Fire Prevention in Ambulatory Procedural Areas
University of California Irvine Health

Case Study Report - Event 1

Introduction
In April 2023, a procedural fire incident occurred within a University of California, Irvine (UCI) Health ambulatory clinic during a shave biopsy procedure utilizing electrocautery and hyfrecator devices. The ignition source was identified as a piece of gauze contaminated with Drysol®, an alcohol-based hemostatic agent.

During the procedure, following the initial application of the hyfrecator, clinical staff employed a piece of gauze from the mayo stand to gently dab the biopsy site and evaluate hemostasis. A subsequent application of the hyfrecator was attempted; however, this action resulted in an unanticipated ignition event when a spark from the device ignited the contaminated gauze. The resulting small fire was promptly extinguished, with no harm to the patient or clinical personnel.

Investigation Findings
A comprehensive investigation was undertaken to ascertain the root causes of the incident. Findings indicated that electrocautery was applied in the presence of residual Drysol®, a flammable alcohol-based product, prior to its complete evaporation. This created a combustible environment conducive to ignition.

The inspection of the mayo stand following the incident revealed a small area on the towel contaminated with Drysol®. This contamination was crucial in understanding the sequence of events that led to the fire. Additionally, gauze used immediately prior to the spark was found on the mayo stand concurrently with the drape contaminated by Drysol®. The proximity of these materials indicates that the electrocautery device likely ignited flammable vapors from the Drysol®, resulting in the fire.

Corrective Action Plan
The corrective action plan identified the root cause of the issue, which was gauze contamination with Drysol®. To mitigate future risks, the following specific measures were implemented:

- All Drysol® containers were clearly labeled with red flammable warning stickers.
- A new policy titled *Ambulatory Medication Management - Aluminum Chloride 20% Solution (Drysol®) Applications in Ambulatory Care* was established to ensure proper handling and application procedures.
- On-site assessments were conducted by Marsh Insurance Brokerage's healthcare risk consultant and reviewed by the workforce strategy consultant at ten clinics to evaluate fire risks. Activities included inventorying flammable products, identifying fire risk factors, reviewing fire safety policies, and providing recommendations for prevention and mitigation strategies.

Case Study Report - Event 2

Introduction

A procedural fire occurred in December 2023 within UCI Health ambulatory clinic; hemostasis was not achieved using pressure and Drysol®. Prior to applying electrodessication to the skin, residual vapors from Drysol® on a gauze square ignited, resulting in a small flame.

During a shave biopsy procedure, standard hemostasis measures including pressure and Drysol® application were initially ineffective in controlling bleeding. While preparing to use electrodessication with a hyfrecator, the device was set up and the physician activated it while holding Drysol®-soaked gauze. This combination caused the gauze to ignite, resulting in a small fire that was promptly extinguished.

Investigation Finding

The investigation identified several critical factors that contributed to the incident. It was determined that gauze absorbs a greater volume of liquid compared to Q-tips, thereby producing a greater amount of flammable fumes. The absence of standardized protocols specifying the required waiting time for these fumes to dissipate prior to the introduction of any ignition source. Additionally, no formal procedure existed for the removal of flammable materials before the use of electrocautery equipment.

Furthermore, insufficient understanding and awareness among staff regarding the scientific principles of fire safety was evident, highlighting the need to educate caregivers on the rationale behind safety. Variability in the type of Drysol® bottles used across various locations led to inconsistent application processes and amounts used. Potential miscommunication or misunderstanding regarding the appropriate use of supplies, such as Q-tips versus gauze, was also identified. Lastly, deviations from established protocols were not challenged, contributing to unsafe conditions leading to the incident.

