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Canadian health care facilities



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The Subcommittee would also like to thank those who contributed content to this Standard through the CSA Z8000 working groups.

Preface

This is the second edition of CSA Z8000, *Canadian health care facilities*. It supersedes the previous edition published in 2011.

It is part of a series of Standards related to health care facility engineering and sets forth planning, design, and construction requirements intended to support five key objectives for health care facility design (the OASIS principles):

- operational effectiveness and efficiency;
- accessibility;
- safety and security;
- infection prevention and control; and
- sustainability.

Changes in this edition include

- a) update and reorganization of the planning clauses to better align with provincial/territorial procurement practices;
- b) greater detail on the make-up the inter-disciplinary team and its role in planning;
- c) new and updated information on mock-ups and simulations as part of planning and design;
- d) revision to occupational health and safety (OHS), patient safety, and accessibility provisions;
- e) update to the infection prevention and control requirements to reflect advances in science, technology, and clinical practice related to infection prevention and control (IPC);
- f) addition and expansion of material on infant and pediatric treatment spaces;
- g) revisions and additions to address specific needs of pediatric patients and their families;
- h) modification of the wayfinding section to align with the new CSA standard on wayfinding, CSA Z317.14;
- i) expansion of the clauses addressing risk assessment and catastrophic event planning;
- j) reorganization of ambulatory care and procedures clauses to provide clear guidance and requirements for low-acuity community health facilities;
- k) addition of clauses specifically addressing long-term care facilities;
- l) updated requirements for equipment, logistics, and information technology planning and support;
- m) adjustment of room size requirements where needed to align with provinces/territories (P/T) planning guidelines and best practice;
- n) updates to architectural requirements to accommodate newer building designs, technologies, and construction practices;
- o) updates to the medical device reprocessing and medical laboratories clauses by experts in those areas; and
- p) new and revised material on technology integration, reflecting the increasing reliance on mobile communications, electronic patient records, building management systems, and robotics.

CSA Group acknowledges that the development of this Standard was made possible, in part, by the financial support of the governments of Alberta, British Columbia, Manitoba, New Brunswick, Newfoundland and Labrador, Northwest Territories, Nova Scotia, Nunavut, Ontario, Prince Edward Island, Quebec, Saskatchewan, and Yukon, as administered by the Canadian Agency for Drugs and Technologies in Health (CADTH).

This Standard was prepared by the Subcommittee on the Design and Construction of Health Care Facilities, under the jurisdiction of the Technical Committee on Health Care Facilities and the Strategic

Steering Committee on Health Care Technology and Systems, and has been formally approved by the Technical Committee.

This Standard has been developed in compliance with Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard of Canada by CSA Group.

Notes:

- 1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*
- 2) *Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.*
- 3) *This Standard was developed by consensus, which is defined by CSA Policy governing standardization — Code of good practice for standardization as "substantial agreement. Consensus implies much more than a simple majority, but not necessarily unanimity". It is consistent with this definition that a member may be included in the Technical Committee list and yet not be in full agreement with all clauses of this Standard.*
- 4) *To submit a request for interpretation of this Standard, please send the following information to inquiries@csagroup.org and include "Request for interpretation" in the subject line:*
 - a) *define the problem, making reference to the specific clause, and, where appropriate, include an illustrative sketch;*
 - b) *provide an explanation of circumstances surrounding the actual field condition; and*
 - c) *where possible, phrase the request in such a way that a specific "yes" or "no" answer will address the issue.*

Committee interpretations are processed in accordance with the CSA Directives and guidelines governing standardization and are available on the Current Standards Activities page at standardsactivities.csa.ca.

- 5) *This Standard is subject to review within five years from the date of publication. Suggestions for its improvement will be referred to the appropriate committee. To submit a proposal for change, please send the following information to inquiries@csagroup.org and include "Proposal for change" in the subject line:*
 - a) *Standard designation (number);*
 - b) *relevant clause, table, and/or figure number;*
 - c) *wording of the proposed change; and*
 - d) *rationale for the change.*

Z8000-18

Canadian health care facilities

0 Introduction

0.1

This Standard provides requirements and guidance for the planning, design, and construction of Canadian health care facilities. It is intended to be used by all facilities providing health care services regardless of type, size, location, or range of services. This Standard was developed for use by architects, engineers, planning and project managers, contractors and builders, commissioning teams, facility managers, maintenance managers, infection prevention and control personnel, and other health care professionals.

0.2

This Standard was developed to provide a consistent methodology and practical requirements for health care facilities (HCFs) across the country, to achieve the following benefits:

- a) establish a common standard that Canadian authorities can adopt and enforce within their jurisdictions;
- b) share best practice between provinces and regions, and between larger and smaller facilities;
- c) promote consistency in the physical layout of Canadian facilities, thereby increasing operational efficiency and helping to reduce the risk of error by newly hired or visiting staff from other facilities;
- d) enhance facility operational efficiency, optimize quality of service delivery, and maintain high levels of worker and patient health and safety; and
- e) provide a common terminology and design approach, to improve communication between the organizations and individuals involved in HCF design and construction, to reduce construction errors, and to facilitate the movement of knowledge and skilled tradespeople between regions.

0.3

This Standard was developed to complement existing standards and codes by providing a set of overarching requirements for HCFs, and referencing out to specific standards and codes as appropriate. In this way, it can serve as a central resource for planners, architects, engineers, health care administrators, and contractors.

0.4

This Standard contains a comprehensive and coordinated set of requirements, references, and guidelines that apply to all aspects of the built environment for health care service delivery. Because of the complexity of HCFs, the requirements that apply to a particular element of the HCF can appear in different places within the document. Therefore this Standard is meant to be used in its entirety, and not as a step-by-step manual.

0.5

The following principles and objectives were considered throughout the development of this Standard:

- a) alignment with federal or provincial/territorial ministries of health and their specific governmental policy directives;

- b) promotion of patient and family-centred care and the elements of respect, information sharing, participation, and collaboration;
- c) promotion of infrastructure elements that have been demonstrated to improve patient outcomes;
- d) integration of guiding principles into the development of technical and functional programs;
- e) ensuring feasibility and flexibility to meet future trends and changes in services and technologies;
- f) promotion of environmentally responsible design including acoustics, lighting, air quality, bio-hazardous waste removal, and energy usage alterations that do not compromise patient care or needs;
- g) incorporation of ergonomics and human factors into all aspects of the HCF as it relates to the patient, clinical providers, other staff, and the general public at large (with particular emphasis on privacy, confidentiality, safety, supportive workplace features, and effective operational requirements);
- h) inclusivity for people of different values, beliefs, and cultural backgrounds, as well as those who face physical, psychological, or other health-related challenges; and
- i) facilitation of long-term, sustainable service delivery for capital and operational expenditures using life cycle costing.

0.6

As a design and construction standard, this Standard does not specify requirements for operational models, policies, procedures, etc. Those elements are addressed in other standards, guidelines, and accreditation tools provided by CSA and other organizations such as Accreditation Canada, Provincial/Territorial governments, and the professional colleges and licensing bodies. This Standard complements these other standards, guidelines, and tools by providing an environment that supports the operational model and management structure that will be used in the HCF.

0.7

This Standard is structured to follow a consistent, modular approach to HCF design. It can apply to the development of an entire HCF or to components within a HCF that are undergoing renovation or new construction. This Standard is organized as follows:

- a) **Clauses 1 to 3** — Scope, reference publications, and definitions.
- b) **Clause 4** — Provides the overarching principles, general requirements, and guidance that apply to all areas of a HCF that is being developed or renovated, such as general program considerations, operations, environment of care, safety and security, infection prevention and control, and sustainability.
- c) **Clause 5** — Planning process, outlines the key planning considerations early in the design/construction process recognizing the variability of factors that would impact the service delivery models. This Clause specifically addresses pre-design planning, design, construction, building commissioning, and operational commissioning.
- d) **Clause 6** — Site and facility development, reviews the key generic external considerations for site development and building development. It also highlights the critical functional adjacencies within a HCF, both for clinical and support services.
- e) **Clause 7** — General functional service requirements, outlines the generic design and construction considerations as they relate to the overall functioning of a HCF, including building services requirements, environmental considerations, infection prevention and control, materials and finishes, occupational health and safety, safety and security, technology considerations, furniture, fittings, and equipment.

- f) Clause 8 — Inpatient and related services, highlights the specific key requirements for inpatient areas, and in some cases for outpatient facilities that are part of a continuum of care. These areas include
- i) medical surgical inpatient;
 - ii) critical care;
 - iii) maternal and newborn;
 - iv) mental health services;
 - v) pediatric and adolescent inpatient;
 - vi) rehabilitation care;
 - vii) burn units;
 - viii) complex care; and
 - ix) long-term care.
- The list of functional service areas is not meant to be exhaustive.
- g) Clause 9 — Diagnostic and treatment functional service requirements, highlights specific key requirements for diagnostic/treatment functional services. These include
- i) general requirements for diagnosis and treatment spaces;
 - ii) ambulatory care;
 - iii) operative procedure and surgical services;
 - iv) renal dialysis;
 - v) oncology;
 - vi) endoscopy;
 - vii) emergency care;
 - viii) allied health;
 - ix) electrodiagnostics;
 - x) respiratory services;
 - xi) medical imaging;
 - xii) laboratory services; and
 - xiii) pharmacy.
- h) Clause 10 — Support functional service requirements, highlights supporting services within a HCF including biomedical engineering, environmental services, nutrition and food services, materials management, plant maintenance, security and parking, and medical device reprocessing.
- i) Clause 11 — Common requirements, provides a table of common spaces across a HCF and, where appropriate, it provides minimum sizes for these areas.
- j) Clause 12 — Building services and environmental design, gives an overview of the engineering and architectural systems that are specific to HCFs.

0.8

This Standard was developed to address new buildings, additions, and renovations. For projects already in process, this Standard may be used as a reference.

0.9

This Standard includes notes for additional support and guidance to users, and to provide further detail or rationales on requirements where needed.

The goal of this Standard is to ensure that the outcomes of those under the care of a HCF are improved where design and construction can assist with these outcomes. To achieve this requires a focus not only on safety and efficiency, but also on the impacts of the physical environment and atmosphere on the care outcome. Using the available knowledge in evidence-based design as outlined in this Standard, HCFs can create a physical environment that promotes positive health outcomes, quicker recovery, a

reduction in medical errors and health care acquired infections, and the recruitment and retention of valued caregivers.

Note: In the planning and design of a HCF, conflict can sometimes arise between competing clauses. In situations where requirements in this Standard are found to be in conflict, or cannot be met for other reasons, the HCF should

- a) document the conflict or the reason the requirement cannot be met;
- b) evaluate the requirements in light of the five principles outlined in Clause 4.1.1 and consider how the intent of these principles could be met through an alternative solution; and
- c) develop and document the rationale for the final decision, i.e., how the proposed solution aligns with the core principles.

When such conflicts arise, the HCF should also consider sharing its analysis (and possible resolutions) with CSA committees, so that this information can be considered for future editions.

