Surgical Fire Safety & Compliance

NEW YORK STATE HEALTHCARE FACILITIES CONFERENCE

RPA
A JENSEN HUGHES COMPANY

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)

NFPA® MEMBER

IAEM International Association of Emergency Managers

ICC INTERNATIONAL CODE COUNCIL®

Research: Volunteer to Review National Fires & Disasters

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

RPA
A JENSEN HUGHES COMPANY

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

Surgical Fire Safety

Discussion Topics

- What's the problem
- Why is it a problem
- What are the requirements
- What are the best practices

Surgical Fire Safety - Why

- 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 byNewsOn6.com

Surgical Fire Safety - Why

- 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 S. 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

Surgical Fire Safety

+ FDA has Been Proactive

Resources

January 01, 0001

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.

Surgical Fire Safety

- The Joint Commission Has Been Proactive

Topic Library Item

Sentinel Event Alert, Issue 29: Preventing surgical fires

June 24, 2003

Download This File

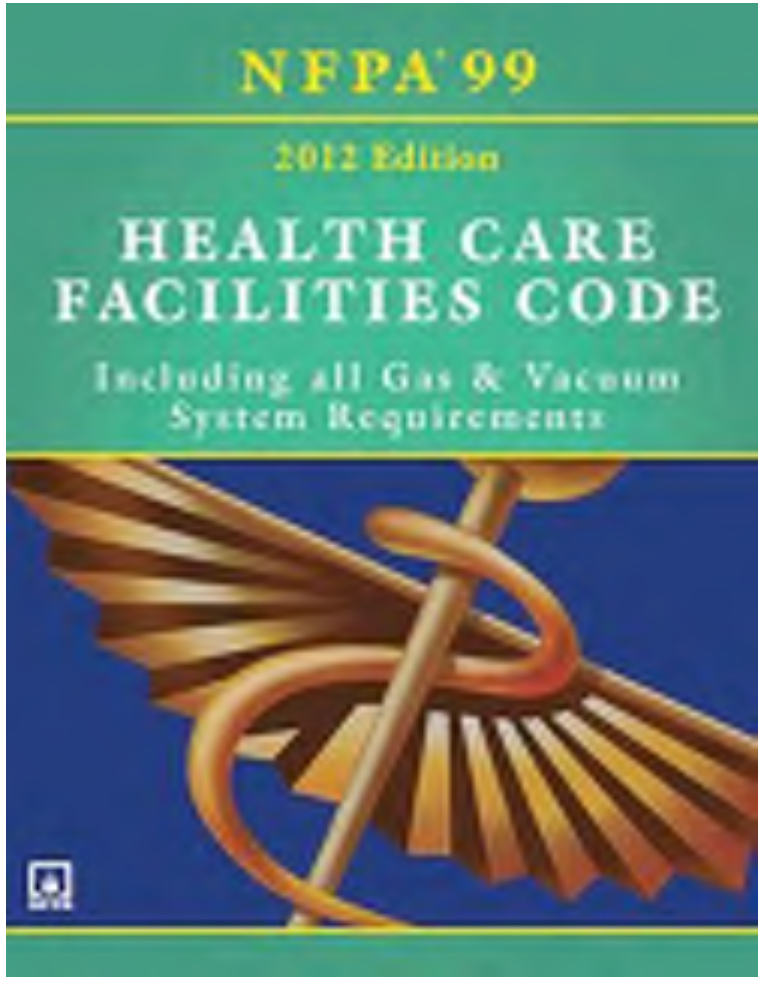
In the fire triangle—heat, fuel and oxygen—each element must be present for a fire to start. And, though the incidents are significantly under-reported, too often all three elements come together in a hospital's surgical suite, yielding disastrous consequences. Though they are considered rare occurrences in the health care environment, surgical* fires are certainly one of the most frightening and devastating experiences for everyone involved. While exact numbers are not available, of the more than 23 million inpatient surgeries and 27 million outpatient surgeries, performed each year, estimates—based on data from the Food and Drug Administration (FDA) and ECRI, an independent nonprofit health services research agency—indicate that there are approximately 100 surgical fires each year, resulting in up to 20 serious injuries and one or two patient deaths annually.

