AHCA Seminar
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Objectives

- Discuss major changes to the new edition of NFPA 99 & 101
- Present operational and design advantages and disadvantages to the new Code
- Discuss the formal adoption of these new requirements
NFPA 99

• Major Changes
How it Started

- NFPA Standards Council allowed a complete rewrite and reformatting of NFPA 99
- TCC and TCs studied the existing version to identify improvements
- Minor technical changes for most uses
- Add relevant topics for Health Care Facilities
- One stop document for Health Care Facilities
Items Deleted

- Laboratory requirements
- Manufacturers’ requirements on electrical equipment
- Annexes B, D, & E are deleted. They are technology not used any longer.
- All of the Occupancy Chapters
New Items Overview

- Fundamentals Chapter on Risk
- Information Technology and Communication Systems
- Plumbing
- Heating
- Emergency Management
- Security
- Fire Protection unique to Health Care Facilities
How the Code Works

• Determine the worst case procedure.
• Select the Risk Category.
• Select the systems or procedures that are prescribed by that level of risk.
• Hyperbaric facilities are addressed by Chapter 14 only (No need for a Risk Category).
• Additional Fire Protection related specialties are addressed in Chapter 15.
Scope

• Establish criteria to minimize:
  – The hazards of fire,
  – Explosion, and
  – Electricity

• Facilities providing services to human beings
Purpose

• To provide minimum requirements for the:
  – Performance
  – Maintenance
  – Testing and
  – Safe practices for systems used in a healthcare setting
Application

- Applies to all health care facilities
- Construction and equipment requirements for new only
- Only altered or renovated or modernized portion of the building
- If alteration, renovation or modernization modifies the performance of a system, it must be updated to new construction requirements
Risk Category Determination (Chapter 4)

- Categories
- Examples
- Application issues
Categories

• Category 1 - System Failure that would probably cause patients or caregivers major injury or death.

• Category 2 - System Failure that would most likely cause minor injury to patients or caregivers.
Categories

• Category 3 - System Failure that would most likely cause discomfort to patients or caregivers.

• Category 4 - System failure has no impact on patients or caregivers.
Categories

• Category 1 - System Failure that would probably cause patients or caregivers major injury or death.
Operating Room Power
Categories

• Category 2 - System Failure that would most likely cause minor injury to patients or caregivers.
Fans*

*Depends on the use of the fan
Categories

• Category 3 - System Failure that would most likely cause discomfort to patients or caregivers.
Categories

• Category 4 - System failure that has no impact on patients or caregivers.
Lawn Sprinkler
Risk Assessment

• Categories determined by following and documenting a defined risk assessment procedure

• Risk assessment comprises:
  – Probabilities
  – Measure of severity
Types of Risk Assessment

• Qualitative Risk Assessment
  – Risk is described as information

• Semi-Quantitative Risk Assessment
  – Likelihood, quantitative, consequence, qualitative or flip it around

• Quantitative Risk Assessment
  – $P$, the probability that the loss will occur
  – $R$, the magnitude of the potential loss ($L$)
# Probability of Occurrence

<table>
<thead>
<tr>
<th>Probability</th>
<th>Definition</th>
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</thead>
<tbody>
<tr>
<td>Frequent</td>
<td>Likely to occur frequently, experienced (&gt;1/Year)</td>
</tr>
<tr>
<td>Probable</td>
<td>Will occur several times during system life (&gt;1/10 Years)</td>
</tr>
<tr>
<td>Occasional</td>
<td>Unlikely to occur in a given system operation (&gt;1/100 Years)</td>
</tr>
<tr>
<td>Remote</td>
<td>So improbable, may be assumed this hazard will not be experienced (&gt;1/1000 Years)</td>
</tr>
<tr>
<td>Improbable</td>
<td>Probability of occurrence not distinguishable from zero (&gt;1/10,000 Years)</td>
</tr>
</tbody>
</table>

