“Lunch & Learn”
2015 Webinar Series

NFPA 99
RISK ASSESSMENTS

Presented By:
Bill Lauzon
Heather Werner

Lauzon Life Safety Consulting, LLC
262-945-4567
Lauzon.LSC@gmail.com

August, 2015
NFPA 99
RISK ASSESSMENTS

Lauzon Life Safety Consulting, LLC
262-945-4567
Lauzon.LSC@gmail.com
CURRENTLY USE NFPA 99 1999 EDITION

BIGGEST IMPACT:
• NEW HOSPITALS
IF 2012 LSC GETS ADOPTED:
IF 2012 LSC GETS ADOPTED:

MAY APPLY TO ALL HOSPITALS & NURSING HOMES
Requirements Change From:

Occupancy-Based

to

Risk-Based
Requirements Change From:

**Occupancy-Based**

to

**Risk-Based**

“You DO IT if the space is health care, regardless if there is a need”
TOTALLY RE-WRITTEN

Requirements Change From:

**Occupancy-Based**

to

**Risk-Based**

"You DO IT if the space is health care, regardless** IF there is a need"
In other words:

**You** get to evaluate which requirements apply to your situation.
REORGANIZED CHAPTERS
<table>
<thead>
<tr>
<th>Re-Organized Chapters</th>
<th>1999</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 – Electrical Sys</td>
<td>4 – Risk Assessment</td>
<td></td>
</tr>
<tr>
<td>4 – Gas &amp; Vacuum</td>
<td>5 – Gas &amp; Vacuum</td>
<td></td>
</tr>
<tr>
<td>5 – Envir</td>
<td>6 – Electrical Sys</td>
<td></td>
</tr>
<tr>
<td>6 – Materials</td>
<td>7 – Info Technology</td>
<td></td>
</tr>
<tr>
<td>7 – Elec Equipment</td>
<td>8 – Plumbing</td>
<td></td>
</tr>
<tr>
<td>8 – Gas Equipment</td>
<td>9 – HVAC</td>
<td></td>
</tr>
<tr>
<td>9 – Mfr Requirements</td>
<td>10 – Elec Equipment</td>
<td></td>
</tr>
<tr>
<td>10 – Laboratories</td>
<td>11 – Gas Equipment</td>
<td></td>
</tr>
<tr>
<td>11 – Emergency Prep</td>
<td>12 – Emergency Mgmt</td>
<td></td>
</tr>
<tr>
<td>12 – Hospital</td>
<td>13 – Security Mgmt</td>
<td></td>
</tr>
<tr>
<td>13 – Other Health</td>
<td>14 – Hyperbaric</td>
<td></td>
</tr>
<tr>
<td>16 – Nursing Home</td>
<td>15 – Features of Fire Prot</td>
<td></td>
</tr>
<tr>
<td>17 – Limited Care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 – Home Care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19 - Hyperbaric</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td>2012</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>------</td>
<td></td>
</tr>
<tr>
<td>3 – Electrical Sys</td>
<td>4 – Risk Assessment</td>
<td></td>
</tr>
<tr>
<td>4 – Gas &amp; Vacuum</td>
<td>5 – Gas &amp; Vacuum</td>
<td></td>
</tr>
<tr>
<td>5 – Envir</td>
<td>6 – Electrical Sys</td>
<td></td>
</tr>
<tr>
<td>6 – Materials</td>
<td>7 – Info Technology</td>
<td></td>
</tr>
<tr>
<td>7 – Elec Equipment</td>
<td>8 – Plumbing</td>
<td></td>
</tr>
<tr>
<td>8 – Gas Equipment</td>
<td>9 – HVAC</td>
<td></td>
</tr>
<tr>
<td>9 – Mfr Requirements</td>
<td>10 – Elec Equipment</td>
<td></td>
</tr>
<tr>
<td>10 – Laboratories</td>
<td>11 – Gas Equipment</td>
<td></td>
</tr>
<tr>
<td>11 – Emergency Prep</td>
<td>12 – Emergency Mgmt</td>
<td></td>
</tr>
<tr>
<td>12 – Hospital</td>
<td>13 – Security Mgmt</td>
<td></td>
</tr>
<tr>
<td>13 – Other Health</td>
<td>14 – Hyperbaric</td>
<td></td>
</tr>
<tr>
<td>16 – Nursing Home</td>
<td>15 – Features of Fire Prot</td>
<td></td>
</tr>
<tr>
<td>17 – Limited Care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 – Home Care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19 - Hyperbaric</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
New