0.10

To assist users in meeting the requirements of this Standard, the following tables have been included:

Table number	Table title
Table 1.1	Examples of facilities that are within the scope of this Standard
Table 6.1	Key relationships and dependencies
Table 6.2	Medical/surgical inpatient care — Important relationships
Table 6.3 a)	Critical care — Essential relationships
Table 6.3 b)	Critical care — Important relationships
Table 6.4 a)	Maternal and newborn care — Essential relationships
Table 6.4 b)	Maternal and newborn care — Important relationships
Table 6.5 a)	Mental health and addictions services — Essential relationships
Table 6.5 b)	Mental health and addictions services — Important relationships
Table 6.6 a)	Pediatric and adolescent inpatient care — Essential relationships
Table 6.6 b)	Pediatric and adolescent inpatient care — Important relationships
Table 6.7 a)	Rehabilitation care — Essential relationships
Table 6.7 b)	Rehabilitation care — Important relationships
Table 6.8	Inpatient continuing care — Important relationships
Table 6.9	General ambulatory care — Important relationships
Table 6.10	Renal dialysis ambulatory care — Important relationships
Table 6.11 a)	Oncology ambulatory care — Essential relationships
Table 6.11 b)	Oncology ambulatory care — Important relationships
Table 6.12 a)	Emergency care — Essential relationships
Table 6.12 b)	Emergency care — Important relationships
Table 6.13 a)	Procedures/operating rooms — Essential relationships
Table 6.13 b)	Procedures — Important relationships
Table 6.14	Allied health services — Important relationships

Table number	Table title
Table 6.15 a)	Laboratory services — Essential relationships
Table 6.15 b)	Laboratory services — Important relationships
Table 6.16	Electrodiagnostic services — Important relationships
Table 6.17	Respiratory services — Important relationships
Table 6.18 a)	Medical imaging — Essential relationships
Table 6.18 b)	Medical imaging — Important relationships
Table 6.19	Pharmacy — Essential relationships
Table 6.20	Biomedical engineering — Important relationships
Table 6.21	Environmental services — Important relationships
Table 6.22	Nutrition and food services — Important relationships
Table 6.23 a)	Materials management — Essential relationships
Table 6.23 b)	Materials management — Important relationships
Table 6.24	Plant maintenance — Important relationships
Table 6.25 a)	Security and parking — Essential relationships
Table 6.25 b)	Security and parking — Important relationships
Table 6.26 a)	Medical device reprocessing — Essential relationships
Table 6.26 b)	Medical device reprocessing — Important relationships
Table 6.27 a)	Building entry and parking — Essential relationships
Table 6.27 b)	Building entry and parking — Important relationships
Table 6.28	Heliport — Essential relationships
Table 6.29 a)	Exterior garden/therapy area — Essential relationships
Table 6.29 b)	Exterior garden/therapy area — Important relationships
Table 6.30	Main entry and lobby — Important relationships
Table 7.1	Minimum distances for inpatient and critical care beds for infection prevention and control
Table 8.1	Key space requirements and recommendations — Inpatient bedrooms
Table 8.2	Key space requirements and recommendations — Critical care
Table 8.3	Key space requirements and recommendations — Maternal and infant care
Table 8.4	Key space requirements and recommendations — Mental health and addictions services
Table 8.5	Key space requirements and recommendations — Pediatric and adolescent
Table 8.6 a)	Key space requirements and recommendations — Rehabilitation care

Table number	Table title
Table 8.6 b)	Key space requirements and recommendations — Pediatric rehabilitation care
Table 8.7	Key space requirements and recommendations — Burn treatment services
Table 8.8	Key space requirements and recommendations — Inpatient complex care
Table 8.9	Key space requirements and recommendations — Long-term/personal care
Table 9.1	Key space requirements and recommendations — Diagnosis and treatment, including ambulatory care — General
Table 9.2	Key space requirements and recommendations — Operative procedures
Table 9.3	Key space requirements and recommendations — Ambulatory care — Dialysis
Table 9.4	Key space requirements and recommendations — Ambulatory care — Oncology
Table 9.5	Key space requirements and recommendations — Endoscopy
Table 9.6	Key space requirements and recommendations — Emergency care
Table 9.7	Key space requirements and recommendations — Allied health
Table 9.8	Key space requirements and recommendations — Electrodiagnostic services
Table 9.9	Key space requirements and recommendations — Respiratory services
Table 9.10	Key space requirements and recommendations — Medical imaging
Table 9.11	Key space requirements and recommendations — Clinical laboratory
Table 9.12	Key space requirements and recommendations — Pharmacy
Table 10.1	Key space requirements and recommendations — Medical device reprocessing
Table 10.2	Recommended size of reprocessing areas, net m ²
Table 11.1	Common area requirements
Table 12.1	Wall sound transmission class (STC) requirements for various room types
Table B.1	HCF examples by class
Table C.1	Site assessment checklist
Table D.1	Key space requirements and recommendations — Special-purpose spaces and rooms

1 Scope

1.1 General

1.1.1

This Standard describes essential elements and specific requirements for the planning, design, and construction of HCFs. It applies to all facilities, public or private, that provide health care treatments, health-related services, or diagnostic testing services, regardless of type, size, location, or range of services. This Standard applies to the following facility types:

- a) inpatient, outpatient, or combined hospitals;
- b) facilities providing outpatient diagnosis and treatment services; and
- c) specialty inpatient centres and residential care facilities.

Note: *Owing to differences in terminology across the country, it is not possible to provide a comprehensive list of all facilities covered by this Standard. The facilities listed in Items a), b), and c), and in Table 1.1 are examples only. Additional examples are listed in Annex B.*

Table 1.1
Examples of facilities that are within the scope of this Standard
(See Clauses 1.1.1 and 1.2.1.)

Facility type:	Examples (including but not limited to the following):
a) Inpatient, outpatient, or combined hospitals	<ul style="list-style-type: none"> i) acute care hospitals, general hospitals, critical care hospitals, and academic teaching hospitals; ii) free-standing emergency departments; iii) psychiatric hospitals; iv) rehabilitation hospitals; v) complex and continuing care hospitals; vi) children's hospitals; vii) birthing centres; viii) cancer centres; and ix) stand-alone surgical facilities.
b) Specialty inpatient centres and residential care facilities	<ul style="list-style-type: none"> i) long-term care facilities; ii) lodging houses for elderly or infirm patients; iii) children's residences; iv) hospices; v) assisted living facilities; and vi) independent living settings that provide medical services on a continuing or intermittent basis.
c) Facilities providing outpatient diagnosis and treatment services	<ul style="list-style-type: none"> i) ambulatory care clinics; ii) primary care facilities (e.g., physician group clinics, dentists' offices, and sole practitioner physician offices); iii) renal dialysis centres; iv) birthing centres; v) urgent care centres; vi) children's treatment centres; vii) chemotherapy/IV therapy treatment centres; viii) office-based procedure and operating rooms or surgical facilities, including dental; ix) endoscopy facilities; x) outpatient psychiatric centres; xi) outpatient rehabilitation therapy centres; xii) adult day care; and xiii) wellness centres. <p>Note: This Standard applies to all such facilities, whether combined with inpatient centres, free-standing centres, or in leased/rental suites in office buildings. It includes transportable, and relocatable units.</p>

Note: See also Annex B.

1.1.2

This Standard applies to new facilities, temporary facilities, and to existing facilities undergoing addition or renovation. It also applies to research and testing facilities that perform medical procedures.

1.1.3

This Standard includes requirements for

- a) planning and design principles, and the planning process;
- b) site and facility development;
- c) general functional service;

- d) inpatient functional service;
- e) diagnostic and treatment functional service;
- f) support functional service;
- g) common requirements for all facilities; and
- h) building services and environmental design.

1.2 Exclusions

1.2.1

This Standard does not apply to veterinary facilities, funeral homes, or mobile health units.

Note: The exclusion for mobile health units applies to facilities that are on wheels and can be moved from place to place. A relocatable health or transportable unit [see the Note under Item c) in Table 1.1] refers to units that are placed in a particular location and remain there for an extended period of time.

1.2.2

This Standard does not address clinical practice.

1.2.3

This Standard does not include requirements for operation and maintenance of HCFs.

Note: This topic is addressed in CSA Z8002.

1.2.4

This Standard does not specify requirements for operational models, policies, and procedures.

Note: A HCF should provide the necessary environment so that services can be offered in accordance with the operational model. The design process begins with the HCF defining its expected operational model and activities. It then designs and constructs the physical infrastructure to support the defined model and activities.

1.3 Terminology

In this Standard, "shall" is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to comply with the standard; "should" is used to express a recommendation or that which is advised but not required; and "may" is used to express an option or that which is permissible within the limits of the Standard.

Notes accompanying clauses do not include requirements or alternative requirements; the purpose of a note accompanying a clause is to separate from the text explanatory or informative material.

Notes to tables and figures are considered part of the table or figure and may be written as requirements.

Annexes are designated normative (mandatory) or informative (non-mandatory) to define their application.

2 Reference publications

This Standard refers to the following publications, and where such reference is made, it shall be to the edition listed below. Additional resources not directly referenced in this Standard are listed in Annex A.

CSA Group**CAN/CSA-B64 Series-11 (R2016)***Backflow preventers and vacuum breakers***B651-12 (R2017)***Accessible design for the built environment***C22.1-15***Canadian Electrical Code, Part I***C282-15***Emergency electrical power supply for buildings***EXP06-2015***Evaluating emerging materials and technologies for infection prevention***PLUS 317-2000***Guidelines for elementary assessments of building systems in health care projects***S478-95 (R2007)***Guideline on durability in buildings***Z32-15***Electrical safety and essential electrical systems in health care facilities***Z275.1-16***Hyperbaric facilities***Z305.12-06 (R2017)***Safe storage, handling, and use of portable oxygen systems in residential buildings and health care facilities***Z305.13-13***Plume scavenging in surgical, diagnostic, therapeutic, and aesthetic settings***CAN/CSA-Z314-18***Medical device reprocessing — General requirements***CAN/CSA-Z314.9-09 (R2013)***Installation, ventilation, and safe use of ethylene oxide sterilizers in health care facilities***Z316.5-15***Fume hoods and associated exhaust systems***CAN/CSA-Z316.6-14***Sharps injury protection — Requirements and test methods — Sharps containers***Z317.1-16***Special requirements for plumbing installations in health care facilities*

CAN/CSA-Z317.2-15

Special requirements for heating, ventilation, and air-conditioning (HVAC) systems in health care facilities

Z317.5-17

Illumination design in health care facilities

Z317.10-15

Handling of health care waste materials

Z317.11-17

Area measurement for health care facilities

CAN/CSA-Z317.13-17

Infection control during construction, renovation, and maintenance of health care facilities

Z317.14-17

Wayfinding for health care facilities

Z386-14

Safe use of lasers in health care facilities

Z412-17

Office ergonomics — An application standard for workplace ergonomics

CAN/CSA-Z614-14

Children's playspaces and equipment

Z782-06

Guideline for Design for Disassembly and Adaptability in Buildings

CAN/CSA-Z902-15

Blood and blood components

CAN/CSA-Z1000-14

Occupational health and safety management

Z1004-12 (R2017)

Workplace ergonomics — A management and implementation standard

Z1600-17

Emergency and continuity management program

Z7396.1-17

Medical gas pipeline systems — Part 1: Pipelines for medical gases, medical vacuum, medical support gases, and anaesthetic gas scavenging systems

CAN/CSA-Z8001-13 (R2018)

Commissioning of health care facilities

Z8002-14

Operation and maintenance of health care facilities

CAN/CSA-Z10535.1:15

Hoists for the transfer of disabled persons — Requirements and test methods

Z10535.2-17

Lifts for the transfer of persons — Installation, use, and maintenance

CAN/CSA-Z60601 Series

Medical electrical equipment

CSA Group/ASME (American Society of Mechanical Engineers)

ASME A17.1-2016/CSA B44-16

Safety code for elevators and escalators

ASME A112.19.2-2013/CSA B45.1-13

Ceramic plumbing fixtures

CSA Group/ISO (International Organization for Standardization)

CAN/CSA-ISO 14971-07 (R2017)

Medical devices — Application of risk management to medical devices

CAN/CSA-ISO 26722-16

Water treatment equipment for haemodialysis applications and related therapies

AAMI (Association for the Advancement of Medical Instrumentation)

ANSI/AAMI ST79:2010

Comprehensive Guide to Steam Sterilization and Sterility Assurance in Health Care Facilities

AAMI TIR34:2014

Water for the processing of medical devices

AISC (American Institute of Steel Construction)

Steel Design Guide Series 11 (2016)

