Rapid EVIDENCE Reports

Mental Health Units in Acute-Care Facilities

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About This Report

About NLCAHR

The Newfoundland and Labrador Centre for Applied Health Research, established in 1999, contributes to the effectiveness of health and community services in Newfoundland and Labrador and to the physical, social, and psychological wellbeing of its population. NLCAHR accomplishes this mandate by building capacity in applied health research, supporting high-quality research, and fostering the effective use of research evidence by decision makers and policy makers in the provincial healthcare system.

About *Rapid Evidence Reports*

NLCAHR designed *Rapid Evidence Reports* to provide support for evidence-based decision making in the Newfoundland and Labrador healthcare system on an expedited basis as compared to the lengthier *'Evidence in Context'* reports issued through the Contextualized Health Research Synthesis Program. Through these expedited reports, NLCAHR provides a succinct review of recent research evidence on a high-priority research topic selected by decision makers in the province.

Rapid Evidence Reports include:

- A clear statement of the issue and the background to the issue/problem;
- A description of the scope and nature of the pertinent English-language scientific literature from the past five years;
- A summary of the principal features of the available evidence – points of consensus, points of disagreement, areas of uncertainty or silence on some or all of the following issues: effectiveness of interventions, potential benefits and harms, risks, costs, and cost-effectiveness; and
- A brief analysis of the types of issues that might affect the applicability of the evidence to the local context.

It is important to note that, unlike our other decision-support product, the *'Evidence in Context'* report, a *Rapid Evidence Report* is **not** a comprehensive and systematic synthesis of the literature on the topic. This rapid report provides neither critical appraisal of included articles nor a full analysis of the contextual issues involved in applying evidence to the Newfoundland and Labrador healthcare setting. Rather, a *Rapid Evidence Report* provides decision makers with a summary of the scope and nature of the recent scientific literature on the topic in question, an initial assessment of the strengths and gaps in this literature, and a review of the key points of agreement and disagreement among researchers.

Researchers and Consultants

For this report, researchers from the Newfoundland and Labrador Centre for Applied Health Research were Sarah Mackey, Research Officer, Contextualized Health Research Synthesis Program (CHRSP) and Dr. Stephen Bornstein, Director of NLCAHR. Our team benefited from the advice and expertise of Dr. Sarah Jarmain, MD, FRCPC. Dr. Jarmain is Site Chief of Mental Healthcare, Chair of the Medical Advisory Committee, and Director of Medical Quality at St. Joseph's Healthcare, London ON as well as being an Associate Professor in the Department of Psychiatry at Western University. Dr. Jarmain's credentials are included in Appendix A.

Background

In many ways, mental healthcare facilities and units are intrinsically different from general hospital facilities and units (1–3). Clinically speaking, the needs of mental health patients and staff are very specific (4–6) and may also vary, depending upon patient diagnoses and age (7,8). Unique patient safety issues that may arise in mental healthcare settings include: self-harming behavior and suicide; violent and aggressive behavior; the use of seclusion and/or restraint to de-escalate aggressive behavior; and the use of measures to mitigate the risk of abscondment (8,9). It is therefore important to consider which aspects of the physical and therapeutic environment might contribute to feelings of safety and self-control when deciding how the physical space will be organized within a given mental healthcare setting (10). Such consideration requires a deep understanding of the therapeutic environment: how *"the interaction between the physical environment and people located in that environment, and also within and between the people"* in an environment can either facilitate or inhibit recovery (11, p. 287).

The unique requirements of mental health patients should be reflected in physical components of facility design so that the physical and therapeutic components necessary for this particular setting are provided (1,2,12).

At the suggestion of Western Health, our provincial stakeholder partners have asked us to identify evidence on how the physical environment of acute mental healthcare units can be improved to enhance quality of care, support the therapeutic experience of patients, and optimize the overall safety of patients and staff.

Our research question is as follows:

"What does the scientific evidence tell us about the appropriate physical and therapeutic features of acute-care mental health units that best support the quality of care and the safety of patients and staff in a recovery-oriented therapeutic environment?

Scope and Nature of the Scientific Literature

For this *Rapid Evidence Report*, we searched for articles within the health data indexes PubMed, CINAHL and PsychINFO, as well as conducting secondary searches for articles in Google Scholar. Our aim was to locate systematic review evidence published in English since 2006 as well as uncovering any comprehensive literature reviews and primary research published in English since 2011. Any primary studies already included in the systematic reviews that were located in our search were included as a part of the synthesized evidence, but were not given separate consideration.

The scope of our search also included two design guideline documents published in the United States that were suggested to us by our Subject Expert.