Surgical Fire Safety

+ 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



NFPA®

Surgical Fire Safety – NFPA 99, Chapter 15

- CMS K 933

- TJC EC02.03.01
  - EP9
  - EP11
  - EP12
  - EP13

Surgical Fire Safety – NFPA 99, Chapter 15

- Hazard Assessment

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.

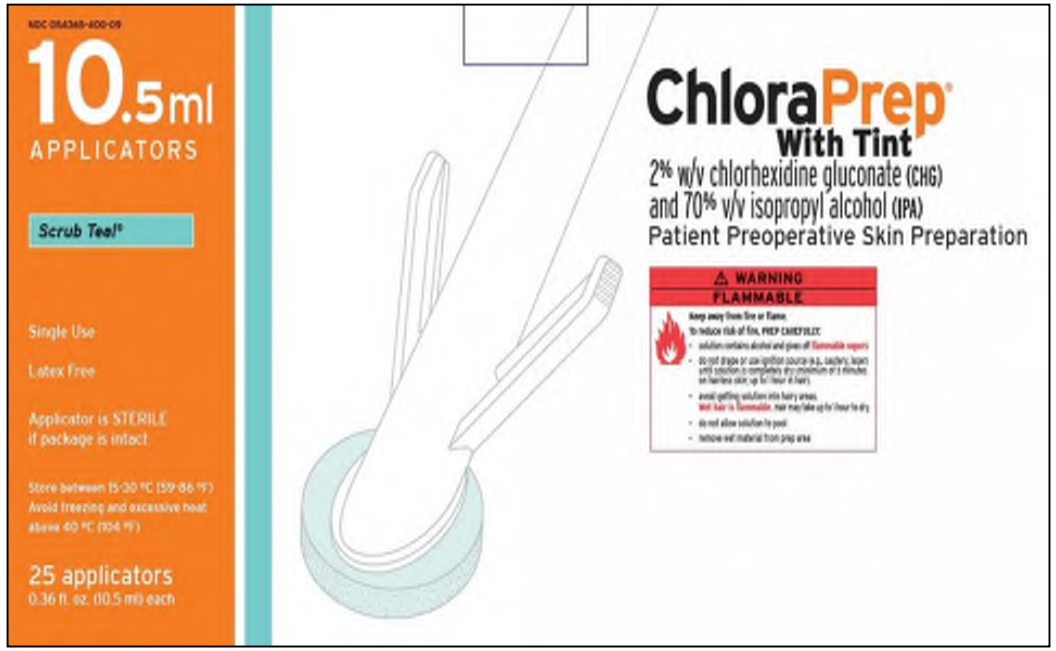
Surgical Fire Safety – NFPA 99, Chapter 15

- Hazard / Risk Assessment

Surgical Fire Safety – NFPA 99, Chapter 15

+ Example – Prep Solutions

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



Betadine -<u>not flammable</u>

Pre-surgery Fire Risk Assessment

SURGICAL SITE FIRE RISK ASSESSMENT SCORE			
Airway Surgery (i.e., Tracheostomy, uvuloplasty, T&A); extreme high risk for fire. ☐ Yes ☐ No	Alcohol based prep solution had sufficient time for fumes to dissipate. ☐ Yes ☐ No		
(Circle appropriate option)	Y	N	Verified By:
• Surgical site or incision above the Xiphoid	1	0	
• Open Oxygen source (Patient receiving supplemental oxygen via any variety of face mask or nasal cannula)	1	0	(Circulating RN Signature)
• Available ignition source (i.e., electrosurgery unit, laser, fiber optic lightsource)	1	0	Print Name:
Scoring: 3=High Risk; 2= Low Risk w/ potential to convert to high risk; 1= Low Risk	TOTAL SCORE:		