Vibrations of Steel-Framed Structural Systems Due to Human Activity (Second Edition)

ANSI (American National Standards Institute)/BICSI (Building Industry Consulting Service International)

ANSI/BICSI 002-2014

Data Center Design and Implementation Best Practices

AS/NZS (Australian/New Zealand Standard)

2208:1996

Safety Glazing Materials

ASHE (American Society for Healthcare Engineering)

Green Healthcare Construction Guidance Statement (2002)

BSI (British Standards Institute)

BS 6206:1981

*Specification for impact performance requirements for flat safety glass and safety plastics for use in buildings***Center for Maximum Potential Building Systems***Green Guide for Healthcare (2007–08)***CNSC (Canadian Nuclear Safety Commission)**

GD-52 (2010)

*Design Guide for Nuclear Substance Laboratories and Nuclear Medicine Rooms***Canadian Society of Respiratory Therapists***National Competency Framework (Parts 1 and 2), 2016*<http://www.csrt.com/2016-national-competency-framework/>**FGI (Facilities Guidelines Institute)***Guidelines for Design and Construction of Hospitals and Outpatient Facilities (2014)***Government of Canada***Personal Information Protection and Electronic Documents Act, SC 2000, c. 5**Privacy Act, RSC 1985, c. P-21***Government of Ontario***Healing Arts Radiation Protection Act, RSO 1990, c. H.2**Freedom of Information and Protection of Privacy Act, RSO 1990, c. F.31**X-ray Safety Code, RRO 1990, Reg. 543***Health Canada***Directive on Physical Security Requirements for Controlled Substances (Security Requirements for Licensed Dealers for the Storage of Controlled Substances) (1999)***IEC (International Electrotechnical Commission)**

62366:2007

*Medical devices — Application of usability engineering to medical devices***IEEE (Institute of Electrical and Electronics Engineers)**

802.1 series of Standards

IEEE Standards for Local and Metropolitan Area Networks

802.3-2008

IEEE Standard for Information Technology — Local and Metropolitan Area Networks — Specific Requirements — Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications

IES (Illuminating Engineering Society)

ANSI/IES RP-28-07

*Lighting and the Visual Environment for Senior Living***ISO (International Organization for Standardization)**

15189:2012

Medical laboratories — Requirements for quality and competence

15190:2003

*Medical laboratories — Requirements for safety***NAPRA (National Association of Pharmacy Regulatory Authorities)***Model Standards for Pharmacy Compounding of Hazardous Sterile Preparations 2015**Model Standards for Pharmacy Compounding of Non-hazardous Sterile Preparations 2015***National Alliance of Respiratory Therapy Regulatory Bodies***National Competency Profile (2016) — Parts 1 and 2*<http://www.nartrb.ca/national-competency-profileframework/>*White Paper on Magnetic Resonance (MR) Safety: Combined Papers 2002 and 2004***NCRP (National Council on Radiation Protection and Measurements)**

Report No. 49 (1976)

*Structural Shielding Design and Evaluation for Medical Use of X-Rays and Gamma Rays of Energies up to 10 MeV**Note: This report, which supersedes NCRP Report No. 34, is concerned with structural shielding design.*

Report No. 102 (1989)

*Medical X-Ray, Electron Beam and Gamma-Ray Protection for Energies Up to 50 MeV (Equipment Design, Performance and Use)**Note: Supersedes NCRP Report No. 33.***NFPA (National Fire Protection Association)**

10 (2010)

Standard for Portable Fire Extinguishers

13 (2016)

Standard for the Installation of Sprinkler Systems

14 (2016)

Standard for the Installation of Standpipe and Hose Systems

96 (2010)

Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations

99 (2015)

Health Care Facilities Code

101 (2018)

Life Safety Code

701 (2010)

Standard Methods of Fire Tests for Flame Propagation of Textiles and Films

NRCC (National Research Council Canada)

National Building Code of Canada, 2015

National Fire Code of Canada, 2015

National Plumbing Code of Canada, 2015

NSF International

NSF/ANSI 49-2010a

Biosafety Cabinetry: Design, Construction, Performance, and Field Certification

OSACH (Ontario Safety Association for Community and Healthcare)

Ergonomics in Hospital Design: A Guide and Workbook to Prevent Musculoskeletal Disorders (2006)

Public Health Agency of Canada

Canadian Biosafety Handbook (CBH) Second Edition (2016)

Canadian Biosafety Standard (CBS) Second Edition (2015)

Hand Washing, Cleaning, Disinfection and Sterilization in Health Care (1998)

"Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care", *Canada Communicable Disease Report, Vol. 25S4 (1999)*

RAIC (Royal Architectural Institute of Canada)

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3 Definitions and abbreviations

3.1 Definitions

The following definitions shall apply in this Standard:

Accessible — describing a site, building, and its facilities that can be approached, entered, and used by all people, including those with varying levels of physical, sensory, or cognitive abilities.

Note: An equivalent term, “barrier free,” has been used in previous editions of CSA health care facility standards. To maintain consistency with the terminology in CSA B651, future health care facility standards will use “accessible.”

Additional precautions — the use of extra measures prior to contact with or exposure to a patient known to or suspected to be infected or colonized with certain micro-organisms and based on the potential for transmission of the micro-organism.

Note: As an example, the use of PPE is considered an additional precaution for contact with a patient known to or suspected to be infected or colonized with certain micro-organisms.

AIR anteroom — a small room or space at the entrance to an AIR that is separated by doors from both the outside and the main space in the AIR.

Note: *The AIR anteroom allows for storage and removal of PPE and provides an airlock between the adjacent space and the patient.*

Airborne isolation room (AIR) — a room that is designed, constructed, and ventilated to limit the spread of airborne micro-organisms from an infected occupant to the surrounding areas of the HCF.

Notes:

- 1) *These rooms are designed for use when caring for patients requiring airborne precautions; for example, patients with known or suspected tuberculosis, varicella-zoster, or measles.*
- 2) *AIRs are designed to maintain negative pressurization relative to adjacent areas.*

Allied health services — clinical support services that work in conjunction with clinical care teams to contribute to the patient's health and well-being.

Note: *Allied health services encompass a wide range of disciplines related to physical and mental health, from social work to spiritual care to chiropody. These services are usually offered as part of a multi-disciplinary team approach.*

Ambulatory care — a mode of delivering health care services as day treatment, on scheduled or unscheduled outpatient basis, and, not requiring admission to an inpatient bed/overnight hospitalization.

Note: *Although ambulatory care services are delivered as day/outpatient treatment, additional follow-up visits and treatment can be needed.*

Ambulatory surgical facility — a surgical facility in which invasive surgical procedures will take place, and patients are expected to be released from the care of the facility in less than 24 h.

Automated endoscope reprocessor (AER) — a machine designed for the sole purpose of cleaning and disinfecting endoscopes.

Note: *This machine requires plumbing and electrical infrastructure to function.*

Bariatric — of or relating to persons with a body mass index greater than 30 or a weight above 182 kg.

Barrier-free — See **Accessible**.

Biohazard — material that is potentially contaminated with viable micro-organisms (including prion protein material) or toxins that under certain circumstances can cause disease or illness.

Biomedical waste — waste that requires special handling and disposal because it presents a particular risk of disease transmission.

Note: *Biohazard and biomedical waste are often used interchangeably.*

Building gross square metres (BGSM) — the sum of all building floor areas measured to the outside face of exterior walls for all stories or areas having floor surfaces.

Note: *Building gross square metres includes component gross areas, general circulation, mechanical and electrical space, and exterior walls. Refer to CSA Z317.11 for a detailed list of inclusions and exclusions. Sometimes referred to as "building gross area".*

Catastrophic event — an incident that threatens life, property, operations, or the environment.

Notes:

- 1) *Catastrophic events can be classified as follows:*
 - a) *a pandemic or infectious disease outbreaks, which include any highly contagious disease (e.g., pandemic influenza) being experienced within the HCF or requiring the HCF to provide treatment;*

- b) *internal catastrophic events, which include fires within the HCF, hazardous spills (e.g., chemical, radiation, nuclear, etc.), power failure, contamination of ventilation air intakes or major failure of heating, cooling sources or power; and*
 - c) *external catastrophic events, which include earthquake, flood, fire, (chemical, biological, radiation, nuclear, explosion) CBRNE including hazardous spills/release of contaminants (chemical, biological, radiation, nuclear, explosion), multi-casualty events, terrorist attacks, civil unrest, unusual weather events (e.g., hurricane, tornado, ice, or other storm), or any other event resulting in the HCF needing to operate actual or potential.*
- 2) *A catastrophic event often results in an increase or surge in the volume of patients needing treatment and accommodation.*
- 3) *See CSA Z1600.*

Catastrophic event management — an ongoing process to prevent, mitigate, prepare for, respond to, and recover from catastrophic events.

Notes:

- 1) *The four pillars of an effective catastrophic event emergency management plan include planning, prevention/mitigation, response, and recovery (both within and beyond the institution)*
- 2) *This can also be referred to as emergency measures or emergency management, or disaster or crisis management.*

Ceiling attenuation class (CAC) — a laboratory measured rating that describes the sound transmission loss properties of a suspended ceiling system when installed in rooms with a common plenum.

Central tub/shower room — a room, not associated with a single inpatient bedroom, containing a tub or shower for the bathing of patients.

Note: *Central tub/shower rooms are generally used for patients with special needs, including patients who are in wheelchairs, are bariatric, require special lift assistance, or who cannot otherwise be accommodated using the bathing facilities at the patient's bedroom (e.g., if the room is equipped with a shower and the patient prefers a tub).*

Commissioning — a systematic verification, documentation, and training process applied to all activities during the design, construction, static verification, start-up, and functional performance testing of equipment and systems in a HCF to ensure that the HCF operates in conformity with the owner's project requirements and the basis of design in accordance with the contract documents.

Note: *Commissioning is an integral part of the design and construction process and is intended to be applied throughout the life of a HCF.*

Component — an organizational unit or department with a defined role within the health care facility.

Component gross square metres (CGSM) — that portion of a building assigned to a specific component, including net areas, internal circulation, partitions, building structure, and small mechanical shafts.

Note: *CGSM includes all individual net areas required by the departmental functions, circulation space necessary to link together the net spaces and area occupied by internal walls. Component gross area is measured to the inside face of exterior walls and to the centre line of partitions adjoining other components or general circulation space. It excludes all engineering spaces and interdepartmental circulation elements such as main corridors, stairways, and elevators. Sometimes referred to as "component/departmental gross square metres" (CGSM/DGSM).*

Construction — the building and/or completing of the structure and supporting elements of a HCF.

New construction — construction to produce all or part of a HCF that did not exist prior to the project.

Renovation — construction to modify or upgrade an existing HCF to be used for similar purposes.

Notes:

- 1) *New construction includes projects on vacant land, additions to existing HCFs, and significant renovations to existing spaces in order to change their functional purpose.*
- 2) *A project in which an existing patient care unit in a HCF is being renovated to be used for a similar purpose is considered to be a renovation (e.g., a medical-surgical inpatient unit being renovated to become an oncology inpatient unit). By contrast, a project including a change of functional purpose is considered to be new construction (e.g., a medical-surgical inpatient unit being renovated to become an outpatient fracture clinic).*

Critical care area — a patient care area where the induction and maintenance of general anaesthesia routinely occurs in connection with the examination or treatment of patients, or where cardiac contact between a patient and medical electrical equipment is frequent or normal.

Note: This definition is adapted from that in the Canadian Electrical Code, Part I.

Department — see **Component**.

Disability — an impairment that is cognitive, developmental, intellectual, mental, physical, sensory, or some combination of these, which can be present from birth or occur during a person's lifetime.

Note: A disability can manifest in a lack of physical coordination, blindness or visual impairment, deafness or hearing impairment, muteness or speech impairment, limited stamina or dexterity, or physical reliance on a guide dog or other animal or on a wheelchair or other remedial appliance or device.

