Surgical Fire Safety & Compliance
Leadership: Nationally Recognized Experts

150 committees in code and standard making organizations

- American Health Care Association (AHCA) Life Safety Committee
- ASPR SME Cadre for Emergency Preparedness (TRACIE)
- International Association for Emergency Managers (IAEM)
- International Code Council (ICC)
- Joint Commission Collaborative – Prevent Surgical Fires
- LeadingAge Life Safety and Emergency Preparedness Consultant
- National Fire Protection Association (NFPA)
Research: Volunteer to Review National Fires & Disasters

- Tropical Storms and Hurricanes
- Multiple Patient Fatality Fires
- Wildfires (including 2018 CA Campfire)
- Healthcare Evacuations
Application

Specialty Fire Safety Programs
Procedure Design, Realistic Training, and Drills

Full Building Evacuation / Surge Planning
Plan Customization, Training, and Disaster Exercises

Life Safety Assessments
Compliance, Drawings and Equivalencies
Discussion Topics

- What’s the problem
- Why is it a problem
- What are the requirements
- What are the best practices
Fires continue to occur

- FDA reports approximately 100 surgical fires in 2018
- Occurrences down from over 650 a few years back
Surgical Fire Safety - Why

+ Catastrophic to the Patient
+ Catastrophic to the Staff

Photo provided by NewsOn6.com
Catastrophic to the Organization

Botched surgery will cost hospital

WENATCHEE — A North Central Washington woman has been awarded a total of $30 million after laser surgery at Central Washington Hospital last year left her unable to speak.

Becky St. Anderson, 55, was in surgery and on a breathing tube in February 2012 when a fire occurred in her throat while she was having polyps removed from her vocal cords, according to the malpractice
FDA has Been Proactive

FDA issues guidance on how to prevent surgical fires

Highlighting a continuing problem facing health care organizations, the U.S. Food and Drug Administration (FDA) released guidance earlier this week on how health care professionals can reduce surgical fires. The FDA is working with The Joint Commission and other health care organizations to increase awareness of this issue.

According to the FDA, a surgical fire can occur at any time when three specific elements are present:

- An oxidizer, such as oxygen or nitrous oxide.
- An ignition source, such as electrosurgical units, electrocautery devices, lasers and fiber-optic illumination systems.
- A fuel source, such as surgical drapes, alcohol-based skin preparation agents, or the patient's tissue, hair, or skin.
The Joint Commission Has Been Proactive
Joint Commission Has Been Proactive

EC.02.03.01: Requires that organizations manage fire risks…requiring an organization to have a written fire response plan that describes the specific roles of staff and licensed independent practitioners at and away from a fire’s point of origin—including when and how to sound fire alarms, contain fire and smoke, use a fire extinguisher, and evacuate to safe areas.
NFPA Has Been Reactive
+ CMS K 933

+ TJC EC02.03.01
  - EP9
  - EP11
  - EP12
  - EP13
15.13 Fire Loss Prevention in Operating Rooms.
15.13.1 Hazard Assessment.
15.13.1.1 An evaluation shall be made of hazards that could be encountered during surgical procedures.
15.13.1.2 The evaluation shall include hazards associated with the properties of electricity, hazards associated with the operation of surgical equipment, and hazards associated with the nature of the environment.
15.13.1.3 Periodic reviews of surgical operations and procedures shall be conducted with special attention given to any change in materials, operations, or personnel.
Hazard / Risk Assessment
Example – Prep Solutions

- Alcohol: 100%
- Duraprep: 74%
- Prevail: 72%
- Chloraprep: 70%

**Betadine** - not flammable
### Pre-surgery Fire Risk Assessment

<table>
<thead>
<tr>
<th>Surgical Site Fire Risk Assessment Score</th>
<th>Y</th>
<th>N</th>
<th>Verified By:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airway Surgery (i.e., Tracheostomy, uvuloplasty, T&amp;A): extreme high risk for fire. □ Yes □ No</td>
<td></td>
<td></td>
<td>(Circulating RN Signature)</td>
</tr>
<tr>
<td>(Circle appropriate option)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>- Surgical site or incision above the Xiphoid</td>
<td>1</td>
<td>0</td>
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<tr>
<td>- Open Oxygen source (Patient receiving supplemental oxygen via any variety of face mask or nasal cannula)</td>
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<tr>
<td>- Available ignition source (i.e., electrosurgery unit, laser, fiber optic lightsource)</td>
<td>1</td>
<td>0</td>
<td></td>
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<tr>
<td>Scoring: 3=High Risk; 2=Low Risk w/ potential to convert to high risk; 1=Low Risk</td>
<td></td>
<td></td>
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<td>TOTAL SCORE:</td>
<td></td>
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**Print Name:**
15.13.2 Fire Prevention Procedures. Fire prevention procedures shall be established.
Surgical Fire Safety – NFPA 99, Chapter 15

Fire Prevention

Surgical Fires are Preventable
Fire Prevention Procedures Address

- Use of open delivery oxygen
- Use of electrosurgery and other heat devices
- Controlling fuel sources
- Ensuring alcohol-based prep solutions have time to dry
Oxidizer
**Oxidizer**

- Evaluate if supplemental oxygen is needed
- At concentrations of approximately 30 percent, a spark or heat can ignite a fuel source
- Titrate to the minimum concentration of oxygen needed to maintain adequate oxygen saturation for your patient
- When appropriate and possible, use a closed oxygen delivery system
- Implement draping techniques that avoid accumulation of oxygen in the surgical field
Ignition Sources

- Electrocautery
- Lasers
- Fiber optic light sources
- Drill/burrs
- Magnets
- Heated probes
Electrocautery

- Holster when not in use
- Communication for open oxygen delivery
- Activate / deactivate only at surgical site
Light Sources
- Do not lay on drapes
Lasers

- Eye protection
- Strong communication
- Put on “Standby” when not in use
15.13.3 Germicides and Antiseptics.

