# Anesthetic consideration in Tracheostomy

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# Consideration

- Shared airway
- Possible difficult airway
- Closed communication with surgeon, backup plan discussed
- Indication for tracheostomy & concomitant injuries (TBI, C-spine injury)
- Potentially critically ill patient with limited reserve,multiple organ failure

# Consideration

- Potential catastrophic complication

  - Loss of airway, Hemorrhage, Pneumothorax, Subcutaneous emphysema ,Aspiration, False passage,Tracheal rupture

  - Airway fire (low$FiO_2$,limited cautery use)

# Goals

- Optimize underlying disease state
- Assessment of stability for elective tracheostomy
- Surgical plan discussed along with backups and additional equipment
- Reduce risk of aspiration
- Motionless surgical field
- Protect against airway fire

# Review and Prevention of Airway Fires in the Peri-Operative Setting

# Fires in OR: Anesthesiology

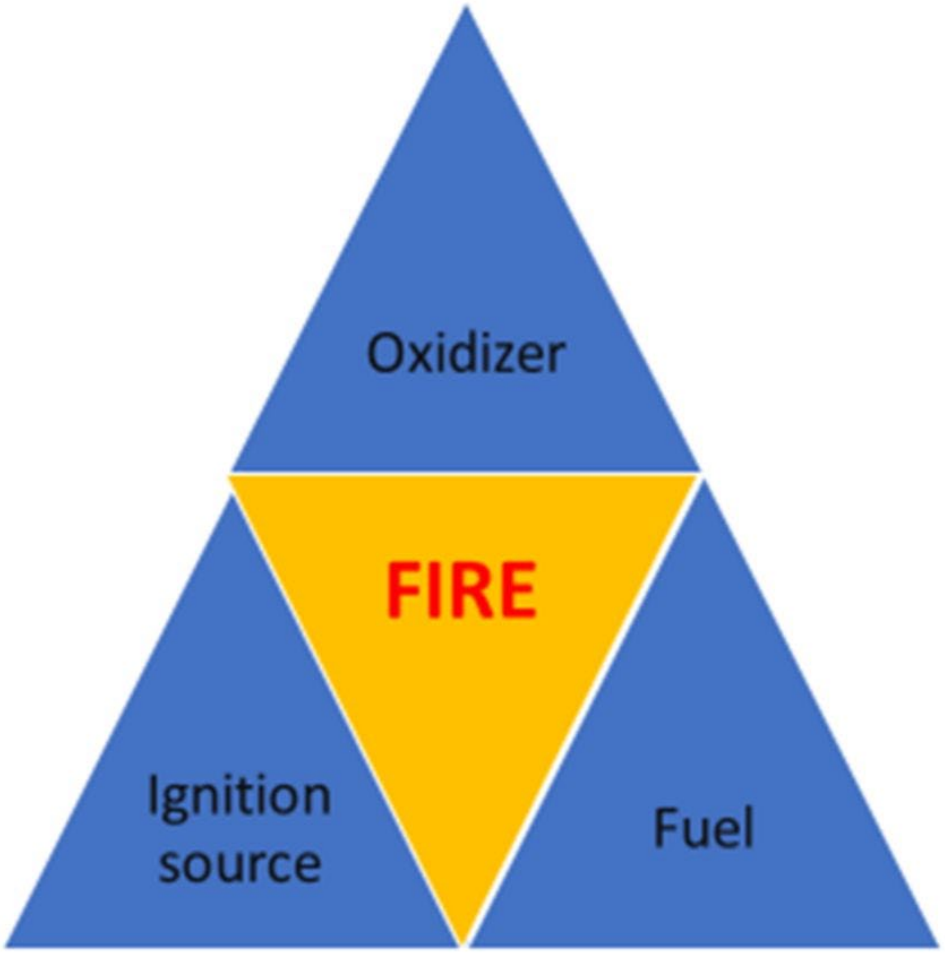
Focus

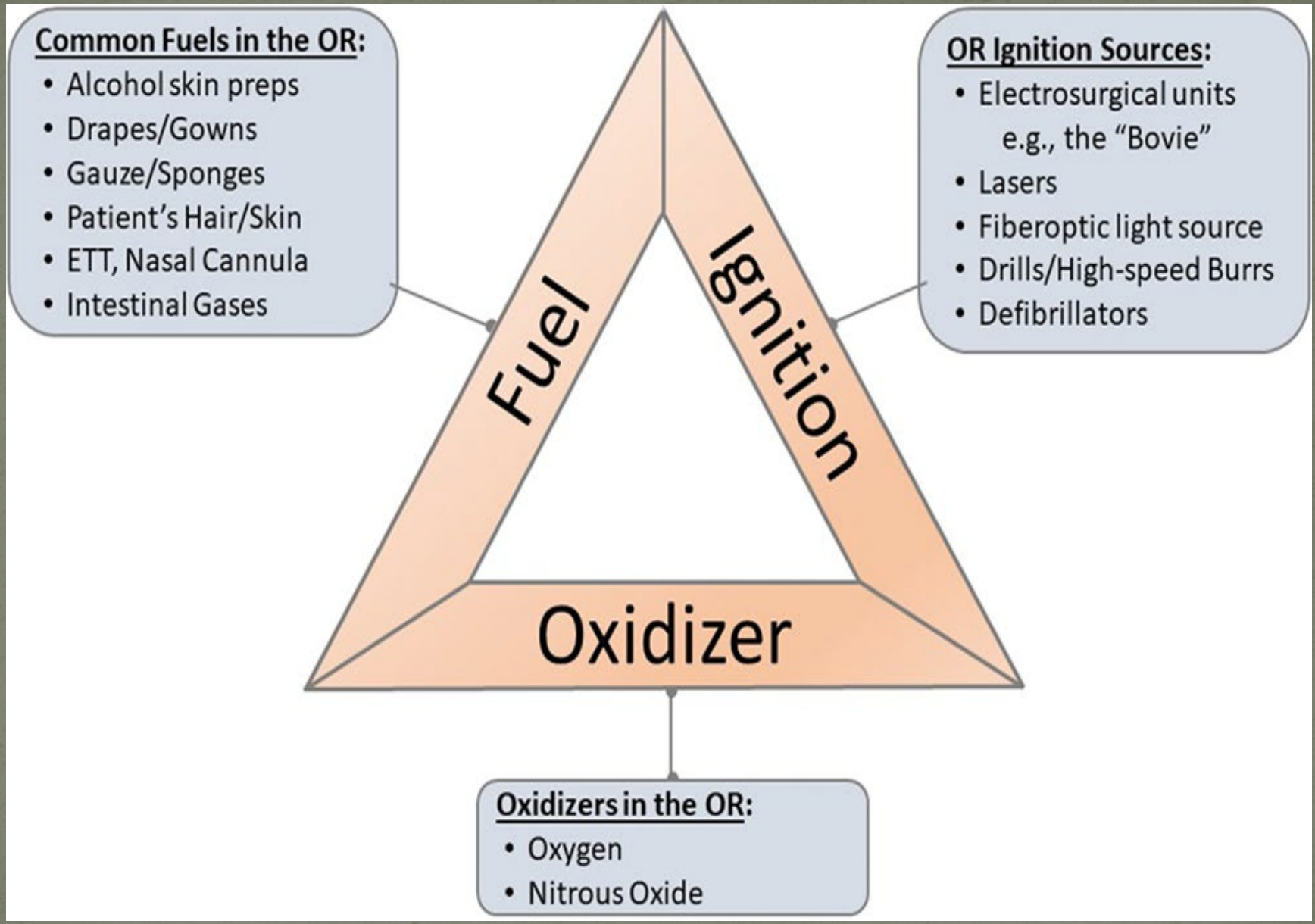
- Preparation,Prevention and management of airway fires
- What to do if an anesthesia fire occurs