1999

3 - Electrical Sys
4 - Gas & Vacuum
5 - Envir
6 - Materials
7 - Elec Equipment
8 - Gas Equipment
9 - Mfr Requirements
10 - Laboratories
11 - Emergency Prep
12 - Hospital
13 - Other Health
16 - Nursing Home
17 - Limited Care
18 - Home Care
19 - Hyperbaric

2012

4 - Risk Assessment
5 - Gas & Vacuum
6 - Electrical Sys
7 - Info Technology
8 - Plumbing
9 - HVAC
10 - Elec Equipment
11 - Gas Equipment
12 - Emergency Mgmt
13 - Security Mgmt
14 - Hyperbaric
15 - Features of Fire Prot
6 Re-Arranged

1999
3 - Electrical Sys
4 - Gas & Vacuum
5 - Envir
6 - Materials
7 - Elec Equipment
8 - Gas Equipment
9 - Mfr Requirements
10 - Laboratories
11 - Emergency Prep
12 - Hospital
13 - Other Health
16 - Nursing Home
17 - Limited Care
18 - Home Care
19 - Hyperbaric

2012
4 - Risk Assessment
5 - Gas & Vacuum
6 - Electrical Sys
7 - Info Technology
8 - Plumbing
9 - HVAC
10 - Elec Equipment
11 - Gas Equipment
12 - Emergency Mgmt
13 - Security Mgmt
14 - Hyperbaric
15 - Features of Fire Prot
HIGHLY RECOMMENDED

Buy the Handbook

Explanations of the many changes

- Expert insights
- Descriptive photos
- Helpful tables & charts

More expensive, but well worth it
NFPA Members: 10% discount

$70.50 – Book or PDF

$151 – Book or PDF
BOOK
- Easy to flip to referenced sections
- Can copy & show others

PDF
- Easy to search for topics

NFPA Free Access
- Free
- Non-searchable
- Non-copiable
- Non-flippable
TODAY’S FOCUS

Chapter 4

Risk Assessment

NFP A 99
2012 Edition
HEALTH CARE FACILITIES CODE
Including all Gas & Vacuum System Requirements
RISK ASSESSMENT

It guides the use of the other chapters

Not: IT, Emerg & Security Mgmt, Fire Protection
4.1 – Building Systems Categories

Consider equipment operation **NOT** Intervention by people

- **1** High Patient Impact
- **2** Minor Patient Impact
- **3** Slight Patient Impact
- **4** No Patient Impact
4.1 – Building Systems Categories

Consider equipment operation NOT intervention by people

SEVERITY OF FAILURE

• Harm to Patients
• Harm to Staff & Visitors

RELIABILITY

• Importance of redundancy
• Probability of system failure
• Levels of sedation
• Complexity of treatment
4.1 – Building Systems Categories

Consider worst-outcome scenario of a failure impact

**Factor A - HARM to PATIENTS**

- Major/Death
- Minor
- Discomfort
- No Harm

**Factor B - RELIABILITY EXPECTED**

- Always Available
- Highly Reliable
- Normally Reliable
- No Impact on Pt Care
### 4.1 – Building Systems Categories

Evaluate **effect of failure**, Based on harm to patients, staff & visitors

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Failure may cause death or serious injury</td>
</tr>
<tr>
<td>2</td>
<td>Failure limited to minor injuries</td>
</tr>
<tr>
<td>3</td>
<td>Failure may cause discomfort</td>
</tr>
<tr>
<td>4</td>
<td>No impact on patients or caregivers</td>
</tr>
</tbody>
</table>
4.1 – Building Systems Categories

Evaluate potential for failure, Based on system reliability

1. System must always work (life support)
2. High Reliability Expected
3. Normal Reliability Needed
4. No Impact on Patient Care
Category 1

Failure likely to cause major injury/death

Major injury

1. Any amputation
2. Loss of sight, or injury to eye
3. Unconsciousness that requires resuscitation, medical treatment, or hospital admit
4. Acute illness from biological agents

