, which only promote logjams” (Leung, 2014). Pushing the concept further,

American health care in general is seeing a shift away from emergency waiting rooms altogether. For example, in Washington, DC the Swedish Medical Center operates under a no-wait emergency department. When patients arrive, they are immediately taken to a back treatment room and assessed by a register clerk, nurse and doctor, put through the necessary medical tests, treated and discharged. Although this is a more extreme example, it isn't without its challenges (Rodak, 2011). Both the Leigh Valley Hospital – Muhlenberg and the Swedish Medical Center reveal how pushing the limits of what is considered the standard in emergency waiting rooms can ultimately lead to higher patient satisfaction.

The concept of the RAU model can be extrapolated to accommodate and better serve Canadians in emergency department waiting environments. Keeping patients in constant flux through the implementation of treatment zones streamlines the waiting time specifically for those with low acuities. This is where the vertical and horizontal patient flow concepts could benefit waiting environments. Again, this example shows drastic improvements in patient and staff satisfaction and reduced waiting times even though patient volumes continue to grow.

Table 6 shows the relevant psychology of waiting concepts that were incorporated through design features present in the Leigh Valley Hospital – Muhlenberg Emergency Department, and those to consider for future redesign.

Table 6: Analysis of Leigh Valley Hospital – Muhlenberg

<b>PSYCHOLOGY OF WAITING PRINCIPLE</b>	<b>DESIGN INTERVENTION</b>	<b>SATISFACTION RESULTING</b>	<b>INITIAL DESIGN CONSIDERATIONS</b>
<p>Emotions dominate/ emotional contagion</p>	<p>Utilizing the RAU to treat patients upon entry to the emergency department Vertical and horizontal patient flow</p>	<p>The continuous flow of patients from one space to another allows patients to perceive to be getting immediate care. Emotional contagion is less likely to sway the entire group because no one is sitting in a single large waiting room.</p> <p>The implementation and distinction between vertical and horizontal patient flow considers the comfort of the patient receiving treatment and determines if they would be more comfortable and better served sitting up in a treatment area or laying down on a stretcher. This design considers the emotional condition of the patient and may increase satisfaction with the overall experience.</p> <p>Doesn't take up beds or stretchers unnecessarily which keeps the emergency department open for incoming patients</p>	
<p>Start strong, end strong because the memory of an event is more important than the experience</p>	<p>RAU team immediately treats or moves patients to another section of the emergency department for further care Immediately separating patients into appropriate</p>	<p>Eliminates potential first wait (wait for triage) Patients feel they are being acknowledged and being taken care of immediately. RAU may allow for quick discharge times to decrease</p>	



<b>PSYCHOLOGY OF WAITING PRINCIPLE</b>	<b>DESIGN INTERVENTION</b>	<b>SATISFACTION RESULTING</b>	<b>INITIAL DESIGN CONSIDERATIONS</b>
	treatment areas	or eliminate the wait altogether	
Occupied time feels shorter than unoccupied time	N/A		Technological implications such as data ports, charging stations, Wi-Fi, TV, games or magazines,
People want to get started	RAU team immediately treats or moves patients to another section of the emergency department for further care  Immediately separating patients into appropriate treatment areas based on acuity	Patients feel they are being acknowledged and taken care of  Moving patients from one area to the next in a series of waiting and treatment areas makes the wait seem faster and less enduring making them perceive they are being processed faster	Make sure there are enough RAU stations to properly serve an influx of patients at one time. Could be through the use of multiple serving lanes
Unfair waits are longer than equitable waits	Acuity based waiting/ treatment spaces	At this point, the wait does become more equitable because all patients within each waiting area would have similar levels of acuity, so the first-come, first-served principle ensues which makes the wait more tolerable	Make sure there are enough RAU stations to properly serve an influx of patients at one time. Could be through the use of multiple serving lanes
Uncertain waits are longer than finite waits	N/A		Within each waiting or treatment area there could be an electronic bulletin board or information screen letting people know how many patients are occupying that waiting environment. As patients arrive they could take note of where they stand in line and make

PSYCHOLOGY OF WAITING PRINCIPLE	DESIGN INTERVENTION	SATISFACTION RESULTING	INITIAL DESIGN CONSIDERATIONS
			an accurate estimation of waiting time – this concept has the ability to affect expectations
Solo waits feel longer than group waits	N/A		Within each waiting or treatment environment, and especially those with a higher level of acuity, areas of private refuge should be considered as patients in these environments may be in significant discomfort (even though the waiting duration may be shorter)

### 4.3 PRECEDENT 3: SURREY MEMORIAL HOSPITAL

Location: Surrey, British Columbia, Canada

Architect: CEI Architecture and Parkin Architects

Completed: Phase 1 October 2013; Phase 2 spring 2014

Surrey Memorial Hospital opened in 1959 and was designed to accommodate approximately 40,000 emergency department patients each year. By the early 2000's, Surrey's emergency department had become one of the busiest in Canada and struggled to accommodate the city's growth. In 2013-2014, the Surrey Memorial Hospital Emergency Department underwent a 512-million dollar redevelopment and expansion project, making it the largest health care project in British Columbia (BC) history (CEI Architecture, 2016).

The new emergency department is 5 times larger than the original department, encompassing 57,000 square feet and includes a mental health unit as well as a specialized pediatric emergency area complete with a separate entrance, check in, treatment and family areas. A separate entrance also exists for those patients arriving by police or paramedics via an ambulance garage that doubles as an additional triage space in the event of overcrowding or disaster (Canadian Architect, 2013).

Project architects state that the design was informed by the latest health care EBD principles. Registration and triage stations are located in the direct path of the entrances to eliminate confusion and offer direction to patients upon arrival. Patient treatment areas are segregated into separate zones with dedicated staff members assigned to

each zone, eliminating walking distances for staff as well as separates patients by acuity. Private patient treatment rooms use glass walls instead of curtains for infection control and allow staff to have a sight of patients. There are also dedicated areas within each patient treatment room for those accompanying the patient so that they do not have to wait separately during treatment. Consideration was also given to the materiality of the space (floor and ceiling) in order to reduce or dampen sound transfer from one space to another. Large window facades wrap the space allowing patient rooms and waiting environments to be on the perimeter of the building to provide as much natural light as possible. The public entrance is a large volume space with wood structural columns (or “internal trees”) (Canadian Architect, 2013).

The exterior of the building responds to the typology of the BC environment featuring natural materials including wood, glass, ceramic and stone. These features can also be seen throughout the interior and are intended to soften the harshness often associated with institutional care facilities (Canadian Architect, 2013). The design also received LEED Gold certification (CEI Architecture, 2016).

Even with the resources available to the redevelopment, the opening of the emergency department did experience problems. The design of the new facility did not include a fast track area that catered specifically to non-urgent, or lower acuity patients, which created patient backlogs and negative media attention regarding lengthy wait times. The problem was remedied through the implementation of a fast track triage area that was constructed adjacent the regular triage area. It was designed specifically for low acuity patients, who would be treated and discharged without entering the main treatment areas (Leung, 2014).



Figure 5: Surrey Memorial Hospital Emergency entrance. Photo courtesy of HDR | CEI Architecture Associates, Inc.; © 2014 Ed White Photographics (CEI Architecture, 2016).

Figure 6: Surrey Memorial Hospital Emergency foyer. Photo courtesy of HDR | CEI Architecture Associates, Inc.; © 2014 Ed White Photographics (CEI Architecture, 2016).

Figure 7: Surrey Memorial Hospital Pediatric Emergency registration and waiting. Photo courtesy of HDR | CEI Architecture Associates, Inc.; © 2014 Ed White Photographics (CEI Architecture, 2016).

Figure 8: Surrey Memorial Hospital Emergency waiting area. Photo courtesy of HDR | CEI Architecture Associates, Inc.; © 2014 Ed White Photographics (CEI Architecture, 2016).

#### 4.3.1 ANALYSIS AND OVERVIEW

The Surrey Memorial Hospital redevelopment offers a strong example of two of the main issues affecting the redesign of emergency departments today. The first reveals how the incorporation of EBD principles alone may not guarantee success, and the second being that building bigger isn't always better. This state of the art facility is undoubtedly beautiful, however issues were experienced by not initially including a patient fast track area for those patients arriving with lower acuities.

Expectations are changing as they relate to emergency department care in that users now expect to receive immediate care for non-urgent ailments. Lengthy waits for non-urgent ailments are typically not deemed acceptable by users and further emphasizes the idea that the design of traditional emergency departments (specifically the way in which people wait for care) is changing. Emergency department design that looks inward and questions the functioning and management of patient care experience higher satisfaction rates among their users than simply expanding to create more space. Patient satisfaction must also be addressed on both a physical and psychological level. The initial complaints illustrate the need for a better understanding of the psychology of waiting and understanding how people wait. Following redevelopment users would presumably have pre-encounter expectations for the new space that it would be a very efficient, state of the art, aesthetically pleasing, and fully functional. Failing to satisfy these expectations would ultimately contribute to lowered satisfaction rates.

Table 7 shows the relevant psychology of waiting concepts that were incorporated through design features present in the Surrey Memorial Hospital – Emergency Department Redevelopment, and those to consider for future redesign.

Table 7: Analysis of Surrey Memorial Hospital

<b>PSYCHOLOGY OF WAITING PRINCIPLE</b>	<b>DESIGN INTERVENTION</b>	<b>SATISFACTION RESULTING</b>	<b>INITIAL DESIGN CONSIDERATIONS</b>
Emotions dominate/ emotional contagion	<p>Separate entrances for those patients arriving with paramedics (via ambulance) or police</p> <p>Separate entrance and treatment area for pediatric patients</p> <p>Treatment zones separated based on acuity</p> <p>Registration and triage stations are on a direct path from entrance</p>	<p>Eliminates the potential for added stress and waiting room overcrowding</p> <p>By separating patients based on acuity, emotional contagion is less likely to sway the entirety of the group.</p> <p>Those of a lower acuity would have similar levels of anxiety or discomfort and therefore be more likely to remain in a neutral emotional position</p> <p>Eliminates confusion and relieves unnecessary stress for both patients and staff</p>	<p>Consider privacy options for triage areas</p> <p>Appropriate signage to distinguish each emergency department entrance for incoming patients. This could be achieved through signage, colour coding, or other wayfinding techniques</p>
Start strong, end strong because the memory of an event is more important than the experience	<p>Separate entrances</p> <p>Clearly marked and accessible registration and triage desk</p> <p>Separating patients into appropriate treatment areas based on acuity</p> <p>Large public entrance and atrium</p>	<p>Eliminates potential stress of seeing grotesque injuries which could add more stress to the wait</p> <p>Start strong by informing patients where to start the care process</p> <p>State of the art facility, family centered approach (use of natural materials)</p>	<p>Creating an aesthetically appealing entrance can impact the experience enough to create a positive memory</p> <p>Do not want to overwhelm patients upon arrival. Keep design features reasonable as top priority is treating patients and not aesthetics</p>
Occupied time feels shorter than unoccupied time	N/A		<p>Technological implications such as data ports, charging stations, Wi-Fi, TV, games, or magazines</p>

PSYCHOLOGY OF WAITING PRINCIPLE	DESIGN INTERVENTION	SATISFACTION RESULTING	INITIAL DESIGN CONSIDERATIONS
People want to get started	Separating entrances and triage/ admitting areas based on acuity (and pediatrics) may make users feel they are being processed faster	<p>Patients feel they are being acknowledged and taken care of</p> <p>Moving patients from one area to the next in a series of waiting and treatment areas makes the wait seem faster and less enduring – perceive they are being processed faster</p>	Make sure there is appropriate signage or design features to separate the various points of patient entry
Unfair waits are longer than equitable waits	Acuity based waiting/ treatment spaces	At this point, the wait does become more equitable because all patients within each waiting area would have similar levels of acuity, so the first-come, first-served principle ensues making the wait more tolerable	
Uncertain waits are longer than finite waits	N/A		<p>Within each waiting/ treatment area there could be an electronic bulletin board or information screen letting people know how many patients are occupying that waiting environment.</p> <p>As patients arrive they could take note of where they stand in line and make an accurate estimation of waiting time. This concept has the ability to affect expectations as well</p>
Solo waits feel longer than group waits			Within each waiting/ treatment environment, and especially those with a higher level of acuity, areas



<b>PSYCHOLOGY OF WAITING PRINCIPLE</b>	<b>DESIGN INTERVENTION</b>	<b>SATISFACTION RESULTING</b>	<b>INITIAL DESIGN CONSIDERATIONS</b>
			of private refuge should be considered as patients in these environments may be in significant discomfort (even though the waiting duration may be shorter)

## **CHAPTER 5: PROGRAMMING**

### 5.1 INTRODUCTION

This chapter of the practicum project is supplemental to the theoretical information presented in the literature review and precedent studies. The program aims to represent a tangible framework that provides an outline of concepts to be considered in the interior design of future emergency department waiting environments.

#### 5.1.1 AN EVOLUTION OF WAITING

The practice of specialized emergency medicine began in the late 1960's and early 1970's, and in turn, so did the specialization of health care design. At this time, health care design was largely undertaken by any design firm willing to accept the challenge. The design teams did not include health care workers or caregivers and, as a result, many emergency departments struggled to meet operational needs. It wasn't until the 1980's that design firms began consulting emergency department caregivers during the design process. The multidisciplinary team initially hindered the design of emergency departments by creating spaces that were too internally segregated (i.e. separate emergency department wings for each acuity – one for trauma, another for surgery), but eventually evolved into the multifunctional, acuity adaptable, decentralized models constructed today (Huddy, 2016). Correspondingly, emergency waiting rooms have transitioned from singular enclosed spaces to a series of waiting environments appropriately corresponding with treatment (Huddy, 2016).

This practicum project began with the analysis of existing emergency department waiting room models to better understand the increasing dissatisfaction among users of this type of environment. Expectations are changing with regard to how long users

are willing to wait, how they wait and what's expected while waiting. Perceptions are also changing, as emergency department users become increasingly discerning with the care they receive (Soremekun et al., 2011). These contemporary formulations are not being satisfied in traditional emergency department waiting room models, ultimately contributing to user dissatisfaction.

Contemporary emergency waiting environment designs reveal an emphasis away from singular external waiting areas, to several internal waiting areas dispersed throughout the department. This separation does not simply separate high and low acuities in the hopes of creating a faster treatment process, but actually creates a procedural path for the patient to take toward receiving care (Huddy, 2016). For this reason, the act of emergency waiting should not be considered static, but rather a process involving movement and progression. The process of waiting is driven by internal operations (or medical interventions) allowing the quickest access to care. However, ultimately only acuity and departmental capacity affect when a patient moves from one waiting area to another. If emergency department waiting is understood this way, then perceivably, no two patients will have exactly the same waiting experience, therefore highlighting the need for multiple internal waiting areas that more intuitively accommodate those waiting at each stage of treatment (W. Palatnick, personal communication, July 3, 2016).

Health care design has seen measurable improvement over the last two decades (Huddy, 2016). However, a small amount of research specific to emergency department waiting environments currently exists. This suggests that waiting environment design may be an overlooked aspect of specialized health care and one that actually has considerable

merit to the wellbeing and satisfaction of its users.

What began as a practicum project aimed at producing user satisfaction in the redesign of the emergency waiting room is now a practicum project aimed at further re-imagining the design of contemporary emergency department waiting environments. The resulting design will not be one traditional large waiting room, but rather several smaller waiting environments within the emergency department. The resulting design solution aims to satisfy users both psychologically and physically through the understanding of their perceptions and expectations while encompassing evidence-based design (EBD) knowledge to arrive at an aesthetically appealing, functional design for future waiting environments.