Surgical Fire Safety – NFPA 99, Chapter 15

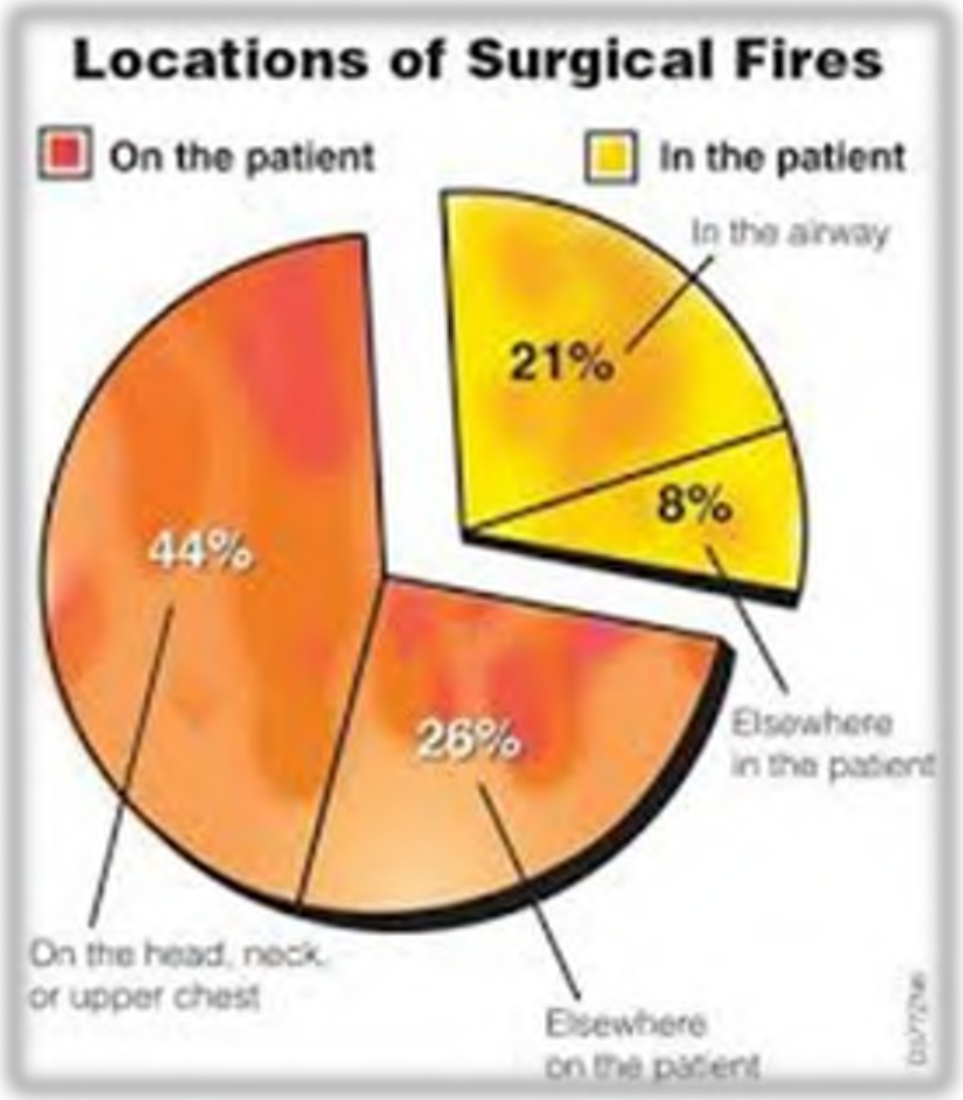
+ Fire Prevention

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



Surgical Fire Safety – NFPA 99, Chapter 15

- 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

Surgical Fire Safety – NFPA 99, Chapter 15

+ Oxidizer

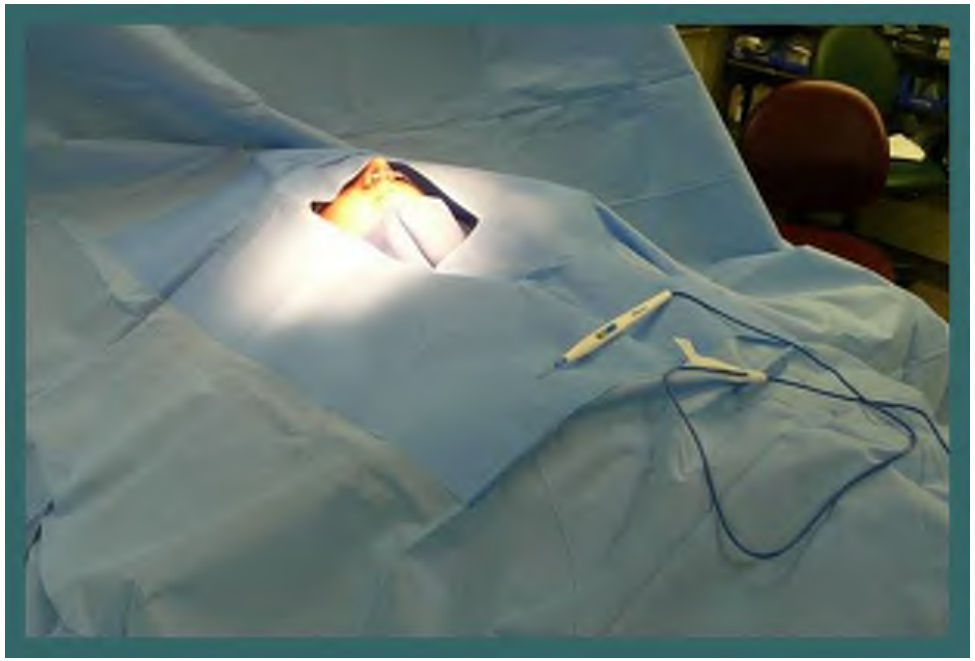
- Evaluate if supplemental oxygen is needed
- At concentrations of approximately 30 percent, a spark or heat can ignite a fuel source
- Titrate to the minimum concentration of oxygen needed to maintain adequate oxygen saturation for your patient