Corrective Action Plan

The investigation found gauze contamination with Drysol® as the root cause. A corrective action plan was implemented to prevent recurrence, including:

- Updated policies to:
    - Use only Q-tips (no gauze) with Drysol®.
    - Remove flammable items exposed to Drysol® before plugging in the hyfrecator.
    - Establish a standard wait time after Drysol® application before using the hyfrecator.
- Added reminder placards on hyfrecators to remove flammable items.
- Extended appointment times to achieve hemostasis without electrocautery.
- Standardized training for all staff on new policies, fire safety, and the rationale behind them.
- On-site assessments were conducted by Marsh Insurance Brokerage's healthcare risk consultant and reviewed by the workforce strategy consultant at ten clinics to evaluate fire risks. Activities included inventorying flammable products, identifying fire risk factors, reviewing fire safety policies, and providing recommendations for prevention and mitigation strategies.

Surgical Fire Prevention

Introduction

Fire prevention in clinical procedural areas is essential for ensuring the safety of patients and staff. It requires a comprehensive strategy that includes thorough risk assessments focused on the interaction of oxidizers, ignition sources, and fuels; strict compliance with regulatory standards, and clear hazard communication. Key risks arise from devices like electrosurgical units and lasers, as well as flammable materials such as surgical drapes and alcohol-based antiseptics. Ongoing environmental inspections, policy updates, multidisciplinary collaboration, targeted training, and adherence to safety guidelines are critical to managing these risks. Together with effective use of Safety Data Sheets, structured communication protocols, and emergency preparedness plans, these measures foster a strong culture of fire safety in ambulatory procedural settings.

Procedural fires are defined as fires that occur on or near a patient undergoing a medical or procedural procedure. According to the American College of Surgeons, "From January 1, 2018, to March 29, 2023, 85 sentinel events related to fires or burns during surgery or procedures were reported to The Joint Commission. Of these fires or burns, 58% were associated with electrosurgical devices, and approximately 15% were related to light sources for electrosurgical devices." There are three primary elements necessary for a fire to ignite. These include a fuel (i.e., surgical drapes or alcohol-based preps), an oxidizer (i.e., oxygen or nitrous oxide), and an ignition source (i.e., lasers, electrosurgical units, or drills). If one element is removed, a fire cannot start. Understanding these components is essential for developing effective fire prevention strategies.

In June 2024, an onsite assessment was conducted at the University of California, Irvine (UCI) Health ambulatory clinic procedural areas to evaluate fire safety risks associated with clinical procedures. This comprehensive evaluation involved multiple clinics, staff interviews, procedural observations, and policy reviews to gain a thorough understanding of current practices and potential hazards.

The assessment identified several key findings and opportunities to enhance fire safety within the clinics. Notably, there was improper use of electrosurgical devices and limited staff awareness of UCI Health's fire safety policies. Additionally, challenges were observed in accessing and utilizing Safety Data Sheets (SDS) for flammable products. Procedural kits—such as punch biopsy packs, alcohol swabs, and adhesive remover wipes—often lacked visible flammability warnings, with hazards only identifiable through SDS review. Furthermore, the "Fire Risk Scoring" process was inconsistently incorporated into procedural timeouts, which diminished the effectiveness of proactive fire risk assessments.

By addressing these gaps and incorporating the fire safety best practices outlined below, UCI can reinforce its fire safety protocols and foster a safer healthcare environment for both patients and staff.

Compliance

Risk Assessment

Conducting a thorough risk assessment is the first step in fire prevention. This involves identifying potential fire hazards in clinical areas, evaluating the likelihood and severity of fire incidents, and implementing risk controls. Regular assessments and periodic updates help ensure that all staff are aware of potential hazards, changes in the environment and the necessary precautions to take.

Key Components of a Comprehensive Fire Risk Assessment
A comprehensive fire risk assessment in ambulatory procedural areas emphasizes the "fire triangle"—fuels, oxidizers, and ignition sources; and evaluates their potential interactions.

