Development of a Tool for Evaluating the Physical Environment of an Emergency Psychiatric Assessment Treatment and Healing (EmPATH) Unit

A Thesis

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ABSTRACT

Psychiatric emergencies are increasing, placing strain on emergency departments (EDs) that lack specialized care environments. EmPATH (Emergency Psychiatric Assessment, Treatment, and Healing) units have emerged as an alternative, offering rapid assessment, short-term stabilization, and a therapeutic, open-milieu environment. While these units improve patient outcomes and reduce ED overcrowding, there is no standardized tool to evaluate their spatial effectiveness. Existing mental health facility assessment frameworks do not fully address the unique design features of EmPATH units, such as their open layout, emphasis on social interaction, and balance between autonomy and safety.

This study develops an evaluation tool and a set of design guidelines tailored to EmPATH units. Using a multi-method approach, it integrates semi-structured interviews with staff and designers (n=15) and spatial analysis of eight case studies through floor plans and space syntax tools. The research identifies eight key design goals—homelike environments, social interaction, maintenance, autonomy, inclusivity, safety and security, positive distractions, and staff respite—and examines the environmental characteristics that support these goals. Among them, social interaction, homelike settings, autonomy, and safety/security emerged as the most critical factors in effective EmPATH unit design.

The research contributes the first systematic framework for evaluating EmPATH units, equipping designers, healthcare administrators, and policymakers with evidence-based strategies for optimizing psychiatric crisis care environments.

Keywords: EmPATH units, psychiatric emergency care, spatial design, evaluation tool, mental health facilities, healthcare architecture.

BIOGRAPHICAL SKETCH

Nastaran Radmanesh was born and raised in Iran. She received her Bachelor of Architecture from Iran University of Science and Technology (IUST) in Tehran, and later earned a Master's degree in Interior Architecture from the University of Tehran. After graduating, she worked for several years in architectural design and planning, while also teaching in architecture and interior design departments at various universities.

In 2023, she moved to the United States to pursue a second master's degree in Human-Centered Design at Cornell University. Her work at Cornell focused on healthcare environments, including projects related to psychiatric emergency units, outpatient physical therapy settings, and digital tools for older adults. She hopes to carry her interest in healthcare design and research forward, working on projects that contribute to more thoughtful and supportive care environments.

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This work would not have come together without the support of several people.

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I am also grateful to my minor committee member, Saleh Kalantari, who offered valuable guidance throughout various stages of this project and whose encouragement and support remained constant during my time at Cornell.

Lastly, I want to thank all the designers and staff members who generously shared their time and insights with me. Their contributions added clarity and depth to this work, and without them, this thesis would not have been possible.

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LIST OF ABBREVIATIONS

BHCU	Behavioral Health Crisis Units
EBD	Evidence Based Design
EmPATH ER	Emergency Psychiatric Assessment, Treatment and Healing
FGI	Facility Guideline Institute
MH	Mental health
NHS	National Health Services
OACBHA	Ohio Association of County Behavioral Health Authorities
PSED	Psychiatric Staff Environmental Design
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

Psychiatric emergencies are a growing concern in healthcare, with an increasing number of individuals seeking crisis intervention in emergency departments (EDs). In the United States, mental health-related ED visits account for 12% to 15% of all emergency visits nationwide (Zeller, OACBHA, 2023). However, EDs—designed primarily for acute medical conditions—are often inadequate for treating psychiatric emergencies, as they lack the specialized environments necessary for de-escalation and therapeutic intervention (Sunderji et al., 2015).

One of the most pressing challenges in psychiatric emergency care is ED boarding, a widespread issue in which psychiatric patients remain in the ED for extended periods due to the unavailability of inpatient beds (Nordstrom et al., 2019; Nicks & Manthey, 2012). This results in increased stress for both patients and hospital staff (Abid et al., 2014; Guzman et al., 2020) and delays in psychiatric treatment, often leading to poorer health outcomes and higher hospitalization rates (Abid et al., 2014). Furthermore, psychiatric boarding strains hospital resources, contributes to ED overcrowding, and leads to financial losses due to reduced patient throughput (Castellucci, 2017; Nordstrom et al., 2019).

To address these issues, alternative models of psychiatric crisis care have been developed. Among them, the EmPATH (Emergency Psychiatric Assessment, Treatment, and Healing) unit has emerged as an effective solution for reducing psychiatric boarding and improving patient outcomes (Zeller, 2018). Unlike traditional psychiatric EDs, EmPATH units

prioritize rapid assessment, early intervention, and short-term stabilization, allowing most patients to be treated and discharged within 24 hours (Zeller, 2010). These units feature a milieu-based, open environment, where patients can engage in social interaction and structured therapeutic activities, reducing the reliance on seclusion or restraints (Zeller, 2014). Research indicates that EmPATH units optimize the use of inpatient psychiatric beds, improve patient and staff satisfaction, and reduce unnecessary hospital admissions (FGI, 2022; Zeller et al., 2014; Stamy et al., 2020; Kim et al., 2021).

Despite the growing adoption of EmPATH units, there is no standardized evaluation tool to assess their spatial and environmental effectiveness. Existing evaluation frameworks for mental and behavioral health settings, such as the Psychiatric Staff Environmental Design (PSED) tool, do not fully account for the unique characteristics of EmPATH units (Shepley, 2017). These units rely on open layouts, a balance between autonomy and safety, and strong patient-staff interaction, which require distinct design considerations. Understanding how the physical environment impacts psychiatric stabilization and staff efficiency is crucial for optimizing the design and operation of these units.

Research Objectives

This study aims to address this gap by developing a standardized evaluation tool and a set of design guidelines for assessing the effectiveness of EmPATH unit environments. The research is guided by the following key questions:

- What design features are perceived as critical by staff and designers in EmPATH units?

- How can an evaluation tool be developed to assess the physical environmental qualities of EmPATH units?
- What design recommendations can be established based on empirical findings?

By answering these questions, this study seeks to create a structured framework for evaluating and improving EmPATH unit design. The findings will provide evidence-based guidance for designers, healthcare providers, and policymakers, ensuring that the built environment actively supports psychiatric crisis care.

Methodology Overview

To investigate these research questions, a multi-method approach was employed, integrating qualitative research with spatial analysis to develop a comprehensive understanding of the environmental and operational factors influencing EmPATH units.

The first component of the study involved semi-structured interviews with 15 participants, comprising seven healthcare staff members (including psychiatric providers, nurses, and security personnel) and eight designers (architects and planners involved in EmPATH unit projects). These interviews explored the perceived impact of environmental features on patient care, staff efficiency, and overall functionality. Participants provided firsthand insights into design challenges, best practices, and unmet needs in existing EmPATH units.

In parallel, the second component of the study examined eight case studies of existing EmPATH units across different healthcare settings. The analysis relied on floor plans, images, and spatial analysis tools, particularly space syntax methods such as visibility graphs,

accessibility maps, and convex spatial configuration analysis. These methods were used to assess the spatial relationships between staff and patients, levels of openness and enclosure, and accessibility of key functional areas.

Key Findings and Contributions

This study identifies eight primary design goals essential for the effectiveness of EmPATH units:

1. Homelike and Calming Environments
2. Social Interaction
3. Maintenance
4. Autonomy
5. Inclusivity
6. Safety and Security
7. Positive Distractions
8. Staff Respite

Among these, social interaction, homelike/calming environments, autonomy, and safety/security emerged as the most critical themes, while maintenance was the least discussed topic. This study makes the following contributions to healthcare design and psychiatric emergency care:

- A structured evaluation tool tailored for EmPATH units, enabling designers, healthcare administrators, and policymakers to systematically assess spatial effectiveness.

- A set of design guidelines that provide evidence-based recommendations for planning new EmPATH units or optimizing existing ones, ensuring alignment with therapeutic and operational goals.

These contributions address the current gap in psychiatric emergency unit evaluation by offering the first systematic framework specifically for EmPATH units. The findings provide a foundational reference for future research, policy development, and evidence-based design improvements.

Thesis Structure

This thesis is structured into six chapters, each building upon the previous to develop a comprehensive understanding of EmPATH unit design and evaluation. Chapter 2 presents a literature review, exploring the challenges of psychiatric emergency care, the EmPATH model, and existing evaluation tools for mental health environments. Chapter 3 outlines the methodology and findings of qualitative interviews conducted with staff and designers, providing insights into the perceived impact of spatial design on patient care and operational efficiency. Chapter 4 focuses on the spatial analysis of eight EmPATH units, applying space syntax tools to assess visibility, accessibility, and spatial organization. Chapter 5 integrates findings from literature, interviews, and case studies to develop a structured framework, culminating in a set of design guidelines and an evaluation tool tailored for EmPATH units. Finally, Chapter 6 concludes the study by summarizing its key contributions, discussing the practical implications of the findings, and identifying potential directions for future research.

Significance of Study

This study advances psychiatric emergency care design by introducing the first dedicated evaluation tool for EmPATH units. By providing a systematic assessment framework and evidence-based design guidelines, this research ensures that the built environment actively supports crisis stabilization, patient well-being, and staff efficiency. As EmPATH units continue to expand across healthcare systems, evidence-based spatial strategies will be essential for optimizing psychiatric crisis care.

CHAPTER 2

LITERATURE REVIEW

To understand the role of research in EmPATH units, it is important to discuss their place in the context of psychiatric emergency facilities and the tools that are available for assessing them.

Psychiatric Emergency Departments

Mental health (MH) issues are among the leading causes of disability in North America, with about 20% of adults experiencing a mental health condition each year (Mental Illness, n.d.). In the U.S., around 1 in 5 adults face mental health challenges annually, and 1 in 20 adults deal with serious mental health issues each year (NAMI, 2023), which significantly impacts emergency departments (Eds). In the United States, mental health concerns account for 12% to 15% of all visits to EDs nationwide (Zeller, OACBHA, 2023). Visits to the ED for suicidal thoughts or attempts were predicted to double from 2012 to 2022, with a higher mortality rate for these visits compared to other ED cases (Ting et al., 2012). Overall, there has been a significant increase in ED visits in the U.S., with a notable rise in those related to mental health (Theriault, 2020). While most mental health care is provided at the community level through outpatient services, emergency departments play a crucial role in providing urgent care for those with mental health needs (Sunderji et al., 2015).

Emergency departments in hospitals face numerous challenges when it comes to accommodating individuals with emergent psychiatric needs. Among these challenges, ED) boarding stands out as a significant issue in the U.S., particularly for psychiatric patients

(Nordstrom et al., 2019; Nicks & Manthey, 2012). Boarding occurs when ED patients, having completed their evaluations, are left waiting for admission or transfer due to a lack of available beds (Nolan et al., 2015). This leads to psychiatric patients remaining in EDs for extended periods, sometimes days, which remains a widespread problem across the nation (Castellucci, 2017).

The issue of boarding arises not only from a shortage of inpatient beds but also from the lack of alternative care options for psychiatric patients (Quick Safety 19: ED Boarding of Psychiatric Patients – a Continuing Problem, n.d.). The insufficient funding for critical community-based mental health services, including basic clinics, intensive outpatient programs, crisis stabilization units, and respite services, further exacerbates this issue (Nordstrom et al., 2019).

Boarding psychiatric patients is stressful for both the patients and the ED staff. For patients, especially those in severe mental states like depression or psychosis, boarding increases psychological stress (Abid et al., 2014; Guzman et al., 2020). It also delays the start of necessary mental health treatments that could prevent the need for inpatient care (Abid et al., 2014). During long boarding times, patients often receive inadequate care, as EDs are not typically equipped to provide comprehensive psychiatric treatment. This lack of proper care can worsen patients' conditions and lead to poorer outcomes. For staff, boarding strains already limited resources, increases workload, and exacerbates ED crowding (Abid et al., 2014; Nordstrom et al., 2019). This situation increases wait times for all patients, leading to frustration (Nordstrom et al., 2019). It often requires additional support, such as security personnel or safety attendants, especially for agitated psychiatric patients (Nordstrom et al.,

2019). Boarding delays care for other patients, including those with potentially life-threatening conditions, increases the rate of patients leaving without being seen, and extends inpatient stays for those who are eventually admitted (Abid et al., 2014; Nordstrom et al., 2019). Additionally, it has a substantial financial impact on ED operations.

Prolonged boarding times also lead to significant financial losses for hospitals. The ED, a high-cost environment intended for short-term care, becomes an expensive holding area for psychiatric patients awaiting appropriate placement. This inefficiency reduces ED throughput and affects the hospital's ability to see more patients, ultimately leading to lost revenue (Abid et al., 2014). Furthermore, the increased use of ancillary services, such as additional staffing for security or safety attendants, adds to the financial burden (Nordstrom et al., 2019). The financial impact is compounded by reduced reimbursement rates due to longer lengths of stay and increased patient dissatisfaction (Abid et al., 2014).

Solving the ED boarding issue requires increased funding for community mental health services and better coordination between outpatient and inpatient care. Without these improvements, the cycle of stress, inefficiency, inadequate care, and financial losses will continue to impact both patients and healthcare providers.

Alternative Psychiatric Emergency Department Settings

Alternative facilities to Emergency Departments (EDs) for psychiatric emergencies in the US predominantly consist of community-based settings. While the importance of these settings in mental health care is widely acknowledged, they face several challenges. Community-based facilities often encounter difficulties in effectively managing acute

psychiatric crises. These crises, similar to other medical emergencies, often manifest with high severity and risk, surpassing the capabilities of subacute community settings and requiring intervention at the hospital emergency level (FGI, 2022).

However, amidst these challenges, innovative models such as EmPATH and BHCU (Behavioral Health Crisis Units) offer promising alternatives to traditional EDs for psychiatric emergencies.

Empath Unit Defined

One innovative solution to address psychiatric emergencies is the EmPATH (Emergency Psychiatric Assessment, Treatment, and Healing) model. Proposed by Dr. Zeller, this model involves creating specialized behavioral health units situated within or near hospital EDs. These units provide a tranquil, supportive environment similar to drop-in crisis programs, aimed at effectively managing high-acuity psychiatric conditions (Zeller, 2018). Research indicates that most psychiatric emergencies can be resolved within 24 hours with prompt and appropriate care (Zeller, 2010).

Over the past decades, EmPATH units have been implemented under various names. The 2022 edition of the Facility Guidelines Institute (FGI) introduced a new chapter on "Behavioral Health Crisis Units," based on the EmPATH concept. According to FGI (2022), establishing a BHCU within or accessible to ED allows mental health patients to be directly received by the crisis unit or medically screened in the ED before being transferred to the BHCU. A setup like this provides a suitable environment for safe and effective interdisciplinary care for behavioral and mental health patients in an emergency setting

(Zeller, 2014). The white paper from FGI (2022) outlines the benefits of BHCUs, including a decrease in involuntary holds, reduced use of intensive therapeutic resources, and improvements in both patient and staff satisfaction (FGI, 2022).

Research shows that these dedicated units have proven effective in optimizing the use of inpatient psychiatric beds, reducing delays in emergency care, increasing the availability of medical ED beds, and saving costs by avoiding unnecessary inpatient admissions (FGI, 2022; Zeller et al., 2014; Stamy et al., 2020; Kim et al., 2021).

Objectives and characteristics of EmPATH unites

EmPATH units, though varied in design and layout, adhere to the following key principles (Zeller, 2008; Zeller, 2010; Zeller, 2017):

Milieu Environment. EmPATH units feature a spacious, comfortable central room where patients have recliners for rest and social activities. The setting includes ample space, natural light, calming colors, and engaging activities, creating a soothing and healing atmosphere.

Integrated Staff. Staff members, including nurses and therapists, interact directly with patients in the milieu, allowing for immediate support and intervention. Private areas are available for patients needing a break.

Rapid Assessment and Treatment. Patients quickly see a psychiatrist and receive prompt treatment, crucial for effective mental health crisis intervention. This approach

significantly reduces the need for physical restraints and involuntary medication, enhancing safety and symptom relief.

Inpatient Hospitalization Avoidance. EmPATH units effectively reduce the need for inpatient hospitalization for many acute patients, reserving inpatient beds for those with no other options. This helps improve patient experience, population health, and reduce costs.

Cost-Effectiveness. By reducing ED boarding and unnecessary hospitalizations, EmPATH units save costs and can often be established by remodeling existing hospital spaces. They free up ED resources for other emergencies and operate more efficiently than traditional psychiatric emergency programs.

While these features are key characteristics of EmPATH units, their abstract nature and diverse implementation highlight the need for a standardized system to define and evaluate these units. Such a system would identify the core environmental features, facilitating their assessment and guiding future design decisions to improve the effectiveness of EmPATH units.

Tools for Evaluating Mental Facilities

In complex healthcare systems, evaluating the impact of design solutions on medical processes is essential. This involves expanding design work to include functional planning, covering aspects such as logistics, public space, wayfinding, layout, ergonomics, organization, and infrastructure (Wagenaar and Mens, 2018, per Brambilla, 2020). Hospitals often hire

external consultants, professionals, and companies to assess architectural and organizational functionality and provide suggestions for improvements or new designs (Brambilla et al., 2020).

A comprehensive evaluation requires a structured framework, comprising elements grouped into areas, criteria, or indicators to define the content of the evaluation. The assessment tool serves as the operational instrument for data collection, using methods such as checklists, user surveys, and documentation analysis (Dell'Ovo et al., 2018; Brambilla et al., 2020).

Providing appropriate physical environments for patients and staff in mental and behavioral health (MBH) facilities is a critical contemporary issue (Papoulias et al., 2014). Despite the clear need to support these populations and the development of new facilities, research to inform the design process remains limited (Chrysikou, 2013; Ulrich et al., 2014). While studies on non-psychiatric acute care settings are more prevalent, the operational goals of these settings differ significantly from MBH facilities in terms of patient length of stay, care delivery, medication and treatment protocols, and staff-patient interaction (Chaudhury et al., 2009). Fortunately, the emergent use of evidence-based design strategies in healthcare settings has facilitated dialogue and research in this field.

Various instruments have been used to evaluate patient and staff experiences in MBH facilities, but these tools often have a limited scope and focus. Some predecessor tools address specific topics such as safety (e.g., The Safety Risk Assessment by the Center for Health Design, 2015, and the Mental Health Environment of Care Checklist by Watts et al., 2012) or specific building typologies like substance abuse facilities (e.g., Timko, 1996, per Shepley,

2017). Others broadly address physical healthcare environments (e.g., NHS Estates, 2008) or consider the physical environment in relation to psychosocial and operational contexts (e.g., Moos & Houts, 1968; Rice et al., 1963, per Shepley, 2017). The Hospital Inpatient Facilities Checklist (Commonwealth of Massachusetts, n.d.) and the Mental Health Checklist based on the SCP model (Chrysikou et al., 2022; Chrysikou, 2013) are examples of such tools, although they primarily focus on inpatient psychiatric wards and the balance between domesticity and institutionalization.

The Psychiatric Staff Environmental Design (PESD) tool (Shepley, 2017) stands out as an effective evaluation tool for psychiatric emergency units. It addresses the limitations of other tools by identifying a spectrum of critical topics while maintaining a focus on the MBH physical environment. This tool explores staff perceptions regarding the importance of specific environmental features and qualities, the effectiveness of these features in existing facilities, and the characteristics most appropriate for supporting desired goals. However, it does not specifically cater to EmPATH units.

To my knowledge, there are few tools that address the full range of important MBH physical environmental issues, and none specifically for EmPATH and Behavioral Health Crisis Units. In this thesis, I aim to develop an evaluation tool for EmPATH units that can support design decisions. The research questions guiding my thesis are

1. What design features are perceived to be critical in terms of their impact on staff and patients in EmPATH units?

2. How can the content for a tool be developed to evaluate the physical environmental features of EmPATH units?
3. What design recommendations can be created based on the findings?

This research aims to fill the existing gaps by providing a comprehensive evaluation tool tailored for EmPATH units, thus enhancing the design and functionality of these critical healthcare environments

CHAPTER 3

INTERVIEW METHODS AND RESULTS

Methods

Tools

To create the content of the interview questions, I utilized several tools. First, I identified all the essential variables that could impact EmPATH units. To achieve this, I consulted three different sources: EmPATH literature reviews, the FGI Guidelines (2022), and existing evaluation tools for analyzing the environmental features of psychiatric facilities (Shepley, 2018). The synthesis of these variables, which is detailed in Figure 3.1., formed the basis for understanding the defining environmental variables and crafting the interview questions accordingly.

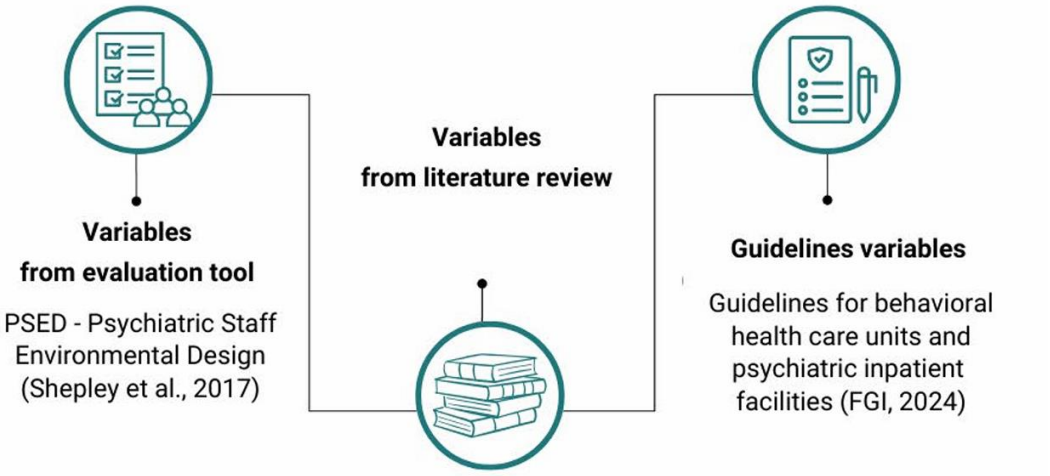


Figure 3.1. *Tools and Variables*

Environmental Variables. The synthesized variables from all sources are collectively referred to as environmental variables and are structured under the hierarchy described below, as shown in Figure 3.2. This synthesis includes a hierarchy of qualities and characteristics.

Environmental Qualities. Qualities refer to broad design objectives, including inclusivity, safety and security, autonomy, aesthetics, social interaction, and ease of maintenance, and the subgoals under each theme.

Environmental Characteristics. These focus on the detailed attributes of each feature that enhance the overall effectiveness of the environmental qualities.

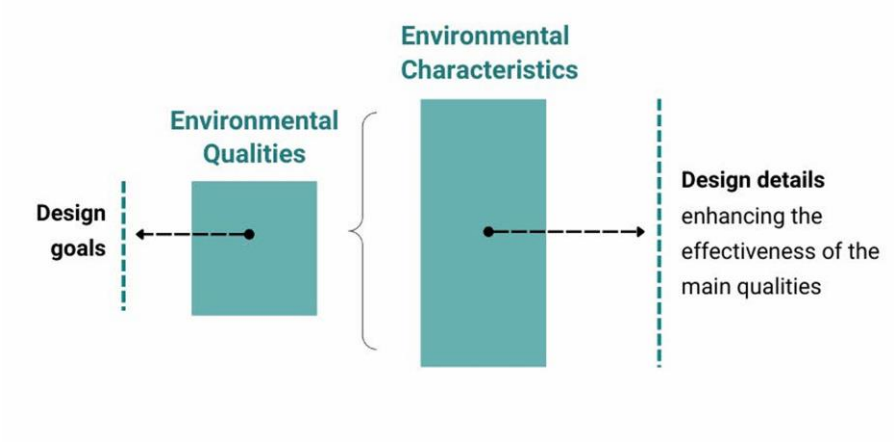


Figure 3.2. *Structure of Environmental Qualities and Characteristics*

Table 3.1.

Variables from three sources: PSED tool (Shepley, 2018), Empath literature review, and FGI guidelines (2024)

PSED variables		EmPATH literature variables		FGI variables	
Qualities	Characteristics	Qualities	Characteristics	Qualities	Characteristics
Autonomy and spontaneity	Mix of sitting / Unrestricted access to: nourishment station, outdoor spaces, entertainment/technology, exercise rooms	Autonomy: Independent access to spaces / Having choice and control	Availability of different activities in space	Autonomy	Nourishment station / Patient storage / shower rooms / Private quiet rooms
Sense of respect		Inclusivity	Inclusive to patients with all diagnoses	Inclusivity	Bariatric seating options
Safety and security	Visibility of clients from nurse station/ Anti-ligature furniture/ Suicide-resistant materials/ Monitoring: via cameras, auditory, via windows, direct on-unit interaction	Safety and security / Rapid assessment and treatment	Less physical restraints / open nurse desk / constant presence of staff in the milieu	Safety and security	Emergency electrical service / medication safety zones / secure holding rooms
Attractive / Aesthatics	Abstract art /Nature depicting art depicting / Colorful finishes / Visually interesting but	Soothing and calming environment	Calming colors, soothing environment	_____	_____

	relatively orderly / Well-designed electric lighting and adequate daylight / Window views of the outdoors				
Well-maintained	Clean surfaces / well-maintained furniture / Properly operating fixtures and equipments	_____	_____	maintenance	Clean supply rooms / supply storage
Social interaction	Group therapy rooms / Group activity rooms / Dining spaces / Outdoor spaces	Social interaction	Open milieu for social interactions/ Engaging activities social / High staff-patient interactions: integrated staff	Social interaction	Availability of Consultation rooms /support areas for families, patients and visitors
Positive distraction	Board games / video games/ Books magazines/ equipment for exercise/ Music systems/ TV/ indoor plants/ artwork	Positive distraction	Availability of engaging activities	Patient privacy	Availability Patient private rooms
Staff respite	Staff nap room/ Staff-only outdoor spaces/ Staff break areas /Outdoor views from staff areas	_____	_____	Staff respite	Availability of Staff support areas
Outdoor spaces & views of nature	Pleasant outdoor spaces for group activities, sitting alone, and one-on-one conversation/	Ample daylight			Outdoor spaces

	Unrestricted access to outdoor spaces				
Orderly and organized environment	Absence of clutter/ designated storage area(s)/ Navigable layout / Visually cohesive	_____	_____	_____	_____

Interview Script. Through an overview of the synthesis of variables, eight key qualities emerged as having the most overlap across sources and were considered critical for inclusion in the interviews to guide discussions. Of the 14 interview questions, eight focused on the following qualities: social interaction, autonomy, inclusivity, aesthetics/beauty, positive distractions, staff respite, safety and security, and maintenance. The remaining questions were more open-ended, addressing broader topics such as challenges, essential design features, and recommendations for improvement.

Participants

Participants include the staff and current Empath designers (n=15), with 7 staff and 8 designers. Regarding the impossibility of direct contact to former patients due to ethical and safety restrictions, insight centered the staff working in relation to EmPATH units (Psychiatric health providers, staff, security or nurses), and the architects or planners that were involved in any of the current EmPATH units in the states of the USA. As long as the participant is included in either of these two categories, it was considered to be valid, and there were no further criteria and limitations in gender, age and other demographic features of the sample study.

Procedure

As previously noted, the participants in this study included both staff members (n = 7) and designers (n = 8) involved in the development of EmPATH units. During the case study analysis and literature review, I identified architecture firms and individual designers who had worked on EmPATH units across various U.S. states. The initial recruitment process involved reaching out via email to invite participation in the interviews.

The first list of staff participants was compiled from the websites of hospitals offering EmPATH services, and they were similarly contacted via email. After the initial interviews began, additional participants were identified through snowball sampling, where interviewees recommended other individuals who were then contacted and invited to participate.

The recruitment email sent to both staff and designers included a brief description of the research objectives, the expected duration and structure of the interview, a consent form, and a PDF containing the interview questions. Fourteen interviews were conducted via Zoom, and one (S1) via Microsoft Teams. The interviews ranged in length from 35 to 80 minutes, with an average duration of 50 minutes and 3 seconds per participant.

After the research analysis was completed and the final design guidelines were prepared, all 15 participants were contacted again to review and provide feedback on the proposed outcomes. Each was sent a PDF document outlining the design guidelines and associated solutions. Three participants responded with feedback. After cross-referencing their comments with the existing literature, some suggestions were incorporated into the revised version of the guidelines to enhance their applicability and accuracy.

Results

A total of 190 codes were identified from the interviews, categorized under eight main environmental themes. Each theme consists of a hierarchy of subcodes, ranging from broad categories to specific environmental details. As previously discussed, I have examined these eight overarching themes under the category of "Quality," each containing subcodes that outline subqualities or environmental objectives. The more detailed physical manifestations of these qualities are referred to as characteristics.

Homelike / Calming

As previously noted, the Homelike / Calming quality was added in place of aesthetics following the interviews, based on participant feedback. Rather than considering aesthetics and beauty as separate, standalone concepts, participants viewed them as tools to foster a de-escalating and calming effect within the environment, speaking of them more from these perspectives rather than as an independent design goal. Consequently, I grouped these aspects under the broader category of Homelike / Calming. This quality is divided into the following subcategories: calming (de-escalating elements), awareness of time and weather, avoidance of confinement and seclusion, and sense of normalcy.

Calming/Deescalating Elements. Almost all the participants highlighted that, since the environmental design of EmPATH units serves as the first step of therapeutic treatment, it requires a careful selection of calming elements that reduce stress and facilitate de-escalation. They discussed various elements and features, including calming graphics and patterns, calming colors, the presence of daylight, good artificial interior lighting, noise control, and calming materials and finishes.

***Calming Graphics/Patterns*.** Five participants (S1, S2, S4, D2, D4, D6) emphasized the importance of calming graphics and patterns as part of the environment, particularly on walls. One argued that "it's much better to have murals or painted things on the walls instead of pictures" (S2), as they are also safer than pictures. However, a key challenge expressed by many participants was finding the right and effective choices for these units. As D4 noted, there is a need to "know and find the appropriate sort of art or graphics for behavioral health." Based on insights from the interviews, three main themes regarding patterns and graphics were identified: graphics of nature (S1, S2, S4, D2, D4), limited use of rigid angles (S2), and minimal use of abstract themes (D4).

- ***Graphics of Nature*.** Five participants highlighted the importance of incorporating nature graphics in units they have either worked on or designed (S1, S2, S4, D2, D4). One noted, "it will help with the de-escalation a lot of times, particularly if we can't have access to nature" (D4). Another justified choosing nature scenes because "having nature be involved, was very relaxing" (D2). Another described how natural patterns contribute to a "homey environment," giving an example of their unit adjacent to a parking lot. They explained how murals of treescapes by a local artist complemented the view of tree tops through highly positioned windows, completing the natural aesthetic (S1).
- ***Limited Use of Rigid Angles.*** One participant described rigid angles as "cold," based on their experience with previous designs. They emphasized that less rigid angles are more favorable for therapeutic environments, particularly emergency stabilization units. They argued that for patients entering these spaces, everything should contribute to a "soothing and calm atmosphere" (S2).

- ***Minimal Use of Abstract Themes.*** One participant expressed a preference for more literal artwork and graphics, stating that "something that is too abstract can agitate somebody" (D4).

Calming Colors. Although challenges were noted regarding the subjective perception of color, such as one participant saying, "Unfortunately, color is a theory. The big challenge is that there is no universal code for using the color" (D4), the majority of participants emphasized the importance of using "calming colors" as a significant aspect of the unit's calming effect (S1, S2, S3, S4, S5, S6, S7, D4, D5, D7, D8). One participant stated, "colors have [an] impact on the way people feel" (S3), while another added, "I think we all, you know, understand what is a typical calming color" (D4). To further define "calming colors" from the participants' perspectives, three main categories were identified from the interviews: nature colors, muted colors/avoidance of strong colors, and avoidance of gang colors.

- ***Nature Colors.*** Three participants (S6, D4, D8) highlighted the use of nature-inspired colors. One noted that soft greens in their space resemble "leaves and like raindrops on leaves," adding that this "has brought warmth to the space versus those white walls that are kind of institutional looking" (S6). Another participant mentioned the use of "sky blue and calming green" (D8), while another emphasized the use of "warm wood tone in colors" (D4).
- ***Muted Colors / Avoidance of Strong Colors.*** Participants generally preferred muted or neutral colors, avoiding strong tones. One explained they typically avoid "very strong colors like reds or oranges" (D4), while another described using "muted colors" for their therapeutic benefits (S7). S2 emphasized neutral colors for their calming effect,

and another participant added, “There are no colors [in our unit] that are offensive, like some giant electric purples or anything like that. It's just all soothing colors that kind of blend together” (S1).

- ***Avoidance of Gang Colors.*** Another topic raised was the intentional avoidance of colors associated with gang affiliations. One participant (D4) noted that this consideration is crucial to avoid exacerbating tensions, particularly for individuals experiencing episodes potentially linked to gang violence.

Presence of Daylight. Eleven participants (S2, S3, S4, S6, S7, D1, D2, D4, D6, D7, D8) emphasized the importance of daylight for its calming and de-escalating effects, as well as its contribution to making the space feel less institutional. One designer stated, "Obviously, we just know that access to daylight and nature is healing in itself, and we find that very just important in that calming aspect” (D4). Two designers identified daylight as the most important physical feature (D1, D7), with another suggesting it should become a guideline requirement (D6). One participant (D8) emphasized its role in reducing the feeling of being “trapped,” and another highlighted its importance in maintaining a sense of connection to the outside world, particularly in emergency departments without windows or natural light (S6).

Good artificial interior lighting. Participants highlighted the critical role of interior artificial lighting in creating a therapeutic and calming environment in EmPATH units. They emphasized the importance of lighting flexibility, color choices, and intensity, while also raising concerns about fluorescent lighting.

- ***Lighting Color***. Three participants (S6, D2, D8) emphasized the role of lighting color in fostering a therapeutic environment in EmPATH units. One participant shared that

on their unit, "We have sensory lighting. So it's usually like we either have it green or purple or blue" (S6). Another participant highlighted how the spectrum of colors can have a calming effect: "Their color spectrum can actually be very incredibly calming for them. And then part of the aesthetic of the space is the way that they regulate themselves in the space" (D2).

- ***Lighting Intensity.*** Two Participants (S2, S6) described how maintaining low light levels can contribute to a calming atmosphere. One noted, "On the main unit, we always keep the lights really low" (S6). Another described the lighting adjustments used at night: "We dim the lights with just some LED lighting so you can see, but it's much calmer. Even during the daytime, when we have more sunlight, the lights are dim, or there's some LED light to do something different" (S2).
- ***Concerns with Fluorescent Lighting.*** Two participants (D7, D8) raised concerns about the use of fluorescent lighting in makeshift EmPATH units. One described how "fluorescent lighting is really harsh and uncomfortable, especially for patients who are there for weeks on end. I think that's uncomfortable for anyone" (D8). Another observed that in some settings, harsh fluorescent lights have led to patients trying to avoid them entirely: "I visited makeshift EmPATH units where half the room had people hiding under blankets because of the fluorescent light" (D7).

Noise Control. Four participants (D2, D4, D8, S2) emphasized the importance of noise control in creating a quiet and calming environment, contrasting it with the "loud and chaotic emergency room" (D8). One participant remarked, "This is a place where it [has] much more quiet and calming energy because you're not hearing all that blaring noises" (D8). Another emphasized how the noise control in EmPATH influences behavior from the moment a patient

enters: “This is where that space socially changes how people act. Just like when you walk into a library—usually it is quiet, and as you walk in, you automatically whisper and calm down” (S2).

Calming Materials and Finishes. Four participants discussed the calming effects of finishes and materials (S3, D3, D4, D6). Two participants (S3, D6) emphasized the use of “textured walls” as a means to reduce agitation and promote calmness. Another participant noted that the use of wood materials adds “warmth” to the space (D4).

Awareness of Time and Weather. Seven participants (S2, S5, S6, D2, D4, D7, D8) emphasized the importance of maintaining a sense of time and weather within emergency rooms, particularly during a "mental crisis." One staff member described their experience in an emergency department: “In an emergency department there [in our hospital], there are no windows, and there is no light. And so when I was working in that environment, it was like people didn't even know what time it was… if it was night, if it was raining” (S6). Two designers highlighted the significance of circadian rhythms and understanding the time of day through daylight (D4, D8). As one of them explained, “ [It’s important to know whether] it’s day, it’s night, it’s evening, as opposed to looking at a time on a clock. Your body might be messed up in that way. Just having a very innate visual cue of where and when they're at” (D4).

In total, the interviewees identified three key environmental features for supporting the perception of time and weather in EmPATH units: the presence of daylight (S2, S6, D4, D8), views of nature (S5, D4), and changeable artificial lighting (S2, D2, D7, D8).

Avoiding Feelings of Confinement and Seclusion. Eight participants (S1, S2, S4, S5, S7, D1, D6, D7) discussed the negative effects of confinement and seclusion on patients, emphasizing the contrast between these feelings and the calming and healing potential of a thoughtfully designed environment. As one staff member explained, "I think [patients] should not feel confined. There needs to be visualization out into the world so that it has that calming impact. Because the environment is really part of the therapeutic intervention" (S7). Their perspectives revealed three distinct subthemes: openness/feeling of space, access to nature/outdoors, and views of nature.

Openness and a feeling of space were emphasized by participants who highlighted the importance of design elements that create spaciousness. Features such as "lines of sight" (D6), "high ceilings" (S2), and "wide hallways and windows" (S7) were described as critical for helping patients feel the space and avoid a "prison-like" atmosphere (D6). Access to nature or outdoor areas emerged as another essential element. Participants (S1, S4, S5, S7, D1, D6, D7) underscored the therapeutic value of outdoor spaces, including the "ability to sort of get away" (S7) and experiencing "some fresh air" (S5). Lastly, views of nature through windows were identified as a significant calming feature by two participants (S7, D6). One participant specifically described such views as an essential aspect of "calming nature engagement" (S7), which helps reduce feelings of confinement.

Feeling of Normalcy. Seven participants (S3, S6, D1, D2, D3, D4, D6) emphasized the importance of creating a sense of normalcy through design choices. As one participant noted, "[Design choices], whether it's furniture, colors, or finishes, are important because they create a sense of normalcy and show care and consideration for the person in crisis, [ensuring]

they are in a place that is comfortable and appealing" (D1). Another participant mentioned that normative furniture offers safety without sacrificing comfort, helping patients feel respected (S3). One participant even pointed out how having security guards wear the same outfits as other staff helps convey the message that "we are all the same" (D7). Five participants (S3, S6, D1, D4, D7) specifically discussed the use of non-institutional elements to create a more normative environment. One participant emphasized the importance of "dignified furniture" (D6), while another highlighted a shift in healthcare furniture design toward balancing safety with normalcy, moving away from traditional plastic chairs that may "signal distrust" (S3). Additionally, one participant mentioned the use of colorful wallpaper instead of "white walls that are, you know, kind of institutional looking" (S6), further emphasizing the movement toward more inviting and dignified spaces.

Positive distractions

All 15 participants agreed on the importance of positive distraction as a key tool for de-escalating crises in emergency units. As S2 explained, "When somebody comes in crisis to the EmPATH, we want to decrease that crisis, decrease that intensity... most of it is letting that get out, and even positive interactions and positive things can be really helpful to do." S2 further emphasized, "They need something to do, and so you'd certainly much rather have positive distractions, but often a lot of them are in crisis, and sometimes they just need to close their eyes and not be involved in something." D2 also highlighted the significance of positive distractions, stating, "You're always combating boredom." However, D1 raised the concern of ensuring that positive distractions do not prevent social interaction, noting, "Positive distractions are good, but we also need to keep in mind that we don't want to distract people,

and that the reason for an EmPATH unit is to connect people." Participants provided multiple insights and examples, which were categorized into two main themes: opportunities for activity as active distractions, and ambient enrichments as passive distractions.

Opportunities for Activity (Active). Participants identified opportunities for engaging in various activities as a key strategy for providing positive distractions. The activities mentioned by participants included: watching TV or movies, listening to the radio or music, reading books and magazines, playing games (e.g., puzzles, word searches), engaging in arts and crafts, and participating in physical exercise.

Watching TV or Movies. Eight participants (S1, S2, S4, S6, D4, D5, D7, D8) highlighted the use of movies or TV as a tool for positive distraction. One participant noted, "something that they've chosen to watch, a movie or, you know, a television show" (S1). Some mentioned that patients could select movies to watch (S1, D4), while others indicated that staff control the selection (S5, S6). Although all participants except for D7 confirmed having TVs in their units, some observed, "we're not seeing a ton of TV. Nobody's sitting there and watching television constantly" (D5).

Participants also discussed challenges associated with TVs in these settings. Some (S6, D4) highlighted issues related to managing conflicting viewing preferences among patients, as S6 explained, "one person wants to watch *Law and Order.* The other person wants to watch *Friends.*" Others (S1, S6) stressed the difficulty of curating an "appropriate" list of movies and TV channels, with one participant emphasizing the importance of "being mindful of the materials that we put out on the unit for people to consume" (S6).

Listening to Radio or Music. Three participants (S6, D7, D8) highlighted the use of radio or music as a tool for positive distraction, emphasizing the importance of allowing individuals to choose what to listen to. As one participant explained, “maybe that's really calming jazz music for them” (D8).

Reading Books and Magazines. Seven participants (S1, S5, S6, S7, D4, D6, D7) addressed the availability of books and magazines in their units as positive distractions with calming effects. However, one participant (S6) raised concerns about the appropriateness of the reading materials provided, sharing an example from their unit: “And we were getting this magazine, and it was like a gossip magazine. And it was just like, why are we putting [this out]? It wasn’t good reading material.” They further emphasized the importance of mindful content selection, asking, “Should we be putting that material [e.g., magazines focused on celebrity culture or fitness] out there? These are people who are maybe struggling with their body image or with their physical health” (S6).

Games (e.g. puzzles, word search, etc.). Eight participants (S1, S2, S3, S5, S6, D4, D6, D7) emphasized the importance of providing equipment and spaces for games, such as puzzles, board games, virtual games, or cards. As one participant noted, patients “can play cards or just do board games” (S1). Another highlighted the social benefits of games, emphasizing their value “especially when it comes with social interactions” like “playing cards, doing puzzles, coloring, [or] drawing with other people around” (S2). Additionally, one participant mentioned the creative possibility of incorporating games into the environment itself, such as playing games on the walls (S3).

Arts and Craft Activities. Three participants (S1, S2, S6) highlighted opportunities for engaging in arts and crafts activities in their units. As S1 noted, “They can go select activities they want to do if they want to do painting, if they want to do some type of craft activity.” S2 emphasized the social benefits of such activities, stating, “Coloring, drawing with other people around [is] totally helpful.” Similarly, S6 strongly advocated for the inclusion of art, observing, “Art. [It’s] really neat how people have really gravitated towards that.”

Physical Activity Exercise. Five participants (S1, S5, S6, D2, D6) highlighted the effectiveness of providing opportunities for physical activities. As D2 explained, “If you want to work out... the environment allows you to successfully do that.” Examples mentioned included yoga (S1, S5), Pilates (S1), bike exercise (S6), and ping pong (D6).

Ambient Enrichment (Passive). Participants also underscored certain elements of the ambient environment as passive forms of positive distraction. Key features included the presence of a TV, background music, and artwork.

Presence of TV (Passive Engagement). Five participants (S1, S2, S7, D4, D7) discussed the use of TV as a passive tool for distraction in EmPATH units, where it plays a background role. One staff member described how two large televisions were used: “Even though it's a small space, we have two very large televisions. One of them is typically always showing something that the patients have chosen to watch, like a movie or TV show. The other one typically displays calming scenes, like an environmental or landscape view, often accompanied by calming music.” Another designer shared that sometimes the TV plays something neutral, saying, “That's maybe even just playing the weather channel, something very agnostic, just something in the background” (D4).

However, some participants expressed concerns about the impact of TV on the environment. One designer shared a personal perspective, stating, “I know if I had to be in a room with a blasting TV, like you feel when you're at an airport waiting for your flight, that makes me feel manic. I don’t want a TV. TV noise drives me insane, but some people love it” (D7).

Another designer emphasized the need to consider the difference between positive and negative distractions, using TV as an example (D1). They explained, “I heard a long time ago that TVs actually lengthen your perception of time. If you're in a waiting room, for example, and you're watching TV, it becomes a bit like a clock because you’re watching a show with episodes that are 30 minutes long, or a movie that's 2 hours long. You know how long you've been there based on how many episodes you’ve watched. Without a TV, you might look at artwork or a magazine, which doesn’t have that same magnetic draw and helps you keep track of time” (D1).

Presence of Background Music. Although four participants discussed the opportunity of listening to music (S1, S6, D7, D8), only one described it as a passive environmental enrichment, highlighting the role of background music: “There [is] some type of calming music [in our unit]. And they'll all listen to that together too. So there's always something going on in the background” (S1).