#### 5.1.2 SITE VISIT

On July 3, 2016, a site visit to the Health Sciences Centre (HSC) emergency department was conducted to better understand emergency department layout, waiting areas and why people wait in this setting. The site tour was led by an emergency department physician willing to offer constructive comments and an inside perspective on the design, function and relevancy of the existing emergency department and waiting environments.

Entering through the public entrance, a small information booth physically (but not visually) separates triage waiting from the public waiting area (friends and family only – no patients are present). To the left of the entrance is the triage waiting area. This environment is relatively small and characterized by three rows of seating in close proximity to the triage and registration desk. It was noted that this space would benefit from wheelchair storage as the small space often becomes cluttered and inaccessible

when at capacity. Through a doorway, the tour continued around the corner to reveal a private family waiting room (maximum of 4 people) and a triage window (attached to the main triage desk) for those arriving by ambulance. At HSC the ambulance entrance is separate from the public emergency entrance. Privacy concerns were mentioned with regard to the triage desk, noting that the middle triage station was unusable due to confidentiality concerns during patient intake. It was suggested that walls or partitions could be used between triage stations, or the implementation of private triage rooms for each patient. Additionally, the need for stretcher waiting bays adjacent the ambulance triage area would benefit staff by keeping patients on stretchers out of the hallways.

The next area visited was a protocol room adjacent the ambulance triage area. This single-bed room which is used for blood draws, electrocardiograms, ultrasounds and reassessments serves as a secondary waiting area (although for only one person at a time), allowing a patient to remain in the department instead of going back to the external public or triage waiting areas to wait for such procedures or reassessment. It was mentioned that the way this room is currently being used substantiates the need for an internal waiting area specifically for those patients waiting for further testing, ordered procedures and reassessments. Additionally, it was mentioned that this waiting area could be combined with the Rapid Assessment Zone (RAZ) waiting area for lower acuity patients.

The tour continued around the department to reveal two more internal waiting areas for patients. The RAZ treatment area had a minimal waiting area (6 chairs lined up in a hallway opposite the 3 curtained treatment areas) and was specifically for those patients with minor ailments and conditions who could be treated quickly. Another large

internal waiting area, separate from the public waiting and triage waiting areas housed those patients waiting for a treatment bed to receive care, to be seen by a physician, to receive reassessment, a procedure or simply waiting for care due to departmental capacity. This internal waiting area allows the main intake areas (triage and public waiting areas) to remain clear for incoming patients.

Additional, more generalized comments gathered during the site tour that pertain to the design of health care waiting areas include:

- The incorporation of more private areas for patients to wait within each waiting area,
- No cell phones were allowed in waiting areas due to privacy concerns,
- Recliner seating should be provided in minor care waiting areas,
- The necessity for more private family rooms,
- The importance of knowing your “waiters” when designing the waiting areas (for example, this may differentiate the type of seating offered, whether waiter controlled televisions are appropriate, or if the ability for waiters to go outside is appropriate).

## 5.2 PROPOSED SITE AND BUILDING

The designs proposed within this practicum project are not site specific, nor do they respond directly to any particular existing emergency department waiting environment in Winnipeg. This practicum project does not aim to provide a singular design solution to be replicated or reproduced. Rather, the theoretical framework and resulting design proposals are meant to uncover, identify and highlight concepts known to influence satisfaction within waiting environments and offer hypothetical examples of how this information could be represented within the built environment. This approach

was chosen in acknowledgement of the fact that every emergency department will have a unique set of needs and constraints (budgets, existing facilities, technological implication, medical interventions offered and demographic data) to consider when designing waiting environments. This approach also allows waiting environments to remain the primary focus of the practicum project without being overwhelmed by the complexity of designing an all-inclusive emergency department.

Despite not being site-specific, the theoretical framework and the proposed designs consider necessary visual and physical adjacencies as well as separations between waiting spaces. Staff and public circulation is also considered within the waiting environment as it relates to hypothetically adjoining areas of the emergency department and emergency vehicle access. Additionally, approximate square footage requirements are considered as they relate to each specific waiting environment. Patient type and patient volume have been considered to represent a mid-sized urban Winnipeg emergency department.

#### 5.2.1 OPERATIONAL DEFINITION OF WAITING

In this document, the word waiting refers specifically to the act of waiting within the hospital emergency department. This includes waiting for triage, waiting for procedure related testing, waiting for reassessment, waiting for a care space (private room or vertical treatment space) and waiting for discharge information. The term waiting should not be confused or compared to waiting times for priority medical procedures such as hip and knee replacements, or waiting periods endured for scheduled procedures.

#### 5.3 CLIENT PROFILE

There will not be a specific client profile for this practicum project. The resulting theoretical framework and hypothetical design proposals represent one attempt at reevaluating emergency department waiting environments. The principles outlined within this practicum project are intended for consideration and application in the design of future emergency waiting environments (both new construction or renovation) and are not specific to one typographical or demographic setting. For the purpose of satisfying programming requirements, the project will rely on the Winnipeg Regional Health Authority (WRHA), for general data and background information on the values and objectives the organization has set out for Winnipeg emergency department care, with the assumption that other health authorities operate in a similar manner with similar goals and objectives for the functioning of their emergency departments.

#### 5.4 PROJECT GOALS

This section outlines the organizational, form and image, and functional goals of the practicum project. Organizational goals for this project represent the strategic direction set out by the WRHA as well as designer led goals. Form and image goals represent the aesthetic and psychological impact the design aims to incur on users. Functional goals describe the broad range of users and how the resulting waiting environments will function to accommodate users.

Organizational Goals:

- Enhance patient experience
- Improve quality and integration
- Advance research and education
- Build sustainability



- Improve patient flow
- Clearly define registration and triage areas
- Cost effective design solutions
- Improve maintenance and operation
- Enhance workplace design for employees

#### Interior Design Goals:

- To establish a tangible framework that provides an outline of the concepts to be considered in the design of future emergency department waiting environments.
- To establish a theoretical framework that examines and outlines a contemporary approach to progressional waiting environments within the emergency department.
- To propose hypothetical design solutions representing information provided in the theoretical framework.
- To propose hypothetical design possibilities that respond to principles from the psychology of waiting and EBD to contribute to a designer lead dialogue around user satisfaction in the waiting environments of emergency care facilities.

#### Form and Image Goals:

- Consider concepts from the psychology of waiting as they relate to physical and psychological satisfaction.
- Consider concepts from EBD as they relate to physical and psychological satisfaction.
- Allow the waiting spaces to be aesthetically appealing to users.
- Keeping climate in consideration, allow for access (both visual and physical) to the exterior from waiting spaces.
- Consider multi-volume spaces while at the same time not overwhelming users with

scale and unnecessary grandeur.

- Focus on the physical and visual separation of waiting environments as users progress in their treatment paths.

Functional Goals:

- Redefine the emergency waiting experience to include treatment focused waiting environments, various seating options, the incorporation of exterior views and physical access outside the building.
- Eliminate confusion while increasing knowledge about the process of waiting within an emergency department through the use of appropriate signage.
- Allow design cues within each waiting environment to provide the user with an environmentally informed estimated waiting time or the ability to appropriately perceive how long they will likely spend within that environment.

## 5.5 MERGING CHARACTERISTICS: A THEORETICAL FRAMEWORK

To become familiar with the type of waiting accommodation that exists regionally, a number of Winnipeg hospital emergency department waiting rooms were visited.

These visits furthered the assumption that in general, the design of Winnipeg emergency department waiting rooms minimally accommodates users. Generally, one type of seating was provided in a large common area near the public entrance, natural light was restricted and numerous privacy concerns were evident.

The information and knowledge gained from consulting with an expert in the health care field coupled with the precedent research ultimately informed the waiting environments that are presented in the theoretical framework. By identifying the required waiting environments in an emergency care facility, the concepts from the

literature review can be fully and properly applied to inform the re-imagining of those spaces. There is sufficient evidence to support the concept that user satisfaction in the emergency department, and more specifically the waiting environments, is the result of a carefully planned emergency department (Huddy, 2016). The process of emergency department care can be ambiguous for many users waiting. However by providing separate waiting areas that more directly align with a particular stage of treatment, users may gain a better understanding of the accommodations provided which can ultimately lead to increased satisfaction.

Figure 9 illustrates the theoretical framework outlining the waiting environments relevant to the scope of this practicum project. The theoretical framework identifies four types of waiting environments: triage waiting, public waiting (including family rooms), rapid care waiting, and inner patient waiting (A+B – including consultation rooms). These waiting areas are represented within the solid lines in the diagram. Family rooms and consultation rooms are supplementary to the main waiting environments and are represented within the dotted lines in the diagram. The sizes of the boxes around each waiting environment are scaled to represent approximate square footage requirements for each waiting environment. The bottom of the figure represents the entrance point of the hospital emergency department, which then leads into the progression of waiting spaces. The thick dashed lines provide a basic representation of patient care streams within the emergency department. Section 1 of the diagram is patient access and is designed for incoming patients and visitors. Section 2 is rapid care, or minor care which would typically see lower acuity patients who could receive treatment vertically without entering the main departmental areas or occupying a bed. This area is commonly referred

to a minor treatment zone (Huddy, 2016). Section 3 represents the main emergency department where the majority of major treatment takes place. In addition to the waiting areas shown in the theoretical framework, this area would house trauma rooms, resuscitation rooms, procedure related testing areas and private treatment beds.

Triage waiting is the patients' first access point to receiving medical attention. Patients wait for a registration clerk and attending physician or nurse to assess their condition in this area. Similar to public waiting space, the triage waiting area should allow 15-18 square feet per person and should be in visual proximity to the public entrance, information desk and security as well as the triage desk and private triage rooms. Accommodation for one family or friend accompanying the patient should also be provided. Traditionally patient triage was done at the registration desk, but contemporary design has moved triage examinations into more private areas adjacent the triage desk and waiting area. The triage waiting room must offer visual and auditory privacy from the public waiting room due to privacy concerns. Triage waiting environments should also consider stretcher waiting bays for those arriving by ambulance as well as wheelchair storage (Huddy, 2016).

The public waiting area accommodates overflow of the family and friends of patients and is not meant for patients at any time. The public waiting area is to be located adjacent to the public emergency department entrance and be visible from the security and information desk. This area should allow 15-18 square feet per person. For visual and auditory privacy reasons, it is important that the public waiting area remain separate from the triage waiting area (Huddy, 2016).

Family rooms are considered supplemental to public waiting environments and

serve multiple functions when situated off the public waiting area. The family rooms are flex spaces that allow the user to have additional options for waiting based on their situation. Family rooms can provide private waiting areas for families with loud children who may be disrupting others in public waiting, or for a user who wishes to make a phone call or have privacy during a difficult situation. Additionally, family rooms provide private discussion spaces for those accompanying patients to meet with physicians about a patient's condition. These rooms should be enclosed with dual points of entry. One from the public waiting environment and another from the clinical side for physicians to enter. Family rooms also exist near trauma and resuscitation bays, to allow friends or family of these patients to have a private space to wait for extended periods of time without having to enter the public waiting area. They also allow for the separation of family or friends accompanying patients in situations of domestic abuse or opposing groups having a fight. Family rooms should be allowed 140-200 square feet (Huddy, 2016).

Rapid care waiting refers to the waiting environment serving those who can receive treatment vertically (seated) rather than occupying an inpatient bed. This waiting area accommodates those who have been triaged and await vertical treatment. The rapid care treatment area, often called the minor treatment area, is separated from the main emergency department and away from patient access areas (triage, public waiting and hospital entrance) (Huddy, 2016).

The inner patient waiting areas are reserved for those patients who have been triaged and are in queue for further treatment. Inner patient waiting 'A' accommodates those patients who have been triaged but still await treatment resulting from no treatment spaces being available due to limited departmental capacity. Inner patient

'B' accommodates those patients who have been triaged and have either been treated, partially treated or not yet treated, but require a diagnostic procedure, additional testing, test results, discharge information or reassessment. This waiting area should be situated away from any public access points and in close proximity to a nursing station, private treatment rooms and consultation rooms. These internal waiting areas are often referred to as waiting lounges and approximate 15-18 square foot per person. Internal waiting areas should also allow accommodation for one person to be accompanying each patient (Huddy, 2016).

Consultation rooms are supplemental to inner patient waiting 'B' and are intended for the accommodation of interactions between the physician and patient. This typically will occur prior to discharge from the hospital or to another inpatient unit. This area should be in close proximity to inner patient waiting areas, yet provide auditory and visual privacy from them (Huddy, 2016).

**USER PATH OF TRAVEL**

User path of travel indicated by colour corresponding rectangle. Note that no two situations will be the same, so the path of travel simply represents all emergency department areas the user could potentially be waiting/ treated for their ailment.

**USER 1**

Patient presents with a swollen wrist after suffering a collision during a soccer game - wrist appears to be fractured or sprained.

**USER 2**

Patient arrives requiring a dressing change on a previous injury.

**USER 3**

Arrives via ambulance after suffering a heart attack.

**THEORETICAL FRAMEWORK DIAGRAM REPRESENTING WAITING SPACES OF THE EMERGENCY DEPARTMENT**

Waiting environments in this figure are represented in boxes. The boxes are accurately scaled and represent the minimum allowable square footage per waiting environment.

Square footages depicted represent a mid-sized urban hospital in Winnipeg serving between 100-150 patients per day. Patients waiting per space were estimated as follows:

- Triage Waiting: 15 users
- Public Waiting: 35 users
- Family Rooms: 20 users (over 6 rooms)
- Rapid Care #1: 15 users
- Rapid Care #2: 15 users
- Inner Patient A: 25 users
- Inner Patient B: 25 users

Total: 150 "waiters"

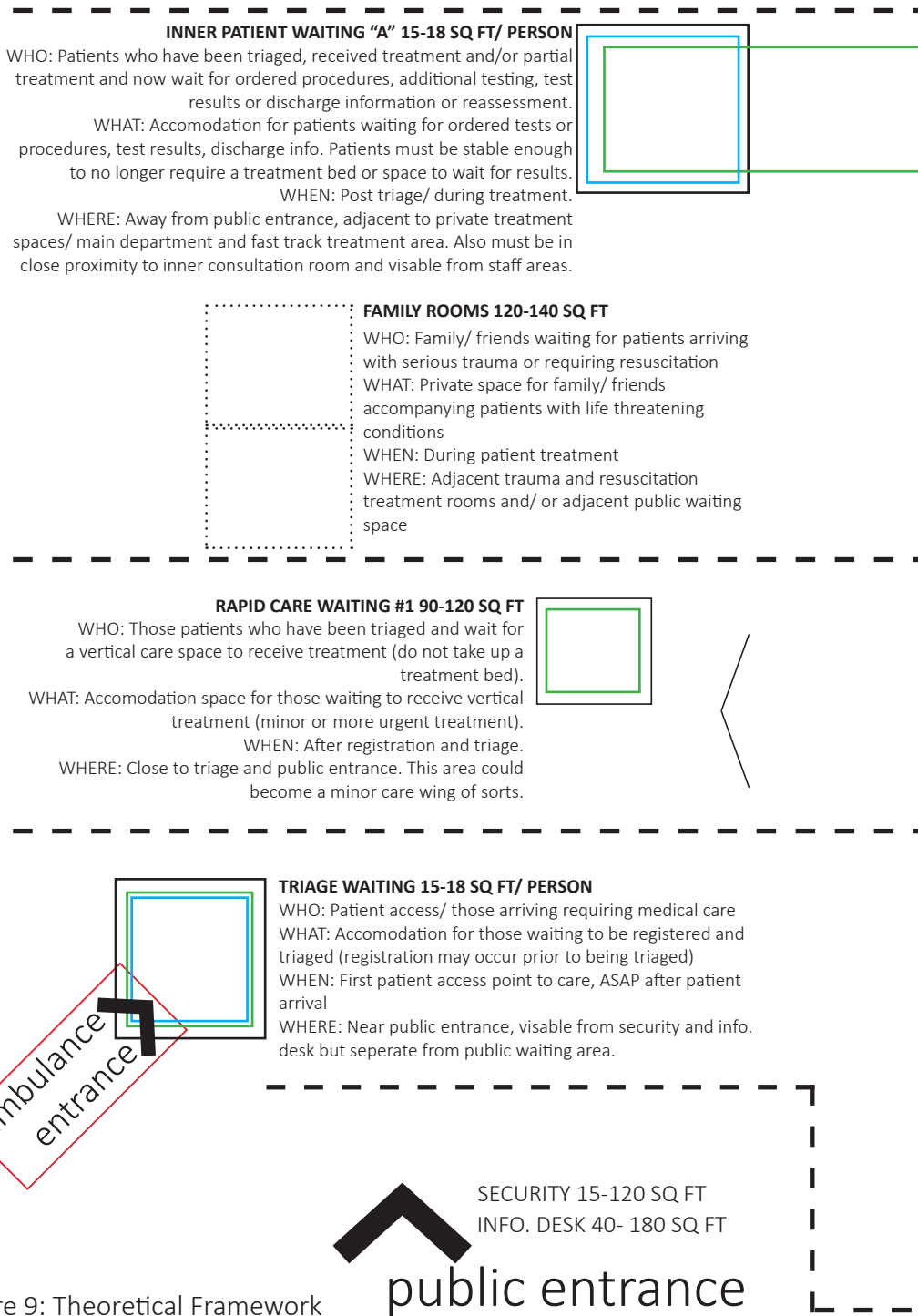
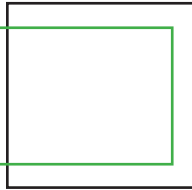
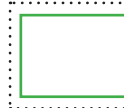