- **Fuels:** Combustible materials present in procedural areas including surgical drapes, gowns, patient hair and tissue, alcohol-based skin antiseptics, ointments, packaging material, sponges, linens, and more. Proper handling and storage of these materials are essential to reduce the fire risk.
- **Oxidizers:** These substances support combustion and include oxygen, nitrous oxide, and ambient air. Oxygen-enriched environments, common during anesthesia, significantly lower the ignition point of fuels, increasing fire risk.
- **Ignition Sources:** Devices and equipment that can initiate a fire include electrosurgical units (electrocautery), lasers, fiber-optic light cables, drills, defibrillators, and warming devices. These generate heat, sparks, or flames that can ignite fuels.

Best Practices for Conducting Fire Risk Assessments
Effective fire risk assessments combine regular environmental walkthroughs, policy reviews, and multidisciplinary team discussions:

1. **Walkthroughs:** Conduct regular inspections (at least bi-annually in patient areas) to identify potential fire hazards during a procedure, assess the physical environment, verify the condition and accessibility of fire safety equipment, assess the equipment to ensure no damage, and ensure emergency routes are clear and accessible. Observing staff practices and documenting findings supports targeted improvements.
2. **Policy Reviews:** Regularly review and update fire safety policies to ensure compliance with national and local regulations, such as those from the National Fire Protection Association (NFPA) and the Joint Commission. Policies should cover emergency response plans, training requirements, hazard management, and personal emergency evacuation plans (PEEPs) for vulnerable individuals.
3. **Team Discussions:** Engage a multidisciplinary team including surgeons, residents, clinical staff, facilities management, patient safety officers, and fire authorities, as needed, in identifying and prioritizing fire risks.

Fire Risk Walkthrough Checklist

Category	Key Checks
Oxidizers	Verify oxygen flow and storage per NFPA 99; ensure tubing/masks are away from cautery heat; and confirm secure cylinder storage.
Ignition Sources	Inspect cautery/laser cords, grounding pads, and foot pedals for any damage; store deactivated devices in holsters; verify energy settings.
Fuels	Confirm alcohol preps are fully dry; identify flammable ointments; maintain sterile field draping clear of ignition sources. Check for proper disposal containers for fuel-soaked materials. Verify that fuel sources are labeled according to safety protocols.
Storage of Flammable Materials	Verify flammable materials are stored in approved containers and cabinets away from ignition sources. Confirm regular inspection of storage cabinets.
Staff Knowledge	Confirm completion of annual fire safety training and mock drills including emergency evacuation and procedures, proper use of fire extinguishers, and adequate response to fire alarms.

Device-Related Risks: Lasers and Electrosurgical Units (ESUs)

Lasers and electrosurgical units (ESUs) are common ignition sources in procedural settings and pose significant risks if not managed properly. These devices can easily ignite fires or cause serious injuries, making it critical to understand and mitigate these hazards to ensure the safety of both patients and staff. Proper training on the safe use of lasers and ESUs is essential. Failure to follow safety guidelines increases the risk of accidents, injuries, and equipment-related fires, which can also lead to legal and liability issues.

Recommended Actions:
- **Training:** Staff must be educated on device-specific hazards, safe operation, and emergency procedures to minimize human error.
- **Manufacturer Guidelines:** Strict adherence to manufacturer instructions is critical to prevent misuse, equipment failure, and legal liabilities.
- **ESU Safety:**
  - Never rest hot or active tips on patients or flammable surfaces.
  - Use flame-resistant holders for inactive accessories.
  - Regularly check alarms, cords, and insulation for safety.
- **Laser Safety:**
  - Maintain proper beam alignment and control per ANSI Z136.3 standards.
  - Use appropriate laser-safe eyewear and flame-resistant drapes.
  - Display clear signage to warn of laser use.

Following these practices reduces the risk of accidents, protects patients and staff, and ensures compliance with safety standards.

Procedural Kits

Procedural kits are essential tools designed to support specific operational tasks; however, they often contain flammable materials—such as solvents, adhesives, cleaning agents, and other chemical components—that can significantly increase the risk of fire hazards within the workplace. Given these potential safety implications, it is imperative to establish a robust framework for the regular review, management, and control of these kits. This framework must emphasize vigilant inventory control, proper storage conditions, and enhanced staff awareness to prevent accidental ignition or exposure, thereby ensuring a safe working environment.