1. Available at all times for life-support systems

System must always work (life support)
Category 1

Failure likely to cause major injury/death

1
Available at all times for life-support systems
System must always work (life support)

Examples of Failures
In this category

• Emergency power to OR's
• Medical gas system in ICU
• Ventilator-assisted procedure in a MOB
• Cardiac cauterization imaging equipment
Category 2

Failure likely to cause minor injury

Minor injury

- Not serious
- Not involving risk to life

2

Failure limited to minor injuries

High Reliability Expected
Category 2

Failure likely to cause minor injury

Examples of Failures
In this category

- Task or procedural lighting in patient rooms
- Potable water in the patient care areas

2

Failure limited to minor injuries

High Reliability Expected
Category 3

Failure not likely to cause injury, but may cause discomfort

Examples of Failures
In this category

- Heating system in southern US
- Humidity control in non-operating areas
- Dental drill
- Motorized bed adjustments
- Cooling tower makeup water in nw US
Category 4

Failure would have no impact on patient care

Examples of Failures
In this category

- Gray water lawn sprinkling
- Seasonal lighting systems
- Public address system
- Pneumatic tube systems
- Vacuum systems in a research area

3

Failure may cause discomfort

Normal Reliability Needed
RISK ASSESSMENT

Must follow & document according to a DEFINED risk assessment procedure

Examples:

ISO 31010 – Risk Assessment Techniques
NFPA 551 – Guide for Eval of Fire Risk Assessments
SEMI S10-0307E – Guidelines for Risk Assess & Eval

Other formal process

ASHE Risk Tool
Risk assessment is part of the core elements of risk management

- Communication and Consultation
- Context establishment
- Risk Assessment, includes:
  - Risk identification,
  - Risk analysis &
  - Risk evaluation
- Risk treatment
- Monitoring and review

Risk can be assessed at any level of a facility’s operations or goals.
There are 31 risk assessment techniques in Annex B of ISO/IEC 31010

- Brainstorming
- Full & semi-structured interviews
- Delphi method
- Checklist
- Preliminary hazard analysis
- Hazard & operability study
- Hazard analysis & critical cont pts
- Toxicity assessment
- Structured “What-If” technique
- Scenario analysis
- Business impact analysis
- Root cause analysis
- Failure mode & effects analysis
- Fault tree analysis
- Event tree analysis
- Cause & consequence analysis

- Cause & effect analysis
- Layer protection analysis
- Decision tree
- Human reliability analysis
- Bow tie analysis
- Reliability centered maintenance
- Sneek circuit analysis
- Markov analysis
- Monte Carlo simulation
- Bayesian statistics & Bayes nets
- FN curves
- Risk index
- Consequence/probability matrix
- Cost/benefit analysis
- Multi-criterial decision analysis

Amazon
$298
192 pages
softcover
There are 31 risk assessment techniques in Annex B of ISO/IEC 31010

- Brainstorming
- Full & semi-structured interviews
- Dephi method
- Checklist
- Preliminary hazard analysis
- Hazard & operability study
- Hazard analysis & critical cont pts
- Toxicity assessment
- Structured “What-If” technique
- Scenario analysis
- Business impact analysis
- Root cause analysis
- Failure mode & effects analysis
- Fault tree analysis
- Event tree analysis
- Cause & consequence analysis

- Cause & effect analysis
- Layer protection analysis
- Decision tree
- Human reliability analysis
- Bow tie analysis
- Reliability centered maintenance
- Sneek circuit analysis
- Markov analysis
- Monte Carlo simulation
- Bayesian statistics & Bayes nets
- FN curves
- Risk index
- Consequence/probability matrix
- Cost/benefit analysis
- Multi-criterial decision analysis
SEMI S10-0307E - RISK ASSESSMENT
SUPERSEDED BY SEMI S10-0215

SEMI: Semi-Conductor Equipment & Materials International

$300 at SEMI online download
ASHE- RISK ASSESSMENT

INSTRUCTIONS & 3 WORKSHEETS

Free download of Excel Spreadsheet to ASHE members
NFPA 99-2012 Risk Assessment Tool

Instructions for Using the ASHE NFPA 99 Risk Assessment Tool

Prior to implementing this risk assessment tool, the following steps should be taken:

1. Establish a multidisciplinary team with knowledge of the facility’s space use, patient care services, clinical practices, and other areas as appropriate.
2. Familiarize the team with the risk category definitions found in chapters 4 (Fundamentals) and 12 (Emergency Management) of NFPA 99-2012: Health Care Facilities Code. These definitions are included in the category legends on each worksheet; mouse over the "Category Legends" box to see them.
3. Familiarize the team with the ways in which system and equipment operate.