The populations under consideration for this study were adult inpatients (over the age of 18) and staff whose work in the hospital setting includes providing inpatient programs for individuals hospitalized with mental health problems. It is worth noting that the literature describes both the populations and the healthcare settings under study in a wide variety of ways. Common terms include: psychiatric inpatient(s), mental health inpatient(s), acute care psychiatric ward(s), psychiatric unit(s), inpatient psychiatric ward(s), psychiatric inpatient unit(s), mental health care unit(s), psychiatric department, and psychiatry ward. Our search terms reflected the various descriptors commonly used in the literature. We further defined the parameters of our search by using specific criteria for including and excluding studies. These criteria are outlined in Table 1.

Table 1: Inclusion and exclusion criteria for evidence in this report

Parameter	Inclusion Criteria	Exclusion Criteria
Population	- Mental health inpatients 18 years and older - Staff working in mental health units	- Studies that focused on patients other than inpatients admitted to hospital for mental health issues (e.g., surgical inpatients were excluded) - Studies that focused solely on children, adolescents, or forensic inpatients or outpatients
Setting	Studies solely or predominantly based in mental health inpatient settings	- Studies solely based in community settings or general hospitals unless specifically on a mental health unit - Studies solely focused on forensic units
Intervention	- Studies that manipulated one or more environmental features - Studies that focused on patient and/or staff perceptions of mental health unit physical or therapeutic environment	- Studies that did not focus on the physical or therapeutic features of mental health units - Complex interventions that did not focus on the physical environment

Given the limited scope of this review, we narrowed our focus to the intersection between the physical and therapeutic features of mental health units or facilities. We note that there is a body of research evidence that looks at improving care quality and patient/staff safety without any focus on the built environment. This literature, which deals with the *processes* of care, includes studies about therapeutic and recovery-oriented approaches that can be used by hospital staff to minimize aggressive incidents and to enhance the therapeutic environment and may also include specific research on safety issues for nurses. It is important to point out that more of the literature in this review dealt explicitly with the safety of patients than it did with the safety of nurses.

Typically, we would not include design guideline reports in this type of literature review; however, given the limited nature of the available research literature and the need to consider the unique safety elements required within mental healthcare settings specifically, design guideline reports were considered worth considering since they provide an important overall perspective on the physical components of mental health facilities— a perspective that is not yet available from other sources of scientific evidence. Additionally, we have included a paper published by the Facility Guidelines Institute that outlines some of the common mistakes made when behavioral health facilities and units are designed (1).

In total, our review covers three systematic reviews, one scoping review, two comprehensive literature reviews, 18 primary studies and two guideline reports. Of the 18 primary studies:

- one was a naturalistic observational study;
- four used a cross-sectional/ descriptive design;
- three were mixed-methods studies (a combination of qualitative and quantitative research methods);
- eight used qualitative methodologies only (interviews or focus groups); and
- two were evaluation studies.

Because this is a *Rapid Evidence Report*, we have not critically appraised any of the included articles. However, the appraisals contained within included systematic reviews will provide readers with some perspective on the quality of the available evidence. Overall, there is a consensus in the review literature that more rigorous research is needed to establish a causal relationship between elements of the physical environment and patient outcomes (5,13,14). Currently, data are scarce for these settings and few firm conclusions can be drawn because much of the available evidence is qualitative in nature (5,6,13,14).

This deficit was echoed throughout the recently published primary research literature as well. Limitations commonly acknowledged in primary studies included low generalizability and the inability of study design to establish causality (15–20). We take the overall weakness of this body of literature as an indication that this type of evidence is still in an emerging stage of development (i.e., evidence- based design for healthcare facilities in general, and evidence-based design for mental health settings more specifically).

Given the weakness of the literature, this review can provide only a map and summary of the research landscape in its current form rather than providing a more definitive indication of what works and what does not.

List of evidence categories in this report

For this *Rapid Evidence Report*, the findings from the literature were organized into the following categories:

- Overall Architectural Features
- Access to Nature
- Interior Design, Materials or Features
- Nursing Stations
- Patient Rooms
- Family Rooms
- Locked Versus Unlocked Units
- Sensory Modulation
- Seclusion Rooms

A summary of the evidence for each of these categories is provided below.

Overall Architectural Features

In this section, we examine research evidence that describes the general architectural features of a mental health unit's physical environment. For the purposes of this study, these overall architecture features would include certain external features such as visual access and/or physical access to the outdoors and nature as well as internal architectural features such as the unit size, layout, configuration and the building materials used. Together, these physical components of a mental health unit make an impression on patients and staff and contribute to how familiar and comfortable the healthcare setting appears and feels (3).

This category of evidence is discussed in the greatest number of studies in this review: three systematic reviews, eight primary studies, and two design guides. Although there are no conclusive findings in the literature that can recommend specific physical components that are absolutely required, a number of common issues were raised in the literature.

All three included systematic reviews commented on the potential impact on patients of the overall architectural features within healthcare settings:

- A 2006 systematic review compiled evidence on studies that manipulated several environmental features simultaneously, in both general healthcare and in psychiatric settings. Although the study found that the well-being of patients was affected by the physical healthcare environment, the authors concluded that the size and direction of such effects are highly dependent on characteristics of patient

populations and on specific healthcare settings; moreover, they acknowledged that many of the examined trials had methodological flaws (21).