Presence of Artwork. Five participants (S1, S2, S7, D5, D7, D8) highlighted the importance of incorporating artwork into the environment. S1 described the positive effects of a mural created by a local artist in their unit, while S2 emphasized the value of having “the right artwork on the wall,” suggesting that it should create an immediate emotional impact:

“You want somebody to walk in and instantly feel something different” (S7). D7 highlighted how artwork can deeply influence emotions, saying, “I don't think the importance of artwork can be underestimated… especially if you provide [a] kind of complicated, layered, beautiful, different type of artwork. It can let people lose themselves in it. They can move to pieces they feel comforted by, or, you know, energized by whatever they're feeling.” D8 added, “I think having healing artwork around does a lot.” Although S7 acknowledged the value of artwork, they noted, “we don't have a ton of artwork in our space right now.”

Staff respite

All participants underscored the critical importance of staff respite in psychiatric crisis units. As one noted, “It is always important in any area of healthcare. But when it comes to psychiatric crisis units or even inpatient wards, it gets extra importance” (D4). Another added, “Staff also need to feel like they have a place that they need to go [to] decompress” (S7). The significance was often tied to its impact on staff well-being and retention, with one participant explaining, “Staff retention and staff burnout are huge challenges in behavioral healthcare” (D1), and another emphasizing that without proper breaks, “they're not gonna be able to serve their patients as well” (D4).

Most participants highlighted the environmental features of spaces for staff respite. One stressed the need for thoughtful design, saying, “It doesn't need to be an expensive space, but giving them space that's thoughtful and not just the leftover janitor’s closet” (D1). Others raised concerns about common deficiencies, such as the lack of light and ventilation in staff areas: “Oftentimes the staff breakroom or other spaces where staff kind of are working… are kind of buried into the building. And so how do you get light and air?” (D2).

Participants shared diverse insights and examples, often reflecting on their own experiences or perceived deficiencies in current units. A significant distinction emerged regarding the location of staff respite areas, with some favoring spaces within the unit for accessibility and others advocating for separate areas to ensure proper disconnection. As one designer explained, “We ask our clients this… Do you want your staff respite room kind of nearby, so it's easy to get back and forth? Or do you really want it separate?” (D6).

Based on participant responses, different approaches to staff respite were identified, categorized as opportunities for respite *inside* or *outside* the units.

Staff Respite Inside the Unit. Many participants focused on opportunities for staff respite within the unit itself, emphasizing the following categories.

Private Staff Breakroom. Out of the seven staff interviews, three participants (S1, S3, S6) mentioned having private staff breakrooms within their units, while four (S2, S4, S5, S7) reported the absence of such spaces. One participant described their breakroom as “kind of like a staff quiet room” (S3). Another (S6) described theirs as “the breakroom that just has, you know, a microwave and a table and chairs,” but emphasized the need for improvement, envisioning an ideal space that would be “more kind of like the space that we have in EmPATH, that's kind of low stimulation, and maybe there's some books or magazines, or, you know, something like that.” Another participant shared a positive experience with a staff room in another unit, describing it as, “It had like a beautiful couch. It had one of those salt rock lamps. It had, you know, some cute cheesy, but therapeutic quote on the wall. It had, you know, a space for tea and water, … a comfortable space for someone to, you know, just chill out and do whatever they need to take a breather” (D8).

All eight designers highlighted the importance of breakrooms, with one stating that they had never designed a unit without one (D1). However, some noted that the primary challenge lies in creating high-quality spaces that are "specifically restful, quiet, and useful" (D1). D4 emphasized the need for breakrooms to function as "true staff respite rooms," comparing them to quiet or calming rooms and highlighting features such as "a comforting chair in there with controllable lighting and sound, and a nature element." They added, "Because they are also put in some very intense situations, and if they aren't able to kind of regulate themselves, … then they're not gonna be able to serve their patients as well" (D4). Designers collectively stressed the importance of environmental qualities for staff breakrooms, including access to "air" (D2), "daylight and windows" (D1, D2, D3, D6), minimizing "noise and chaos" (D1, D4), incorporating "nature elements" (D4), and "access to exterior" (D2, D6, D8).

Challenges related to the lack of or improper breakrooms were often attributed to spatial constraints and financial limitations (S2, S4, S5, D6, D8). As S5 explained, "There's no designated breakroom [in our unit] because we didn't have the space to build one." Another explained, "[EmPATH units] are so streamlined. When you're putting in a unit, they tend to be so constrained for space that it's hard to find the space" (D6). Others indicated that the availability of breakrooms often depends on the financial resources of the clients commissioning the units (D8, D6).

Semi-private Space Break Spaces. Two participants (S2, S4) mentioned having semi-private rooms in their units for short breaks, eating, and phone calls. S2 described not having a dedicated breakroom for staff but noted a small back room that provides space away from

patient view. Similarly, S4 explained, “There’s a back hallway where we’ve got some computers where staff can chart and do some paperwork. So there is a place where they can kind of come back away from the patients, or if they need to have a private conversation with other staff, there are places they could do that” (S4).

Staying in the Milieu for Snacks and Short Breaks. As part of the interaction-based features of EmPATH and the inviting environment, some participants mentioned that staff sometimes stay in the milieu for coffee and snacks (S1, S2). One participant explained, “The therapist frequently will eat their snack or meal and chart at the same time during their break, so to speak, and just stay in the work milieu” (S2).

Creating Personal Break Spaces in Unused Corners. One designer suggested using unused corners of the unit for small break spaces, proposing, “Can we have a breakroom even? Or could we just have this corner of the space fit a nice chair for them to take a break?” (D4).

Dual Use of Quiet Rooms for both Staff and Patients. Although many participants described an ideal staff respite room as similar to calming or quiet rooms with interactive and comforting elements, one participant mentioned the possibility of using patient quiet rooms for both staff and patients. D4 explained, “We’re trying to find spaces that can serve dual purposes, because ideally, the staff won’t need a respite room every hour of the day.” They added, “Sometimes, we try to combine the calming room for both staff and patients” (D4).

Separate Staff Restrooms. Three staff (S3, S4, S5) highlighted the importance of having separate bathrooms for staff, with one describing the benefits of their current facilities:

“We have a separate breakroom. It has a kitchenette, it has lockers. It actually has a shower and a full bathroom. So if staff get something thrown on them and they're soiled, we have extra scrubs. They can go… actually shower if they need to. So it is a quiet, calming space that's just for our staff” (S7).

Conversely, other participants noted the lack of designated staff bathrooms and the challenges this creates. One explained that nursing staff in their unit must leave the EmPATH unit entirely to use a restroom in the main emergency department (S4). Another described a situation where intended staff bathrooms were repurposed: “When we built EmPATH, we built two bathrooms, thinking one would be staff and one would be patients. But they didn’t want to go in there and have patients listening to them, so both bathrooms have now become patient bathrooms” (S5). This participant further expressed frustration, explaining they often have to “run across the parking lot to another building” or use the unsanitary facilities in the emergency department (S5).

Staff Respite Outside the Unit. Several participants highlighted the importance of spaces outside the unit for staff respite, including other areas of the hospital, such as the cafeteria, ER breakroom, or rooms designated for meetings with families. As S6 noted, “We have a couple of rooms outside of our unit, where we can meet with families and loved ones.” However, the proximity of these spaces to the unit was identified as a key factor in their effectiveness (S2, S7). One staff member emphasized the need for staff to have a space that is “close by,” noting that “it’s not, you know, across the building or down the hall, so if they need to respond to a situation, they can” (S7).

Walking Around in Other Sections of the Hospital (e.g. lobby or cafeteria). Three participants (S2, S5, S8) mentioned that staff often take breaks outside the unit, including in areas such as the cafeteria or lobby. One participant explained that the small size of their breakroom leads staff to use other spaces: "A lot of times [staff] end up in the hallway, taking phone calls and things like that" (S5). Another noted that, despite having a private staff breakroom, many staff members still prefer to go to the cafeteria or find a quiet spot in the lobby to relax, explaining, "It's just you want to move and get out" (S2). Additionally, one designer (D8) reflected on their own experience as a previous staff, noting that they preferred to leave the unit during breaks rather than spend time in the breakroom.

Shared Breakroom with Other Units. Five participants (S1, S2, S5, D6, D7) mentioned that breakrooms are often shared between different units. D6 referred to the guidelines that allow for shared spaces, stating, "The guidelines… allow that space to be shared with the emergency department or other places. So it's not like it has to be a dedicated staff room." Some participants noted using shared breakrooms across departments. For example, D7 described an emergency responder breakroom as "a small room next to the emergency entrance." S1 mentioned a larger shared breakroom in the emergency department that includes vending machines and televisions. S7 discussed a separate breakroom for EmPATH units located outside the unit, with its own entrance.

Using Outdoor Space for Staff Respite. Four participants emphasized the value of accessible outdoor spaces for staff respite (S3, D2, D6, D7). One staff member described having a dedicated outdoor area in their unit: "We have a staff, a dedicated staff outdoor space where staff can go" (S3). Another participant (D7) highlighted the importance of

incorporating outdoor spaces for staff alongside similar spaces for patients and visitors, explaining, “We're always trying to provide an outdoor space for them as well… so that you can get away and be outside and not have to think about it for a few minutes.” However, most of the participants noted a common challenge: “A lot of times those outdoor spaces might get cut” due to various constraints (D2, D6, D7).

Social interactions

All designers and staff emphasized social interaction as a defining feature of EmPATH units. Reflecting on prior experiences in emergency psychiatric settings, S6 explained the stark contrast: “We kept people isolated to their room. If they came out and tried to communicate with other patients, we just hard stop. You can't do that in the EmPATH setting. We encourage it.” Similarly, S4 highlighted the significance of the open design, noting, “The openness of it all, and everybody kind of being in the same space—it promotes socialization.” The themes identified through the interviews were categorized into three interaction types: staff-staff, patient-staff, and patient-patient.

Staff-staff Interactions. Five participants (S1, S3, S6, S7, D4) emphasized the significant impact of design on interactions among staff. They described how the open space design, open nurse stations, constant presence of staff within the unit, and close proximity of interdisciplinary professionals foster various types of interactions compared to traditional psychiatric units. These interactions promote teamwork, collaboration, and cross-functionality among staff. The following insights highlight environmental elements influencing these interactions:

Promoting Team Work and Collaboration. Three participants (S6, S7, D4) noted that the open space design enhances teamwork and collaboration among staff. As one participant explained, “They can say, ‘Hey, can you help? Maybe we'll take this person outside,’ or, ‘They can communicate and know when to intervene” (S7). Another participant described how being in the same space fosters a strong team dynamic: “We’re all right there, and we can all see what’s happening” (S6). However, concerns about maintaining professional boundaries were raised, with S7 highlighting the importance of staff being mindful of conversations, ensuring they remain professional in the milieu.

Cross Functionality among Staff with Different Expertise. Three staff members (S1, S6, S7) and one designer (D4) highlighted how environmental design supports cross-functionality among professionals from different disciplines. Two participants (S6, S7) specifically pointed to the open space design, with S6 stating, “We’re therapists, you’re nurses, and you’re the doctor. Being in the same space encourages consultation among us.” Similarly, D4 noted that the open space and compact design enable collaboration between professionals such as nurses, pharmacists, social workers, and other healthcare providers.

In addition, S1 highlighted the importance of the unit’s proximity to the emergency department, which facilitates collaboration: “If there’s a medical emergency, or if a patient becomes violent or needs to be brought back to the ER, staff can back each other up. This proximity enhances cross-functionality.”

Patient-staff Interactions. All 15 participants described social interactions between staff and patients in EmPATH units as significantly more effective compared to traditional emergency psychiatric rooms. Three key environmental factors supporting these interactions

were identified: easy access to staff, maintaining staff-patient connections, and opportunities for one-on-one consultations.

Easy Access to Staff. Nine participants (S2, S3, S4, S5, S6, S7, D2, D6, D7) emphasized how the design of EmPATH units facilitates easy access to staff. One participant contrasted this with traditional emergency psychiatric settings: "It improves patient experience when they feel like, 'Oh, my nurse is right here, and my therapist is right there. They're available if I need them'" (S6). Key design features contributing to this accessibility include: Open space (S3, S7), optimal unit size (S2, S4, S5), minimal interior barriers (S4, D2), design of the nurse desk (glass partitions, desk height) (S2, S3, S7, D6, D7).

Maintaining Connections Between Staff and Patient. Nine participants (S1, S2, S3, S5, S6, S7, D2, D4, D7) highlighted the importance of maintaining connections between staff and patients. As S3 explained, "Connection is the most valuable tool for achieving good patient outcomes." They noted that active engagement between staff and patients reduces aggression and enhances safety. Open design of the space and group activities were identified as key environmental features supporting this engagement.

Participants described how the availability of games, designated spaces, and interactive furniture fosters interaction. For instance, one participant noted, "Our staff have become really good at playing cornhole and Uno because that's something they do every day" (S1). Another added, "The open concept allows staff to play cards with one patient while chatting with another, rather than going room to room" (S7).

To further encourage engagement, one designer (D7) mentioned deliberately minimizing nurse desk space to discourage staff from sitting and instead keep them active in the milieu.

Opportunity of One-by-One Consultation. Several participants mentioned the importance of providing both private and public spaces to facilitate one-on-one consultations between staff and patients. S2 highlighted this dual approach: "About half the patients prefer talking in a private room, while the other half are comfortable with a staff member pulling up a chair by their recliner and chatting." This flexibility in spatial configuration was noted as a way to maintain strong connections while addressing individual patient preferences.

Patient-patient Interactions. Almost all participants identified patient-patient interaction as a distinctive and impactful feature of EmPATH units. One staff member explained, "It feels like they're getting treatment in a natural way rather than them sort of being like, I gotta sit through this group therapy. It's just brought to them as part of their environment" (S7).

However, some participants raised challenges. S2 and S3 discussed issues arising from patients with higher levels of acuity, which could sometimes lead to aggressive behavior. Four participants (S2, S3, S7, D6) emphasized the importance of addressing patient relationship dynamics, as conflicts might arise in shared spaces when patients do not get along. To mitigate these challenges, they highlighted the importance of respecting privacy, providing options for isolation or socialization, and offering various zones within the unit.

Insights regarding patient-patient interactions from the interviews centered around four key themes: group therapy sessions, creating bonds through shared experiences, opportunities for group activities, and providing a choice between socialization and isolation.

Group Therapy Sessions. Three staff members (S3, S4, S6) highlighted the presence of group therapy sessions in their units. While these sessions facilitate both staff-patient and patient-patient interactions, most participants discussed them primarily in the context of enhancing patient-patient connections. Therefore, I addressed this theme here as part of the environmental opportunities that promote social interactions among patients.

Creating Bonds / Sharing Experiences. Five participants (S1, S7, D2, D4, D8) described how the design of EmPATH units supports "shared experiences" (S1) and "creating bonds in a natural way" (S7) by avoiding the segregation of patients. Unlike traditional spaces that segregate individuals, the open and communal layout allows patients to connect and support one another.

S1 shared how the group dynamic helps patients improve collectively, sharing an instance where one patient, after discussing their job loss, received a job offer from another patient in the unit. D8 highlighted the therapeutic impact of realizing "I'm not the only one going through this," while S7 pointed out the positive effects of shared experiences in fostering understanding and mutual encouragement. This natural interaction creates a sense of belonging, helping patients feel less isolated in their crisis.

Opportunities of Group Activities. Another distinguishing element of EmPATH units contributing to positive patient-patient interactions was the availability of multiple

opportunities for group activities (S1, S6, D2, D8). S1 highlighted that patients engage in activities like basketball, cornhole, and Uno, explaining, “For a while, they’re just people and trying to help each other” (S1). Similarly, S6 emphasized how the environment encourages community-building, allowing patients to sit together, play games, and do puzzles, rather than being physically secluded in an ED room.

Choice of Socialization and Isolation. Four participants (S7, D2, D6, D8) highlighted the importance of autonomy and individual choice for patients in EmPATH units, particularly regarding their social interactions. They emphasized that patients should have the freedom to choose whether or not to engage with others. One participant stated, “They can choose to engage socially and not be forced to engage, either amongst themselves, with staff, or amongst staff. So part of that is looking at that voice and choice” (D2).

Another designer expanded on this perspective, explaining the need for creating diverse environmental options to support varying levels of interaction: “You know, some people are wallflowers, and they just want to hang out on the side. They feel safe being around other people and being watched by staff, but they don’t feel comfortable interacting with others. So a really important part of a milieu is designing little safety zones within the milieu—a bench on the side, or a quiet corner” (D6).

To support these needs, participants identified three key environmental design characteristics:

- ***Moveable Recliners (S7, D2).*** The ability to reposition recliners allows patients to create personal spaces within the communal area, offering flexibility for those who prefer solitude or proximity.
- ***Availability of Private Rooms (D2, D8).*** Private rooms provide an option for patients who require a completely separate space to decompress or avoid social interaction altogether.
- ***Availability of Different Zones (D2, D6).*** Diverse spatial configurations within the unit, such as open areas, semi-private nooks, and secluded corners, ensure that patients have choices in how they engage with the environment and others.

Safety and security

Participants shared insights about safety measures they observed or designed in EmPATH units. These discussions centered around patient safety, staff safety, control and accessibility, and zones with more risks. While all participants agreed on the importance of ensuring safety for both staff and patients, they also highlighted challenges in balancing safety with aesthetics (D7) and maintaining a sense of normalcy for patients (S3).

Staff Safety. Areas related to staff safety highlighted by the participants include access to emergency call buttons/panic buttons, monitoring video cameras, and line of sight.

Access to Emergency Call Buttons / Panic Buttons. Participants underscored the importance of panic buttons, which staff can either wear or find mounted on walls, as essential safety tools (S1, S4, S5, S6, D4, D7). S1 explained how staff wear a panic button or use wall-mounted ones during emergencies. Similarly, S5 stated: “Each staff [member] is assigned a

panic button. Whether they wear it or not is a different story, but they have the option to have a panic button which they just press… we also have built-in panic buttons throughout the unit."

Monitoring Video Cameras. Participants discussed the role of video cameras in enhancing both patient and staff safety (S1, S4, D4, D7). S1 noted that cameras in their units are subtly integrated into the environment, stating: "They're kind of hidden, so you don't notice them as much, so they blend in."

One designer emphasized the importance of strategically placing cameras in specific areas, particularly in quiet rooms where patients might be alone and require additional monitoring. They explained: "Any room that maybe a patient would be alone in, we usually would put monitoring in there, whether it's on at all times or they only turn it on in the case that someone needs to be monitored." (D4).

However, another designer argued against the use of cameras outside of quiet rooms and noted the absence of dedicated security staff to monitor video feeds. They stated: "I have not ever seen them used for [anywhere] other than in seclusion rooms." (D7).

Line of Sight. Seven participants highlighted the critical importance of maintaining clear sightlines in the milieu, not only for patient safety but also for staff security (S2, S4, S5, S7, D3, D6, D7). S7 described it as: "The ability for our staff to see down every hallway and into the milieu from the main nursing area—that line of sight, visibility in every area—is really important for staff safety." Similarly, S4 explained how the design of their unit ensures

visibility: “The staff that are in the milieu can see all of the patients at one time. There aren't lots of hidden corners, and like, so they can see the patients and have eyes on [them].”

Patient Safety

Ensuring Line of Sight from the Nurse Desk. Nine participants (S2, S4, S5, S7, D2, D3, D6, D7, D8) emphasized the critical importance of maintaining a clear line of sight from the nurse desk to ensure patient safety.

S2 stressed that “the best safety feature is intervention before somebody gets, you know, to attend in a crisis.” Similarly, S4 highlighted the visibility of patients, stating, “Unless they're in the bathroom, we can kind of see where they're at at all times.” S7 underscored the importance of visual access across the unit: “Visualization throughout this space is really important.”

From a design perspective, D3 described openness and visibility as key: “As far as the openness and visibility, that's one of the key things because it allows clinicians [to monitor effectively].” Meanwhile, D8 emphasized the functional and economic benefits of design that ensures constant observation: “All staff must have a line of sight for every single patient at all times. That’s essential. In a traditional ER setting, you’d need a one-to-one patient ratio for those experiencing psych emergencies because such environments lack these design elements. Employing additional sitters to monitor patients is uncomfortable for both the patient and the sitter, and it can be costly for the facility. An environment that allows constant observation by all staff members, due to the unit’s design, is essential for patient safety” (D8).

Anti-ligature Furniture and Equipment. Several participants (S2, S3, S5, S6, D1, D4, D6, D8) underscored the importance of anti-ligature furniture and equipment for patient safety, highlighting several areas of concern:

Two staff members (S5, S6) emphasized anti-ligature considerations for personal and portable items. Examples included "styrofoam meal trays" and "paper spoons" instead of plastic or metal utensils, as well as foam-like materials for "shower doors" (S6). Other items included cordless headphones, footwear without laces, and hooded sweatshirts without drawstrings. They also mentioned furniture designs with no sharp points or removable components (S5).

- ***Bathroom Fixtures.*** Bathrooms were identified as particularly challenging spaces in EmPATH units due to the absence of cameras and staff accompaniment. Participants (S1, S2, S5) emphasized the importance of anti-ligature bathroom fixtures. One designer (D7) highlighted the need for anti-barricading doors to enhance safety in these spaces.
- ***Wall-Mounted Elements***. Safe finishes and secure wall-mounted elements, such as outlets, artwork, and TVs, were highlighted by S2 and D6. These elements should be installed with safety screws and placed behind thick, durable plexiglass (S2).
- ***Recliners.*** One designer noted that recliners are a distinctive feature of EmPATH models but raised concerns about their safety. They explained:

  "Recliners typically have a lot of issues with safety. They're not as durable. There are a lot of screws and moving parts. They're not ligature-resistant except for a couple of recliners on the market as of recently" (D1).

- ***Ceiling Fixtures.*** Ceiling tiles were identified as one of the most challenging elements in terms of ligature risks, particularly in private rooms where patients might be alone (S2, D3, D4, D6, D7). One solution suggested was increasing ceiling heights above 10 feet or using extra heavy tiling clips (S2).
- A designer (D3) expressed concerns about acoustic ceilings and mentioned the limited number of manufacturers that produce suitable materials, such as perforated metal ceilings or wood-look systems. They also noted that behavioral health units often resort to hard ceilings, such as gypsum board lids, paired with ligature-resistant products.

Behavioral Healthy Materials. One designer emphasized the importance of using behavioral health-friendly materials, highlighting the need for robust, high-impact furnishings:

"Making sure the space and materials are behavioral health-friendly is crucial. Do we have [a] high-impact gypsum board? Are the furnishings robust enough for behavioral health needs? Sometimes, items are weighted so that patients can't pick them up. It's also about staff safety, but ultimately, the goal is to ensure that patients can't pick something off the wall and use it to injure themselves." (D4).

Monitoring Video Cameras. Similar to staff safety, the use of monitoring video cameras was discussed as an essential tool for maintaining patient safety (S1, S4, D4, D7). Video surveillance can help track patient behavior and provide a layer of security for both patients and staff in high-risk areas.

Choice of Privacy. One participant emphasized privacy as a form of self-preservation, explaining:

"Privacy is actually a self-preservation technique from one perspective. If you see privacy as having an appropriate level of control for the patient in a given social circumstance." (D5).

Another staff member (S3) discussed how providing private spaces contributes to patient safety, saying: "We manage space per patient by offering all private rooms where people can have some privacy." (S3). This participant also noted that private rooms serve as a space for patients with agitation to be secluded until they can be de-escalated.

Additionally, a designer (D8) mentioned the importance of calming rooms for patients in distress, explaining: "Calming rooms are really important. These are available for patients who need a quieter, more secluded space to regain control during moments of distress."

Control and Accessibility. Participants discussed approaches for managing control and accessibility, which lay under two categories of access control and detection systems.

Access Control: Locking In/Out, Double Doors. Staff emphasized the critical role of access control in ensuring patient safety, particularly in managing door security. One staff member described it as the most vital aspect of safety, highlighting the distinction between locking patients in versus keeping others out. Another noted the use of double-door systems to prevent unauthorized exits. Additionally, some staff advocated for access badges over physical keys to enhance security and control.

Detection Systems. Two designers (D2, D7) mentioned detection systems as part of safety measures. D7 discussed the use of weapons detection systems, including metal detectors, while D2 explained that "sensor systems that use types of lidar or other technologies can detect where a person is in the space."

Zones with More Risks. Several participants identified specific zones with heightened safety risks.

Restrooms. Four participants (S1, S2, D2, D7) emphasized the risk associated with restrooms, as these are the only spaces where patients are entirely alone without surveillance cameras. One designer noted, “Showers and bathrooms are high-risk environments, which are difficult to design, and it is not uncommon in psychiatric settings.” (D2).

One staff member described the safety measures in their unit, stating: “Our designers did a great job on that. You can't flood the space, and you can't hurt yourself in the space. We monitor it because the doors are badged in; we let you into the bathroom, but you can let yourself out at any time. We also monitor how long you're there to prevent co-mingling.” (S1). Another designer (D7) recommended the use of anti-barricade doors to enhance safety.

Outdoor Courtyard. One designer (D5) raised concerns about maintaining patient access to outdoor spaces, saying, “I think we're going to find that it is going to be hard to maintain patient access to those areas.” Another designer explained, “All the outdoor spaces are enclosed so that nobody can leave that way or enter that way. So they're kind of more like exterior rooms” (D7).

Involuntary Lobby. One designer discussed the involuntary lobby, stating, “The involuntary lobby, where patients are being brought in by emergency departments or police, is a pretty high-risk location.” (D7)

Comfort/Quiet Rooms. Many participants also emphasized the safety risks associated with private rooms, where patients can be alone. One designer explained, “I would say that's

high risk because people might be left in there with the door shut, even though they're going through something that the nurses can't directly observe." (D7)

Care Desk. There was a discrepancy in opinions about the use of glass in nurse desks, based on participants' experiences. While most participants appreciated the concept of an open nurse desk without glass, some found it challenging to implement in practice. One designer (D6) explained, "The care desk plexiglass... that's the thing that creates separation. That's the thing that makes it seem awkward," but still acknowledged that "staff can be at risk, too. And they want a place of protection." Another designer (D5) shared their experience, stating, "I can't tell you the number of times that we've started a project where leadership has a commitment like Scottie Zellers to open access from the care desk, seeing, hearing all of it, and nursing staff grudgingly mumbling under their voice, accepting it, and then the first accident becomes the death knell, and people enclose the care desk with polycarbonate." Finally, another participant (D8) noted the resistance from hospitals to not incorporate glass for staff safety concerns.

Maintenance

Although participants acknowledged the importance of maintenance, they did not emphasize it as significantly different from other healthcare environments. Their input was categorized into cleaning surfaces, repair and durability, and challenging spaces to maintain.

Cleaning Surfaces. Three participants (S1, S6, D5) addressed cleaning, as one staff member emphasized their commitment to cleanliness, saying, "we really try to stay on top of that." (S6).

Beyond specific surfaces, a general challenge highlighted by one staff member was cleaning in close proximity to patients due to the open-space design concept. They explained, “Open space. We don't want the staff to leave a cart if they go into one of the rooms.” The same staff member noted that cleaning activities could occasionally make patients feel uneasy: “Sometimes it can make the patients feel a little uncomfortable.” (S2).

Insights from participants in regard to cleaning surfaces were mainly focused on floors, walls, and nurse desk glass.

Floor Cleaning. One staff member shared their unit's choice of flooring material for easy cleaning, explaining, “The floors are, you know, that welded vinyl. So there's no cracks or anything in it. And so they mop the floor once a day” (S1).

Wall Cleaning. Two participants (S1, S6) also addressed wall materials chosen for ease of cleaning. One staff member described their unit's wall coverings: “The walls were actually covered with a product called Astrovan, which is a plastic material that can be wiped.” (S1). Another staff member highlighted challenges related to cleaning chalkboards used for art activities in their unit (S6).

Nurse Desk Glass Care. One staff member shared a positive experience with their nurse station glass, emphasizing its practicality: “We have reinforced glass around the nurse station. So it's really, really easy to clean.” (S1). Conversely, a designer noted the difficulty of maintaining polycarbonate enclosures used for safety: “People enclose the care desk with polycarbonate. So, I think that's gonna be hard to maintain.” (D5).

Repairing and Durability. Repairing and durability were concerns highlighted by multiple participants, particularly regarding frequently used elements like recliners and wall materials.

Durability of Recliners. Recliners were mentioned as prone to wear and tear (S1, S4). One staff member explained, “We just happened to hit kind of a bad batch of recliners when we first did it, and the recliners got used a lot, so they were breaking” (S2). Another participant added, “The recliners get lots of wear and tear,” and noted, “We've only been open for a year, and some of our recliners are already starting to show signs of wear and distress. So I would say that investing in furniture is important” (S4).

Repairing Recliners. One staff member discussed the need for repairing the recliners, saying, “Within the first year, they’re starting to break... we got it fixed” (S2).

Durability of Wall Materials., Wall materials were emphasized by two participants as needing to balance aesthetics, acoustics, and durability (S1, D4). One designer noted, “The challenge [is finding] a durable material and cleanable, wipeable spaces” (D4), and further noted, “A lot of things need to be more of a hard material for that durability” (D4). A staff member shared their experience, saying, “The walls were actually covered with a product called Astrovan… It's also very, very durable. You could hit it with your fist, and your fist will take more damage than the wall” (S1).

Difficult Spaces to Maintain. Participants identified certain areas as being particularly challenging to maintain, including bathrooms, outdoor spaces, and the triage area.

Bathroom. Four participants (S1, S4, S6, D2) described bathrooms as the most difficult spaces to clean and maintain. One participant noted, “Those get lots of use. Keeping those clean and sanitary requires a lot” (S4). Another added, “There’s only two restrooms, and there’s sometimes 15 people using those two restrooms. I think that’s a challenge” (S6). A designer highlighted both maintenance and safety concerns, saying, “Bathrooms are probably the spaces that get the most amount of wear and tear, and they are the most difficult to design for because those are the highest-risk environments” (D2). However, one staff member shared a positive perspective, noting that the European-style bathrooms in their unit were easier to clean: “Because the bathrooms are the European style, where the shower is basically the entire room, you can wet the whole space. So they just go in there and wipe it down twice a day and in between patients. It’s really easy to clean” (S1).

Triage Area. While triage is not normally in the Empath unit, its maintenance should be considered when one is available. One staff member discussed maintenance challenges in the triage area, saying, “In terms of maintaining the space, our triage area, when you first come in... there’s just a lot of people. And so we’re trying to keep it clean and keep it ready and maintained and available for people” (S7).

Garden / Outdoor Space. According to one designer, outdoor spaces also posed maintenance challenges. The participant emphasized the importance of designing such spaces to minimize upkeep, explaining, “It’s really about getting a really good landscape architect who knows how to design things to be virtually maintenance-free” (D7). They further elaborated, “The facility can keep those exterior spaces up without having to do too much. People don’t need much—just to be outside. You can have some grass and a bench” (D7).

Autonomy

All 15 participants unanimously emphasized the importance of autonomy and competence in the healing process. They viewed the EmPATH unit as an emergency psychiatric crisis model that effectively incorporates these principles into its design. As one designer explained, “It is important to provide autonomy and competence… I mean, control and choice over the environment, providing opportunities for empowerment” (D1).

Choice and Control. The ability for patients to make choices and exert control was widely regarded as both therapeutic and a distinguishing feature of EmPATH. One staff member remarked, “When you can provide people with choices, they tend to use them in a way that helps their overall regulation. That’s super important” (S3). Participants highlighted several aspects of choice and control including: Choice of socialization or isolation. Choice of Activities ,Choice of seating, choice of walking around, Control over the location of recliners (moveable), and Communication with family.

Choice of Socialization or Isolation. Six participants (S1, S4, S6, D2, D5, D7) emphasized the importance of offering patients the choice between socialization or isolation as a fundamental element in their units. One staff member explained, “You'll see people sometimes sitting on a chair kind of watching what the other people are doing, you know, trying to decide if they're going to get involved or not. And nobody forces them” (S1), further adding, “They can just self-select to go into that space to get away for a while” (S1).

Participants highlighted the realization of this concept in the environment either through the availability of different seating arrangements and zones inside the milieu or

separate private and quiet rooms for patients who prefer to be alone. One designer noted, "The fact that you have a multitude of spaces and seating arrangements and opportunities to have voice and choice in where you sort of sit in a space, have ownership of a space, have agency and autonomy in a space, and in the same way that trauma-informed design principles kind of aid in that" (D2). Another designer (D5) discussed the idea of small groupings, noting, "An idea of small groupings and diversified settings, that there might be tables that people sit around, not just lounge chairs." Additionally, D7 underscored the necessity of designing units that have both "private rooms" and "semi-private areas."

Choice of Activities. Almost all participants mentioned the availability of various activities in their units and the freedom patients had to choose which ones to engage in. One staff member emphasized that the ability for patients to do different things without having to "ask [for] permission" fosters a "sense of self-worth" (S1). Examples of free-choice activities included watching movies (S1, S6, D1, D4, D6, D7), reading (S1, D4, D6), making a meal (D2), listening to music (S6, D1, D7, D8), playing games (S1, S3, S6, D4), physical activities (S1, S5, S6, D2, D6), controlling the TV channel (S1, S5, S6, D4, D8), and working on art projects (S6, D7).

Choice of Seating. Six participants (S1, S2, S7, D2, D4, D7) emphasized the importance of designing the environment and spatial configuration to provide a variety of seating choices to accommodate different preferences. One designer highlighted how "spaces [that] are broken up" contribute to the intended "sense of voice and choice" (D2). Another designer described their unit as offering diverse seating options, explaining, "It's that freedom of choice" (D4).

Participant insights show seating areas and zones vary across multiple aspects. Some participants noted the acoustic differences between seating places, allowing patients to choose between “a louder corner and a quieter corner” (D7). Others addressed differences in lighting levels or colors for various zones, as well as proximity to windows and daylight, with one designer explaining, “Place in the room that's closer to the windows that you can go sit, and just you have natural daylight, or you might have a kind of naturally darker zone in this big open room” (D7). Another element highlighted was the level of socialization in different areas. One staff member mentioned the availability of private zones “where [patients] can sit and sleep” or “self-reflect,” alongside areas with more “social settings” (D2).

Control over the Location of Recliners (Moveable). One staff member highlighted the flexibility offered by moveable recliners, explaining that patients are free to relocate their recliners anywhere within the unit (S7). They noted, “We have folks who move their recliner anywhere on the unit... They're on wheels.” The recliners, which “lay flat,” allow patients to sleep wherever and whenever they feel comfortable. The participant further explained how this feature is particularly beneficial for patients experiencing homelessness, as it helps them feel more at ease by accommodating their accustomed sleeping habits (S7).

Choice of Walking Around. The environment’s encouragement for patients to move and walk around was emphasized by four participants (S5, S6, S7, D4). One staff member explained, “There are lots of distractions [in the environment],” adding, “if you want to pace around, you can walk around” (S6). Another participant highlighted how patients could independently explore the space, stating, “They can navigate the environment themselves” (S7).

Communication with Family. The opportunity for communication with family members was addressed by two staff members (S1, S5). One noted, “Telephones and [other] devices where people can stay in communication with their family, although much of that's monitored, they do have access to phones to stay in touch with family” (S1).

Independent Access. Independent access was also highlighted by participants as a significant aspect of autonomy. Discussions centered on independent access to restrooms, outdoor courtyards, food and snacks, and blankets.

Independent Access to Restrooms. Seven participants (S1, S2, S4, S5, S7, D2, D8) discussed the importance of independent access to restrooms in EmPATH units as a fundamental aspect of not only autonomy, but also dignity. One staff member explained, “They can go to the restroom by themselves. They do not have to have someone observe them. And that's just a basic dignity thing that I think goes a long way in patients feeling comfortable and supported in their environment” (S7). Four participants (S1, S5, S6, D7) also emphasized the availability of free access to hot showers, further enhancing the sense of independence for patients.

One designer (D8) contrasted this approach with traditional ER settings, noting, “A lot of times you'll find a traditional ER that patients like any of us would get extremely frustrated, and you know, and then which builds to them to escalate because they're not able to get staff's attention just to get their basic needs met. Whether that's, you know, having to go to the bathroom” (D8).

Independent Access to the Outdoor Courtyard. Independent access to outdoor courtyards was discussed as an aspect of autonomy for patients in EmPATH units. Several participants emphasized the value of having a dedicated outdoor space where patients could spend time away from the unit, allowing for a sense of freedom and self-regulation. One staff member explained, "Being able to do something outside" (S1), further adding, "We actually have a small outdoor area where patients can go for several hours per day to get outside" (S1). However, this staff member also noted security concerns and protocols tied to these outdoor spaces.

Not all units have an outdoor space, but another staff member emphasized its importance, stating, "The outdoor space is one of the biggest components" (S5). In units with such spaces, staff described them as a means for patients to access fresh air and relaxation. For example, a staff member from a unit with an outdoor patio explained, "We have an outdoor patio space that patients can access independently. It has line of sight from our milieu, so we can see folks out there, but they can go out there without staff. It's enclosed" (S7). They added, "We always have somebody that moves their recliner down there. I think it's their ability to sort of get away, which is a calming nature engagement" (S7), emphasizing how this space provides a restorative break for patients.

Designers also weighed in on the design and security of outdoor spaces (D5, D7). One designer (D5) highlighted the challenges in ensuring reliable access, stating, "I think access to the outdoor courtyards is going to be more fragile, and the closer we can get those courtyards and visibility to those courtyards, to the care desk and within the span of control of nursing staff, the better" (D5). Another designer (D7) discussed how security concerns shape the

design of outdoor spaces, noting, "All the outdoor spaces are enclosed so that nobody can leave that way or enter that way" (D7). This reflects the balance between patient autonomy and the need for safety and control in these environments.

Access to Food/Snacks. Participants (S1, S2, S4, S5, S6, S7, D2, D3, D4, D7, D8) discussed the importance of providing free access to food and snacks without requiring permission, contrasting this with the traditional emergency department where patients must ask for everything and wait for staff assistance. One staff member explained, "I actually think that keeps patients from escalating because they feel like they can get their basic needs met without having to rely on staff" (S7). Examples of food access included open and accessible "fridges and snack counters" (S6). However, one staff member (S5) described their snack services as more structured, saying, "We have a very structured [approach]. They have snack times, and they can't have, you know, an excessive amount of snacks. So we do monitor that" (S5).

Access to Blankets. Four participants (S1, S2, S6, D7) discussed the availability of blankets in EmPATH units, highlighting the importance of patients being able to access blankets independently, in contrast to traditional behavioral health settings. As one staff member explained, "The patient can go to the nurse and say, 'Can I have a blanket?' and the nurse will just kind of say, 'Yeah, it's right there.' By the end of their stay, they're realizing, 'Wait a minute. I can take care of myself. I can have my own agency.'" They added that this minimal intervention fosters a sense of self-sufficiency, as "most people are higher-function[ing] and can do that" (S2).

Environmental Control. Participants highlighted environmental control as a significant realization of autonomy in EmPATH units. One designer defined it as "the ability to choose or adjust your environment, if possible, whenever possible" (D7). Another emphasized how the environment could help meet individual needs, stating, "The environmental controls provide what the individual needs to meet the aesthetic that helps them, fosters a sense of belonging and place, and aids in self-regulation" (D2).

A designer also pointed out that a key difference between EmPATH and traditional ER settings is the personalized nature of the environment in EmPATH units. They explained, "The difference with EmPATH versus traditional ER is that it's a very personalized or individualized treatment approach, whereas in a traditional psych ER, it's more of a one-size-fits-all approach" (D8).

Adjusting the Ambient Environment. A key aspect of environmental control discussed by participants was the ability to adjust the ambient environment, particularly through the intensity and color of lighting, as well as acoustic control. While most of these features were mentioned in relation to private rooms (often referred to as sensory rooms), some participants noted their availability in the main milieu. A common theme was the "interactivity" of these systems. As one designer described, "Throughout the spaces, so that again, an individual can sort of tailor the environment to their hypersensitive or hypersensitive needs, so that can be lighting systems that are patient-controlled, psychsafe, and allow full spectrum and full color ranges, wind generators, tactile sensations, or creating haptic environments through projector systems that interact and play off of the interactivity of the patient engaging with them" (D2).

- ***Adjusting the intensity of lighting .*** Five participants (S6, D1, D2, D6, D7) discussed the importance of adjusting the intensity of lighting as a way to give patients control over their environment. One designer explained, “Giving people this sense of control could be so simple, even, you know, dimming the lights, having control over dimming the lights” (D1). Another designer emphasized, “Advancing lighting controls to certainly dimming levels [in the observation area], but even hopefully individual lighting over the beds, each chair, or each station so it could be adjusted per patient. I don’t think that should be a requirement, but I think that’s an obvious design criteria” (D6).
- ***Adjusting the color of lighting.*** Seven participants (S1, S6, D1, D2, D4, D7, D8) highlighted the ability to change the color of lighting as an important feature that provides patients with more control over their environment. As D4 noted, “Color is not the same for everybody, so a color that someone else might find calming, someone else doesn’t.” Although some participants mentioned this technology in the main milieu, most specifically highlighted its importance in calming or sensory rooms. One staff member explained, “We also have sensory lighting, so they can change the lighting. It’s like this little circle, and you just run your finger around it. Any color of the rainbow. It’s in an interactive way” (S6). Another staff member added, “LED lights, so we can have different colors, so we can change the color, the lighting in the room. And the patient can pick the color that they like” (S1). A designer also emphasized the therapeutic benefit, saying, “They can change the color lighting that is in the room, because that feels more therapeutic to have blue instead of, you know, an orange, or whatever it may be again. To have choice” (D8).

- ***Acoustic control***. Although many participants mentioned the significance of acoustic control, only one designer (D7) specifically addressed it in relation to autonomy. They briefly discussed providing acoustic control as a way of giving patients more control over their environment.

Changing the Seating Layout. Two participants (S7, D1) discussed the importance of allowing patients to change the seating layout in the milieu as a way to provide them with more autonomy. One staff member emphasized that the recliners in their unit are movable, enabling patients to easily rearrange them as they wish. They noted, "We have patients who then sort of bring their recliners together" (S7).

One designer also highlighted the value of giving patients the ability to rearrange furniture, viewing it as a way to enhance autonomy and competence (D1). However, they acknowledged that this flexibility can sometimes be "complicated." They added, "Being able to move furniture, decide which direction you're looking… I think it's interesting. In impact units, a lot of times I'll see new construction photos and all the recliners are in a row, and they're all facing one direction. In reality, patients have control over which way they're facing—whether they're closer to somebody or facing somebody. Just being able to control is a huge step in the right direction" (D1).

Inclusivity

Topics related to inclusivity were discussed under three categories: addressing diverse abilities and needs, including patients with different diagnoses, and considering cultural and personal factors.

Addressing Diverse Abilities and Needs. Participants discussed addressing diverse abilities and needs from three perspectives: varying motor and mobility capabilities, bariatric seating options, and a wide range of ages.

Consideration of Varying Motor and Mobility Capabilities. One participant emphasized the importance of considering varying motor abilities in design. She discussed the challenges with the current mattress setup in the units. Since EmPATH units are designed for short stays and do not provide traditional beds, they offer mattresses for patients who prefer to sleep on the floor. However, the participant highlighted the potential challenges: "It's just like a mat, a very small mattress that lays on the floor, and you can lay on that. You can spread out on that. But it wouldn't be very comfortable, and especially for people with any kind of mobility issues, getting up from the floor would be really hard because it's literally that thick, and it's on the floor. It can be really uncomfortable" (S6).

Bariatric Seating Options. A staff member raised the issue of insufficient bariatric seating options, explaining, "Patients of a larger size that aren't fitting comfortably... We do have a bariatric chair, but it's still not that big; a bed might be better for them. It's not out in the milieu but in a separate room. I like that idea; I like that it could be available" (S6).

Accommodation for a Wide Range of Ages. Participants discussed age-related considerations, with many units only accepting patients over the age of 18, excluding children and adolescents (S1, S6, S7), and some units excluding seniors over 65 due to the potential need for more personalized care (S1). The importance of separating children and adolescents was emphasized by all participants, with D2 noting, "Oftentimes, they will already segregate populations by sex or age."

To address this, one designer shared a solution: designing a separate unit near EmPATH for children and adolescents, with the aim of limiting the number of patients to a maximum of eight. As they explained, “We’re trying to keep those down to like eight people maximum. Those are smaller units” (D7). However, D4 highlighted the complexities involved in designing pediatric EmPATH units, noting that these units are still rare. “We're designing one, and the staff is working to figure out how to support this broad age range" (D4). The challenge, they explained, is balancing social interaction with age-appropriate separation, as mixing a 5-year-old with a 16-year-old can create developmental challenges. Creating separate units for each age group isn't feasible, as the population fluctuates. "Everything has to be very flexible" (D4), they said, emphasizing that pediatric design is challenging, especially in avoiding situations where teens feel like they’re in a toddler's room.

