The Future is Here – Z8000

The NEW Standard for Canadian Health Care Facilities
The Future is Here – Z8000

Panelists:

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Jeffrey Kraegel
Gordon Burrill
CSA Z8000 - Health Care Facilities

• The Future is Here
• First comprehensive National Standard for HCF
• 33 members, 4 year development, 400 pages
• Capital Spending / Procurement Models
• Evidence Based Design
• Hot Topics / Technical Examples / Q & Eh?
Development of the Standard

- June 2003 - TC Meeting Concept Discussion
- 2005 – Business Case
- 2006 – Approval to form Technical Subcommittee
- March 2007 – First Subcommittee Meeting
- April to June 2010 - Public Review
- June 2011 – Committee Vote
- September 2011 – Publication
Scope – CSA Z8000

• New construction AND significant renovation
• “Shalls”, “Shoulds” and Best-Practice guidance
• Objective and performance based
• Not a specification or a replacement for design innovation
• Functional Approach
• Reference existing CSA standards, not re-write them
Sections of the Z8000 Standard

• 1-3  Scope, References and Definitions
• 4    Principles
• 5    Planning
• 6    Site and Facility Development
• 7    General Functional Requirements
• 8-10 Specific Requirements
• 11   Common Technical Requirements
• 12   Building Services
Section 4 – General

Principles of Health Care Facilities
- Operations
- Accessibility
- Safety and Security
- Infection Prevention and Control
- Sustainability
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Principles of Health Care Facilities

O perations
A ccessibility
S afety and Security
I nfection Prevention and Control
S ustainability
Hot topics
Single Bedded Rooms
### Single-bed vs. Multi-bed Rooms

* (Roger Ulrich, 2004)

<table>
<thead>
<tr>
<th>Factor</th>
<th>Single</th>
<th>Multi-bed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare associated infections</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Medical errors</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Falls</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Staff observation of patients</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Staff/patient communication</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Confidentiality of information</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Presence of family</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Patient privacy and dignity</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Avoid mixed-sex accommodation</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Death with dignity</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Noise</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Sleep quality</td>
<td>✔️</td>
<td></td>
</tr>
</tbody>
</table>
# Single-bed vs. Multi-bed Rooms

(Roger Ulrich, 2004)

<table>
<thead>
<tr>
<th></th>
<th>Single</th>
<th>Multi-bed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Patient stress</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Patient satisfaction</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Choice</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Staff satisfaction</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Staff work effectiveness</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Reducing room transfers</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Adapt to handle high acuity</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Patient privacy and dignity</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Managing bed availability</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Initial construction costs</td>
<td></td>
<td>✔️</td>
</tr>
<tr>
<td>Operations and whole life costs</td>
<td>✔️</td>
<td></td>
</tr>
</tbody>
</table>
Single Bedded Rooms

7.5.2.2 Single inpatient bedrooms
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 patient bedroom accommodation shall include supporting documentation validating the clinical significance of this arrangement. See Clause 4.5.2.

7.5.2.3 Multi-patient bedrooms
A multi-patient bedroom shall accommodate no more than two patients. In this arrangement, there shall be one washroom per patient.
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.

27.0 m² net per single room (including 3 pc washroom)
49.0 m² net per double room (including two 3 pc washrooms)
Single Bedded Rooms

100% single rooms
Length 46.5 m
Area 406.4 m²

80% single rooms
Length 45.5 m
Area 397.8 m²
-2.1% *

60% single rooms
Length 44.5 m
Area 388.9 m²
-4.2% *

* Area difference does not represent DGSM
## Direct Capital Cost Impacts (2)