- Along the same lines, a 2014 systematic review stated that *"existing studies show a correlation between the availability of private spaces and home-like features and an increase in social interaction and improvements in well-being"* (5, p.175) but ultimately, the review concluded that findings were inconclusive.

- The third systematic review we looked at (2014) focused on the *preventive* properties of the physical environment and found evidence that crowding/lack of space often leads to aggression in patients. It is noteworthy that these authors also characterized the studies under review as having numerous methodological limitations (13).

Evidence from eight primary studies further elaborates on the findings of these systematic reviews. These primary studies mainly describe how physical architectural features affect:
- incidents related to safety;
- patient perceptions of safety; and
- the therapeutic environment.

The majority of these studies were qualitative in design; as such, they could not establish causal relationships and had limited generalizability beyond the specific setting within each study (14,16–18,22,23).

Four primary studies identified similar trends: each used interviews with patients and staff on contributors to patient aggression and agitation but the methods and perspectives differed from study to study. A secondary analysis of patient and staff survey results in one study found that poor physical environments are a common factor in units with high rates of conflict (16). In another study, patients perceived crowded and less private environments as conducive conditions for increased violence and aggressive behavior (23). The recorded experiences of nurses in one qualitative study concurred that crowded and noisy physical environments exacerbated aggression and contributed to the use of restraint and seclusion, particularly when low-stimulus areas were not an available option for patient retreat (24).

One evaluation study of a new purpose-built psychiatric intensive-care unit similarly concluded that improvements to the physical environment were related to significantly reduced episodes of seclusion, total seclusion hours, aggressive incidents, and levels of agitation. These reductions were related to specific changes to the new unit that included:
- increased privacy for patients through private patient rooms,
- designated/specific visiting areas, and
- increased levels of visibility and observation throughout the unit (22).

Patient interviews in two studies reported that some aspects of the physical environment can cause confusion and distress in patients (e.g., units in which the rooms all look the same, units in which a lack of signage makes navigation of the unit difficult) (17,18). In one of these studies, patients noted that a general psychiatric unit that lacked any clear architectural identity was problematic, as it was neither like a home nor like a hospital (17).

One study used patient interviews and researcher observations to examine a number of important environmental strategies that were related to falls prevention and patient safety in a geriatric psychiatric locked unit. Study participants listed the following as preventive strategies: closer patient proximity to staff, minimized clutter, access to handrails on both sides of the hallway, benches for rest and appropriate flooring (18). Patient falls were also examined in a retrospective chart review of incident reports on mixed psychiatric populations. The most commonly reported environmental factor contributing to falls was related to wet surfaces (whether in showers or from spilt beverages on the floor). This study noted that, unlike other healthcare settings in which falls tend to happen in patient bedrooms, in the mental healthcare setting, falls occur more frequently in lounge rooms, communal dining rooms, and outdoor areas (25).

One primary study resolved that more conclusive research is needed regarding the appropriate physical environment in mental and behavioral health settings. However, based on interviews with psychiatric staff, facility administrators, and architects working in these settings, the authors provided the following objectives to consider when remodeling or developing new mental health facilities:
- provide attractive, aesthetically pleasing, and easily maintainable furniture and finishes;
- create a "deinstitutionalized" appearance;
- integrate features that support patient and staff safety;
- encourage orderly and organized spaces;
- include areas for staff respite; and
- provide visual and physical access to the outdoors (26, p.20).

Finally, two design guides from the United States provided the best overall perspectives on the physical characteristics necessary for inpatient mental health units. Recommendations from these guides provide the most comprehensive conceptualization of how designers can create more home-like therapeutic spaces within the overall mental health unit. Both guides agree that the design goal should be to avoid an institutional look while recognizing that it can be challenging *"to strike a balance between the safest possible healing environment and a non-institutional appearance that is correct for the unique conditions that exist in each facility"* (2, p.9).

One design guide based on a recovery-oriented, evidenced-based design paradigm for mental health facilities made three overarching design recommendations (3):

- facility design should be flexible to account for changing workloads, care objectives and technologies;
- the design should be efficient—for example, designers can consider economizing on space utilization through more efficient use of support spaces such as storage and utility rooms that can share a single space. The guide also suggests minimizing walking distances for nurses to get to support spaces and patient rooms; and
- fundamental patient needs such as dignity, respect, and privacy should be balanced with patient safety. This includes accounting for known patient stressors such as noise, lack of privacy, poor or inadequate lighting and ventilation, among other issues. Conceptually, principles for a safe and secure environment include minimizing potential physical hazards, enhancing staff visibility and staff engagement with patients, using abuse-resistant materials, furnishings and fixtures, and incorporating safety-promoting technologies.