Inclusion of Individuals with Different Diagnoses. Participants discussed varying approaches to admitting patients with different mental health diagnoses in EmPATH units. While most units aim to accommodate a broad range of conditions, policies regarding the inclusion of patients with acute mental health issues (such as psychosis), substance abuse problems, and involuntary admissions, varied significantly.

One staff member described their unit as highly inclusive, explaining they accept “around 90% of mental health patients” (S2). A designer echoed this perspective, emphasizing the value of an "open milieu" that allows for constant line of sight and staff reevaluation, making it feasible to care for a wide range of patients (D8). Another staff member highlighted the calming effect of the physical environment and care approach in EmPATH units, sharing, “Someone who might be agitated, hearing voices, or seeing things, when they come to

EmPATH, because of that physical space and the different approach to care, I've seen people just calm right down. People who I never thought could tolerate the environment found it way better for them. I really think we've achieved that goal for most people" (S6).

In contrast, some units adopt stricter inclusion-exclusion policies. One staff member explained that their unit does not admit "highly aggressive patients" (S1) or "an avid psychotic patient who is very agitated," as such cases could "disrupt the whole unit and take away from the other nine patients in the space" (S5). Another designer emphasized the importance of segregating patient populations to ensure the safety and well-being of everyone in the unit (D2).

Discussions around inclusion highlighted three main themes: admissions of acute patients, accommodations for detoxification, and policies for voluntary versus involuntary admissions.

Environmental Strategies for Acute Patient Admissions. Participants highlighted the importance of designing EmPATH units to accommodate patients with acute mental states, particularly those exhibiting aggressive behaviors. One designer emphasized the unpredictability of admissions, stating, "They don't know who's going to come through that door, and so they might want to then segregate different populations" (D2). To address this challenge, participants proposed several environmental strategies, including zoning within the milieu, creating multiple milieus, and incorporating more private rooms.

- **Zoning inside the milieu (S3, D5, D7).** Several participants discussed the benefits of zoning as a way to organize patients with different needs. This approach, sometimes

referred to as “clustering,” allows staff to group patients based on their conditions. As one staff member explained, “Based on who's receiving care from us right now, we can kind of cluster our trauma background folks over here… We can put our more psychotic people over here. … And you can kind of create these unique zones that allow you to get the benefit of the milieu while also mitigating some of the challenges” (S3). A designer expanded on this, emphasizing the importance of breaking large units into smaller, more manageable groups: “What makes sense for funding for psychiatric units is having them be 24 people per unit. And that's a lot of people in a space that are all having serious problems. Our models have been to break them into sub-clusters... groups of 6 to 8 people” (D7).

- **Multiple milieus (D5, D7).** Another approach involved creating “multiple milieus” (D7) to accommodate patients with varying conditions and needs. A designer highlighted a recent trend of incorporating several smaller, individual lounge settings, each designed for around 10 patients (D5). These spaces could then be combined into clusters of 10 to 20 patients, offering increased flexibility and adaptability. As the designer further explained, this approach ensures that the space can accommodate a broad range of patient needs, emphasizing, “It’s providing a diversity of response. Possibilities will provide for a diversity of patient types” (D5).
- **More private rooms (distinct rooms for different patient types) (D2, D5, D7).** Three participants recommended increasing the number of private rooms, such as "quiet rooms" or "de-escalation rooms," to better accommodate a wider range of patients. As one participant noted, these spaces offer patients a place to retreat and self-regulate, helping manage their needs more effectively (D2).

Environmental Strategies for Detoxification. Regarding patients with substance abuse concerns, most participants highlighted that only medically cleared patients can enter EmPATH units. As one participant explained, "[Patients] would be in the ED being medically cleared before we move them into EmPATH" (S5). Another noted that while some units allow detoxing patients, others prefer not to accommodate them, explaining, "They need to be detoxed before they come into EmPATH" (D4).

However, several participants described how their units address detoxification needs by applying the same environmental strategies mentioned earlier: zoning, multiple milieus, and the addition of more private rooms.

- **Zoning inside the milieu (S3).** One designer discussed creating different zones within the open milieu to accommodate patients in need of detoxification: "We can do people that are needing observation for a substance detox. And you can kind of create these unique zones that allow you to get the benefit of the milieu while also mitigating some of the challenges" (S3).
- **Multiple milieus (D7).** A further suggestion involved the design of multiple milieus, with one specifically tailored to drug addiction purposes. One designer explained the potential benefits: "You're putting them with people who they might have a chance to connect with and talk about having similar problems, and you might have staff that are more specialized at seeing those issues and knowing how to deal with them" (D7).
- **More quiet rooms (D6).** One designer mentioned that one of the EmPATH units they designed regularly serves patients with substance abuse issues and accommodates detoxification needs through additional quiet rooms. They explained, "If they're in a

detox state, they really need quiet. … But it was one of the reasons why they decided to provide two private rooms off the open observation room, so that people who are more sensitive to light and sound could retract a little bit from the broader group in a way that was safe and still allowed staff to monitor them" (D6).

Voluntary and Involuntary Patient Admissions. Some participants shared that their units only accept voluntary patients. One staff member noted, "Right now, our EmPATH unit only takes voluntary patients" (S4), while another explained that their unit excludes involuntary patients due to state laws that mandate, they be escorted by police officers, raising concerns about the potential presence of weapons in the unit (S5).

In contrast, three participants shared that their units accept both voluntary and involuntary patients (S6, S7, D7). One staff member explained, "We will take involuntary folks. They just need to be able to remain calm and not get agitated or not too agitated. We can handle some agitation, but they need to be able to follow directions and participate in the therapeutic services we're offering" (S6).

A designer (D7) who had worked on units that accept both types of patients emphasized the importance of creating separate entry points for voluntary and involuntary patients. They described their design approach: "In our units, everyone is welcome. It gets tricky when some people are coming in against their will, being brought by emergency departments. So we often provide secondary entrances. The voluntary patients enter one way, and the involuntary patients come in through a secondary entrance, giving them a moment to be introduced, calmed down, and prepared before entering the main milieu" (D7).

Personal and Cultural Considerations. Two designers (D2, D4) emphasized the critical role of personal and cultural considerations in shaping the design of healthcare environments, particularly in spaces that cater to individuals in crisis. D2 highlighted that understanding the cultural and community context of patients is essential when designing spaces that foster healing and psychological safety, as they described, "aesthetics imply the value of the space and the individual within it," and investing in these aesthetics helps to de-institutionalize the environment. Furthermore, D2 stressed that the arrangement of furniture, settings, and spatial configurations should also be culturally and contextually appropriate, whether for indigenous, rural, suburban, or urban communities. This thoughtful integration of aesthetics can foster a sense of psychological safety that differs from place to place and person to person (D2).

D7 similarly discussed the subjective nature of design preferences, particularly in terms of color. They pointed out that people's reactions to color are highly individual and culturally influenced, saying, "Some people get energized by bright colors, and for others, simplicity and minimalism calm them down." D7 further elaborated, noting that "colors are subjective," and that this subjectivity is shaped by cultural and personal differences. By offering a variety of design options, environments can be made more inclusive and responsive to the diverse needs of patients, allowing individuals to engage with their surroundings in ways that are personally meaningful and calming.

CHAPTER 4

FLOOR PLAN AND SPACE SYNTAX CASE STUDY METHODS AND RESULTS

Methods

In total, eight case studies were conducted on existing EmPATH units. The case study methodology involved reviewing the units based on available published data and providing descriptive information and space syntax analysis. Due to ethical and safety restrictions regarding site visits to EmPATH units, it was not possible to gather information directly from the health organizations. I analyzed the spatial features of each unit using the floor plans, as well as pictures and videos (when applicable). For confidentiality purposes, the identifiers of each case study have been removed.

Tools

Space syntax tools were applied to analyze the visibility and accessibility of each site based on their plans. The tools employed include visibility graphs (isovist, visual connectivity and visual integration) and accessibility maps (convex maps and convex depth step maps).

Isovist Map. Isovist maps represent the line of sight and visible area from a specific point within a space, capturing the boundaries of what can be seen from that location (Klarqvist, 2015).Isovist maps help in understanding how spatial configurations affect visibility, surveillance, and the perception of openness or enclosure. In healthcare settings, by mapping the visible extents from nurse desks, isovist maps can highlight potential blind spots

and assess the effectiveness of layout designs in supporting staff supervision and patient safety (Sadek & Shepley, 2016).

Visual Connectivity. Visual connectivity describes the extent to which spaces are directly visible from one another within a layout. It reflects the number of uninterrupted lines of sight between different points (Sadek & Shepley, 2016), influencing how effectively staff can monitor patients and respond to emergencies.

High visual connectivity values indicate visually open areas with a wide field of view, such as open milieus or large rooms, facilitating greater observation and interaction. In contrast, low connectivity values suggest visually constrained spaces, like narrow corridors or corners, which may limit visibility and surveillance. The graph uses a color gradient—from cool to warm colors—to represent different levels of connectivity, providing a clear visual representation of how sightlines and visibility are distributed throughout the space.

Visual Integration. Visual integration measures how easily a location within a space can be visually accessed from all other locations. It is a global measure of how "central" or "integrated" a point is within the entire spatial system. Locations with high integration have shorter, more direct visual connections to many other points, making them visually accessible and often associated with areas of high activity or traffic (Ericson et al., 2020). Conversely, less integrated areas are visually isolated and tend to be more segregated.

The visual integration graph uses color gradients to represent integration levels, where warmer colors (e.g., red) indicate higher integration and cooler colors (e.g., blue) indicate lower integration.

Convex Spatial Configuration. Convex maps are used to analyze the layout of programmatic spaces by dividing a spatial environment into the minimum number of the largest possible convex areas. Each convex area is represented as a node, with edges connecting nodes that share spatial relationships. This creates a justified graph that visualizes the relationships between neighboring areas (Hillier & Hanson, 1984).

Convex Step Depth. A Convex Step Depth Map is a Space Syntax tool that visualizes and quantifies the topological depth between convex spaces within a layout. It depicts the number of steps (transitions or turns) required to access each convex space from a designated origin, offering insights into the spatial accessibility and connectivity of the environment (Klarqvist, 2015).

Procedure

The analysis began by extracting a matrix of significant elements from documents, including plans and images, selected based on their relevance to the literature review, interview themes, and data availability. Following this descriptive data extraction, spatial characteristics were examined using space syntax tools, including visibility (isovist, visual integration and connectivity graphs) and accessibility (convex maps and convex step depth maps).

Isovist Map. To assess the line of sight from the nurse desk, isovist maps were generated for each unit using DepthmapX software, with a 180-degree visibility range from the origin of the nurse desk. The maps were then refined in Photoshop for enhanced clarity. The gray area on the maps represents all the points visible from the nurse desk's origin. For

units with multiple-seat nurse stations oriented in different directions towards the milieu, the isovist area was created by combining the visibility ranges of each seat according to its angle.

Visual Connectivity Graph. For all sites, the plans were redrawn in Revit and then uploaded to DepthmapX software to generate visual connectivity maps. These maps were further refined in Photoshop for clarity. DepthmapX measures the number of direct visual connections each point has with its immediate surroundings and illustrates these connections using a color spectrum. Warmer colors (e.g., red) represent areas with the highest visibility, while cooler colors (e.g., purple) indicate areas with the lowest visibility.

Visual Integration Graph. Visual integration was measured in DepthmapX software using the redrawn plans from Revit. This analysis determines how visually "integrated" each point is within the overall spatial environment. The resulting graphs use a color gradient to represent integration levels: warmer colors (e.g., red) indicate higher integration and greater visual accessibility, while cooler colors (e.g., blue) suggest lower integration and more visually isolated areas. These images were also refined in Photoshop for improved presentation.

Convex Map. To create the convex maps, each site plan was divided into the fewest and largest possible convex areas. Each convex area is represented as a node, with connections between adjacent nodes depicted as edges. This forms a justified graph that visualizes the spatial relationships between neighboring areas.

The nodes and connection lines are represented in two colors: blue is used for staff-specific spaces, while orange indicates spaces shared by both staff and patients. For areas

requiring a permanent staff presence, such as security or intake rooms, but also accessible to patients, nodes are depicted in blue with an orange stroke to signify their dual function.

To maintain clarity and consistency in analyzing spatial accessibility and connectivity across the eight plans, a systematic labeling system was implemented. This system assigns unique identifiers to all spaces and convex areas, enabling clear differentiation between spaces of the same type and facilitating a thorough analysis of their relationships.

System of Space Labeling in Convex Maps. Each space type is represented by a letter corresponding to its function: for example, "M" for milieu, "B" for breakroom, "N" for nursing area, "O" for office, and "L" for lobby. Additional letters are assigned similarly based on the specific functions of other spaces that are demonstrated below. Convex areas within these spaces are further labeled using sequential numbering to distinguish between individual segments.

For spaces that appear only once within a plan, the convex areas are numbered simply. For instance, if there is a single nursing area in a plan, the convex spaces within it are labeled as N1, N2, N3, and so on. In cases where a plan contains multiple instances of the same space type, an additional identifier is added to reflect this hierarchy. For example, convex areas within the first breakroom are labeled as B1-1, B1-2, and B1-3, while those in the second breakroom are labeled as B2-1, B2-2, and B2-3. A similar pattern is applied to milieus and other space types.

In some cases, there are multiple spaces with the same function that do not contain any convex subareas. For example, if there are three distinct nursing areas in a plan, each is labeled uniquely as N1, N2, and N3 to represent the individual spaces themselves, not convex

subdivisions. This distinction ensures that readers can clearly understand whether a label refers to a unique space or to a convex area within that space.

P= Patient rooms (quiet/ consultant/ sensory/ private/ seclusion/ etc)

O= Offices (Office and other staff working places)

S= Services (utility, maintenance, storage, cleaning, meds, ets.)

C= Corridors

M= Milieu

N= Care/nurse desk

R= Restrooms (Toilet or shower)

E= Entrance / Exit

I= Intake areas

T= Treatment areas

L= Lobby

I depicted three spaces—M (milieu), N (nurse desk), and E (entrance/exit)—using larger nodes to emphasize their significance and to distinguish them more clearly from other spaces. This approach helps in better visualizing the access paths and understanding their spatial relationships.

Convex Step Depth Map. This map represents the number of steps required to reach each convex space from a selected origin, illustrating the spatial accessibility and connectivity within the environment. For all sites, three maps were created with three different origins: the staff entrance, the patient entrance, and the nurse desk. While additional maps with other origins could provide valuable information, I selected these three points as the most significant starting locations for analyzing accessibility, as they are key areas related to my research objectives.

Each node represents a convex area, as shown in the convex map, and the depth number indicates how many convex spaces (transitions or turns) need to be passed to reach a particular space from the starting point (E or N). For example, in the map with the nurse desk (N) as the origin, if the milieu (M) is located on the third line, the depth value of 3 means the nurse must pass through three convex areas to reach the milieu.

Sites

A total of 8 sites were selected for this study. Due to site restrictions and protocols for site visits, I was unable to visit them in person. The selected sites vary in terms of square footage, scale (large/small), number of milieus, and layout (sociofugal vs. sociopetal). They also differ in spatial configuration, color scheme, artwork and patterns, as well as window availability, daylighting, and access to nature and the outdoors. To maintain confidentiality, the identifiers of each unit have been removed, and they are referred to as Site One through Site Eight.

Results

The case study results were obtained through two primary methods: first, by extracting critical environmental information from floor plans and available photos, and second, by using a set of space syntax tools to analyze the visibility and accessibility of each site.

Floor Plan and Photo Analysis

For each site, a matrix was created to summarize key information. The matrix elements were selected based on their relevance to the literature review, topics identified from interviews, and data availability. These include the number of milieus, patient rooms, bathrooms, seating arrangements, nurse station configurations, staff respite spaces, entrances/exits, outdoor areas, proximity to the ER, and patterns. Some sites had missing data for certain elements due to incomplete or insufficient information.

Site One. Site One is a small unit with eight recliners, designed to accommodate up to eight patients. The main entrances for patients and staff are separate, and the unit is hospital-affiliated, located adjacent to the ER. It adheres to the EmPATH model, incorporating an open milieu, a nourishment station, two private rooms (one consult room and one quiet room), and two bathrooms. The plan includes various furniture options, such as recliners and tables for group activities.

The nurse station is divided into two sections: one enclosed with glass partitions accommodating two seats and the other completely open with one seat. Along the staff entrance path, behind the nurse station, there are two seats, a desk, and a small counter for food preparation (or kitchenette). However, the unit does not have a designated breakroom for

staff respite inside the unit. According to the plan and interior pictures, multiple windows on two sides of the milieu provide ample natural daylight and views of nature, although they are not operable. The interior design features a cool-toned palette, with shades ranging from light gray to light blue. A black-and-white mural of a tree adds a nature-inspired graphic element behind the nurse station.

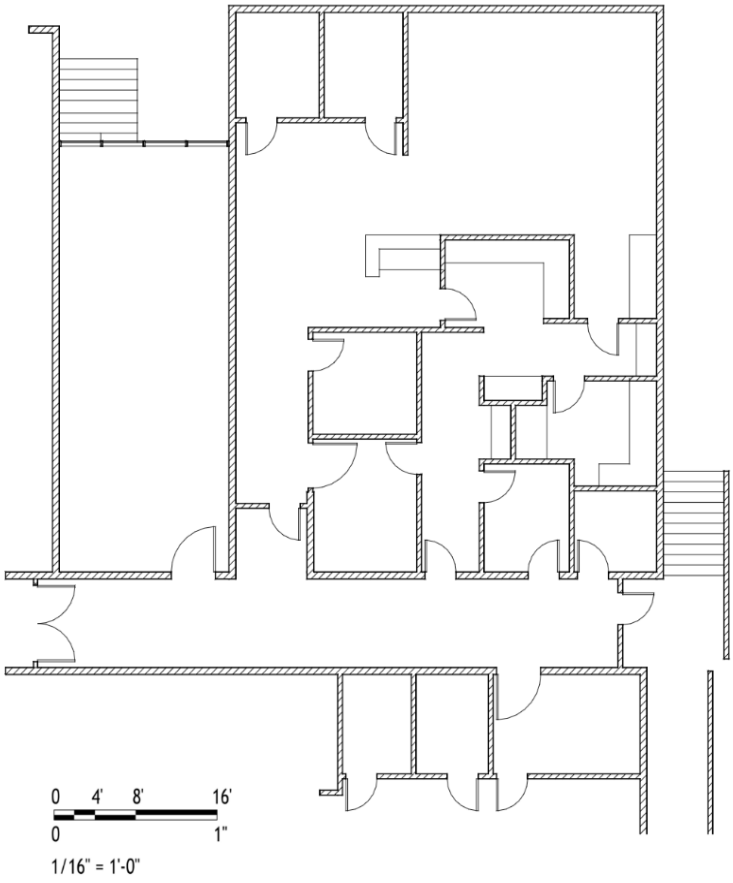


Figure 4.1. *Site One – Plan (SC: 1/16"=1-0')*

Figure 4.2a. *Site One -Patient Milieu*

Figure 4.2b. *Site One -Nursing Station*

Table 4.1

Site One -Matrix of Environmental variables

Number of milieus	1
Number of patients	8
Square Footage	
Patients seating layout	Sociopetal seating
Nurse station	• 1 glass-protected open nurse desk • 1 open patient area nurse station
Staff respite rooms	Semi-private (small area behind the nursing station)
Patient private rooms	• 1 Quiet room • 1 Consultation room
Entrance	• 1 Patient entrance • 1 staff entrance
Number of Bathrooms	2 restrooms for patients
Outdoor space	None
Windows and daylighting	Nature views
Color scheme	Neutral cold color scheme - Dark blue, light blue, white, light gray, brown
Graphics / Patterns	Graphics of nature

Site Two. Site Two is an EmPATH unit designed to accommodate up to twelve patients, featuring twelve recliners. The main entrance is shared by both patients and staff. The unit includes one open milieu and three private patient rooms: a consult room, a semi-private room, and a cool room. The nurse station is open, with no glass partitions, and has three nurse seating areas.

For staff respite, there is a designated staff breakroom adjacent to the nurse station. The breakroom includes a staff bathroom, while two additional bathrooms for patients are

located within the milieu. The unit features recliners arranged in a sociofugal layout, along with tables designed for group activities. An intake room is situated near the lobby, serving as the initial space for patients before they enter the milieu.

The windows provide ample natural daylight and views of nature. The color scheme combines warm and cool tones, with furniture in white and blue, warm brown wood tones for doors and flooring, and a striped pattern in shades of yellow to orange on one of the main walls in the milieu. Additionally, luminous ceiling panels feature images of the sky and tree leaves, enhancing the calming atmosphere.

Figure 4.3. *Site Two - Plan (SC: 1/16" =1-0')*

Figure 4.4. *Site Two - Interior Pictures*

Table 4.2

Case Study One -Matrix of Environmental variables

Number of milieus	1
Number of patients	12
Patients seating layout	Sociofugal seating
Nursing station	1 open nursing station with no glass
Staff respite rooms	Private breakroom
Patient private rooms	• 1 semi-private room • 1 Cool room • 1 consult room
Entrance	• 1 staff entrance • 1 patient entrance
Number of Bathrooms	• 2 patient toilets • 1 patient shower room • 1 staff toilet

	• 1 public toilet
Outdoor space	None
Windows and daylighting	Availability of windows on one side of the milieu - Nature views
Color scheme	Combination of cold, neutral and warm colors - white,gray, blue, shades of orange and yellow, and warm colors of wood
Graphics / Patterns	• Digital images of nature on the ceiling • Abstract patterns on the walls • Pictures of nature in the semi-private room

Site Three. Site Three accommodates eighteen patients and features a large milieu with eighteen recliners arranged in a sociofugal layout. The milieu includes two semi-private subsections on the sides for added privacy. Additionally, the unit has four private patient rooms, comprising two consultation rooms and two seclusion rooms. The entrances for patients and staff are separate.

A staff breakroom for respite is located near the staff entry, featuring a table and equipment for food preparation and storage. It also includes a dedicated staff bathroom. Within the main milieu, there are two showers and two toilets for patients. The nurse station is open, without glass partitions, and accommodates four nurse seats.

The plan indicates the presence of large windows along the main wall of the milieu, providing ample daylighting. However, since no images of the unit are available, details about window views, the color scheme, and interior design patterns remain unknown.

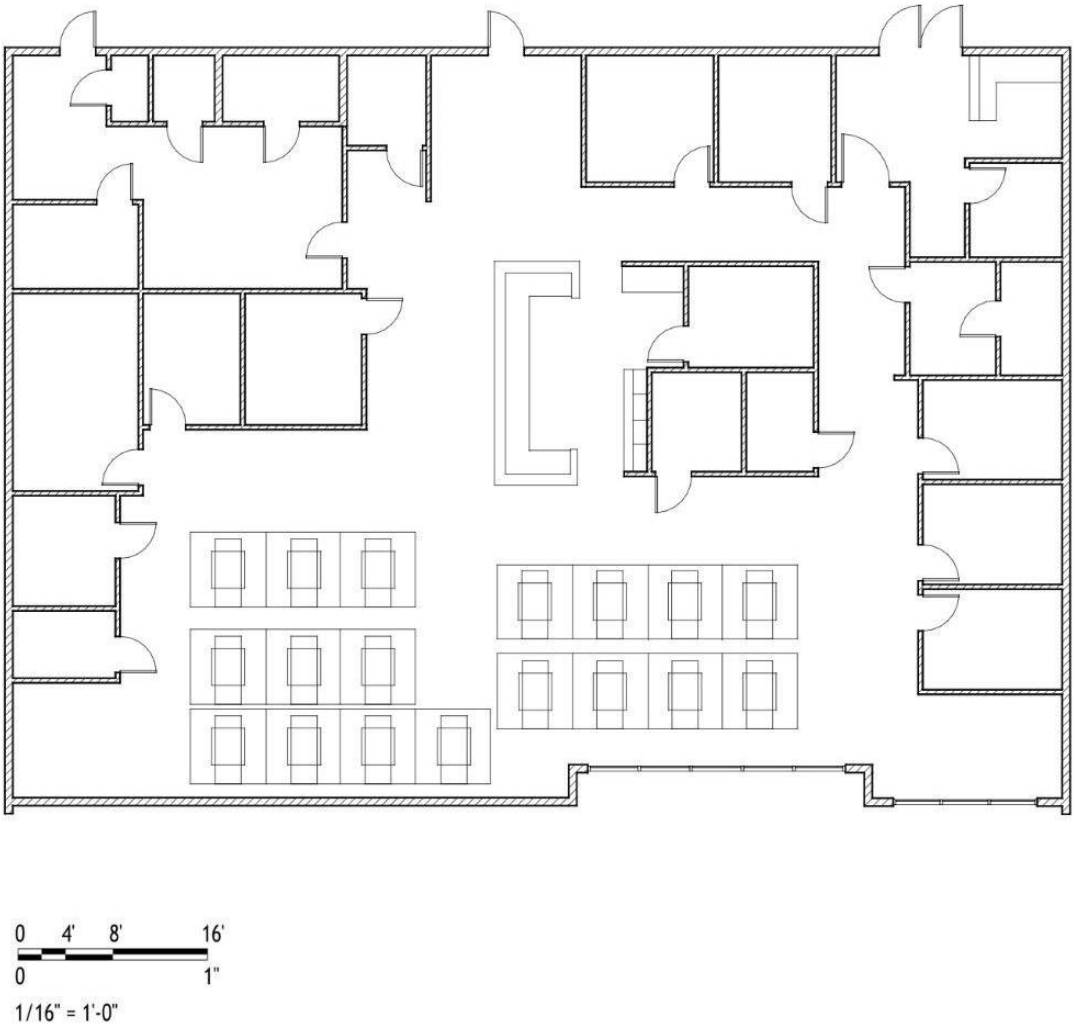


Figure 4.5. *Site Three - Plan (SC: 1/16" =1-0')*

Table 4.3

Site Three -Matrix of Environmental variables

Number of milieus	1
Number of patients	18
Patients seating layout	Sociofugal seating
Nursing station	1 open nursing station with no glass

Staff respite rooms	Private staff breakroom
Patient private rooms	• 1 consultation room • 1 exam/consultation room • 2 seclusion rooms
Entrance	• 1 staff entrance • 1 patient entrance • 1 from “Coffee breakroom”
Number of Bathrooms	• 2 patient toilets (separate for men and women) • 2 patient shower rooms • 1 staff toilet
Outdoor space	None
Windows and daylighting	Availability of large windows on one side of the milieu - No pictures
Color scheme	No pictures
Graphics / Patterns	No pictures

Site Four. Site Four is a small-scale EmPATH unit designed to accommodate up to nine patients. It includes one milieu furnished with recliners, tables for group activities, and a nourishment station. Adjacent to the milieu, there is an outdoor patio, with windows facing this space. The unit has two private patient rooms: a restraint room and a cooldown room. The nurse station is open, without glass partitions as indicated in the plan, and accommodates two nurse seats.

An intake room is located near the entrance, with access from the lower end of the milieu. The unit has one patient bathroom within the milieu (without a shower) and one staff bathroom, accessible from the entry corridor outside the milieu. The entrances for staff and patients are separate: patients enter directly into the milieu, while staff access the intake room. There is no designated breakroom for staff respite within the milieu.

Due to the unavailability of photographs, details about the unit's color scheme, patterns, and lighting system are not available

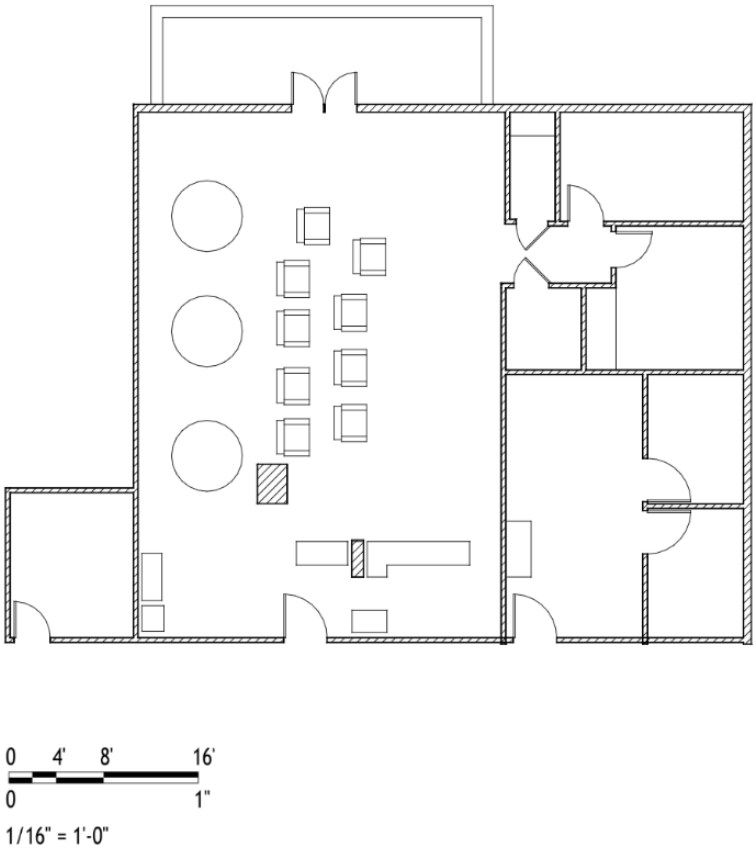


Figure 4.6. *Site Four - Plan (SC: 1/16" =1-0')*

Table 4.4

Site Four -Matrix of Environmental variables

Number of milieus	1
Number of patients	9
Patients seating layout	Sociofugal seating

Nursing station	1 open nursing station with no glass / one security desk
Staff respite rooms	No breakroom inside the unit
Patient private rooms (e.g. Quiet room, seclusion room, Consultation room)	• 1 cooldown room • 1 restraint room • 1 Tele-psych room • 1 treatment room
Entrance	• 1 main entrance • 1 entrance to intake room
Number of Bathrooms	• 1 patient bathroom • 1 staff-designated restroom outside the unit from the hallway
Outdoor space	One patio
Windows and daylighting	Windows on one side of the milieu according to the plan - No pictures
Color scheme	No pictures
Graphics / Patterns	No pictures

Site Five. Site Five is a mid-sized EmPATH unit with a capacity of up to ten patients. It features one open milieu in an L-shaped layout, creating two distinct zones. The furniture includes recliners, tables, and chairs for group activities, with a nourishment station located on one side. The nurse station is open, without glass partitions, and accommodates three nurse seats.

The unit has five private patient rooms, one patient bathroom with a shower that opens directly into the milieu, and one staff bathroom located in the staff section behind the care desk. The entries for staff and patients are separate. Patients enter through a corridor that includes an intake room before reaching the main milieu, while staff access the unit via a

separate entry that passes by a series of workstations and offices. There is a designated staff breakroom with two points of access: one from the staff entry corridor and another from the corridor leading to the milieu.

Interior images show a cool-toned color palette, featuring neutral grays, light green, light beige, and dark wood finishes. The walls are plain white, with no visible graphics or patterns. One side of the milieu has large windows, which, in the images, reveal views of nature

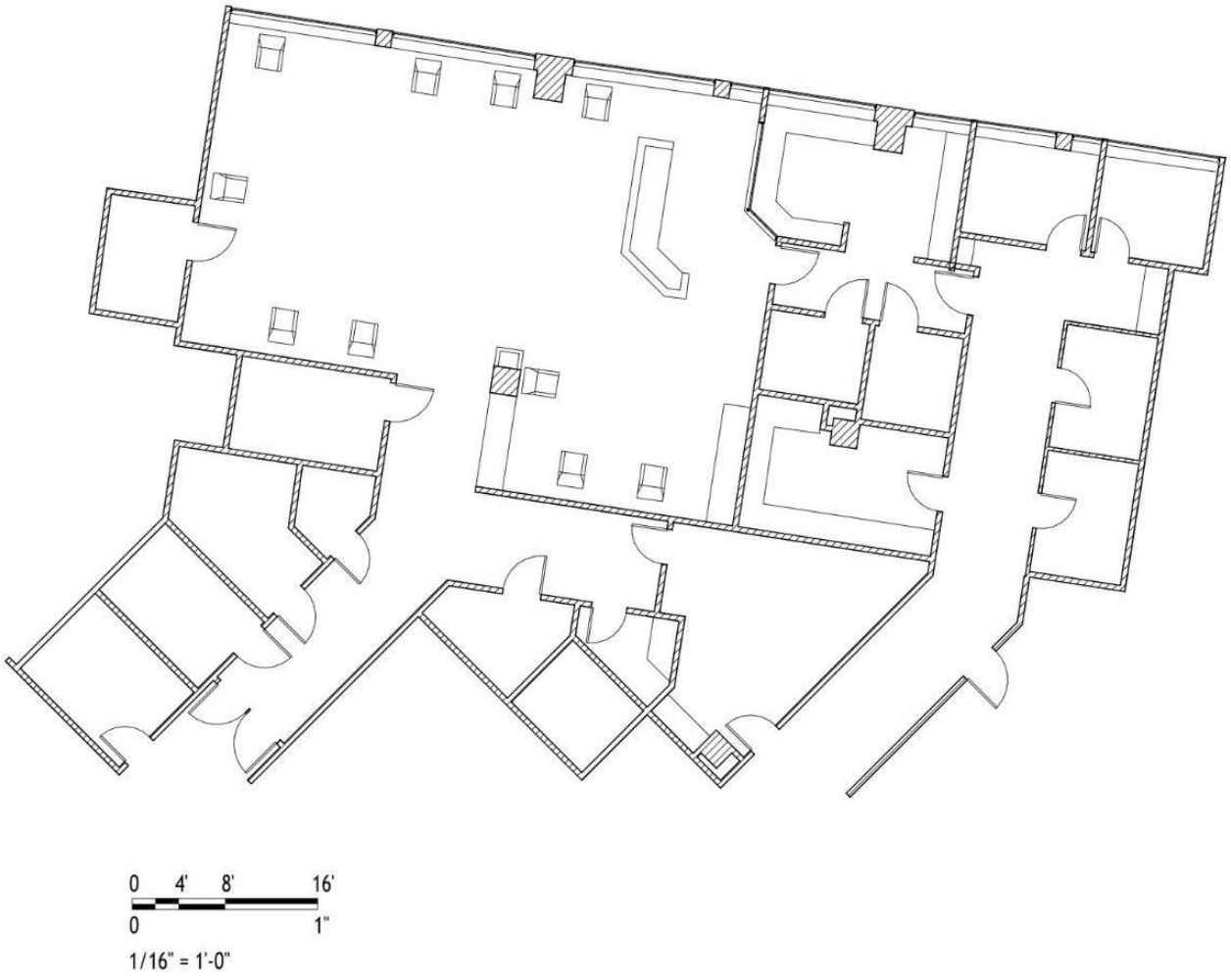


Figure 4.7. *Site Five - Plan (SC: 1/16" =1-0')*

Figure 4.8. *Site Five - Pictures of the Open Milieu*

Table 4.5

Site Five - Matrix of Environmental variables

Number of milieus	1
Number of patients	10
Patients seating layout	Sociopetal seating
Nursing station	1 open nursing station with no glass
Staff respite rooms	1 breakroom inside the unit
Patient private rooms	• 5 (room names not specified)
Entrance	• 1 main entrance • 1 entrance for staff • 1 entrance to undesignated room
Number of Bathrooms	• 1 bathroom for patients • 1 bathroom for staff
Outdoor space	None
Windows and daylighting	Availability of large window on one side of the milieu - Nature views
Color scheme	Bright and neutral - white, beige, light brown, light green, gray
Graphics / Patterns	None, solid surfaces

Site Six. Site Six accommodates up to fifteen patients. It features a large L-shaped milieu with two sides of approximately equal size, one accommodating seven recliners and the other eight. Additional furniture includes three round tables for group activities and two ceiling-height, visually massive closets at the column grid intersections with TV screens and partial open shelving for books.

The nurse station is open, without glass partitions, and positioned at the intersection of the two sides of the milieu, with seating for three nurses. The milieu includes six private patient rooms: four sensory rooms and two consultation rooms. Two patient bathrooms are located within the milieu, one of which includes a shower. Two sides of the milieu are adjacent to outdoor spaces, with large wall windows providing ample daylighting. However, the views through the windows remain unknown.

The milieu has two entry/exits connecting to hospital corridors. One of these serves as the main patient entry, where patients pass through an intake room before entering the milieu. A separate staff-only entrance provides access to a large work nurse room located behind the nurse station. Outside the milieu, along the same entrance corridor, there are five additional staff-designated rooms, including two family visit rooms and one staff bathroom.

Interior images reveal a light color palette, with colors ranging from light blue to warm beige wood tones. Interior patterns inside the milieu include green leaf graphics on a blue background on one wall and blue brick tile accents in smaller wall surfaces.

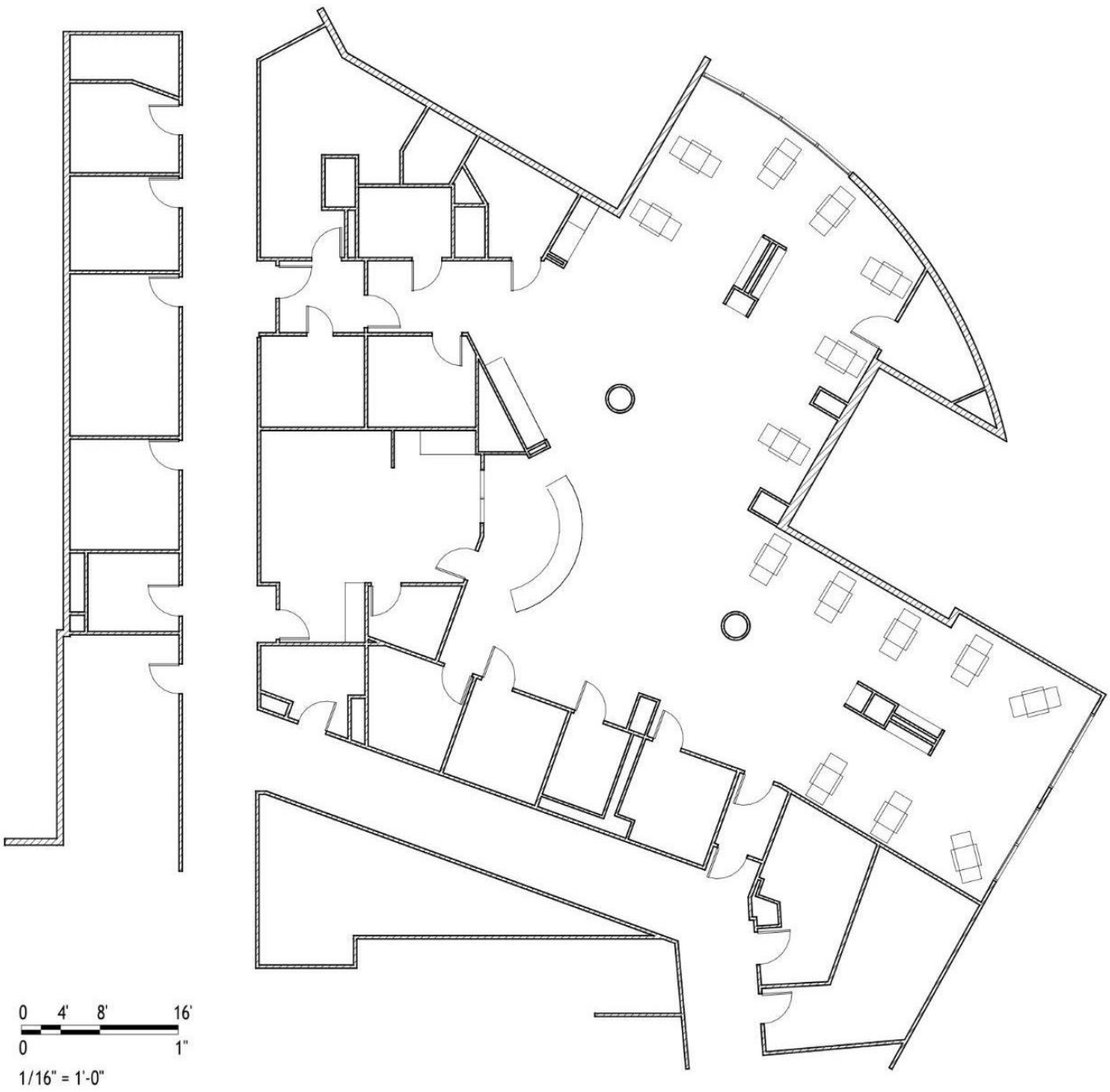


Figure 4.9. *Site Six - Plan (SC: 1/16" =1-0')*

Figure 4.10. *Site Six - Interior Pictures*

Table 4.6

Site Six - Matrix of Environmental variables

Number of milieus	1 divided into two convex spaces
Number of patients	15
Patients seating layout	Sociopetal seating
Nursing station	1 open nursing station with no glass
Staff respite rooms	None
Patient private rooms	• 4 sensory rooms • 2 consult room

Entrance	• 1 main entrance • 1 entrance for staff • 1 exit from the milieu
Number of Bathrooms	• 2 bathrooms for patients inside the unit • 1 bathroom for staff from the hallway (shared corridor)
Outdoor space	None
Windows and daylighting	Availability of large windows on multiple sides of the milieu
Color scheme	Bright and neutral - white, shades of blue, light brown, gray
Graphics / Patterns	• Patterns of nature with green leaves on blue on one wall • Brick tile pattern in shades of blue

Site Seven. Site Seven is a large-scale unit with three milieus, accommodating a total of twenty eight patients, eight patient rooms, and two nurse desks.

The two upper milieus are of equal size, visually separated yet openly connected, and share a single open nurse desk. Each milieu accommodates up to ten patients with a symmetrical furniture layout that includes ten recliners, one table for group activities, and a couch and table set. Each milieu also has access to three patient rooms (one quiet room and one consult room) and two patient bathrooms (one with a shower).

The third milieu, located at the bottom of the plan, has a separate patient entrance, though internal circulation is accessible to staff via the nurse desk and a connecting corridor. This milieu accommodates up to eight patients with eight recliners and additional furniture, such as tables, chairs, and a sofa set, catering to various social or personal preferences. It includes two private rooms with toilets and one seclusion room. Apart from the two main

entries, there are three exits leading outside. Staff use the same main entrance as patients, and two staff bathrooms are located near the nurse desk.

Interior images reveal a muted color palette, with shades of white, beige, light green/blue, and some furniture featuring more vibrant textures with accents of sharp blue. The primary materials include light-colored wood used in the flooring, ceiling strips, and nurse desk. On one wall, an abstract graphic of nature is displayed—a simple depiction of three branches on a muted blue-gray wall.