Recommended Actions:
- Conduct thorough audits of procedural kits to identify and remove any non-essential flammable items.
- Provide comprehensive training for staff to ensure proper recognition and safe handling of all kit contents. Training should be refreshed periodically and integrated into onboarding for new employees.
- Ensure all procedural kits are prominently and clearly labeled to indicate the presence of flammable components. Labels should comply with regulatory standards and include hazard symbols.
- Continuously update kit contents based on ongoing risk assessments and analysis of incident reports.

Hazard Communication

Effective hazard communication is essential to ensure that all personnel, including physicians, anesthesiologists, residents, nurses, medical assistants, and clinic staff are fully informed of potential fire hazards and the materials that contribute to such risks. A comprehensive understanding of the fire triangle concept is critical for the identification and prevention of fire incidents. This risk is notably elevated during procedures involving the head and neck, where increased oxygen concentrations or the presence of methane gas can significantly heighten the likelihood of fire. Fires occur only when all three elements of the fire triangle are present simultaneously.

Equally important in hazard communication is a thorough understanding of Safety Data Sheets (SDSs). SDSs provide detailed information about the properties, hazards, safe handling, and emergency measures related to the chemicals and materials used in the workplace.

Fuel Sources: Surgical Prep and Chemicals
To minimize fire risks related to fuel sources,
- Alcohol-based preps should be allowed to dry for at least three minutes or according to product instructions.
- Avoid pooling of these substances under the patient or in skin folds, as this can increase flammability.
- When possible, replace flammable ointments, such as petroleum-based products, with water-soluble alternatives.
- Store alcohol preps and aerosol adhesives in closed, clearly labeled containers away from ignition sources to prevent accidental ignition.
- Discard used preps, adhesives, and other saturated material into metal flame resistant containers with a lid.

Oxidizers and Ignition Sources

Oxidizers are substances capable of releasing oxygen or other oxidizing agents that facilitate and accelerate the combustion process. Although they are not inherently flammable, oxidizers can significantly enhance the intensity and rate of fire when combined with combustible materials. Common examples of oxidizers include pure oxygen, nitrates, peroxides, and chlorine compounds.

Ignition sources refer to any objects, devices, or conditions that can generate the heat or spark necessary to initiate combustion. Typical ignition sources include open flames, electrical sparks, hot surfaces, static electricity, and certain medical instruments such as electrocautery devices.

Effective management of oxidizers and ignition sources is essential for fire prevention, particularly in environments where flammable materials and oxidizers are present simultaneously. By controlling or eliminating either oxidizers or ignition sources, the risk of fire ignition can be substantially reduced, even in settings containing both oxidizing agents and combustible substances.

- **Oxygen and Anesthesia Safety**

    o To reduce the risk of fire, oxygen flow should be maintained at the minimum level required for effective patient care. The use of open oxygen delivery systems should be strictly avoided in proximity to active ignition sources, such as electrocautery devices, as the presence of oxygen can significantly accelerate fire propagation.

    o Prior to activating any ignition devices, supplemental oxygen must be completely discontinued to eliminate the potential for accidental ignition.

    o The anesthesiologist must be actively engaged in all discussions regarding fire risk and during procedural "timeouts." This collaboration ensures comprehensive awareness of fire hazards and consistent implementation of safety protocols throughout the procedure.