- When appropriate and possible, use a closed oxygen delivery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

Surgical Fire Safety – NFPA 99, Chapter 15

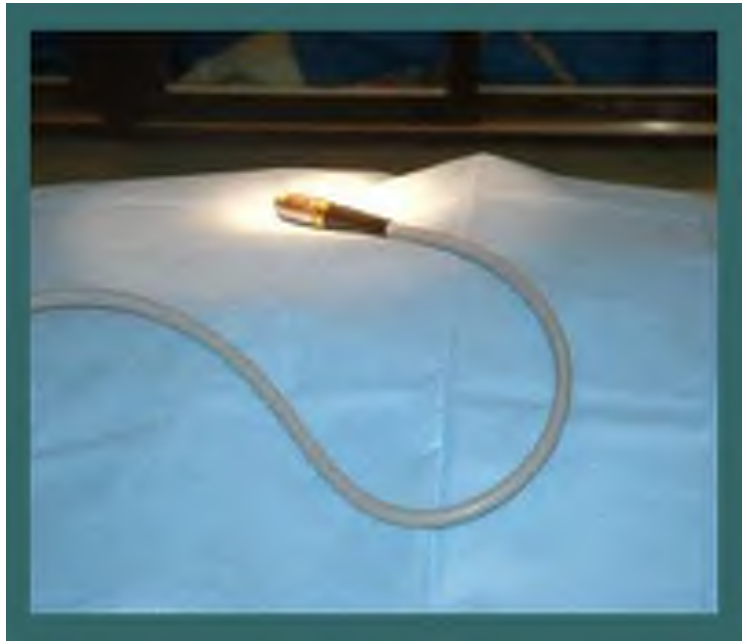
- Ignition Sources
  - Electrocautery
  - Lasers
  - Fiber optic light sources
  - Drill/burrs
  - Magnets
  - Heated probes

Surgical Fire Safety – NFPA 99, Chapter 15

- Electrocautery
  - Holster when not in use
  - Communication for open oxygen delivery
  - Activate / deactivate only at surgical site



- Light Sources
  - Do not lay on drapes



Surgical Fire Safety – NFPA 99, Chapter 15

- Lasers
  - Eye protection
  - Strong communication
  - Put on “Standby” when not in use