Figure 9: Theoretical Framework



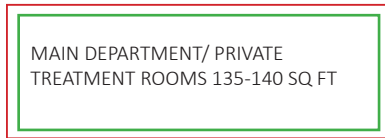
**INNER PATIENT WAITING "B" 15-18 SQ FT/ PERSON**

WHO: Patients who have been triaged and wait for a treatment space to become available due to departmental capacity.  
 WHAT: Accomodation for patients waiting for a horizontal treatment space (bed). These patients cannot be treated in the rapid care and treatment area.  
 WHEN: Post triage.  
 WHERE: Away from public entrance, adjacent to private treatment rooms and fast track treatment area.



**CONSULT ROOM 120-140 SQ FT**

WHO: Doctor and patient  
 WHAT: Private space for doctor to discuss results with patient  
 WHEN: After treatment - about to leave hospital or be moved to another ward for more care.  
 WHERE: Adjacent Inner Patient Waiting 'B'

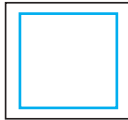
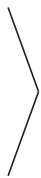


MAIN DEPARTMENT/ PRIVATE TREATMENT ROOMS 135-140 SQ FT

**FAST TRACK TREATMENT AREAS 135-140 SQ FT**

WHO: Patients waiting that can be treated quickly for minor ailments.  
 WHAT: Regular size private treatment rooms for patients requiring care that can be administered quickly.  
 WHEN: During high patient times doctors will open up a fast track treatment area to decrease those waiting in Inner Patient Waiting B requiring minor medical intervention.  
 WHERE: Adjacent private treatment rooms, near Inner Patient waiting spaces.

3



**RAPID CARE WAITING #2 90-120 SQ FT**

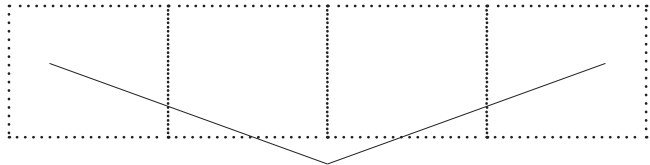
WHO: Those patients who have been triaged and wait for a vertical care space to receive treatment (do not take up a treatment bed).  
 WHAT: Accomodation space for those waiting to receive vertical treatment (minor or more urgent treatment).  
 WHEN: After registration and triage.  
 WHERE: Close to triage and public entrance. This area could become a minor care wing of sorts.

2



**PUBLIC WAITING SPACE 15-18 SQ FT/ PERSON**

WHO: Overflow family/ friends - no patients  
 WHAT: Accomodation for family/ friends of patients recieving medical care  
 WHEN: Partial to total duration of patient treatment  
 WHERE: Near public entrance, visable from security and info. desk but not near triage waiting for privacy reasons



**FAMILY ROOMS 140-200 SQ FT**

WHO: Friends/ family and physcian/ nurse  
 WHAT: Private space for family/ friends of patient to converse with medical specialists abot patient condition, treatment etc.  
 WHEN: Patient is in treatment, family/ friends waiting will be called into family consult room to recieve news/ updates  
 WHERE: Adjacent public waiting room. Doctor access separate from public access to room

1



5.6 DESIGN PROGRAM

5.6.1 HUMAN FACTORS

This section identifies and describes the user groups of emergency department waiting environments and provides descriptions of the functional and spatial requirements specific to each waiting area. The section concludes with design guidelines, issues and objectives.

5.6.2 OVERVIEW OF USER GROUPS

<b>PRIMARY</b>	<p><b>PATIENT</b></p> <ul style="list-style-type: none"> <li><b>ARRIVE</b> <ul style="list-style-type: none"> <li>Walk in main public entrance or arrive via ambulance</li> <li>entrance by ambulance or police.</li> </ul> </li> <li><b>ACTIVITIES</b> <ul style="list-style-type: none"> <li>Wait for triage.</li> <li>Wait for medical care.</li> </ul> </li> <li><b>FREQUENCY/ DURATION</b> <ul style="list-style-type: none"> <li>24/7 facility access.</li> <li>Duration dependant on acuity and departmental capacity.</li> </ul> </li> </ul>	<p><b>VISITOR</b></p> <ul style="list-style-type: none"> <li><b>ARRIVE</b> <ul style="list-style-type: none"> <li>Walk in main public entrance or arrive with patient in ambulance.</li> </ul> </li> <li><b>ACTIVITIES</b> <ul style="list-style-type: none"> <li>Wait for family/ friends receiving medical treatment or awaiting medical care.</li> </ul> </li> <li><b>FREQUENCY/ DURATION</b> <ul style="list-style-type: none"> <li>24/7 facility access.</li> <li>Duration dependant on acuity of patient and departmental capacity.</li> </ul> </li> </ul>	<p><b>STAFF</b> (MEDICAL /SERVICE)</p> <ul style="list-style-type: none"> <li><b>ARRIVE</b> <ul style="list-style-type: none"> <li>Staff entrance (not in project scope).</li> </ul> </li> <li><b>ACTIVITIES</b> <ul style="list-style-type: none"> <li>Information Clerk, Triage Register and Nurses, Physicians, Specialists, cleaning and maintenance.</li> </ul> </li> <li><b>FREQUENCY/ DURATION</b> <ul style="list-style-type: none"> <li>24/7 facility access. Typical 8-12 hour shift for nurses and support staff, longer shifts for physicians.</li> </ul> </li> </ul>
	<b>SECONDARY</b>	<p><b>PARAMEDICS/ POLICE</b></p> <ul style="list-style-type: none"> <li><b>ARRIVE</b> <ul style="list-style-type: none"> <li>Staff entrance (not in project scope).</li> </ul> </li> <li><b>ACTIVITIES</b> <ul style="list-style-type: none"> <li>Arrive with patients and proceed to triage with patient, wait for next call.</li> </ul> </li> <li><b>FREQUENCY/ DURATION</b> <ul style="list-style-type: none"> <li>24/7 facility access. Length of stay dependant on acuity of patient and departmental capacity.</li> </ul> </li> </ul>	<p><b>PARAMEDICS/ POLICE</b></p> <ul style="list-style-type: none"> <li><b>ARRIVE</b> <ul style="list-style-type: none"> <li>Staff entrance (not in project scope).</li> </ul> </li> <li><b>ACTIVITIES</b> <ul style="list-style-type: none"> <li>Arrive with patients and proceed to triage with patient, wait for next call.</li> </ul> </li> <li><b>FREQUENCY/ DURATION</b> <ul style="list-style-type: none"> <li>24/7 facility access. Length of stay dependant on acuity of patient and departmental capacity.</li> </ul> </li> </ul>

Figure 10: User profiles. Primary Users are the focus of this analysis.

The primary user groups of emergency department waiting environments include patients, visitors (friends and family of patients), and hospital staff (medical and service). Patients entering the emergency department will be those who are ill and require medical attention ranging in acuity from non-urgent to those requiring resuscitation (Canadian Triage and Acuity Scale levels I-V). Patients will be from varying demographic backgrounds, including age, race and gender, with the majority of patients being adult Manitobans residing within central Winnipeg or those coming from Northern Manitoba requiring more specialized medical attention. Visitors include family and friends of patients who may accompany patients at the time of arrival, or arrive after they are notified of the patient arriving to the emergency department. Visitors will share a similar demographic profile to patients, although they may be children. Emergency department medical staff are also considered to be primary users of emergency department environments. These users are highly trained and educated individuals who treat patients and inform visitors of a patients' condition as they are receiving treatment. Like patients and visitors, medical staff would be of varying demographics, age, gender and race. Emergency department staff also includes maintenance and cleaning personnel.

Secondary users include paramedics and police as they accompany patients to the hospital. Paramedics and police are highly trained adult individuals who arrive with patients to the emergency department. They stay with the patient until they are registered and admitted to the department.

## 5.6.3 FUNCTIONAL REQUIREMENTS

Table 8: Functional requirements

<b>WAITING ENVIRONMENT</b>	<b>FUNCTION</b>	<b>FF+E, AESTHETICS and DESIGN CONSIDERATIONS</b>
TRIAGE WAITING	Accommodates those arriving to the emergency department requiring medical attention (patients)	<p>Stretcher bay for min 3 stretchers</p> <p>Health care grade waiting chair with appropriate health care rated seating upholstery</p> <p>Wheelchair alcove (in entrance vestibule or triage waiting area)</p> <p>Wall mounted TV</p> <p>Informative signage about waiting environment and treatment process (could be electronic display)</p> <p>Accessible public washrooms</p> <p>Vending machine (1-2)</p> <p>Design should create a clear path of travel to information desk/ triage desk</p> <p>View outside</p> <p>Staff should have clear view of all patients waiting</p>
PUBLIC WAITING	Accommodates overflow family/ friends during patient treatment. No patients should be in this space at any time.	<p>Various types of comfortable seating (chair, bar stools at table, recliner or cushioned benches). Seating should be arranged into different areas to allow for areas of privacy and refuge. All seating should conform to health care standards.</p> <p>Area for light refreshments (beverages, light food)</p> <p>Accessible washrooms</p> <p>Public phone, cell phones/ magazines and Wi-Fi</p> <p>Access to outdoors/ smoking and walking paths</p>

WAITING ENVIRONMENT	FUNCTION	FF+E, AESTHETICS and DESIGN CONSIDERATIONS
FAMILY ROOMS	<p>Family rooms located off public waiting allow the physician speak to family/ friends waiting about a patients condition and/ or allow family/ friends waiting a private space to wait if they are experiencing emotional distress. Family rooms located near trauma and resuscitation are for friends/ family accompanying very ill patients.</p>	<p>Small coffee table</p> <p>TV screen for viewing x-rays/ watching television</p> <p>Four walls should be sound proof and not contain translucent glass. If glass doors are included, a film should be applied making the glass opaque.</p> <p>Dual opening doors (one from public side, one from physician side)</p> <p>Accessible washroom in close proximity</p> <p>These rooms could resemble a domestic living room and offer comfort to users (less clinical)</p> <p>Dual lighting options or dimmable lighting</p>
RAPID CARE	<p>Accommodates those patients who have been registered and triaged, but now wait for a vertical treatment space to receive care.</p>	<p>Multiple rapid care waiting environments can be provided (to accommodate overflow)</p> <p>Comfortable seating conforming to health care standards</p> <p>Private phone rooms</p> <p>Staff should be able to see patients waiting at all times</p> <p>TV</p> <p>Dimmable lighting that can follow the circadian rhythms of patients waiting (darker at night)</p> <p>Accessible washroom</p> <p>Light refreshments area (vending machine/coffee)</p>
INNER PATIENT A	<p>Accommodates those patients who have been registered and triaged, but now wait for a private</p>	<p>Varied seating options (chair/ recliner) conforming to health care standards</p> <p>Wheelchair alcove</p>

WAITING ENVIRONMENT	FUNCTION	FF+E, AESTHETICS and DESIGN CONSIDERATIONS
	treatment space to receive care.	<p>Stretcher alcove (can be separate from main waiting area)</p> <p>TV</p> <p>Private phone rooms</p> <p>Staff should have view to patients at all times</p> <p>Refreshments area</p> <p>Accessible washrooms</p> <p>Access outside/ access nearby for smoking/ getting air during long waits</p> <p>Dimmable lighting that follow the circadian rhythms of patients waiting (darker at night)</p> <p>Sound masking panels or other form of sound baffling should be considered</p>
INNER PATIENT B	Accommodates those patients who have been triaged and have either been treated, partially treated or not yet treated, but require a diagnostic procedure, additional testing, test results, discharge information and/ or reassessment.	Same as Inner Patient A with the addition of consultation rooms (2) nearby

## **CHAPTER 6: DESIGN**

### 6.1 INTRODUCTION

The following chapter reveals one attempt at re-imagining the design of emergency department waiting environments. The design proposal involves the integration of four distinct waiting areas allowing the waiter to transition from one area to the next following their individual course of treatment. The design proposals are not meant to provide a singular design solution to be replicated or reproduced, but rather identify and highlight concepts known to influence satisfaction within waiting environments and challenge the traditional “singular-room” waiting room model.

The design of emergency department waiting environments is seeing a shift in how to accommodate patients. There is movement toward the separation (and addition) of waiting spaces to improve patient flow throughout the department and allow patients faster access to medical care (Huddy, 2016). The resulting waiting spaces of this model can be understood as queuing spaces that are smaller in size, internally located within the department (as opposed to the traditional singular external waiting room) and allow for greater staff organization of patients.

This practicum project acknowledges the value in the separation and division of emergency department waiting spaces – especially when it results in faster treatment, but challenges the lack of design criteria associated with each new waiting environment. The intention of this practicum project is to understand what users want while waiting, how they wait, and how they can be better accommodated within each waiting environment. The literature and resulting design proposals shed light on the fact that simply focusing on reducing inevitable wait times won't necessarily lead to user

satisfaction (Fottler & Ford 2002; Soremekun et al., 2011; Trout, Magnusson, & Hedges, 2000; Wellstood et al., 2005). Therefore, research on the psychology of waiting allows the concept of waiting room separation and division to be taken further to generate a series of waiting spaces that not only align with the course of treatment, but also align with the psychological wellbeing of users. A design criteria specific to each waiting environment is formulated as it relates to concepts from the psychology of waiting and evidence-based design (EBD) with the intention of creating emergency waiting environments that lead to increased user satisfaction. Although waiting spaces are a result of the emergency care process, the resulting design proposals reveal the significance of appropriately designed waiting spaces within emergency department design.

The division, separation and creation of 6 waiting environments allows user-specific criteria to inform a design solution that more intuitively meets the satisfactory needs of each type of “waiter.” The development of the resulting waiting environments was informed by concepts explored in the literature review, precedent research, design programming and the examination of existing waiting room models in Winnipeg. The four waiting environments are: Triage Waiting, Public Waiting (including Family Rooms), Rapid Care Waiting, and Inner Patient Waiting (A+B – including Consultation Rooms).