This risk assessment tool contains three worksheets (Systems, Equipment, and Area) on the worksheet tabs below.

Systems Worksheet - This worksheet is used to record the level of risk determined for the listed systems in a given area (room or spaces within a room) of the facility being evaluated. Indicate the risk level with an NFPA 99 risk category number (see the Category Legend for details).

Room Name: Enter the unique identification information for the room being evaluated (i.e., room name or number).
Room Number: Enter the room number, if applicable.
Space: Enter the unique identification information for the space in a room that is being evaluated (e.g., the charting area in a recovery area).
Chapter 5: Enter the risk category for the various components of the medical gas and vacuum systems in the room or space being evaluated.
Chapter 6: Enter the risk category for the electrical system in the room or space being evaluated.
Chapter 7: Enter the risk category for the various components of the IT and communications systems in the room or space being evaluated.
Chapter 8: Enter the risk category for the various components of the plumbing systems in the room or space being evaluated.
Chapter 9: Enter the risk category for the various components of the HVAC systems in the room or space being evaluated.
Chapter 10: Indicated on this worksheet for information only - to be assessed on the Equipment worksheet.
Chapter 12: Indicated on this worksheet for information only - to be assessed on the Emergency Management Note: Categories assigned in the chapter columns listed above are based on categories as outlined in Chapter 4 of NFPA 99-2012.

"Instructions" explains how to use the 3 worksheets
1. “Systems “worksheet is used to enter & record the Risk Category # for the various systems within a given space.
2. “Equipment” worksheet is used to enter & record the Risk Category # for facility equipment
3. “Emergency Mgmt” worksheet used to enter & record the Risk Assessment for buildings
**ASHE- HAZARD VULNERABILITY ANALYSIS**

Similar to H-V Tool of 2014

<table>
<thead>
<tr>
<th>Component</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Threat</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health/Safety</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical Power and ITSS Assessment: Electrical Infrastructure</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Preparedness Codes</th>
<th>Mitigation Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Additional Capacity Required</td>
<td>C Change in Process Required</td>
</tr>
<tr>
<td>E Emergency Equipment Required</td>
<td>I Infrastructure Repair/Upgrade Required</td>
</tr>
<tr>
<td>R Identify Additional Resources</td>
<td>P Policy &amp; Procedure Required</td>
</tr>
<tr>
<td>T Training Required</td>
<td></td>
</tr>
</tbody>
</table>
Hospitals need to do risk assessments **NOW** for compliance with:

- EC.02.01.01 EP 1 – Identify Risks
- EC.02.01.01 EP 3 – Take Action
ASHE- RISK ASSESSMENT

Let’s take another look at the ASHE spreadsheet.
**ASHE- RISK ASSESSMENT**

**Step 1** - List EVERY room & space in the facility.
Step 2 - Evaluate & document the risk for EACH utility system
ASHE- RISK ASSESSMENT

1. Grab a floor plan
2. Methodically list every room
### ASHE - RISK ASSESSMENT

#### Systems Risk Assessment Tool

<table>
<thead>
<tr>
<th>Room Name</th>
<th>Room #</th>
<th>Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Room</td>
<td>2382</td>
<td></td>
</tr>
<tr>
<td>Patient Room</td>
<td>2380</td>
<td></td>
</tr>
<tr>
<td>Patient Room</td>
<td>2355</td>
<td></td>
</tr>
<tr>
<td>Patient Room</td>
<td>2352</td>
<td></td>
</tr>
<tr>
<td>Patient Room</td>
<td>2350</td>
<td></td>
</tr>
<tr>
<td>Patient Room</td>
<td>2348</td>
<td></td>
</tr>
<tr>
<td>Patient Room</td>
<td>2343</td>
<td></td>
</tr>
<tr>
<td>Pharmacy Office</td>
<td>2401</td>
<td></td>
</tr>
<tr>
<td>Pharmacy Process</td>
<td>2408</td>
<td></td>
</tr>
<tr>
<td>Pharmacy Storage</td>
<td>2407</td>
<td></td>
</tr>
<tr>
<td>Pharmacy Mixing</td>
<td>2402</td>
<td></td>
</tr>
<tr>
<td>Patient Room</td>
<td>2368</td>
<td></td>
</tr>
<tr>
<td>Patient Room</td>
<td>2370</td>
<td></td>
</tr>
<tr>
<td>Patient Room</td>
<td>2372</td>
<td></td>
</tr>
<tr>
<td>Patient Room</td>
<td>2375</td>
<td></td>
</tr>
</tbody>
</table>

