



Issue 55
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Safety Topic
Fire Prevention and
Response
Interim Life Safety

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Safety Tip

Trash and linen chutes must be closed and latched whenever they are not being used. Open chutes increase the risk of fire and the potential for fire and smoke to spread throughout the building. This is a Life Safety Code requirement.

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Safety Bulletin

Don't rely on badge card during fires

Portions of article reprinted from *Safety Connections*.

Sometimes when he visits a hospital, consultant Steven Bryant queries employees about their fire safety training and doesn't like their responses.

"I ask, 'What would you do in the event of a fire?' and I get blank looks," says Bryant, practice director of accreditation at The Greeley Company. One of the common reasons behind this mental block is that staff members try to memorize fire safety procedures rather than truly understand them.

The RACE strategy (Rescue the patient, sound the Alarm, Confine the fire, Extinguish/Evacuate) is a common example of how workers can trap themselves.

The idea behind RACE is a good one. But sometimes employees rely too much on little badge cards behind their IDs that list what RACE stands for, Bryant says.

Can you imagine a nurse having to look on a badge card during a real fire, wondering what to do next? Chances are the nurse will be under pressure to handle other duties, such as keeping patients from immediate harm.

The point is that no one has time during a blaze to figure out what to do; staff members should know it automatically, Bryant says.

Badge cards can be a helpful way to remind staff members about fire policies every time they put on the name badge. But managers must complement this friendly reminder with real training that helps people understand the intent of the strategy.

Employees should not look at the back of their badges during drills, when queried in the unit by a surveyor, or during a fire.

The UK Hospital Way

At UK Hospital, all employees are given badge cards that outline important safety information when they are issued ID badges. They aren't required to memorize the telephone numbers on the card, but they are required to know how to respond to a fire without looking at the card.

Employees receive basic information in Hospital orientation, but managers and supervisors are required to provide specific information about the employees' role in fire response in departmental orientation and annual continuing education.

Work to be Done

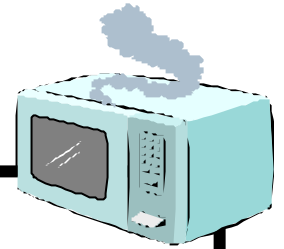
Recent fire drills underscore the fact that there is still work to be done.

In fire drills conducted between July and December 2002, only 79% of Hospital employees surveyed answered all fire response questions correctly.

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This newsletter is distributed to STCs and other Hospital leaders to help them fulfill their safety responsibilities.





Don't Rely on Badge Cards

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That's down 7 percentage points from the previous period.

Hospital employees have to know "off the top of their heads" how to respond to a fire in the work area, according to Tomi Ross, UK Hospital Safety Officer. Hospital employees must be the experts when it comes to fire response in their areas.

It's true that fire drills often are viewed as educational opportunities, but in the first few minutes after an alarm sounds, employees often don't know whether it's a false alarm or the real thing.

"When the alarm sounds is no time to be educating employees," Ross says.

About 45% of employees who could not answer basic fire response questions didn't know their area of refuge or their role in evacuation. That information is not on the back of their badge cards. It's information that is specific to the work area and must be supplied by the supervisor or manager. Another 32% did know the basic fire response procedures—outlined by the RACE acronym, and 22% of patient care employees surveyed didn't know the procedure for shutting off the medical gas.

Hospital leaders and employees should approach each drill as though it is a real fire. As a leader, ask yourself whether you would be comfortable with your staff's knowledge and response if it were a real fire.

Fire drills are conducted in the three primary Hospital buildings quarterly on each shift. That's a drill a month, designed to help leaders ensure that all of their employees have the opportunity to participate.

Microwave Removed After False Alarm

On May 13, 2003, the Hospital Safety Officer removed the microwave from Radiation Medicine after its use caused a false fire alarm.

"That's the first time since I sent out the warning that I've had to remove a microwave," said Tomi Ross, Hospital Safety Officer, "and I hope that it's the last."

