



WORKSHOP REPORT

Northern, Small, and Remote Health Care Facilities (HCFs) Design

February 2024



Background

Development of the next edition of CSA Z8000, *Canadian Health Care Facilities* is underway, and SCC is funding and working with CSA Group to support the integration of northern-specific considerations into the standard. This work focuses on climate change risks and considerations specific to Northern Canada, such as permafrost thaw and risks to transportation and access due to extreme weather. It also includes additional information tailored to small communities that are geographically isolated and have unique considerations, such as ventilation within the context of northern buildings.

The 2021 budget unveiled financial support for Standards Council of Canada's (SCC) Standards to Support Resilience in Infrastructure Program (SSRIP). This enabled the SCC to continue working with Canada's national standardization network, supporting the creation and implementation of standardized solutions. These efforts aim to enhance infrastructure resilience, ultimately contributing to stronger Canadian communities.

The objective of the workshop is to support the Technical Subcommittee responsible for development of CSA Z8000 in their review of how climate change is impacting the north in permafrost zones. The goal is to acknowledge how northern realities may differ from the south so that this information can be considered across the standard, whether through design values, normative elements, or informative elements.



CSA GROUP HEALTH CARE

CSA Z8000: Building for health and safety in our health care facilities

Canadians need safe healing spaces

The toll from hospital-acquired infections (HAIs) in Canada is staggering. Each year about 220,000 Canadians will get an HAI and 8,000 will die from these infections, according to the Public Health Agency of Canada (PHAC, 2013).

In addition to the terrible human cost, these deaths also place an ongoing financial burden on the Canadian health care system.

The sad reality is that many of those infections, and subsequent deaths can be traced to the environment where care is delivered.

A series of research studies have uncovered some of the poor design features that can contribute to higher rates of infections – an insufficient number of hand hygiene sinks (or their locations), lack of dedicated patient isolation rooms, and materials or surfaces that are not conducive to cleaning.¹

¹Infection Prevention And Control in Healthcare Facility And Design (CSA Group 2018)

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CSA Z8000 and the role of standards in the health care system

Standards play an important role in supporting health care delivery. By outlining requirements and best practices for performance and process, standards can help patients, staff, and visitors avoid injury from medical devices or contracting health care-associated infections. Based on evidence-informed design and practices, standards can also help build health care facilities that last longer, operate more efficiently, and serve their users better.

CSA Z8000 provides requirements and guidance for the planning, design, and construction of Canadian health care facilities (HCFs). It is intended to be used by facilities providing health care services regardless of type, size, location, or range of services. Many concepts set out in the Standard, such as isolating infected patients and single-patient rooms, were informed by research that commenced after the SARS crisis of the early 2000s and challenged the accepted design practices at the time. Subsequent Standard updates happened in a similar way – through learned experience, reflecting changes in the health care system.

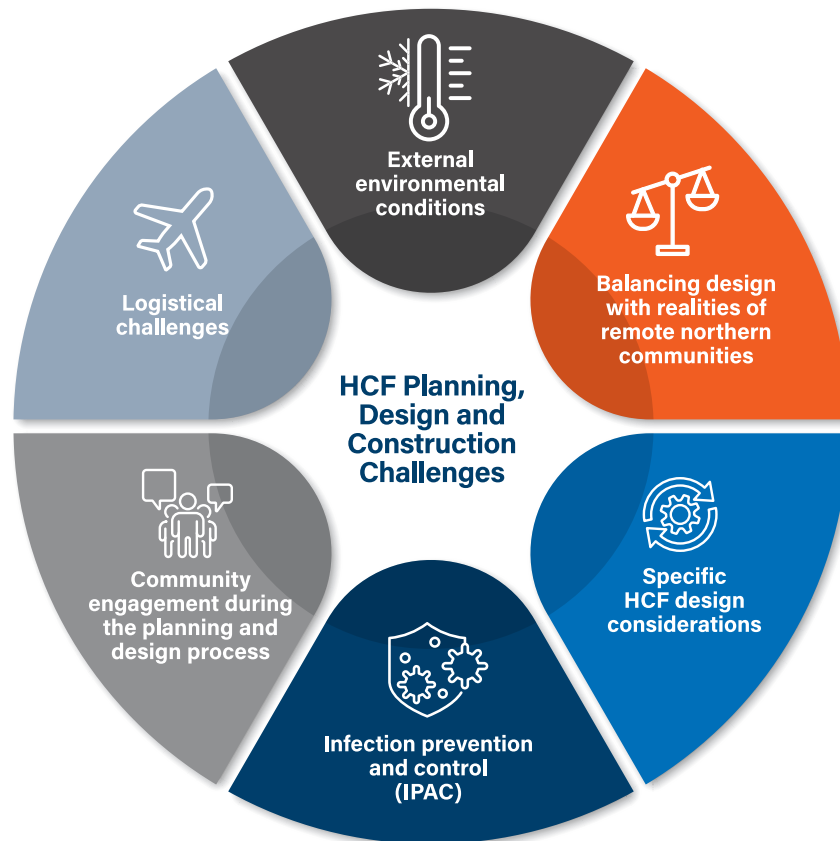
The next edition of CSA Z8000 is anticipated in December 2024. For this new edition, the Technical Subcommittee is considering various updates to address challenges HCFs faced during the Covid-19 pandemic, climate change considerations, design requirements for HCFs in small and remote communities, and many other topics.