This design guide also recommended other spatial features for newly-constructed units or for major renovation projects in mental health inpatient units, as outlined in Table 2.

Table 2: Summary of recommended spatial features suggested by the U.S. Department of Veterans Affairs, 2010 (3)

Recommendation	Design Aim
Overall Recommendations	- Home-like internal/external architectural features and interior design features that promote social engagement and interaction between staff and patients - Patient rooms and common areas that pay attention to wall color, trim accent colors, and that have artwork securely anchored to the walls - Visual and physical access to nature, including natural light and views in indoor patient activity areas - Appropriate acoustic controls - Safe furnishings, fixtures, and equipment
Layout and unit configuration recommendations	- Open and bright - Free of blind corners - After-hours portions of the unit that can be closed off - Pod-like design without long corridors - Identifiable reception area in a lobby area just outside the unit with sufficient signage - A nursing station that is functional and designed to facilitate interaction with patients - All patient wings and activity areas directly visible from the nursing station - Multiple patient room clusters to allow for the separation of patient sub-groups - Outdoor spaces directly off the unit that are secure and attractive

Another very recent guide, called the *Design Guide for Behavioral Healthcare Facilities* (2), parallels a number of the recommendations made above. It notes the need to minimize/eliminate blind spots in corridors (places where patients cannot be observed by staff) and calls attention to the therapeutic benefits of access to outdoor spaces (discussed specifically in a later section). This design guide added a few additional points to consider:

- chart rooms and other staff areas should be configured so that confidential information is not overheard;
- if medication rooms or zones are used, they should be sized to accommodate the maximum necessary staff and equipment;
- service areas should be accessible from both the unit and a service corridor, when possible;
- placement of components such as electrical outlets and circuits as well as water shut-off valves should be considered in terms of safety, repair, and patient access;
- housekeeping rooms and cleaning materials should be locked away when not in use; and
- smoking areas – if provided—should be outside (2).

This guide proposes different levels of safety for different parts of the facility. Overall, it advises that

> *…the greater the opportunity for a patient to be alone, the greater the opportunity for self-harm and the greater the caution that should be taken regarding design choice and material* (2, p.12)*.*

This second guide provides a tool to help clinical staff and designers think about the different degrees of caution that should be taken, relative to the opportunity for patients to be alone within a space. This tool is not meant to predict definitive risk levels in a particular facility because these can fluctuate over time. The authors of this guide propose that, no matter what level of safety is required, every effort should be made to maintain a residential, rather than an institutional, atmosphere within the mental health unit (2).

Worth mentioning here is a primary study that aimed to empirically measure the five levels of safety that were proposed in the design guide. The authors examined incident reports over seven years and conducted focus groups that gathered caregiver perspectives. They found support for the notion of five levels of safety and noted that:

- patient rooms and bathrooms had the most patient incidents;
- dayrooms and corridors had fewer incidents;
- patient room and bathrooms were the most common sites of suicide; and
- hallways and dayrooms were a frequent site of violence.

The authors recommend that the built environment reflect the safety required in specific areas to:

- provide better visibility and accessibility for staff to patient rooms and bathrooms;
- consider design that will mitigate unauthorized patient access to staff-designated areas;
- provide visibility in hallways where entrances are located to help reduce the rate of elopement; and
- locate admission/intake units where quick access from an ambulance or from outside the building can be provided.

The study's generalizability is limited because it provides data from only one individual psychiatric facility. Nonetheless, it serves as an example of how such tools can be used to help improve safety in the built environment (15).

Access to Nature and Light

Access to nature and adequate lighting are common topics examined in the research evidence. A comprehensive literature review by Connellan et al. 2013 found that nature is seen as healing for patients and adds positive complexity and stimulation to their environment. These authors also found evidence that gardens foster feelings of renewal/ restoration of attention, and stress relief for patients and staff (27).

Similarly, patients in an exploratory study of a locked 16-bed psychiatry unit with a small outdoor balcony identified features of the natural world such as the patio, sunlight, fresh air from outdoors, flowers, and plants to be calming, refreshing and stimulating. Access to an outdoor patio facilitated positive social interactions according to patients and family members (18). Health professionals in another qualitative study also unanimously recognized the importance of access to nature as a component of healing environments (26). Possible specifications for outdoor areas are outlined in the *Design Guide for Behavioral Health Facilities* including detailed design considerations for exterior landscaping, for outdoor furniture and for how to use building exteriors, walls or fences to establish clear boundaries and to provide safety (2).

Two systematic reviews and two comprehensive literature reviews sought information on lighting in mental health facilities. These reviews combined research from general healthcare facilities and from mental healthcare settings (5,6,21,27). Generally, well-lit spaces maximizing the use of natural light are described positively; however, one systematic review found the effects of sunlight to *"be highly dependent on the characteristics of the patient population" (p.178)*. This was in reference to two primary studies in the review that found variable preferences for sunlight among mental health patients with different kinds of depression (21). A more recent primary study that conducted interviews from professionals working in mental health settings strongly supported providing a maximum amount of daylight. One limitation of this study is that patient perspectives were not gathered (26).