Duress alarm — see **Staff emergency assistance alarm**.

Emergency electrical power supply system — one or more in-house electrical generator sets intended to be available if all other supplies fail, and capable of supplying all of the essential loads.

Environmental services — a functional unit or department of a HCF that has the responsibility for laundry, housekeeping, solid and liquid waste control, safe disposal of materials contaminated by radiation or pathogenic organisms, and general maintenance of safety.

Essential electrical system — an electrical system that has the capability of restoring and sustaining a supply of electrical energy to specified loads if the normal supply of energy is lost.

Exterior area — the perimeter space around a building as well as naturally ventilated and lit atriums and courtyards.

Functional area — an area within the HCF that is described by its function within the facility or by the activities that take place there as part of the operation of the facility, e.g., inpatient bedrooms, critical care units, ambulatory care areas.

Functional program — a planning document that defines the desired outcome for a building project, informing both operating and capital cost estimates and providing the functional and spatial specifications that provide the primary guide for the subsequent architectural design of a building.

Notes:

- 1) *The functional program generally follows the development of an organization's strategic plan, role statement, or the identification of a discrete project from a master plan and typically includes program parameters, general planning criteria, and specific planning criteria for each functional component comprising a facility or specific project.*
- 2) *Functional program is also referred to as "facilities program" or "design brief".*

Hand hygiene sink — a sink that is designed for effective and efficient cleaning of the hands while restricting splashes and the spread of aerosols, and that is dedicated exclusively for the purposes of hand hygiene.

Notes:

- 1) *The design of a hand hygiene sink includes the placement of soap and towel dispensers and garbage can.*
- 2) *A lavatory or other sink that is used for general purposes is not a dedicated hand hygiene sink.*
- 3) *See CSA Z317.1.*

Harm —

- a) physical injury or damage to the health of people; or
- b) damage to property or the environment.

Note: This definition is identical to that in CAN/CSA-ISO 14971.

Hazard — combination of the probability of occurrence of harm and the severity of that harm.

Note: This definition is identical to that in CAN/CSA-ISO 14971.

Hazardous waste — any material or substance that if handled improperly has the potential to harm people, property, or the environment.

Note: Dental amalgam because of the mercury content is considered hazardous waste.

Health care authority — the corporation administering the health care services within its borders; its responsibilities include but are not limited to promoting health, access to health care services, determining the health care priorities and budget management.

Health care facility (HCF) — a set of physical infrastructure elements supporting the delivery of health-related services.

Notes:

- 1) *A HCF can comprise a single room or area, an entire building, or a group of buildings. A HCF could also be a non-stationary unit such as a mobile facility, ambulance, or trailer where health care services are provided (although these would be outside the scope of this Standard). In addition, different classes of HCF can reside in the same building or structure.*
- 2) *For examples of different HCFs by class, see Annex B.*
- 3) *This Standard recognizes that provincial/territorial governments define health care facilities in different ways for regulatory and capital planning purposes. The definition in this Standard is meant to ensure a consistent approach to health care facility requirements in this Standard and the other CSA standards for health care facilities.*

Class A HCF — a HCF in which patients are accommodated on the basis of medical need, and are provided with continuing medical care, and supporting diagnostic and therapeutic services, generally involving an overnight stay.

Note: Class A HCFs typically provide trauma and emergency services, have surgical operating rooms, and are referred to as "active treatment" or "acute care" institutions.

Class A-1 HCF — a Class A HCF that, because of its location, role in the community, or the nature of its services, requires additional backup systems, as well as the capacity to be self-sufficient for a defined period in the event of equipment failures or catastrophic events.

Note: The criteria that would identify a HCF as Class A-1 include

- a) *designation by the authority having jurisdiction as a mission critical facility, including those HCFs designated as essential in infectious diseases outbreak management;*
- b) *a location more than 1 h from the nearest Class A HCF under normal driving conditions;*
- c) *responsibility for providing urgent, complex, or highly specialized medical services that cannot be interrupted or transferred to nearby HCFs (e.g., transplantation, cardiac surgery, etc.); or*

- d) other factors that would indicate the need for additional redundancy or backup measures, as determined through a risk analysis of the functional program.

Class A-2 HCF — a Class A HCF that provides acute care services, but has the option to reduce or modify services or transfer patients in the event of equipment failure or a catastrophic event.

Note: Depending on the nature and criticality of procedures being performed, individual areas within a Class A-2 HCF could require additional system redundancy.

Class B HCF — a facility whose residents cannot function independently because of a physical or mental disability and are accommodated because they require daily care by health care professionals, but generally do not require invasive medical interventions.

Class C HCF — a facility where ambulatory patients are provided with supportive, diagnostic, and treatment services on an outpatient or occasional basis.

Note: Class C HCFs are further divided in this Standard into Class C-1 and Class C-2.

Class C-1 HCF — a Class C HCF in which elective surgical or diagnostic procedures are performed that could temporarily render a patient incapable of self-preservation, or where a service interruption could otherwise endanger patients.

Notes:

- 1) This classification applies to HCFs that have operating rooms or procedure spaces in which anesthesia or sedation are used.
- 2) The following factors should be considered in determining whether a HCF is Class C-1 or Class C-2:
 - a) the ability of medical staff to end the medical procedure immediately and safely and the patients' ability to move to safety (versus the potential effect of sedation or other factors that could affect mobility);
 - b) staffing levels (staff available to help patients exit the building); and
 - c) whether the HCF provides critically important services not otherwise available in that community.

Class C-2 HCF — a Class C HCF that provides surgical or diagnostic procedures on an outpatient or occasional basis, in which patients remain capable of self-preservation.

Notes:

- 1) Class C-2 HCFs provide health care services where timely access to the care is not life threatening, or where a delay in service could be life threatening (e.g., a dialysis clinic), but there is an alternative location capable of handling the volume of the service provided by this facility.
- 2) Class C-2 HCFs include same day surgical procedures with the use of local anaesthetic and/or oral procedural sedation only that can easily be discontinued, allowing the patient to exit the facility with minimal need for assistance.
- 3) Class C-2 HCFs include residential facilities (e.g., group homes and privately-managed residences) where occasional medical care is provided. Depending on the patient population and the level of service, the classification might only apply to a clinic within the HCF.

HCF administration — the unit responsible, under the authority of a HCF governing board, for planning, organizing, directing, and controlling the HCF in accordance with the policies and procedures of the HCF, the policies of the HCF governing board, and applicable regulatory requirements.

Hopper — a large, floor-standing or wall-hung sink equipped with a flush valve and handle, for use in disposing of body fluids and other substances that cannot be safely disposed of in a conventional sink or toilet.

Notes:

- 1) *Hoppers (sometimes referred to as "clinical service disposal sinks") are generally equipped with faucet and blade handles for hot and cold water, a medical vacuum breaker spout, a flush valve with a handle, a flushing rim, and a combined waste soil pipe.*
- 2) *This Standard provides for the use of hoppers, but with appropriate precautions. See Table 9.1, Item 13, and CSA Z317.1.*

Independent health facility — a space or building intended for the delivery of health care services, which is not part of a Class A hospital as defined in this Standard.

Note: *As defined in jurisdictional acts and regulations, health care services can be delivered in a hospital, stand-alone purpose-built facility, or an office. An independent health facility is generally considered to be a space where services are provided by a health care professional, and such services are covered by the jurisdiction's health insurance system.*

Infection control risk assessment (ICRA) — a process used to identify design elements that increase the risk of microbial transmission in the environment.

Note: *An ICRA considers the facility's patient population and clinical programs, and the potential effects of disruptions to essential services (e.g., water, ventilation, electricity) and potential effects of dust-generating activities that could affect patient placement or safety, or necessitate relocation of patients. See the FGI Guidelines for Design and Construction of Hospitals and Outpatient Facilities.*

Inpatient — a HCF patient who occupies a bed for at least one night in the course of treatment, examination, or observation.

Inpatient unit — a unit in the HCF specifically intended for the accommodation of inpatients.

Note: *Examples of inpatient units include critical care, maternal and newborn, medical-surgical inpatient, mental health services, pediatric and adolescent inpatient, and rehabilitation care.*

Instrument Air — a medical support gas intended for non-patient care applications.

Note: *Typical uses of instrument air could include non-patient care applications such as driving surgical tools, laboratories, sterilizing systems, articulating arms, pneumatic columns, and blowing-down or drying equipment.*

Interdisciplinary design team (IDT) — a design team comprising key members of the HCF, subject matter experts, and professional designers, with the role of determining the needs of the organization at all stages of planning and design (i.e., starting with needs assessment and continuing through programming and design).

Invasive procedure — see **Procedure**.

Lavatory — see **Sink**.

Master plan — a document (or set of documents) that states how the HCF intends to move from its current state to a desired future state as outlined in its strategic plan.

Notes:

- 1) *The master plan usually includes*
 - a) *an assessment of the existing conditions;*
 - b) *a master program, which is a high-level projection of future space needs (within a stated time horizon);*
 - c) *the exploration of significant planning issues and design concepts; and*
 - d) *the documentation of a preferred plan among alternatives, often to be implemented in phases.*

- A master plan is not a single-issue response, but should address all current planning issues for the organization. A master plan is often conducted at the level of schematic designs.*
- 2) *A master site plan, an outcome of the master plan, shows an entire property, the location of each building, and the future phases of development included in the plan.*

Master program — a document (or set of documents) that translates the stated project parameters (including key functional, physical, operational and financial parameters) into preliminary high level physical accommodation and operational requirements.

Material safety data sheet — See Safety data sheet.

Medical device reprocessing (MDR) — the activities performed to prepare a used medical device for reuse.

Medical device reprocessing department (MDRD) — a functional area that reprocesses reusable medical devices (not necessarily centralized).

Note: *In smaller health care settings such as clinics or offices in the community, this refers to any segregated area where reprocessing of reusable medical devices takes place, away from patients.*

Medical electrical equipment — electrical equipment that

- a) has only one connection to a particular supply main;
- b) is intended to diagnose, treat, or monitor a patient under medical supervision; and
- c) comes into physical or electrical contact with a patient, and/or transfers energy to or from a patient, and/or detects energy transfer to or from a patient.

Minimally invasive procedure — See Procedure.

Mode of transmission — the way in which pathogenic infectious particles are transmitted from the reservoir to the host or susceptible patient (e.g., airborne, droplet, contact).

Monolithic — characteristic of an interior wall, ceiling, or floor material whereby it presents a single large surface that is unbroken and free of fissures, cracks, and crevices.

Notes:

- 1) *Seals or gaskets are used to maintain ceiling integrity at penetrations such as lights, diffusers, and access panels.*
- 2) *Ceilings using "lay-in" panels are not monolithic.*
- 3) *Examples of monolithic floor surfaces include sheet vinyl, linoleum, rubber sheet, fluid applied epoxy, and poured epoxy. The term would not apply to a tiled floor surface.*

Net area — the horizontal area of space assignable to a specific function.

Notes:

- 1) *The net area of rooms is measured to the inside face of wall surfaces.*
- 2) *Spaces such as corridors, unprogrammed or unassigned storage, mechanical and electrical service space, and other areas that are determined as a result of design are not considered assignable net areas.*
- 3) *Also referred to as "net square metres".*

Network infrastructure — the hardware and software resources of an entire network that enable network connectivity, communication, operations, and management of an enterprise network.

Noise reduction coefficient (NRC) — a rating that describes the sound absorptive properties of architectural finishes and building materials.

Note: *NRC values range from 0.01 (negligible absorption) to 0.99 (very high absorption).*

Occupant — persons who would normally be present inside a HCF.