Surgical Fire Safety – NFPA 99, Chapter 15

+ Prep Solutions

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

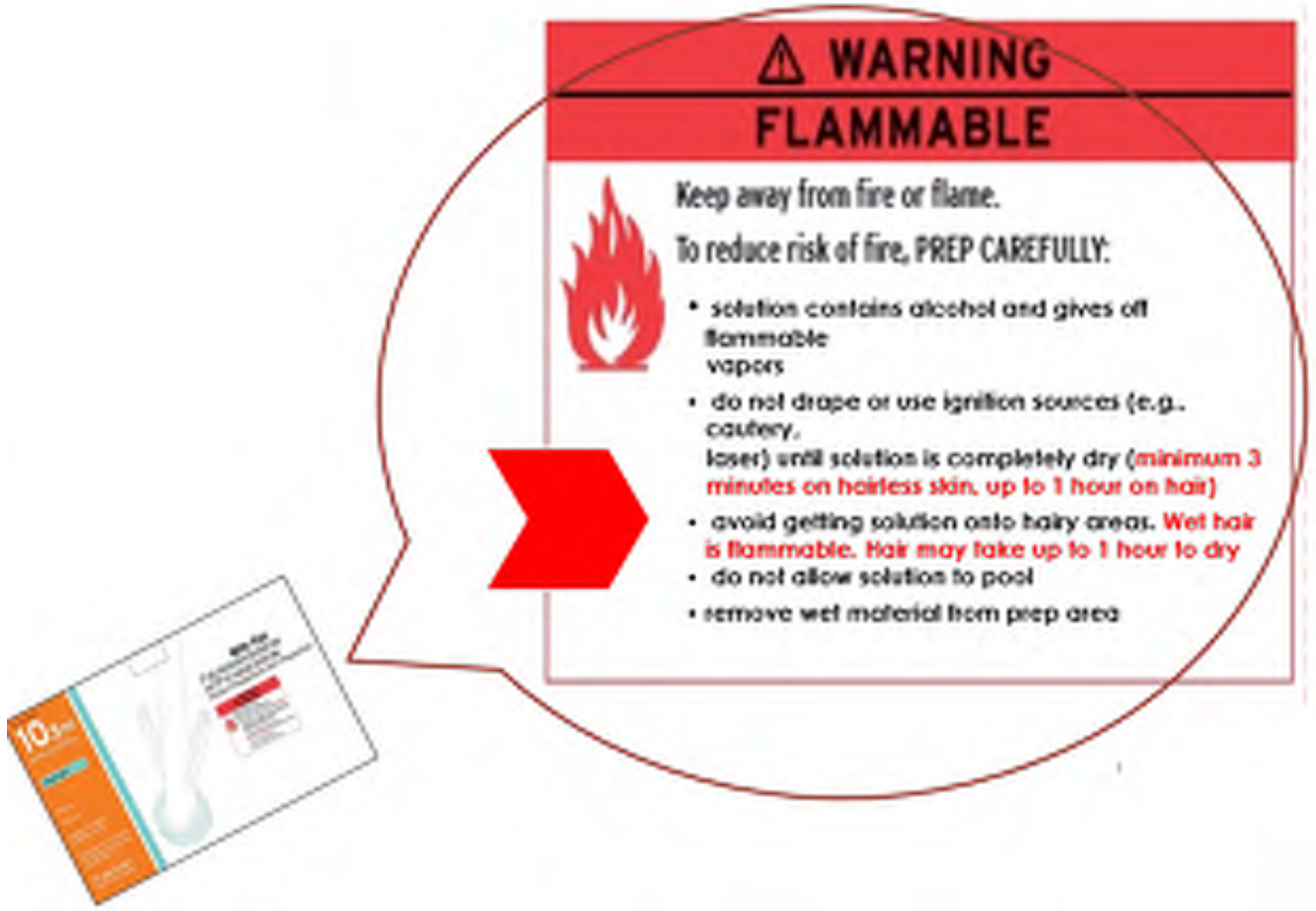
Surgical Fire Safety – NFPA 99, Chapter 15

- 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:

(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



Surgical Fire Safety – NFPA 99, Chapter 15

+ Perioperative Time-out

SURGICAL SITE FIRE RISK ASSESSMENT SCORE			
Airway Surgery (i.e., Tracheostomy, uvuloplasty, T&A); extreme high risk for fire. ☐ Yes ☐ No	Alcohol based prep solution had sufficient time for fumes to dissipate. ☐ Yes ☐ No		
(Circle appropriate option)	Y	N	Verified By:
• Surgical site or incision above the Xiphoid	1	0	
• Open Oxygen source (Patient receiving supplemental oxygen via any variety of face mask or nasal cannula)	1	0	(Circulating RN Signature)
• Available ignition source (i.e., electrosurgery unit, laser, fiber optic lightsource)	1	0	Print Name:
Scoring: 3=High Risk; 2= Low Risk w/ potential to convert to high risk; 1= Low Risk	TOTAL SCORE:		

Surgical Fire Safety – NFPA 99, Chapter 15

- Clarification

> **15.13.3.4** Any solution-soaked materials shall be removed from the operating room prior to draping or use of electrosurgery, cautery, or a laser.