Interior Design, Materials or Features

Interior design features refer to impermanent attributes that contribute to the physical and therapeutic environment within mental health units. Generally speaking, it is recognized that the choice of interior design, materials, and colors, including surface materials such as wall finishes, ceiling and floor coverings, can have significant impact on the quality of a healthcare environment (28). However, how individual interior design elements might translate to specific impacts on patient outcomes has yet to be rigorously studied.

A 2006 systematic review of clinical literature notes that available evidence for interior design features is limited (21). Predominantly, studies within this review manipulated multiple features all at once rather than isolating individual interior design features. This methodological flaw limited the ability of the authors to make any causal inferences. Many of the included studies in this review also included mixed healthcare settings (21). A more recent literature review found that there is a need for clear visual communication balanced with a home-like environment through various interior design sub-themes such as furnishings, color, wayfinding, spatial organization, and the design of patient rooms (27). Another review found that the arrangement and location of furniture has an influence on social interaction (6).

Three primary studies provide insight into patient and staff perspectives on the impact of interior features within mental health units. The most recent mixed-methods study used photographic evidence from patients and showed that patients' sense of well-being could be compromised by the location of certain fixtures and fittings that disrupted their habitual routines and generated discomfort (29). Another study of a locked unit for older patients indicated that certain aspects of the physical environment restricted their functional independence. These included: toilets with no doors; long hallways cluttered with stretchers, wheelchairs, and other equipment; inadequate space to move around safely; and inconvenient storage or lack of storage for clothing and other personal effects. Feedback indicated that providing directional clues and signage in the environment would prevent confusion. Some patients indicated that warm colors, comfortable furniture, and domestic decor contributed to reduced stress. Patients also perceived long straight hallways as institutional and confusing since they often deterred their ability to find their way back to their rooms independently (18). A study surveying the perspectives of health professionals reported a preference for flexible seating arrangements to allow people to rearrange the environment as needed. As well, most survey participants identified the importance of damage-resistant and attractive furnishings that are both non-institutional and also safe and durable (26).

Recommendations from the two design guides suggest that interior design can be used to help create a more home-like environment (2,3). *The Veterans Affairs Design Guide* provides general consideration of materials recommended when designing lighting, acoustics,

interior finishes, wayfinding and signage, wall-mounted items and patient furnishings. It strongly encourages facilities to include certain interior elements that will help create a residential feel. These elements include: wood-tone vinyl flooring, wall color, artwork, and attractive and safe furnishings. For patient rooms and common areas, the guide advises that designers should pay attention to wall color, trim and accent colors and that artwork should be securely anchored. It advises that furnishings, fixtures and equipment within the unit minimize potential safety hazards e.g., ligature points (3). Both guides outline in detail specific materials for various individual areas of a mental health unit as well as finishing details such as bathroom and door hardware. Although it is beyond the scope of this review to outline exact dimensions, materials and finishing details covered in the guides mentioned above, we would like to emphasize that these components can crucially enhance the safety of the overall space. In particular, theses guides pay special attention to interior design and materials that eliminate points of ligature and ensure that relevant aspects of design are anti-barricade (2,3).

Nursing Stations

Nursing stations are a central feature of mental health units and, therefore, a significant physical structure to consider for design. Consistently mentioned in the literature is the challenge of designing a nursing station to address the competing, and sometimes conflicting, needs of patients and staff. The research often examined the shift from closed nursing stations to open nursing stations in an attempt to improve the therapeutic environment for patients.

One systematic review found that the removal of the glass panel from the nurse's station facilitated an increase in staff/patient interactions when compared with a control ward (5). Evidence from a comprehensive literature review on patient perceptions found that open areas encourage interactions between patients and staff. Closed nursing stations were perceived by patients as conveying the idea that staff are inaccessible and unwelcoming to patients and visitors (27). However, the study also recognizes *"the need for discreet and separate spaces for nurses and other staff to relax and also for spaces away from patients where they can attend to administrative tasks"* (27, p.154).

A recent primary study published in 2015 revealed the differences between how nurses and patients responded to a new open nursing station design. Though nurses appreciated how the open design improved communication with patients, they also found it challenging to maintain safety and patient confidentiality. Patients, on the other hand, unanimously preferred nursing stations without a barrier (10). A study that gathered health professional feedback noted the need for a design that balances patient supervision and staff safety. Some favored open nursing stations for patient visibility and better staff-patient relationships, while others favored closed stations for staff safety. A possible compromise suggested in this study was to have a relatively open nursing station that has *"features that*

allow it to be transformed into a more controlled space" (26, p.20). A critical review by Hunt 2015 contends that maximizing visual observation of patients from the nursing station could be the most important design feature of a psychiatric hospital (1). Overall, the literature identifies the need for a physical design that is supportive of the therapeutic environment for patients, is safe, and remains functional for the work of nurses.