## 6.2 DESIGN OVERVIEW: DESCRIPTIONS AND INTERIOR DEVELOPMENTS

This section of the practicum project is a representation of major concepts established in the literature review and their application to the design of the proposed emergency department waiting environments. Within the design descriptions of each waiting environment, principles or concepts from the psychology of waiting and EBD are written in brackets and italicized after the description of the corresponding design

feature.

### 6.2.1 TRIAGE WAITING

Walking through the entrance vestibule, users will have access to accessibility aids such as walkers or wheelchairs (start strong, end strong). Users will then make a 90-degree turn into the emergency department. A large directional arrow on the flooring pattern leads users to the information/security desk (start strong, end strong). The large desk allows clear sightlines from staff to patients waiting (emotions dominate). The physical waiting area features a large curtain wall that floods the area with natural light (emotions dominate) and allows users a view outdoors (views of nature; access to natural light). The seating implemented is intended for quick turn around times, knowing that users will not spend extended periods of time in this waiting environment (uncertain waits are longer than known waits). The space accommodates 15-20 users comfortably and has considered one person accompanying the patient to the emergency department. The decision to use a seating type that provides users with minimal comfort was chosen with the intention of allowing the environment to dictate the perception of wait time by the user (uncertain waits are longer than known waits). Additionally, there is large signage within the waiting environment outlining and describing the wait, what to expect within that waiting environment and various treatment paths (start strong, end strong; uncertain waits are longer than known waits). Aesthetically, the space is minimalistic and showcases a limestone accent wall behind the corian covered information/ security desk (start strong, end strong). The triage waiting area also has accessible washrooms and a vending machine. Four triage rooms are situated behind the desk where patients are called to be registered and assessed by a nurse and then filtered into the appropriate



waiting area (people want to get started; emotions dominate). Patients will not return to the triage waiting area. Those patients arriving to the emergency department via ambulance or police will enter the emergency department through a separate entrance located away from the public entrance. Here they will be greeted by a separate registration desk and receive triage in the adjacent stretcher bays (emotions dominate; start strong, end strong).

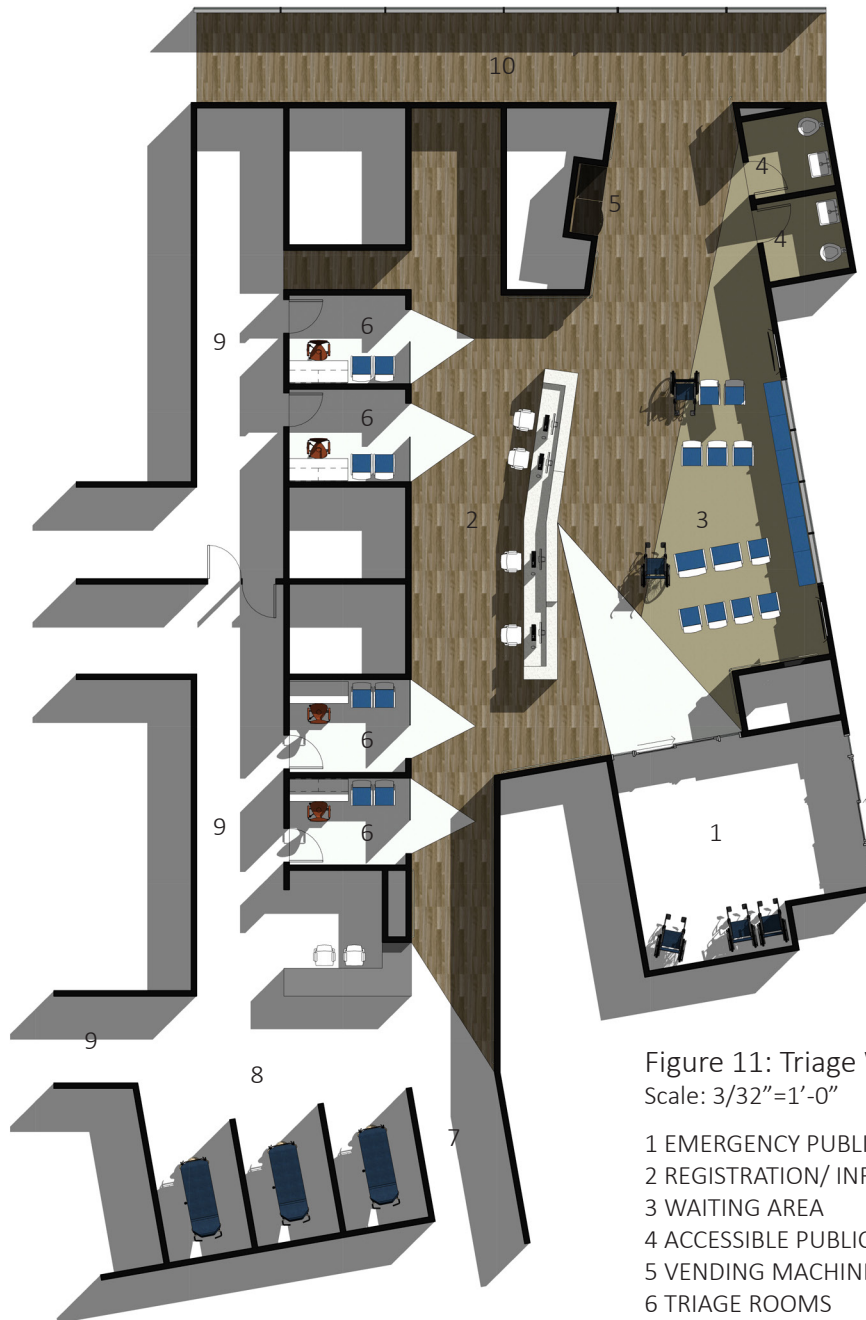


Figure 11: Triage Waiting Floor Plan  
Scale: 3/32"=1'-0"

- 1 EMERGENCY PUBLIC ENTRANCE
- 2 REGISTRATION/ INFO. DESK
- 3 WAITING AREA
- 4 ACCESSIBLE PUBLIC WASHROOM
- 5 VENDING MACHINES
- 6 TRIAGE ROOMS
- 7 AMBULANCE ENTRANCE
- 8 STRETCHER BAY
- 9 CORRIDOR TO TREATMENT AREAS
- 10 CORRIDOR TO PUBLIC WAITING



Figure 12: View of Triage  
Waiting from registration/  
info./ security desk (top)

Figure 13: View of Triage  
Waiting seating area  
(bottom)

## 6.2.2 PUBLIC WAITING and FAMILY ROOMS

The public waiting room is situated on an exterior wall and has connection points (via hallways) to the hospital entrance and triage waiting area as well as to internal department treatment areas. An expansive curtain wall facing a large outdoor green space that can be accessed from the waiting area defines the space. This design feature provides natural light within the interior waiting environment as well as views to nature satisfying concepts of emotional contagion and EBD. Users of the public waiting environment are free to use the outdoor space for refuge, a breath of fresh air or to smoke. Operable window shades are installed along the curtain wall but are only operable by the security desk personnel. The public waiting area has been designed to comfortably accommodate 50 people at approximately 18 square feet per person.

Inside, the public waiting environment is defined by zoned seating areas that provide users with a level of choice with regard to their desired activities. On one end there is a small café that serves light refreshments, a large bar height communal table with charging strip and power as well as two dining tables and benches. A security/information desk that is staffed 24 hours a day overlooks this area. This area is intended for conversation, work and eating. On the other end of the space, lounge type seating is arranged opposite the family rooms. This area of seating is intended to be quieter, but not noise free. The lounge seating was chosen for its flexibility as its many components allow the user to lie down, sit relaxed (lounge) or sit upright and work. The incorporation of technology was a strong consideration in the design of the public waiting space. Integrated technologies such as charging ports for personal electronics have been incorporated into seating and furniture acknowledging that occupied time feels shorter

than unoccupied time. Integrated technologies allow users to continue working during long waits or distract themselves with television or personal technologies. Two televisions are mounted at a low height on a specialized component of the lounge seating. Mounting the televisions within the furniture and at a lower height reduces noise within the space and allows users a choice in watching. Round ottoman seating and small work tables have been provided for children or adults to use. These furniture elements are on casters and are easily moveable.

Aesthetically this environment is intended to have a calming effect on its users. The space balances areas of conversation and areas of refuge while allowing maximum user control. The colour palette is neutral with white paint, light 'wood look' vinyl sheet flooring and nature inspired patterned accent furniture upholstery. This allows the space to feel large and clean.

Cleanliness and durability were major concerns with regard to the materiality of the space. The furniture line conforms to health care standards and provides easy cleaning through the incorporation of crumb sweeps, durable fabrics and removable seating and back cushions.

Four family rooms are located off the lounge seating area and are considered supplemental waiting spaces within the public waiting area. Family rooms have two points of entry, one from the public waiting area and the other from a clinical side for physicians to enter. The family rooms offer flexibility to users by providing areas of privacy and refuge. Families waiting with young children may prefer to wait in a family room if they feel they are disruptive to others within the public waiting area. Similarly, those users wanting to make a private phone call during a difficult time or those wanting to be

alone with family may choose to occupy a private family room while waiting. Physicians may also use private family rooms for discussion space with family or friends of patients that are waiting within public waiting room. Family rooms have a 3-seat sofa that can be pulled out into a bed as well as 2 recliner chairs, a small coffee table and ottoman. Each family room is also equipped with a TV for watching television or for physicians to use as a screen when discussing results with patients' family or friends. The incorporation of family rooms within the public waiting area satisfies the emotions dominate principle from the psychology of waiting by anticipating and providing accommodation of behaviors that may result in negative emotional contagion. Throughout the public waiting environment (including family rooms), zoned seating areas allow users the choice to wait alone or wait with others allowing preferential concepts from social facilitation theory to appropriately satisfy the solo waits feel longer than group waits principle.

The public side of the family rooms utilizes a glass sliding door partition to allow natural light from the curtain wall into the space. When users want privacy, the glass door can be closed and the opaque design film conceals the room. This design finish is meant to be informative and features a large number identifying the family room and a small explanation of what the family room should be used for. This, along with other signage regarding emergency department waiting aim to provide the user with more information about the wait and the space they are currently waiting in satisfying the uncertain waits are longer than known, finite waits principle.

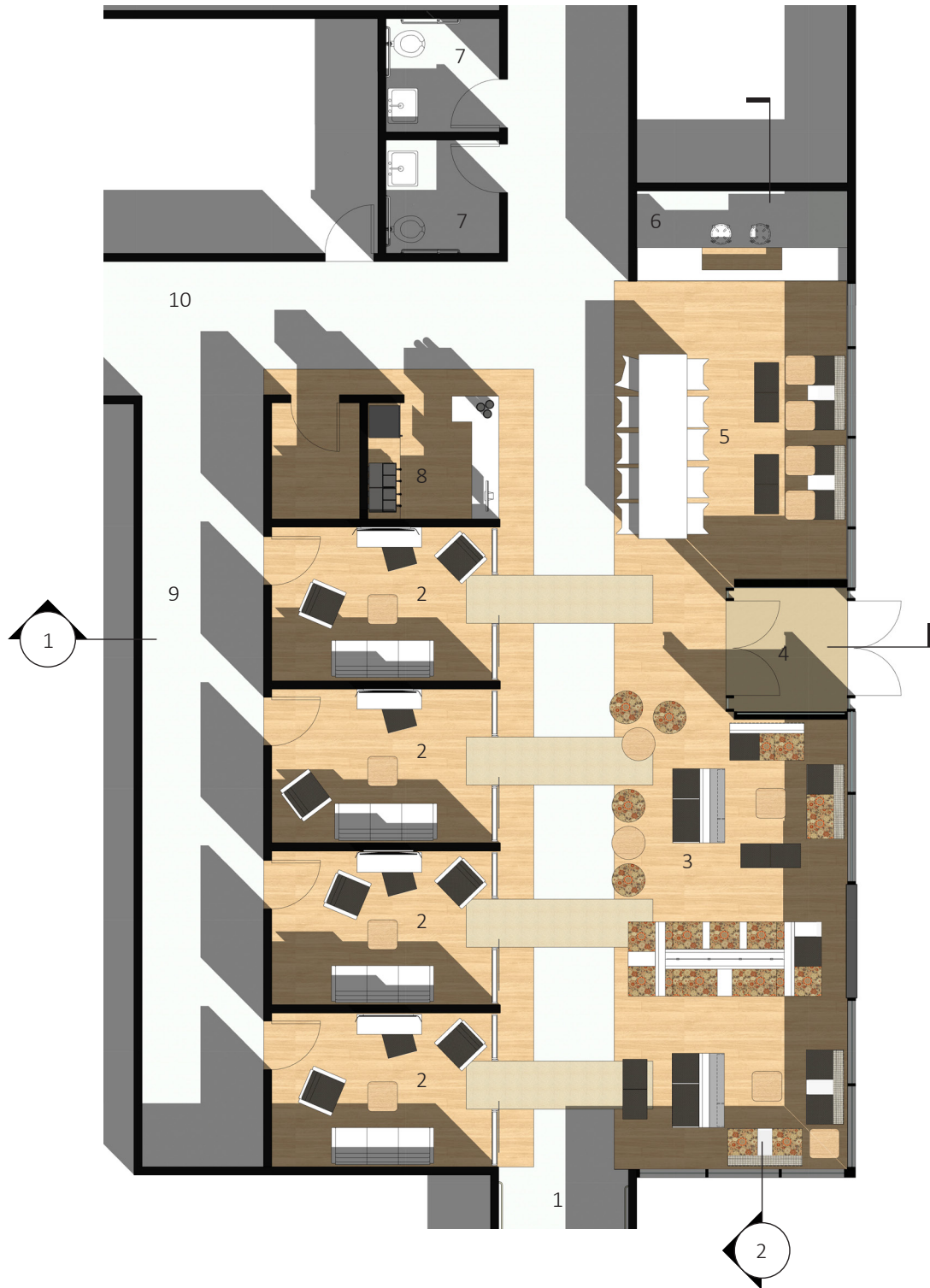


Figure 14: Public Waiting Floor Plan

Scale: 1/8"=1'-0"

- |                                    |                                       |
|------------------------------------|---------------------------------------|
| 1 CORRIDOR FROM TRIAGE             | 6 SECURITY DESK                       |
| 2 FAMILY ROOMS                     | 7 ACCESSIBLE PUBLIC WASHROOMS         |
| 3 LOUNGE WAITING AREA              | 8 CAFE                                |
| 4 ACCESS TO OUTDOOR PATIO          | 9 PHYSICIANS CORRIDOR TO FAMILY ROOMS |
| 5 BAR HEIGHT TABLE + DINING BOOTHS | 10 CORRIDOR TO TREATMENT AREAS        |



Figure 15: View of cafe and bar height table in Public Waiting







Figure 16: Longitudinal section of Public Waiting (Section 2)



Figure 17: Latitudinal section of Public Waiting and Family Room (Section 1)





Figure 18: Family Room public entry (left)  
Figure 19: Private Family Room interior

Figure 20: View of Public Waiting lounge area



### 6.2.3 RAPID CARE WAITING

First and foremost, rapid care waiting has been separated from all other waiting areas in the emergency department (people want to get started). Rapid care waiting is typically located in the minor care wing of an emergency department. The proposed design shows the waiting area cornered by two long connecting hallways. One hallway connects the rapid care waiting and treatment areas with the triage area, and the other hallway leads to an exit that is separate from the triage and emergency department entrance. The rapid care waiting environment is situated inside these hallways and defined by a change in flooring colour that outlines the boundaries of the waiting environment. This placement also allows those waiting to see the treatment rooms and feel engaged in the treatment process and that they will not be forgotten while waiting (emotions dominate). Although the rapid care waiting environment doesn't have direct access to an exterior view, a small amount of natural light enters the waiting space from the adjacent treatment rooms and LED lighting has been implemented to mimic natural daylight (emotions dominate; appropriate artificial lighting). The waiting environment is overlooked by a nurses' desk allowing visual proximity and clear sightlines from staff to patient (emotions dominate).