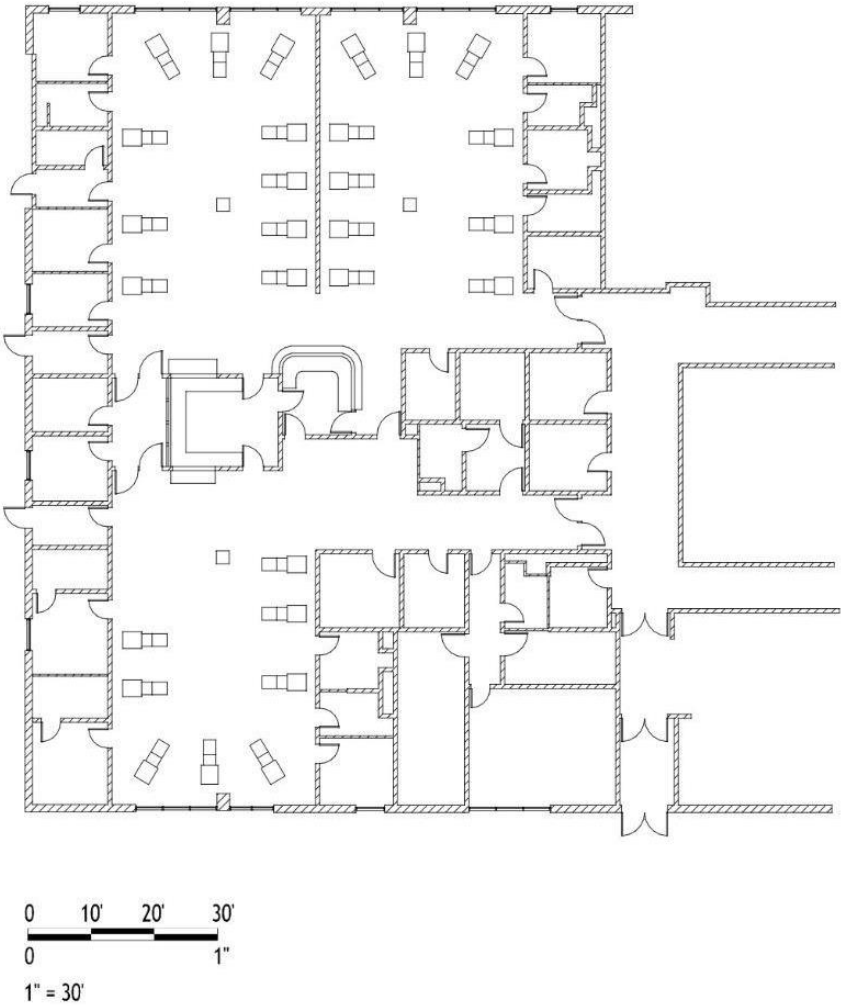


Figure 4.11. *Site Seven - Plan (SC: 1" = 30')*

Figure 4.12. *Site Seven - Picture of the Open Milieu*

Table 4.7

Site Seven - Matrix of Environmental variables

Number of milieus	3
Number of patients	28
Patients seating layout	Sociopetal seating
Nursing station	2 open nursing stations without glass
Staff respite rooms	No staff breakroom inside the unit
Patient private rooms	• 2 quiet rooms • 3 consult room • 2 private rooms with private toilets • One ANTE (seclusion room)
Entrance	• 1 shared entrance for the upper milieus • 1 separate entrance for the lower milieu

Number of Bathrooms	• 3 toilets and 3 shower rooms for patients inside the unit • 3 private toilets inside the private and seclusion rooms • 2 staff toilets
Outdoor space	None
Windows and daylighting	Availability of windows on one side of each milieu
Color scheme	Bright and neutral (white, beige, light blue, light brown)
Graphics / Patterns	• Abstract patterns of natures on walls (Carved tree branches on a light blue color) • Wood patterns on floor materials

Site Eight. Site eight is a large-scale unit with three distinct milieus of similar sizes. One milieu is completely separate with its own entrance, while the two lower milieus, though having separate doors from the shared entrance, are physically connected by a corridor along the shared nurse desk. Based on the unfurnished plan and a single interior image, the upper milieu appears to accommodate 10 recliners, suggesting the unit's total capacity could be approximately thirty patients.

A key feature of this unit is the availability of an outdoor guest courtyard accessible from the milieus. Additionally, the nourishment station is located in a separate room called the "dining room," designed with glass walls for visibility.

The upper milieu includes six patient rooms: two private rooms, one quiet room, two consult rooms, and one multi-purpose room with high visibility due to its glass walls. It also contains five bathrooms (two toilets, two showers, and one private bathroom for the seclusion room). The two lower milieus together feature four private rooms, three consult rooms, two

quiet rooms, two seclusion rooms, and one multi-purpose room, with a total of nine bathrooms (four toilets and four showers) and one exclusively for the seclusion rooms.

The main entrance is shared by staff and patients, but separate corridors diverge for staff, leading behind the nurse desks. Staff restrooms are provided along these corridors. A designated staff breakroom is located between the two lower milieus but is only accessible from outside the unit. Its entrance is near the unit's main entry, positioned between the doors of the two lower milieus.

The single interior image reveals a color scheme featuring shades of blue, beige wood tones, and smaller orange accents on some furniture. Nature-inspired patterns, including cartoony floral illustrations, are present on one wall of the milieu. Windows on one side of the milieu provide daylighting; however, due to their high sill height, they do not offer significant outdoor views at eye level.

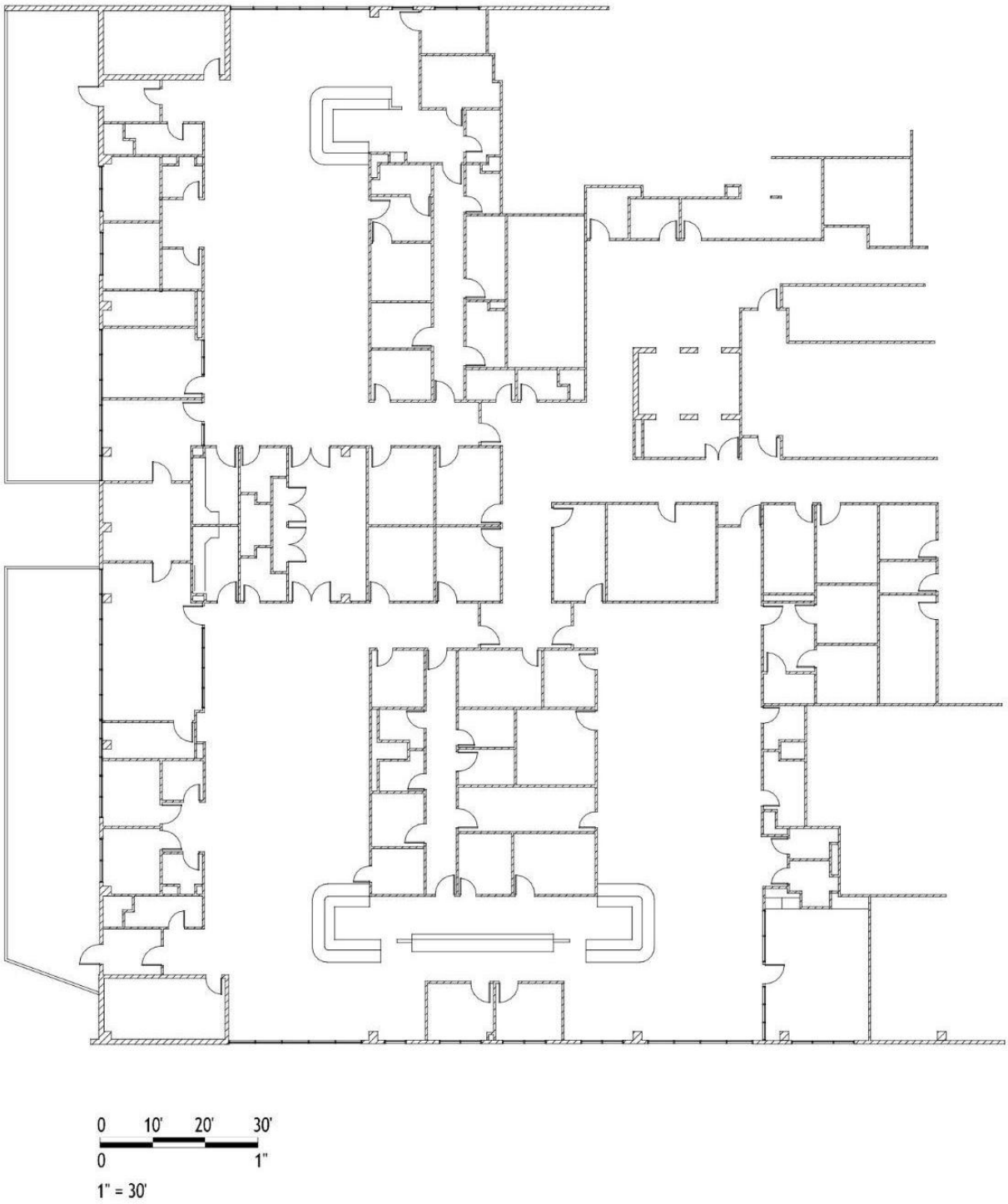


Figure 4.13. *Site Eight - Plan (SC: 1” = 30’)*

Figure 4.14. *Site Eight - Picture of the Open Milieu*

Table 4.8

Site Eight - Matrix of Environmental variables

Number of milieus	3
Number of patients	unknown
Patients seating layout	Unknown
Nursing station	2 open nursing stations without glass
Staff respite rooms	1 staff break room with access from outside the unit
Patient private rooms	• 3 quiet rooms • 5 consult rooms • 2 multi-purpose rooms • 6 private rooms • 3 seclusion rooms
Entrance	• 3 separate entrance for each milieu • 2 Exits

Number of Bathrooms	• 6 Toilets and 6 shower rooms for patients inside the unit • 3 toilets in anti- room for seclusion rooms • 3 staff toilets
Outdoor space	Two courtyards
Windows and daylighting	Presence of windows and daylight High window sill height (in the northeast milieu)
Color scheme	Combination of both warm and cold colors - white, beige, light brown, shades of blue, orange, warm gray
Graphics / Patterns	• Patterns of nature on walls (flowers in a simplified and cartoony illustration) • Wood patterns on floor materials

The Space Syntax Results

The visibility of all plans was analyzed using space syntax tools for visual connectivity and visual integration and isovist area from the nurse desk. Physical accessibility was evaluated through convex maps, illustrating the interrelation and accessibility of each convex space. Depth step convex maps were used to depict the number of steps from three origin points: the staff entrance, the patient entrance, and the nurse station.

Site One

Isovist Map. The map illustrates the combined isovist area from the two positions in the nurse station, indicated by red arrows. The direction of the arrows reflects the seat angles of the nurses. The isovist area, shaded in gray, represents the direct visibility from the nurse desk, covering a 180-degree angle from the starting points.

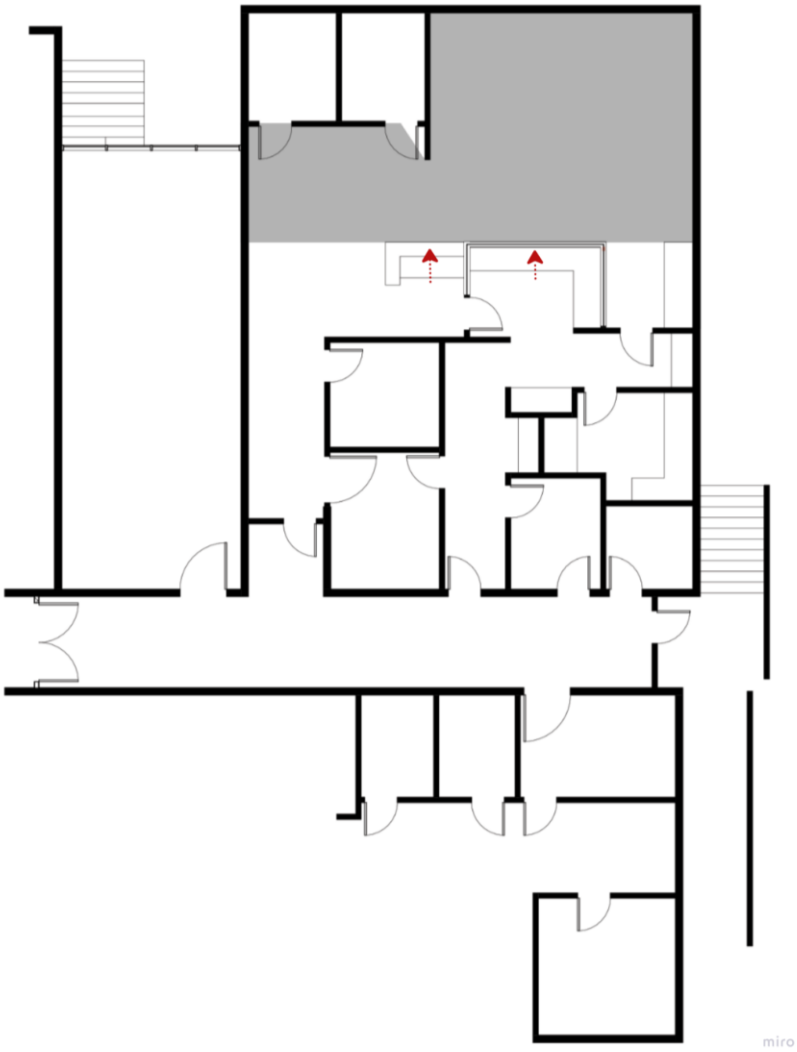


Figure 4.15. *Site One - Isovist Map from the Nurse Desk*

Visual Connectivity. The visual connectivity graph indicates the highest visibility within the milieu, extending up to the nurse desk, while the lowest visibility is observed in staff-designated areas and the entrance corridor.

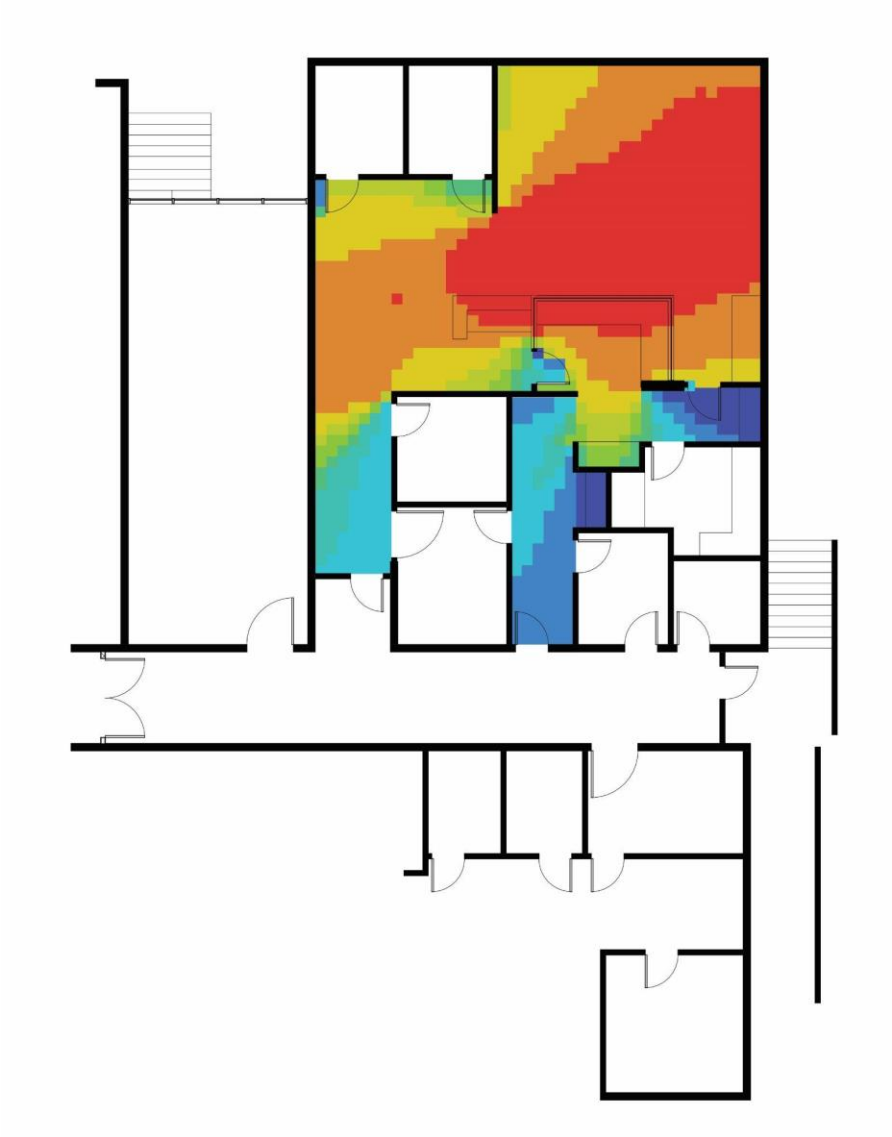


Figure 4.16. *Site One - Visual Connectivity Graph*

Visual Integration. Similar to the visual connectivity pattern, the visual integration graph indicates that the center of the milieu, extending towards the nurse desk, exhibits the highest visibility, while the lowest visibility is observed in staff-designated areas and the corridor near the entrance.

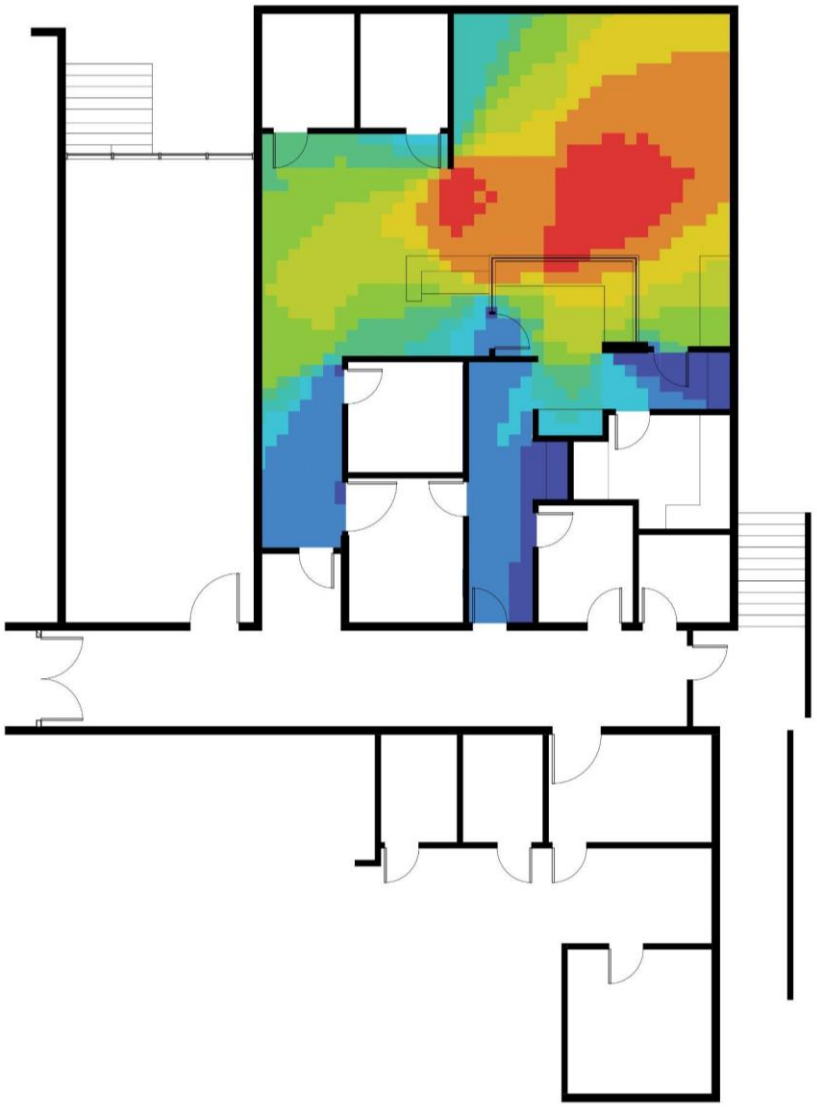


Figure 4.17. *Site One - Visual Integration Graph*

Convex Map. The convex map below illustrates the accessibility within each space of Site One, with blue representing staff-only areas and orange representing spaces accessible to both patients and staff.

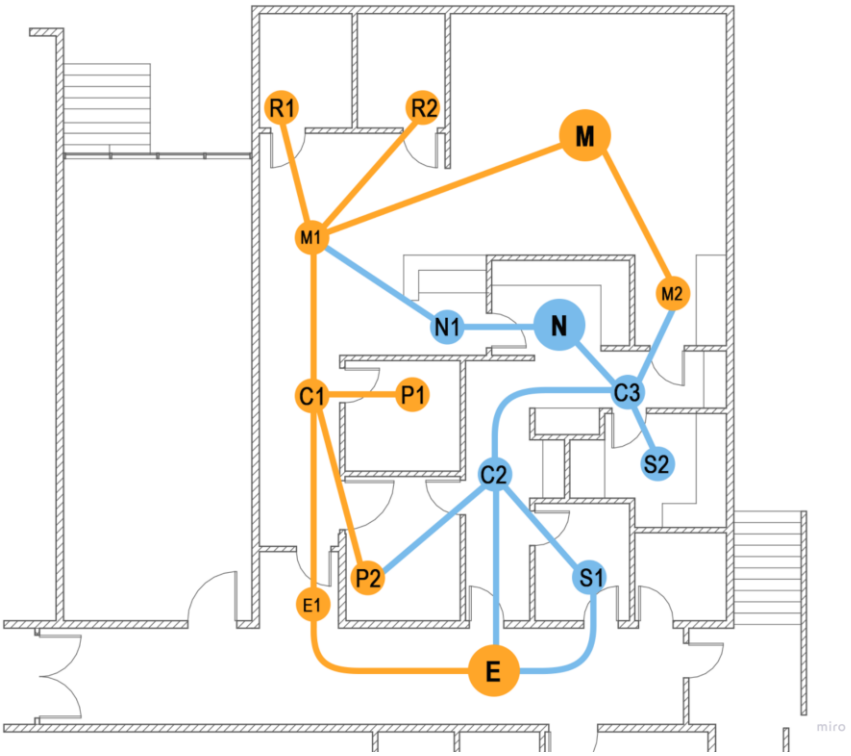


Figure 4.18. *Site One- Convex Map*

Convex Step Depth Map. To explore accessibility for patients, the maps indicate that the mean depth for patients to reach nurse desk N from key points, including the entrance (E), milieu (M), and accessible private rooms (Ps), is 3.00 steps. The mean depth to access the main convex area of the milieu (M) from the entrance and private rooms is 3.33 steps.

For staff accessibility to patients, the maps show that the mean depth from the nurse desk (N) to the patient rooms is 3.00 steps. Although it takes 2.00 steps for nurses to reach the milieu (M), reaching the farthest area of the milieu (M2) requires 3.00 steps. The depth from the nurse desk to exit the unit via the staff entry is 3.00 steps, while the depth to reach the closest staff restroom (R6) is 5.00 steps.

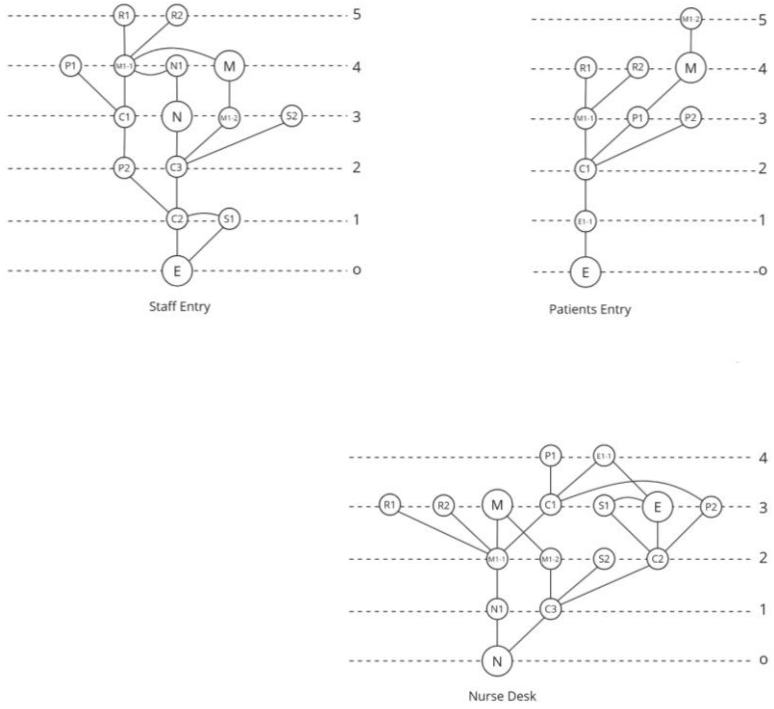


Figure 4.19. Site One - Convex Step Depth Maps

Table 4.9

Site One - Matrix of Critical Step Depths for Patients and Staff

Patients		Staff	
Variables	Number of steps	Variables	Number of steps
Depth from nurse desk (N) to milieu (M)	2	Depth from nurse desk (N) to milieu (M)	2
Depth from nurse desk (N) to patient entry (E)	4	Depth from nurse desk (N) to the farthest area of milieu (M2)	3
Depth from nurse desk (N) to patient rooms (Ps)	P1=3, P2=3	Depth from nurse desk (N) to patient rooms (Ps)	P1=3, P2=3

Mean depth from nurse desk (N) to key points (M, Ps, E)	3	**Mean depth from nurse desk (N) to patient rooms (Ps)**	3
Depth from milieu (M) to patient rooms (Ps)	P1=3, P2=3	Depth from nurse desk (N) to breakroom (B)	-
Depth from milieu (M) to patient entry (E)	4	Depth from nurse desk (N) to staff entry (E)	3
Mean depth from milieu (M) to key points (Ps, E)	3.33	Depth from nurse desk (N) to the closest staff restroom (R6)	5

Site Two

Isovist Map. The map shows that the majority of the milieu is covered by the 180-degree isovist area from the two starting points of the nurse desk, which correspond to the nurse seats as per the current plan. However, some parts of the milieu, particularly the semi-private areas on the left, are not within the visibility range.

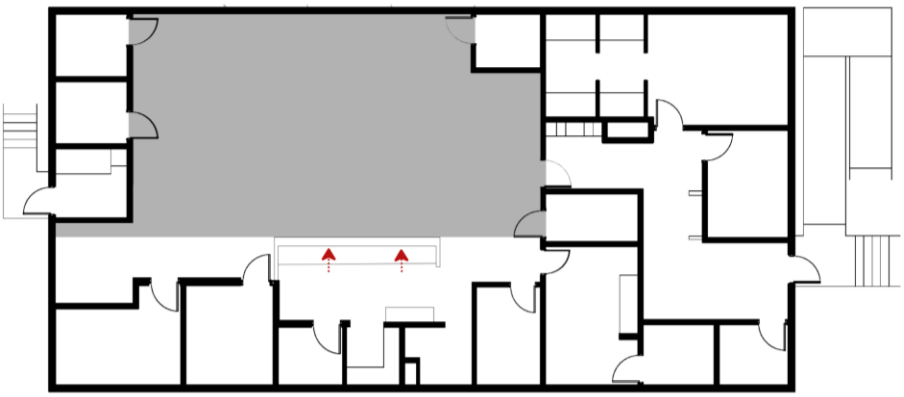


Figure 4.20. *Site Two- Isovist Map from the Nurse Desk*

Visual Connectivity. The map indicates the highest visual connectivity throughout the majority of the milieu, with reduced visibility in the semi-private section. The entrance corridor is both physically and visually separate entirely from the milieu, so it is not represented in the graph. Within the interconnected areas, there are few areas with low visibility, except for the staff-only service room behind the nurse desk.

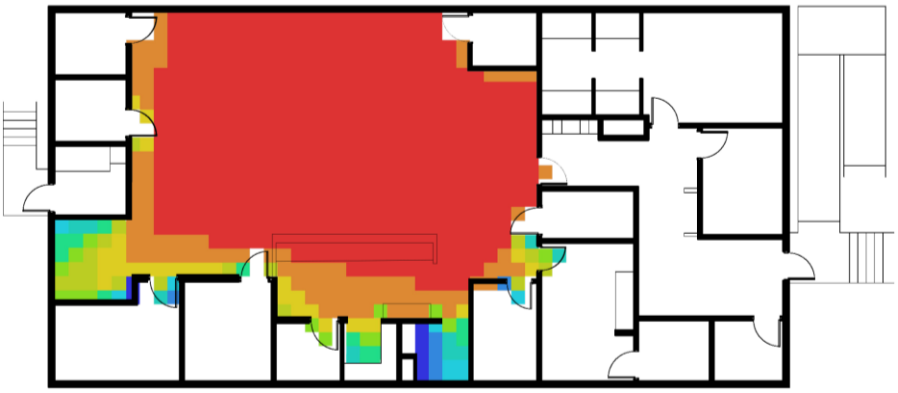


Figure 4.21. *Site Two- Visual Connectivity Graph*

Visual Integration. The graph shows the highest visual integration in the core of the open milieu, and lowest in the semi private section and service rooms behind the nurse desk.

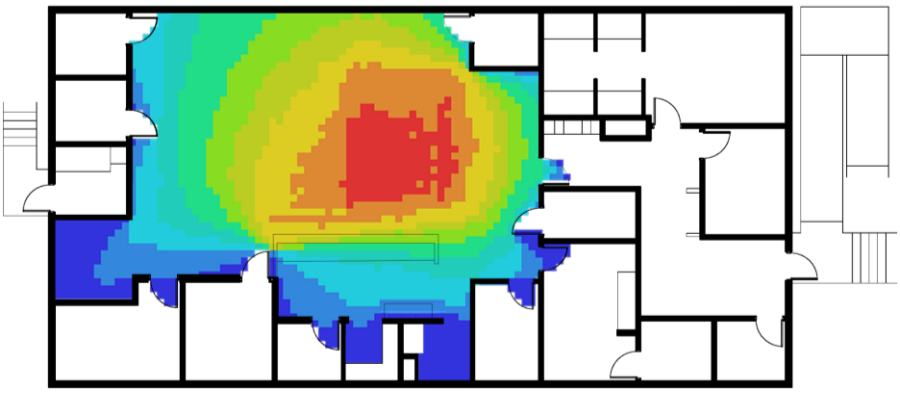


Figure 4.22. *Site Two- Visual Integration Graph*

Convex Map. The convex map of site two indicates relatively high integration between the orange and blue nodes, suggesting a good spatial integration between staff and patient areas. The spatial connectivity from the main entry to the milieu appears lower, with a longer and more complex path for patients to reach the milieu compared to the other case studies.

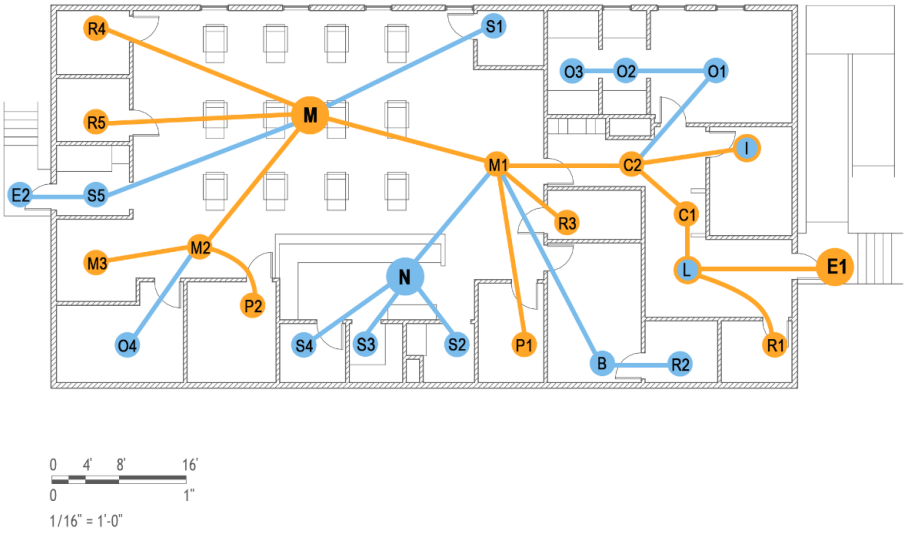


Figure 4.23. *Site Two - Convex Map*

Convex Step Depth Map. The convex step depth maps show the accessibility of nurse desks for patients, with a mean step depth of 2.50 steps from key points, including the milieu (M), patient private rooms P, and patient entry (E1). The mean step depth to reach the main convex area of the milieu (M) is 3.00 steps.

For staff accessibility to the patients, the map indicates a mean step depth of 2.50 steps from the nurse desk (N) to patient rooms P. While the step depth from the nurse desk to the milieu (M) is 2.00 steps, reaching the farthest area of the milieu (M2) requires 4.00 steps. The

step depth to the staff entry (E2) is 5.00 steps, to the closest staff restroom (R2) is 3.00 steps, and to the breakroom (B) is 2.00 steps.

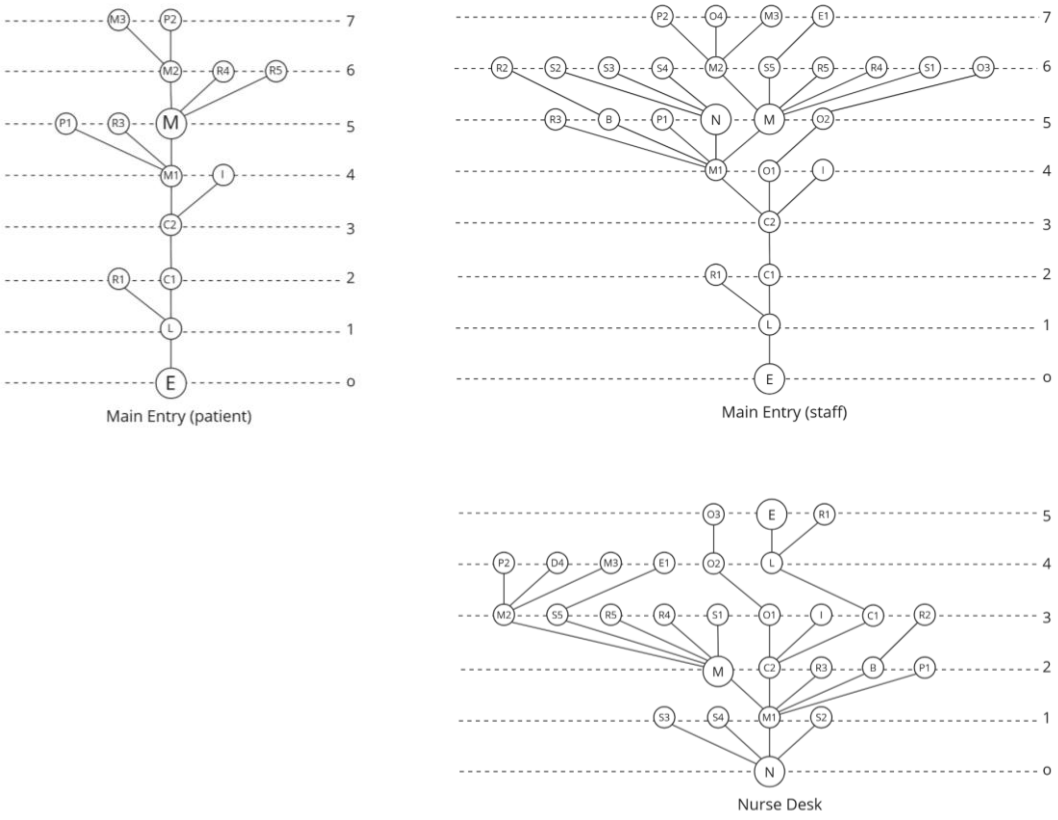


Figure 4.24. *Site Two - Convex Step Depth Maps*

Table 4.10

Site Two - Matrix of Critical Step Depths for Patients and Staff

Patients		Staff	
Variables	Number of steps	Variables	Number of steps
Depth from nurse desk (N) to milieu (M)	1	Depth from nurse desk (N) to milieu (M)	2

Depth from nurse desk (N) to patient entry (E1)	5	Depth from nurse desk (N) to the farthest area of milieu (M2)	4
Depth from nurse desk (N) to patient rooms (Ps)	P1=2, P2=2	Depth from nurse desk (N) to patient rooms (Ps)	P1=2, P2=3
Mean depth from nurse desk (N) to key points (M, Ps, E1)	2.50	**Mean depth from nurse desk (N) to patient rooms (Ps)**	2.50
Depth from milieu (M) to patient rooms (Ps)	P1=2, P2=2	Depth from nurse desk (N) to breakroom (B)	2
Depth from milieu (M) to patient entry (E1)	5	Depth from nurse desk (N) to staff entry (E2)	5
Mean depth from milieu (M) to key points (Ps, E1)	3	Depth from nurse desk (N) to the closest staff restroom (R2)	3

Site Three

Isovist Map. Site Three features a nurse desk with three seating areas positioned at different angles, indicated by red arrows. The combined isovist area, shaded in gray, demonstrates moderate visibility toward the milieu and corridors. However, a significant portion of the milieu and the corridors near the main entrance remain outside the visibility range from the nurse desk.

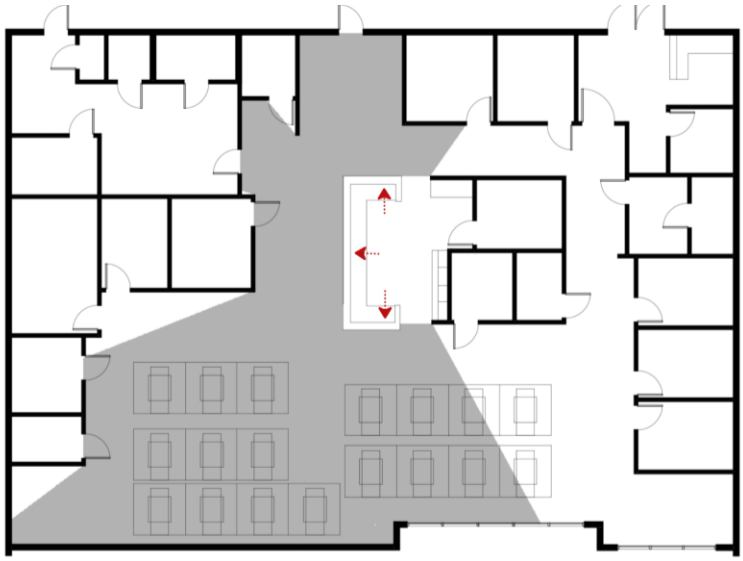


Figure 4.25. *Site Three - Isovist Map from the Nurse Desk*

Visual Connectivity. The graph shows high visual connectivity across most of the milieu, with only small areas of lower visibility in the two semi-private sections at the corners of the milieu. The lowest visual connectivity is observed in the corridors near the entrance.

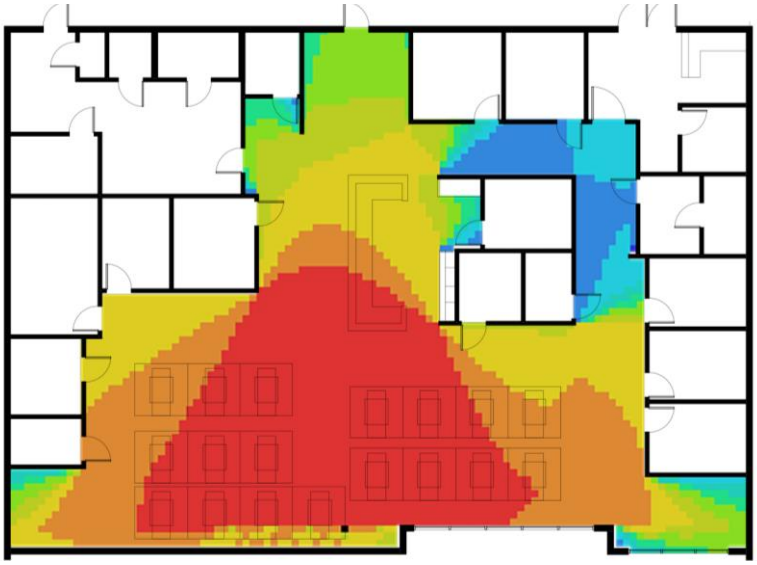


Figure 4.26. *Site Three - Visual Connectivity Graph*

Visual Integration. The graph shows a low color variance, indicating that the visual integration of spaces in site three is relatively uniform. However, the highest integration is observed at the center of the open milieu, while the lowest is found in the corridors.

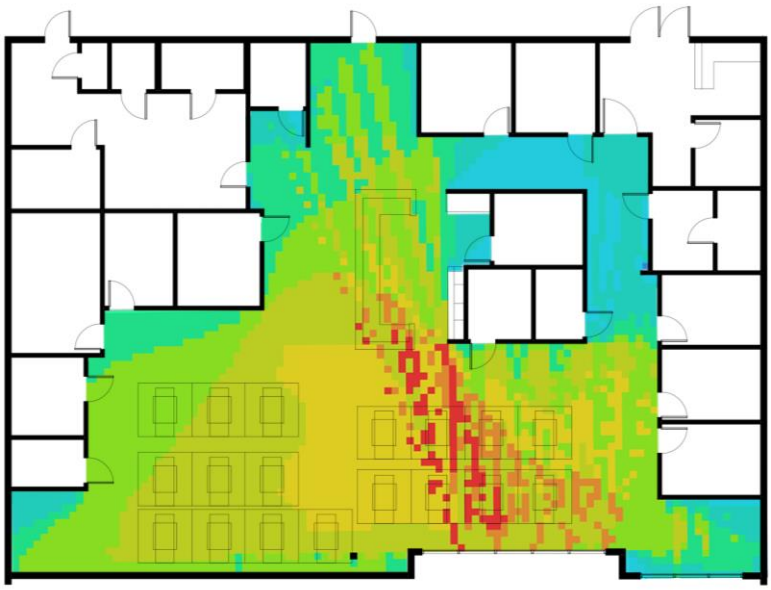


Figure 4.27. *Site Three- Visual Integration Graph*

Convex Map. The convex map reveals a complex arrangement of blue and orange nodes and their connections, indicating a high integration between patient and staff areas. The map also highlights a well-connected network of nodes, allowing access to different spaces from multiple directions, which suggests enhanced spatial interconnectivity

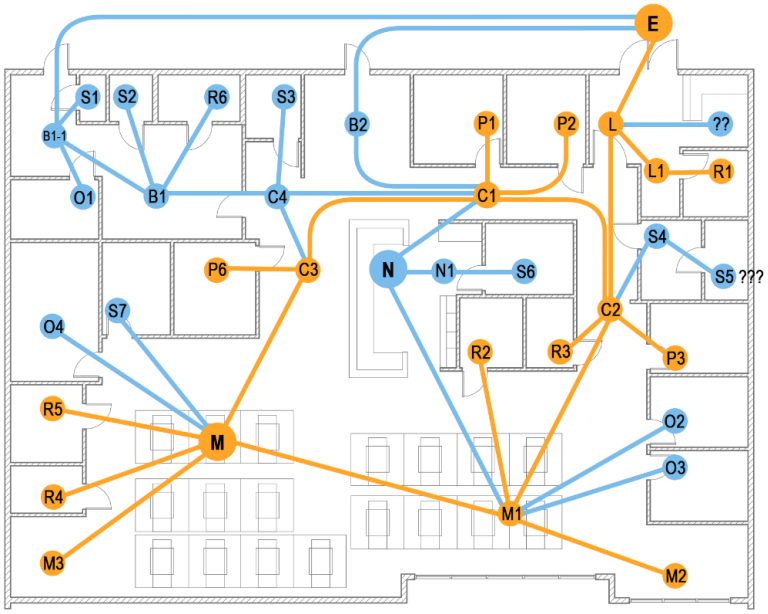


Figure 4.28. *Site Three - Convex Map*

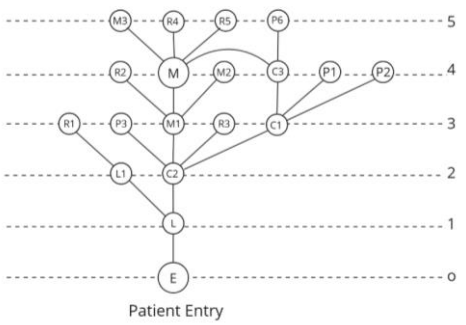
Convex Step Depth Map. The convex step depth maps show the accessibility of nurse desks for patients, with a mean step depth of 2.33 steps from key points, including the milieu (M), patient private rooms P, and patient entry (E). The mean step depth to reach the main convex area of the milieu (M) is 3.75 steps.

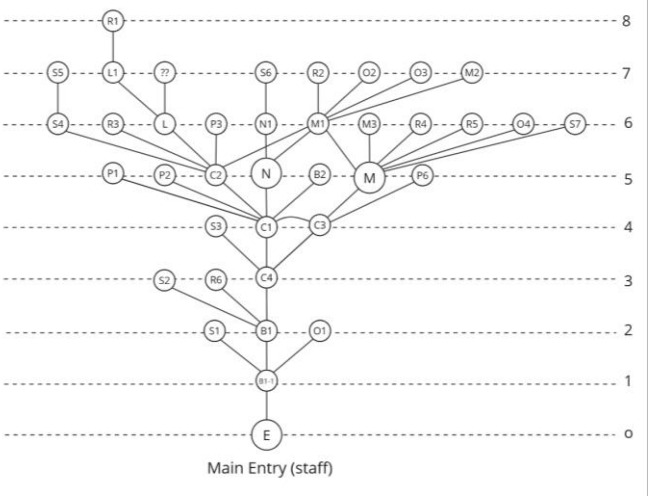
For staff accessibility to patients, the map indicates a mean step depth of 2.50 steps from the nurse desk (N) to patient rooms P. While the step depth from the nurse desk to the milieu (M) is 2.00 steps, reaching the farthest area of the milieu (M3) requires 3.00 steps. The step depth to the staff exit is 4.00 steps, to the closest staff restroom (R6) is 4.00 steps, and to the breakroom (B) is 2.00 steps.