- **Static Electricity**
  Static electricity poses a significant fire hazard in procedural areas, particularly where flammable substances and oxygen-enriched environments are present. It accumulates when two poorly conductive materials—such as plastic, wool, rubber, or nylon—come into contact and then separate, often through friction or movement. All common textiles can contribute to static production. However, wools and synthetic materials have been proven to contribute more to static production than cotton. Once sufficient charge builds up, a spark discharge can occur, potentially igniting flammable materials like ethers, ethyl chloride, and alcohol-based solutions. The presence of oxygen-enriched atmospheres further elevates the risk of ignition from these static sparks. Static charge is always accumulating; however, there are ways to mitigate the conditions from being a fire hazard and preventing injury to the patient, staff, or damage to the building.
    o Maintain relative humidity > 30% as static charge can accumulate faster than it can dissipate in these conditions. At > 60% relative humidity, static charge is all but eliminated. This can be achieved by daily monitoring of temperature/humidity devices or by providing humidifiers. Readings should be documented and devices should undergo annual calibration.
    o Properly ground equipment and even patients when atmospheric conditions present an increased susceptibility to static electricity.

- o Utilize ionizers to assist with neutralizing static charges in the air and on insulative items (i.e., plastic packaging). For example, ionizers can be used to neutralize static charge generated when procedural kits are opened.
- o Apply anti-static sprays to surfaces to reduce static charge generation. Always review manufacturer directions and warnings before applying the spray.

Safety Data Sheets

Maintaining accessible and up-to-date Safety Data Sheets (SDSs) is essential for ensuring workplace safety, protecting employee health, and meeting regulatory requirements such as OSHA's Hazard Communication Standard. SDSs provide comprehensive, manufacturer-specific information about chemical properties, hazards, safe handling, storage, and emergency procedures. Having current SDSs readily available enables staff to quickly access critical safety information, guiding the use of personal protective equipment, safe handling practices, and emergency response measures like first aid for spills or fires. Regular review and updating of SDSs further enhance safety by identifying new hazards as products or formulations change, helping to prevent accidents, injuries, and harmful exposures.

Recommended Actions:
- Ensure SDS binders or digital databases are easily accessible in every procedural or work area where chemicals are used.
- Train all staff on how to locate, read, and interpret SDS content effectively upon hire.
- Verify that each SDS is the manufacturer-specific version and not a generic or outdated copy.
- Conduct annual reviews of all SDSs to confirm they remain current and accurate.
- Update SDSs immediately whenever new chemical products are introduced or formulations change and educate staff on the new SDSs.
- Remove or archive SDSs for chemicals that are no longer in use to avoid confusion.
- Maintain a log or tracking system to document SDS updates and reviews.
- Provide staff with refresher training on SDS use and hazard communication regularly.

Case Study Report - Event 3

Introduction

In December 2023, a procedural fire occurred within a UCI ambulatory clinic during a wound vac change. The patient's wife opened an adhesive remover pad that spontaneously ignited, likely resulting from static electricity generated by her clothing.

A patient with a longstanding history of recurrent squamous cell carcinoma underwent resection with flap reconstruction in October and November 2023, followed by placement of a wound vacuum device. After discharge, the patient required frequent wound vac changes. During a wound vac change appointment in December 2023, the patient's wife was assisting with removing the wound vac dressing when she opened the adhesive remover pad, which spontaneously ignited. The fire was promptly extinguished, and no visible injuries were sustained. However, the patient's wife reported pain between the thumb and index finger of her right hand and declined evaluation in the emergency department.

Investigation Findings

The investigation into the fire incident highlighted several key factors. First, there was a general lack of awareness and education among both staff and patients about the flammability of adhesive remover wipes, especially during dry conditions and low humidity when the risk is higher. Staff also did not

always connect static electricity with the potential for fire, showing a need for better understanding of how these risks are linked.

Another important factor was the absence of non-flammable alternatives to the wipes being used, which limited safer options for wound care. Additionally, there was a limited understanding of why fire safety procedures are important, which affected how people responded during the incident. For example, the natural reaction was to put out the fire immediately rather than activating the fire alarm, which could have delayed a full emergency response.

Lastly, there was no system in place to alert staff when conditions like low humidity or static electricity increased the risk of fire. Putting in place better education, safer product options, and environmental alerts will be important steps to reduce the chance of similar incidents happening in the future.