Understanding northern climate change needs for health care facilities

To incorporate the inclusion of small and remote communities' considerations in the new edition of CSA Z8000, CSA Group formed a new Working Group (WG) to facilitate and support this initiative, and held a workshop to gain a deeper understanding of the matter. The WG contained national representation, consisting of the following members:

Perry Heath, Government of Northwest Territories
Stephen Jackson, Government of Nunavut
Colin Young, Government of Yukon
Philip Christensen, Government of Yukon
Michael Simon, Government of Yukon
Beverly Cousins, Government of Nunavut
Theo Potgieter, Government of Nunavut
William Glenn, Government of Nunavut
Kathryn Wyndham, Provincial Health Services Authority
Cliff Harvey, Niagara Health

On February 22, 2023, CSA Group hosted a workshop to gather input from experts around Canada to explore how CSA Z8000 can support the design of HCFs in Northern, small, and remote areas in Canada. The workshop consisted of panel discussions, presentations, facilitated discussions and breakout rooms, all with the purpose of better understanding the realities of health care service provision in Northern, small, and remote HCFs and how CSA Z8000 can better address the challenges that are present. It was agreed that the ultimate goal is to provide the same level of care in every Canadian HCF, regardless of size or location. All feedback from the workshop will be considered in the development of the new edition of CSA Z8000.



HCF Planning, Design and Construction Challenges:



External environmental conditions are very different. The harsh climate of the north, which includes long winters, reflects a different reality from other parts of Canada. Outside air humidity during the winter is much lower which makes it very challenging and expensive to maintain the humidity levels defined with CSA standards within the HCF. Further, outside temperature ranges are much narrower, and wind speeds can be higher, in the north than in the rest of Canada. Beyond these challenges, the ground/soil that the HCF is built on is different (permafrost versus other common soil types in Canada) and poses its own design challenges.



There are many logistical challenges. Availability of equipment, materials and supplies are limited by transportation methods to many communities. This includes replacement equipment, material and supplies in case of defects or damage during transportation.

Additionally, the availability of transportation methods varies depending on the season. This can lead to short or rushed planning and design timelines. The logistical challenges can also prevent the reduction of embodied carbon.



Balancing theoretical/precautionary design approach with practical realities of Northern, small and remote communities.

The intent of the HCF or scope of health care services can be hard to define at times. This can result in overdesigning the HCF to account for every situation. Because of the high cost of space and technology, it is a challenge to balance the theoretical/precautional design approach with the practical realities. For example, if data shows that a decontamination room, mandated by the standard, is hardly used, question as to whether it is a good use of limited resources may be raised? Similarly, if a particular technology is installed, but the availability of service personnel is limited and it cannot be used consistently, rationale for its installation may be questioned?

Several additional challenges were noted, including the availability of staff to operate and maintain the HCF, and the scarcity of technology and material suitable for use in Northern, small, and remote communities. Additionally, HCFs can require a large diversity of spaces such as staff residences and space for allied health staff to provide their services which can be difficult to accommodate in northern facilities. To address these challenges an ethical design framework should be used, and the following question asked throughout the design process, “would a hospital-acquired infection in a Northern, small and remote community have the same, more or less dire consequences when compared to other HCFs?”



Community engagement during the planning and design process of the HCF is very important.

It was recommended to partner with community organization to understand how the HCF can best serve the community. This includes elements such as post disaster recovery or business continuity planning that may need to be conducted at the community or regional level instead of HCF level. Additionally, communities may consider the HCF to be a higher classification (Class A HCF instead of Class C2 HCF). This may lead building inspectors to treat the building as such and require higher levels of redundancy than would be normally required for Class C2 HCF. Finally, this practice can help ensure that the design incorporates Indigenous cultural safety.

Participants referenced Dr. Turpel-Lafond’s In Plain Sight report, which notes that a culturally safe environment can only be defined by the Indigenous person receiving care and does not profile or discriminate against the person, but is experienced as respectful, safe, and allows meaningful communication and service. It is a physically, socially, emotionally, and spiritually safe environment, without challenge, ignorance, or denial of an individual’s identity. To be culturally safe requires positive anti-racism stances, tools and approaches and the continuous practice of cultural humility¹.



Specific HCF design considerations. If the HCF is built on permafrost, the HCF design and construction must protect the permafrost below. Most HCFs need to have heated water tanks for storage of clean water, sewage, and fire sprinkler water. This greatly impacts the building envelope and design of the HCF. Additionally, because in certain situations, regular supply of clean water cannot be relied upon, these water tanks must have larger capacities to provide some redundancy and resilience.