- 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.

Surgical Fire Safety – NFPA 99, Chapter 15

+ Emergency Procedures

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.

Surgical Fire Safety – NFPA 99, Chapter 15

- 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

Scrub Position

- Take Instruments to stabilize / close patient
- Assist in moving OR table

Surgical Fire Safety Procedures

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

Surgical Fire Safety – Extinguishment

- Extinguishment
  - Shutting down oxygen
  - Suppressing fires
  - Roles and types of extinguishers

Surgical Fire Safety – Extinguishment

- Surgical Fire Types

In a Patient's Airway

In a Patient's Oral Cavity

Newson6.com

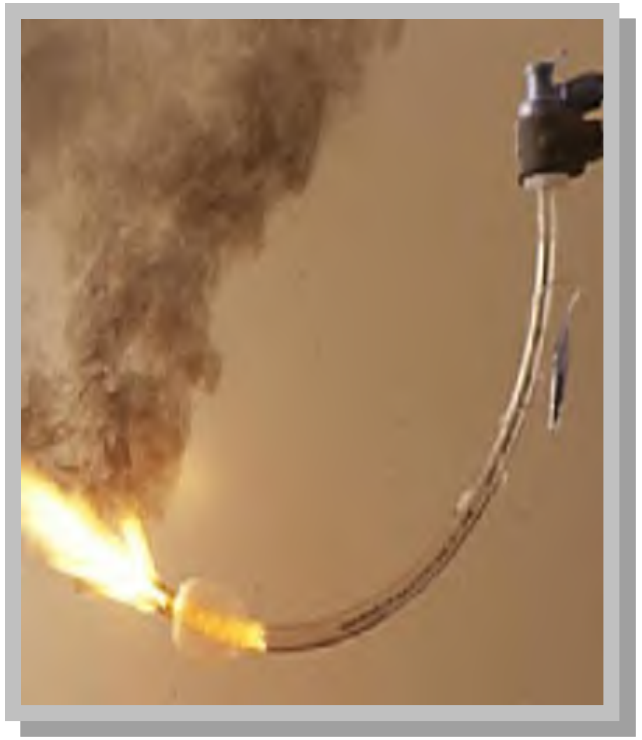
On a Patient's Surgical Site

Surgical Drapes

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



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 Fire Safety – Extinguishment

+ Surgical Site Fires (on the patient)