Both design guides make recommendations on the features of nursing stations. The *Veterans Affairs Guide* proposes that nursing stations fit with a recovery-oriented model. To accomplish this, it suggests an open nursing station design that blends in well with the unit in scale and physical appearance. Functional components include the incorporation of computer tables and/or computer-on-wheels and safe stationary equipment. If deemed necessary, frameless laminated glass can be installed on the station but it should not impede engagement between patients and staff. It is also suggested that design should allow for the direct visibility of all patient wings and activity areas, informal interaction with patients, and confidentiality of patient records (3). Similarly, a more recent guide proposes that nursing stations provide the least possible barrier between staff and patients. The solution to maintaining patient confidentiality suggested by this guide is to re-locate chart rooms and other staff areas so that conversations between staff are not overheard by patients or visitors. The guide also encourages the provision of quiet gathering areas for patients near the nursing station since it is a place where patients tend to congregate and socialize (2).

Patient Rooms

While the literature does discuss the clinical or safety advantages of providing single patient rooms, neither conclusive evidence nor consensus is available (1). Evidence consists of the perceptions of patients, staff, families, and health professionals, correlational research, and one evaluation of a new facility. One systematic review found that private or semi-private spaces contributed to a more home-like environment and correlated with increased social behavior and reduced violence and vandalism (5). Research from another literature review noted that private rooms may benefit some patients and not others. In this view, shared rooms are seen as a way to support patient safety and therapeutic interaction (6).

An exploratory study of geriatric patients in a psychiatric unit provided evidence that a lack of private patient rooms caused distress for patients and family members (18). Interviews completed in a primary study of health professionals on the design components of behavioral health facilities was divided: many professionals were in favor of private rooms for patients as a way to decrease the institutional character of mental health units, whereas others felt shared bedrooms can deter patient self-harm. There was overall agreement that private rooms increased staffing and construction costs. Ultimately, the authors of this study suggested including both shared and private rooms to allow for needs of facilities or patient populations that may change over time (26). An evaluation study compared ratings of the physical environment of a facility's old Psychiatric Intensive Care Unit to that of a newly-

built Psychiatric Intensive Care Unit. These authors found that the new facility's physical environment had higher ratings, which were attributed to a number of changes, one of which was the provision of single-patient bedrooms (22).

Design guidelines from both the U.S. Department of Veterans Affairs and the U.S. Facility Guidelines Institute take on the issue of private versus semi-private rooms. Guidelines from the Department of Veterans Affairs list various advantages in providing private rooms such as: increased privacy, reduced noise, lower levels of agitation for some patients, as well as more flexibility in patient assignment. However, for social or clinical reasons, some double-occupancy rooms are preferable. This guide recommends that some rooms be private and others be double-occupancy and that room assignment should be based on careful consideration of patient characteristics and needs, and discussions with mental healthcare staff (3). The more recent guidelines from the Facility Guidelines Institute focus on the safety aspects provided in patient rooms. Materials and specifications for patient rooms are detailed in both guides (2,3).

Family Rooms

In a related note on patient privacy, one recent descriptive primary study explored nurses' perspectives and staff-logged patient data on the development of family rooms in four mental health inpatient units. Although this evidence can be considered preliminary, designated family rooms were found to contribute to the therapeutic landscape. The study provides recommendations for establishing family rooms in mental healthcare facilities, including their location, aesthetics, and contents, as well as policy and guidelines for their use (19).

Locked or Unlocked Units

The locked unit is a physical safety measure sometimes used to limit mobility of patients (9). Five primary studies investigated the effects of locked or unlocked units. Generally, these studies discussed this feature as it pertained to patient safety. Together, these studies show the difficulty of balancing patient safety with the therapeutic aim of providing patient autonomy.

One 15-year naturalistic study compared the effect of unlocked versus locked units on patient safety incidents. It found that suicide attempts were less common on open wards than on locked wards and that suicide attempts and completed suicides were less common in open-door units. However, locked and unlocked units showed no difference in the number of completed suicides when units were compared. As well, locked units showed no decrease in the risk of completed suicide, suicide attempts, absconding with return and absconding without return. According to this study's findings, authors suggest that the

safety of patients is not improved by units with locked doors (30). Another primary study from 2011 found that locked doors seemed "*to have modest effects on preventing patients from leaving the ward without permission*" (20, p.614).

Two other qualitative studies that examined perceptions of patients also reported that patients felt that locked units reduced their autonomy even though, in one of the studies, they recognized that these were needed for safety reasons (18,31). Evidence gleaned in interviews in one of these studies described the pros and cons of both open and closed wards. Ultimately, this study advised that, if a hospital chooses to lock its ward doors, it can mitigate the negative psychological impacts on patients by providing access to the outdoors (31). A final study evaluated the move from a locked facility designed in the 1950s to a newly-designed facility with a uniquely designed "interdependent inpatient entrance" and a unique transitional security zone. The study gathered perspectives on the new entrance under four themes:

- autonomy versus inconvenience;
- safety versus stigma;
- unit door versus independent inpatient entrance; and
- privacy versus community integration.