Phone rooms have been implemented at the far end of the waiting areas and provide users with a semi-private area to make a phone call during waiting. This gives the patients privacy but also eliminates any negative emotions that could arise from someone talking loudly on the phone in an otherwise quiet waiting environment (emotions dominate).

The phone rooms are a glass enclosure to allow staff to see the patients inside, however an opaque film has been implemented on the outside in the form of cellphone numbers



offering an insight to waiters on the function of the room (start strong, end strong).

Seating accommodation within this waiting environment provides the user with increased comfort acknowledging that the wait for treatment could take a long time and allows the seating type to dictate user perception of waiting time (emotions dominate; start strong, end strong; uncertain waits are longer than known waits). Electronic display boards are grouped together on the back wall of the waiting environment. These displays offer a welcome distraction to those waiting as well as provide information regarding emergency department waiting (occupied time feels shorter than unoccupied time; uncertain waits are longer than known waits). Accessible washrooms are available in close proximity to both waiting areas as are vending machines for light refreshments.

This practicum project design only shows one rapid care waiting environment however, hospitals may have the need for more than one. The principles of this design could be duplicated and applied to an additional rapid care waiting and treatment area to appropriately accommodate the anticipated number of patients.



Figure 21: Rapid Care Waiting Floor Plan  
 Scale: 3/32"=1'-0"

- |                               |                                 |
|-------------------------------|---------------------------------|
| 1 MAIN WAITING AREA           | 6 MAINTENANCE CLOSET            |
| 2 PHONE ROOMS                 | 7 PHARMACY                      |
| 3 TREATMENT/ PROTOCOL ROOMS   | 8 CORRIDOR TO/ FROM TRIAGE AREA |
| 4 NURSES STATION              | 9 CORRIDOR TO HOSPITAL EXIT     |
| 5 ACCESSIBLE PUBLIC WASHROOMS |                                 |



Figure 22: View of Rapid Care Waiting (left)

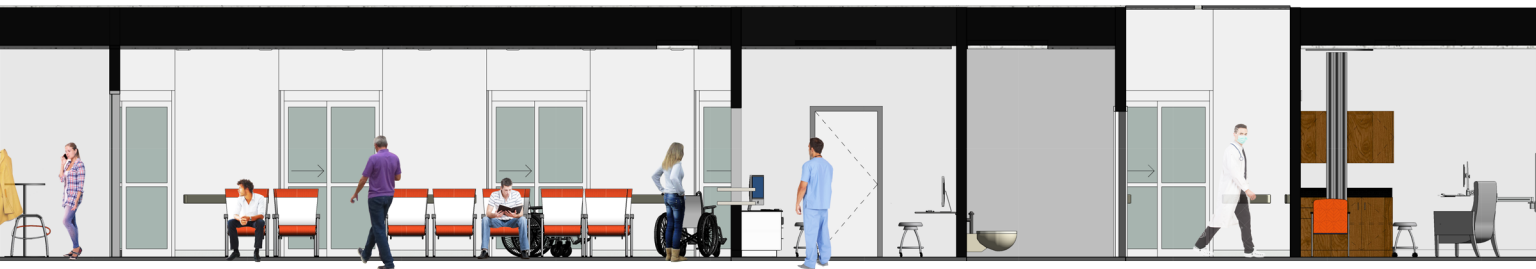




Figure 25: View of Rapid Care Waiting

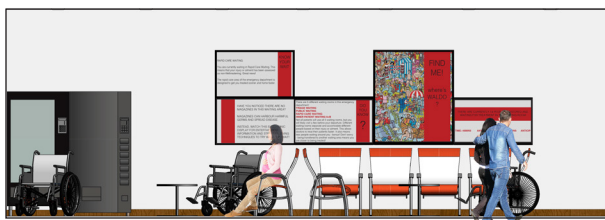


Figure 23: Elevation of electronic display wall

Figure 24: Section of Rapid Care Waiting (left)

#### 6.2.4 INNER PATIENT WAITING A + B

Inner Patient A waiting is reserved for those patients who have been triaged, but now wait for a private treatment space to become available. These patients cannot be treated in rapid care and may (or may not) be in significant discomfort. The design of this waiting environment keeps physical and psychological comfort at the forefront of the design to accommodate patients for what may be a lengthy wait. This waiting area provides 3 types of seating: a guest chair, a lounge chair that reclines and a sleeper chair that allows the user to lay completely horizontal. This allows users a choice in the type of comfort they desire while waiting, especially if the wait is overnight (emotions dominate; start strong, end strong). The guest chair is mainly intended for those accompanying a patient (family zone in single patient room) however patients can use them as well. Both the lounge chair and the guest chair accommodate bariatric widths (emotions dominate).

Patients seated within the main waiting area have clear sightlines to a large staff desk located at the top of the waiting space (emotions dominate). All seating within the waiting area is positioned on an angle from the staff areas to ensure staff has clear sightlines to patients (emotions dominate). There are 2 semi-private phone rooms available for patients to use at the side of the waiting area that may help eliminate negative emotions between users (emotions dominate). The phone rooms have large phone numbers on the glazing allowing users to understand what the space is used for (uncertain waits are longer than known waits). Although patients of this waiting area cannot be physically separated (because staff have to oversee them at all times), the seating has been arranged in semi-grouped sections with low walls between. Even this small amount of visual separation may aid in stress reduction for those waiting as from

their vantage point less people are waiting for care (emotions dominate). Additionally, areas of conversation or areas of refuge may occur due to this seating layout. Since the presence of others is more tolerable during short waits than during long waits the ability to remove oneself from a conversation area may benefit users (occupied time feels shorter than unoccupied time; solo waits feel longer than group waits).

Those users who are required to wait on a stretcher will be situated in semi-private stretcher bays that are located away from the main waiting space. This area is tucked in alongside a main staff corridor and has a lowered ceiling height with dimmable LED lighting that the patient can control (emotions dominate; appropriate lighting). Stretchers face into the bay, as opposed to facing the hallway, allowing patients to view the expansive Fiber Reinforced Plastic Panels (FRP's) that have been printed with a forest scene along the back wall (emotions dominate; views to nature). Patients waiting here have the option of a personal TV that is on an arm coming from the wall (occupied time feels shorter than unoccupied time). The separation of those patients waiting on a stretcher may reduce anxiety and stress for others in the waiting area (emotions dominate).

Toward the back of the waiting area are six semi-private protocol rooms used for blood draws, IV treatment, and other non-invasive procedures or tests. These are considered to be a portion of the waiting environment, as they would allow patients to begin treatment, while still waiting for an inpatient bed. The incorporation of protocol rooms within the waiting environment becomes a rapid assessment zone (RAZ), to improve efficiency and improve psychological needs of those waiting (people want to get started; emotions dominate; start strong, end strong).



Two accessible washrooms are located adjacent the main waiting area as well as around the corner from the stretcher waiting bays. Vending machines provide light refreshments (emotions dominate; occupied time feels shorter than unoccupied time). There is a pharmacy located adjacent Inner Patient A and B allowing discharged patients to fill prescriptions prior to exiting the hospital.

Inner Patient A is equipped with consultation rooms for private discussions with the physician (emotions dominate). The consultation rooms are located just outside the main waiting area are adjacent an exit so that patients (once discharged) can leave without entering the waiting area again (emotions dominate).

Electronic screens are positioned along the back wall of the main waiting area. These screens act as a form of positive distraction for those waiting (occupied time feels shorter than unoccupied time). The displays rotate through information about waiting in the emergency department, provide users with approximate wait times and display interesting facts about health care related information (uncertain waits are longer than known waits). There are also displays that are simply a form of non-educational distraction such as a "Where's Waldo" image, or dinner ideas.

The seating upholstery within Inner Patient A is bright and memorable. This was selected for an unexpected pop of color within an otherwise professional or clinical environment. The incorporation of a memorable design feature is known to positively influence satisfaction within waiting environments (start strong, end strong).

Aesthetically, the space has been designed with no natural light present. This was done to show how design recommendations from the psychology of waiting and EBD can still be incorporated into a waiting space located at the interior of a hospital. This would

likely be a scenario facing renovation projects as well. In lieu of a window, Inner Patient A utilizes a series of backlit 3Form panels that have a nature inspired motif on them. Panels are located within the two half walls dividing seating as well as in a 3' strip running the length of the space. Panels are backlit using LED bulbs that mimic daylight and are dimmable for overnight waits (start strong, end strong; occupied time feels shorter than unoccupied time; views of nature; access to appropriate artificial lighting).

Spatially, Inner Patient A and B have been separated to control emotional contagion. If the spaces were to be combined, users would have an inaccurate sense of how many people are actually waiting for care in the same situation as them, as opposed to those who are simply waiting for an ordered procedure or test results (emotions dominate). Users may move back and fourth between the two waiting environments during their treatment as required. The movement users experience when moving from one space to another following their treatment facilitates progression and may reduce the perception of overall wait time as well (people want to get started).

The design of Inner Patient B is the same as Inner Patient A but has incorporated a large window façade. This design decision was made since those waiting for procedures or awaiting test results may be under significant stress and a view to nature has been known to be beneficial in these situations (access to natural light; views of nature; emotions dominate). The option of a window façade could also be applied to Inner Patient A, however for the purpose of considering various existing site conditions, Inner Patient A was designed with no external walls.

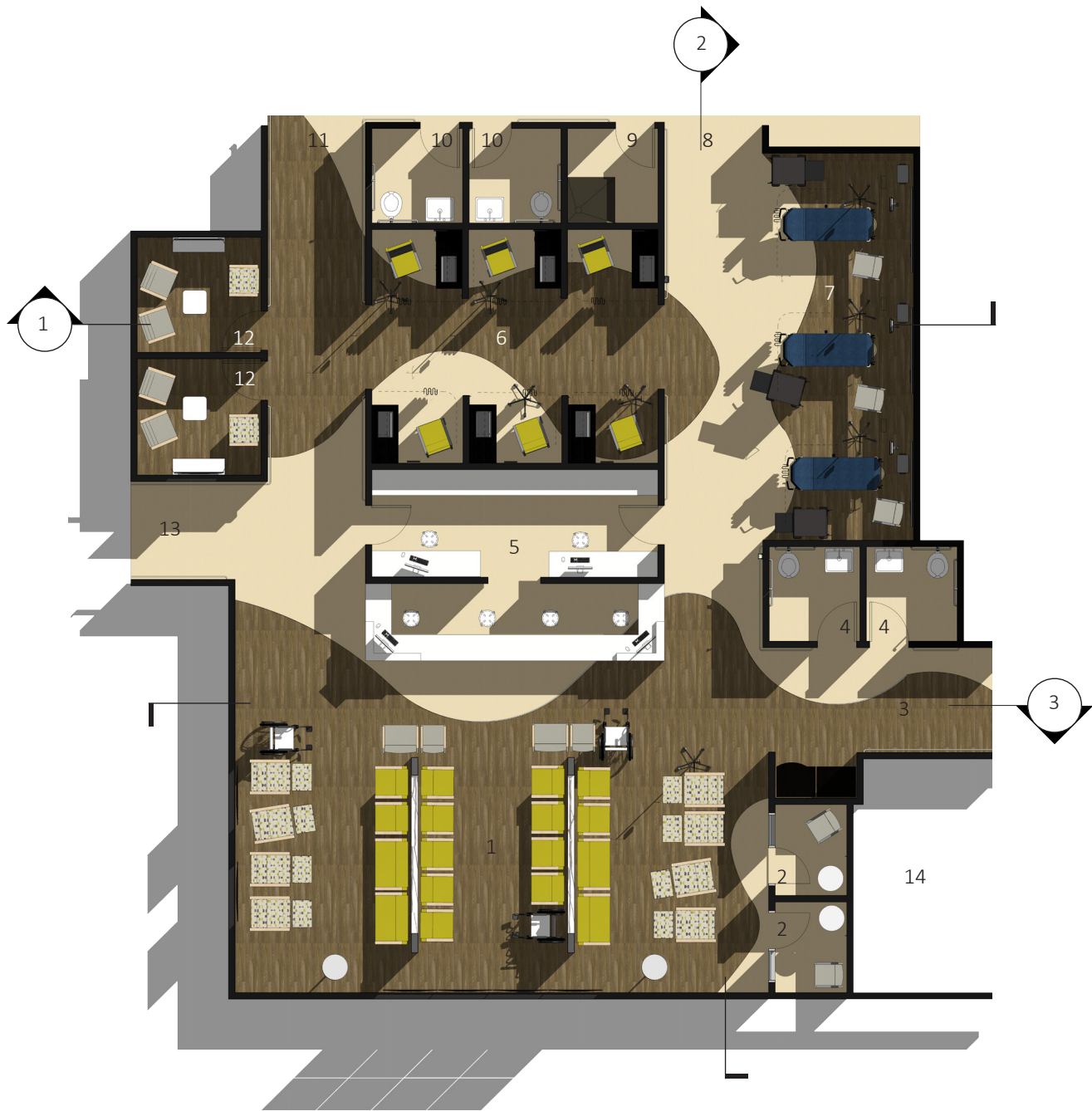


Figure 26: Inner Patient Waiting A/B Floor Plan

Scale: 3/32"=1'-0"

- |   |                                |
|---|--------------------------------|
| 1 MAIN WAITING AREA                     | 8 CORRIDOR TO TREATMENT AREAS  |
| 2 PHONE ROOMS                           | 9 MAINTENANCE CLOSET           |
| 3 CORRIDOR TO INNER PATIENT WAITING 'B' | 10 ACCESSIBLE PUBLIC WASHROOMS |
| 4 ACCESSIBLE PUBLIC WASHROOMS           | 11 CORRIDOR TO TREATMENT AREAS |
| 5 NURSES STATION AND STAFF AREA         | 12 PRIVATE CONSULT ROOMS       |
| 6 PROTOCOL AREA                         | 13 CORRIDOR TO TREATMENT AREAS |
| 7 STRETCHER WAITING BAYS                | 14 PHARMACY                    |

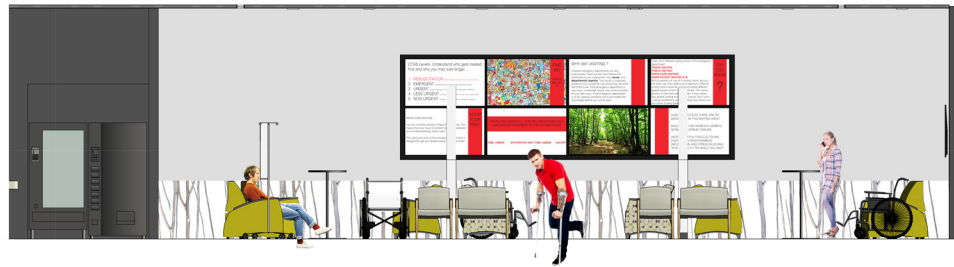


Figure 27: Elevation of Inner Patient Waiting



Figure 28: Section of protocol rooms and stretcher waiting bay



Figure 29: Elevation of Inner Patient Waiting and stretcher waiting bay

Figure 30: View of Inner Patient Waiting





Figure 31: View of protocol room (above)

Figure 32: View of stretcher waiting bay (below)