Note: *Occupants include patients, families, staff, visitors, physicians, volunteers, tradespeople, and others who would visit, work in, or reside in the HCF.*

Operative procedure — an invasive procedure performed on an inpatient or outpatient that involves any or all of the following:

- a) operation within a sterile field;
- b) use of regional nerve block or general anaesthesia; or
- c) medically supervised recovery.

Note: *Operative procedures include laparoscopic surgery.*

Patient — a person who is waiting for or undergoing medical investigation, care, or treatment.

Note: *This Standard uses "patient" as a global term applying to all HCFs. Some HCFs prefer to use alternative terms such as client or resident.*

Patient care area — an area used primarily for the provision of diagnosis, therapy, or treatment.

Personal protective equipment (PPE) — equipment that is designed to protect the wearer's face and body from injury or infection when worn correctly.

Note: *Examples of PPE include masks, respirators, gowns, gloves, and eye protection.*

Post-occupancy evaluation (POE) — a structured approach for the evaluation of the performance of a new or existing facility when it is fully operational and after at least 12 months of occupancy.

Note: *A POE focuses on occupants' interactions with a facility and the degree to which the facility is supporting service delivery objectives. This includes measuring the effectiveness of the facility in terms of achieving asset planning requirements.*

Procedure — a series of actions conducted in a certain order or manner for the purpose of medical diagnosis, treatment, or care.

Invasive procedure — any surgical procedure that is performed in an aseptic field, in which the protective surface of a patient's body is penetrated (e.g., skin, mucous membrane, or cornea).

Note: *Excluded from this category would be procedures or treatments that involve percutaneous penetration of the skin (e.g., injections, placement of peripheral intravenous needles or catheters, or dialysis), and procedures that involve contact between medical devices and intact mucous membranes (e.g., bronchoscopy, endoscopy, insertion of urethral catheters, and similar procedures).*

Minimally invasive procedure — any procedure that is carried out by entering the body through the skin or through a body cavity or anatomical opening, but with the smallest damage possible to these structures (e.g. bronchoscopy, endoscopy, arthroscopic, or laparoscopic surgery).

Non-invasive procedure — any procedure where no break in the skin is created and there is no contact with the mucosa, or skin break, or internal body cavity beyond a natural or artificial body orifice.

Note: *Procedures can also be characterized as diagnostic, therapeutic, or surgical, and can be further categorized in terms of the type of electrical contact between the patient and the medical electrical equipment when such equipment is used.*

Radioactive waste — any liquid, gaseous, or solid material that contains a radioactive nuclear substance as defined under applicable requirements and that the owner has declared to be waste.

Note: *In Canada, the Canadian Nuclear Safety Commission defines the applicable jurisdictional requirements for radioactive substances.*

Renovation — see Construction.

Risk — the probable rate of occurrence of a hazard causing harm and the degree of severity of the harm.

Note: *This definition is identical to that in CAN/CSA-ISO 14971.*

Routine infection prevention and control practices — the approach to infection prevention and control in which all human blood and body fluids are treated as if known to be infectious.

Note: *Routine infection prevention and control practices incorporate the use of hand hygiene, appropriate PPE, and patient placement to minimize the risk of transmission of organisms.*

Safety data sheet (SDS) — summary document that provides basic information about a material or chemical product, including its properties and potential hazards, how to use it safely, and what to do during an incident.

Note: *This term will replace "material safety data sheet" in late 2018.*

Sally port — an entry vestibule secured by two doors, where only one door can be opened at a time.

Scrub sink — a sink that is specifically intended for use by medical personnel prior to a procedure.

Sink — a bowl and faucet permanently installed and connected to a water supply and drainpipe.

Notes:

- 1) *See also Hand hygiene sink and Scrub sink.*
- 2) *Sinks are used for a variety of purposes throughout the HCF (e.g., in patient washrooms, surgical scrub areas, service areas, and housekeeping closets). Specific requirements for sinks are provided as part of the area requirements for each of these locations.*
- 3) *A lavatory is one type of sink, defined in CSA Z317.1 as "a sink that is permanently installed and connected to a water supply and drainpipe located in a patient bathroom or in a patient care area and used for hand washing." This Standard does not refer specifically to lavatories, but addresses requirements for sinks in all types of washroom.*
- 4) *Hand hygiene sinks, which are located throughout the facility, are separately defined and the requirements for these sinks are provided in Table 11.1, Item 19.*

Soft spaces (areas) — areas that have an intended function in the design but can be used or converted to another function in case of expansion or program changes.

Sound transmission class (STC) — a laboratory measured rating that describes the sound transmission loss properties of a wall, floor, window, or door.

Note: *See the National Building Code for wall and floor STC rating.*

Staff emergency assistance alarm — an alarm that can be activated by staff to request immediate assistance.

Note: *Some HCFs refer to this as a duress alarm.*

Storm water — water that is discharged from a surface as a result of rainfall, snowfall, or icemelt.

Surgical day care — an area where patients undergo same-day diagnostic and/or surgical procedures, which may include services for admission and post-operative care until discharge.

Technology and communications systems — any or all of the wired and wireless systems that are used in a health care setting.

Note: *This term includes, but is not limited to, computers, networks, voice and data transmission, alarms, locating services, nurse call system, security, paging and patient engagement applications. Variously referred to as "IMIT"*

(information management information technology) or "ICAT" (information, communication and automation technology).

Telecommunications room (TR) — an enclosed architectural space complete with power and cooling, which houses the main cross-connects between the backbone cabling and horizontal distribution as defined by ANSI/TIA-569-B.

Transfer — to raise, lower, and potentially horizontally move or shift a patient from one surface to another in immediate proximity.

Notes:

- 1) *Typical transfers move subjects to and from beds, chairs, tubs, and toilets.*
- 2) *A repositioning activity is a transfer.*
- 3) *The majority of lifts are designed to transfer patients, not to transport them.*

Transfer points — the specific locations where a patient lift or transfer takes place.

Transport — to move a patient a significant distance, typically from one room/location to another distant room/location.

Notes:

- 1) *Transport is usually done by means of wheelchairs, stretchers, ambulances, etc. The majority of patient lifts are designed to raise and transfer patients, not to transport them.*
- 2) *Some currently available patient lifts are specially constructed for patient transport. However, most lifts in use are designed simply to lift or transfer subjects from one surface to another, not to transport them over significant distances (e.g., distances of more than a metre). While some lifts do have wheeled bases, these bases are intended to make the empty lifts easier to move around the hospital and position for patient transfers. Transport of patients, supported by lifts not specifically designed for transporting patients, can cause dynamic loading of the lift frame and can predispose the frame to tipping and mechanical failure.*

Treatment — maintenance, observation, nursing, and medical care and supervision of a person who is receiving health services in a health facility.

User — person occupying or performing an activity in a building, area, or room intended for that purpose (e.g., diagnosis, treatment, waiting, dining, etc.).

Note: *Users in this Standard are generally health care facility personnel and patients, but can include visitors (e.g., for a waiting room).*

Waterless hand hygiene station — a location that is equipped with a waterless (e.g., alcohol-based) hand sanitizer dispenser.

Note: *The product used in these locations is sometimes called "alcohol-based hand rub," and the stations themselves referred to as "ABHRs." This Standard retains the more general term because, although the products currently licensed by Health Canada are alcohol-based, other formulations could become available in the future.*

Wayfinding — a spatial problem-solving process that individuals use to understand where they are in an environment or building, know where their desired location is, and to know how to get to their desired destination from their present location.

Wayfinding design — a diverse selection of interior and exterior coordinated elements including floor and wall treatments, distinctive site furnishings, and lighting and signage designed to capture the specific needs of all users, to help them find their way while minimizing stress and reinforcing and optimizing independence.

Wayfinding plan — a comprehensive planning process facilitated by the wayfinding multidisciplinary team to address the key components of

- a) place (form and function of the building);
- b) people (human interactions);
- c) elements (signage and technology); and
- d) continual improvement (maintenance and follow-up on the changing environment).

Wayfinding system — processes to assist with clearly defined orientation from the first point of contact (i.e., home to arrival to the site, to the entrance to the building, and the ultimate destination within the facility and the return journey).

3.2 Abbreviations

The following abbreviations shall apply in this Standard:

ABG	— arterial blood gas
ABHR	— alcohol-based hand rub
ADL	— activities for daily living
ADU	— automatic dispensing unit
AFP	— alternative financing and procurement
AIER	— airborne isolation examination room
AIR	— airborne isolation room
ALARA	— as low as reasonably achievable
ASTC	— apparent sound transmission class
BAS	— building automation systems
BE	— biomedical engineering
BGSM	— building gross square metres
BIM	— building information management system
BPOC	— bar coding to point-of-care
CAC	— ceiling attenuation class
CACF	— central alarm and control facilities
CBRNE	— chemical, biological, radiation, nuclear, explosion
CGSM	— component gross square metres
CMMS	— computerized maintenance management system
CNC	— computer numerical control
COMP	— comprehensive operation and maintenance plan
COPD	— chronic obstructive pulmonary disease
COW	— carts on wheels
CPOE	— computerized physician order entry
CPTED	— crime prevention through environmental design
CRI	— colour rendition index
CT	— computerized tomography
CTAS	— Canadian Triage and Acuity Scale

DBFM	— design, build, finance, maintain
ECG	— electrocardiograph
ECT	— electroconvulsive therapy
ED	— emergency department
EEG	— electroencephalogram
EHR	— electronic health records
EPT	— examination/procedure/treatment
ETO	— ethylene oxide
FF&E	— furniture, fittings, and equipment
FTE	— full time equivalent
GI	— gastro-intestinal
HACCP	— hazard analysis critical control point
HCF	— health care facility
HHS	— hand hygiene sink
HPLC	— high-pressure liquid chromatography
HVAC	— heating, ventilation, and air conditioning
HWMS	— human waste management system
ICP	— infection control practitioner
ICRA	— infection control risk assessment
ICU	— intensive care unit
IDT	— interdisciplinary design team
IHF	— independent health facilities
IMIT	— information management information technology
IPD	— integrated project delivery
LBR	— labour/birthing room
LBRP	— labour/birthing/recovery/postpartum
LIS	— laboratory information system
MDR	— medical device reprocessing
MDRD	— medical device reprocessing department
MRI	— magnetic resonance imaging
NICU	— neonatal intensive care unit
NRC	— noise reduction coefficient
OASIS	— operations, accessibility, safety and security, infection prevention and control, and sustainability
OH&S	— occupational health and safety
OR	— operating room
P3	— private public partnerships
PACS	— picture archiving communication system

PACU	— post-anaesthetic care unit
PAS	— patient administration system
PDU	— photothermal detoxification unit
PER	— protective environment room
PET	— positron emission tomography
POE	— post-occupancy evaluation
PPE	— personal protective equipment
QOS	— quality of service
RCDD	— registered communication distribution designer
RFID	— radio-frequency identification
RFP	— request for proposal
RO	— reverse osmosis
RSO	— radiation safety officer
RTLS	— real time locating system
SDCU	— surgical day care unit
SDS	— safety data sheet <i>Note: The former abbreviation, MSDS, is no longer used.</i>
SPECT	— single photon emission computed tomography
STC	— sound transmission class
TEE	— trans-oesophageal echocardiogram
TMS	— transcranial magnetic stimulation
TR	— telecommunications room
TTY	— teletypewriter
UPS	— Uninterruptable power supply
VoIP	— voice over Internet protocol
VSS	— video surveillance system
WHMIS	— workplace hazardous materials information system

4 General

4.1 Planning and design principles

4.1.1

The health care facility (HCF) shall be planned and designed to serve its patients, families, staff, and visitors in accordance with the following core principles:

- a) operations — creating an operating environment that promotes the efficient and effective delivery of health care services, thereby helping to ensure positive patient outcomes;
- b) accessibility — creating an environment that facilitates the patient's access to receiving care and the caregiver's ability to provide care;

- c) safety and security — creating an environment of care that is safe and secure for all occupants (patients and their families, staff, and visitors);
- d) infection prevention and control — creating an environment that is safe for all building occupants in terms of the prevention of health care acquired infections and the control of infectious diseases; and
- e) sustainability — taking into account the sustainability of the construction process and the finished building, and the sustainable operation of the HCF over time.