Additional design considerations were noted, each addressing specific aspects essential for the effective planning and design of HCFs in Northern, small, and remote communities. Ventilation rates and humidity level requirements emerged as critical factors as any negative pressure leaks could cause doors to freeze. In addition, ample space should be provided for multipurpose rooms, especially for services with similar clinical requirements and patient risk groups. The HCF design should include cultural considerations. For example, patient rooms need to be large enough to allow for patient families to be present to prevent patients from feeling isolated and alone. Additional provisions need to be made for increased lighting as access to natural light is limited, especially in the wintertime, and allowances need to be made for sufficient supply storage. The use of specific materials, such as laminate flooring, was advised against because of their incompatibility with the environmental and working conditions. Balancing indoor and outdoor spaces, including a specialized morgue or body holding area, and recognizing that the terminology used to identify the HCF can be different based on its regional role (e.g., nursing centre or health centre or health station or hospital) all need to be considered when designing HCF in northern and remote communities.



Infection prevention and control (IPAC) design best practices can be expensive. For example, in long-term care facilities, full HEPA air filtration, bed pan macerators in every resident bathroom, high end solid surface materials that are FDA approved and antibacterial are expensive but are also seen as investments.

¹ M. E. Turpel-Lafond, In Plain Sight (2020) <https://engage.gov.bc.ca/app/uploads/sites/613/2020/11/In-Plain-Sight-Summary-Report.pdf>



Operational realities of health care service provision, including operation and maintenance:

Numerous operational realities were discussed, outlining the complexities of designing and operating HCFs in Northern, rural, and remote communities. Notably, a municipal clean water supply is not always available, and depending on the location of the community, clean water may need to be brought to the facility. Technological challenges may be encountered, as broadband internet may not be readily available, and the site where the HCF is being built could also be a heritage site, which would lead to further design considerations and constraints. In addition, the community may not have enough contractors or tradespersons to operate and maintain the infrastructure within the HCF, which could impact the business continuity of the facility. Moreover, clinical workflows and IPAC considerations are different in the North, as a result of the differing patient demographics and common diseases. HCFs in these settings provide much more outpatient

care instead of inpatient care, and depending on the community and location, the regional role of the HCF can vary significantly. For example, the primary purpose of a HCF may be to just stabilize a patient for transport to a larger hospital. All of these factors require consideration throughout HCF design and maintenance.

In addition to the design and maintenance challenges HCF face in Northern, remote and small communities, upgrading and renovating existing facilities also poses substantial challenges due to the various elements highlighted above. This can pose a significant concern as the majority of the current HCF infrastructure in these regions is aging. These challenges highlight the difficulties and obstacles involved in improving and updating the current healthcare infrastructure to align with changing standards and community needs.



Role of CSA Z8000 and related standards:

It is critical for standards to acknowledge the different planning, design, construction, operation, and maintenance challenges faced by HCFs in Northern, small, and remote communities. This recognition should extend across various stages, including the planning, design, construction, operation, and maintenance, and the design requirements in standards should be based on the services offered in the HCF. The geographical and environmental contexts of Northern and remote communities present distinct hurdles that necessitate a nuanced and tailored approach within established standards.

The concern was raised that consultants supporting HCF projects may not have enough experience with HCFs in Northern, small, and remote communities, and may default to the most stringent requirements in HCF standards. Similarly, standards are often used within the accreditation process for HCFs in Northern, small, remote communities, and if standards do not acknowledge the different challenges faced, then this can make the accreditation process difficult and, incorrectly, give the impression that these HCFs are not as safe as others in Canada.

Because of the unique challenges in Northern, small, and remote communities, it is not always possible to create a set of prescriptive requirements that address every HCF in every community. As such, a risk-based approach should be included for HCFs in Northern,

small, and remote communities. This would allow planners and designers to tailor the HCF standards to better address the unique challenges with alternate methods in a documented and structured manner.

Standards often reference other standards within them and are very comprehensive. This can create hidden challenges when trying to show compliance to standards and be a barrier to applying them to HCFs. Additionally, standards should be accessible by the public to access the information within them readily.

Next Steps

The Technical Subcommittee responsible for the development of the content for CSA Z8000, along with its Working Groups, reviewed the comments and themes identified during the Workshop in order to develop proposals for change for the new edition of the standard. The goal of this work is update CSA Z8000 such that HCFs in Northern and remote communities can tailor the standard to safely address the unique conditions faced by these communities. The New edition of CSA Z8000 is expected to publish in December 2024.

For more information about Z8000 and CSA's standards for Health Care Facilities in Canada, please visit <https://www.csagroup.org/standards/areas-of-focus/healthcare-and-well-being/standards-for-safer-health-care-facilities-in-canada/>.

CSA Group

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The mission of CSA Group's Standard Development organization is to enhance the lives of Canadians through the advancement of standards in the public and private sectors. As such, CSA Group continues to be at the forefront of standards research, development, education, and advocacy.

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