Table 4.11

Site Three - Matrix of Critical Step Depths for Patients and Staff

Patients		Staff	
Variables	Number of steps	Variables	Number of steps
Depth from nurse desk (N) to milieu (M)	1	Depth from nurse desk (N) to milieu (M)	2
Depth from nurse desk (N) to patient entry (E)	4	Depth from nurse desk (N) to the farthest area of milieu (M3)	3
Depth from nurse desk (N) to patient rooms (Ps)	P1=2, P2=2, P3=3, P4=2	Depth from nurse desk (N) to patient rooms (Ps)	P1=2, P2=2, P3=3, P4=3
Mean depth from nurse desk (N) to key points (M, Ps, E)	2.33	**Mean depth from nurse desk (N) to patient rooms (Ps)**	2.50
Depth from milieu (M) to patient rooms (Ps)	P4=2,P1=3, P2=3, P3=3	Depth from nurse desk (N) to breakroom (B)	2
Depth from milieu (M) to patient entry (E)	4	Depth from nurse desk (N) to staff entry (E)	4
Mean depth from milieu (M) to key points (Ps, E)	3.75	Depth from nurse desk (N) to the closest staff restroom (R6)	4





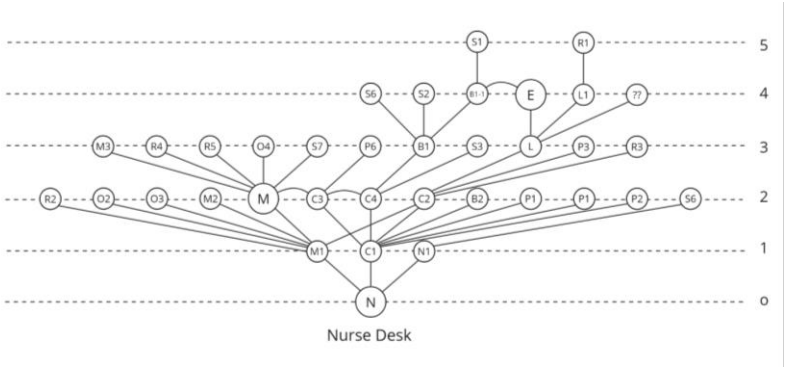


Figure 4.29. *Site Three- Convex Step Depth Maps*

Site Four

Isovist Map. The isovist map is generated using the nurse desk and the adjacent security area as starting points, following the plan configuration that suggests similar functions. The gray-shaded areas represent the combined isovist coverage based on these starting points and the directions of the nurse seats, indicated by red arrows. With a 180-degree visibility range, the map shows that most of the milieu is within the nurse's line of sight, except for a few narrow sections blocked by a column and areas near the entrance, which are situated behind the security area.

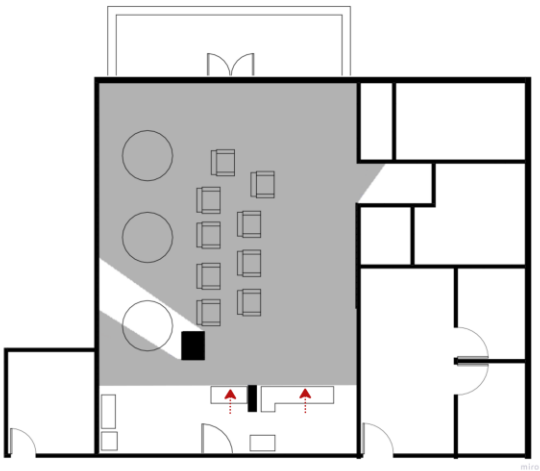


Figure 4.30. *Site Four - Isovist Map from the Nurse Desk*

Visual Connectivity. The graph indicates high visual connectivity throughout most of the open milieu, with slightly lower levels near the column that partially obstructs views. The predominant red areas, representing the highest connectivity, cover the majority of the milieu.

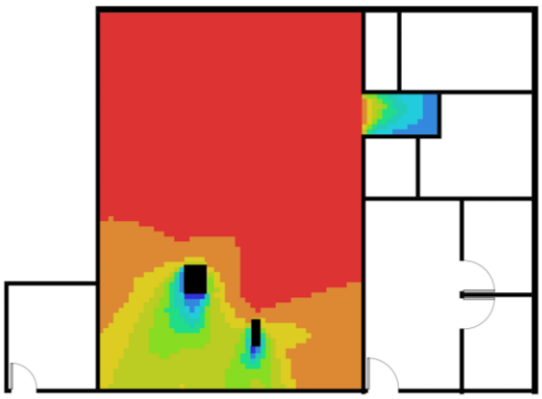


Figure 4.31. *Site Four - Visual Connectivity Graph*

Visual Integration. The graph indicates the highest visual integration in the upper central part of the milieu, while the lowest levels are observed in the lower sections near the column, the nurse desk, and the entrance. However, it is important to note that this is a small-scale plan with a limited number of convex areas, which may influence the variation in color representation.

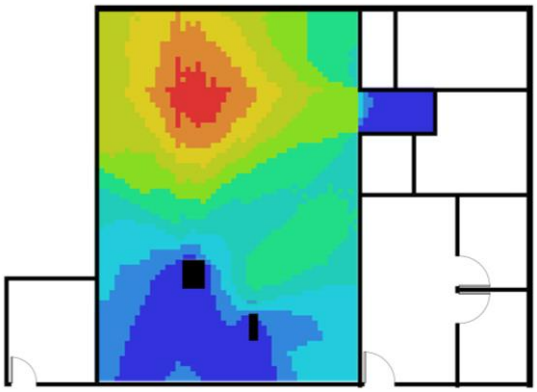


Figure 4.32. *Site Four - Visual Integration Graph*

Convex Map. The convex map illustrates a relatively straightforward and compact user flow within the plan. The open milieu (M) functions as a central point, facilitating connections to various spaces such as patient rooms (P), the outside garden (G), and staff areas.

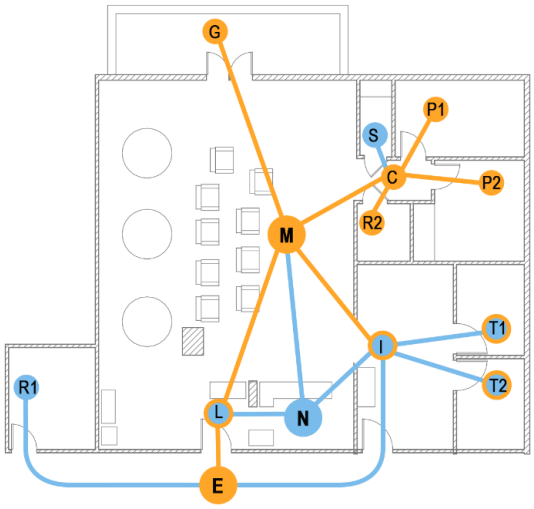


Figure 4.33. *Site Four - Convex Map*

Convex Step Depth Map. The convex step depth maps show that the mean depth for patients to reach the nurse desk from key points, including the milieu, patient rooms, and patient entry (M, P(s), E) is 2.50 steps. The mean depth for patients to access the main milieu (M) from the entrance and private rooms is 2.00 steps.

For staff accessibility to patients, the map indicates that the mean depth from the nurse desk (N) to patient rooms (P) is 3.00 steps. The step depth from the nurse desk to the milieu (M) is 1.00 step, and similarly reaching the farthest area of the milieu (M2) requires 1.00 step. The depth from the nurse desk to the staff entry is 2.00 steps, while the step depth to the closest staff restroom (R1) is 3.00 steps. No direct depth to a breakroom was indicated in this case study.

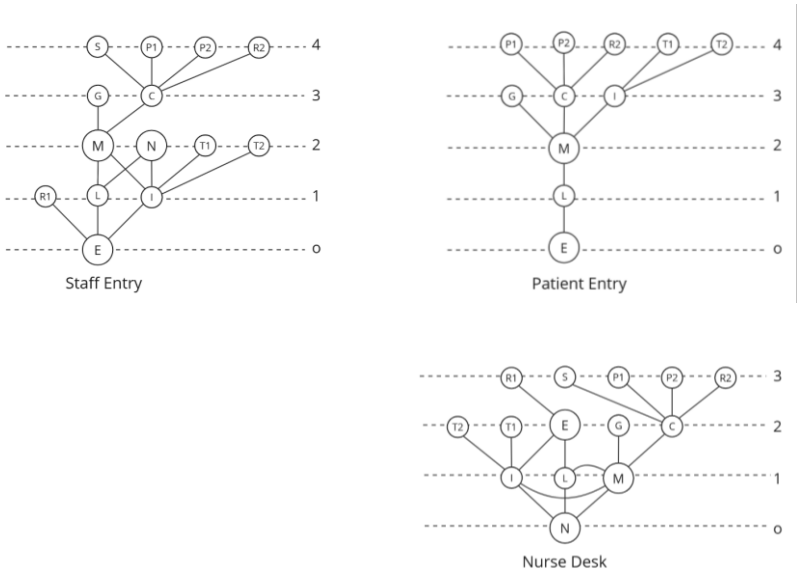


Figure 4.34. *Site Four - Convex Step Depth Maps*

Table 4.12

Site Four - Matrix of Critical Step Depths for Patients and Staff

Patients		Staff	
Variables	Number of steps	Variables	Number of steps
Depth from nurse desk (N) to milieu (M)	1	Depth from nurse desk (N) to milieu (M)	1
Depth from nurse desk (N) to patient entry (E)	3	Depth from nurse desk (N) to the farthest area of milieu (M2)	1
Depth from nurse desk (N) to patient rooms (Ps)	P1=3, P2=3	Depth from nurse desk (N) to patient rooms (Ps)	P1=3, P2=3
Mean depth from nurse desk (N) to key points (M, Ps, E)	2.50	**Mean depth from nurse desk (N) to patient rooms (Ps)**	3
Depth from milieu (M) to patient rooms (Ps)	P1=2, P2=2	Depth from nurse desk (N) to breakroom (B)	-
Depth from milieu (M) to patient entry (E)	2	Depth from nurse desk (N) to staff entry (E)	2
Mean depth from milieu (M) to key points (Ps, E)	2	Depth from nurse desk (N) to the closest staff restroom (R1)	3

Site Five

Isovist Map. The gray-shaded areas represent the combined isovist coverage from two starting points at the nurse desk, based on the direction of the nurse seats indicated by red arrows. With a 180-degree visibility range, the map shows that most of the milieu and half of the entrance corridor are within the nurse's line of sight.

Figure 4.35. *Site Five - Isovist Map from the Nurse Desk*

Visual Connectivity. The graph shows high visual connectivity in the core of the open milieu and around the nurse desk, with a moderate decrease in the lower part of the milieu, suggesting a more private zone. The lowest connectivity is observed in the circulation corridor, primarily used by staff and containing a private room.

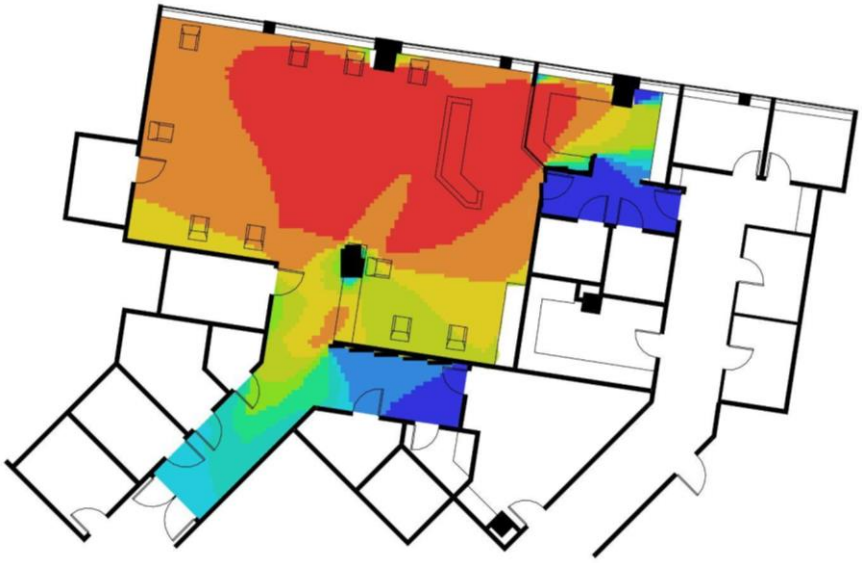


Figure 4.36. *Site Five- Visual Connectivity Graph*

Visual Integration. Similar to the variation in visual connectivity, the integration is highest in the core of the milieu, decreases in the semi-private areas, and reaches its lowest point in the corridor on the lower right side.

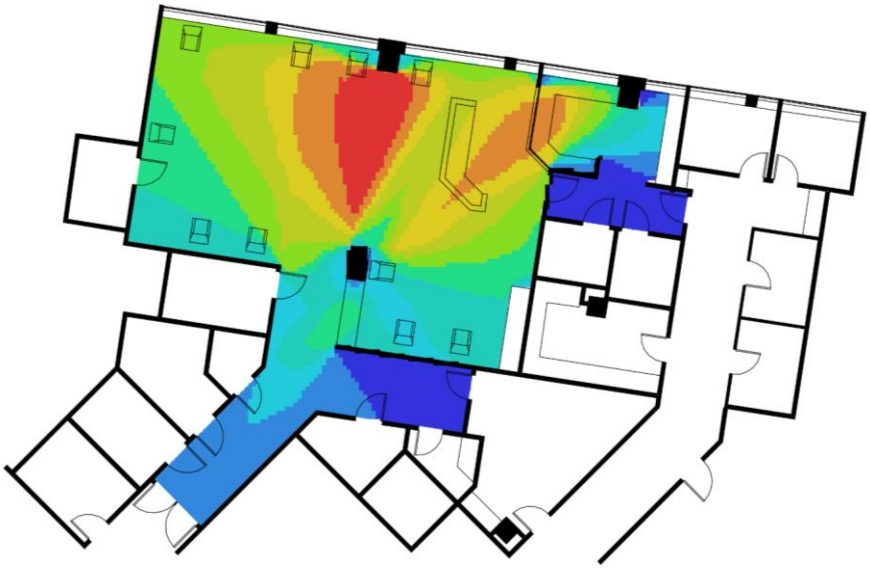


Figure 4.37. *Site Five- Visual Integration Graph*

Convex Map. The convex map shows that nearly half of the space is designated for staff, with a noticeable separation between blue and orange nodes and lines, indicating a low integration between staff and patient areas. The patient flow from the main entry appears straightforward, providing direct access to the milieu and various rooms.

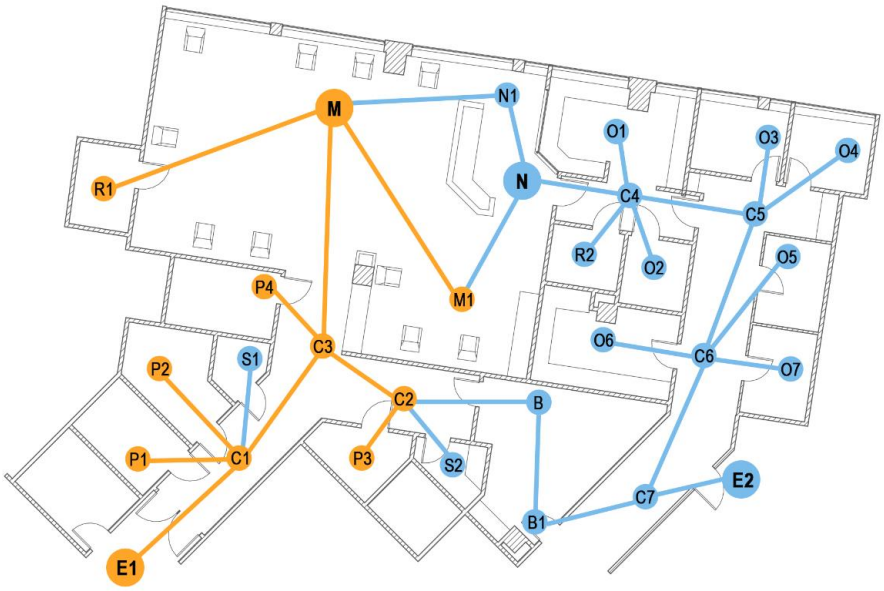


Figure 4.38. *Site Five - Convex Map*

Convex Step Depth Map. The convex step depth map indicates that the mean depth for patients to access the nurse desk from key points, including the milieu, patient entry, and patient rooms (M, E1, Pn), is 2.50 steps. Similarly, the mean depth for patients to reach the main milieu (M) from the entrance and private rooms is 2.80 steps.

For staff, the mean depth from the nurse desk to patient rooms (P) is 4.75 steps. The step depth to both the milieu (M) and its farthest area (M2) is 2.00 steps. The depth to the staff entry and breakroom (B) is 5.00 steps each, and the closest staff restroom (R2) is 2.00 steps away.

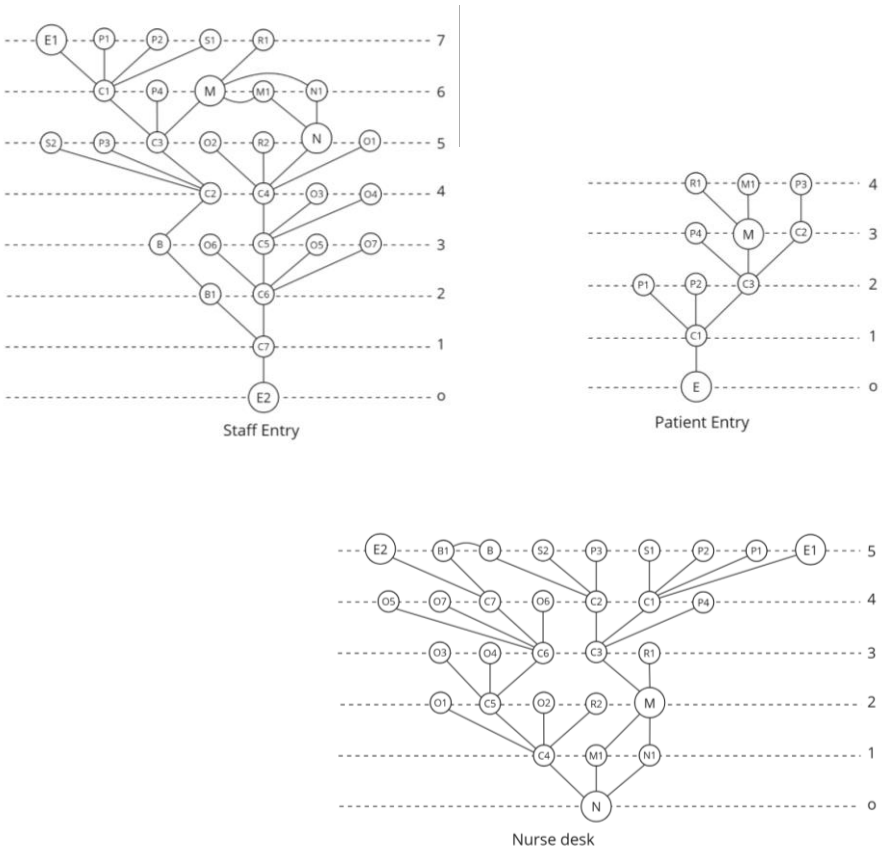


Figure 4.39. *Site Five - Convex Step Depth Maps*

Table 4.13

Site Five - Matrix of Critical Step Depths for Patients and Staff

Patients		Staff	
Variables	Number of steps	Variables	Number of steps
Depth from nurse desk (N) to milieu (M)	1	Depth from nurse desk (N) to milieu (M)	2
Depth from nurse desk (N) to patient entry (E1)	4	Depth from nurse desk (N) to the farthest area of milieu (M2)	2

Depth from nurse desk (N) to patient rooms (Ps)	P1=4, P2=4, P3=4,P4=3	Depth from nurse desk (N) to patient rooms (Ps)	P1=5, P2=5, P3=5,P4=4
Mean depth from nurse desk (N) to key points (M, E1, Pn)	2.50	**Mean depth from nurse desk (N) to patient rooms (Pn)**	4.75
Depth from milieu (M) to patient rooms (Pn)	P1=3, P2=3, P3=3, P4=2	Depth from nurse desk (N) to breakroom (B)	5
Depth from milieu (M) to patient entry (E1)	3	Depth from nurse desk (N) to staff entry (E2)	5
Mean depth from milieu (M) to key points (Pn, E1)	2.80	Depth from nurse desk (N) to the closest staff restroom (R2)	2

Site six

Isovist Map. The isovist area, shaded in gray, is generated from the two starting points at the nurse desk based on their locations and directions toward the milieus. With a 180-degree visibility range from each point, the combined isovist area demonstrates extensive coverage of nearly all parts of the milieu, except for some narrow sections behind columns and long ceiling-mounted furniture that obstruct the line of sight.

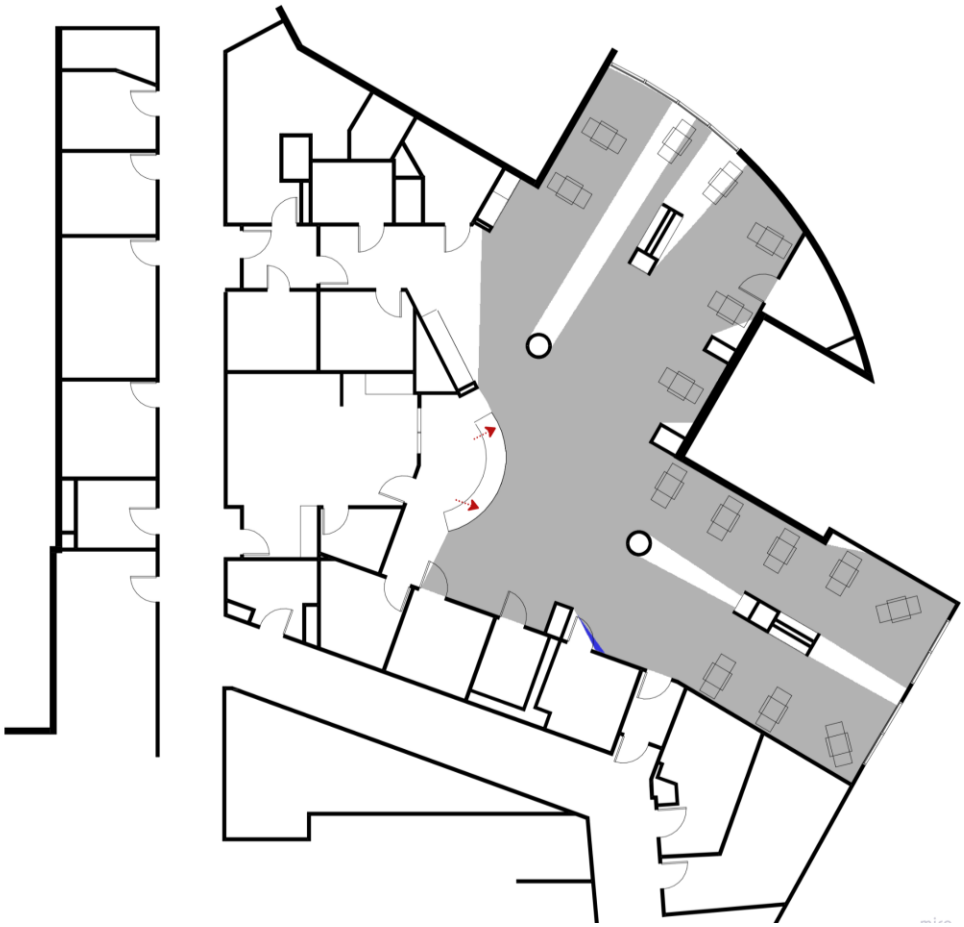


Figure 4.40. *Site Six - Isovist Map from the Nurse Desk*

Visual Connectivity. The graph shows high visual connectivity around the nurse desk and the core of the open milieu, especially at the intersections of the two wings of the milieu. Lower visual connectivity is observed in areas behind columns and in the entrance corridor.

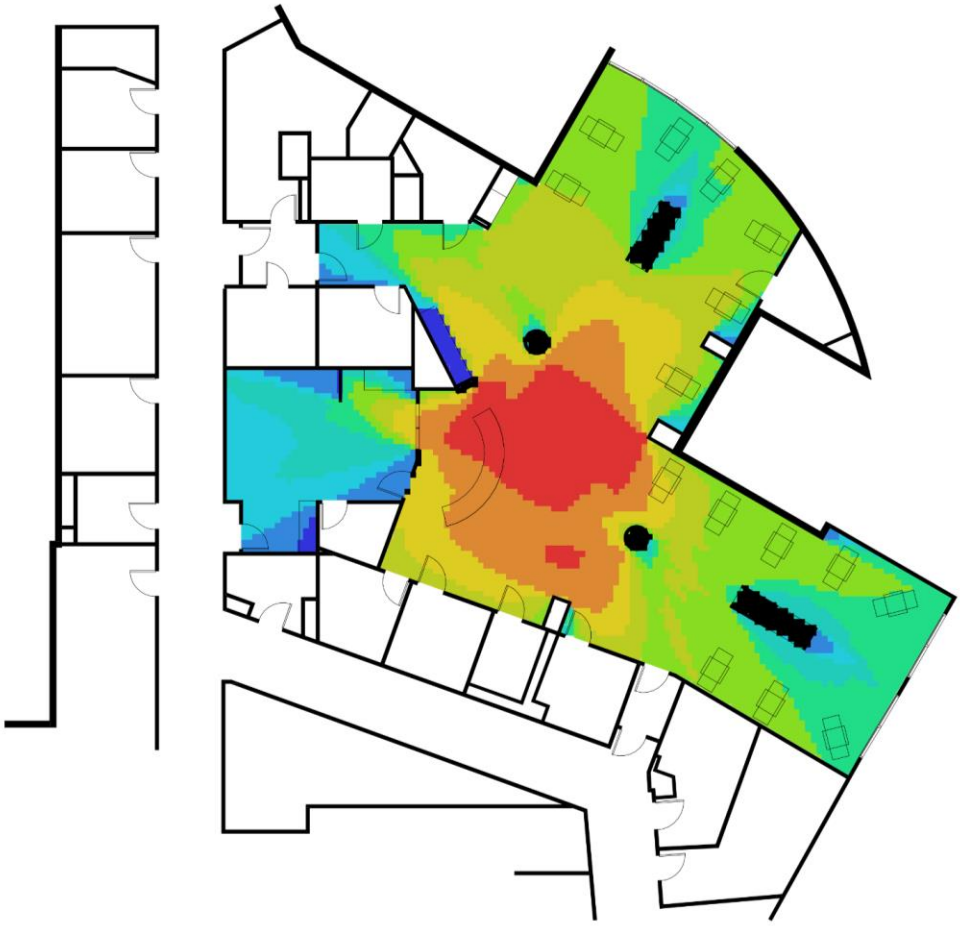


Figure 4.41. Site Six- Visual Connectivity Graph

Visual Integration. Similar to the variation in visual connectivity, visual integration is highest around the nurse desk and the core of the open milieu, though within a smaller area. It gradually decreases in the wings of the milieu and reaches its lowest levels in the spaces behind columns and the larger staff-designated areas behind the nurse desk, as well as in the entrance corridor.

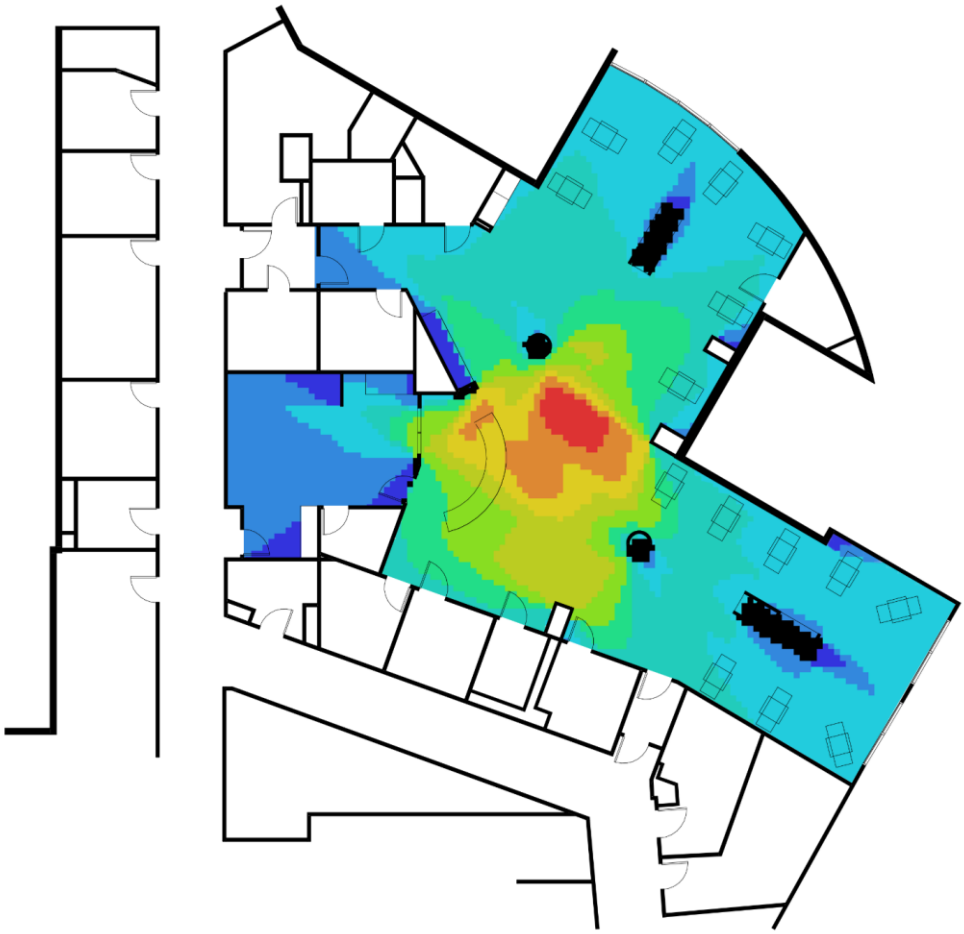


Figure 4.42. *Site Six - Visual Integration Graph*

Convex Map. The convex map illustrates a balanced distribution of blue and orange nodes, indicating a moderate level of integration between staff and patient areas. The open milieu (M) serves as a central point, connecting various spaces efficiently. However, the extended flow in the blue paths suggests more complex access for staff, particularly towards the entry points and service areas.

Figure 4.43. *Site Six - Convex Map*

Convex Step Depth Map. To assess patient accessibility, the map shows that the mean depth for patients to reach the nurse desk from key points of milieu (M), entrance (E1), and patient private rooms (P) is 2.50 steps, while the mean depth to reach the main convex area of the milieu (M) is 2.28 steps.

For staff accessibility, the mean depth from the nurse desk to patient rooms (P) is 2.33 steps. The step depth from the nurse desk to the milieu (M) is 1.00 step, and reaching the farthest area of the milieu (M2) also requires 1.00 step. The depth to exit the unit from the

staff entry is 4.00 steps, while the depth to reach the closest staff restroom (R3) is also 4.00 steps. The step depth to the patient entry (E1) from the nurse desk is 5.00 steps.

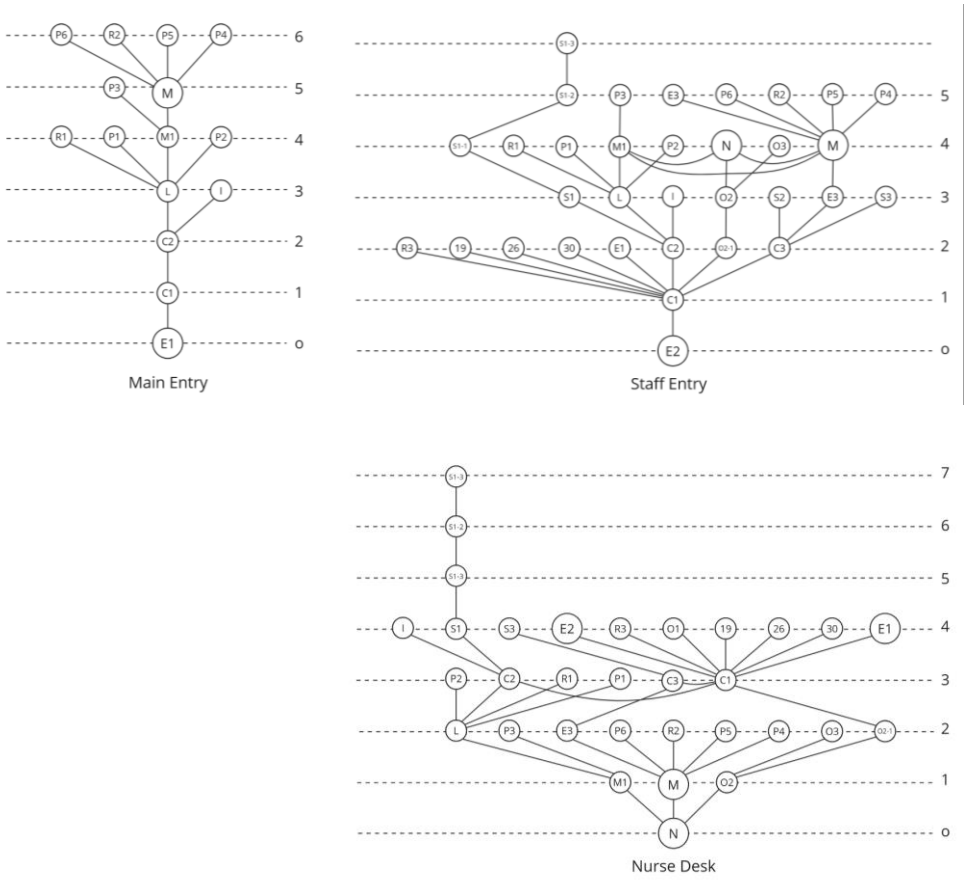


Figure 4.44. *Site Six - Convex Step Depth Map*

Table 4.14

Site Six - Matrix of Critical Step Depths for Patients and Staff

Patients		Staff	
Variables	Number of steps	Variables	Number of steps
Depth from nurse desk (N) to milieu (M)	1	Depth from nurse desk (N) to milieu (M)	1

Depth from nurse desk (N) to patient entry (E1)	5	Depth from nurse desk (N) to the farthest area of milieu (M2)	1
Depth from nurse desk (N) to patient rooms (Ps)	P1=3, P2=3, P3=2, P4=2, P5=2, P6=2	Depth from nurse desk (N) to patient rooms (Ps)	P1=3, P2=3, P3=2, P4=2, P5=2, P6=2
Mean depth from nurse desk (N) to key points (M, E1, Pn)	2.50	**Mean depth from nurse desk (N) to patient rooms (Pn)**	2.33
Depth from milieu (M) to patient rooms (Pn)	P1=3, P2=3, P3=2, P4=1, P5=1, P6=1	Depth from nurse desk (N) to breakroom (B)	-
Depth from milieu (M) to patient entry (E1)	5	Depth from nurse desk (N) to staff entry (E2)	4
Mean depth from milieu (M) to key points (Pn, E1)	2.28	Depth from nurse desk (N) to the closest staff restroom (R3)	4

Site Seven

Isovist Map. The gray-shaded areas represent the combined isovist coverage from two starting points at the nurse desk, based on the direction of the nurse seats indicated by red arrows. With a 180-degree visibility range, the map shows that most of the milieu and half of the entrance corridor are within the nurse's line of sight.

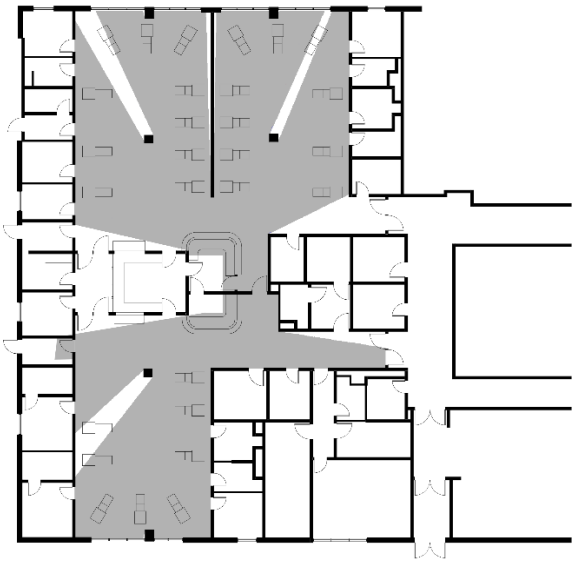


Figure 4.45. *Site Seven- Isovist map*

Visual Connectivity. Site Seven, a large-scale unit with three milieus, features independent entrances for the lower units, restricting free patients access between the upper and lower parts. However, the glass windows of the charting area maintain interconnected visibility across the entire unit. The graph highlights the highest visual connectivity in three areas: two near the charting rooms and one close to the nurse desk. Within the milieus, visibility is relatively uniform, as indicated by the low variation in color. However, the top-left and bottom-left milieus show better visual connectivity compared to the top-right milieu. The lowest visibility is observed in the entrance corridor.

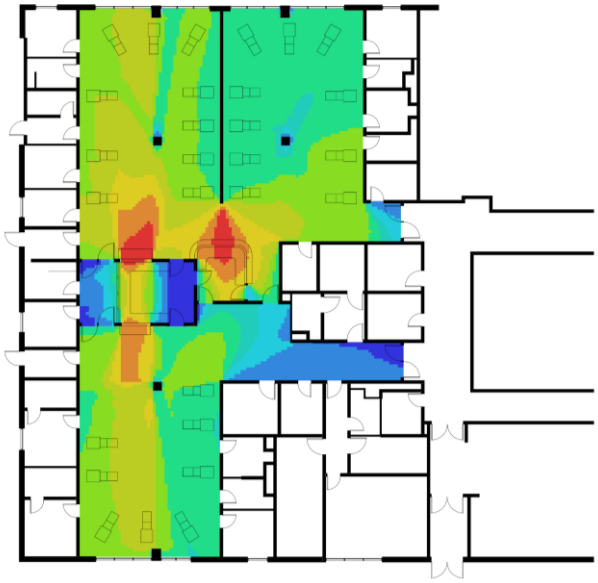


Figure 4.46. *Site Seven- Visual Connectivity Graph*

Visual Integration. The map indicates the highest visual integration in a small area below the top-left milieu, close to the charting room. Each milieu exhibits different levels of visual integration, with the top-left milieu displaying the highest integration, the bottom-right milieu showing lower integration, and the top-right milieu having the lowest visual integration.

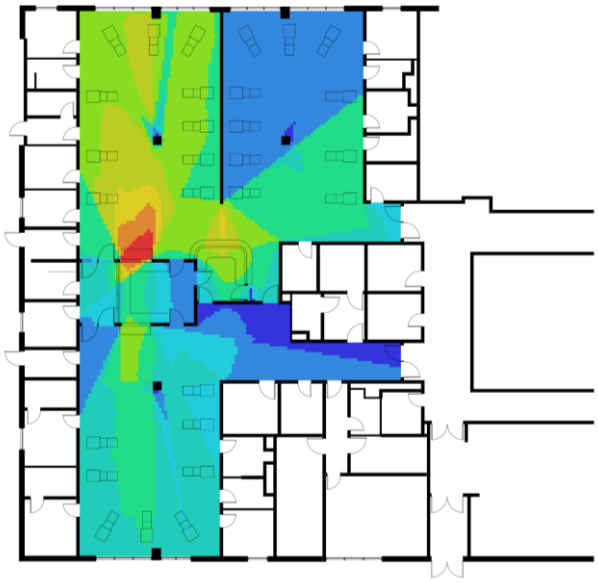


Figure 4.47. *Site Seven- Visual Integration Graph*

Convex Map. The convex map illustrates a complex but well-distributed integration between staff and patient areas, represented by the orange and blue nodes and lines. The three milieus (M1, M2, M3) serve as central hubs, connecting various spaces efficiently. However, the separation between the orange and blue lines indicates a moderate level of segregation between staff-only areas and patient-accessible spaces. The flow of patients appears relatively direct towards the milieus

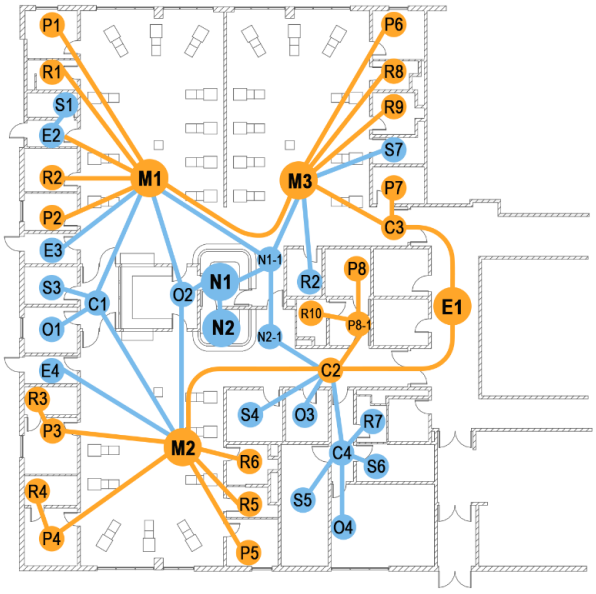


Figure 4.48. *Site Seven- Convex Map*

Convex Step Depth Map. To examine patients' accessibility to key areas,the map indicates that the mean depth for patients to reach nurse desk N1 from key points, including entrance, accessible milieus, and private rooms, is 2.00 steps, while for nurse desk N2, it is 2.16 steps. The mean depth to access the main convex areas of the milieus (M1, M2, M3) from the main entrance and accessible private rooms is 1.66, 1.60, and 1.66 steps, respectively.

For accessibility of staff to patients, the mean depth from nurse desk N1 to patient rooms is 3.37 steps, and for N2, it is 4.37 steps. The depth from N1 to milieus (M1 and M3) is 3.00 steps, while for N2, the depth to M2 and the farthest area of the milieu is 5.00 steps.

Regarding access to staff respite areas, the depth to the closest staff restroom (R2) is 3.00 steps from N1 and 4.00 steps from N2. There is no designated breakroom for staff within

the unit. The depth to exit the units is 4.00 steps from N1 and 5.00 steps from N2 to the staff entry.