4.1.2

The design process for the HCF shall include activities to achieve specific objectives related to the core (OASIS) principles, as specified in Clauses 4.2 to 4.6.

Note: *The principles specified in Clause 4.1.1, which form the acronym "OASIS", are intended to support an objective-based approach to all planning and design activities. They are especially valuable when a specific topic for planning or design is not adequately covered by a requirement or recommendation within this Standard.*

4.1.3

In the planning and design of a HCF, conflict can sometimes arise between competing clauses. In situations where requirements in this Standard are found to be in conflict, or cannot be met for another reason, the HCF should

- a) document the conflict or the reason the requirement cannot be met;
- b) evaluate the requirements in light of the five principles outlined in Clause 4.1.1 and consider how the intent of these principles could be met through an alternative solution; and
- c) develop and document the rationale for the final decision, i.e., how the proposed solution aligns with the core principles.

4.2 Operations

4.2.1 Clinical functionality

Planning and design shall focus on creating an operating environment that promotes the efficient and effective delivery of health care services, thereby helping to ensure positive patient outcomes.

The planning and design of the HCF shall take into account the expected sequence of activities that will take place in the facility and create an environment of care in which these activities can be performed safely, effectively, and efficiently. The functional program shall be consulted at every stage of the planning and design of the HCF (see Clause 5). The design shall incorporate balance between all flow processes involving patients, visitors, and staff in the work environment. Clinical equipment and support services (e.g., laundry, medication, food tray delivery) placement shall also be considered in the overall design.

Notes:

- 1) *Operations considerations include*
 - a) *an environment of care that promotes healing and wellness, and is sensitive to the needs of individuals;*
 - b) *clinical functionality to promote the effective delivery of care, including the application of equipment, and the efficient operation of the HCF; and*
 - c) *support services to facilitate the creation and maintenance of the environment of care and clinical functionality.*
- 2) *Clinical work processes should be established with consideration for adjacencies to services/programs that are connected for clinical purposes.*
- 3) *Where possible, clinical areas that rely on each other and feed into the processes of each other should be located adjacent to each other.*

- 4) *For operational efficiency as well as ergonomic reasons, the HCF should be designed to minimize the need to move heavy or bulky supplies (e.g., food carts, laundry, garbage).*
- 5) *Technology should be considered in parallel with the clinical work processes to support efficient operations so that staff can communicate easily, supplies and equipment are readily available, and information is accessible.*

4.2.2 Environment of care

4.2.2.1

The planning and design of the HCF shall support an environment of care that promotes safe and effective treatment while respecting the personal and social needs of the patient. Design decisions shall be based on available scientific evidence, good engineering practice, and risk assessment regarding patient outcomes and patient satisfaction.

4.2.2.2

Environment of care components shall be addressed in the functional program (see Clause 5.1.6).

4.2.2.3

To promote a safe and effective environment of care, the HCF should be designed to achieve the following objectives:

- a) reduced stress for patients and their families, visitors, and staff;
- b) maintenance of dignity, confidentiality, respect, and comfort at all levels;
- c) adjacency of related services, to minimize transfers or walking between services;
- d) sensitivity to individual needs;
- e) access for all persons (see Clause 4.3);
- f) appropriate gender segregation;
- g) standardization of area design, furniture, fittings, and equipment where applicable to reduce the possibility of staff errors;
- h) reduction of noise;
- i) sensitivity to the cultural beliefs and expectations of the expected patients where appropriate (e.g., selection of colours or materials that are associated with healing);
- j) promotion of a healing environment through design and choice of materials for interior furnishings and finishes; and
- k) foster a sense of control over the environment by giving patients access to information, navigation, and environmental preferences through the use of technology.

Notes:

- 1) *Jurisdictional regulations and policies can apply.*
- 2) *Research and evidence-based materials, when available, should be reviewed to support these goals. Design should make every effort to enhance the performance and productivity of the staff in order to promote a safe environment of care. The building and interior planning should be designed to create an efficient and high-quality patient environment, which is supportive of the delivery of clinical services, patient well-being, comfort, and patient dignity. Furnishings, fittings, and finishes should be appropriate to the architecture and the functions being performed and items should be coordinated to fit and work with each other as needed.*

4.3 Accessibility

4.3.1 General

4.3.1.1

The HCF shall be planned and designed to produce an environment that facilitates the patient's access to receiving care and the caregiver's capacity to provide appropriate and effective care. The HCF shall be designed so that people of all abilities are able, without modification to their normal conduct, to access the services, work in the facility, use the facility, or assist staff in accomplishing their work.

Notes:

- 1) *Accessibility includes*
 - a) *design intended to minimize barriers for persons with various disabilities;*
 - b) *consideration of the physical, cognitive, social, and emotional capabilities, limitations, needs, and wants of all people who will use, work in, or visit the HCF;*
 - c) *provision of effective and appropriate aids to wayfinding;*
 - d) *arrangement of services to minimize patient travel from outside the HCF and between destinations within the HCF;*
 - e) *organization of staff workflow and provision of supplies to meet the needs of all patients;*
 - f) *facilitation of family support; and*
 - g) *information and communications.*
- 2) *Accessibility addresses not only the primary needs of persons with disabilities, but any supporting elements that a person might require, such as mobility devices, handlers, or assistive devices.*
- 3) *Patients or staff who encounter a barrier in accessing or providing care can experience increased stress levels, which can have a negative impact on clinical outcomes. All effort should be made to reduce or remove such barriers.*
- 4) *In designing for accessibility in the HCF, building codes should be considered as representing minimum requirements only. Building codes do not capture the needs of all users in the health care setting.*
- 5) *Accessibility also addresses the barriers in use of the HCF and equipment such as wayfinding systems and transfer onto examination equipment.*

4.3.1.2

The HCF shall be designed so that staff can safely assist and serve patients of all abilities, including the accommodation of assistive devices and other supporting elements.

4.3.1.3

The HCF shall be designed to adapt to the changing accessibility needs of patients and the possibility that a patient who normally does not have a disability could experience a temporary disability because of impairment due to an illness or to a medical or surgical condition.

4.3.1.4

The planning and design of HCFs shall comply with CSA B651 and applicable requirements for accessibility.

Note: *Federal, provincial/territorial, and local laws and regulations can apply.*

4.3.2 Functional requirements

4.3.2.1

The HCF shall be designed and constructed so as to minimize barriers to the normal activities of patients and families, staff, and visitors with various levels of physical or sensory abilities.

Note: *A barrier can be anything that prevents a person with a disability from fully participating in all aspects of society because of his or her disability, including a physical barrier, an information or communication barrier, an attitudinal barrier, a technological barrier, or a policy or practice obstacle.*

4.3.2.2

The planning process shall include a procedure to identify and resolve possible conflicts between the accessibility needs of different user groups.

Note: *In some situations, a design solution intended to help one user group can inadvertently create a barrier for another group.*

4.3.2.3

The HCF and all of its components should be simple and intuitive regardless of the user's experience, knowledge, language skills, or current concentration level. The HCF should be able to be used efficiently and comfortably and with a minimum of fatigue by all users, regardless of ability.

4.3.2.4

All patient-occupied spaces should be designed for accessibility and ease of assistance by clinical staff. Patient care equipment should allow for approach, reach, manipulation, and use regardless of the patient's body size, posture, or mobility.

Note: *The design should take into account the need for possible variations in design features for accessibility, depending on the function of the space or department, or because of staff requirements in terms of assistance levels required by patients.*

4.4 Safety and security

4.4.1

The HCF shall be planned and designed to produce an environment of care that is safe and secure for all occupants (patients, staff, and visitors). The planning and design of the HCF shall include provisions for achieving the following objectives related to the safety and security of patients, staff, and visitors to the HCF:

- a) security from criminal activity, such as personal assault or theft of property;
- b) safety from errors in the delivery of care (e.g., medication, needle-sticks, etc.);
- c) safety from environmental hazards (e.g., mould, chemicals, etc.);

Notes:

- 1) *Infection prevention and control is a special subset of safety and is covered separately.*
- 2) *Consideration should be given to hazards from the external environment (e.g., air pollution, smoke, toxic discharges).*

- d) protection of physical privacy and personal dignity;
- e) safety from equipment hazards (e.g., electrocution, fire, tripping hazards, bed sores);
- f) protection of staff from physical hazards (e.g., overexertion, repetitive stress, excessive bending, reaching, or lifting);
- g) protection from psychosocial hazards;
- h) protection of personal information;
- i) emergency preparedness and management of emergency conditions;

- j) protection of the patient by the caregiver;
- k) protection from public and patients; and
- l) protection from terrorism or mass incident.

Notes:

- 1) *HCFs present unique issues when it comes to safety and security design. Often incompatible issues such as 24-hour operation in an environment that has to be more open than most other facilities combined with a large portion of patients being in a vulnerable state, and staff often under stress, present particularly difficult challenges for the design team.*
- 2) *By addressing safety and security issues appropriately in the HCF environment, considerable costs can be avoided that can otherwise arise if patients, staff, or visitors are injured or if property is damaged or stolen.*
- 3) *In addition to actual safety, perceived safety also improves patient outcomes and staff effectiveness.*
- 4) *Specific safety and security risks for a particular facility can be identified through a threat and risk assessment, which provides the baseline for physical and electronic security measures.*

4.4.2

The HCF design should minimize hazards and the adverse consequences of accidental or unintended actions for all occupants.

4.5 Infection prevention and control**4.5.1 General****4.5.1.1**

The HCF shall be planned and designed to be safe for all building occupants in terms of both the prevention of health care acquired infections and the control of infectious diseases.

4.5.1.2

The planning and design process shall include participation by representatives of the major stakeholders that are involved and have expertise in infection prevention and control issues and practices.

Note: See Clause 5.1.1.7.

4.5.1.3

An infection control risk assessment (ICRA) shall be conducted as part of the planning process for any new construction, addition, or renovation of a HCF. The HCF shall be designed and constructed to minimize the potential for acquisition and transmission of infections in the health care setting, as outlined in the ICRA.

Notes:

- 1) *CAN/CSA-Z317.13 provides requirements, guidance, and a sample form for an ICRA associated with construction and renovation projects.*
- 2) *The health status of occupants in a HCF is not always known and every precaution should be taken to prevent the transmission of illness from patient to patient, from patient to the health care provider, and from the building to its occupants.*

4.5.1.4

The following infection prevention and control measures shall be incorporated into the design and construction of the HCF:

- a) allocating sufficient space for patient care to prevent the spread of illness (i.e., adhering to minimum clearances and area requirements as specified in this Standard);

- b) protecting construction materials from contaminants and excessive moisture in accordance with CAN/CSA-Z317.13;
- c) using finish materials that are able to withstand regular use and repeated cleaning;
- d) review of fabrics and other materials on furniture, fittings, and equipment;
- e) providing areas for localized waste management;
- f) provision of storage areas exclusively for the storage of supplies and equipment (see Clause 7.7.1.6); and
- g) providing hand hygiene sinks and waterless hand hygiene stations that are well-designed to minimize transmission of micro-organisms, and are conveniently located to encourage use by health care workers.

Notes:

- 1) See CAN/CSA-Z317.13, and the FGI Guidelines for Design and Construction of Hospitals and Outpatient Facilities.
- 2) Planning processes for infection prevention and control should include consideration of new and emerging technologies, and the design aspects that could be needed to accommodate these technologies.