**List every room**
### 3. Methodically evaluate the risk (1-4) for EVERY Utility in every room

<table>
<thead>
<tr>
<th>Room Name</th>
<th>Room #</th>
<th>Space</th>
<th>Oxygen</th>
<th>Medical Air</th>
<th>Vacuum</th>
<th>WADG</th>
<th>Electrical</th>
<th>Data</th>
<th>Nurse Call</th>
<th>Cable TV</th>
<th>Patient Wa</th>
<th>Non-Patient Wa</th>
<th>Water Heat</th>
<th>Water Cont</th>
<th>Water Medic</th>
<th>Black Wa</th>
<th>Gray Waste</th>
<th>Clear Waste</th>
<th>Heating</th>
<th>Ventilation</th>
<th>Air Conditioning</th>
<th>Equipment (See Equipment tab)</th>
<th>Emergency Management (See Emergency Management tab)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Room</td>
<td>2382</td>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Patient Room</td>
<td>2380</td>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Patient Room</td>
<td>2355</td>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Patient Room</td>
<td>2352</td>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Patient Room</td>
<td>2350</td>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Patient Room</td>
<td>2348</td>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Patient Room</td>
<td>2343</td>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Pharmacy Office</td>
<td>2401</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Pharmacy Process</td>
<td>2408</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Pharmacy Storage</td>
<td>2407</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Pharmacy Mixing</td>
<td>2402</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Patient Room</td>
<td>2368</td>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Patient Room</td>
<td>2370</td>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Patient Room</td>
<td>2372</td>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Patient Room</td>
<td>2375</td>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
ASHE Form is missing documentation of HOW you figured the Risk Categories ...

1. Evaluation of patient impact
2. Evaluation of system reliability
Changes from the ASHE form:
Switched H & V to fit on a letter sheet
LLSC- RISK ASSESSMENT

Added lines to document the “harm” & “reliability” evaluations
**LLSC - RISK ASSESSMENT**

ENTER THE # OF EVALUATED RISK TO PATIENT FOR HARM & RELIABILITY FOR EACH ROOM

|-------------------------|---------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|

Excel file available via e-mail request to: Lauzon.LSC@gmail.com
NFPA 99 - RISK ASSESSMENT

Develop a uniform Risk Assessment process

Best to coordinate with:

- Quality Improvement
- Infection Prevention
- Environment of Care

They usually have experience in risk assessments
WHAT do you do with this jumble of numbers?
Now let’s Apply the Risk Categories To the NFPA 99 Chapters

1. **High** Patient Impact
2. **Minor** Patient Impact
3. **Slight** Patient Impact
4. **No** Patient Impact
Applying the Risk Categories

5 – Gas & Vacuum
6 – Electrical Sys
7 – Info Technology
8 – Plumbing
9 – HVAC
10 – Elec Equipment
11 – Gas Equipment
12 – Emergency Mgmt
13 – Security Mgmt
14 – Hyperbaric
15 – Features of Fire Prot
Organized by Risk Category requirements

(not retroactive, except for operation & management requirements)
## NFPA 99 - CHAPTER 5
### GAS & VACUUM SYSTEMS