# Procedures with high risk of fires

- Oropharyngeal Surgery: Tonsillectomy and Adenotonsillectomy
- Facial Surgery: Removal of lesions on head, face, or neck
- Endoscopic Laser Surgery: Removal of layrngeal papilliomas
- Cutaneous/ Transcutaneous Surgery
- Tracheostomy and Burr Hole Surgery

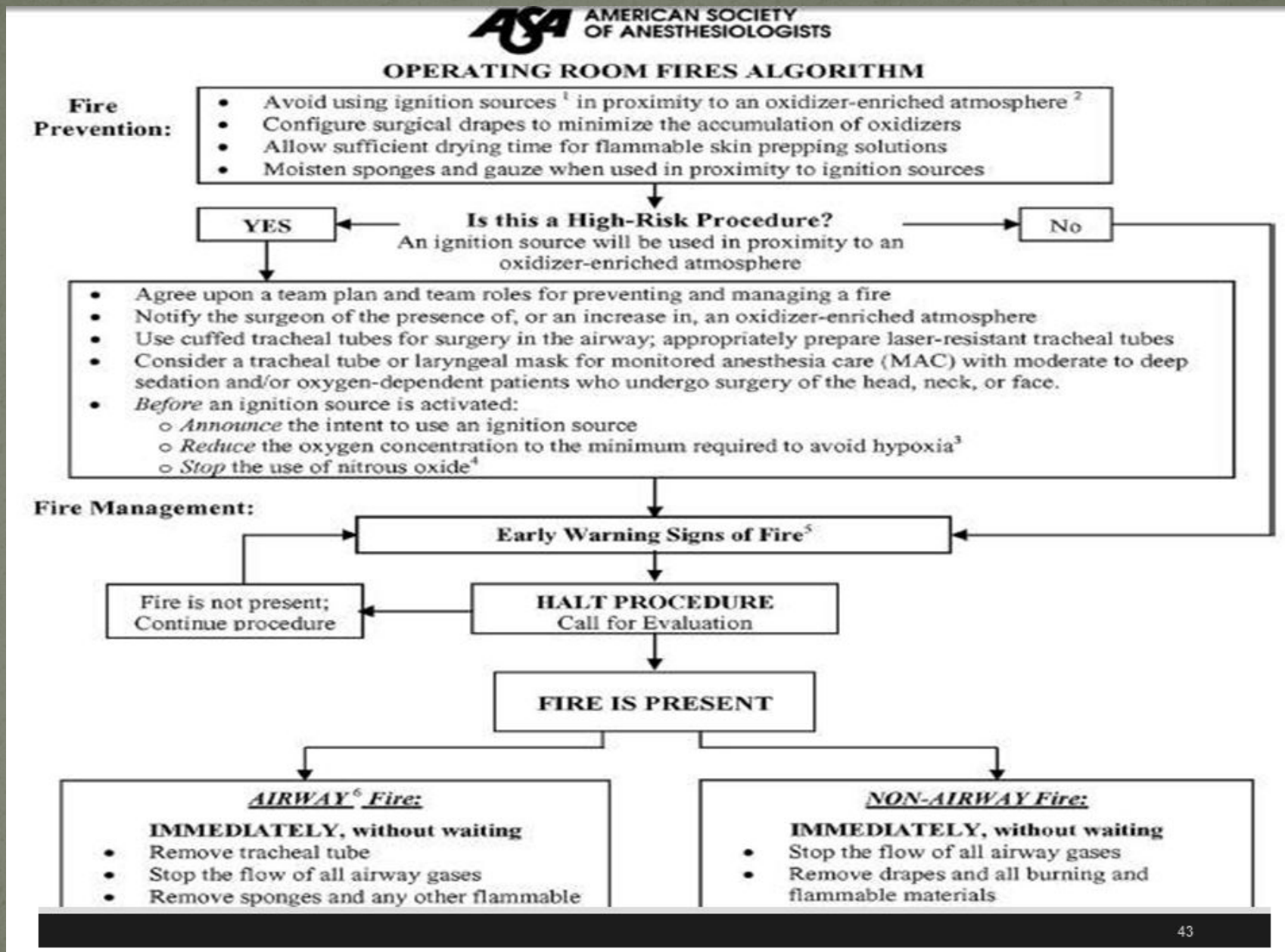
# OR FIRE TRIAD

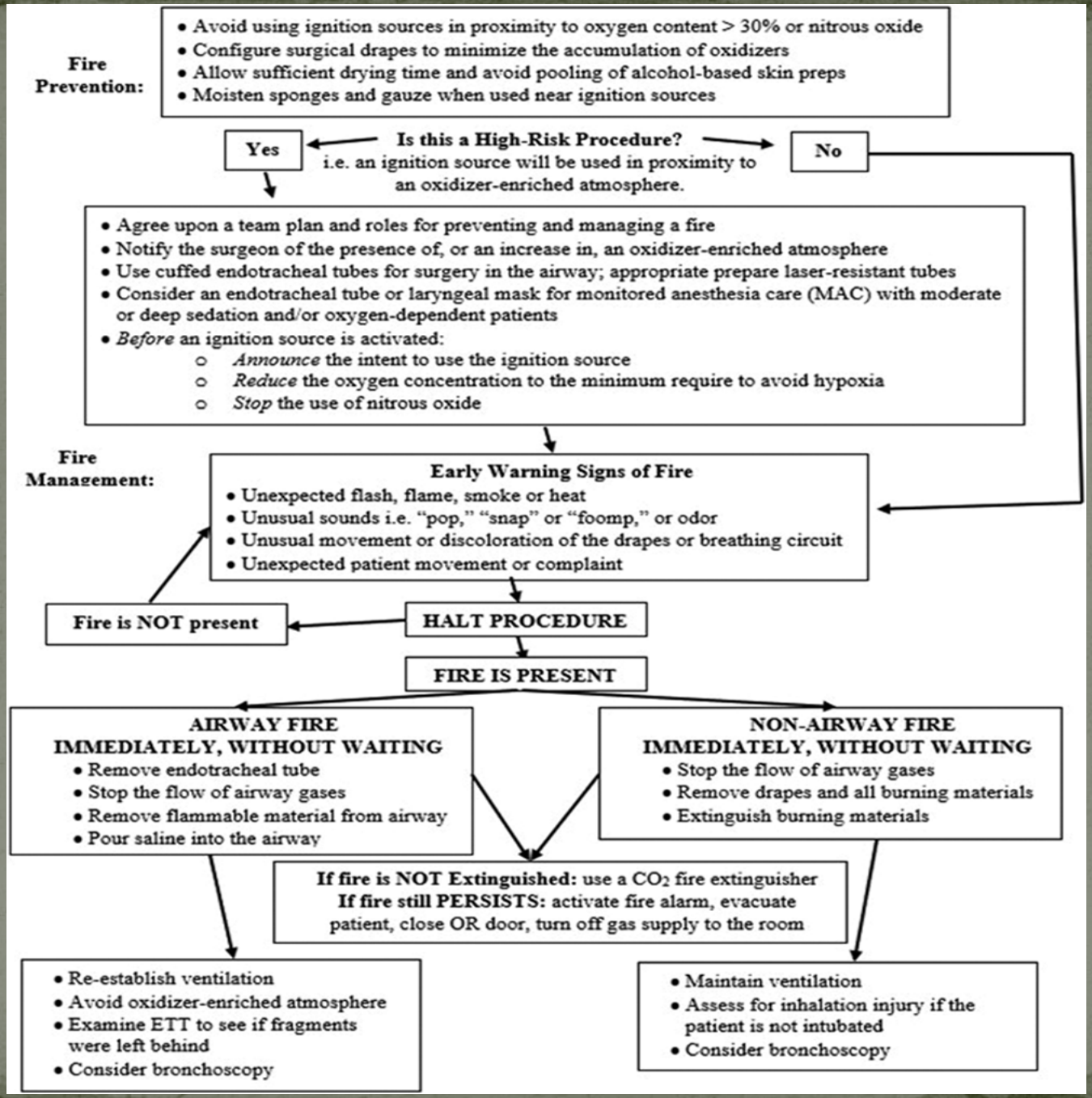


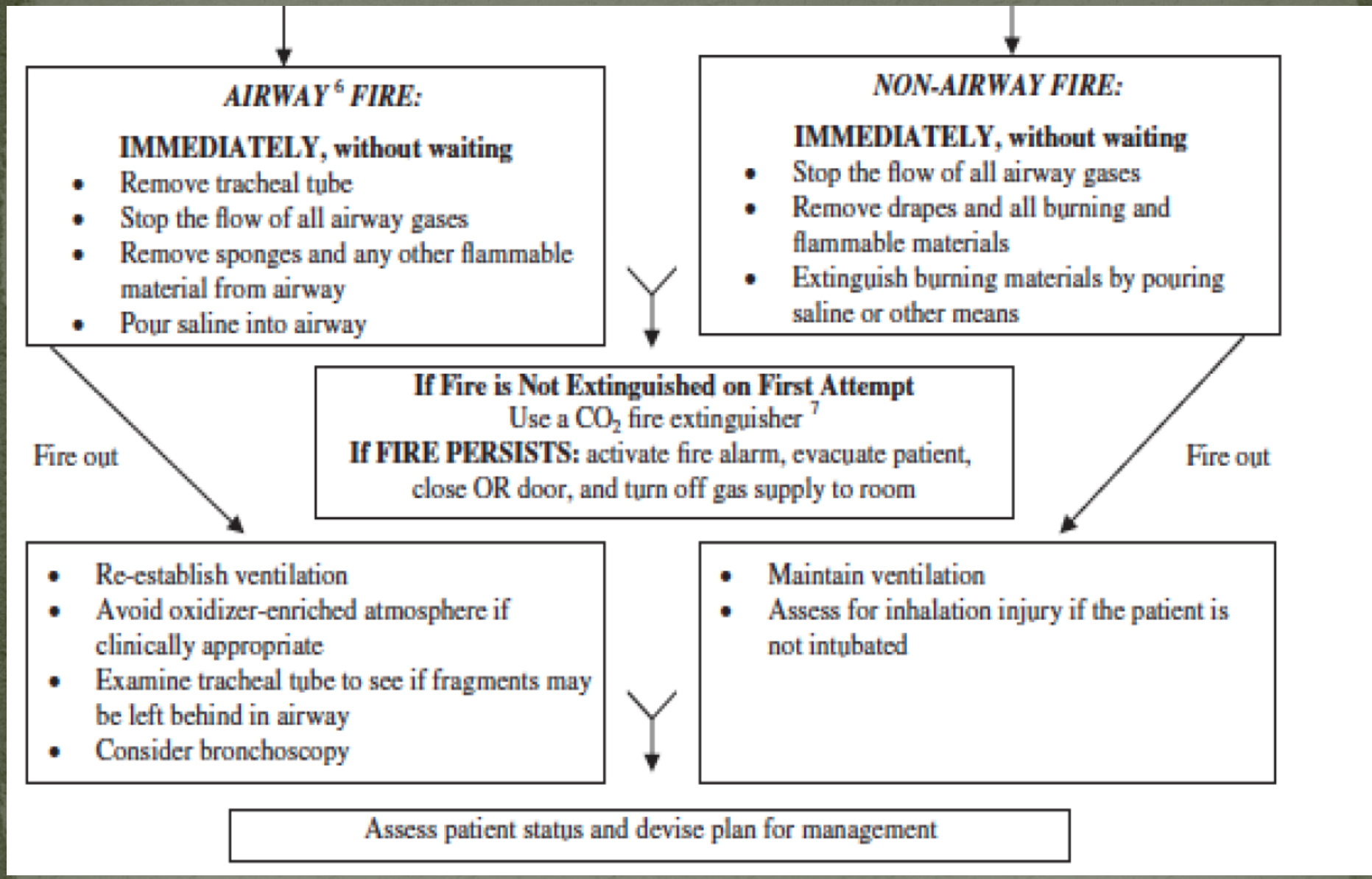

Common Fuels in the OR:
• Alcohol skin preps
• Drapes/Gowns
• Gauze/Sponges
• Patient's Hair/Skin
• ETT, Nasal Cannula
• Intestinal Gases
OR Ignition Sources:
• Electrosurgical units
e.g., the "Bovie"
• Lasers
• Fiberoptic light source
• Drills/High-speed Burrs
• Defibrillators