4.5.2 Objectives

The design and construction of the HCF shall support the following infection prevention and control objectives:

- a) facilitate the use of routine infection prevention and control practices for all patients, regardless of the diagnosis and tailored to the patient and the risk, including
 - i) placement of hand hygiene sinks and waterless hand hygiene stations; and
 - ii) placement of personal protective equipment used in delivery of care and/or non-patient health-care-related functions (e.g., decontamination of reusable medical devices);
- b) provide sufficient space and number of rooms to allow the placement of patients based on mode of transmission of infectious organisms, the existing patient population, and identifiable risks;

Note: For Class A and B HCFs, this includes the capability to establish and maintain separate zones for patients in pandemic situations.
- c) take into account patient flow, so that the arrangement of rooms and corridors minimizes the spread of infection through patient movement/transfer;
- d) facilitate the management of potentially infectious materials, including soiled medical devices, human waste and body fluids, and medical waste;
- e) minimize the potential for airborne or water-borne transmission of infection; and
- f) facilitate effective cleaning of reusable medical devices, shared electronic devices, and high-touch surfaces (items that are susceptible to cross-contamination) and, where warranted, disinfection of the HCF.

Note: The objectives identified in Items a) to f) will reduce the potential for transmission of organisms. See CAN/CSA-Z314.

4.5.3 Inpatient bedrooms

4.5.3.1

All inpatient bedrooms in Class A HCFs shall be single bedded rooms unless the functional program demonstrates the necessity of a two-bed arrangement.

Justification for two-bedded or multi-bed inpatient bedroom accommodation shall include supporting

documentation validating the clinical significance of this arrangement. In this arrangement there shall be one washroom per patient.

Note: Single-patient room occupancy has been shown to reduce the potential for transmission of organisms and therefore decrease the risk of infection, decrease medication errors and improve safety for both patients and health care providers overall.

Facilities are continually challenged in having to close rooms and/or units due to patient exposure to infectious organisms. Many outbreaks start from a roommate exposure or shared bathroom facilities. Patient placement is hampered, and waiting times in emergency rooms increased, as a result of lack of appropriate rooms to place patients.

The design of single-bed inpatient bedrooms should not preclude the rooming-in of family members, particularly for pediatric, labour and delivery, post-ICU, and end of life care.

4.5.3.2

The following should be provided in a pediatric setting:

- a) dedicated mother and child rooms (for post-partum recovery and NICU); and
- b) NICU rooms designed to accommodate related children (i.e., twins).

4.5.3.3

The patient washroom may be omitted in an NICU inpatient room.

Note: In pediatric facilities, the ability for parents to stay in the room is important, however in this situation, washrooms should not be designed for use by family members. Separate family washrooms and showers should be provided elsewhere in the inpatient unit, for use by parents.

4.5.3.4

The use of single inpatient bedrooms in other facility classes should be in accordance with the HCF's functional program. In an inpatient bedroom with more than one bed, there shall be one washroom per patient bed.

4.5.4 Patient treatment spaces

All spaces used for diagnosis or treatment of patients, whether intended for inpatient or outpatient use, shall either be an enclosed room or have spatial separation and provision for physical barrier to separate patients (e.g., wall, or a stationary or movable partition), unless the functional program demonstrates the necessity of multi-patient arrangement.

Notes:

- 1) Spatial separation between patients is addressed in Clause 7.5.2. The purpose of the physical barrier is to provide privacy, protection from the spread of infection, and adequate space to support clinical functions. This should not be confused with the single patient bedroom as referenced in Clause 4.5.3.
- 2) If foldable partitions are used, accommodations should be made for storage.
- 3) Curtains have been implicated in the spread of infection and pose an infection control risk. At the time of publication, use of privacy curtains with antimicrobial properties had not been proven to reduce infection risk or eliminate the risk of contamination with microorganisms. Curtains, if used, should be easy to remove and launder or be disposable.
- 4) In some settings privacy can be ensured by means of the area design, rather than curtains or partitions.

4.5.5 Construction considerations

The HCF shall comply with the infection prevention and control requirements specified in CAN/CSA-Z317.13 when performing new construction, renovations, or additions to HCFs.

4.6 Sustainability

4.6.1 General

4.6.1.1

The HCF shall be planned and designed to promote sustainability in terms of the construction process, the finished building, and the sustainable operation of the facility over time.

Notes:

- 1) *Sustainability includes provision for the following issues:*
 - a) *environmentally responsible construction (including pre-construction site clearance and demolition);*
 - b) *creating and maintaining environments that promote occupant wellness;*
 - c) *socially responsible impact of HCF operations on the external environment ("green");*
 - d) *flexibility to accommodate future changes in the provision of care, including capacity changes (see Clause 7.10);*
 - e) *total cost of operation (i.e., not only the direct capital investment in the built environment but also indirectly the ongoing services and impacts);*
 - f) *consideration for innovative technology; and*
 - g) *appropriate design for the needs of the community and patients serviced by the HCF.*
- 2) *According to the ASHE Green Healthcare Construction Guidance Statement, "Building design and construction practice can be shaped to protect health at three scales:*
 - a) *protecting the immediate health of building occupants;*
 - b) *protecting the health of the surrounding community; and*
 - c) *protecting the health of the larger global community and natural resources".*

4.6.1.2

The planning, design, and construction of the HCF shall follow a recognized structured sustainability program.

Note: Examples of structured programs include:

- a) *WELL Building Standard (administered by the International WELL Building Institute (IWBI);*
- b) *LEED (Leadership in Energy and Environmental Design);*
- c) *Green Guide for Healthcare (GGHC);*
- d) *the Building Owners and Managers Association of Canada's Building Environmental Standards Program (BOMA BESt); and*
- e) *Green Globes (UK).*

LEED is a green building assessment tool initially developed by the US Green Building Council and subsequently launched in Canada by the Canada Green Building Council.

In Canada, there are LEED rating systems for different applications, including one specifically for health care facilities. Building performance is designated with ratings (Certified, Silver, Gold, or Platinum) based on the total number of points earned by a project.

The GGHC is a green building guide specifically tailored to the unique conditions of HCFs. With regard to design and construction, its format is closely modelled after LEED with a point system, but it considers health issues as an explicit component of each credit. In addition to design and construction, the Green Guide addresses operational issues throughout the lifetime of the building.

4.6.1.3

The structured program should include the following elements:

- a) *integrated design and commissioning process;*
- b) *site selection and development;*
- c) *waste and pollutant minimization;*
- d) *water quality and conservation;*
- e) *energy conservation;*

- f) indoor environmental quality; and
- g) selection of building materials.

4.6.1.4

The plans for sustainability should help to ensure that the HCF is integrated into the surrounding community and has a positive impact on its surroundings.

4.6.1.5

All planning decisions related to sustainability shall take into account the health and safety of patients and staff. Where there is a conflict, patient health and safety shall be given priority.

4.6.2 Flexibility

The planning and design process for new construction, additions, and renovations shall include consideration of potential changes in the functional requirements over time. Programs should be designed with flexibility to facilitate future internal conversion. Programs should be designed to accommodate future expansions either internally by pushing out “soft spaces”, or through external expansion. See Clause 7.10.

Technology infrastructure should be designed with the capacity and flexibility to allow for the ongoing evolution of applications and uses to address the unknowns in future systems requirements.

4.6.3 Total life cycle cost

The expected lifespan of the HCF shall be determined at the early stages of planning and a total life cycle cost analysis shall be performed during planning and design. Capital cost versus long-term operations and maintenance costs should be examined to make informed decisions about the total cost of design.

Notes:

- 1) *Consideration should be given to effects of the procurement model and operational funding arrangements on the long-term financial and environmental sustainability of the HCF. A HCF can be funded through a complex arrangement of sources through its design, construction, ongoing operation, and renovation, and it is important to ensure that decisions made at each of these stages take into account the future costs, even if the next stage function is funded through a different agency or organization. Efforts should be made, either through contract arrangements or incentives, to align the sustainability goals of the designers, builders, operators, and managers of the HCF.*
- 2) *CSA S478 and CSA Z782 contain requirements and references for use in building life cycle planning and assessment.*

5 Project planning and design process

5.1 Initial planning

5.1.1 Project planning and design process

5.1.1.1

The HCF shall be planned and designed through the use of a project planning process.

Note: *A typical project planning process includes several stages of planning that*

- a) *identifies health needs of the catchment community and the expected role of the HCF;*
- b) *translates the needs into services/activity levels;*

- c) calculates space requirements of the services; and
- d) translates the space requirements into a facility development plan to accommodate the services. Each step in the process builds on the previous and a complete planning process should maintain this sequence to ensure a fully integrated and thought-out facility plan.

The project planning process must, as a first step, establish the core principles and vision that will guide the project through all stages of planning and execution.

The project process and the working groups and committees established should be appropriate to the size and complexity of the project.

5.1.1.2

The project planning process used shall conform to applicable jurisdictional requirements.

Note: Provincial/territorial laws, regulations, codes, and guidelines can apply.

5.1.1.3

The project plan shall include at least the following elements:

- a) initial assessment (to determine needs);
- b) role review;
- c) master program;
- d) master plan, including:
 - i) site and space analysis, including impact on the immediate ecosystem/environment and any downstream ecosystems;
 - ii) physical feasibility study;
 - iii) building development plans; and
 - iv) information management and information technology strategic plan;
- e) technical review of building systems and life-cycle assessment;
- f) functional program;
- g) furniture and equipment planning;
- h) preliminary design development, including schematic design and design report;
- i) detailed design/design development;
- j) tendering documents development;
- k) tendering and contract award process;
- l) abatement, demolition, remediation, and excavation as the condition requires;
- m) construction;
- n) commissioning;

Note: Commissioning process needs to be considered in all planning processes. See CAN/CSA-Z8001.
- o) occupancy following construction/renovation (operational readiness); and
- p) post-occupancy evaluation (POE).

5.1.1.4

The project planning process for a renovation or phased redevelopment where operations are ongoing shall also incorporate planning for maintaining operations and safety and for selective demolition as part of the project.

5.1.1.5

The project planning and design process shall include a mechanism to ensure continued alignment between

- a) the project planning documents;
- b) applicable jurisdictional requirements for the jurisdiction; and

- c) planning, design and reporting requirements of the agencies or organizations that are funding the project.

Note: Provincial/territorial, local, and federal laws, regulations and bylaws can apply.

5.1.1.6

From the start of the planning process, the HCF shall be planned such that the physical systems and their installations in the HCF shall be designed, constructed/installed, and commissioned in accordance with the following standards:

- a) CSA Z32 (electrical systems and installations);
- b) C282 (emergency electrical power supply systems);
- c) *Canadian Electrical Code, Part I* (CSA C22.1);
- d) CSA Z7396-1 (medical gas systems);
- e) CSA Z317.1 (plumbing);
- f) CAN/CSA-Z317.2 (HVAC);
- g) CSA Z317.5 (illumination);
- h) CSA Z317.11 (area measurement);
- i) CSA Z317.10 (handling of waste);
- j) CAN/CSA-Z317.13 (infection control during construction, renovation, and maintenance);
- k) CAN/CSA-Z8001 (commissioning); and
- l) CSA EXP06-15 (evaluating emerging materials and technologies for infection prevention).

Any additional CSA standards applying to HCFs shall also be followed.

Note: Legal requirements can also apply (e.g., federal, provincial/territorial, and local regulations). The HCF should identify requirements of these and other governing agencies (e.g., worker safety authorities) that could have jurisdiction early in the process.

5.1.1.7

The project planning process shall include input from an interdisciplinary design team (IDT) from the earliest stages to help ensure that the resulting building will meet the needs and expectations of the people who will be using it.

Note: The IDT is the basis of a human-centred design approach. It involves creation of a design team comprising both subject matter experts (umbrella organization) and professional planners and designers to determine the needs of the organization at all planning and design stages.

The IDT mandate should include flexibility in responding to the changing needs of the health care system, and incorporate an iterative design process that can respond to the system needs.

5.1.1.8

The IDT shall be assembled as early as possible in the planning and design process, and be engaged based on the scope of the project.