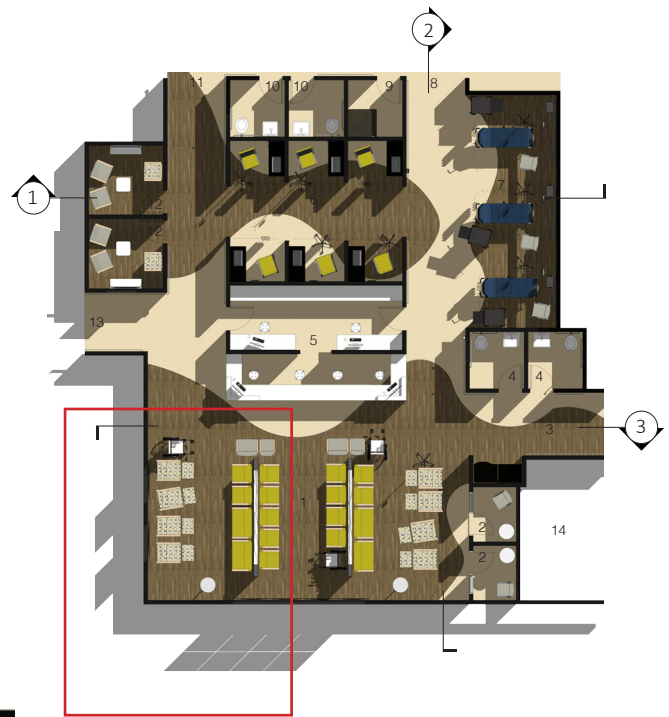


Figure 33: Inner Patient B floor plan (above)

Figure 34: Enlarged Inner Patient B floor plan showing window facade (left)





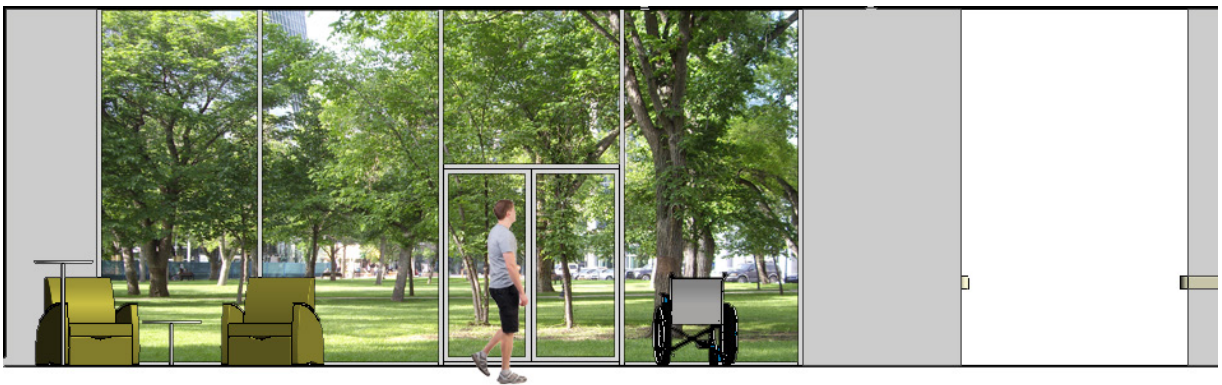
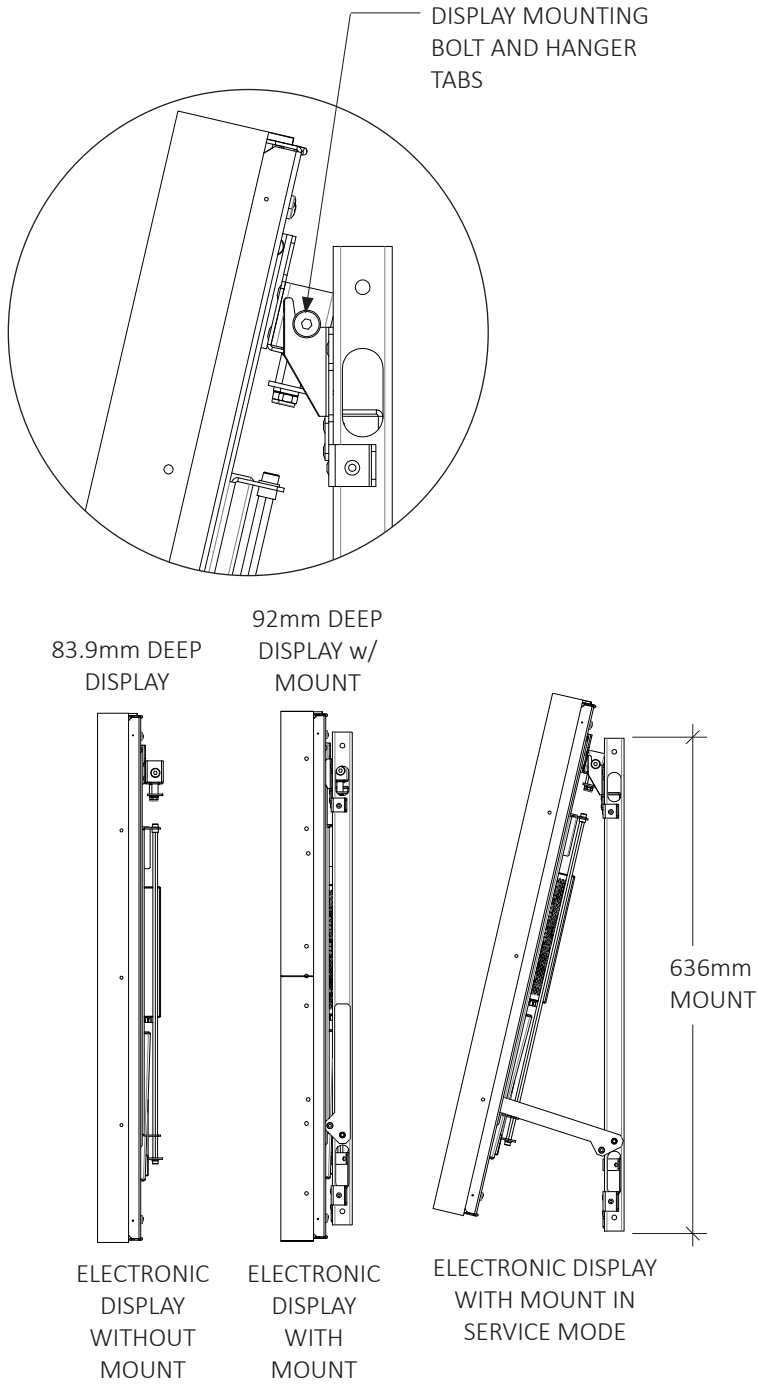
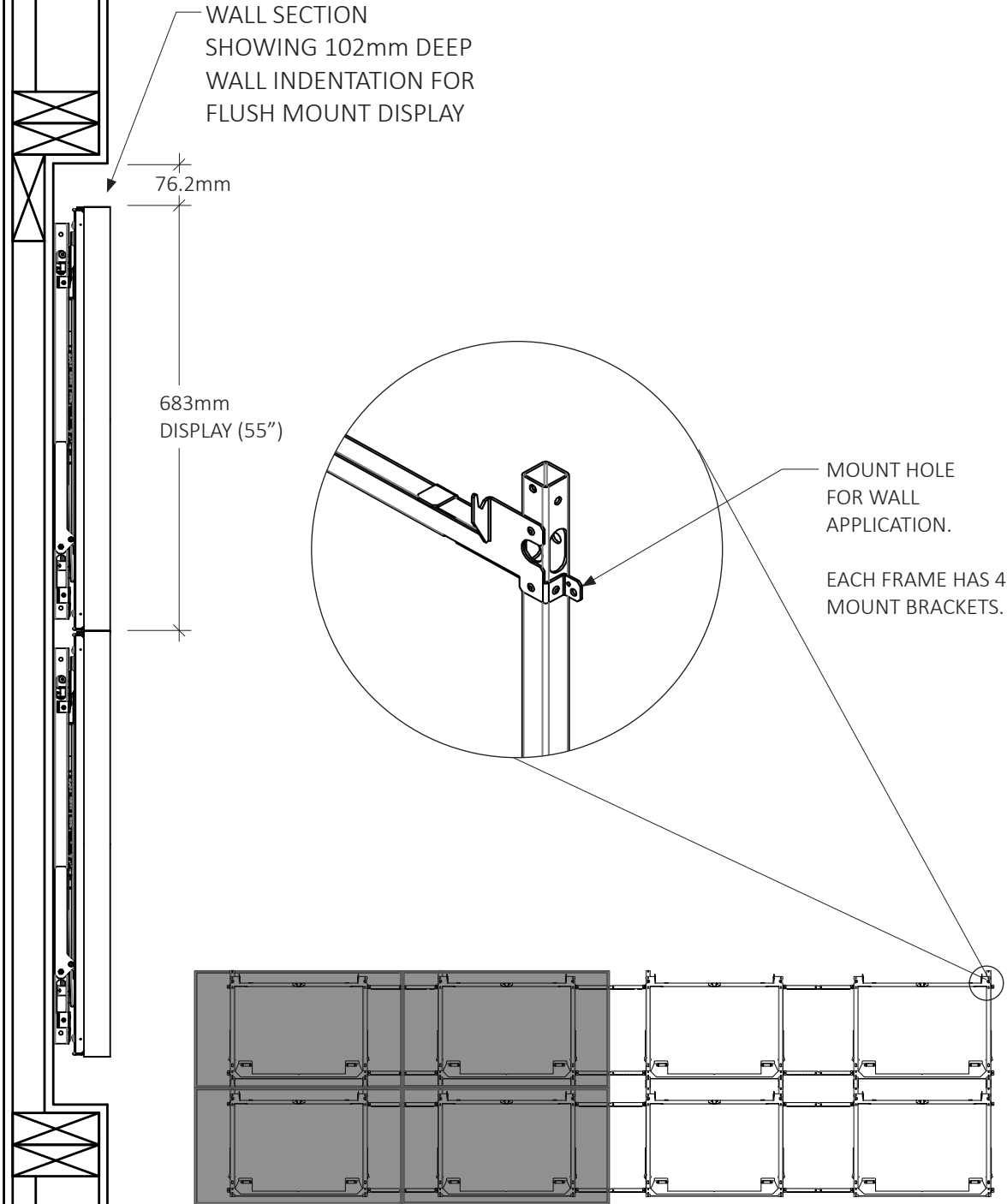


Figure 35: Inner Patient B elevation of window facade (above)  
Figure 36: View of Inner Patient B waiting



Figure 37: Detail of Electronic Display





Samples of electronic images to be displayed on screens in waiting environments.

CTAS Levels: Understand who gets treated first and why you may wait longer...

- 1 **RESUSCITATION** heart attack, unconscious, major trauma
- 2 **EMERGENT** vomiting blood, severe high blood pressure
- 3 **URGENT** abdominal pain, headache, mild respiratory distress
- 4 **LESS URGENT** urinary track infection, minor cuts, sore throat
- 5 **NON URGENT** neusea, diarrhea, bites, dressing changes

WHY AM I WAITING ?

Hospital emergency departments are very busy places. There are two main factors that contribute to your waiting time: Your **acuity**; and **departmental capacity**. Your acuity is assessed based on your symptoms and where they fall within the CTAS scale. If the emergency department is very busy, a treatment space may not be available for you right away. If the emergency department is at full capacity someone has to be treated and discharged before you can be seen.

There are 5 different waiting rooms in this emergency department:

- TRIAGE WAITING**
- PUBLIC WAITING**
- RAPID CARE WAITING**
- INNER PATIENT WAITING A+B**

Not all patients will use all 5 waiting rooms, but you will likely visit a few before your departure. Different waiting rooms separate and accomodate different people based on their injury or ailment. This allows doctors to treat their patients faster. It also means less people waiting around you - bonus! Don't worry - being transferred to another waiting area means you are closer to being treated!

**DID YOU KNOW**  
?

RAPID CARE WAITING

You are currently waiting in Rapid Care Waiting. This means that your injury or ailment has been assessed as non-lifethreatening. Great news!

The rapid care area of the emergency department is designed to get you treated sooner and home faster.

**KNOW YOUR WAIT**

THERE ARE CURRENTLY 14 PEOPLE REGISTERED AND WAITING FOR TREATMENT IN THIS WAITING ROOM

**TIME: 45MINS    ANTICIPATED WAIT TIME: 45MINS    ANTICIP**



HAVE YOU NOTICED THERE ARE NO MAGAZINES IN THIS WAITING AREA?

MAGAZINES CAN HARBOUR HARMFUL GERMS AND SPREAD DISEASE.

INSTEAD, WATCH THIS ELECTRONIC DISPLAY FOR ENTERTAINMENT, INFORMATION AND STRESS RELIEVING TECHNIQUES TO TRY WHILE YOU WAIT!

**FIND ME!**  
where's WALDO ?

### 6.3 MATERIALS, FURNITURE AND LIGHTING

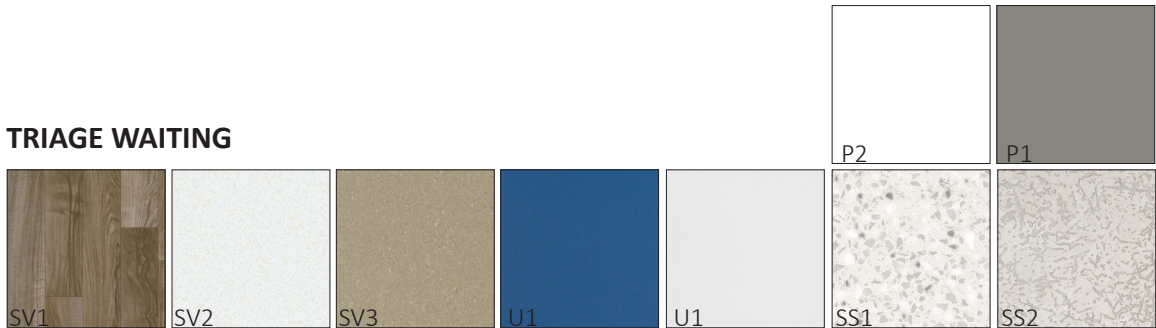
#### 6.3.1 MATERIALS

The furniture and associated materials in this practicum project were selected for their adherence to health care standards. The design attempted to balance health care durability, cleanability and function while considering a contemporary aesthetic that would be pleasing to a variety of users.

The vinyl flooring occurring in all waiting areas was selected for a number of reasons. It has the ability to withstand heavy foot traffic and rolling loads occurring from heavy medical equipment. The flooring itself as well as its associated adhesives meets LEED EQ Credits for low emitting interior finishes. The flexibility of the heterogeneous material allows for heat weld self covered bases, which eliminate the growth of bacteria. Due to its flexibility and easy install, custom patterns allowed the design to create the eye catching flooring patterns. It exceeds standards in chemical resistance tests, meaning that it can be easily cleaned and maintained by hospital maintenance staff. All paint has been specified as low VOC.

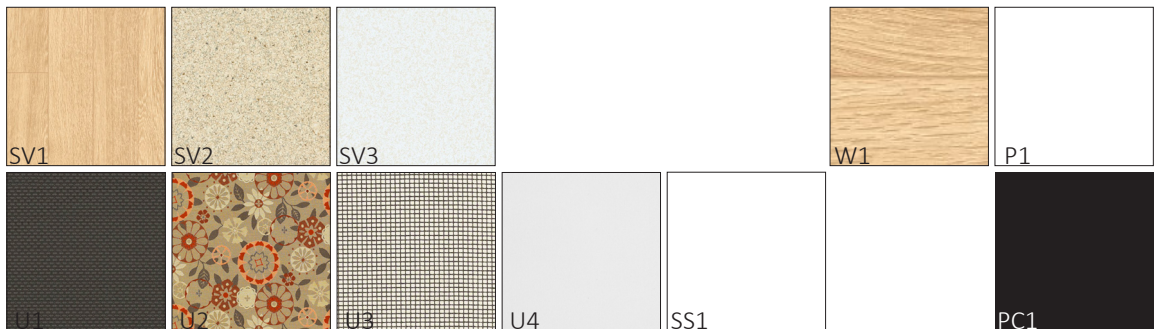
Upholstery fabrics are all health-grade standard meaning that they are bleach cleanable, Greenguard certified, conform to CAN/ULC fire testing standards, and have an abrasion resistance not less than 100,000 double rubs. Seating types were selected to accommodate various seating postures and allow flexibility during waiting periods. Users are able to sit, recline or become completely horizontal which is important in a 24/7 environment.