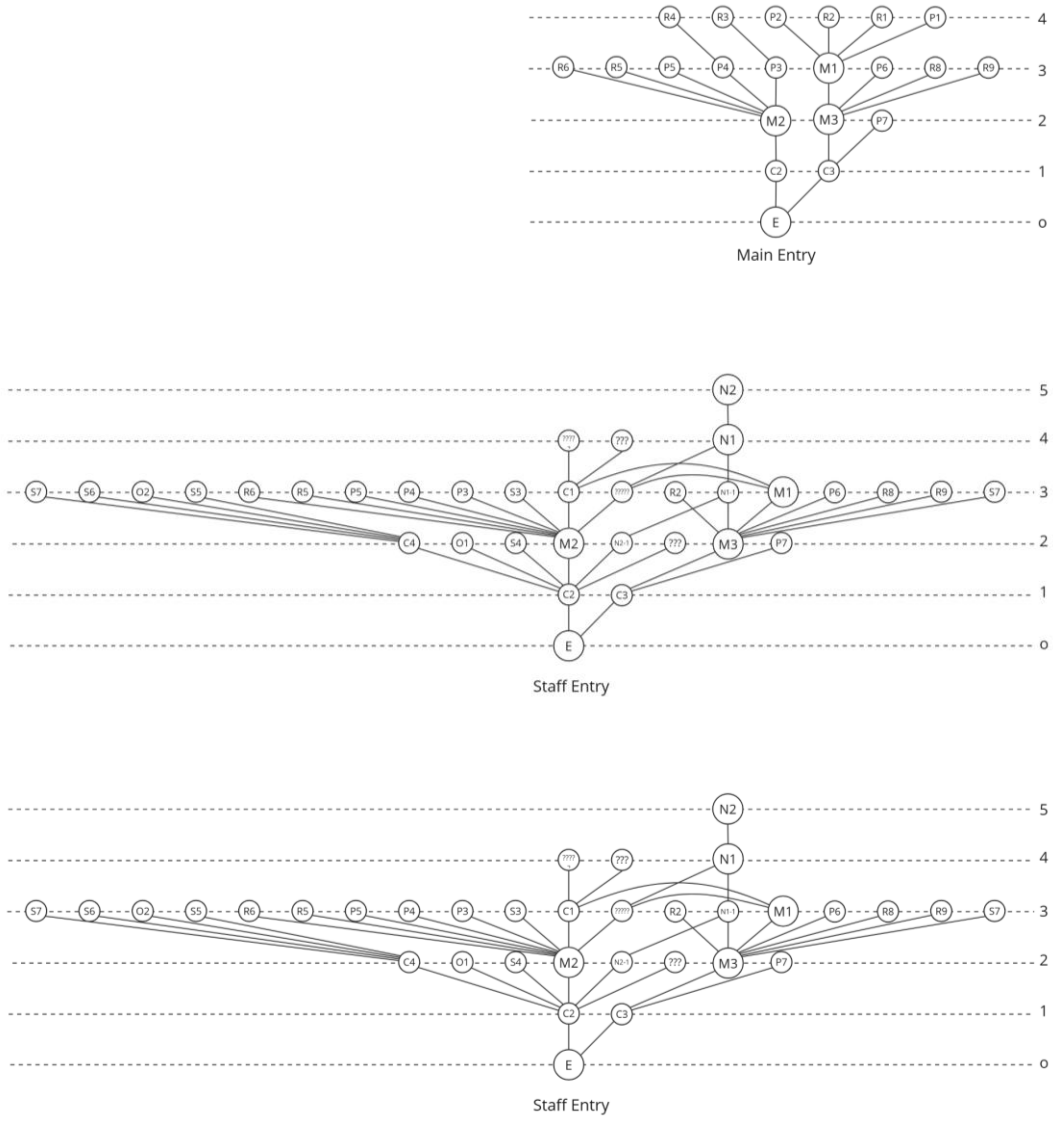


Figure 4.49. *Site Seven- Convex Step Depth Map*

Table 4.15

Site Seven - Matrix of Critical Step Depths for Patients and Staff

Patients		Staff	
Variables	Number of steps	Variables	Number of steps
Depth from nurse desk (N1) to milieus (Mn)	M1=1, M3=1	Depth from nurse desk (N1) to milieu (Mn)	M1=3, M3=2
Depth from nurse desk (N1) to patient entry (E)	3	Depth from nurse desk (N1) to the farthest area of milieu (M1)	3
Depth from nurse desk (N1) to patient rooms (Pn)	P1=2, P2=2, P6=2, P7=3	Depth from nurse desk (N2) to milieu (M2)	5
Mean depth from nurse desk (N1) to key points (Mn, E, Pn)	**2**	Depth from nurse desk (N2) to the farthest area of milieu (M2)	5
Depth from nurse desk (N2) to milieu (M2)	1	Depth from nurse desk (N1) to patient rooms (Pn)	P1=3, P2=3, P3=3, P4=3, P5=3, P6=3. P7=4, P8=5
Depth from nurse desk (N2) to patient entry (E)	2	**Mean depth from nurse desk (N1) to patient rooms (Pn)**	3.37
Depth from nurse desk (N2) to patient rooms (Pn)	P3=2, P4=2, P5=2, P8=3	Depth from nurse desk (N2) to patient rooms (Pn)	P1=4, P2=4, P3=4, P4=4, P5=4, P6=4. P7=5, P8=6
Mean depth from nurse desk (N2) to key points (M2, E, Pn)	**2.16**	**Mean depth from nurse desk (N2) to patient rooms (Pn)**	4.37
Depth from milieu (M1) to patient rooms (Pn)	P1=1, P2=1	Depth from nurse desk (N) to breakroom (B)	-
Depth from milieu (M1) to patient entry (E)	3	Depth from nurse desk (N1) to staff entry (E)	4
Mean depth from milieu (M1) to key points (Pn, E)	1.66	Depth from nurse desk (N2) to staff entry (E)	5

Depth from milieu (M2) to patient rooms (Pn)	P3=1, P4=1, P5=1, P8=3	Depth from nurse desk (N1) to the closest staff restroom (R2)	3
Depth from milieu (M1) to patient entry (E)	2	Depth from nurse desk (N2) to the closest staff restroom (R2)	4
Mean depth from milieu (M2) to key points (Pn, E)	1.60		
Depth from milieu (M3) to patient rooms (Pn)	P6=1, P7=2		
Depth from milieu (M3) to patient entry (E)	2		
Mean depth from milieu (M3) to key points (Pn, E)	1.66		

Site Eight

Isovist Map. The isovist area in the upper milieu is based on two starting points at the nurse desk, indicated by red arrows, aligning with the positions and orientations of the nurse seats. With a 180-degree visibility range from these points, the map shows that most of the milieu, along with sections of the corridors and parts of the glass wall of the multi-purpose room, are within the line of sight.

The lower milieu shows a stronger isovist area, with three starting points based on the seats in the large nurse desk, each indicating different viewing angles. With a 180-degree visibility range for each point, the combined isovist area, shaded in gray, covers the entire milieu as well as parts of two patient rooms with glass walls (the multi-purpose room and the dining room).

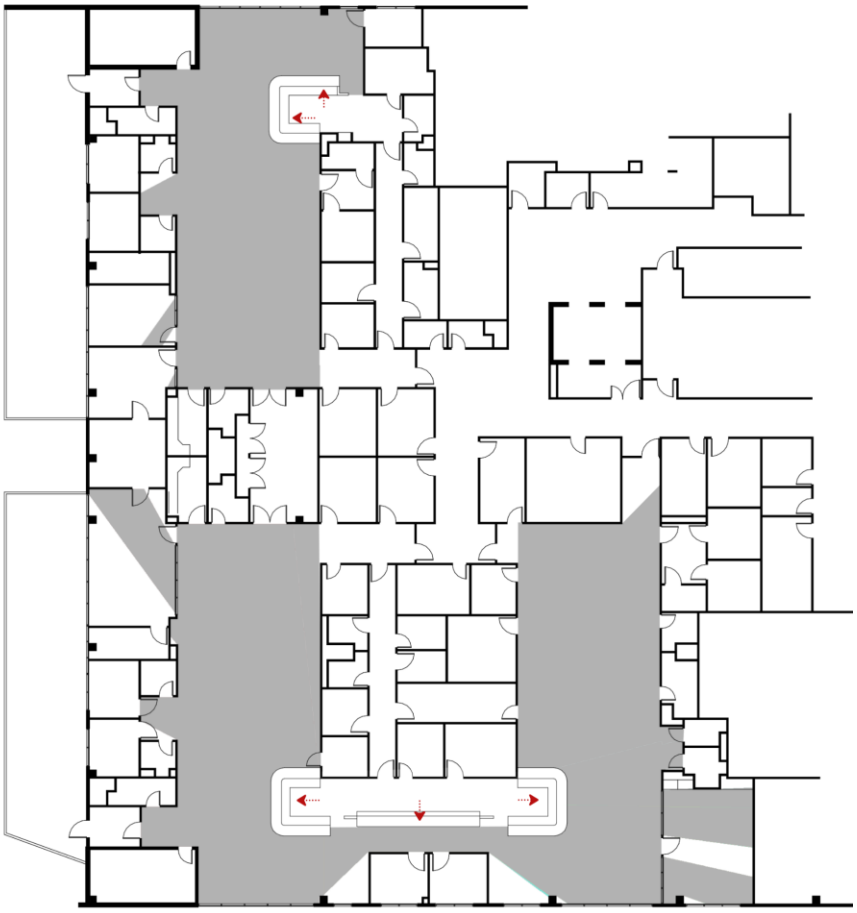


Figure 4.50. *Site Eight - Isovist Map from the Nurse Desk*

Visual Connectivity - Upper Milieu. The graphs show that most of the milieu is represented in red, indicating the highest visual connectivity to the surrounding spaces. The lowest visibility is observed in the entrance corridor and in two patient rooms on the left, which, due to their functions as multi-purpose and dining rooms, have glass walls that allow some level of visual connection to the milieu.

Figure 4.51. *Site Eight - Upper Milieu - Visual Connectivity Graph*

Visual Connectivity - Lower Milieus. In the lower part of the unit, visibility variance appears roughly symmetrical for both milieus, with the highest visibility observed near the nurse desk areas. However, the right milieu shows a slightly lower visual connectivity, indicated by a cooler color layer compared to the left. Similar to the upper side of the unit, some patient rooms with glass walls also maintain visual connections to the rest of the space.

Figure 4.52. Site Eight- Lower Milieus - Visual Connectivity Graph

Visual Integration - Upper Milieu. The graph shows the highest visual integration in two areas of the milieu: one near the nurse desk and another close to the dining and multi purpose rooms with glass walls, facing the main entry corridor. The lowest integration is observed in the circulation corridors and inside these two patient rooms.

Figure 4.51. *Site Eight- Upper Milieu - Visual Integration Graph*

Visual Integration - Lower Milieus. The graph shows the highest visual integration in the left milieu near the nurse desk, with a slightly lower level observed in the right milieu. The remaining areas of the milieus display a uniform blue color, indicating a low degree of visual integration and minimal variation.

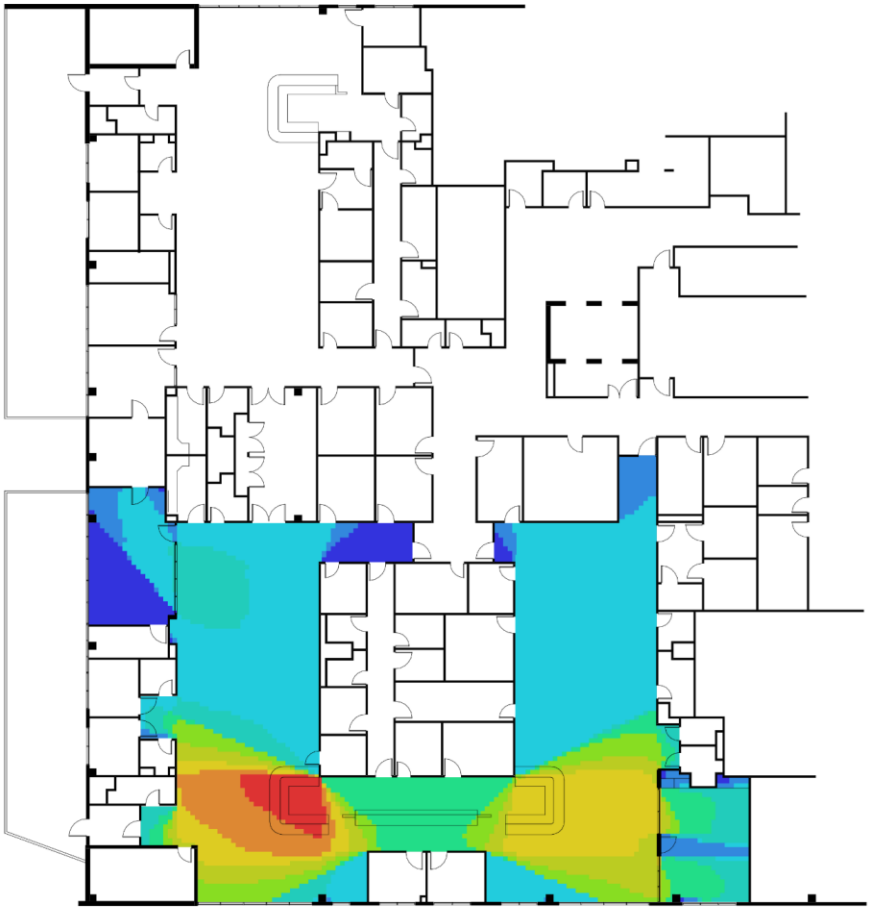


Figure 4.52. *Site Eight- Lower Milieus - Visual Integration Graph*

Convex Map. The convex map shows a complex network of connections between the blue (staff) and orange (patient) nodes, indicating a high level of spatial integration. The three milieus (M1, M2, M3) act as central hubs, linking various functional areas. However, the map also reveals distinct separation between staff and patient pathways, with limited direct connections in some parts of the unit, suggesting controlled access and movement between zones.

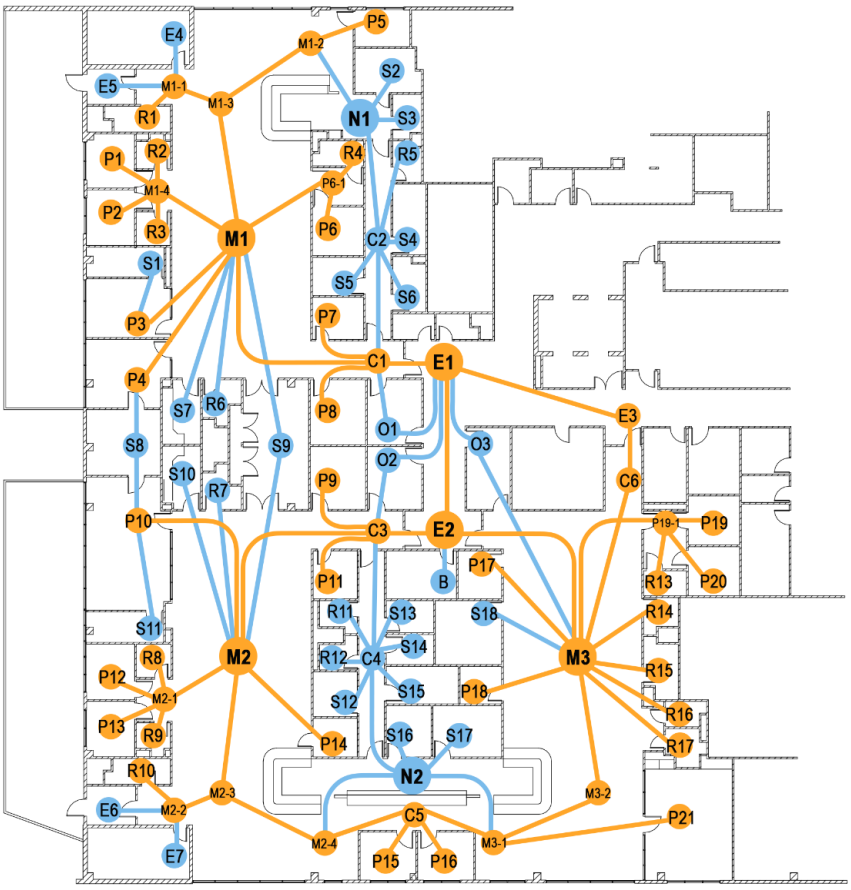
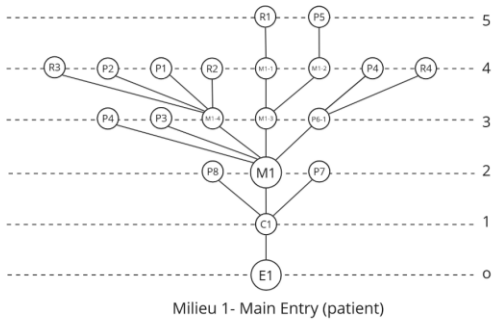


Figure 4.53. *Site Eight- Convex Map*

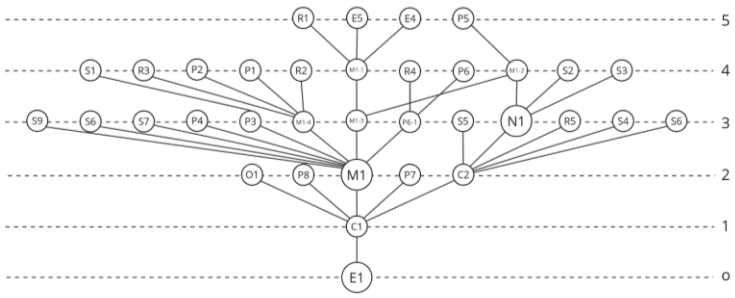
Convex Step Depth Map - Upper Milieu. To assess accessibility for patients, the map shows that the mean depth for patients to reach nurse desk N1 from key points, including the entrance (E1), milieu (M1), and accessible private rooms, is 2.50 steps. The mean depth to access the main convex area of the upper milieu (M1) from the entrance and private rooms is 1.88 steps.

For staff accessibility, the mean depth from nurse desk N1 to patient rooms is 3.87 steps. The depth from N1 to the milieu (M1) is 3.00 steps, while reaching the farthest section of the milieu (M1-4) requires 4.00 steps. The depth to exit the unit via the staff entry is 3.00

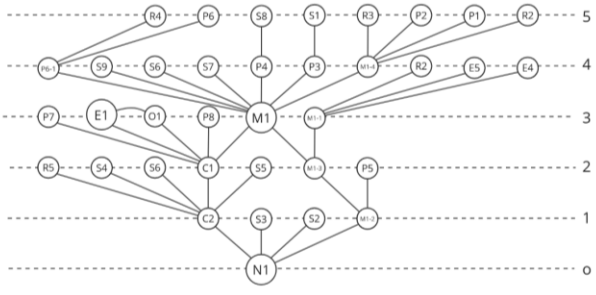
steps, and the depth to reach the nearest staff restroom (R5) is 2.00 steps. The breakroom is located outside the unit, requiring 5.00 steps to access it.



Milieu 1- Main Entry (patient)



Milieu 1- Main Entry (staff)



Nurse Desk

Figure 4.54. *Site eight- Upper Milieu - Convex Step Depth Maps*

Table 4.16

Site Eight - Upper Milieu - Matrix of Critical Step Depths for Patients and Staff

Patients		Staff	
Variables	Number of steps	Variables	Number of steps
Depth from nurse desk (N1) to milieu (M1)	1	Depth from nurse desk (N1) to milieu (M1)	3
Depth from nurse desk (N1) to patient entry (E1)	3	Depth from nurse desk (N1) to the farthest area of milieu (M1-4)	4
Depth from nurse desk (N1) to patient rooms (Pn)	P1=3, P2=3, P3=2, P4=2, P5=2, P6=3, P7=3, P8=3	Depth from nurse desk (N1) to patient rooms (Pn)	P1=5, P2=5, P3=4, P4=4, P5=2, P6=5, P7=3, P8=3
Mean depth from nurse desk (N1) to key points (M1, E1, Pn)	2.50	**Mean depth from nurse desk (N1) to patient rooms (Pn)**	3.87
Depth from milieu (M1) to patient rooms (Pn)	P1=2, P2=2, P3=1, P4=1, P5=3, P6=2, P7=2, P8=2	Depth from nurse desk (N1) to breakroom (B)	5
Depth from milieu (M1) to patient entry (E1)	2	Depth from nurse desk (N21) to staff entry (E1)	3
Mean depth from milieu (M1) to key points (Pn, E1)	1.88	Depth from nurse desk (N1) to the closest staff restroom (R5)	2

Convex Step Depth Map - Lower Milieus. To evaluate patient accessibility, the map indicates that the mean depth for patients to reach nurse desk N2 from key points, including the entrance (E2), accessible milieus (M2, M3), and private rooms, is 2.35 steps. The mean

depth for patients to access the main convex areas of the lower milieus (M2 and M3) from the main entrance and accessible private rooms is 1.87 and 1.85 steps, respectively.

For staff accessibility, the mean depth from nurse desk N2 to patient rooms is 3.84 steps. The step depth from N2 to the milieus (M2 and M3) is 3.00 steps each, while reaching the farthest section of milieu M2 requires 4.00 steps. The depth to exit the unit through the staff entry is 3.00 steps, and the depth to reach the nearest staff restroom (R12) is 2.00 steps. The breakroom is situated outside the unit, requiring 4.00 steps to access.

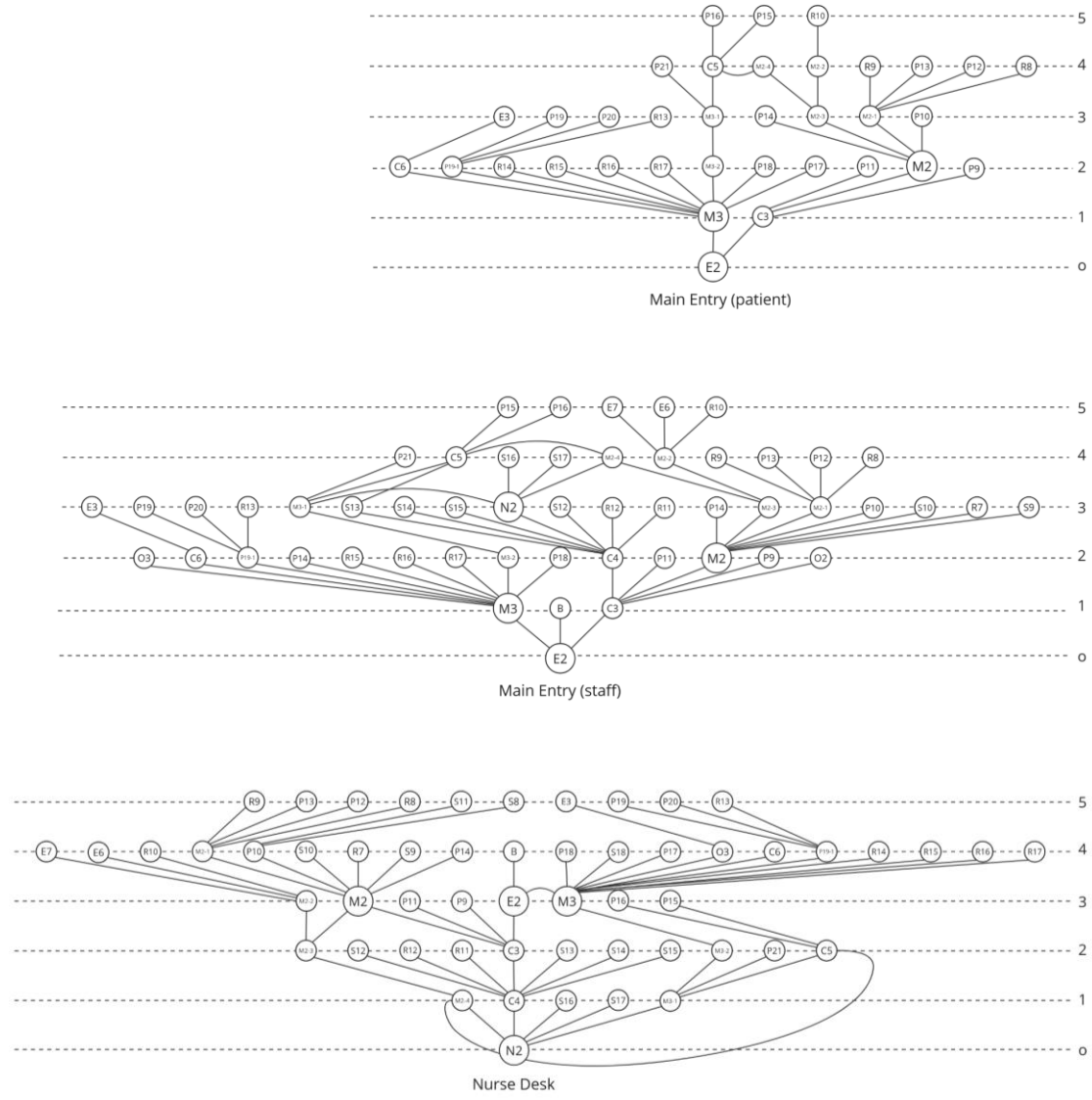


Figure 4.55. *Site eight- Lower Milieus - Convex Step Depth Maps*

Table 4.17

Site Eight - Lower Milieus - Matrix of Critical Step Depths for Patients and Staff

Patients	Staff

Variables	Number of steps	Variables	Number of steps
Depth from nurse desk (N2) to milieu (Mn)	M2=1, M3=1	Depth from nurse desk (N2) to milieu (Mn)	M2=3, M3=3
Depth from nurse desk (N2) to patient entry (E2)	2	Depth from nurse desk (N2) to the farthest area of milieu (M2-1)	4
Depth from nurse desk (N2) to patient rooms (Pn)	P9=2, P10=2, P11=3, P12=3, P13=3, P14=2, P15=2, P16=2, P17=2, P18=2, P19=3, P20=3, P21=2	Depth from nurse desk (N2) to patient rooms (Pn)	P9=3, P10=4, P11=3, P12=5, P13=5, P14=4, P15=3, P16=3, P17=4, P18=4, P19=5, P20=5, P21=2
Mean depth from nurse desk (N2) to key points (Mn, E2, Pn)	2.35	**Mean depth from nurse desk (N2) to patient rooms (Pn)**	3.84
Depth from milieu (M2) to patient rooms (Pn)	P9=2, P10=1, P11=2, P12=2, P13=2, P14=1, P15=3	Depth from nurse desk (N2) to breakroom (B)	4
Depth from milieu (M2) to patient entry (E2)	2	Depth from nurse desk (N2) to staff entry (E2)	3
Mean depth from milieu (M2) to key points (Pn, E2)	1.87	Depth from nurse desk (N2) to the closest staff restroom (R12)	2
Depth from milieu (M3) to patient rooms (Pn)	P16=3, P17=1, P18=1, P19=2, P20=2, P21=3		
Depth from milieu (M3) to patient entry (E2)	1		

Mean depth from milieu (M3) to key points (Pn, E2)	1.85

Case Study Summary Results

A summary of the analysis of all eight sites are included in Table 4.18.

Table 4.18

Case Study Summary Results

Number of milieus	• Single-milieu unit in six sites • Three-milieus units in two sites (7&8) accommodating 8 to 10 patients for each
Number of patients	• Range of 8-18 patients for single-milieu units • 28 patients for three-milieus units
Square Footage	
Patients seating layout	• Sociopetal seating arrangement in four sites • Sociofugal seating arrangement in three sites (2&3&4)
Nurse desk	• 1 glass-protected open nurse desk • 1 open patient area nurse station
Staff respite rooms	Among the eight sites, four (Sites 2, 3, 5, and 8) have private breakrooms within the unit, while one site (Site 1) includes a small semi-private space behind the nurse's desk.
Private rooms per patients	A range of private rooms per patient from 16.67% to 40%, with a median of 25%—suggesting that half of the EmPATH units provide private rooms for about 1 in 4 patients or fewer.
Entrance	Five sites have a designated staff entrance, while the remaining three sites (2, 7,,& 8) share the main entrance with patients.

Number of Restrooms	• Total number of restrooms across the 8 sites is in the range of 2 - 18 • The number of accessible restrooms per patient ranges from 10 % to 25 %. across all sites • Six of the eight sites (2, 3, 5, 6, 7, and 8) have separate staff restrooms, while the remaining two sites share restrooms between patients and staff
Outdoor space	6 sites none. sites 4 and 8 have outdoors courtyards
Windows and daylighting	With all eight showing substantial window openings in the open main milieu, suggesting a natural light exposure.
Color scheme	A predominant use of cool and neutral color schemes—including blue, gray, white, and light green in bright shades on interior surfaces. Warm tones, such as brown and beige, were primarily used in wood-look materials. Two of the Sites (2&8) featured warmer accents like orange and yellow in small portions of furniture or wall patterns
Graphics / Patterns	Two sites with no pictures. five of the six with available interior images showed the incorporation of nature-themed graphics on the walls of the open milieu, primarily featuring organic elements. expect for one (Site 5) with all solid walls with no patterns.

CHAPTER 5

DISCUSSION OF INTERVIEWS AND CASE STUDIES

While the results of the interviews and case studies have been presented independently in the previous two chapters, in this discussion section I have integrated the interpretation of the findings. The interviews provided valuable insights into eight overarching themes: homelike/calming, positive distraction, staff respite, social distraction, safety and security, maintenance, autonomy, and inclusivity. These themes, aligned with the Psychiatric Staff Environmental Design (PSED) tool (Shepley, 2017), were categorized as design goals under "quality," with associated environmental implications defined as "characteristics." The interview findings were first examined against relevant literature to find supporting or conflicting evidence and were then cross-analyzed with case study data to identify consistencies and discrepancies. Additionally, some findings from the case studies, deemed significant in the literature but not discussed in the interviews, were incorporated to enhance the analysis and update the previous format of the evaluation tool.

Homelike/Calming

Nearly all interviewees emphasized the importance of a homelike quality in EmPATH units, linking it directly to calming and de-escalation effects. As the primary goal of an emergency psychiatric unit is to stabilize and calm patients, participants stressed that environmental design plays a crucial role in facilitating this process. This perspective is strongly supported by existing literature, which highlights the therapeutic value of institutional spaces that incorporate homelike elements (Grosenick & Hatmaker, 2000; Ulrich et al., 2014;

Whitehead, Polsky, & Tapak, 2012; Wilson et al., 1992; Crookshank & Fik, 1984). Participants stressed that the environmental design of EmPATH units serves as a crucial first step in therapeutic treatment, making the careful selection of calming elements essential for reducing stress and facilitating de-escalation. Key features identified included the presence of calming elements, awareness of time and weather, minimizing feelings of confinement and seclusion, and fostering a sense of normalcy.

Calming Elements

Participants discussed various environmental elements that contribute to a calming atmosphere, including calming graphics and patterns, color choices, the presence of daylight, artificial interior lighting, noise control, and materials and finishes.

Calming Graphics and Patterns. One of the most frequently mentioned features was the use of nature-inspired graphics, which, according to existing research, can enhance emotional well-being and reduce stress in healthcare settings (Beukeboom et al., 2012; Raimie et al., 2024; Nanda et al., 2010). Such elements have also been linked to a reduction in seclusion and aggressive behaviors (Borckardt et al., 2011; Ulrich et al., 2018; van der Schaaf et al., 2013). Some interviewees also emphasized the limited use of rigid angles and minimal abstract themes as effective strategies for fostering a calming environment, aligning with studies suggesting that sharp edges can evoke anxiety and tension (Shamy, 2021).

The case studies support these findings: among the eight case studies, five of the six with available interior images showed the incorporation of nature-themed graphics on the

walls of the open milieu, primarily featuring organic elements such as leaves, trees, and flowers.

Calming Colors. Color selection plays a crucial role in psychiatric hospital design, as inappropriate choices may exacerbate depression, increase self-harm tendencies, heighten anxiety, and cause other negative psychological effects (Shamy, 2021; Jablonska, 2024). Participants emphasized the importance of muted, nature-inspired hues for creating a calming environment while cautioning against bold or gang-associated colors. However, they also acknowledged the subjective nature of color perception and the lack of a universal standard for its use. These preferences align with existing research recommending light and subdued tones and minimizing dark shades to maintain a calming atmosphere (Jablonska, 2024).

Research suggests that cool tones such as green, blue, and white are ideal for quiet spaces like patient rooms, offices, and therapy areas, while warmer tones such as orange, red, and beige are better suited for active spaces like living rooms, dining areas, and physiotherapy rooms (Dalke et al., 2005; Shamy, 2021). The case studies support this approach, showing a predominant use of cool and neutral color schemes—including blue, gray, white, and light green—in bright shades on interior surfaces. Warm tones, such as brown and beige, were primarily used in wood-look materials, enhancing a natural feel. Additionally, two of the case studies featured warmer accents like orange and yellow in small portions of furniture or wall patterns, suggesting a cautious but strategic use of warm colors to balance the environment.

Presence of Daylight. Daylight was frequently highlighted by participants for its calming effects and its ability to support de-escalation by making spaces feel less institutional and reducing the sensation of being "trapped" (D8). This perspective aligns with existing

literature that emphasizes the positive impact of daylight on healing processes and stress reduction (Shepley et al., 2012; Welch et al., 2005).

The case studies reinforce the importance of daylight, with all eight showing substantial window openings in the open main milieu, suggesting a deliberate design strategy to enhance natural light exposure.

Good Artificial Interior Lighting. Participants highlighted good artificial lighting as a crucial factor in fostering a calming environment. Discussions centered around the ideal intensity and color variations of lighting. While some participants favored dim lighting for its soothing effect, this preference contrasts with some existing literature, which suggests that low-intensity lighting can increase agitation (Moye et al., 1997) or interfere with circadian rhythms (Verek, 2013). However, literature also acknowledges the value of adjustable lighting that can be tailored to meet individual patient needs based on their emotional or physical state (Jablonska, 2024). Additionally, concerns were raised about fluorescent lighting, with some participants noting that patients tend to avoid it due to its harsh intensity and the disruptive color spectrum it emits.

Noise Control. Noise control emerged as a crucial factor for maintaining a calming environment in EmPATH units. Participants emphasized the need for quiet spaces, contrasting this with the "loud and chaotic" atmosphere of traditional emergency rooms (D8). This finding aligns with research indicating that excessive noise in healthcare settings can increase stress, hinder recovery, and disrupt sleep (Brown et al., 2015). In psychiatric facilities, high noise levels have also been linked to higher blood pressure, anxiety, and depression

Calming Materials and Finishes. Although literature on materials and finishes in psychiatric settings is limited, participants highlighted their importance in creating a pleasant and de-escalating environment. Features such as textured walls to reduce agitation and the use of natural materials like wood were identified as effective. The case studies support this perspective, showing the widespread use of wood in furniture and flooring across most sites.

Awareness of Time and Weather

Many participants highlighted the importance of maintaining awareness of time and weather within emergency rooms, particularly in relation to circadian rhythms. Three key environmental characteristics were identified: the presence of daylight, views of nature, and changeable artificial lighting to simulate the time of day. Research supports the notion that exposure to daylight positively influences patients' circadian rhythms (Shepley et al., 2016.). Additionally, views of nature and artificial lighting adjustments were seen as beneficial in connecting patients to time and the external environment.

Avoiding Feelings of Confinement and Seclusion

Participants emphasized the negative effects of confinement and seclusion on patients, identifying three key factors to mitigate these feelings: openness, access to nature/outdoors, and views of nature. Interior openness—a core feature of the EmPATH model (Zeller, 2008, 2010, 2017)—was highlighted as essential for reducing the sense of seclusion. This perspective aligns with existing research suggesting that visual and physical access to nature significantly supports positive health outcomes (Perkins, 2013; Shepley et al., 2016; Ulrich, 1997).

In the case studies, although available documents did not provide comprehensive information on window views, three of the sites with images showed substantial nature views from windows.

Feeling of Normalcy

Participants emphasized the importance of creating a sense of normalcy in EmPATH units through design choices such as furniture selection, colors, and finishes that feel familiar and non-institutional. This approach aligns with normalization theory, which advocates for homelike environments that fulfill clinical purposes while promoting a sense of normality (Hagerup et al., 2024; Chrysikou, 2019). A recurring theme was the shift away from institutional aesthetics towards spaces that balance safety with familiarity.

The need for “dignified furniture” was specifically mentioned, highlighting the importance of design that respects patients' dignity—a point supported by existing research (Faerden et al., 2023; Hagerup et al., 2024). Case study images from six sites corroborate this perspective, showing the use of homelike and non-institutional furniture in the open milieu.

However, a key challenge identified was the need to balance normative design with safety regulations, ensuring that safety does not come at the expense of comfort and respect for patients.

Table 5.1

Qualities and Characteristics for Homelike/ Calming

Qualities	Characteristics
Calming Elements • Calming Graphics and Patterns • Calming Colors • Good lighting • Noise Control • Calming Materials and Finishes	• Presence of daylight • Good artificial interior Lighting (color and intensity) • Limited use of rigid angles • Nature-themed graphics • Minimal use of abstract graphics • Colors of nature • Prominence of neutral and cool colors • Acoustics and noise control • Use of natural materials
Awareness of Time and Weather • Regulating circadian rhythm	• Presence of daylight • Views of nature • Changeable artificial lighting
Avoiding Feelings of Confinement and Seclusion	• Access to nature/outdoors • Views of nature • Interior openness
Feeling of Normalcy	• Familiar and non-institutional elements • Dignified furniture

Positive Distractions

Although research on positive distractions in mental health facilities is limited, existing studies suggest that incorporating such features benefits both patients and staff in various healthcare settings, including outpatient (Pati & Nanda, 2011) and inpatient environments (Shepley, 2006). Positive distractions are also a key component of Ulrich's supportive design theory for general healthcare settings (1991). Participants in the interviews emphasized the role of positive distractions as a de-escalation tool and a way to alleviate boredom, aligning with findings that identify boredom as a common experience in psychiatric acute units (Marshall et al., 2019). However, they also stressed that the extent of such distraction should be carefully managed to avoid overwhelming patients, as a key design goal

of EmPATH units is to foster human connections. Discussions centered on two main types of distractions: active (engagement opportunities) and passive (ambient enhancements).

Opportunities for Activity (Active)

Meaningful activities in psychiatric settings are known to help patients connect to life beyond the hospital and support recovery by promoting autonomy and social connection (Cutler et al., 2021; Fletcher et al., 2019). Participants emphasized the importance of providing diverse activities as positive distractions, including watching TV or movies, listening to music, reading, playing games, arts and crafts, and physical exercise.

While the case study images did not provide comprehensive evidence of all activity options, they showed the presence of TV screens, bookshelves, and varied furniture ranging from individual recliners to group seating, suggesting a supportive design approach.

A survey conducted as part of the Psychiatric Staff Environmental Design (PSED) tool found that board games were perceived as the most valuable positive distraction, followed by music, while video games were seen as the least significant (Shepley et al., 2016). This aligns with interview findings, where participants identified TV, games, and reading as the most common activities, with music and crafts mentioned less frequently.

However, the use of television emerged as a complex issue. Participants noted challenges such as conflicting viewing preferences and the need for careful content selection to ensure appropriateness. Similar concerns were raised regarding books and magazines, indicating the importance of thoughtful content curation.

Ambient Enrichment (passive)

In addition to active engagement, participants identified passive forms of positive distraction within the ambient environment, including television, background music, and artwork. Views of nature were also highlighted as effective passive distractions, aligning with extensive research showing their positive impact on stress reduction and emotional well-being (Nanda et al., 2010; Ulrich, 1984; Ulrich, 1997; Garg & Dewan, 2022; Jablonska & Furmanczyk, 2024).

The presence of televisions is evident in many interior images of the case study sites. However, the use of television sparked mixed opinions among participants in the interviews. While some viewed it as a beneficial source of distraction, others questioned whether it served as a positive or negative distraction. One participant noted that television could create a passive, waiting-room atmosphere, similar to an airport setting, while another raised concerns about its potential to distort time perception, unlike magazines or artwork, which allow for more flexible engagement. As a compromise, some participants suggested using televisions in silent mode to display calming imagery rather than traditional programming.

The role of artwork as a passive distraction was widely supported by both participants and existing research. Studies indicate that nature-based art can help reduce anxiety and agitation in mental health settings (Nanda et al., 2011). Interviewees emphasized the immediate emotional impact of nature-inspired murals and paintings, which they saw as contributing to a "healing effect." This approach is also reflected in the case studies, with most sites showing nature-based murals or graphics of nature on the walls. However, participants

acknowledged the challenge of selecting the "right type" of artwork, emphasizing the need for careful consideration of thematic elements and their potential psychological effects.

Finally, background music was mentioned as a potential passive distraction but was the least frequently discussed topic in the interviews. This may suggest that, while music has recognized therapeutic benefits, its role in mental health settings is less explored or prioritized compared to other environmental features.

Table 5.2

Qualities and Characteristics for Positive Distraction

Qualities	Characteristics
Opportunities for activity (Active)	• Watching TV or movies • Listening to radio or music • Reading books and magazines • Playing games (e.g. puzzles, word search, etc.) • Arts and craft activities • Physical activity exercises
Ambient enrichment (passive)	• Presence of TV • Presence of background music • Presence of artwork • Views of nature

Staff Respite

Recent studies emphasize the crucial role of respite areas for healthcare staff in hospital environments (Nejati, Rodiek & Shepley, 2015; Nejati, Shepley, & Rodiek, 2016; Nejati, Shepley, Rodiek, Lee & Varni, 2016). However, research on this topic remains limited

within mental and behavioral health settings and is entirely absent in emergency psychiatric units. Nevertheless, the necessity of dedicated staff respite spaces in psychiatric facilities is undeniable. The nature of psychiatric care, particularly in managing self-harm prevention and restraint interventions, places significant psychological and emotional strain on staff (Salerno et al., 2012).

In a study by Shepley et al. (2016), findings from interviews with staff, designers, and administrators in mental and behavioral health environments reaffirm the importance of designated respite areas, highlighting the need for spaces where staff can temporarily withdraw from their demanding work environment.

Interview participants unanimously supported the value of respite areas within EmPATH units, providing diverse perspectives based on their experiences and perceived gaps in current facilities. A key distinction emerged regarding the location of these spaces: while some staff preferred on-unit respite areas for immediate accessibility, others advocated for off-unit spaces to allow a more complete mental and emotional break.

The case studies also reflected different approaches to staff breakrooms, with four units having breakrooms, three without any breakroom inside the unit, and one with a small semi-private respite area for staff. This variation highlights the need for flexible strategies to accommodate different spatial and operational constraints. Based on participant insights and case study data, staff respite strategies were categorized into on-unit and off-unit opportunities.

Staff Respite Inside the Unit

On-unit respite spaces included private staff breakrooms, semi-private areas behind the nurse station, and the use of the milieu for snacks and brief breaks. Some participants also mentioned the dual use of quiet rooms shared by staff and patients and emphasized the importance of separate staff bathrooms. Case studies show that among the eight sites, four (Sites 2, 3, 5, and 8) have private breakrooms within the unit, while one site (Site 1) includes a small semi-private space behind the nurse's desk.

Private Staff breakroom. Many participants supported the idea of private breakrooms within the unit, provided they were designed to promote relaxation and reduce stress. This feature was evident in four of the case studies, which included separate rooms with kitchenette amenities and resting furniture for staff breaks. In the interviews, effective break spaces were associated with access to natural light, comfortable furniture, and the availability of books, magazines, and artwork.

Designers also emphasized environmental factors that enhance the restorative quality of these spaces, such as access to fresh air, daylight, noise reduction, natural elements, and, when possible, direct access to outdoor spaces. Although research on staff respite in psychiatric settings is limited, studies in general healthcare environments support these principles. Natural daylight, views of nature, biophilic elements, and outdoor access have been shown to significantly improve the restorative potential of break spaces (Nejati et al., 2016).

Another factor contributing to the effectiveness of staff breakrooms is their proximity to the nurse desk, as studies indicate that staff break spaces tend to be used more frequently

when positioned closer to the nurse desk (Nejati et al., 2015). The step depth map analysis in the case studies shows that among the four units with breakrooms, the step depth ranges from 2.00 to 5.00 steps, indicating varying levels of proximity across different units.

However, participants frequently cited spatial constraints and financial limitations as challenges to implementing these features effectively, suggesting a need for cost-effective and space-efficient design solutions for staff respite areas.

Semi-private Staff Break Areas. Some participants mentioned having semi-private break areas near the nurse desk to accommodate short breaks, meals, and private conversations, often as a solution to space constraints that prevent the inclusion of dedicated staff breakrooms. Case studies show that one site among the small-scaled units (Site 1) adopted a similar approach, with a semi-private space located behind the nurse desk.

Dual Use of Quiet Rooms for Both Staff and Patients. Another notable on-unit respite strategy involved the dual use of quiet or multi-sensory rooms for both patients and staff. Participants suggested that the calming environments designed for patient relaxation could also provide staff with a temporary retreat from workplace stress.

Creating Personal Break Spaces in Unused Corners. Some staff utilized corners of the milieu for short breaks, arguing that a well-designed, homelike atmosphere in patient areas could serve as an informal respite space. This practice highlights the value of flexible space utilization for staff well-being.

Separate Staff Bathrooms. A key concern raised was the lack of separate staff bathrooms. Staff who had to share restrooms with patients or leave the unit to access facilities

in the main emergency department expressed frustration, underscoring the importance of dedicated staff amenities.

Case studies show that six of the eight sites (2, 3, 5, 6, 7, and 8) have separate staff restrooms, while the remaining two sites share restrooms between patients and staff. However, across all sites, the step depth maps indicate that the depth from the nurse's desk to the nearest staff-accessible restroom ranges from 2.00 to 4.00 steps, suggesting a reasonably accessible arrangement.

Staff Respite Outside the Unit

Interviews revealed that due to spatial and financial constraints, many units lack designated staff breakrooms and instead rely on shared break spaces with other hospital departments, which sometimes limited their effectiveness. Case studies show that three of the eight sites (4, 6 and 7) do not have staff breakrooms inside the units.

Despite these limitations, several staff members highlighted the benefits of using break spaces outside the unit, such as hospital cafeterias, emergency department breakrooms, and family meeting rooms. Some preferred to take short walks around the hospital, seeking a change of scenery in the lobby or cafeteria, while others relied on shared breakrooms with other hospital units. Interestingly, even when private breakrooms were available within the unit, many staff members still chose to step outside, explaining that leaving the immediate work environment helped them mentally reset.

Distance to the Exit. Although this issue was not directly raised in the interviews, some staff members emphasized the importance of the proximity of staff respite areas to the

exit to ensure they remain accessible without disrupting duties. Supporting this view, a study suggests that respite areas are more likely to be used if they are close to nurses' work areas (Nejati et al., 2015).

In this context, it can be inferred that spaces outside the milieu intended for staff respite, such as common breakrooms shared with other hospital units, hallways, or outdoor areas, should ideally be easily accessible via the unit exit. Therefore, the distance from the nurse desk to the exit could influence the effectiveness of these spaces and was examined in the case studies.

The case studies indicate that the distance from the staff entrance to the nurse desk ranges from 2.00 to 5.00 steps across the eight units, with the maximum distance from the nurse desk to the farthest point of the unit ranging from 3.00 to 7.00 steps. While no optimal step depth is specified in the literature, these findings suggest that the exit for staff is located on the deep lines of the step depth map from the nurse desk, indicating it is among the farthest points of accessibility for staff within the unit.