Environmental conditions, such as humidity, can elevate the risk of ignition, and were not actively monitored within the clinic setting. Additionally, appointment time constraints created pressure that limited the opportunity to achieve adequate hemostasis before electrocautery use.

Corrective Action Plans
- **Fire Safety Training**
  - Reinforce that staff should always pull the fire alarm even if the fire is already out; practice fire alarm activation for familiarity.
  - Instruct staff not to place burned materials into the trash to prevent secondary fires.
  - Provide engaging training on ignitable materials and supplies (e.g., wipes, alcohol gels).
  - Implement site-specific orientation and training for residents (aligned with ongoing RCA efforts).
- **Product Flammability**
  - Educate staff on product flammability and how weather conditions affect their use (include video training).
  - Ensure teams are aware of the importance of informing family members about fire risks and proper application; define roles responsible for education and documentation.
- **Static Electricity**
  - Educate staff that static electricity can cause fires. Identify common sources.
  - Provide education on precautions when handling materials and caring for patients, including grounding/discharging techniques, and avoiding static sparks before patient contact.
  - Ensure proper assessments are being conducted to verify humidity levels and take corrective action when humidity nears or falls below 30%.
  - Promote communication among clinic teams about static electricity risks.
  - Offer just-in-time training or awareness sessions during low humidity or dry weather conditions.
- **Weather**
  - Develop a process to alert staff when weather conditions increase risks related to humidity and static electricity.

Policy and Training
Policy and Procedures for Fire Prevention

Comprehensive policies and procedures that address the unique risks associated with perioperative and procedural settings support effective fire prevention. All policies related to fire prevention and the handling of flammable products must be clearly documented and rigorously maintained. Importantly, these policies require formal review and sign-off by all procedural staff, including nursing personnel, medical assistants, physicians, anesthesiologists, and residents. This collective acknowledgment ensures shared responsibility and accountability across multidisciplinary teams.

Specific attention must be given to equipment- and chemical-specific policies, such as those governing the use of flammable compounds like Drysol® (20% aluminum chloride solution), commonly used in ambulatory care. Integrating these specialized policies into the broader fire safety framework helps mitigate risks associated with chemical handling and storage, including the introduction of new equipment or chemicals.

Fire safety policy awareness begins during the onboarding process for new employees and is reinforced through mandatory annual reviews. This ongoing education ensures that all staff stay up to date with best practices and regulatory requirements, fostering a strong foundation of knowledge. Integrating these policies into onboarding and annual education programs reinforces their significance and supports consistent application across all staff levels.

Active compliance monitoring is critical and is achieved through a combination of audits, fire drills, and feedback mechanisms. These tools offer valuable insights into how well policies are being followed and help identify areas needing improvement, thereby promoting a culture of safety and vigilance throughout the organization.

Policy Awareness and Compliance
> To maintain a high standard of fire safety, all staff must be thoroughly familiar with key organizational policies. These include, but are not limited to:
> - The UCI Fire Safety in Perioperative & Procedural Areas policy
> - The Ambulatory Medication Management policy for Aluminum Chloride 20% Solution (Drysol®®)

Fire Prevention Training
Effective fire prevention training equips all team members with the knowledge and skills necessary to identify fire risks, respond appropriately during emergencies, and maintain a safe working environment. As a vital component of workplace safety in healthcare and procedural settings, such training fosters awareness of potential fire hazards, teaches the proper use of emergency equipment, clarifies response roles, and incorporates regular drills and assessments. By implementing a well-structured and documented training program, organizations can significantly reduce the likelihood and impact of fire incidents while promoting a culture of safety and preparedness that protects both lives and property.