**TRIAGE WAITING**



- SV1 sheet vinyl Armstrong DecorArt Rejuvenations TimberLine 37345 Walnut Grove Plum Creek w/ 4" self cove base
- SV2 sheet vinyl Armstrong DecorArt Rejuvenations StoneRun 34348 Sidecar Diner w/ 4" self cove base
- SV3 sheet vinyl Armstrong ColorArt Medintone H8312 Natural w/ 4" self cove base
- U1 seating upholstery CF Stinson Collection BT212 Bombay
- U2 seating upholstery Mayer Fabrics Collection Finesse FI-027 Alabaster
- SS1 solid surfacing Corian Silver Birch
- SS2 Tyndall Stone
- P1 Benjamin Moore, Natura (no VOC) 2143-70 Simply White
- P2 Benjamin Moore, Natura (no VOC) HC-168 Chelsea Gray

**PUBLIC WAITING**



- SV1 sheet vinyl Armstrong DecorArt Rejuvenations TimberLine 37355 Oak Tried and True w/ 4" self cove base
- SV2 sheet vinyl Armstrong DecorArt Corlon 88705 Devon Beige w/ 4" self cove base
- SV3 sheet vinyl Armstrong DecorArt Rejuvenations StoneRun 34348 Sidecar Diner w/ 4" self cove base
- U1 seating upholstery Momentum Collection Trove 9133749Carex

- U2 seating upholstery Arc-ComCrossroads 61107 Coal
- U3 seating upholstery CF Stinson Zoom 63110 Open Air
- U4 seating upholstery Mayer Fabrics Collection Finesse FI-027 Alabaster
- W1 Panolam Straightaway Oak WO0040
- SS1 solid surface Corian Designer White
- P1 Benjamin Moore, Natura (no VOC) 2143-70 Simply White
- PC1 Black powder coat

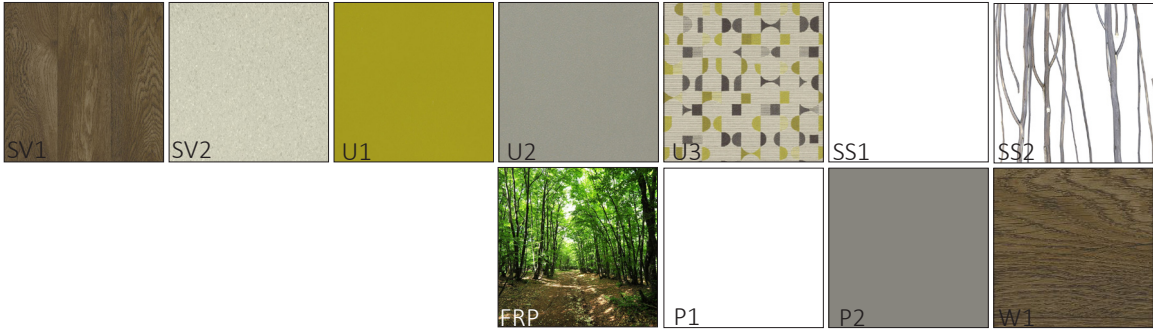
**RAPID CARE WAITING**



- SV1 sheet vinyl Armstrong DecorArt Rejuvenations TimberLine 37377 Walnut Coffee Bean w/ 4" self cove base
- SV2 sheet vinyl Armstrong DecorArt Rejuvenations StoneRun 34348 Sidecar Diner w/ 4" self cove base
- U1 seating upholstery Designtex Collection Leaves 2494/703 Azalea
- U2 seating upholstery Momentum Collection Eon 9134618 Blaze
- W1 Panolam Chusto Printatre W381
- SS1 solid surface Corian Designer White
- P1 Benjamin Moore, Natura (no VOC) 2143-70 Simply White
- P2 Benjamin Moore, Natura (no VOC) HC-168 Chelsea Gray



**INNER PATIENT WAITING**



- SV1 sheet vinyl Armstrong DecorArt Rejuvenations TimberLine 37374 Acadian Oak Well Versed
- SV2 sheet vinyl Armstrong DecorArt Rejuvenations Medintone H8331 Green Tea Light
- U1 seating upholstery Designtex Collection Silica 9122397 Appletini
- U2 seating upholstery Momentum Collection Silica 9143429 Shale
- U3 seating upholstery Momentum Collection Essay 9170951 Aspen
- W1 Panolam Stout Walnut WW3100
- SS1 solid surface Corian Designer White
- SS2 3Form Thicket Grey
- FRP Fiber Reinforced Panel printed with nature image
- P1 Benjamin Moore, Natura (no VOC) 2143-70 Simply White
- P2 Benjamin Moore, Natura (no VOC) HC-168 Chelsea Gray

**6.3.2 FURNITURE**

- |   |  |    |                     |
|---|--|----|---------------------|
| 1 | Aspekt Arm Chair                       | 9  | Mitra Sleeper Chair |
| 2 | Turnstone Alight Ottoman               | 10 | Mitra Lounge Chair  |
| 3 | Alight Ottoman                         | 11 | Mitra Arm Chair     |
| 4 | Campfire Papertable                    |    |                     |
| 5 | Regard Lounge Seating                  |    |                     |
| 6 | Steelcase Health Turnstone Scoop Stool |    |                     |
| 7 | Cura Mid-back Chair                    |    |                     |
| 8 | Verge Stool                            |    |                     |