NFPA 551, *Guide for the Evaluation of Fire Risk Assessments*, Table A.5.2.5(a)
Severity (Magnitude of Loss)

- **Negligible** – no affect on patients or operations
- **Marginal** – potential for minor injury, loss of operations for a brief time
- **Critical** – potential serious injury or death, loss of operations for period of time that effects cash flow
- **Catastrophic** – major loss of patients or staff, loss of facility
Common Risk Assessment Techniques

• Risk Matrix
• Event Tree
• Fault Tree
### Risk Matrix

<table>
<thead>
<tr>
<th>Frequency of Occurrence</th>
<th>Category 1</th>
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<tr>
<td>Frequent</td>
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<tr>
<td>Remote</td>
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<td>Improbable</td>
<td>Category 4</td>
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<td>No Effect</td>
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<tr>
<td>Discomfort</td>
<td>Minor Injury</td>
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<tr>
<td>Minor Injury</td>
<td>Death</td>
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</table>

From NFPA 99 2 day Course
<table>
<thead>
<tr>
<th>Frequency of Occurrence</th>
<th>No Effect</th>
<th>Discomfort</th>
<th>Minor Injury</th>
<th>Death</th>
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</tbody>
</table>

From NFPA 99 2 day Course
Event Tree

Alternate Power Source Scenario

- Loss of voltage detected
- Transfer switch operates
- Generator batteries fully charged
- Batteries cranks engine
- Generator engine starts
- Alternate power outcome

Normal power is lost

Yes
No

Yes
No

Yes
No

Yes
No

Yes
No

Power is supplied
No power
No power
No power
No power

From NFPA 99 2 day Course
Fault Tree

Electrical power supply

Transfer switch operates

Normal power

Alternate power source

Batteries

Generator power

Engine batteries

Fuel

Engine ventilation

+ = “OR Gate”

○ = “AND Gate”
Simple Risk Assessment

For systems, ask yourself:

• If I lose my system, what happens to the patient/staff?
  1. Patient/staff die? Yes = Category 1
  2. Patient/staff has minor injury? Yes = Category 2
  3. Patient/staff has discomfort? Yes = Category 3
  4. Patient/staff not impacted? Yes = Category 4
Simple Assessment

- System loss: Yes
  - Patient dies: Yes (Category 1)
  - Patient dies: No
    - Patient has minor injury: Yes (Category 2)
    - Patient has minor injury: No
      - Patient has discomfort: Yes (Category 3)
      - Patient has discomfort: No
        - No impact on patient: Yes (Category 4)
        - No impact on patient: No
Examples & Issues

- Ambulatory Surgical Center - 2 Patients
Examples & Issues

- Dentist’s office - no anesthesia
- Reconstructive surgeon’s office
Examples & Issues

• Cooling Towers in Houston
• Cooling Towers in Seattle
Examples & Issues

• Lawn Sprinkler system
Risk Categories

• In risk category definitions there is the assumption that there is no intervention from caregiver or others.

• Different categories of systems can exist in the same occupancy.
  – Gas system in doctor’s office = Category 3; gas system in ER = Category 1
  – HVAC (cooling tower) at Seattle hospital = Category 3, but a Category 1 gas system
Mitigation of Risk

• If the risk is not acceptable:
  – Develop mitigation strategies
    • IPS, GFCI, fluid containment systems, OR housekeeping practices, etc.
  – Perform the risk assessment again
Risk Categories

• 4.3 Application
  – Only applies to Chapters 5 through 11
TC – Electrical Systems

• Definition of Wet Location
  – Including all operating rooms
  – Annex language on spillage of liquids
TC – Electrical Systems

• Eliminated emergency system heading
• Changed equipment system to equipment branch
• Overcurrent protection devices
  – Accessible to authorized personnel
  – Not permitted in public access spaces
• Receptacles
  – Critical care – 14 outlets/seven duplex
  – Operating rooms – 36 outlets/18 duplex
Selective Coordination