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

Surgical Fire Safety – Extinguishment

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

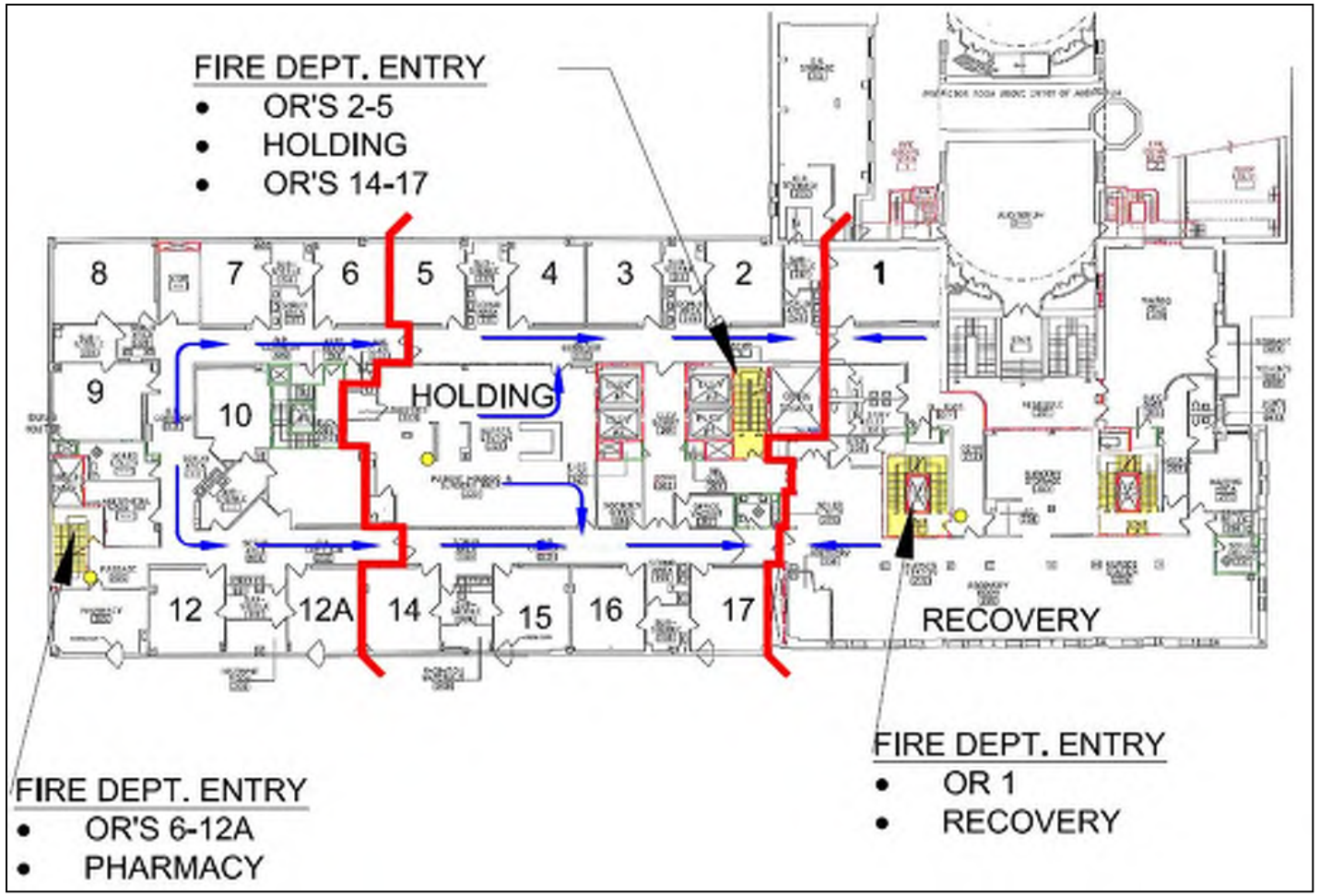
Surgical Fire Safety – Extinguishment

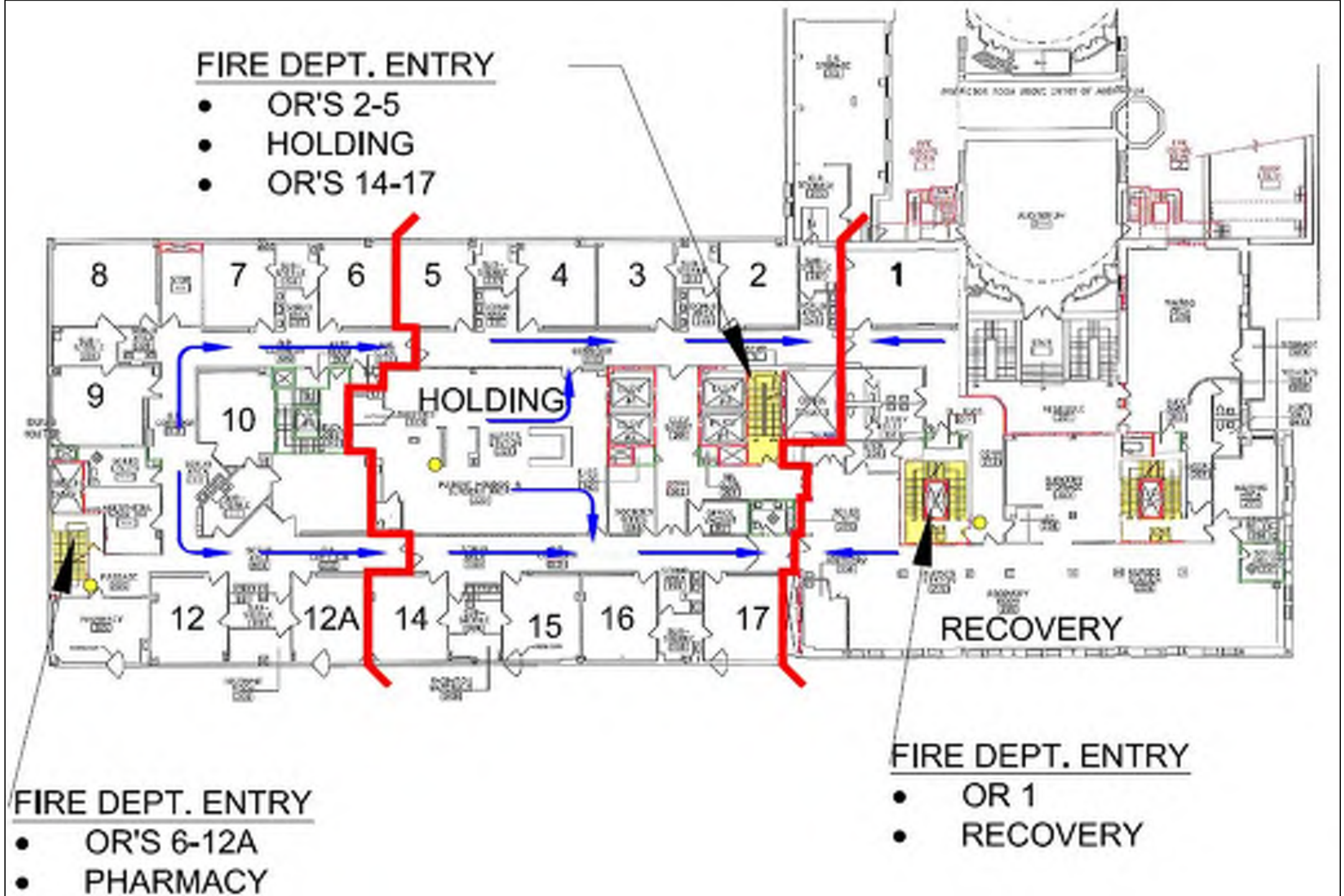
Fire Extinguishers

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

Surgical Fire Safety – Evacuation

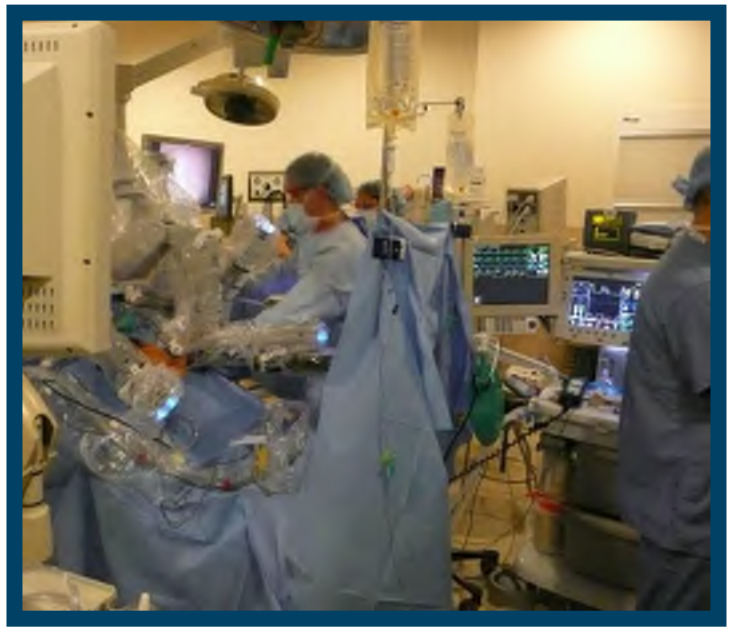
- Evacuation
  - Stay or go
  - Patient break-down
  - Evacuation sites




FIRE DEPT. ENTRY
• OR'S 2-5
• HOLDING
• OR'S 14-17
8
7
6
5
4
3
2
1
9
10
HOLDING
12
12A
14
15
16
17
RECOVERY
FIRE DEPT. ENTRY
• OR'S 6-12A
• PHARMACY
FIRE DEPT. ENTRY
• OR 1
• RECOVERY

Surgical Fire Safety – Evacuation

- Evacuation Challenges



Surgical Fire Safety - NFPA 99, Chapter 15

+ 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.

Surgical Fire Safety – NFPA 99, Chapter 15

- 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

David Hood
david.hood@jensenhughes.com
www.phillipsllc.com

Thank You

David Hood
david.hood@jensenhughes.com
www.phillipsllc.com