<table>
<thead>
<tr>
<th>Topic</th>
<th>Category 1 Systems</th>
<th>Category 2 Systems</th>
<th>Category 3 Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicability</td>
<td>5.1.1</td>
<td>5.2.1</td>
<td>5.3.1</td>
</tr>
<tr>
<td>Nature of Hazards</td>
<td>5.1.2</td>
<td>5.2.2</td>
<td>5.3.2</td>
</tr>
<tr>
<td>Sources</td>
<td>5.1.3</td>
<td>5.2.3</td>
<td>5.3.6.21/5.3.7</td>
</tr>
<tr>
<td>Valves</td>
<td>5.1.4</td>
<td>5.2.4</td>
<td>5.3.6.19</td>
</tr>
<tr>
<td>Station Outlet/Inlets</td>
<td>5.1.5</td>
<td>5.2.5</td>
<td>5.3.6.18</td>
</tr>
<tr>
<td>Manufactured Assemblies</td>
<td>5.1.6</td>
<td>5.2.6</td>
<td>NA</td>
</tr>
<tr>
<td>Surface-Mounted Medical Gas Rails (MGR)</td>
<td>5.1.7</td>
<td>5.2.7</td>
<td>NA</td>
</tr>
<tr>
<td>Pressure and Vacuum Indicators</td>
<td>5.1.8</td>
<td>5.2.8</td>
<td>NA</td>
</tr>
<tr>
<td>Warning Systems</td>
<td>5.1.9</td>
<td>5.2.9</td>
<td>5.3.6.22</td>
</tr>
<tr>
<td>Distribution</td>
<td>5.1.10</td>
<td>5.2.10</td>
<td>5.3.7/5.3.8</td>
</tr>
<tr>
<td>Labeling and Identification</td>
<td>5.1.11</td>
<td>5.2.11</td>
<td>5.3.11</td>
</tr>
<tr>
<td>Performance Criteria and Testing — Gases, Medical—Surgical Vacuum, and WAGD</td>
<td>5.1.12</td>
<td>5.2.12</td>
<td>5.3.6.23/5.3.9</td>
</tr>
<tr>
<td>Operation and Management</td>
<td>5.1.14</td>
<td>5.2.13</td>
<td>5.3.13</td>
</tr>
</tbody>
</table>
New Risk Categories are similar to the former
Level 1
Level 2
Level 3
Under the 1999 edition hospitals had to follow this:

- Level 1 Hospital
- Level 2 Hospital ASC
- Level 3 Dental

Under the 2012 edition HEALTH CARE FACILITIES can do any of these (depending on the patient risk):

- High Patient Impact
- Minor Patient Impact
- Slight Patient Impact
- No Patient Impact
## NFPA 99 – CHAPTER 5
### GAS & VACUUM SYSTEMS

### 5.X.14 - MAINTENANCE

<table>
<thead>
<tr>
<th>Patient Impact</th>
<th>5.1</th>
<th>5.2</th>
<th>5.3</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Inventory includes all sources, control valves, alarms &amp; mfr assemblies.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor</td>
<td>Must have scheduled inspections based on risk assessment &amp; OEM recommendations (minimum annual). Very prescriptive lists of what must be included.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slight</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>Maintainers must be qualified by training or credentialing.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: NA indicates Not Applicable.*
NFPA 99 – CHAPTER 6
ELECTRICAL SYSTEMS

Not organized by Risk Categories

Similar to 1999 standard

Still organized by the “Type” of EES

Code lists which sections are retroactive, such as GFI, # receptacles, OR wet locations
BIG change: ORs are now a “wet” environment by default

Unless a Risk Assessment determines otherwise

6.3.2.2.8.4 (not retroactive)
Low-voltage voice, data, communications & biomed systems

NURSE CALL is now regulated!

(Code does not say chapter is not retroactive, so many inspectors may apply it to existing)
### NFPA 99 - CHAPTER 7
### INFO TECHNOLOGY SYSTEMS

<table>
<thead>
<tr>
<th>Patient Impact</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>7.3</td>
</tr>
<tr>
<td>Minor</td>
<td>7.4</td>
</tr>
<tr>
<td>Slight</td>
<td>7.5</td>
</tr>
<tr>
<td>No</td>
<td>NA</td>
</tr>
</tbody>
</table>

75% of the Chapter deals with Risk Category 1.
7.3.1 – Infrastructure
- Building Entrance
- Data Center
- Telecom Equip Rm
- Power Requirements
- Pathways

1 High Patient Impact

7.3.2 – Systems
No requirements
(reserved for future code development)

7.3.3 – Nurse Call
- Patient Call
- Emergency Call
- Staff Assist Call
- Emergency Resuscitation
- (many other sys reserved for future code development)
NFPA 99 – CHAPTER 8
PLUMBING SYSTEMS

NEW Chapter
(very short)

- Potable Water
- Nonpotable Water
- Special Use Water
- Grease Interceptors
- Black Waste Water
- Gray Waste Water
- Clear Waste Water
- Fuel

- Non-med Compressed Air
- Water Conditioning
- Water Heating

(not retroactive)
8.2 For each plumbing component system, the facility must designate risk category for each building space.