• Added text to permit a 0.1 second delay
TC Electrical Systems

• New chapter on low voltage systems being recommended
• New section on campus electrical systems being added
Information Technology and Communication (Chapter 7)

• Recognizes it is becoming vital to health care delivery.
• Covers IT rooms, fire protection, nurse call, emergency call and staff emergency assistance.
Plumbing & Heating by TIA

- Non-medical compressed air systems
- Heating, cooling and ventilation
- Humidity control
- Natural and mechanical ventilation for storing and trans-filling medical gases
- Ventilation for waste anesthetic gases disposal system
## System Categories Annex

### A8.2.1

<table>
<thead>
<tr>
<th>Function</th>
<th>Heating</th>
<th>Cooling</th>
<th>Ventilating</th>
<th>Humidity</th>
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TC – Medical Equipment

• Reduced medical equipment testing
  – Patient care – removed testing frequencies
  – Non-patient care
  – Be careful as the requirements for current leakage have been relocated.
Emergency management – completely rewritten and expanded for 2010
  - Two categories of risk
    - In-patient facility is expected to be operable
    - In-patient and out-patient areas that augment the critical mission but do not receive in-patients
  - Uses The Joint Commission standards as a basis for plan evaluation
TC – Emergency Management

- New Chapter on Security
  - Based on the foundations of NFPA 730, Guide for Premises Security
  - Facility shall conduct a Security Vulnerability Assessment (SVA)
  - Defines responsible person
Fire Protection Features

- Fire alarm and detection
- Protection of gas cylinder storage
- HVAC detection requirements
- Fire Protection of:
  - Compact Shelving
  - Closet protection omission Hospitals only
NFPA 101 – 2012 Overview
Major Code Changes Impacting Healthcare

- Definitions
- Suite arrangement
- Exiting
- Corridor clutter
- Special hazards
Definition - New

• **3.3.255.2.3 Non-Patient Care Suite (Health Care and Ambulatory Health Care Occupancies).** A suite within a healthcare or ambulatory healthcare occupancy that is not intended for sleeping or treating patients.
Definition - New

• Normally Unoccupied Building Service Equipment Support Area
  – Examples of such areas include interstitial spaces, crawl spaces, chases, tunnels, attics and service vaults
Example
Impact of New Definition

• New Section 7.13 for Normally Unoccupied Building Service Equipment Support Areas
  – Unless prohibited by Chapters 11 to 43
  – Areas less than 45,000 sq ft non-sprinklered and 90,000 sq ft sprinklered buildings have little change
Unoccupied Areas

• Larger areas will have:
  – Head room 6 feet 8 inches minimum
  – Width 28 inches minimum
  – Exit signage required
  – Exit lighting required
  – Minimum 2 exits from the space
Definition Clarification

• Contiguous facilities
  – Ambulatory care facilities, medical clinics, and similar facilities that are contiguous to healthcare occupancies shall be permitted to be used for diagnostic and treatment services of inpatients who are capable of self preservation 18.1.2.3.1 & 19.1.2.3.1
Clarification

• Building Heights in Table 18.1.6 must include total stories of the building. This includes non-healthcare above.
Suite Arrangement

- Travel distance within non-sleeping suites will be 100 ft (18.2.5.7.3.4 and 19.2.5.7.3.4); NO reduction for multiple room or intervening rooms.
Suite Arrangement

• One of the exit accesses from suites may be directly to:
  – Exit stair
  – Exit passageway or
  – Exit door to the exterior

• One must be to the corridor (18.2.5.7.2.1 & 19.2.5.7.2.1)
Suite Arrangement

• Suite sizes increase:
  – 7,500 sq ft maximum sleeping
  – 10,000 sq ft maximum sleeping with direct supervision and smoke detection

(18.2.5.7.2.3 & 19.2.5.7.2.3)
Exiting

• Marking of Exits
  – Exits signs NOT required for secured gates
  – Exits signs NOT required within rooms or sleeping suites where staff is responsible for relocating or evacuating occupants
Exiting