Overall, the findings suggested that patients found the new design created safety and privacy, effectively supported recovery-oriented care, and that visitors reported positive experiences with it (32).

Sensory Rooms/Sensory Modulation

Sensory approaches in mental healthcare have grown more popular over the last 10 years as a means of helping patients regulate physiological and emotional arousal. Sensory interventions are described as non-invasive, self-directed, and empowering means that "*may support recovery-oriented and trauma-informed mental health practice and may assist in efforts to reduce the use of seclusion and restraint*" (14, p.277).

A scoping review of 17 studies published in 2015 provides the best available overview on the use of sensory approaches in mental health. A range of sensory approaches was reviewed, including sensory integration, Snoezelan rooms[1] and sensory rooms (sometimes called comfort rooms). The majority of studies in the scoping review (12/17) examined sensory rooms and the ways in which various sensory stimuli could be used to sooth and calm patients. A lack of rigor in the reviewed studies prevented the authors from drawing any clear conclusions. However, the authors did suggest that overall sensory approaches can be safe and effective. Emerging evidence consistently shows reduced distress and behavioral disturbances in patients. There was no clear or consistent evidence to support the idea that

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[1] Name given to a specific form of sensory room originating in the Netherlands (14).

sensory interventions, by themselves, can lead to reduction in the use of seclusion and restraint. The authors of the scoping review highlighted three other important issues: the importance of multidisciplinary team involvement, staff education, and the tendency of men to avoid the use of sensory approaches (14).

A more recent primary study used a survey in various psychiatric wards to examine staff perceptions of working with sensory rooms. Staff reported that sensory rooms had mostly positive effects on patients as well as positive effects on the general ward environment. They found that their patients were calmer and that sensory rooms provided a means to both manage and de-escalate patients' feelings of anxiety and distress. Finally, this study showed that staff, rather than patients, initiated 47% of sensory room visits. The authors suggested that this showed the importance of staff taking on an active role in encouraging patients to use the sensory room (33).

Seclusion Rooms

In current practice, seclusion is a behavioural intervention of last resort and not considered a therapeutic care procedure (34). As such, we focused on research that studied design components preventing agitation and aggression in patients rather than on seclusion rooms, per se. However, we would like to draw attention to a 2014 report published in British Columbia that provides insight into how seclusion is related to the physical environment. Authors of this report state:

> *The physical environment is critical to preventing seclusion. Facilities must undergo detailed exterior and interior assessment by clinical staff as well as by designers, architects and builders to determine improvements in entrances, paint, furnishings, signage, lighting and other design elements* (35).

Potentially Relevant Contextual Issues

The reviewed evidence suggests several potentially relevant contextual issues regarding physical and therapeutic features of mental health facilities in NL.

Demographics, geography and population needs

Three important challenges that are likely to affect the planning, design or renovation of mental health facilities in this province are: Newfoundland and Labrador's rapidly aging population, its comparatively high incidence of chronic disease, and the high proportion of its population living in rural and remote communities. Traditionally, mental health facilities have been designed with young adults in mind (18) but the increasing prominence of older adults with mental illnesses will place new demands on the designers of mental health facilities. Accommodations adapted for patients with multiple comorbid conditions will likely become increasingly necessary in NL where rates of chronic disease are known to be higher than average. Also, the isolated nature of many rural and remote communities across

the province can mean limited access to acute inpatient services for populations living in these areas. Suitable alternatives will require their own unique considerations.

Economic and Political Factors

As noted in a report from the Canadian Mental Health Association of Newfoundland and Labrador (CMHA-NL) (36), the absence of modern mental health facilities in our province's hospital and correctional facilities is a long-standing mental healthcare issue. Public demand for new facilities is supported by growing evidence showing that environmental influences on mental health are *"neither passive nor minor"* (37).

A key component to improving facility design and numerous other mental health issues is having the funding to support necessary changes (36). According to 2016 budget highlights, the Government of Newfoundland and Labrador will provide:

- *$2.5 million to support further planning and design of a new facility to replace the Waterford Hospital.*
- *$8.5 million to support the continued planning and design of the new Western Memorial Regional Hospital* (38)*.*

In December 2016, the province struck a deal with the federal government to have $73 million in healthcare transfer payments go towards mental health initiatives over the next 10 years (39).

Commitment of this funding provides the province with an opportunity to finally improve the physical environment of mental health units for staff and patients. However, the fiscal constraints facing the province at present may make it challenging to allocate sufficient funding to ensure that newly-built facilities will actually improve the physical environment in ways that are specifically appropriate for mental health.