<table>
<thead>
<tr>
<th></th>
<th>30% Private</th>
<th>60% Private</th>
<th>80% Private</th>
<th>100% Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Area (NSF)</td>
<td>11,280</td>
<td>12,130</td>
<td>12,620</td>
<td>12,810</td>
</tr>
<tr>
<td>Departmental Gross Area</td>
<td>18,048</td>
<td>19,408</td>
<td>20,192</td>
<td>20,496</td>
</tr>
<tr>
<td>Bldg Gross Floor Area (GFA)</td>
<td>23,462</td>
<td>25,230</td>
<td>26,250</td>
<td>26,645</td>
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<tr>
<td>DGSF per Bed</td>
<td>564</td>
<td>607</td>
<td>631</td>
<td>641</td>
</tr>
<tr>
<td>Total Cost</td>
<td>$11,064,087</td>
<td>$11,941,852</td>
<td>$12,461,485</td>
<td>$12,685,050</td>
</tr>
<tr>
<td>Cost per DGSF</td>
<td>$613.04</td>
<td>$615.31</td>
<td>$617.15</td>
<td>$618.90</td>
</tr>
<tr>
<td>Cost per BGSF</td>
<td>$471.57</td>
<td>$473.32</td>
<td>$474.72</td>
<td>$476.08</td>
</tr>
<tr>
<td>Cost per Bed</td>
<td>$345,753</td>
<td>$373,183</td>
<td>$389,421</td>
<td>$396,408</td>
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<tr>
<td>Capital Cost over Baseline</td>
<td></td>
<td>$27,430</td>
<td>$43,669</td>
<td>$50,655</td>
</tr>
</tbody>
</table>

* Based on 1 washroom per double bedded room

October 2007
Eight thousand Canadians die of hospital-acquired infections each year. One simple change could save half of them. Why aren’t we doing it? By Nicholas Köhler
Hot topics
To LEED® or not to LEED®

LEED-NC SILVER 2006
LEADERSHIP IN ENERGY & ENVIRONMENTAL DESIGN

CSA STANDARDS
To LEED® or not to LEED®

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

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.
To LEED® or not to LEED®
Hot topics
Where can I store that?
Where can I store that?

7.7.1.6
Equipment storage shall be provided in every service. The storage area shall be determined in accordance with the functional program, but in no case shall the storage be less than 2% of the total area of the service. Circulation areas shall not be used for storage.

Note: Improperly stored items, for example in corridors or treatment spaces, can present multiple risks to safety and security, in terms of fire safety, infection prevention and control, theft, and hazards due to sharps or electrical shock.
Where can I store that?

• Example – Typical Med/Surg Floor
  – 1500 m² DGSM
  – Storage = 2% × 1500 m²
  – Storage = 30 m²
  – Approx size of Storage = 5.5 m × 5.5m
Hot topics
Patient Lifts
Patient Lifts

7.6.6.2.1
In Class A HCFs, all inpatient bedrooms for the following patient groups shall have a rail for a patient mechanical lift device installed in the ceiling:
(a) acute medical or surgical patients;
(b) critical care;
(c) paediatric;
(d) inpatient continuing care; and
(e) rehabilitation.

The lift rail may be omitted if the functional program demonstrates that there is not a justified cost/benefit need for ceiling mounted patient lifts.

The HCF shall have the means to provide mechanical lifting for patients in all other clinical areas (e.g., physiotherapy, diagnostic imaging).

Note: Ceiling mounted patient lift rails are not required in maternal and newborn care programs and mental health programs; however, dedicated storage should be provided for portable lifting devices in these programs.

Ceiling lift rails shall be installed with the necessary structural, mechanical, and electrical systems, and these shall be designed so that the lift system does not interfere with other inpatient support services located in the ceiling (e.g., lighting, HVAC, life safety). Proper fasteners shall be provided for ceiling mounted patient lifting devices.
Patient Lifts

7.6.6.2.2
Ceiling lifts shall have minimum vertical and horizontal lift capacities of 200 kg. Rooms that are designed for bariatric patients (see Clause 7.8.8.1) shall have a lift with a capacity of at least 453 kg.