Fuel
Ignition
Oxidizer
Oxidizers in the OR:
• Oxygen
• Nitrous Oxide

| Discipline | | Potential Risk | Intervention | Score |
|---|---|---|---|---|
| Circulator/ Tech | Fuel | • Surgical site ABOVE xiphoid<br>• Drapes/Blankets<br>• Gowns<br>• Sponges/Gauze<br>• Alcohol-based skin preps<br>• Patient's hair/skin<br>• ETT, SGAs, masks, nasal cannulas, tents, tags<br>• Intestinal gases | • Communication of risks in Time-out<br>• Confirm no tunneling of drapes between oxygen rich environment and surgical field<br>• Bovie in holster when not in use<br>• Laser on stand-by when not in use<br>• Fiberoptic source "off" when not in use<br>• Fiberoptic source never in contact with fuel<br>• Saline soaked sponges/gauze/towels<br>• Saline/sterile water on field<br>• Preps allowed to dry 3 minutes<br>• No pooling of preps | 1 |
| Surgeon | Ignition | • Surgical site ABOVE xiphoid<br>• Electrosurgical device<br>• Laser<br>• Fiberoptic light source<br>• Defibrillator<br>• High speed burr/Drills | • Communication of risks in Time-out<br>• Confirm no tunneling of drapes between oxygen rich environment and surgical field<br>• Bovie in holster when not in use<br>• Laser on stand-by when not in use<br>• Fiberoptic source "off" when not in use<br>• Fiberoptic source never in contact with fuel<br>• Saline soaked sponges/gauze/towels<br>• Communicate prior to use of energy device<br>• Utilize irrigation with drills and saws | 1 |
| Anesthesia | Oxidizer | • Surgical site ABOVE xiphoid<br>• Oxygen rich environment (> 30%)<br>• Nitrous Oxide in the presence of Oxygen | • Communication of risks in Time-out<br>• Confirm no tunneling of drapes between oxygen rich environment and surgical field<br>• Minimize or discontinue (when appropriate) oxygen 1 min prior to energy device use<br>• Titrate oxygen to lowest safe concentration<br>• Avoid oxygen trapping with tenting of drapes or use "open" draping<br>• Consider ETT if patient likely to require >30% $FiO_2$<br>• Utilize cuffed ETT for airway surgery (when appropriate)<br>• Utilize laser-reinforced ETT with methylene blue in cuff (when appropriate) | 1 |
| | | | TOTAL | (1-3) |