Training Content

A comprehensive fire prevention training program should thoroughly cover the following essential topics:

- **Fire Triangle Awareness**
  - Understanding the interaction of fuel, oxygen, and ignition sources in fire development is foundational. Staff must recognize how these elements combine to create fire hazards, particularly in environments using electrosurgical units (ESUs), lasers, anesthesia, and ignitable liquids.
- **Extinguisher Use**
  - Training must include proper selection and operation of fire extinguishers, emphasizing the PASS method—**P**ull the pin, **A**im at the base of the fire, **S**queeze the handle, and **S**weep side to side—to ensure effective fire suppression.
- **Oxygen and Nitrous Oxide Management**
  - Safe handling and monitoring of oxygen and nitrous oxide are critical to prevent fire hazards, given their role in intensifying combustion.
- **Role-Specific Response**
  - Clearly defined actions for different staff roles during a fire emergency enhance coordination and efficiency. Each team member should understand their responsibilities, including evacuation procedures, communication, and patient safety measures.
  - Training should be provided on emergency response and specific roles at least annually.
- **Mock Drills**
  - Conducting semi-annual fire drills in actual procedural areas provides realistic practice scenarios, reinforcing emergency response protocols and evacuation procedures.
  - Evaluation and post-drill discussions assist with reinforcing procedures and identifying areas where improvement is needed. This also allows staff to ask questions in a safe environment without real-world consequences.

Training Frequency and Delivery

To maintain elevated levels of preparedness and competency, fire prevention training should be delivered with the following frequency and methods:

- **Initial Training**
  - Fire safety education should be an integral part of staff onboarding, ensuring new employees understand fire risks and response protocols from the outset. This ensures a thorough foundation is laid, emphasizing the significance of fire safety and consequences associated with fire events.
- **Annual Refresher Training**
  - Regular annual refreshers are essential to reinforce knowledge, update staff on any procedural changes, and maintain readiness. This should include an in-depth review and knowledge check to ensure staff are aligned with expectations and procedures should an event occur.
- **Department- and Role-Specific Training**
  - Tailoring training to the unique hazards and responsibilities of different departments and roles enhances relevance and effectiveness. While there are common best practices that apply company-wide, specific training is needed to ensure the various facilities and hazards presented are covered.

- **Live Response Exercises and Semi-Annual Drills**
    - Hands-on exercises and drills conducted at least twice a year help staff practice real-time responses, build confidence, and identify areas for improvement.
    - Evaluators from different departments or facilities can provide another perspective and ensure quality feedback.
    - Interactive post-drill reviews should occur to welcome open dialogue and conversations on what went well, what did not, and what areas the team can improve upon.
    - Documentation of the drill, successes, opportunities for improvement, and changes to be implemented should be documented and reviewed.

Communication

Procedure Timeout

A standardized procedural "timeout" is conducted to enhance communication and ensure fire safety awareness prior to initiating any procedure. This timeout includes the following critical steps:

- Discussion of the presence of fuel sources, ignition devices, and oxidizers.
- Verbalization of the fire risk score, categorized as Low, Moderate, or High.
- Confirmation of the availability of fire extinguishers and saline solutions.
- Agreement on specific roles and responsibilities in the event of ignition, including identification of personnel responsible for removing drapes, shutting off gas supplies, and retrieving the fire extinguisher.

This structured communication protocol significantly improves situational awareness among the team and reduces reaction time during emergencies.

Fire Risk Scoring:

Integrating fire risk assessments into the pre-procedure timeout heightens awareness of potential fire hazards, improvs communication among team members, and actively engages staff in fire prevention efforts.

Following the announcement of the fire risk score, it is formally documented as part of the time-out procedure. By identifying the fire risk and ensuring that contributing factors are effectively managed, the overall likelihood of fire during a procedure is significantly reduced.

Fire Risk Score

Score	Criteria
Low (1)	No open oxygen, no ignition device, non-alcohol prep
Moderate (2)	Alcohol prep OR ignition device present
High (3)	Oxygen source + ignition device + alcohol prep/fuel present

Staff must verbalize mitigation strategies before proceeding when the score is **≥2**.

Emergency Action and Evacuation Planning

Effective Emergency Action and Evacuation Planning in clinical settings is essential to ensure the safety of patients, staff, and visitors during emergencies. Clinics must develop comprehensive, site-specific plans that are regularly reviewed, practiced, and integrated with local emergency response systems.