7.6.6.2.3
Class A HCFs shall determine the number of lifting slings and associated equipment to be installed at time of initial construction based on the functional program. Class A HCFs shall also determine the number of lifting slings and associated equipment to be kept in storage and readily available in each patient functional area. Where the functional program demonstrates that lifting slings and associated equipment will be stored within each area, dedicated space for such storage shall be provided.
Key Relationships
Key Relationships and Dependencies

• Related Programs
• Components within the program impacting the relationship
• Objectives
• Alternatives to direct adjacency of programs
## Key Relationships and Dependencies Matrix

<table>
<thead>
<tr>
<th>Critical care</th>
<th>Maternal &amp; newborn care</th>
<th>Medical/surgical inpatient care</th>
<th>Pediatric &amp; adolescent inpatient care</th>
<th>Mental health care</th>
<th>Rehabilitation care</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td>Critical care</td>
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<td>Maternal &amp; newborn care</td>
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<td>Medical/surgical inpatient care</td>
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<td>Pediatric &amp; adolescent inpatient care</td>
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<tr>
<td>Mental health care</td>
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<tr>
<td>Rehabilitation care</td>
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<tr>
<td>Specialized inpatient care</td>
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<tr>
<td>Ambulatory care - general</td>
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<tr>
<td>Ambulatory care - renal dialysis</td>
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<tr>
<td>Ambulatory care - oncology</td>
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<tr>
<td>Emergency care</td>
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<tr>
<td>Procedures</td>
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<tr>
<td>Allied health services</td>
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<td>Laboratory services</td>
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<td>Electrodiagnostic services</td>
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<td>Respiratory services</td>
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<tr>
<td>Medical imaging</td>
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<tr>
<td>Pharmacy</td>
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<tr>
<td>Biomedical engineering</td>
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<tr>
<td>Environmental services</td>
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<tr>
<td>Nutrition and food services</td>
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<td>Materials management</td>
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<tr>
<td>Plant maintenance</td>
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<tr>
<td>Security &amp; parking</td>
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<td>Medical device reprocessing</td>
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<tr>
<td>Building entry &amp; parking</td>
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<tr>
<td>Help desk</td>
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<tr>
<td>Exterior garden/therapy area</td>
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<tr>
<td>Main hospital entry/lobby</td>
<td></td>
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<tr>
<td>Inpatient Continuing Care</td>
<td></td>
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</tr>
</tbody>
</table>

### LEGEND

- **Critical**: Relationships that are critical to patient safety and clinical performance
- **Important**: Relationships which are important, but of normal base-level importance to patient safety and clinical performance
Examples of Key Relationships

• Critical Care Essential Relationships (required)
  – Maternal and newborn care
  – Pediatric and adolescent inpatient care
  – Emergency care
  – Procedures

• Critical Care Important Relationships (recommended)
  – Medical/surgical inpatient care
  – Laboratory services
  – Respiratory services
Technical Details
Doors & Windows

- **Doors (minimum widths)**
  - 1050 mm wide in patient bedrooms + side leaf = 1525mm total
  - 1220 mm wide (in bariatric areas)
  - 1800 mm wide (in Level 1 recovery – isolation room)
  - 1500 mm wide (for Level 2 recovery)
Doors & Windows

• Door Heights
  – 2100 mm (6’-10.5”)
  – Be conscious of mag-locks and other required hardware

12.2.3.8
The minimum door height shall be 2100 mm to provide clearance for movement of beds and other equipment (such as i.v. poles).
Doors & Windows

• Operable Windows
  – At least one operable window in patient rooms
  – Staff lockable
  – Removable operators
  – Restricted opening size
  – Security screens in mental health areas
## Bed Clearances

<table>
<thead>
<tr>
<th></th>
<th>Inpatient Beds *</th>
<th>Critical Care Beds *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-transfer side of the bed</td>
<td>1000 mm</td>
<td>1200 mm</td>
</tr>
<tr>
<td>Foot of bed</td>
<td>1200 mm</td>
<td>1500 mm</td>
</tr>
<tr>
<td>Between beds (where there is more than one bed)</td>
<td>1200 mm</td>
<td>1800 mm</td>
</tr>
<tr>
<td>Centre to centre of beds (where there is more than one bed)</td>
<td>1800 mm</td>
<td>2400 mm</td>
</tr>
</tbody>
</table>