Even though the various psychiatric sub-populations are more alike than different, certain of these (e.g., adolescents, seniors and forensic populations) will have unique needs and these should be reflected in the design of their environments.

Absence of Building Codes and Standards for Mental Health Facilities

To our knowledge, no specific building codes and standards are available in Canada or in Newfoundland and Labrador for renovation or new construction of mental health facilities. In part, this is the result of a lack of conclusive evidence linking physical features of the environment to patient outcomes. However, as we have seen, guidelines from credible sources that have been based on considerable recorded experience point to some common mistakes that tend to be made when psychiatric hospitals and units are designed. These experts note that certain common features of general hospitals are sometimes unnecessarily carried over into behavioral facilities. These features compromise safety and reinforce the institutional and unwelcoming character of the space. Examples cited are: medical gas outlets, bedpan washers, nurse call systems, light fixtures placed directly over

patients' beds (designed for medical procedures), and wrist handles on faucet valves (1). Professionals planning new facilities in NL should consider how these design issues might need to be modified within mental health units in order to avoid producing new facilities that are no safer or no more home-like then the facilities being replaced.

Summary of Key Points

- Research on evidence-based design for health facilities is a relatively new and emerging field of study; this is especially evident where mental health facilities are concerned. To date, most of the research in this area is of limited scientific quality. Most of the primary studies examined or synthesized involve qualitative findings based on surveys and interviews of patients and staff rather than on carefully-designed interventions or comparisons. As a result, these studies are rarely able to draw any causal links between physical or therapeutic features of the environment and outcomes for staff and patients. Some of the best advice currently available can be found in 'guides' that are based only indirectly on systematic syntheses of the existing evidence and expert opinion. For robust, evidence-based decision support on these issues, more research and better research design will be required (5,6,27,40,41).

- The available literature examines a limited number of common themes: overall architecture, access to nature, interior design features or materials, nursing stations, patient rooms, family rooms, locked versus unlocked units, and sensory modulation.

- There is a widely recognized need to move away from asylum-style architectural design of mental health spaces in favor of familiar, home-like environments suitable for healing and recovery (18,27,40,42). Ideally, such facilities would enable the provision of healthcare in a pleasant, comfortable and safe environment while also facilitating better mental healthcare (1–4).

- One special consideration that the research we have examined makes clear is that mental healthcare facilities are intrinsically different from general healthcare facilities—these inherent differences should be the lens through which any design decisions are made in an effort to produce safer, more therapeutic, and more recovery-oriented mental healthcare environments.

- The unique safety issues that arise within mental healthcare settings are such that nurses have to juggle the often-conflicting requirements of technical safety with those of providing recovery-oriented patient care. Patients may regard what nurses see as safe treatment as being counter to their need for autonomy and privacy (5). Two common areas in the literature that allude to such differences in staff and patient perceptions of physical components of the environment involved in safety are locked versus unlocked units and the design of nursing stations. In some cases, it

is possible that these perceptions are related to the process of care or the model of care rather than to the physical environment. This is a distinct body of literature outside the scope of this review that also requires consideration.

- Patients in mental health units are not a homogenous group. Therefore, physical and therapeutic design elements should reflect the needs of specific categories of patients. Different individual patients may also have different reactions to environmental features or have different definitions of what is meant by a home-like environment (1,3,26,43).

- This report focuses on features of the physical environment; however, it is important to note that many other factors also affect patient outcomes. Research evidence points to the importance of system characteristics that play a role, such as organizational culture, management culture, management style, pharmacological patterns, and technology (6). Additionally, patient perspectives often acknowledge the importance of interactions with staff and although physical design can support these interactions, interpersonal relations between patients and staff contribute as well (17,18). Significant improvements in the physical environment alone may not be enough to change the atmosphere depending on the nature of these relationships (11).

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Appendix A: Our Consultant

Dr. Sarah Jarmain

Sarah Jarmain, MD, FRCPC is the Site Chief Mental Health Care, Chair Medical Advisory Committee and Director Medical Quality at St. Joseph's Health Care London and an Associate Professor in the Department of Psychiatry, Western University. She has worked as a physician administrator since 2001 and has developed models for physician HR planning, workload measurement, and physician engagement and leadership. Sarah has been actively involved in health system transformation including participating in the design and development of the new mental health facilities in St. Thomas and London, the promotion of collaborative care models, and in service planning with a focus on rehabilitation and recovery. She is a strong advocate for the development of a resilient work culture, continuous quality improvement and patient safety, and the effective integration of technology into clinical care. She has also been actively involved in curriculum development and has a keen interest in helping health care professionals and trainees gain the leadership and administrative skills to be able to effectively function in today's health care environment. She is the past-president of the Ontario Psychiatric Association and is currently treasurer of the Coalition of Ontario Psychiatrists. Sarah lives on the north shore of Lake Erie and has been exploring the challenges of viniculture in Southwestern Ontario.