### 6.3.3 LIGHTING AND REFLECTED CEILING PLANS

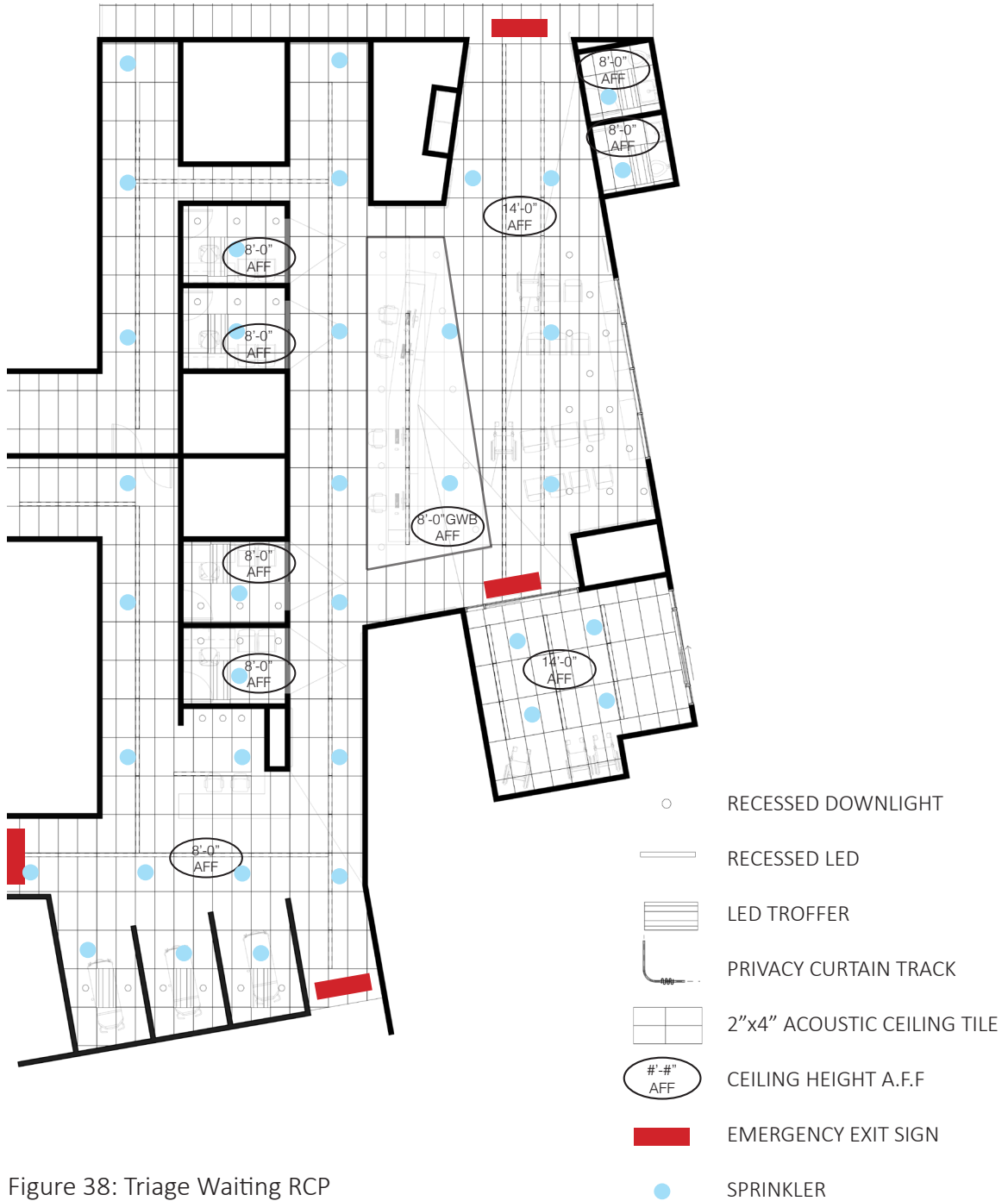


Figure 38: Triage Waiting RCP

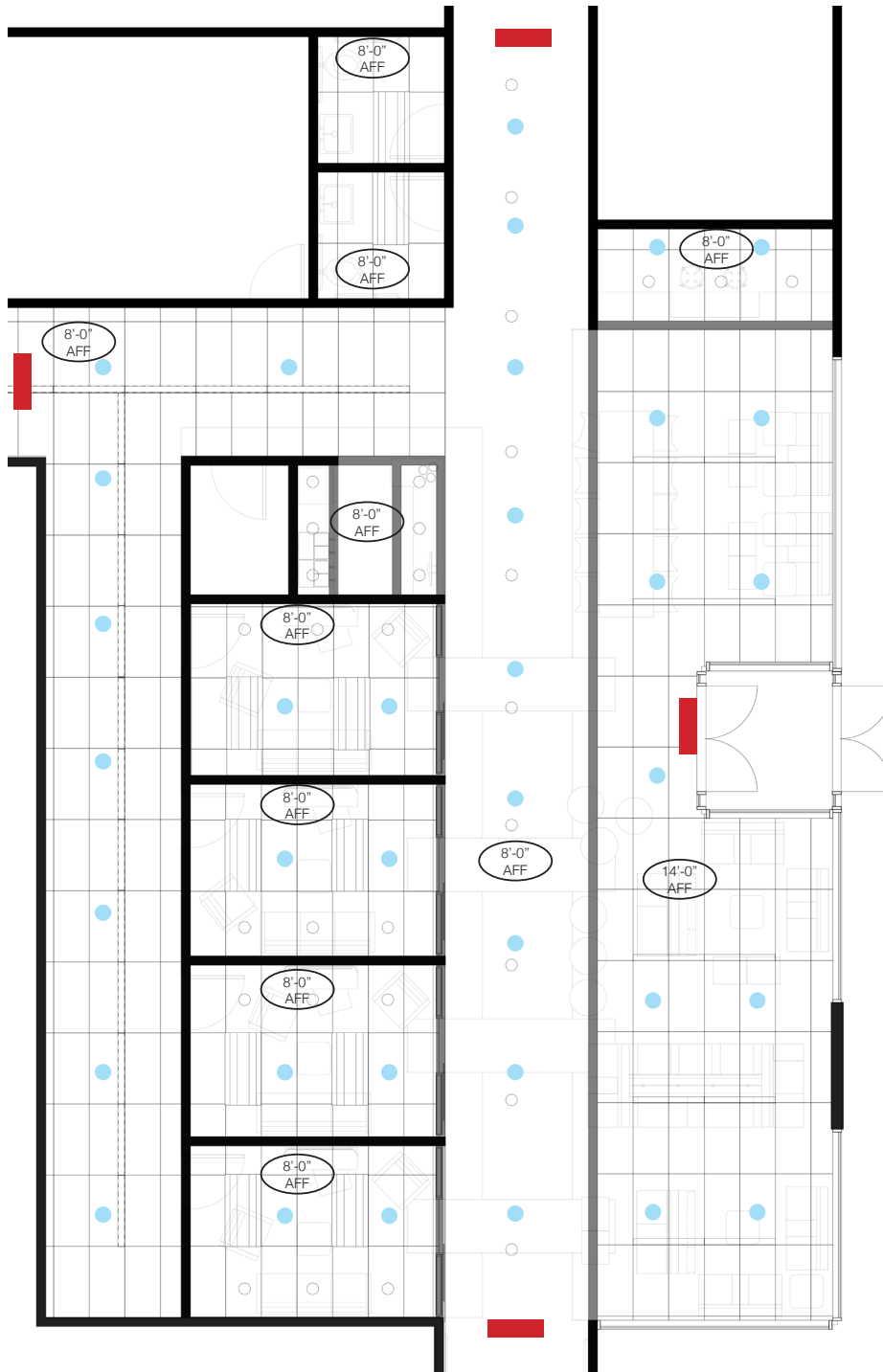


Figure 39: Public Waiting RCP



Figure 40: Rapid Care Waiting RCP

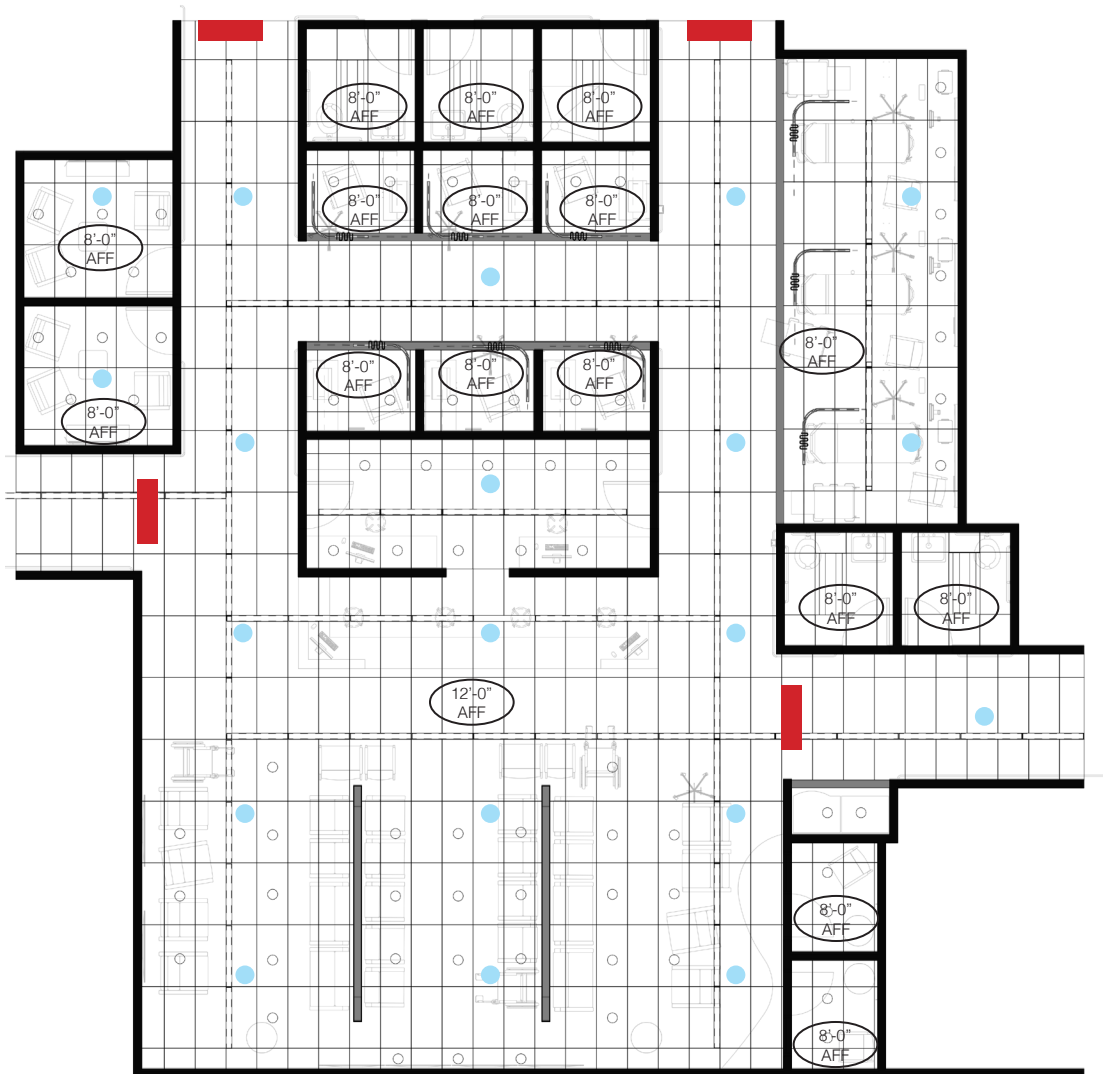


Figure 41: Inner Patient Waiting RCP

## **CHAPTER 7: CONCLUSION**

### 7.1 OVERVIEW

This practicum project utilized multiple approaches to understand the satisfaction of emergency department users. The design of existing emergency department waiting areas was examined to understand the type of accommodations currently provided in Winnipeg waiting environments. The psychology of waiting was explored to better understand users' perceptions and expectations, while evidence-based design (EBD) and precedent studies revealed strategies toward better accommodation. This led to questioning the design of contemporary emergency department waiting environments and their importance within the process of receiving medical care in Canada as a whole.

The culmination of research led to the understanding that waiting is not a static action. Instead it is a transitional, procedural path for the patient to take toward receiving care and permanent for no user (Huddy, 2016). Waiting is simply the product of the process of receiving medical treatment in an emergency department. By understanding the psychology of waiting (through the conceptualization of users perceptions and expectations) this inevitable waiting period can become more satisfactory for the user. Translating this into design, it is important to understand the user so that perceptions and expectations can be managed to impact satisfaction. Waiting environments should not only improve the waiting experience (physically and psychologically), but also allow the user to become more educated (through environmental cues) with regard to why they are waiting and how long they will be waiting. The combination of these design strategies ultimately leads to a more tolerable wait.

The resulting design recommendations put forward in this practicum project

represent the beginning of a theoretical framework that aims to identify and highlight concepts known to influence satisfaction within waiting environments. The design proposals are not meant to provide singular design solutions to be replicated or reproduced, but rather provide examples of how the design recommendations can be applied within the built environment. The recommendations are to be viewed as design options for integration in emergency department renovation or new build projects. The specific recommendations implemented, or the level of integration on a project would depend on numerous constraints such as site and building constraints, costing, typographic or demographic variables, or what services the facility offers, among others.

## 7.2 RESEARCH OBJECTIVES REVISITED

This section revisits and reflects upon the questions of inquiry outlined in Section 1.3.

*What psychological concepts could lead to increased satisfaction for people in Winnipeg emergency department waiting areas?*

The psychology of waiting was studied extensively to gain an understanding of user experience in waiting environments. The psychology of waiting is comprised of three major concepts that interrelate in a formula related to satisfaction. The concepts are perception, expectation and satisfaction. Where satisfaction is measured as the difference between perception and expectation of an experience. Perceptions and expectations can be managed through the design in an attempt to increase satisfaction levels among waiters in emergency departments.

*What physical aspects of evidence-based design could apply to a Winnipeg emergency department waiting area?*



After a review on relevant EBD principles set out by Ulrich, et al. (2008) for health care environments, the following physical aspects of EBD have application to emergency department waiting areas: single- bed rooms, access to natural light or appropriate artificial lighting, views of nature, family zone in single patient room and noise reducing finishes. Table 3 has a detailed description of each principle and potential design applications..

*How can theories from the psychology of waiting and evidence-based design be incorporated into a design that could potentially increase patient satisfaction in Winnipeg emergency department waiting areas?*

The psychology of waiting presented 7 principles that were analyzed to formulate tangible design criteria that can be used in emergency department waiting environments. The origins of the psychology of waiting are based in service management strategies that were extrapolated to suit user specific data relevant to health care waiting environments. Table 4 outlines the design implications of these 7 principles.

The principles from EBD were focused on application in health care treatment spaces. Therefore, these concepts needed to be analyzed to understand how they could be applied to health care waiting environments. Table 3 outlines the design implications arising from EBD literature.

### 7.3 RECOMMENDATIONS FOR FUTURE RESEARCH

This practicum project has contributed to the conversation about the design of emergency department waiting environments in Canada and can continually be added upon, re-imagined and reconsidered. Like the act of waiting itself, the information presented within this practicum cannot be considered static, and will become outdated

over time. The design recommendation charts can be updated as new research is published or new concerns regarding waiting emerge.

The separation and division of waiting environments within the emergency department is relatively new (Huddy, 2016) and as this concept is implemented, research will be needed in quantifying the effectiveness of this strategy. Post occupancy studies will be needed to study not only the satisfaction rates among emergency department users, but also to understand whether the separation has resulted in increased efficiency for treating patients.

The impact of future technologies is another area of potential research for the design of emergency waiting environments. Currently, the design of these waiting spaces is very transitional as they move from the traditional singular waiting room to numerous throughout the department. However, the advancements in technology will provoke even more transition in the future, to the point where perhaps waiting environments are not needed at all, or the act of waiting can be done virtually.

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## **APPENDIX A: BUILDING CODE ANALYSIS**

Based on the National Building Code of Canada (2010)

Division B Part 3

### **Section 3.1. General**

#### 3.1.2.1. Classification of Buildings or Parts of Buildings by Major Occupancy

Group B Division 2 – Treatment occupancies

#### 3.1.17.1. Occupant Load Determination

The occupant load is based on Table 3.1.17.1. The occupant load per space are:

Triage Waiting: 15

Public Waiting: 35

Rapid Care Waiting: 30

Inner Patient Waiting A+B: 25 each

### **Section 3.2. Building Fire Safety**

Sprinklers will be located throughout the building.

#### 3.2.2.38. Group B, Division 2, Any Height, Any Area, Sprinklered

The building shall be of noncombustible construction, and

- shall be sprinklered throughout,
- floor assemblies shall be fire separations with a fire-resistance rating not less than 2h,
- mezzanines shall have a fire-resistance rating not less than 1h, and
- loadbearing walls, columns, and arches shall have a fire-resistance rating not less than that required for support assembly.

#### 3.2.4.1. Determination of Requirements for a Fire Alarm System

A fire alarm system shall be installed in buildings in which an automatic sprinkler system is installed.

#### 3.2.4.2. Continuity of Fire Alarm System

A fire alarm system shall be installed throughout the entire building.

#### 3.2.4.3. Types of Fire Alarm Systems

The fire alarm must be a 2-stage system.

##### 3.2.4.11. Fire Detectors

Fire detectors are not required as the building is sprinklered.

##### 3.2.4.12. Smoke Detectors

Smoke detectors shall be installed in each public corridor.

#### 3.2.5.12. Automatic Sprinkler Systems

An automatic sprinkler system shall be designed, constructed, installed and tested in conformance with NFPA "Installation of Sprinkler Systems".

#### 3.2.7.1. Minimum Lighting Requirements

An exit, a public corridor, or a corridor providing access to exit for the public shall be equipped to provide illumination to an average level not less than 50 lx at floor or tread level and at angles and intersections at changes of level where there are stairs or ramps.

##### 3.2.7.3. Emergency Lighting

Emergency lighting shall be provided to an average level of illumination not less than 10 lx at floor or tread level in exits, principal routes providing access to exit in open floor areas and in service rooms, corridors used by the public.

### Section 3.3. Safety within Floor Areas

#### 3.3.1.1. Separation of Suites

Each suite shall be separated from adjoining suites by a fire separation having a fire-resistance rating not less than 1h.

#### 3.3.1.3. Means of Egress

Except as permitted by Sentences 3.3.4.4. (5) and (6), each suite in a floor area that contains more than one suite shall have a doorway into a public corridor or to an exterior passageway.

### **Section 3.3. Safety within Floor Areas**

#### 3.3.1.4. Public Corridor Separations

A public corridor shall be separated from the remainder of the storey by a fire separation and shall have a fire-resistance rating not less than 45 min.

#### 3.3.1.5. Egress Doorways

A minimum of 2 egress doorways located so that one doorway could provide egress from one room or suite as required by Article 3.3.1.3. if the other doorway becomes inaccessible to the occupants due to a fire which originates in the room or suite, shall be provided for every room and every suite:

- intended for an occupant load more than 60,
- in a floor area that is sprinklered throughout and the travel distance to an egress doorway is more than 25m, or the area of the room or suite is more than 200 m<sup>2</sup>.

#### 3.3.1.9. Corridors

- The minimum width of a public corridor shall be 1100 mm.
- Obstructions located within 1980 mm of the floor shall not project more than 100 mm horizontally into an exit passageway, or public corridor in a manner that would create a hazard for a person with a visual disability traveling adjacent to

walls. The horizontal projection of an obstruction is permitted to be more than 100 mm provided the clearance between the obstruction and the floor is less than 680 mm.

- Except for a dead end corridor that is entirely within a suite or as permitted by Sentences 3.3.3.3.(1) and 3.3.4.4.(6), a dead end corridor is permitted provided it is not more than 6 m long.

#### 3.3.1.11. Door Swing

- A door that opened into a corridor or other facility providing access to exit from a suite or room not located within a suite shall swing on a vertical access.
- A door that opened into a corridor or other facility providing access to exit from a room or suite that is used or intended for an occupant load more than 60 shall swing in the direction of travel to the exit.
- If a pair of doors is installed in a corridor that provides access to exit in both directions, the doors shall swing in opposite direction of travel to the exit.

#### 3.3.1.12. Sliding Doors

Shall be designed and installed to swing on the vertical axis in the direction of travel to the exit when pressure is applied, and be identified as a swinging door by means of a label or decal affixed to it.

#### 3.3.1.13. Doors and Door Hardware

- A door that opens into or is located within a public corridor shall provide a clear opening of not less than 800 mm if there is only one door leaf, and not open to a step.
- Shall be readily operable and operable by one hand with not more than one

releasing operation.

- Door release hardware shall be installed not more than 1200 mm above the finished floor.

#### 3.3.1.19. Transparent Doors and Panels

- Shall be designed and constructed so that the existence and position of the door is readily apparent, by attaching non-transparent hardware, bars or other permanent fixtures.
- Shall be constructed of laminated or tempered glass, or wired glass.

#### 3.3.2.3. Non-fixed seating

Shall conform to the National Fire Code (NFC).

### **Section 3.4 Exits**

#### 3.4.2.1. Minimum Number of Exits

Every floor area intended for occupancy shall be served by at least 2 exits.

#### 3.4.2.3. Distance Between Exits

The least distance between 2 exits from a floor area shall be

- one half the maximum dimensions of the floor area, but need not be more than 9m for a floor area having a public corridor, or
- one half the maximum dimensions of the floor area, but need not be more than 9m for all other floor areas

The minimum distance between exits referred to above shall be the shortest distance that smoke would have to travel between the exits, assuming that the smoke will not penetrate an intervening fire separation.

#### 3.4.2.5. Location of Exits

The exits shall be located so that the travel distance to at least one exit shall not be more than 45 m.

#### 3.4.2.6. Principal Entrances

At least one door at every principal entrance to a building providing access from the exterior at ground level shall be designed in accordance with the requirements for exits.

#### 3.4.3.2. Exit Width

The minimum aggregate width of exits serving floor areas intended for care treatment shall be determined by multiplying the occupant load of the area served by 18.4 mm per person. The minimum exit widths shall be 1100mm for exit corridors and passageways and 850 mm for doorways not serving patients' or residents' sleeping rooms.

#### 3.4.3.4. Headroom Clearance

Every exit shall have a clear height over the clear width of the exit of not less than 2050 mm.

#### 3.4.4.1. Fire-Resistance Rating of Exit Separations

Every exit shall be separated from the remainder of the building by a fire separation having a fire-resistance rating not less than 2 h.

#### 3.4.4.4. Integrity of Exits

A fire separating that separates an exit from the remainder of the building shall have no opening except for standpipe and sprinkler piping, electrical wires and cables, totally enclosed noncombustible raceways and noncombustible piping that serve only the exit, and exit doorways.

#### 3.4.5.1. Exit Signs

Every exit door shall have an exit sign placed over or adjacent to it if the exit serves a

building having an occupant load of more than 150. Every exit sign shall be visible on approach to the exit.

#### 3.4.6.5. Handrails

Handrails shall be continuously graspable along their entire length and shall have

- a circular cross-section with an outside diameter not less than 30 mm and not more than 43 mm, or
- a non-circular cross-section with a graspable portion that has a perimeter not less than 100 mm and not more than 125 mm and whose largest cross-sectional dimension is not more than 45 mm.

#### 3.4.6.11. Doors

- The distance between a stair riser and the leading edge of a door during its swing shall be not less than 300 mm.
- Exit doors shall be clearly identifiable.
- No door leaf in an exit doorway with more than one leaf shall be less than 610 mm wide.

#### 3.4.6.12. Direction of Door Swing

Every exit door shall open in the direction of exit travel, and swing on a vertical axis.

#### 3.4.6.14. Sliding Doors

An exit door leading directly to outdoors at ground level is permitted to be a sliding door provided it conforms to Sentence 3.3.1.12 (1).

### **Section 3.7. Health Requirements**

#### 3.7.1.1. Room and Space Height

The height of every room and space shall be sufficient so that the ceiling or ceiling



fixtures do not obstruct movement or activities below.

#### 3.7.2.2. Water Closets

Water closet shall be provided for each sex. The number of water closets required for a care or residential occupancy shall be at least one for each persons of each sex.

#### 3.7.2.3. Lavatories

At least one lavatory shall be provided in a room containing one or 2 water closets or urinals, and at least one additional lavatory shall be provided for each additional 2 water closets or urinals.

#### 3.7.2.6. Surface Protection

Floor surfaces around a water closet shall be protected from deterioration by an impervious and durable material for a distance not less than 900 mm from the projected outline of the water closet on the floor.

### Section 3.8. Barrier-Free Design

#### 3.8.1.2. Entrances

Not less than 50% of the pedestrian entrances shall be barrier-free and shall lead from the outdoors at sidewalk level or a rap that leads from a sidewalk.

#### 3.8.1.3. Barrier-Free Path of Travel

The unobstructed width of a barrier-free path of travel shall be not less than 920 mm.

#### 3.8.2.1. Areas Requiring a Barrier-Free Path of Travel

A barrier-free path of travel from the entrances required to be barrier-free shall be provided throughout the entrance storey.

#### 3.8.2.3. Washrooms Required to be Barrier-Free

A washroom in a storey to which a barrier-free path of travel is required shall be barrier-

free to the requirements set in 3.8.2.