* Based on a nominal bed size of 1000 mm width or 1200 mm wide for bariatric beds
Bed Clearances

Typical inpatient single bedded room
Operating Rooms

• Included with the requirements for “Procedures” areas
  – Emergency communication required
  – Film viewers or PACS systems required
  – Seal perimeter walls, ceilings and floors
  – Scavenging systems shall be provided
  – Other requirements for specialty ORs
Operating Rooms (General)

- Table 9.5 outlines some prescriptive requirements
  - Minimum area = 55.0 DNSM
  - Ceiling height $\geq$ 3500 mm
  - Clearances
    - Table to wall $\geq$ 3000 mm
    - Table to obstruction $\geq$ 3000 mm
    - At head of table $\geq$ 2400 mm
    - At foot of table $\geq$ 3000 mm
  - Anesthetic gasses and patient entry on opposite sides of table
## Operating Rooms (General)

<table>
<thead>
<tr>
<th></th>
<th>Alberta</th>
<th>Ontario</th>
<th>Quebec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating room, general</td>
<td>60.0</td>
<td>58.6</td>
<td>50.0</td>
</tr>
<tr>
<td>Level one recovery (isolation room), plus anteroom</td>
<td>25.0</td>
<td>13.0</td>
<td>N/A</td>
</tr>
<tr>
<td>1-Bed Room Suite</td>
<td>31.0</td>
<td>26.0</td>
<td>23.5</td>
</tr>
</tbody>
</table>
Operating Rooms (General)

- Table 9.5 outlines some additional recommendations
  - Consider standardized rooms
  - Rooms should be close to square
  - Consider ceiling mounted booms
  - Patient access doors $\geq 1800$ mm wide
  - Access to central core $\geq 1200$ mm wide
Operating Rooms (Hybrid/Specialty)

- Table 9.5 outlines some prescriptive requirements
  - Minimum area = 70.0 DNSM
  - Ceiling height ≥ 4000 mm
  - There shall be additional space for control room and electrical equipment room
  - Anesthetic gasses and patient entry on opposite sides of table
Z8000: Practical & Comprehensive

Everything from A to **Z8000-11**
Overview of Standards

• Standards in general
  – Information documents
  – Stipulate requirements for the safety, performance and operation of products, processes, services and systems
  – Outline industry guidelines and good practices
  – Represent minimum requirements
  – Are voluntary; compliance becomes mandatory only when the standards are referenced in legislation or regulation
National Standards

- Developed through a consensus process*
- Process is managed by an accredited Standards Development Organization (SDO)
- Reviewed/Developed by a balanced Technical Committee
- Published in both official languages

*Consensus is defined as substantial agreement.

“Consensus implies much more than a simple majority, but not necessarily unanimity.”
Standards Development Process

- Request/Evaluation/Approval
- Establish Committee
- Draft Development
- Public Review
- Internal Quality Audit
- Balloting
- Translation
- Publication
Standards Maintenance Process

- Ongoing Monitoring
- 5 year review
- Committee recall as needed
- Revisions
- Amendments/New Edition
- Withdrawal
Key Messages

• Z8000 is a made-in-Canadian standard, meant to be used across the country.

• To develop it, CSA followed a process that involved experts from many fields, representing a balance of stakeholder interests, and we checked the result through a Public Review.

• Z8000 is a living document. We can improve through amendments it after it’s published, and we will be looking for feedback for the next edition. We always welcome suggestions.
One closing thought
“Random thoughts create chaos...
...you have to have a plan.”

A TSC Z257.10 Committee Member on the value of CSA Z8000
CSA Z8000-11 Canadian health care facilities will be a valuable resource and essential tool to develop your plan for a successful health care construction project.
Canadian Health Care Facilities (CSA Z8000)

Questions