Earlier this year, the campus fire marshal instructed the Hospital to remove any microwaves in areas that had false alarms due to burnt popcorn or other food. Ross sent out a notice to be posted in staff break areas.

"We recognize that employees often don't have enough time to go to the cafeteria for a meal or a snack, so they heat something up in the work area," Ross said. "We want them to be able to do that, but we can allow it only if employees understand that they must remain with the food while it's heating to avoid burning it and setting off the smoke detectors."

Employees must also remember that microwaves and coffeepots are the only heat-producing appliances allowed in work areas. Toasters, toaster ovens, crockpots, and grills are prohibited. "I remove a lot of toasters and toaster ovens during my inspections," Ross said.

Interim Life Safety Measures Required For Significant Code Deficiencies

Interim Life Safety Measures (ILSM) are used to reduce hazards that may arise during renovation or construction projects or whenever there is a significant code deficiency.

Because we generally maintain the building in compliance with code, we tend to associate ILSM with construction. Last winter, for example, the ground floor of the Critical Care Center was operating under ILSM while the K stairwell exit was closed for construction in the smoking area.

For the most part, ILSM involves implementing one or more prescribed actions, such as designating alternative exits or conducting additional fire drills in the area.

In the case of The Learning Center, which has operated under interim life safety measures for more than a year due to a closed exit, the primary ILSM is the restriction of the number of people who can attend classes at one time.

When an area is placed under interim life safety measures, area leadership is notified by the Hospital Safety Officer and signs with specific instructions are posted.

In May, the Hospital conducted a fire watch as a primary interim life safety measure when the sprinkler system was taken out of service for 8 hours due to the Gill Building construction project.

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Operating Rooms Pose Serious Fire Hazard

Each year there are an estimated 27 million surgical operations in the United States. Despite the many precautions taken in the operating room, there are substantial risks. One risk that is, perhaps, the most terrifying is an unexpected fire.

In the United States, there are approximately 2,260 reported hospital fires each year, resulting in about one death and 130 injuries. Of these, between 20 and 30 occur in the operating room. The incidence of fires in the operating room has substantially decreased over the past 40 years, as flammable anesthetic use has diminished and the awareness of situations that can cause fires has increased.

Fire causes

For any fire to occur, three factors must be present --an oxygen source, a fuel source, and an ignition mechanism. In the operating room these are all abundantly available.

The use of additional oxygen in the operating room makes it an oxygen-rich environment, priming the arena to fires of greater intensity. Nasal cannulae, nebulizers, and oxygen cylinders provide additional sources of oxygen. To diminish the possibilities of a fire in the operating room, extreme care must be used to contain any oxygen source and keep it from an ignition source.

Using the lowest possible oxygen concentration that still ensures adequate oxygen saturation is an effective means of controlling excess oxygen accumulation. Another effective means is administering oxygen along with a nonflammable gas such as helium or nitrogen. Nitrous oxide, historically used by anesthesiologists, should not be

used to dilute oxygen because it does not improve the safety of delivered oxygen. In fact, it can serve as an oxidizing agent, further propagating fires.

In the operating room, there are many fuel sources, some relatively obvious and others more obscure. Paper and cloth drapes, antiseptic skin agents, endotracheal tubes, and other breathing apparatuses such as nasal cannulae and plastic masks are obvious sources. The hazard has been heightened by the increased use of disposable drapes. While less expensive and more water-resistant than traditional draping, disposable drapes burn more readily. Although often treated with flame retardant materials, once ignited the flames spread with alarming speed.

Antiseptic skin agents, particularly those with alcohol bases, are extremely flammable. Solutions with 70 percent alcohol will ignite in temperatures of 900[deg] C. Those in aqueous solution will ignite at temperatures above 1000[deg] C. These temperatures are often reached with lasers and with some electrocautery devices.

Betadine solution (10% povidone-iodine) also is flammable. Solutions containing iodine have been shown to explode in the presence of high oxygen or nitrous oxygen concentrations.