The IDT should be of a size and makeup that is appropriate to the scope, size, and complexity of the project. It should include subject matter experts and professionals as follows:

- a) Subject matter experts:
 - i) government representation in accordance with applicable requirements and structures;

Note: Government regulations and other planning guidelines and administrative structures can apply.
 - ii) administrators;
 - iii) clinicians;
 - iv) infection prevention and control professionals;

- v) occupational health and safety professionals;
 - vi) ergonomists;
 - vii) materials managers;
 - viii) clinical and non-clinical support staff;
 - ix) biomedical engineers;
 - x) technology and communications staff;
 - xi) patients, their families, carers, or advocates that can speak to their needs;
 - xii) members of the surrounding community;
 - xiii) facility operations and maintenance personnel; and
 - xiv) health care program and clinical planners;
- b) Professionals:
- i) furniture and equipment planners;
 - ii) architectural and space planners;
 - iii) engineering specialists;
 - iv) construction project planner or manager;
 - v) emergency management and security specialists;
 - vi) commissioning specialist;
 - vii) moving and transitional planners; and
 - viii) other groups that will use, work in, or be affected by the HCF.

Note: There will likely be overlap between the professionals on the IDT and the stakeholder consultation group, which includes clinical and technical program users, and has a role later in the process once the scope of the clinical program needs are determined.

5.1.1.9

The core members of IDT should remain constant throughout the entire project. The IDT membership shall be consulted and provide input to the various stages of planning/design development.

Notes:

- 1) Projects that do not create an interdisciplinary design team from the beginning of the project often experience changes throughout the planning and design process, which can impact schedule, costs and the final integrated solution in a negative way. Similarly changes to team members throughout the project often can lead to changes in the planning and design if the team does not document the rationale of their planning and design through the functional program and design briefs.
- 2) Some changes in the core team can occur in alternative finance and procurement projects or public/private partnerships. See Clause 5.1.1.11.

5.1.1.10

The project planning process shall include specific provisions for the planning, design, construction, and commissioning of the building's mechanical, electrical, and information technology systems.

Note: Commissioning includes planning and implementation of the facility-related aspects of the project. Such items include planning for building turnover, electrical, plumbing, HVAC testing, and verification plus training of facility engineering and maintenance staff.

5.1.1.11

The planning process for the HCF should take into account the procurement model and its potential impact on the planning and design process.

Note: Traditional procurement models use a stipulated sum approach to tendering their projects. In this case, the design is fully translated into contract documents for the purpose of tendering. This model is often referred to as "Design-Bid-Build".

Alternative models for procurement can include

- a) construction management;

- b) design/build;
- c) alternative financing and procurement (AFP); or
- d) public-private partnerships (P3).

In these models the planning and design is tendered using a request for proposal (RFP) format, at which time the pre-design planning is finished but the design is only finished to varying degrees.

In a design, build, finance, and maintain model (DBFM) the contracted company or organization maintains responsibility for a set period, for example 30 years. In these arrangements the division of responsibilities and the rules for transferring responsibilities to other organizations (e.g. through the sale of a contract) should be clearly defined so that the quality and service provided by the HCF is maintained. As well, the HCF should be aware of the potential effects of a long-term maintenance contract on its future ability to add to or change building services. A newer procurement model, integrated project delivery (IPD), is characterized as a collaborative partnership between owner and constructor that focuses on value engineering to deliver projects on time and under a guaranteed maximum price budget while maximizing services.

5.1.1.12

The project planning process shall include consideration of, and alignment with, the facility management plan and systems, including the building information management system (BIM), and the comprehensive operation and maintenance plan (COMP) as outlined in CSA Z8002.

Note: Planning and making provision for the tagging of devices and equipment for a BIM should begin early in the design process.

5.1.2 Initial assessment

5.1.2.1 General

Prior to starting the master program and master plan for a HCF, the planning team responsible for the HCF shall undertake an initial assessment of the health care needs in the community/region, which will inform the planning and design of the future HCF. For an existing facility this part of the process shall also include a functional assessment to determine the ability of the existing infrastructure to meet the defined needs in accordance with Clause 5.1.5.8.

5.1.2.2 System-wide service plan/regional service plan

Early within the process, the IDT should review the overall system-wide service plan or regional service plan, and determine the role for the services that the HCF's programs will provide within the broader plan or system. This shall be done prior to determining facility technical needs. The system plan or service plan should include the following inputs:

- a) demographics and population growth/shifts;
- b) population health; and
- c) capacity plan.

5.1.2.3 Facility needs assessment

Once the role has been established, the scope of HCF planning and design (see Clause 5.1.3.3) shall align to this initial assessment of program requirements. This shall be accomplished through a facility needs assessment, which shall include the following:

- a) the patient profile including health status/acute, as well as risk factors of the treatment;
- b) acute of patient — risk of unknown factors of infections/health status;
- c) risk of the treatment;

Note: The risk level for a given treatment or procedure can depend on a number of factors, including

- a) level of invasiveness;
- b) type of anesthesia or sedation used; and
- c) length of procedure.

- d) the scope and extent of services to be provided by each program;
- e) the service planning gap determined between past/current and future state;
 - i) Past/current —
 - 1) Historic workload for each component for the past three years (if available) in terms of
 - A) total attendances (total number served/treated);
 - B) service volumes (average and maximum numbers served/treated); and
 - C) number of beds.
 - ii) Future state —
 - 1) Projections based on patient profile and past/current practices based on
 - A) demographics/population growth; and
 - B) mitigation factors — technology impact, system change.
- f) catastrophic event management requirements as documented in the applicable regional plan; and
- g) the need for business continuity in the event of a catastrophic event, as identified in regional emergency planning documents.

Note: *This includes a determination of whether a HCF will be utilized for a surge in the context of multi-casualty incidents, CBRNE exposure, and other high volume incidents like a pandemic. This assessment would consider the geographic hazards in the area, the population, and the nature of the HCF (trauma centre/specialty centre, etc.). Other factors for consideration include the proximity of alternate facilities for alternate care centres such as a municipality-owned recreation centre or community hall.*

5.1.2.4

The needs assessment/role review should be reviewed and agreed upon with the project sponsors, regulatory agencies, and funding authorities involved in the project. During the planning process the IDT shall be responsible for keeping the alignment between the design and the defined role.

5.1.2.5

The project planning and design process shall consider the expectations for the HCF with respect to business continuity. This should be considered in pre-design, and should be aimed at identifying gaps in regional coverage, the needs for business continuity and ongoing operation, as well as post-disaster recovery and regional support. This exercise shall be conducted in consultation with the project sponsors, regulatory agencies, and funding authorities involved in the project.

5.1.3 Master program

5.1.3.1 General

5.1.3.1.1

A master program shall be developed that summarizes the identified needs, the resources available to meet those needs (including existing infrastructure, if applicable), and the changes or additions necessary to meet existing and future needs.

Notes:

- 1) *A master program is a broad level document which combines an assessment of the hospital's existing facilities with recommendations for change required to fulfill a defined role or strategic direction.*
- 2) *If a master program and master plan exists, the requirements of this process may only require that it be updated to reflect current understanding of health care needs and the information of the community served. Some HCFs, such as community health centres may not require a master program if they are part of a larger regional service plan that acts as the master program for the areas the HCF serves.*

- 3) *The master program reflects the HCF's present and future service role within the community; it sets out the changes anticipated in each service area with respect to the scope of services provided, the level of activity sustained, and the amount of space occupied. It may also consider the staffing of the service.*
- 4) *The master program assists in the planning process by*
 - a) *providing the funding and oversight agencies (i.e., the health authority) with a high-level picture of what the HCF is planning in the early stages;*
 - b) *providing managers of programs or components in an existing HCF with a summary of planning changes in the scope or space for the service; and*
 - c) *gathering essential information and setting a direction to the development of the master plan.*

5.1.3.1.2

The master program may be directed by a set of planning parameters that set the framework for the HCF, including:

- a) the HCF mission statement;
- b) the HCF vision;
- c) the role of the HCF as defined by funding and oversight agencies;
- d) catchment area and population needs; and
- e) definitions of existing and proposed service (by component).

5.1.3.2 Content

The master program shall include the following information for each service in the HCF:

- a) scope and extent of services provided by each component;
- b) historic activity/services/volumes/workload for each component for the past three years as applicable to the service including
 - i) service volumes;
 - ii) attendances;
 - iii) visits;
 - iv) tests; and
 - v) beds
- c) projected activity/services/volumes/workload for each component as applicable to the service (e.g., service volumes, attendances, visits, tests, beds, etc.). Projections shall be for three planning horizons: short, medium, and long term;
- d) projected major elements needed to accommodate the workload, such as bedrooms, operating rooms, exam rooms, workstations/offices (when staffing is the key driver of space), etc.;
- e) the result of the functional assessment (if applicable) highlighting the appropriateness of the current space, location, organization, and rooms and general functionality of space/key room elements for the service which lead to space projections;
- f) existing component space (CGSM) (to be coordinated with site and space analysis); and
- g) projected component space requirements (CGSM).

Note: *The format and the content of the master program beyond what is listed in this Clause will vary depending on the scope of the project, the reporting requirements of funding, and oversight authorities.*

5.1.3.3 HCF Classification

5.1.3.3.1

The IDT shall establish the HCF classification and shall ensure that it is aligned with the proposed services and the role of the facility in the regional delivery of health care services.

Notes:

- 1) Refer to CSA Z1600.

- 2) *Although this Clause applies primarily to new builds, the principles of matching design intent to classification applies to all construction and renovation projects (See Clause 5.1.3.3.2).*

During the project planning and design process, the service or program component in the HCF plans shall be assessed for functionality (i.e., its ability to fulfill its intended purpose in terms of location, organization, rooms, and general functionality) and designed to meet this functionality.

5.1.3.3.2

The entire HCF should not be planned to address the highest level of patient acuity and treatment risk for any one individual program component, but each program component should be established by the IDT according to their specific needs assessment (See Clause 5.1.2.2). This includes new as well as renovation projects.

5.1.3.3.3

If the project involves a renovation or addition to an existing HCF, each service or component in the HCF shall be assessed for functionality (i.e., its ability to fulfill its intended purpose in terms of location, organization and rooms, and general functionality). The master program shall report the functional deficiencies and planning shall incorporate strategies to eliminate the deficiencies identified in these assessments. In addition, the existing facility shall be assessed to ensure it can support the emergency planning and business continuity plans of the HCF, both during construction and after completion of the project. A carefully formulated construction staging/phasing strategy shall form part of the implementation strategy. The implementation strategy shall include all provisions necessary in the planning and design to ensure that all services/operations will be maintained throughout the construction and shall safely continue to meet the ongoing health care needs of the catchment area.

5.1.3.4 Technology and communications systems

The existing technology and communications infrastructure and application environment shall be assessed to ensure that they can support the future needs of the HCF. A gap analysis between the current state and minimal future state that allows for flexibility should be completed, including wired and wireless network, locating services, nurse call system, voice, security, paging, and patient engagement applications.

5.1.4 Project staging and phasing

5.1.4.1

The HCF shall identify the total needs of the facility as part of the master planning process. All short, medium, and longer-term planning shall occur in the context of the master plan/broader vision of how the facilities will evolve as they adapt and change to meet the health care needs of the community.

5.1.4.2

Planning shall include a strategy for how the required short, medium, and longer-term facility changes will be implemented. This process shall consider how to ensure the continued operation of the facility, as well as the safety of patients, families, and staff, as physical changes are made.

Note: To achieve the desired final state, redevelopment could need to be phased; that is, the scope of the required redevelopment of an existing facility could exceed the HCF's ability to implement the work as a single project. When redevelopment occurs over a series of distinct projects (potentially separated by years of ongoing operations), the redevelopment is considered as a "phased" redevelopment.