Separate Staff Entrance. Although the separate staff entrance was not mentioned in the interviews, literature suggests that staff respite is significantly influenced by access to outdoor spaces and a dedicated staff entrance (Shepley et al., 2016). Case studies show that five of the eight sites have a designated staff entrance, while the remaining three sites (2, 7, and 8) share an entrance with patients.

Using Outdoor Space for Staff Respite. Another significant theme in the discussions was the use of outdoor spaces for staff respite. Participants from units that offered accessible

outdoor areas provided overwhelmingly positive feedback, aligning with existing research indicating that natural elements in respite areas significantly enhance their restorative quality, with direct outdoor access being the most effective stress reliever (Nejati et al., 2016).

However, the case studies do not provide reliable support for this finding, as only two of the sites had outdoor courtyards or patios, both of which were connected to the main milieu. Additionally, there is no information on whether these outdoor spaces are accessible to both staff and patients or are designated for either group exclusively. This lack of clarity limits the ability to assess the effectiveness of outdoor spaces for staff respite within these units.

Table 5.3

Qualities and Characteristics for Staff Respite

Qualities	Characteristics

Staff Respite Inside the Unit	• Private or semi-private staff breakroom
	  ○ Optimal location of the breakroom in relation to the nurse desk
	  ○ Natural daylight
	  ○ Views of nature
	  ○ Biophilic elements
	• Dual use of quiet rooms for both staff and patients
	  ○ Optimal number of rooms
	• Creating personal break spaces in unused corners
	  ○ Varied levels of privacy in the milieu
	• Separate Staff Bathrooms

Staff Respite outside the Unit	• Distance to the exit • Separate staff entrance • Using outdoor space for staff respite

Social Interaction

The role of social interaction in improving mental health outcomes is well-documented (Davis et al., 1979; Devlin, 1992; Gutkowski et al., 1992; Jovanović et al., 2019; Shepley et al., 2017; Sidman & Moos, 1973). Interviewees consistently emphasized social interaction as a defining feature of EmPATH units, noting that staff-patient, patient-patient, and staff-staff interactions were significantly more effective compared to traditional emergency psychiatric settings.

The case study analysis supports this perspective, highlighting the prevalence of open nurse desks, open milieus, and flexible furniture arrangements, all strategically integrated to encourage group activities and engagement. The alignment between literature, interview insights, and case study findings reinforces the importance of these environmental features in fostering social interaction. Previous studies have similarly emphasized the impact of homelike environments, shared spaces, open nursing stations, and adaptable furniture in promoting interaction within psychiatric care settings (Jovanović et al., 2019).

Staff-Staff Interaction

Participants highlighted that the design of EmPATH units significantly enhances staff interactions, emphasizing the role of open spaces, open nurse stations, and the close proximity of interdisciplinary professionals. These design features were seen as key to promoting teamwork, collaboration, and cross-functional cooperation among staff, contrasting with the more compartmentalized interactions in traditional psychiatric units. Existing research supports this view, indicating that open layouts and centralized visibility enhance

communication, team interaction, and cohesion (Gharaveis et al., 2017; Liddicoat, 2019; Zamani, 2018). Furthermore, positioning staff workstations within sight of each other has been shown to improve morale and strengthen communication among caregivers (Lenaghan et al., 2018; Liddicoat, 2019).

Many of these design principles are evident in the case studies, as visibility graphs confirm the open-space approach across all sites. Convex maps illustrate the adjacency and interconnection of staff and patient areas, with some sites showing greater integration than others. However, beyond the centralized model, the decentralized operational system of EmPATH units—where staff frequently move throughout the space—suggests that relying solely on connectivity maps to interpret staff interactions may be insufficient.

An analysis of convex maps from three of the eight sites (Sites 1, 4, and 5) reveals that staff-designated areas (including nurse desks, charting stations, offices, bathrooms, and breakrooms) are often positioned at the peripheries, as indicated by blue nodes, suggesting segregation from patient areas. While this spatial arrangement might seem to limit staff-patient interactions, interview findings and supporting literature suggest that clustering staff workstations within semi-private settings can enhance collaborative communication among staff. These findings highlight the need for a strategic balance between open and private spaces and underscore the importance of further studies to determine the optimal level of integration and separation of staff areas to maximize both communication and efficiency in EmPATH units.

Staff-Patient Interaction

Interviewees indicated that staff-patient interactions in EmPATH units were significantly more effective than in traditional emergency psychiatric rooms. This observation aligns with existing literature emphasizing the importance of strong patient-staff relationships in psychiatric care (Dexter & Wash, 1997; Forchuk, 1995; Peplau, 1988). The synthesis of case studies, literature, and interview findings underscored three key environmental qualities that enhance these interactions: easy access to staff, sustained staff-patient connections, and opportunities for one-on-one consultations. The environmental characteristics that support these goals include open spaces, minimal interior barriers, optimally sized milieus, and the strategic location and design of nurse desks.

Openness of Space. The openness of space and nurse desks was consistently recognized as a positive factor in sustaining staff-patient interaction. Interviewees highlighted that open designs allowed unobstructed visibility and ease of access to staff. This finding is supported by space syntax analysis, which shows high visibility in the main milieus across all case studies. Previous studies utilizing space syntax methods in healthcare settings have demonstrated that nurses tend to occupy areas with greater visibility towards patients, thereby facilitating more frequent interactions (Haq & Luo, 2012; Lu et al., 2009). The visibility graphs from the case studies support this finding by demonstrating high visibility in the main milieus, while the convex maps indicate open layouts with minimal interior barriers. This alignment reinforces the importance of strategically designed open spaces in promoting accessible and visible environments for both staff and patients.

Optimal Size of the Milieu. Participants expressed concerns that larger units might impede staff-patient interactions due to increased distances and reduced visibility. The literature supports this view, suggesting that smaller, homelike units with up to 20 beds are more conducive to positive social interactions (Jovanović et al., 2019). Case study data reveal a range of 8 to 28 patients per unit, with some units incorporating multiple milieus. The maximum number of patients per milieu across all the case studies is 18.

Optimal Location of the Nurse Desk (visibility and accessibility). The proximity of the nurse desk to key areas such as patient rooms, entrances, and the milieu was identified as a critical factor in facilitating staff-patient interactions. Case study findings reveal that the mean step depth for patients to reach the nurse desk from the key points (Entrance, milieu, and patient private rooms) ranges from 2.0 to 3.0 steps, indicating relatively high accessibility. This observation aligns with the environmental quality of easy access to staff, as emphasized in the interviews. Furthermore, visibility graphs demonstrate that the nurse desk is positioned in areas of high visibility in most units, with the exception of Case Study 4. These findings are consistent with existing research suggesting that open nurse stations in visible and accessible locations significantly increase interaction frequency (Gurascio-Howards & Malloch, 2007; Jovanović et al., 2019; Whitehead et al., 1984).

Good Design of the Nurse Desk. The nurse station design was another challenging topic raised by the interviews, mostly in terms of use of glass partitions and the optimal desk height. Many of these insights align with existing research on psychiatric facility design. Research suggests that enclosed stations, particularly those with plexiglass, can make staff feel confined (Shattell et al., 2015). However, opinions in the interviews were mixed

regarding the use of glass in nurse stations—while most participants preferred an open design, some raised security concerns.

Integration of Staff and Patient Areas. Although interviewees did not explicitly discuss the integration of staff and patient areas, convex maps from most units (Sites 2, 3, 6, 7, 8) suggest a relatively integrated layout. Staff-designated areas appeared scattered among patient-designated spaces, potentially facilitating incidental staff-patient interactions. However, this layout raises questions about the balance between integration for interaction and the need for staff privacy and collaboration, which requires further research to explore.

Opportunities for Group Activities. Group activities within the milieu were identified as a crucial environmental feature for fostering ongoing staff-patient engagement. Interview participants emphasized that staff involvement in activities such as playing games significantly strengthened social connections and helped maintain positive relationships between staff and patients. This perspective is reinforced by existing research, which underscores the role of meaningful activities in enhancing patient safety and promoting recovery by encouraging choice, autonomy, and connections with both self and others (Cutler et al., 2021; Fletcher et al., 2019). The case studies further support this finding, showing that 7 out of 8 units provided varied furniture arrangements to accommodate a range of activities, indicating a deliberate design strategy to promote interaction and flexibility in the milieu.

Opportunities for One-on-One Consultations. Opportunities for private one-on-one consultations were highlighted as essential for fostering strong staff-patient interactions in EmPATH units. Participants emphasized the importance of balancing private and communal spaces to enable staff to engage with patients while respecting their preferences. The

flexibility of spatial configurations was identified as crucial for accommodating diverse patient needs. The availability of private rooms in all the sites, as well as consult rooms or multi-purpose rooms, supports this approach.

Patient-Patient Interaction

Nearly all participants identified strong patient-patient interaction as a defining and impactful feature of EmPATH units, attributing this to specific design elements such as open milieus and diverse furniture arrangements. This observation is consistent with existing research, which emphasizes the role of psychiatric facility design in fostering social interaction by providing shared spaces that promote engagement among patients as well as between patients and staff, thereby cultivating a sense of community (Davis et al., 1979; Devlin, 1992; Gutkowski et al., 1992; Sidman & Moos, 1973). Additionally, studies have highlighted the influence of furniture arrangements on the social environment, suggesting that group tables and shared recreational areas can significantly enhance positive patient interactions (Gutkowski et al., 1992; Timko, 1996).

Interview findings reinforce these insights, indicating that the open and communal layout of EmPATH units facilitates organic social connections and mutual support among patients—contrasting sharply with traditional settings that tend to isolate individuals. Several participants noted that shared experiences within these open spaces naturally fostered bonds among patients. However, some participants also raised concerns about potential challenges within an interaction-based design, particularly regarding higher-acuity patients who might exhibit aggressive behavior or contribute to conflicts. To address these concerns, participants

emphasized the need for a balance between social engagement and privacy, advocating for varied spatial configurations that include both communal and private areas.

The synthesis of interview data, case studies, and literature suggests that the effectiveness of patient-patient interactions in EmPATH units depends on a combination of high integration in main milieus, opportunities for group therapy sessions, diverse shared activities, and flexible spaces that accommodate different levels of privacy. This approach appears to support not only socialization but also patient autonomy and safety, highlighting the importance of strategic spatial design in psychiatric care settings.

High Integration of the Milieu. Although the spatial integration values could not be extracted due to the limited scope of this research, step depth analysis indicates that the mean step depth from key patient areas, including all patient rooms and the patient entrance, to the main milieus ranged from 1.64 to 3.75 steps. This range suggests that the milieus offer a reasonable level of accessibility for patients, potentially encouraging interactions within these spaces. The findings align with previous research suggesting that higher spatial integration is associated with increased social interaction by reducing perceived distances between shared spaces (Hanson & Zako, 2005). The relatively low step depth observed in the case studies implies that the spatial configuration of EmPATH units may effectively balance accessibility and social engagement within the milieu.

Opportunities for Group Therapy Sessions. Some participants identified group therapy sessions as a significant factor in fostering both staff-patient and patient-patient interactions. This perspective aligns with findings from the PSED survey (Shepley et al., 2016), which recognized group therapy as a primary contributor to positive social interactions

in psychiatric settings. While the available documents from the sites do not provide comprehensive confirmation of this practice, the presence of group tables in open milieus and multi-purpose rooms, as well as movable recliners that allow flexible room layouts, suggests a similar approach to supporting group interactions. These design elements imply a strategic intent to facilitate both formal and informal group therapy sessions, enhancing the potential for social engagement and therapeutic outcomes

Opportunities for Shared Activities. The availability of diverse group activities was identified as a defining feature of EmPATH units. Participants emphasized that the design of these units encouraged community-building, enabling patients to sit together, play games, and engage in shared activities—contrasting sharply with the isolation often experienced in traditional emergency department rooms. Existing research supports the role of meaningful activities in promoting social engagement, highlighting that communal spaces and varied activities can enhance patients' sense of autonomy and community (Cutler et al., 2021; Fletcher et al., 2019). Tyson (2002) similarly found that psychiatric facilities with redesigned wards, including dining areas, lounges, activity rooms, and outdoor seating, facilitated stronger staff-patient interactions than traditional ward designs (Jovanović et al., 2019).

Findings from the PSED survey further reinforce this view, identifying communal dining and group activities as key factors contributing to social connection and a sense of community (Shepley et al., 2016). The case studies support this perspective, showing that 7 out of 8 units offered a variety of furniture arrangements to support different activities, indicating a deliberate design strategy to promote interaction and flexibility. Additionally, some units provided semi-private zones with sufficient visibility from the nurse desk but

limited accessibility, creating more private environments for small group discussions and activities.

Varied Levels of Privacy. The provision of privacy and the inclusion of private zones within the milieu were prominent topics raised in the interviews.Varied levels of privacy in the open milieu are evident in the visibility graphs from the case studies. The visual integration maps show a range of integration levels, with high integration associated with more public and engaging spaces—particularly in the main milieus—supporting social interaction and enhancing safety through improved visibility. In contrast, areas with lower visual integration suggest greater privacy, aligning with findings by Geng et al. (2020) that lower integration can help maintain privacy in patient wards.

However, this balance is not consistent across all case studies. For instance, Case Study 3 and the upper milieu of Case Study 8 exhibit less variation in visual integration, indicating a more uniform level of privacy that may limit flexibility in accommodating different patient needs. Additionally, factors such as unit size and the spatial placement of areas, which were not fully explored in this analysis, appear to influence privacy levels.For example, the map of Case study 3—a smaller-scale unit—shows varied visual integration; however, cross-referencing with the convex map reveals that this lower integration spot is near the entrance and security area, with no seating available. This suggests that the area cannot genuinely function as a private space within the milieu. These findings emphasize the need for a more context-sensitive spatial design approach that carefully balances privacy and social engagement.

Table 5.4

Qualities and Characteristics for Social Interaction

Qualities	Characteristics
Staff-staff interaction • Promoting teamwork and collaboration • Cross functionality among staff with different expertise	• Adjacency of staff workspace • Open layout of the milieu • Positioning staff workstations within sight of one another
Patient-staff interaction • Easy access to staff • Maintaining Connections Between Staff and Patient • Opportunity of one-by-one consultation	• Openness of space • Optimal size of the milieu • Optimal location of the nurse desk • Good design of the nurse desk • Integration of staff and patient areas • Opportunities for group activities • Opportunities for 0ne-on-one Consultation
Patient-patient interaction • Creating bonds / sharing experiences • Group activities • Choice of socialization and isolation	• High integration of the milieu (or accessibility to the milieu) • Opportunities for group therapy sessions • Opportunities for shared activities • Varied levels of privacy in the milieu

Safety and Security

Healthcare facilities, particularly emergency departments, are recognized as high-risk workplaces where staff frequently encounter verbal and physical violence (Amaniyan et al., 2020; Anderson et al., 2010; Carayon et al., 2014). Studies indicate that ensuring adequate safety and security is the highest priority among environmental features in mental and behavioral health settings (Shepley et al., 2016). This concern was echoed in the interviews, where participants emphasized the importance of balancing safety with aesthetics to maintain a homelike environment and uphold normalcy and dignity for patients.

Participants shared insights on safety measures in EmPATH units, focusing on patient safety, staff safety, control and accessibility, and high-risk zones.

Patient and Staff Safety

Patient and staff safety is influenced by both operational and environmental features (Foster et al., 1999; Shepley et al., 2016). While acknowledging the impact of operational practices, participants' insights focused on environmental features such as visibility and accessibility of patient areas, anti-ligature furniture, privacy options, video monitoring, and emergency call buttons.

Good Visibility of Patient Communal Areas. Visibility is recognized as a crucial component of safety measures in emergency departments (EDs) (Gharaveis et al., 2024; Liddicoat, 2019). Similarly, research on inpatient psychiatric facilities suggests that areas with greater openness and visibility, such as dayrooms, tend to experience lower incident rates (Bayramzadeh, 2016). Interviews and case studies reinforced these findings, with participants describing the openness and visibility of the milieu as key features for ensuring safety in EmPATH units. Additionally, case studies indicated high visual connectivity across the units.

Ensuring Line of Sight from the Nurse Desk. The importance of a direct line of sight from the nurse desk to patient areas is well-documented as a critical factor for both safety and care efficiency (Fay et al., 2017; Lu, 2010; Stichler, 2009). Literature suggests that better visibility enhances patients' sense of safety, lowers response times, and reduces falls and failure-to-rescue episodes (Stichler, 2009).

Interview findings supported these insights, emphasizing the need for clear sightlines to promote both patient safety and staff security. Participants highlighted the importance of unobstructed visibility from the nurse desk, describing it as essential for monitoring the milieu effectively, with one saying "An environment that allows constant observation by all staff members, due to the unit's design, is essential for patient safety" (D8). Design elements such as the "openness of the milieu" and the "lack of hidden corners" were frequently mentioned as key attributes for safety.

Case studies reinforce these findings. Isovist maps show that most units maintain a good line of sight from the nurse desk, influenced by the location of the desk, space geometry, and orientation of nurse seats. Units with centralized nurse stations and a combination of different seating angles provided a broader peripheral view across the space. In contrast, units with more complex geometries—featuring corners and spatial breaks—faced challenges in maintaining clear sightlines, potentially impacting safety and monitoring capabilities.

These findings underscore the importance of strategic positioning of the nurse desk and careful consideration of spatial layout to enhance visibility and safety in EmPATH units.

Visual Integration of Patient Communal Areas. Beyond the targeted visibility from the nurse desk, the openness and visibility of patient communal areas on a broader scale—determined by visual connectivity and visual integration—have been suggested as crucial for ensuring patient safety and security. This aligns with the open design approach frequently mentioned in the interviews as a defining characteristic of EmPATH units. Studies indicate that emergency departments (EDs) with high visual connectivity across all locations can prevent, control, or minimize security risks more effectively (Gharaveis et al., 2024).

Additionally, research using space syntax methods suggests that nurses tend to occupy spaces with higher visibility toward patient areas, enhancing safety and maximizing nurse-patient interaction time (Lu, Peponis, et al., 2009; Lu, 2010; Lu & Zimring, 2010).

Case studies reinforce these insights. Visibility graphs for all sites demonstrate a clear preference for the open design approach in EmPATH units, with the majority of the unit's square footage—excluding private patient rooms and some staff areas—showing high levels of visual connectivity. However, the degree of visual integration varies across different areas, with the highest levels typically observed in the milieu or around the nurse desk.

Staff Accessibility to Patient Areas. In addition to ensuring visibility of patient areas, the physical accessibility of nurses to patients is equally crucial, as extensively discussed in the literature (Cutler et al., 2021; Harrington et al., 2019; Lindsey et al., 2018). This underscores the need for a balanced design approach that integrates both high visibility and easy physical access to key patient areas, particularly in emergency psychiatric settings. This aspect has been specifically examined in terms of accessibility to both the open milieu and private patient rooms.

Accessibility to the Milieu. Step depth and convex map analysis reveal that the distance from the nurse desk to the farthest open convex area of the milieu (including corridors) ranges from 1.00 to 5.00 steps, with a median of 3.00 steps. This suggests that while visibility graphs indicate high visual connectivity across most convex areas, more than half of the units have reduced physical accessibility to these areas.

Cross analysis using Isovist maps and convex maps further shows that despite some sub-areas in the open milieu or corridors being within the line of sight from the nurse desk, they are less physically accessible due to longer distances or deeper step depths. This disparity between visibility and physical accessibility may delay response times during incidents, highlighting a potential design challenge in ensuring both open sightlines and easy access.

Accessibility to Private Rooms. Accessibility of staff to private patient rooms is also critical, given that personal spaces in acute facilities are often where self-harm incidents occur, emphasizing the need for quick access (Harrington et al., 2019; Cutler et al., 2021). Step depth maps show that the distance from the nurse desk to private rooms ranges from 2.00 to 3.75 steps, with a median of 2.47 steps. This suggests that a majority of the units have lower step counts, indicating better accessibility to private rooms compared to other areas.

Monitoring Video Cameras. Interviews highlighted video cameras as essential for ensuring both patient and staff safety. Participants emphasized the strategic placement of cameras, particularly in quiet rooms where patients may be alone and require additional monitoring. A key consideration was integrating cameras subtly into the environment to avoid disrupting the patient experience. This aligns with research by Liddicoat (2019), which recommends housing cameras in tamper-resistant enclosures and visually making them as unobtrusive as possible to maintain a supportive care setting.

However, some participants did not see a need for cameras outside of quiet rooms, as the milieu already had high visibility and staff were constantly present among patients.

Access to Emergency Call Buttons / Panic Buttons for staff. Participants underscored the importance of panic buttons in EmPATH units, which staff can either wear or find mounted on walls, as essential safety tools.

Anti-ligature Furniture and Equipment. Participants highlighted the importance of anti-ligature furniture and equipment as a critical component of patient safety, a concern widely discussed in the psychiatric facility literature. Research indicates that while suicide-resistant and anti-ligature solutions have advanced, an ongoing dialogue is necessary to address emerging risks and refine existing guidelines (Shepley & Pasha, 2018; Shepley et al., 2016). Key design considerations focus on mitigating ligature risks and addressing safety concerns related to self-harm, aggression, elopement, and hazardous items (Roberts et al., 2024).

In the interviews, the most concerning ligature risks were identified as bathroom fixtures, wall-mounted elements, recliners, and ceiling fixtures. These elements were seen as high-risk due to their potential use for self-harm. Participants emphasized the need for discreet integration of anti-ligature features to avoid a clinical or prison-like appearance, aligning with the challenge of balancing safety and normalcy. As Shepley et al. (2016) noted, "Anti-ligature features should be camouflaged as they can be demeaning."

This balance between safety and a therapeutic environment also resonates with Lundin's (2020) perspective that "offering patients and staff a healing and safe environment is the most important architectural challenge in the design of psychiatric wards." This highlights the ongoing design challenge of integrating anti-ligature solutions in a way that maintains a calming and dignified environment.

Choice of Privacy. Some participants emphasized that privacy serves as a form of self-preservation for patients, providing them with a sense of control over social interactions. Privacy in personal spaces—such as bedrooms and bathrooms—was highlighted as a critical safety feature. Research supports this view, suggesting that privacy can enhance the perception of safety. A study of former patients in acute mental health facilities found that privacy contributed to a supportive environment, whereas breaches of privacy led to feelings of fear and vulnerability, leaving patients feeling unsafe and unable to protect themselves (Cutler et al., 2021). However, it is also acknowledged that personal spaces in acute facilities pose a higher risk for self-harm incidents, necessitating designs that allow quick staff access (Cutler et al., 2021; Harrington et al., 2019). This underscores the need to balance privacy, security, and surveillance in the design of psychiatric environments.

The visibility graphs of the case studies reflect this balance. Visual integration maps show varied degrees of integration, where high integration is linked to public and engaging spaces—such as the milieus—promoting social interaction and safety through increased visibility. Conversely, lower integration suggests greater privacy. According to space syntax studies, low visual integration can help maintain privacy in patient wards (Geng et al., 2020).

Case studies show some units with more varied levels of integration and others with less. However, as discussed before, visibility maps alone are not sufficient to determine privacy. Unit size and area placement also influence privacy, which is not fully accounted for in this analysis.

Detection and Access Control

Participants discussed approaches for managing access and detection, which lay under two categories of access control and detection systems.

Access Control: Locking In/Out, Double Doors. The importance of access control for patient safety was raised by some participants, with one describing it as the most critical aspect, particularly in managing doors. They highlighted the use of double doors and locking mechanisms to prevent unauthorized exits, suggesting the use of access badges instead of physical keys to improve security and control.

Detection Systems. Some designers emphasized the importance of detection systems for safety, mentioning the use of weapons detection systems, such as metal detectors, and lidar-based location sensors.

Zones With Higher Risks

Specific zones with greater safety risks were highlighted in the interviews.

Restrooms. The interviews highlighted safety risks associated with restrooms, as they are the only areas where patients are completely alone without surveillance, a concern also discussed in previous research (Cutler et al., 2021; Harrington et al., 2019). Designers and staff emphasized the challenges in designing these spaces to minimize risks. One designer noted that showers and bathrooms are high-risk environments in psychiatric settings. Safety measures discussed included controlled access to bathrooms, such as badged doors and

monitoring time spent in the space, to prevent self-harm and co-mingling. Additionally, one designer suggested using anti-barricade doors for added safety.

Outdoor Courtyard. The interviews revealed that outdoor courtyards in units with such spaces pose challenges in balancing safety and patients' independent access. Some mentioned that these areas are typically enclosed to prevent patients from leaving or entering, effectively turning them into exterior rooms.

Involuntary Lobby. Although not all EmPATH units have an involuntary lobby, the decision to accept both voluntary and involuntary patients, or only voluntary ones, varies. For those that accept both, some choose to have separate entrances and lobbies for each. One designer from a large-scale unit highlighted the involuntary lobby as a high-risk location, noting, “The involuntary lobby, where patients are being brought in by emergency departments or police, is a pretty high-risk location” (D7).

Comfort/Quiet Rooms. Many participants also highlighted the safety risks associated with private rooms, where patients may be alone. This aligns with current research, which suggests that personal spaces in acute facilities are where self-harm incidents are most likely to occur, necessitating designs that allow staff quick access to these areas (Cutler et al., 2021; Harrington et al., 2019).

Care Desk. There was a discrepancy in opinions about the use of glass in nurse desks, based on participants' experiences. While most participants appreciated the concept of an open nurse desk without glass, some found it challenging to implement in practice. The same concern about balancing staff protection with patient safety and normalization. has been

addressed in a study by (Shepley et. al., 2016), finding emphasized the need for staff to maximize supervision and engage directly with patients. However, in units with potentially violent patients, some staff viewed the nurse station as a necessary refuge during emergencies.

Table 5.5

Qualities and Characteristics for Safety and Security

Qualities	Characteristics

Patient and staff safety	• Good visibility of patient communal areas
	  o Ensuring line of sight from the nurse desk
	  o Visual integration of patient communal areas
	• Accessibility of staff to patient areas
	  o Accessibility to the patient communal areas from the nurse desk
	  o Accessibility to the patient's private rooms from the nurse desk
	• Anti-ligature furniture and equipment
	• Choice of privacy
	• Monitoring video cameras
	• Access to emergency call buttons (panic buttons) for staff

Detection and access control	• Access control: Locking in/out, double doors. • Detection systems
Considerations for high-risk zones	• Restrooms • Patient private rooms • Outdoor courtyard

Maintenance

Although participants acknowledged the importance of maintenance, they did not emphasize it as significantly different from other healthcare environments. However,

maintenance is undeniably an important issue to consider in design decisions. Prior studies have underscored the importance of maintenance, noting that factors such as clean furniture, floors, walls, along with properly functioning systems, are essential for a well-maintained environment (Grosenick & Hatmaker, 2000; Shepley et al., 2016; 2017). Research further suggests that these elements contribute to greater satisfaction and positive attitudes among occupants (Holahan & Saegert, 1973; Potthoff, 1995). The input of the interview was categorized into cleaning surfaces, repair and durability, and challenging spaces to maintain.

Cleaning Surfaces

According to Shepley et al. (2017), one of the most highly regarded factors for maintaining a well-kept environment are clean floors and walls. The same issue was raised in the interviews. However, a general challenge mentioned was cleaning in close proximity to patients due to the open-space design concept, which occasionally might make patients feel uncomfortable. The interviews emphasized the importance of selecting materials that facilitate easy cleaning and maintenance in high-use surfaces, including floors, walls, and nurse desk glass. For instance, staff discussed the use of welded vinyl flooring and wipeable plastic wall coverings, which simplify cleaning and help maintain hygiene. Additionally, reinforced glass around nurse stations was appreciated for its practicality, while polycarbonate enclosures for safety, though effective, presented challenges in upkeep.

Repairing and Durability

Several participants expressed concerns regarding the repair and durability of frequently used elements, particularly recliners and wall materials, highlighting the need for

long-lasting and easily maintainable furnishings. In line with these concerns, Davis, Glick, and Rosow (1979) recommend selecting furnishings that are damage-resistant and can be easily repaired or replaced. based on their experiences renovating a psychiatric facility. However, creating furnishings that are both damage-resistant and aesthetically appealing presents a challenge, as noted by Shepley et al. (2016), who emphasize the difficulty in balancing durability

Repairing and Durability of Recliners. Recliners were identified as prone to wear and tear, with some staff members noting issues even within the first year of use. One staff member explained that a batch of recliners broke due to heavy use, while another highlighted the need for repairs due to visible damage. Participants emphasized the importance of investing in durable furniture for long-term use.

Durability of Wall Materials. The durability of wall materials was highlighted by some participants, who emphasized the need to balance aesthetics, acoustics, and resilience. One designer noted the challenge of finding durable and cleanable materials, suggesting that harder materials are necessary for long-lasting performance. A staff member shared their experience with Astrovan, a durable wall covering that can withstand impact without significant damage.

Difficult Spaces to Maintain

Participants identified certain areas as being particularly challenging to maintain, including bathrooms, outdoor spaces, and the triage area.

Bathroom. Bathrooms were identified as the most challenging spaces to clean and maintain due to heavy use and safety risks. Participants highlighted the high traffic and wear, with one noting the strain of limited restroom availability (S6) and another emphasizing their high-risk nature (D2). However, one staff member found European-style bathrooms easier to clean, as the entire space could be wiped down efficiently (S1).

Triage Area. Although triage is not typically part of the EmPATH unit, its maintenance remains important when present. One staff member highlighted challenges in keeping the high-traffic triage area clean and ready for use (S7).

Garden / Outdoor Space. A designer from a unit that incorporated an outdoor courtyard within the milieu highlighted maintenance challenges in these spaces, emphasizing the importance of low-maintenance design. They stressed the role of skilled landscape architects in creating spaces that require minimal upkeep, noting that simple elements like grass and a bench can be sufficient (D7).

Table 5.6

Qualities and Characteristics for Maintenance

Qualities	Characteristics
Cleaning surfaces	• Careful material selection
Repairing and durability	• Repairable and durable recliners • Durable wall materials
Considerations for difficult spaces to maintain	• Restrooms • Triage area • Garden / Outdoor space

Autonomy

Existing literature highlights autonomy as a critical factor in contemporary psychiatric care settings. It has long been one of the ten core measures of the *Ward Atmosphere Scale (WAS)*, a widely used instrument for assessing the psychosocial climate of inpatient settings since 1974. More recent frameworks, such as the *Psychiatric Patient Environmental Design (PPED) tool* (Shepley et al., 2017) and the *SCP model* (Chrysikou, 2013; Chrysikou et al., 2022), further highlight its significance in evaluating mental health facilities. Research consistently demonstrates the impact of autonomy on various aspects of mental healthcare outcomes. A qualitative study of adult acute mental health inpatient units in New Zealand identified a lack of autonomy and a sense of enforcement as contributing factors to violence (Jenkin et al., 2022). Similarly, a study on mental health rehabilitation services in England found a positive relationship between service quality and service users' autonomy (Killaspy et al., 2013). Another study identified autonomy as a key factor in fostering a supportive mental health facility environment (Hagerup et al., 2024).

Findings from the interviews align with this existing literature, as all the participants unanimously emphasized the importance of autonomy and competence in the healing process. Their insights revolved around choice and control, independent access, and environmental control.

Choice and Control

According to Ulrich's theory of supportive environments in healthcare settings, fostering a sense of control is one of the three key components in creating a supportive environment. Within the three-dimensional SCP framework for understanding and evaluating mental healthcare settings, choice and personalization, along with competence, are critical dimensions that address patients' needs (Chrysikou, 2013; Chrysikou et al., 2022). Additionally, incorporating a sense of control and privacy into the design of mental health facilities has been shown to enhance patients' sense of dignity (Faerden et al., 2023), while also reducing stress and the likelihood of aggressive behaviors (Russotto et al., 2024).

Consistent with existing research, interview findings emphasized the therapeutic benefits of choice and control as defining features of EmPATH units. Participants identified several aspects of choice and control as significant, including the ability to choose between socialization and isolation, participation in activities, seating arrangements, mobility within the unit, positioning of moveable recliners, and maintaining communication with family.

Choice of Socialization or Isolation. Facilitating control, including the ability to choose privacy, is regarded as a key factor in establishing supportive healthcare environments (Ulrich, 1991). The sense of autonomy and control over personal spaces has been linked to improved healing outcomes, a greater sense of dignity, and reduced aggressive behaviors (Faerden et al., 2023). Interview participants emphasized the importance of providing patients with the freedom to choose between socialization and isolation as a crucial element of autonomy. This choice was reflected in the design of EmPATH units, which included varied

seating arrangements, zoning within the milieu, and the availability of private and quiet rooms for those preferring solitude.

Sufficient Number of Private Rooms. Participants highlighted the importance of offering a sufficient number of private rooms to support patient autonomy, while acknowledging that space and budget constraints could limit this provision. Case studies revealed a range of private rooms per patient from 16.67% to 40%, with a median of 25%—suggesting that half of the EmPATH units provide private rooms for about 1 in 4 patients or fewer. The mean of 27.81%, being slightly above the median, suggests that some units offer a higher proportion of private rooms, indicating a moderate approach to balancing privacy and communal engagement.

Varied Levels of Privacy in Communal Areas. Ensuring that patients have semi-private spaces within the open milieu was highlighted in the interviews. In line with this, visibility graphs from the case studies reveal varying levels of integration in communal areas, suggesting a balance between social interaction and privacy—both essential for supporting patient autonomy. Areas with lower visual integration are likely to offer greater privacy (Geng et al., 2020), allowing patients the option to withdraw from social settings when needed. The site plans indicate that the geometry of spaces, availability of corners and spatial breaks, and the presence of partitions and columns all contribute to the variation in visual integration across different milieus.

Choice of Activities. Research highlights the impact of meaningful activities in mental healthcare settings, emphasizing that their absence can lead to boredom and a sense of insecurity (Cutler et al., 2021). Conversely, offering these activities aids safety by enhancing

personal choice, reinforcing autonomy, and encouraging meaningful connections with oneself and others. (Fletcher et al., 2019). This concept was echoed in the interview results, where participants emphasized the importance of offering a variety of activities to provide patients with choices, control, and independence, which in turn contributes to a "sense of self-worth" (S1). Examples of free-choice activities mentioned included watching movies, reading, preparing meals, listening to music, playing games, engaging in physical activities, watching TV (with control over channels), and working on art projects.

Choice of Seating. Participants emphasized the importance of offering diverse seating options and spatial configurations in EmPATH units to cater to different preferences. This aligns with studies by Shepley et al. (2016) and Baldwin (1985), which identified varied seating arrangements as beneficial for enhancing social interaction and health outcomes in psychiatric settings. Baldwin (1985) specifically found that adjusting furniture and introducing recreational activities could reduce incidents of seclusion and foster more positive behavior and relationships.

Nearly half of the participants highlighted the need for a flexible environment with a range of seating choices, emphasizing that this contributes to a "sense of voice and choice" (D2). This perspective supports the findings of Shepley et al. (2017), who underscored the role of flexible seating in accommodating diverse needs in mental health facilities. Participants also pointed out individual preferences for acoustic conditions, lighting levels, colors, and the balance between social interaction and privacy—all of which can be facilitated by creating distinct zones within the environment.

Consistent with these insights, the case study analysis shows that all sites, except for Site 3, included a mix of varied furniture such as individual recliners and group seating arrangements. Site 3's plan, which features only recliners in a sociofugal arrangement, lacks further visual documentation, making it difficult to fully assess the flexibility of seating options in that unit.

Control Over the Location of Recliners (Moveable). The importance of having moveable recliners, allowing patients to control their seating location and relocate within the unit, was raised by some participants. While previous studies have not specifically addressed recliners in emergency psychiatric crisis units, the concept of moveable furniture in inpatient psychiatric settings has been discussed as a factor that can positively influence health outcomes. Research by Ulrich et al. (2018) and Chrysikou (2015) supports the idea that furniture that can be lifted and moved by patients contributes to improved results.

Choice of Walking Around. Some participants emphasized the importance of the environment encouraging patients to move and walk around, allowing them the freedom and choice to navigate the open space.

Communication with Family. Family visits are recognized as important in psychiatric settings, with research highlighting environmental designs that support dignity and patient well-being (Faerden et al., 2022). Jovanović et al. (2022) found that spaces for off-ward family meetings were strongly linked to higher patient satisfaction. In this study, two staff members discussed the importance of free communication with family, noting that virtual technology in multi-sensory rooms could facilitate these connections, emphasizing the role of technology in supporting family interactions when physical visits are not possible.

Independent Access

Independent access was also highlighted by participants as a significant aspect of autonomy. Discussions focused on the importance of independent access to restrooms, outdoor courtyards, food and snacks, and blankets, all of which contribute to patients' sense of control and dignity within the EmPATH environment.

Independent Access to Restrooms. Independent access to bathrooms was highly valued in the interviews as a distinguishing feature of EmPATH. Interview participants highlighted the importance of independent access to bathrooms in EmPATH units, viewing it as essential for both autonomy and dignity. They contrasted this with traditional ER settings, where patients must ask for permission and be accompanied by staff to access bathrooms, a process that often causes frustration for both patients and staff.

Independent Access to the Outdoor Courtyard. Providing access to nature is considered a key factor in promoting a supportive healthcare environment (Ulrich, 1991), and outdoor spaces have been recognized for promoting a sense of independence and freedom, which plays a crucial role in the treatment of mental illnesses.(Ghazaly et al., 2022; Jablonska & Furmanczyk, 2024; Ulrich, 1997).

According to interview participants, although not all EmPATH units have outdoor spaces, the availability of such areas and the ability to access them independently were considered vital aspects of autonomy for patients. Several participants emphasized the importance of dedicated outdoor spaces where patients could spend time away from the unit, fostering a sense of freedom and self-regulation. However, while these spaces were

appreciated, concerns about security and protocols related to their use were raised. This underscored the need for a balance between autonomy and safety. Design solutions, such as ensuring visibility from the nurse's desk and fully enclosing the outdoor courtyards, were discussed as potential responses to address these concerns while still providing independent access.

Access to Food/Snacks. The availability of nourishment areas, such as open-access stations for food and snacks, is recognized as an essential guideline for behavioral health crisis units (FGI, 2014). This was reinforced in the interviews, where participants emphasized the importance of allowing patients free access to food without needing to ask for permission—contrasting sharply with traditional emergency departments, where patients must request food and rely on staff availability. Common examples included open and accessible fridges and snack counters, although one participant mentioned a more structured approach with designated snack times and a monitored system for food access.

Supporting these insights, the case studies reveal that five of the units included nutrition stations directly in the open milieu, facilitating easy access for patients. In contrast, two units (Sites 3 and 8) featured dining areas in separate rooms, indicating varied approaches to balancing accessibility and supervision in food provision.

Access to Blankets. Some participants discussed the availability of blankets in EmPATH units, emphasizing the importance of allowing patients to access blankets independently. This access was seen as crucial for fostering a sense of self-sufficiency and self-care.

Environmental Control

Control over certain aspects of the environment, such as lighting (Kuosmanen et al., 2015), wall objects like art or pictures (Ulrich, 1991), or seating layouts (Chrysikou, 2015; Jablonska, 2024; Shepley et al., 2016; Ulrich et al., 2018), has been associated with positive health outcomes in in-patient psychiatric facilities. Consistent with existing knowledge in the field, participants emphasized environmental control as a realization of autonomy in EmPATH units. One participant stated, “the ability to choose or adjust your environment, if possible, whenever possible” (D7), while another noted that the personalized nature of the environment in EmPATH units was a key difference from traditional ER settings. Participants' insights focused on the importance of adjusting both the ambient and physical environment, including seating arrangements, to enhance patient autonomy and well-being.

Adjusting the Ambient Environment. A key aspect of environmental control discussed by participants was the ability to adjust the ambient environment, particularly through lighting intensity and color. This aligns with findings from Kuosmanen et al. (2015), who deemed control over lighting beneficial in psychiatric inpatient facilities. While most participants focused on this option in private rooms, often referred to as sensory rooms, some also noted its presence in the main milieu. Participants emphasized the importance of allowing patients to control lighting in personal zones, such as recliners or desks, or to dim the lights, as this fosters a sense of autonomy and control over the environment. Additionally, the color of the lighting was noted as another important factor. Participants suggested that patients should have control over lighting color, considering individual psychological differences in color perception and the evolving understanding of color psychology.

Changing the Seating Layout. Previous studies have highlighted the positive outcomes of adjustable furniture and the autonomy to rearrange seating layouts, noting their effectiveness in promoting social interactions in inpatient psychiatric facilities (Chrysikou, 2015; Ulrich et al., 2018) and as a criterion for healing architecture (Jablonska, 2024). In a similar vein, several participants in this study discussed how allowing patients to change the seating layout in EmPATH units can provide a sense of control and autonomy, highlighting the importance of flexibility in the open milieu. One topic raised was the use of moveable recliners that could be easily relocated to modify the seating arrangement. As one participant observed, the furniture layout is often controlled by patients, and in practice, it may differ significantly from the original design plans or early layout documents.

Table 5.7

Qualities and Characteristics for Autonomy

Qualities	Characteristics
Choice and control • Choice of socialization or isolation • Choice of activities • Choice of walking around • Communication with Family	• Sufficient number of private rooms • Varied levels of privacy in communal areas • Opportunities for different activities • Mix of seating • Moveable recliners • Open design to encourage walking and navigation • Spaces equipped with virtual communication technologies
Independent access • Independent access to restrooms • Independent access to the outdoor courtyard • Access to food/snacks	• Sufficient availability of independent accessible bathrooms • Availability of secure outdoor spaces • Availability of nourishment stations

Environmental control	• Adjustable ambient environment • Moveable furniture

Inclusivity

The significance of universal and inclusive design has been widely explored in architectural and healthcare literature (Petazzoni & Bresciani, 2024; Marjadi et al., 2023; Steinfeld & Maisel, 2012). Myerson and West (2015) emphasize that healthcare environments designed to accommodate diverse physical, sensory, and cognitive abilities can significantly enhance patient experiences. This perspective was reflected in the interviews, where discussions focused on three key areas: addressing diverse abilities and needs, accommodating patients with different diagnoses, and considering cultural and personal factors in the design of EmPATH units.

Inclusive Design for Diverse Physical Needs

The integration of physical, sensory, and cognitive needs in healthcare design is a key aspect of inclusivity, widely recognized in the literature (Marjadi et al., 2023; Myerson & West, 2015). However, interview findings, though limited, primarily focused on physical abilities and constraints, particularly concerning patients with mobility challenges and bariatric needs.

Adaptive Furniture Options for Patients with Limited Mobility. Inclusive furniture plays a key role in supporting individuals with mobility challenges, including hidden disabilities (Meiklejohn-Kerr, 2024), by enhancing comfort and independence (Meiklejohn,

2024). While not widely mentioned in interviews, a staff member noted that the lack of beds forces some patients to sleep on floor mattresses, making it difficult for those with mobility issues, such as back problems, to get up. They suggested recliners that fully recline to a flat position as a more accessible alternative.

That this issue was not broadly raised in the interviews suggests it may be overlooked rather than unimportant. Literature on inclusive design emphasizes proactively addressing diverse needs, not just the most apparent ones (Myerson & West, 2015). Ensuring adaptable furniture solutions reflects the broader goal of equitable and inclusive EmPATH design.

Bariatric Seating Options. The importance of accommodating bariatric populations in healthcare settings, particularly in furniture design, has been extensively studied in the literature (Bakewell, 2007; Malone & Dellinger, 2011; Williams, 2008). Bariatric-specific design considerations have long been incorporated into the Facility Guidelines Institute (FGI) recommendations, particularly for waiting areas. Although this issue was not a prominent topic in the interviews and was only mentioned by one participant, its significance is supported by global health data, which indicates that one in eight people worldwide are living with obesity (World Health Organization, 2024). Given this prevalence, the literature suggests that bariatric accommodation should be an integral part of inclusive healthcare design.

Inclusion of Individuals with Different Diagnoses

According to the interviews, EmPATH units differ in their admission policies for patients with acute mental health conditions, substance use disorders, and involuntary admissions. While some units follow an inclusive approach, accepting most mental health

patients, others enforce stricter criteria to prevent disruptions from aggressive or severely psychotic individuals. Most participants stated that their units only admit medically cleared patients with substance use disorders, though some reported allowing patients experiencing mental distress during detox.

An open milieu with continuous staff oversight was generally seen as beneficial for managing a diverse patient population, with some staff highlighting its calming effect. However, others emphasized the need to exclude certain acute cases due to potential disruptions and stressed the importance of patient segregation for safety. Overall, key inclusion policies varied across units, particularly regarding acute patient admissions, detox accommodations, and voluntary versus involuntary admissions.