# Management of airway fires


AMERICAN SOCIETY OF ANESTHESIOLOGISTS
OPERATING ROOM FIRES ALGORITHM
Fire Prevention:
Avoid using ignition sources [1] in proximity to an oxidizer-enriched atmosphere [2]
Configure surgical drapes to minimize the accumulation of oxidizers
Allow sufficient drying time for flammable skin prepping solutions
Moisten sponges and gauze when used in proximity to ignition sources
Is this a High-Risk Procedure?
An ignition source will be used in proximity to an oxidizer-enriched atmosphere
YES
No
Agree upon a team plan and team roles for preventing and managing a fire
Notify the surgeon of the presence of, or an increase in, an oxidizer-enriched atmosphere
Use cuffed tracheal tubes for surgery in the airway; appropriately prepare laser-resistant tracheal tubes
Consider a tracheal tube or laryngeal mask for monitored anesthesia care (MAC) with moderate to deep sedation and/or oxygen-dependent patients who undergo surgery of the head, neck, or face.
Before an ignition source is activated:
Announce the intent to use an ignition source
Reduce the oxygen concentration to the minimum required to avoid hypoxia[3]
Stop the use of nitrous oxide[4]
Fire Management:
Early Warning Signs of Fire[5]
HALT PROCEDURE
Call for Evaluation
Fire is not present; Continue procedure
FIRE IS PRESENT
AIRWAY[6] Fire:
IMMEDIATELY, without waiting
Remove tracheal tube
Stop the flow of all airway gases
Remove sponges and any other flammable
NON-AIRWAY Fire:
IMMEDIATELY, without waiting
Stop the flow of all airway gases
Remove drapes and all burning and flammable materials


Fire Prevention:
• Avoid using ignition sources in proximity to oxygen content > 30% or nitrous oxide
• Configure surgical drapes to minimize the accumulation of oxidizers
• Allow sufficient drying time and avoid pooling of alcohol-based skin preps
• Moisten sponges and gauze when used near ignition sources
Is this a High-Risk Procedure?
i.e. an ignition source will be used in proximity to an oxidizer-enriched atmosphere.
Yes
No
• Agree upon a team plan and roles for preventing and managing a fire
• Notify the surgeon of the presence of, or an increase in, an oxidizer-enriched atmosphere
• Use cuffed endotracheal tubes for surgery in the airway; appropriate prepare laser-resistant tubes
• Consider an endotracheal tube or laryngeal mask for monitored anesthesia care (MAC) with moderate or deep sedation and/or oxygen-dependent patients
• Before an ignition source is activated:
o Announce the intent to use the ignition source
o Reduce the oxygen concentration to the minimum require to avoid hypoxia
o Stop the use of nitrous oxide
Fire Management:
Early Warning Signs of Fire
• Unexpected flash, flame, smoke or heat
• Unusual sounds i.e. "pop," "snap" or "foomp," or odor
• Unusual movement or discoloration of the drapes or breathing circuit
• Unexpected patient movement or complaint
Fire is NOT present
HALT PROCEDURE
FIRE IS PRESENT
AIRWAY FIRE
IMMEDIATELY, WITHOUT WAITING
• Remove endotracheal tube
• Stop the flow of airway gases
• Remove flammable material from airway
• Pour saline into the airway
NON-AIRWAY FIRE
IMMEDIATELY, WITHOUT WAITING
• Stop the flow of airway gases
• Remove drapes and all burning materials
• Extinguish burning materials
If fire is NOT Extinguished: use a CO2 fire extinguisher
If fire still PERSISTS: activate fire alarm, evacuate patient, close OR door, turn off gas supply to the room
• Re-establish ventilation
• Avoid oxidizer-enriched atmosphere
• Examine ETT to see if fragments were left behind
• Consider bronchoscopy
• Maintain ventilation
• Assess for inhalation injury if the patient is not intubated
• Consider bronchoscopy


AIRWAY [6] FIRE:
IMMEDIATELY, without waiting
Remove tracheal tube
Stop the flow of all airway gases
Remove sponges and any other flammable material from airway
Pour saline into airway
NON-AIRWAY FIRE:
IMMEDIATELY, without waiting
Stop the flow of all airway gases
Remove drapes and all burning and flammable materials
Extinguish burning materials by pouring saline or other means
If Fire is Not Extinguished on First Attempt
Use a $CO_2$ fire extinguisher [7]
If FIRE PERSISTS: activate fire alarm, evacuate patient, close OR door, and turn off gas supply to room
Fire out
Fire out
Re-establish ventilation
Avoid oxidizer-enriched atmosphere if clinically appropriate
Examine tracheal tube to see if fragments may be left behind in airway
Consider bronchoscopy
Maintain ventilation
Assess for inhalation injury if the patient is not intubated
Assess patient status and devise plan for management