- New Section 7.14 Elevators as a means of egress or prior to Phase 1 elevator recall
Exiting

- Roller Latches are still prohibited
- New allowance to use roller latches in acute psychiatric settings
  - 5 lb. pull minimum
  - Fully sprinklered buildings only
Exiting - Corridor Clutter
Corridor Clutter
Exiting - Corridor Clutter

• 18.2.3.4 & 19.2.3.4 added allowances in 8 foot corridors:
  – Wheeled mobile equipment can reduce the corridor to not less than 5 feet
  – Fire plan and training to relocate mobile equipment
Exiting - Corridor Clutter

• Mobile equipment is limited to:
  – Equipment in use and carts in use
  – Medical emergency equipment not in use
  – Patient lifts and transport equipment
Exiting - Corridor Clutter

• 8 foot corridor shall be permitted to have fixed furniture provided:
  – Furniture is secured to the floor or wall
  – Corridor width not less than 6 feet
  – Area of furniture is less than 50 sq ft
  – Furniture grouping is separated by 10 feet
Exiting - Corridor Clutter

- Fixed furniture does not block access to building services or fire protection equipment
- Direct supervision of the staff or corridor smoke detection
Special Hazards and Clarifications

• Atrium wall separations cannot be used as an occupancy separation.
• Alcohol Based Hand Rubs (ABHR) are now allowed for use by all occupancies.
• Alcohol in ABHR cannot exceed 95% by volume.
Special Hazards and Clarifications

- Corridor wall construction forms a barrier to limit the passage of smoke.
  - A new Annex note was added to state the wall IS NOT a smoke barrier or smoke partition.
Special Hazards and Clarifications

- Automatic sprinklers can be omitted in hospital only patient closets less than 6 sq ft
Special Hazards and Clarifications

- Home Type settings
Special Hazards and Clarifications

- Domestic Cooking for 30 or fewer will be allowed open to the corridor provided:
  - Cook top has a suppression system, grease collection, and 500 cfm minimum exhaust
  - Interlocks to shut down fuel and electrical power
  - Area provided with smoke alarms
  - Smoke zone limited to 30 beds
Special Hazards and Clarifications

• Domestic cooking (continued):
  – No solid fuel
  – No deep fat frying
  – A locked switch to deactivate the cook top
  – Timer to deactivate cook top in 120 minutes or less
  – Fire extinguishers

• Cook tops can be in a separate room
Special Hazards and Clarifications
Special Hazards and Clarifications

• Direct vent gas fireplaces are permitted open to the corridor.
  – Not allowed in patient rooms
  – Smoke zone sprinklered
  – Controls are restricted access or locked
  – Carbon Monoxide monitors are required
Special Hazards and Clarifications

• Solid Fuel fireplaces shall be permitted in other than patient sleeping areas provided:
  – 1 hour separation to sleeping areas
  – Complies with 9.2.2
  – Enclosure temperature rated
  – CO monitoring
  – AHJ approval for locked enclosure or other safety issues
How and When Do we Use this New Code?

• CMS is the key
  – Notice for rule change was posted in Oct of 2011
  – Close for public comments was in Dec 2011
  – Impact study required
  – Act of congress needed to adopt
  – Earliest adoption 2014

• Waivers and Equivalencies
CMS - S & C Letters

• March 2012 allows waivers for:
  – Corridor clutter (5 feet clear)
  – Fixed furniture
  – Direct vent fireplaces
  – Cooking surfaces open to the corridor.
  – Decorations on the corridor walls.
CMS - S & C Letters

• August 30, 2013
  – Med gas alarms
  – Openings in Exit Enclosures
  – Emergency Generators & Standby Power Systems
  – Doors
  – Suites
  – Extinguishing Requirements
  – Clean Waste & Patient Record Recycling Containers
CMS - S & C Letters

- Waivers can be prepared in advance.
- Both letters allow major changes in 2012 to be used.
- The Joint Commission requests the waivers be recorded on the eBBI in the notes.
Thank You! & Questions?

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