While many of these policies are influenced by state regulations, space constraints, and funding availability, participants identified key environmental strategies to address these challenges, including zoning within the milieu, incorporating multiple milieus, and increasing private rooms.

Zoning Inside the Milieu. Participants emphasized clustering patients within the milieu to accommodate different needs while maintaining the benefits of an open environment. This approach allows for flexible groupings, such as separating individuals with trauma backgrounds, psychosis, or those undergoing detoxification. One participant highlighted that designated zones within the milieu could provide observation spaces for detoxing patients, ensuring both safety and therapeutic benefits.

The case studies show that two of the sites implement clustering within the milieu, both with an L-shaped spatial configuration providing two separate wings (Sites 5 & 6). Two

other case studies feature all the main recliners situated in the same central area of the milieu, although they include small semi-private corners (Sites 2 & 3).

Multiple Milieus. Some participants recommended incorporating multiple smaller milieus to accommodate various patient populations. This model allows for greater flexibility by grouping individuals with similar needs while enabling staff to specialize in specific conditions. One designer noted that a separate milieu tailored for substance use patients could foster peer connections and improve care by placing them with staff experienced in addiction treatment.

The use of multiple milieus is evident in two of the case studies, which feature three milieus each, accommodating 8 to 10 patients. Some of these milieus are completely separate from one another, while others are interconnected through a shared nurse station (Sites 7 & 8).

More Private Rooms (Distinct Rooms for Different Patient Types). Private rooms, including quiet and de-escalation spaces, were seen as essential for accommodating patients who require lower-stimulation environments. These rooms provide spaces for self-regulation and can be particularly beneficial for patients experiencing acute distress or detox symptoms. One designer noted that quiet rooms positioned off the main observation area allowed detoxing patients to retreat while still being monitored by staff, ensuring their safety and comfort.

Separate Entrances for Voluntary and Involuntary Patient Admissions. While this topic was not extensively discussed in the interviews, a few participants noted that their units admit both voluntary and involuntary patients. One participant highlighted the advantage of having separate entrances for these groups, emphasizing its role in maintaining a calming

environment. They explained, “The voluntary patients enter one way, and the involuntary patients come in through a secondary entrance, giving them a moment to be introduced, calmed down, and prepared before entering the main milieu” (D7).

Personal and Cultural Considerations

Considering cultural differences in healthcare design has been shown to be effective, particularly for minority populations (Dimer et al., 2013; Marjadi et al., 2023). This view was echoed by some participants, with one noting that the arrangement of furniture, settings, and spatial configurations should be culturally and contextually appropriate, whether for Indigenous, rural, suburban, or urban communities. Aesthetics, such as the choice of color, were also identified in the interviews as being highly influenced by personal and cultural contexts. Offering a variety of design options was recommended as a way to enhance inclusivity in EmPATH environments. Additionally, a study in general healthcare settings by Marjadi et al. (2023) suggests that providing a quiet room for individuals who need space to observe religious practices or manage sensory overload is an important practice to support patients' cultural or spiritual needs.

Table 5.8

Qualities and Characteristics for Inclusivity

Qualities	Characteristics
Inclusive design for diverse physical needs	• Adaptive furniture options for people with limited mobility • Bariatric seating options

Accommodation for a wide range of ages	• Separate zones or milieus for children and adolescents
Inclusion of individuals with different diagnoses	• Zoning inside the milieu • Multiple milieus • More private rooms (distinct rooms for different patient types) • Separate entrances for voluntary and involuntary patient admission
Personal and cultural considerations	• Variety of design options • Private rooms for religious or spiritual practices

Design Guidelines

Based on the findings from case studies, literature review, and interviews, the following design guidelines have been developed to reflect the key environmental features identified.

Table 5.9

Design Guidelines

Design Goals	Design Suggestions
Design a calming environment to facilitate de-escalation	Incorporate calming graphics and patterns, colors of nature, and neutral or cool tones. Ensure good lighting with a combination of daylight and high-quality artificial lighting. Utilize noise control strategies, including acoustic treatments. Select calming materials and finishes, such as natural materials and soft textures. Avoid excessive use of rigid angles and abstract graphics.
Enhance patients' awareness of time and weather	Support patients' circadian rhythm regulation by maximizing daylight exposure, providing access to views of nature, and

	incorporating adaptable artificial lighting that changes in intensity and color temperature throughout the day.
Reduce feelings of confinement and seclusion	Design with openness by incorporating access to outdoor spaces, nature views, and interior layouts that reduce a sense of enclosure.
Foster a sense of normalcy in the environment	Integrate familiar, non-institutional elements in the environment to create a comfortable and homelike setting. Use dignified, comfortable furniture that promotes patient well-being and reduces the clinical feel of the space.
Incorporate positive distractions for patient engagement	Provide structured activity opportunities such as access to books, music, TV, puzzles, art, and movement-based exercises. Integrate passive environmental enrichment, such as background music, artwork, and nature views, to support relaxation.
Provide designated spaces for staff respite	Include private break rooms positioned optimally near the nurse station with access to nature views and natural light. Ensure designated staff restrooms and separate staff exits when possible.
Foster teamwork and collaboration among staff	Provide an open layout that encourages staff interaction and teamwork. Ensure adjacency of staff workspaces to enhance cross-functionality. Position staff workstations within sight of one another to facilitate communication.
Enhance patient access to staff and maintain strong staff-patient connections	Optimize the location and design of the nurse desk for accessibility. Maintain an open and optimally sized milieu to encourage engagement. Ensure staff and patient areas are integrated for continuous interaction. Provide activities that facilitate staff-patient engagement.
Support patient socialization and peer engagement	Provide spaces that encourage bonding and shared experiences through group activities and therapy sessions while ensuring options for privacy and independent retreat. Maintain high integration and accessibility within the milieu to support flexible interaction.
Improve patient and staff safety	Ensure clear visibility of communal areas and direct sightlines from the nurse desk. Facilitate quick access between staff and patient areas. Use anti-ligature furniture and fixtures. Provide options for patient privacy while ensuring security through discreet monitoring systems and emergency call access.
Design for efficient maintenance and durability	Select easy-to-clean, durable, and repairable materials, especially in high-use areas. Pay special attention to restrooms, triage areas,

	and outdoor spaces, ensuring they are designed for ease of upkeep and hygiene.
Enhance patient autonomy, choice, and environmental control	Provide options for socialization or isolation, varied activities, and independent movement within the unit. Ensure sufficient private rooms, diverse seating, and flexible communal spaces. Allow patients to adjust ambient conditions (lighting, temperature) and reposition recliners for comfort.
Ensure independent access to key amenities	Facilitate direct access to restrooms, outdoor courtyards, and nourishment stations. Integrate secure outdoor spaces and accessible private bathrooms. Equip spaces with virtual communication technologies for family connection.
Accommodate patients with diverse diagnoses and needs	Use spatial zoning strategies to group patients based on clinical needs. If possible, provide multiple milieus to accommodate a range of care requirements and age groups. Ensure adequate private rooms and diverse furniture options, including bariatric seating.

Validation of Design Guidelines

As part of evaluating the thesis outcomes, the proposed design guidelines were shared with all 15 participants. Five responded and provided detailed feedback. Overall, they found the guidelines comprehensive and endorsed their validity, while also offering specific suggestions for refinement.

Participant S2 emphasized the need for flexible spaces that offer both open areas and more enclosed, “cocoon-like” zones to support neurodiverse and high-anxiety patients. They suggested achieving this through architectural variation and the inclusion of sensory or calming rooms.

Participant S6 noted the challenges of incorporating outdoor spaces, explaining that their unit could not accommodate one due to spatial limitations. However, they expressed interest in implementing such a feature in future projects if space permits.

Participant S7 offered detailed suggestions across multiple areas of the guidelines. For calming environments, they recommended prioritizing uplighting and ambient lighting over direct sources like fluorescent or can lights. To reduce feelings of confinement, they proposed allowing room for pacing or walking, and enabling chairs to be repositioned to more protected spots—such as near walls or corners—which can support a sense of safety without being restrictive. They also stressed the importance of barrier-free access to staff, noting that the continued use of plexiglass in some facilities makes the lack of barriers noteworthy. For patient and staff safety, they suggested having calming spaces nearby but not immediately adjacent to the milieu. While not essential, they noted that shower access can be very beneficial. Additional suggestions included ensuring the space is fully accessible to individuals using mobility aids (e.g., easy navigation, reachable call lights and restrooms), providing a private consult room for therapy or provider meetings, and offering trays or flexible eating surfaces to prevent spills when using recliners

Participant D8 recommended placing greater emphasis on quiet or calming rooms within the guidelines, reflecting their importance in de-escalation and patient comfort.

Participant D6 provided the most extensive feedback. They advised replacing the term “anti-ligature” with “ligature-resistant” and suggested using “furniture” instead of “recliners” for broader applicability. They also cautioned against presenting proximity to the nurse station as best practice for staff respite areas. Drawing on experience, they noted, “Most direct care

staff prefer having the staff respite space away from the care desk or charting space (but still on or just off the unit) to truly get away for a few minutes. We often find administrators and supervisors request staff respite close to the nurse station so that staff can respond quickly when needed" (D6).

Regarding environmental control as a form of patient autonomy, D6 observed that patient control over temperature is rarely feasible due to centralized HVAC systems. They also recommended removing references to age diversity in the "Diverse Diagnoses and Needs" section, citing regulatory requirements that mandate separate units for pediatric and adolescent populations. Finally, they encouraged including a discussion on single versus double bedrooms, emphasizing that "while there may be clinical reasons to include double bedrooms in some cases, research generally shows that private rooms improve patient experience and recovery in many ways" (D6).

The Evaluation Tool

The evaluation tool, based on the PSED framework, will take the form of a questionnaire that assesses all identified characteristics in relation to their corresponding environmental quality, by comparing perceived importance and effectiveness (Figures 5.1 and 5.2). The full survey is listed in the appendices.

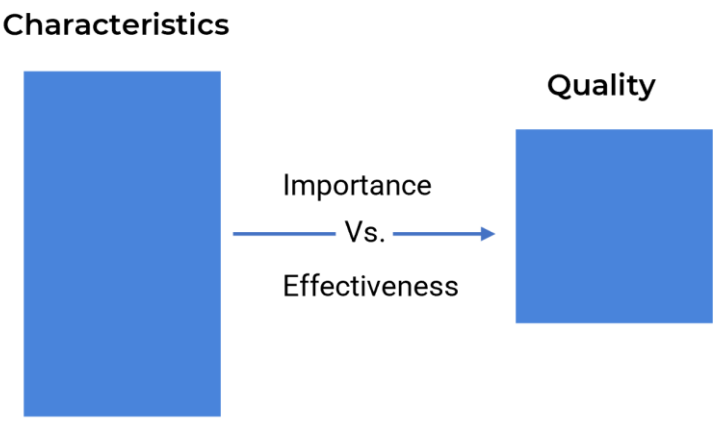


Figure 5.1. T*he Concept of Importance versus Effectiveness*

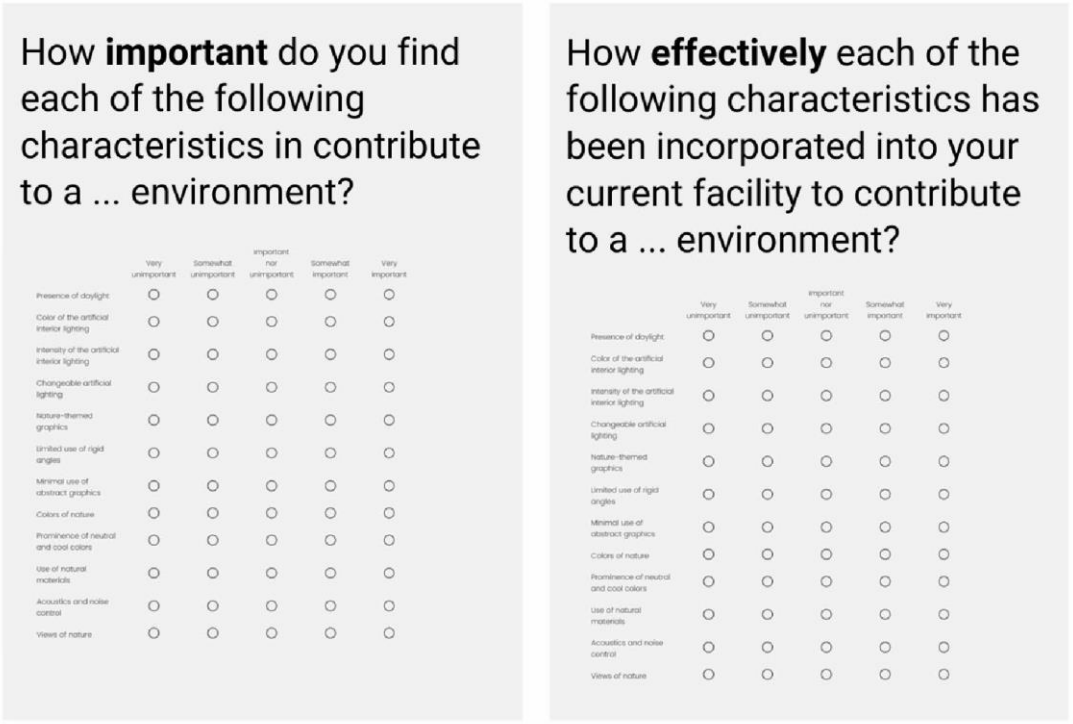


Figure 5.2. *The Structure of the Evaluation Tool*

CHAPTER 6

CONCLUSION

The growing number of psychiatric emergencies in recent years has raised the need for environments that are better suited to urgent mental health care. The EmPATH model has gained attention as a promising alternative to standard emergency rooms, with its focus on open, flexible spaces, early intervention, and opportunities for social interaction. Still, while its benefits are recognized, the specific design features that make these units effective have yet to be fully explored.

This research aimed to bridge this gap by developing a new evaluation tool and a set of design guidelines to support future EmPATH unit design and assessment. Findings from literature, interviews, and case studies revealed a broad range of critical topics that define the primary design goals of EmPATH units, along with environmental characteristics essential for achieving these goals.

The evaluation tool and design matrix proposed in this study provide a structured framework for standardizing EmPATH unit assessments. This tool can help designers, healthcare administrators, and policymakers assess existing units and refine future designs. The design guidelines highlight the most critical spatial considerations, ensuring that EmPATH units effectively balance therapeutic, operational, and safety needs.

However, this study had certain limitations. The sample size for both interviews and case studies was limited, and expanding these in future research would improve reliability. Some case studies had limited imagery and data, restricting the scope of spatial analysis.

Additionally, due to ethical constraints, patient perspectives were not included in the interviews. Incorporating patient voices would provide a more holistic understanding of how EmPATH environments impact user experiences.

Further studies should explore the interrelationship between design features using larger samples and mixed methods. Behavioral mapping and focus groups could offer insight into real-time challenges, such as movement patterns and patient-staff interactions. Quantitative tools—such as axial mapping and spatial integration analysis—could further enhance the rigor of spatial evaluation. Additionally, to validate and refine specific variables identified in this study, the following hypotheses are proposed for future research based on their observed significance and feasibility:

Suggested Hypotheses for Future Research

1. **Access to Outdoor Space**

   H1: The presence of secure and easily accessible outdoor areas in EmPATH units is associated with improved patient well-being and reduced agitation.

2. **Visual Integration and Privacy in Milieu Spaces**

   H2: Varied levels of visual integration within the milieu space are associated with perceived levels of privacy and patient autonomy.

3. **Staff Break Area Proximity (On-site or Off-site)**

   H3. Decreased distance from the nurse desk to staff respite areas is associated with higher staff satisfaction and reduced burnout in EmpATH units,

4. **Spatial Configuration and Patient Behavior**

   H4: Higher visual integration of the milieu area is associated with increased patient engagement in shared therapeutic activities.

5. **Staff Accessibility and Perceived Safety**

   H5: Reduced distance between patient zones and nurse stations correlates with higher perceived safety and staff responsiveness.

6. **Design of Non-Verbal Communication Cues**

   H7: Environmental features that signal availability and presence of staff (e.g., open nurse stations, transparent partitions) improve perceived trust and reduce agitation among patients.

Finally, the proposed evaluation tool should be pilot tested in real-world settings to assess its usability and refine its criteria.

In conclusion, this thesis contributes to the evolving field of psychiatric emergency care by introducing a comprehensive framework for evaluating and designing EmPATH units. By standardizing assessment and offering evidence-based design strategies, it lays the groundwork for more responsive, supportive, and human-centered care environments.

REFERENCES

Bakewell, J. (2007). Bariatric furniture: Considerations for use. International Journal of Therapy and Rehabilitation, 14(7), 329–333. https://doi.org/10.12968/ijtr.2007.14.7.23858

Beukeboom, C. J., Langeveld, D., & Tanja-Dijkstra, K. (2012). Stress-Reducing Effects of Real and Artificial Nature in a Hospital Waiting Room. The Journal of Alternative and Complementary Medicine, 18(4), 329–333. https://doi.org/10.1089/acm.2011.0488

Chrysikou, E. (2015). Furniture and mental health: there is more to it than meets the eye - UCL Discovery Stage. Ucl.ac.uk. https://discovery-pp.ucl.ac.uk/id/eprint/10115095/3/Chrysikou_Furniture%20and%20mental%20health%201.pdfp

Dalke, H., Little, J., Niemann, E., Camgoz, N., Steadman, G., Hill, S., & Stott, L. (2005). Colour and lighting in hospital design. Optics & Laser Technology, 38(4–6), 343–365. https://doi.org/10.1016/j.optlastec.2005.06.040

Dellinger, B, Malone, E. (2011). Furniture Design Features and Healthcare Outcomes.

Devlin, A. S. (1992). Psychiatric Ward Renovation: Staff Perception and Patient Behavior. Environment and Behavior, 24(1), 66-84. https://doi.org/10.1177/0013916592241003

Dignity in an Acute Psychiatric Ward: Outcome of a User-Driven Service Design Project. HERD, 16(2), 55–72. https://doi.org/10.1177/19375867221136558

Ericson, J. D., Chrastil, E. R., & Warren, W. H. (2020). Space syntax visibility graph analysis is not robust to changes in spatial and temporal resolution. Environment and Planning B Urban Analytics and City Science, 48(6), 1478–1494. https://doi.org/10.1177/2399808319897624

Faerden, A., Rosenqvist, C., Håkansson, M., Strøm-Gundersen, E., Stav, Å., Svartsund, J., Røssæg, T., Davik, N., Kvarstein, E., Pedersen, G., Dieset, I., Nyrud, A. Q., Weedon-Fekjær, H., & Kistorp, K. M. (2022). Environmental Transformations Enhancing Dignity in an Acute Psychiatric Ward: outcome of a User-Driven Service Design Project. HERD Health Environments Research & Design Journal, 16(2), 55–72. https://doi.org/10.1177/19375867221136558

Fay, L., Carll-White, A., Schadler, A., Isaacs, K. B., & Real, K. (2017). Shifting Landscapes: The Impact of Centralized and Decentralized Nursing Station Models on the Efficiency of Care. HERD: Health Environments Research & Design Journal, 10(5), 80–94. https://doi.org/10.1177/1937586717698812

Gharaveis A, Hamilton DK, Pati D, Shepley MM, Rodiek S, McCall D. How Visibility May Reduce Security Issues in Community Hospitals' Emergency Departments. HERD: Health Environments Research & Design Journal. 2024;17(1):135-147. doi:10.1177/19375867231188985

Gharaveis, A., Hamilton, D. K., Pati, D., & Shepley, M. (2017). The impact of visibility on teamwork, collaborative communication, and security in emergency departments:

an exploratory study. HERD Health Environments Research & Design Journal, 11(4), 37–49. https://doi.org/10.1177/1937586717735290

Garg, A., & Dewan, A. (2022). Manual of hospital planning and designing : for medical administrators, architects and planners. Springer

Ghazaly, M., Badokhon, D., Alyamani, N., & Alnumani, S. (2022). Healing Architecture. Civil Engineering and Architecture, 10(3A), 108–117. https://doi.org/10.13189/cea.2022.101314

Gutkowski, S., Ginath, Y., & Guttmann, F. (1992). Improving Psychiatric Environments Through Minimal Architectural Change. Psychiatric Services, 43(9), 920–923. https://doi.org/10.1176/ps.43.9.920

Haq, S., & Luo, Y. (2012). Space Syntax in Healthcare Facilities Research: A Review. HERD: Health Environments Research & Design Journal, 5(4), 98–117. https://doi.org/10.1177/193758671200500409

Harrington, A., Darke, H., Ennis, G., & Sundram, S. (2019). Evaluation of an alternative model for the management of clinical risk in an adult acute psychiatric inpatient unit. International Journal of Mental Health Nursing, 28(5), 1102–1112. https://doi.org/10.1111/inm.12621

Hillier B., Hanson J. (1984). The social logic of space. Cambridge, England: Cambridge University Press. Crossref. https://doi.org/10.1017/CBO9780511597237

Jenkin, G., Quigg, S., Paap, H., Cooney, E., Peterson, D., & Every-Palmer, S. (2022). Places of safety? Fear and violence in acute mental health facilities: A large qualitative study of staff and service user perspectives. PLOS ONE, 17(5), e0266935. https://doi.org/10.1371/journal.pone.0266935

Jovanović, N., Campbell, J., & Priebe, S. (2019). How to design psychiatric facilities to foster positive social interaction – A systematic review. European Psychiatry, 60, 49–62. https://doi.org/10.1016/j.eurpsy.2019.04.005

Jovanović, N., Miglietta, E., Podlesek, A., Malekzadeh, A., Lasalvia, A., Campbell, J., & Priebe, S. (2022). Impact of the hospital built environment on treatment satisfaction of psychiatric in-patients. Psychological Medicine, 52(10), 1969–1980. https://doi.org/10.1017/S0033291720003815

Killaspy, H., Marston, L., Omar, R. Z., Green, N., Harrison, I., Lean, M., Holloway, F., Craig, T., Leavey, G., & King, M. (2013). Service quality and clinical outcomes: an example from mental health rehabilitation services in England. British Journal of Psychiatry, 202(1), 28–34. https://doi.org/10.1192/bjp.bp.112.114421

Klarqvist, B. (2015). A Space Syntax glossary. NA, 6(2). http://arkitekturforskning.net/na/article/view/778/722

Lenaghan, P. A., Cirrincione, N. M., & Henrich, S. (2018). Preventing Emergency Department Violence through Design. Journal of Emergency Nursing, 44(1), 7–12. https://doi.org/10.1016/j.jen.2017.06.012

Lundin, S. (2020). Can Healing Architecture Increase Safety in the Design of Psychiatric Wards? HERD: Health Environments Research & Design Journal, 14(1), 193758672097181. https://doi.org/10.1177/1937586720971814

Marjadi, B., Flavel, J., Baker, K., Glenister, K., Morns, M., Triantafyllou, M., Strauss, P., Wolff, B., Procter, A. M., Mengesha, Z., Walsberger, S., Qiao, X., & Gardiner, P. A. (2023). Twelve tips for inclusive practice in healthcare settings. International Journal of Environmental Research and Public Health, 20(5), 4657. https://doi.org/10.3390/ijerph20054657

Meiklejohn-Kerr, H. (2024). From ancient adaptations to modern innovations: A historical perspective of disability inclusive furniture. Humanities Journal, 1(3), 2024011–2024011. https://doi.org/10.31893/humanitj.2024011

Mental and behavioral health environments: critical considerations for facility design. (2016). General Hospital Psychiatry, 42, 15–21. https://doi.org/10.1016/j.genhosppsych.2016.06.003

Myerson, J., West, J. (2015). Make It Better: how universal design principles can have an impact on healthcare services to improve the patient experience. Universal Design in Education Dublin, Ireland, 12-13 November 2015.

Nanda, U., Eisen, S., Zadeh, R. S., & Owen, D. (2010). Effect of visual art on patient anxiety and agitation in a mental health facility and implications for the business case. Journal of Psychiatric and Mental Health Nursing, 18(5), 386–393. https://doi.org/10.1111/j.1365-2850.2010.01682.x

Nejati A, Shepley M, Rodiek S. A Review of Design and Policy Interventions to Promote Nurses' Restorative Breaks in Health Care Workplaces. Workplace Health & Safety. 2016;64(2):70-77. doi:10.1177/2165079915612097

Peplau, 1988; Forchuk, 1995; Dexter & Wash, 1997; Barker, Jackson & Stevenson, 1999; Stevenson, Barker & Fletcher, 2002; Moyle, 2003; Barker & Buchanan-Barker, 2005; Cameron, Kapur & Campbell, 2005

Perkins, E., Prosser, H., Riley, D., & Whittington, R. (2012). Physical restraint in a therapeutic setting; a necessary evil? International Journal of Law and Psychiatry, 35(1), 43–49. https://doi.org/10.1016/j.ijlp.2011.11.008

Roberts, L. G., Moran, J. M., & Caufield, S. (2024). Developing and Constructing the Physical and Safety Environment of an Inpatient Psychiatric Hospitalization Unit. Issues in Clinical Child Psychology, 35–56. https://doi.org/10.1007/978-3-031-62749-1_3

Russotto, S., Conti, A., Vanhaecht, K., Mira, J. J., & Panella, M. (2024). Patient Safety Incidents in Inpatient Psychiatric Settings: An Expert Opinion Survey. Behavioral Sciences, 14(11), 1116–1116. https://doi.org/10.3390/bs14111116

Sadek, A. H., & Shepley, M. M. (2016). Space Syntax Analysis. HERD Health Environments Research & Design Journal, 10(1), 114–129. https://doi.org/10.1177/1937586715624225

Shamy, N. E. (2021). The impact of architectural psychology on the interior design of psychiatric hospitals. Journal of Design Sciences and Applied Arts/Journal of Design Sciences and Applied Arts, 2(1), 30–49. https://doi.org/10.21608/jdsaa.2021.29937.1043

Shattell, M., Bartlett, R., Beres, K., Southard, K., Bell, C., Judge, C. A., & Duke, P. (2015). How Patients and Nurses Experience an Open Versus an Enclosed Nursing Station on an Inpatient Psychiatric Unit. Journal of the American Psychiatric Nurses Association, 21(6), 398–405. https://doi.org/10.1177/1078390315617038

Stichler, Jaynelle F. DNSc, RN, FACHE, FAAN. Healthy, Healthful, and Healing Environments: A Nursing Imperative. Critical Care Nursing Quarterly 32(3):p 176-188, July 2009. | DOI: 10.1097/CNQ.0b013e3181ab9149

Whitehead, C., Polsky, R., Crookshand, C., & Fik, E. (1984). Objective and subjective evaluation of psychiatric ward design. American Journal of Psychiatry, 82, 454–462

Zamani, Z. (2018). Effects of emergency department physical design elements on security, wayfinding, visibility, privacy, and efficiency and its implications on staff satisfaction and performance. HERD Health Environments Research & Design Journal, 12(3), 72–88. https://doi.org/10.1177/1937586718800482

APPENDICES

Appendix A. Interview Questions

Environmental Features

1. From your experience, what are the biggest challenges in the design of EmPATH units?
2. In your opinion, what physical environmental features of EmPATH spaces are most important?
3. Are there physical environmental features of EmPATH spaces that tend to be more difficult to maintain than others?
4. Are aesthetics and attractiveness/beauty of the environment important in an emergency psychiatric unit, for example, the furniture, color palette, artwork, the walls, the floor or ceiling patterns?
5. What type of specialized technology (patient observation monitors, alarm systems) do you specify to be used in the unit?

Impact of Environment on Behavior

6. What physical environmental features do you believe play a critical role in ensuring patient safety?
7. In comparison to other emergency psychiatric settings, how do EmPATH units impact social interactions? How about interactions among staff members? How about interactions between patients and staff? How about interactions among patients?
8. Have you encountered any challenges in social interactions that are different from traditional emergency psychiatric facilities?
9. How important are positive distractions in the physical environment in EmPATH units?
10. Are spaces for staff respite typically provided in EmPath units? How do you think staff respite could be improved in an EmPATH unit?

11. Is it important to design a physical environment in such a way as to support autonomy and competence in patients in psychiatric emergency settings?
12. A goal of the physical design of EmPATH units is to support all patients regardless of diagnosis. Do you believe the environment successfully accomplishes this goal?
13. What would you suggest for improving the design of EmPATH units?

Appendix B. Recruitment Email

Dear …,

I am a graduate student at Cornell University studying human-centered design, currently focusing on the design of EmPATH units. Given that there are no current evaluation tools and design guidelines for EmPATH units, I am seeking to gather information that will enable me to develop these resources. My intention is to share this information with health practitioners and designers to improve the experience of EMPATH facilities for patients and staff and support future design decisions.

As a **staff member /designer** of an EmPATH unit, I am eager to hear your thoughts about the design of psychiatric emergency rooms and would be very appreciative of your time.

I am asking participants to engage in a 30-minute telephone or Zoom interview and respond to a short questionnaire.If you're willing to participate, please let me know your preferred time. I'm available on Monday through Fridays 8:00 to 9:00 am. On Monday through Thursday I am available after 4:30 pm, and on Fridays I am available after 2:00 pm Eastern time . Please inform me of the most convenient time for you.

Thanks,

Nastaran Radmanesh

Appendix C. IRB Consent Form

I am asking you to participate in a research study titled "Development of a Tool for Evaluating the Physical Environment of an Emergency Psychiatric Assessment Treatment and Healing (EmPATH) Unit". I will describe this study to you and answer any of your questions. This study is being led by Nastaran Radmanesh, Department of Human-Centered Design at Cornell University. The Faculty Advisor for this study is Mardelle Shepley, Department of Human-Centered Design at Cornell University.

What the study is about

The purpose of this research is to develop an evaluation tool for EmPATH units that can be used to support design decisions.

What we will ask you to do

I will ask you to participate in a 30-minute online (Zoom) or telephone interview and to respond to a 10-minute online survey. I will ask about your thoughts regarding how EmPATH units should be evaluated and designed.

Risks and discomforts

I do not anticipate any risks from participating in this research.

Benefits

There are no direct benefits. However, information from this study may benefit other people now or in the future. I hope to learn more about the effect of environmental factors on the effectiveness of psychiatric emergency rooms that could support design solutions.

Incentives for participation

All participants will be automatically entered in a raffle in which 3 participants will each win a $40 gift card. Your name and contact information may need to be shared with Cornell

University finance staff to process your payment, but they will not receive any research data or other details about the study.

Audio/Video Recording

An audio recording of the interview will be conducted to enable the researchers to accurately recall the content of the interaction.

Privacy/Confidentiality/Data Security

I anticipate that your participation in this survey presents no greater risk than everyday use of the Internet.

Please note that email communication is neither private nor secure. Though I am taking precautions to protect your privacy, you should be aware that information sent through email could be read by a third party.

Your confidentiality will be kept to the degree permitted by the technology being used. I cannot guarantee against interception of data sent via the internet by third parties.

Taking part is voluntary

Your involvement is voluntary, and you may refuse to participate before the study begins, discontinue at any time, or skip any questions that may make you feel uncomfortable, with no penalty to you and no effect on the compensation earned before withdrawing.

If you have questions

The main researcher conducting this study is Nastaran Radmanesh, a graduate student at Cornell University. Please ask any questions you have now. If you have questions later, you may contact Nastaran Radmanesh at nr362@cornell.edu or at +1-718-496-6642. If you have any questions or concerns regarding your rights as a subject in this study, you may contact the Institutional Review Board (IRB) for Human Participants at 607-255-6182 or access their website at https://researchservices.cornell.edu/offices/IRB. You may also report your concerns or complaints anonymously through Ethicspoint online at www.hotline.cornell.edu or by

calling toll free at 1-866-293-3077. Ethicspoint is an independent organization that serves as a liaison between the University and the person bringing the complaint so that anonymity can be ensured.

Statement of Consent

I have read the above information and have received answers to any questions I asked. By participating in this research, I consent to take part in the study.

Appendix D. Interview Findings – Thematic Map

Appendix F. Evaluation Tool on Cornell Qualtrics

Start of Block

What is your association with EmPATH Units?

- ○ Designer
- ○ Staff

Page Break

End of Block: Default Question Block

Start of Block: Staff Questions

What is the number of months/years of experience in association with EmPATH units?

_____

What is the number of mental health facilities you have worked on?

_____

End of Block: Staff Questions

Start of Block: Designers Questions

What is the number of EmPATH projects you have worked on?

_____

What is the number of months/years of experience in association with EmPATH units?

_____

End of Block: Designers' Questions

Start of Block: Homelike / Calming

The following questions address various environmental characteristics of EmPATH units in terms of their **importance** and **effectiveness**. "Effective" means whether the characteristic is adequate in your current facility.

How **important** do you find each of the following characteristics in contributing to **a homelike and calming environment** in EmPATH units?

	Very unimportant	Somewhat unimportant	Neither important nor unimportant	Somewhat important	Very important
Presence of daylight	○	○	○	○	○
Color of the artificial interior lighting	○	○	○	○	○
Intensity of the artificial interior lighting	○	○	○	○	○
Changeable artificial lighting	○	○	○	○	○
Nature-themed graphics	○	○	○	○	○
Limited use of rigid angles	○	○	○	○	○
Minimal use of abstract graphics	○	○	○	○	○
Colors of nature	○	○	○	○	○

Prominence of neutral and cool colors	○	○	○	○	○
Use of natural materials	○	○	○	○	○
Acoustics and noise control	○	○	○	○	○
Views of nature	○	○	○	○	○
Access to nature/outdoors	○	○	○	○	○
Interior openness	○	○	○	○	○
Familiar and non-institutional elements	○	○	○	○	○
Dignified furniture	○	○	○	○	○

Please evaluate how **effectively** each of the following characteristics has been incorporated into your current facility to contribute to a **homelike and calming** environment.

	Very ineffective	Somewhat ineffective	Neither effective nor ineffective	Somewhat effective	Very effective
Presence of daylight	○	○	○	○	○
Good color of the artificial interior lighting	○	○	○	○	○
Optimal intensity of the artificial interior lighting	○	○	○	○	○
Changeable artificial lighting	○	○	○	○	○

Nature-themed graphics	○	○	○	○	○
Limited use of rigid angles	○	○	○	○	○
Minimal use of abstract graphics	○	○	○	○	○
Use of colors of nature	○	○	○	○	○
Prominence of neutral and cool colors	○	○	○	○	○
Use of natural materials	○	○	○	○	○
Acoustics and noise control	○	○	○	○	○
Views of nature	○	○	○	○	○
Access to nature/outdoors	○	○	○	○	○
Interior openness	○	○	○	○	○
Familiar and non-institutional elements	○	○	○	○	○
Dignified furniture	○	○	○	○	○

End of Block: Homelike / Calming

Start of Block: Positive Distraction

How **important** do you find each of the following characteristics in supporting **positive distraction** in EmPATH units?

	Very unimportant	Somewhat unimportant	Neither important nor unimportant	Somewhat important	Very important
Presence of TV	○	○	○	○	○
Presence of background music	○	○	○	○	○
Presence of artwork	○	○	○	○	○
Views of nature	○	○	○	○	○
Listening to radio or music	○	○	○	○	○
Watching movies	○	○	○	○	○
Reading books and magazines	○	○	○	○	○
Playing games	○	○	○	○	○
Arts and craft activities	○	○	○	○	○
Physical activity exercises	○	○	○	○	○

Please evaluate how **effectively** each of the following characteristics has been incorporated into your current facility to support **positive distraction.**

	Very ineffective	Somewhat ineffective	Neither ineffective nor effective	Somewhat effective	Very effective
Presence of TV	○	○	○	○	○
Presence of background music	○	○	○	○	○
Presence of artwork	○	○	○	○	○
Views of nature	○	○	○	○	○
Opportunity to listen to radio or music	○	○	○	○	○
Opportunity to watch movies	○	○	○	○	○
Opportunity to read books and magazines	○	○	○	○	○
Opportunity to play games	○	○	○	○	○
Provision of arts and craft activities	○	○	○	○	○
Having physical activity exercises	○	○	○	○	○

End of Block: Positive Distraction

Start of Block: Staff Respite

How **important** do you find each of the following characteristics for supporting **staff respite** in EmPATH units?

	Very unimportant	Somewhat unimportant	Neither important nor unimportant	Somewhat important	Very important
Private or semi-private breakrooms inside the unit	○	○	○	○	○
Location of the breakroom in relation to nurse desk	○	○	○	○	○
Daylight in breakroom	○	○	○	○	○
Biophilic elements in breakroom	○	○	○	○	○
Views of nature in breakroom	○	○	○	○	○
Dual use of quiet rooms for both staff and patients	○	○	○	○	○
Separate staff restrooms	○	○	○	○	○
Breakrooms outside of the unit	○	○	○	○	○
Distance from the nurse desk to the exit	○	○	○	○	○
Separate staff entrance	○	○	○	○	○
Using outdoor space for staff respite	○	○	○	○	○

Please evaluate how **effectively** each of the following characteristics has been incorporated into your current facility to support **staff respite.**

	Very ineffective	Somewhat ineffective	Neither ineffective nor effective	Somewhat effective	Very effective
Private or semi-private breakrooms inside the unit	○	○	○	○	○
Optimal location of the breakroom in relation to nurse desk	○	○	○	○	○
Daylight in breakroom	○	○	○	○	○
Biophilic elements in breakroom	○	○	○	○	○
Views of nature in breakroom	○	○	○	○	○
Dual use of quiet rooms for both staff and patients	○	○	○	○	○
Separate staff restrooms	○	○	○	○	○
Breakrooms outside of the unit	○	○	○	○	○
Optimal distance from the nurse desk to the exit	○	○	○	○	○
Separate staff entrance	○	○	○	○	○
Availability of outdoor space for staff respite	○	○	○	○	○

End of Block: Staff Respite

Start of Block: Safety and Security

How **important** do you find each of the following characteristics in supporting **safety and security** in EmPATH units?

	Very unimportant	Somewhat unimportant	Neither important nor unimportant	Somewhat important	Very important
Line of sight from the nurse desk to patient communal areas	○	○	○	○	○
Visual integration of patient communal areas	○	○	○	○	○
Accessibility of staff to patient areas	○	○	○	○	○
Ligature-resistant furniture and equipment	○	○	○	○	○
Choice of privacy	○	○	○	○	○
Monitoring video cameras	○	○	○	○	○
Access to emergency call buttons (panic buttons) for staff	○	○	○	○	○
Access control: Locking in/out, double doors	○	○	○	○	○
Detection systems	○	○	○	○	○

Extra safety consideration for restrooms	○	○	○	○	○
Extra safety consideration for Patient private rooms	○	○	○	○	○
Extra safety consideration for outdoor courtyard (Please do not answer if outdoor spaces are not available in your current facility)	○	○	○	○	○

Please evaluate how **effectively** each of the following characteristics has been incorporated into your current facility in supporting **safety and security.**

	Very ineffective	Somewhat ineffective	Neither ineffective nor effective	Somewhat effective	Very effective
Good line of sight from the nurse desk to patient communal areas	○	○	○	○	○
Visual integration of patient communal areas	○	○	○	○	○
Accessibility of staff to patient areas	○	○	○	○	○
Ligature-resistant furniture and equipment	○	○	○	○	○
Choice of privacy	○	○	○	○	○

Monitoring video cameras	○	○	○	○	○
Access to emergency call buttons (panic buttons) for staff	○	○	○	○	○
Access control: Locking in/out, double doors	○	○	○	○	○
Detection systems	○	○	○	○	○
Proper safety consideration for restrooms	○	○	○	○	○
Proper safety consideration for Patient private rooms	○	○	○	○	○
Proper safety consideration for outdoor courtyard (Please do not answer if outdoor spaces are not available in your current facility)	○	○	○	○	○

End of Block: Safety and Security

Start of Block: Maintenance

How **important** do you find each of the following characteristics for a good **maintenance** in EmPATH units?

	Very unimportant	Somewhat unimportant	Neither important nor unimportant	Somewhat important	Very important
Easy-to-clean surfaces	○	○	○	○	○
Repairable and durable recliners	○	○	○	○	○
Durable wall materials	○	○	○	○	○
Extra maintenance consideration for restrooms' materials and fixtures	○	○	○	○	○
Extra maintenance consideration for triage	○	○	○	○	○
Extra maintenance consideration for garden / outdoor space (Please do not answer if outdoor spaces are not available in your current facility)	○	○	○	○	○

Please evaluate how **effectively** each of the following characteristics has been incorporated into your current facility for a good **maintenance**.

	Very ineffective	Somewhat ineffective	Neither ineffective nor effective	Somewhat effective	Very effective
Easy-to-clean surfaces	○	○	○	○	○
Repairable and durable recliners	○	○	○	○	○
Durable wall materials	○	○	○	○	○
Extra maintenance consideration for restrooms' materials and fixtures	○	○	○	○	○
Extra maintenance consideration for triage	○	○	○	○	○
Extra maintenance consideration for garden / outdoor space (Please do not answer if outdoor spaces are not available in your current facility)	○	○	○	○	○

End of Block: Maintenance

Start of Block: Autonomy

How **important** do you find each of the following characteristics for supporting **autonomy** in EmPATH units?

	Very unimportant	Somewhat unimportant	Neither important nor unimportant	Somewhat important	Very important
Sufficient number of private rooms (quiet/calming rooms)	○	○	○	○	○
Varied levels of privacy in communal areas	○	○	○	○	○
Opportunities for different activities	○	○	○	○	○
Mix of seating	○	○	○	○	○
Moveable furniture	○	○	○	○	○
Open design to encourage walking and navigation	○	○	○	○	○
Spaces equipped with virtual communication technologies	○	○	○	○	○
Sufficient number of restrooms	○	○	○	○	○
Availability of outdoor spaces	○	○	○	○	○
Availability of nourishment stations	○	○	○	○	○
Adjustable ambient environment	○	○	○	○	○

Please evaluate how **effectively** each of the following characteristics has been incorporated into your current facility for supporting **autonomy**.

	Very ineffective	Somewhat ineffective	Neither ineffective nor effective	Somewhat effective	Very effective
Sufficient number of private rooms (quiet/calming rooms)	○	○	○	○	○
Varied levels of privacy in communal areas	○	○	○	○	○
Opportunities for different activities	○	○	○	○	○
Mix of seating	○	○	○	○	○
Moveable furniture	○	○	○	○	○
Open design to encourage walking and navigation	○	○	○	○	○
Spaces equipped with virtual communication technologies	○	○	○	○	○
Sufficient number of restrooms	○	○	○	○	○
Availability of outdoor spaces	○	○	○	○	○
Availability of nourishment stations	○	○	○	○	○
Adjustable ambient environment	○	○	○	○	○

End of Block: Autonomy

Start of Block: Inclusivity

How **important** do you find each of the following characteristics in supporting **inclusivity** in EmPATH units?

	Very unimportant	Somewhat unimportant	Neither important nor unimportant	Somewhat important	Very important
Adaptive furniture options for people with limited mobility	○	○	○	○	○
Bariatric seating options	○	○	○	○	○
Separate milieus for children and adolescents	○	○	○	○	○
Zoning inside the milieu	○	○	○	○	○
Multiple milieus for different patient types	○	○	○	○	○
More patient private rooms (Calming/quiet rooms)	○	○	○	○	○
Inclusion of both voluntary and involuntary admissions	○	○	○	○	○
Variety of design options	○	○	○	○	○
Provision for spiritual, religious, or	○	○	○	○	○

culturally specific practices	

Please evaluate how **effectively** each of the following characteristics has been incorporated into your current facility in supporting **inclusivity**.

	Very unimportant	Somewhat unimportant	Neither important nor unimportant	Somewhat important	Very important
Adaptive furniture options for people with limited mobility	○	○	○	○	○
Bariatric seating options	○	○	○	○	○
Separate milieus for children and adolescents	○	○	○	○	○
Zoning inside the milieu	○	○	○	○	○
Multiple milieus for different patient types	○	○	○	○	○
More patient private rooms (Calming/quiet rooms)	○	○	○	○	○
Inclusion of both voluntary and involuntary admissions	○	○	○	○	○
Variety of design options	○	○	○	○	○
Provision for spiritual, religious, or culturally specific practices	○	○	○	○	○

End of Block: Inclusivity

Start of Block: Block 13

What do you think is the best ratio of staff to patients?

- ○ 1:1 to 1:3
- ○ 1:3 to 1:6
- ○ 1:6 to 1:10
- ○ Doesn’t matter

What do you think is the most effective number of patients in each EmPATH unit?

- ○ 5 to 8
- ○ 9 to 12
- ○ 13 to 16
- ○ More than 17
- ○ Doesn’t matter

If you have any additional thoughts about the design of EmPATH units, please add them here.

_____

_____

_____

_____

_____

End of Block: Block 13