8.2.1 The risk category of each plumbing system shall be independent of the category applied to other systems that serve the same space.
### NFPA 99 - CHAPTER 8
### PLUMBING SYSTEMS

#### Sample Table

<table>
<thead>
<tr>
<th>Function</th>
<th>Potable</th>
<th>Nonpotable</th>
<th>Special Use</th>
<th>Water Conditioning</th>
<th>Water Heating</th>
<th>Process Air</th>
<th>Fuel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airborne infection isolation room</td>
<td>2</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>3</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Burn patient care rooms</td>
<td>2</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>3</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Business offices/administration</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Central sterile room</td>
<td>2</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>3</td>
<td>2</td>
<td>NA</td>
</tr>
<tr>
<td>Class A surgical procedures</td>
<td>2</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>3</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Class B surgical procedures</td>
<td>2</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>3</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Class C surgical procedures</td>
<td>2</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>3</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Critical care rooms (Category 1 room)</td>
<td>2</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>3</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Emergency department trauma room</td>
<td>2</td>
<td>NA</td>
<td>2</td>
<td>NA</td>
<td>3</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Hemodialysis</td>
<td>2</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>3</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Intensive care</td>
<td>2</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>3</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Medical records</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Morgue</td>
<td>2</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>3</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>PACU</td>
<td>2</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>3</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Patient education</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>2</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>3</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Protective environment room</td>
<td>2</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>3</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Radiology</td>
<td>2</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>3</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Speech therapy</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Waiting rooms</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

NA: Not applicable

Note: This is a sample table. The numbers represented in this table might not be consistent with the health care facility scenario.
NFPA 99 - CHAPTER 9
HVAC SYSTEMS

NEW Chapter (short)

- Heating
- Cooling
- Ventilation
- Process

(not retroactive)
9.2 For each HVAC component system, the facility must designate risk category for each building space.

9.2.1 The risk category of each HVAC system shall be independent of the category applied to other systems that serve the same space.
<table>
<thead>
<tr>
<th>Function</th>
<th>Heating</th>
<th>Cooling</th>
<th>Ventilating</th>
<th>Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airborne infection isolation room</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>NA</td>
</tr>
<tr>
<td>Ambulance garage</td>
<td>NA</td>
<td>NA</td>
<td>3</td>
<td>NA</td>
</tr>
<tr>
<td>Biomedical waste holding</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Bone marrow transplants</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>NA</td>
</tr>
<tr>
<td>Burn patient care rooms</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>NA</td>
</tr>
<tr>
<td>Business office/administration</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Central sterile room</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Class A surgical procedures</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Class B surgical procedures</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Class C surgical procedures</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Critical care rooms (Category 1 room)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Emergency department trauma room</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Intensive care</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Medical-gas storage room</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>NA</td>
</tr>
<tr>
<td>Medical records</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Morgue</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>NA</td>
</tr>
<tr>
<td>Occupation therapy</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Oxygen transfilling</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>NA</td>
</tr>
<tr>
<td>PACU</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Patient education</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Physical therapy</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Protective environment room</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>NA</td>
</tr>
<tr>
<td>Radiology</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Speech therapy</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Waiting rooms</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>
NFPA 99 – CHAPTER 9
HVAC SYSTEMS

ADOPTED BY REFERENCE

- **ASHRAE 170** for spaces listed in that std
- **ASHRAE 90.1** for energy & commissioning
- NFPA 90A for ductwork
- NFPA 55 for transfiling
- NFPA 110 for emergency power room
NFPA 99 - CHAPTER 10
ELECTRICAL EQUIPMENT

Not organized by Risk Categories

Similar to 1999 standard

Primarily on TESTING
• Patient-Care related equip
• Non-Patient equipment
• Laboratory equipment

(retroactive)
NFPA 99 - CHAPTER 11
GAS EQUIPMENT

Not organized by Risk Categories

Similar to 1999 standard

- Cylinder Requirements
- Cylinder Storage
- Gas Equipment Testing
- Transfilling & Liquid Oxygen
- Testing Requirements

(retroactive)
ARE YOU READY?

(Get started now)
NFPA 99
RISK ASSESSMENTS

Lauzon Life Safety Consulting, LLC
262-945-4567
Lauzon.LSC@gmail.com