15.13.3.1 Medicaments and alcohol-based hand sanitizers, including those dispersed as aerosols, shall be permitted to be used in anesthetizing locations.

15.13.3.2 Flammable liquid germicides or antiseptics used in anesthetizing locations, whenever the use of electrosurgery, cautery, or a laser is contemplated, shall be packaged as follows:

1. In a nonflammable package
2. To ensure controlled delivery to the patient in unit dose applicators, swabs, and other similar applicators

15.13.3.3 Whenever the application of flammable liquid germicides or antiseptics is employed in surgeries where the use of electrosurgery, cautery, or a laser is contemplated, time shall be allowed to elapse between application of the germicide or antiseptic and the following:

1. Application of drapes, to allow complete evaporation and dissipation of any flammable vehicle remaining
2. Use of electrosurgery, cautery, or a laser, to ensure the solution is completely dry and to allow thorough evaporation and dissipation of any flammable vehicle remaining
Fuels
- Alcohol based prep solution

15.13.3.3 Whenever the application of flammable liquid germicides or antiseptics is employed in surgeries where the use of electrosurgery, cautery, or a laser is contemplated, time shall be allowed to elapse between application of the germicide or antiseptic and the following:

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## Surgical Fire Safety – NFPA 99, Chapter 15

### Perioperative Time-out

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**Scoring:**
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- 1 = Low Risk

**TOTAL SCORE:**
Clarification

Intended to refer to moving away from heat sources.

Clarified in the upcoming 2021 edition of NFPA 99 focusing on placing items in a non-combustible disposal unit.
15.13.3.9 Emergency Procedures.

15.13.3.9.1 Procedures for operating room/surgical suite emergencies shall be developed.

15.13.3.9.2 Procedures shall include alarm actuation, evacuation, and equipment shutdown procedures and provisions for control of emergencies that could occur in the operating room, including specific detailed plans for control operations by an emergency control group within the organization or a public fire department.

15.13.3.9.3 Emergency procedures shall be established for controlling chemical spills.

15.13.3.9.4 Emergency procedures shall be established for extinguishing drapery, clothing, or equipment fires.
Procedures
- Response
- Extinguishment
- Evacuation
Circulating Nurse

- Communicate outside the room / Page or Call
- Obtain ambu bag
- Assist anesthesia provider
- Help move OR table
- Clear path to door
- Ensure door is shut
Surgical Fire Safety Procedures

+ Scrub Position
  - Take Instruments to stabilize / close patient
  - Assist in moving OR table
Anesthesia Provider

- Disconnect equipment
- Shut down med gases
- Ventilate w/ ambu bag
- Unlock OR table
- Take drugs to maintain patient (as necessary)
- Ensure medical gases serving room are shut-off
Surgical Fire Safety Procedures

Surgeon

- Stabilize patient
- Protect surgical site
- Communicate when to evacuate
Extinguishment

- Shutting down oxygen
- Suppressing fires
- Roles and types of extinguishers
Surgical Fire Types

- In a Patient’s Airway
- In a Patient’s Oral Cavity
- Surgical Drapes
- On a Patient’s Surgical Site
- Equipment
Airway Fires

- Shut-down Oxygen
- Remove ET Tube & team member extinguishes
  - Remove cuff protecting devices
  - Check for residual in throat
- Treat the Patient
  - Consider saline in the throat
  - Re-establish airway (no burning)
  - Transition from room air to O2
  - Examine airway
Surgical Fire Safety – Extinguishment

**Oral Cavity Fires**

- Shut-down oxygen
- Squirt/pour saline into mouth (bulb syringe)
- Remove extinguished materials
- Disconnect circuit
- Extubate, if tube damaged
- Treat patient
Surgical Site Fires (on the patient)

- Shut-down oxygen
- Pour saline
- Remove drapes
- Search for additional flame
Drape Fires

- Shut-down oxygen
- Option A: Remove burning material to floor (if possible)
- Option B: Pour saline (note - fluid resistant drapes)
- Option C: Appropriate smother / sweeping technique
- Remove all drapes
Fire Extinguishers

- For electrical, drapes (on the floor), etc.
- Suppress with extinguisher
- Use as a last resort for fires involving a patient
Evacuation

- Stay or go
- Patient break-down
- Evacuation sites
Evacuation Challenges
Training / Drills

15.13.3.10 Orientation and Training.

15.13.3.10.1 New operating room/surgical suite personnel, including physicians and surgeons, shall be taught general safety practices for the area and specific safety practices for the equipment and procedures they will use.

15.13.3.10.2 Continuing safety education and supervision shall be provided, incidents shall be reviewed monthly, and procedures shall be reviewed annually.

15.13.3.10.3 Fire exit drills shall be conducted annually or more frequently as determined by the applicable building code, NFPA 101, Life Safety Code, or fire code.
Training & Drills
- Review incidents
- Review procedures
- Review equipment
- Practice break-down
- Simulate evacuation

Documentation
Summary – Key Compliance Components

- Risk / Hazard Assessment
  - Pre-surgery Risk Assessment
- Prevention Plan / Procedure
  - Perioperative Time-out (preps)
- Fire Procedure
  - Response, Extinguishment, Evacuation
- Training
- Annual Drill
Questions
Thank You

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