Key Elements of Emergency Action and Evacuation Planning
1. **Documented Evacuation Plan**
   - Clinics should maintain a written evacuation plan covering all procedural and public areas.
   - The plan must be site-specific, addressing unique facility layouts, patient populations, and potential hazards.
   - It should include clear reporting procedures for emergencies, defined evacuation routes, and contingency plans.
   - The plan must be reviewed with all employees upon implementation and updated regularly.

2. Clearly Marked and Unobstructed Exits
   - All exits must be clearly marked with illuminated signage and kept free of obstructions.
   - Exits should be wide enough and designed to accommodate stretchers and other patient transport equipment.
   - Regular inspections ensure exits always remain accessible.

3. Fire Safety Equipment and Gas Shutoff Valves
   - Fire extinguishers must be readily accessible throughout the clinic, with staff trained in their use. The appropriate extinguishment (i.e., gas, dry chemical, water) and size is key. Monthly visual inspections (local staff) and annual physical inspections (qualified contractors) should occur.
   - Gas shutoff valves should be clearly identified and accessible to authorized personnel. Periodic training should be provided for gas shutoff valve operations.
   - Emergency lighting, fire alarms, and suppression systems require monthly functional inspection to ensure readiness.

Reporting and Continuous Improvement
Reporting Procedural Fires, Close Calls, and Near Misses
In healthcare settings, procedural fires, close calls, and near misses represent critical safety events that, if left unreported, can lead to serious harm to patients, staff, and the facility. Reporting these events is essential because it:
1. **Enhances Patient and Staff Safety:** By documenting every procedural fire or near miss, healthcare providers can identify potential hazards before they result in injury or damage. This proactive approach helps prevent future incidents and protects everyone involved.
2. **Promotes a Culture of Transparency and Trust:** Encouraging open reporting without fear of blame fosters a safety culture where staff feel empowered to share concerns. This transparency is vital for early detection of risks and collaborative problem-solving.
3. **Ensures Compliance with Regulatory Standards:** Many healthcare accreditation bodies and regulatory agencies require systematic reporting of safety events. Compliance helps maintain facility accreditation and avoids legal or financial penalties.

Reporting Supports Continuous Improvement

Reporting procedural fires, close calls, and near misses is not just about documentation; it is a foundational step toward continuous quality and safety improvement:

1. **Systematic Data Collection:** When all events are reported into a centralized Safety & Quality Information System (SQIS) or equivalent, the facility accumulates valuable data that reflects operational challenges and risks.
2. **Root Cause Analysis and Learning:** Detailed reports enable multidisciplinary teams to conduct thorough investigations to understand underlying causes. This learning process helps identify weaknesses in protocols, equipment, or training.
3. **Trend Identification:** Over time, analysis of reported events reveals patterns or recurring issues. Recognizing these trends allows healthcare leaders to prioritize interventions, allocate resources effectively, and implement targeted safety measures.
4. **Feedback Loop for Staff and Leadership:** Reporting creates a feedback mechanism where frontline staff and management can see the impact of their reports through changes in policies, procedures, or environment, reinforcing the value of their participation.
5. **Accountability and Responsibility:** Transparent reporting and follow-up actions reinforce accountability at all levels. It ensures that safety is a shared responsibility and that corrective measures are tracked and evaluated for effectiveness.

Conclusion

In summary, effective fire prevention in clinical procedural areas requires ongoing staff training, clear communication, and strict adherence to safety policies. By thoroughly managing the interaction of oxidizers, ignition sources, and fuels, and conducting regular risk assessments, healthcare teams can better prevent and respond to fire emergencies. A culture of continuous improvement, supported by transparent reporting and accountability, enables organizations to enhance safety protocols. Ultimately, a proactive, multidisciplinary approach that combines education, policy enforcement, and emergency preparedness is essential to protecting patients, staff, and facilities from procedural fires.

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