Endotracheal tubes can also serve as a source of fuel. What makes endotracheal tubes so dangerous is the proximity the tubing has to high concentrations of oxygen. This particular hazard is illustrated by a 1991 case in which a fire occurred during a tracheotomy after the patient was intubated and the lungs were ventilated with 100 percent oxygen. The surgeon used electrocautery for coagulation.

The tracheal tube ignited with an explosion.



While most OR have involved the fuels mentioned above, there are a variety of less obvious substances that can ignite. These include dermatome glue used in the harvesting of skin grafts, lanugo, and gastrointestinal gases. Lanugo, the fine hair that covers most bodily surfaces and is found predominately on the face, is easily ignitable. Once burning, the fire can propagate at speeds between two and 10 feet per second. Covering these hairs with a water soluble lubricant can prevent fire.

Hydrogen and methane are extremely flammable gases produced by bacteria in the gastrointestinal tract in quantities of up to 200 ml per day. Forty percent of these gases are contained in the large bowel. Patients with medical conditions requiring surgery, such as pyloric stenosis or intestinal obstruction, commonly have large amounts of gastrointestinal gas in their intestines. These gases may be liberated during abdominal operations due to accidental perforation of bowel and can become the fuel source for intra-abdominal ignition.

Of course, for a fire to start there must be an ignition mechanism, and there are many in the operating room--electrocautery units, lasers, overhead and fiberoptic light sources, drills, and burrs.

Lasers are a particularly potent ignition mechanism for operating room fires. They create small areas of intense heat that can burn through anything in their

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OR Fires

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path. Lasers have been reported to ignite throat packs, swabs, tracheal and tracheotomy tubes, clothing, and patient hair.

Safety in the OR

With all of the ways a fire can start in the OR, meticulous care must be taken to ensure safety. It is the primary responsibility of the surgeon and anesthesiology staff to coordinate and control any possible hazards. However, all surgical staff must be trained in fire prevention and extinguishing.

All of the safety methods aim at keeping the fuel source, ignition mechanism, and oxygen separate.

- Keep the electrocautery tip in the holster when it is not being used.
- Have power going to high-intensity light sources only when they are being used.
- Use air or air and oxygen mixtures in anesthetic gases.
- Avoid tenting of surgical drapes in a fashion that allows accumulation of oxygen or other flammable gases.
- Use water-soluble rather than oil-based substances to cover lanugo and other flammable parts on the body.
- Use fire-retardant surgical drapes.

In case of a fire, all persons in the operating room should know the location of fire extinguishers and how to use them. Every attempt should be made to disrupt either the oxygen or fuel source.



Will Someone Please Explain “Area of Refuge”...

By Tomi Ross, Hospital Safety Officer

When I took the job as hospital safety officer almost nine years ago, I didn't understand much of what my colleagues were saying to me. My educational background was in English and I'd never had any trouble following conversations spoken in English before, but I simply had no idea what the environmental health and safety people, the fire marshal, or other safety professionals were saying to me. They used terms like “path of egress” and “musculoskeletal disorders” and the message got lost before I could translate it into simple English. That's the problem with professionals that have their own specialized terminology; they think everyone should know what they're talking about, but they never bother to explain themselves.

Lately, it seems that I've been guilty of the same thing. Over the years, I've become quite comfortable with the “language of safety,” but I've forgotten that many of the terms need to be explained in order for them to be understood by people from other professions.

What is Area of Refuge?

Let's take the term “area of refuge” as an example. When I'm conducting fire drills, I often walk up to nurses, clerks, housekeepers, and other healthcare workers and ask them where their “area of refuge” is. Because I'm so matter of fact about it, some of them try to give me an answer, assuming that it's a common term that they just missed out on in school. Most, however, simply stare at me blankly. They don't know how to answer, because they don't understand what I'm asking.

If I asked employees where they would move patients during a partial evacuation, many would be able to give me a reasonable answer—like on the other side of a fire wall. Some even would be able to name a specific location that has been designated as the probable evacuation site for their area.

The problem is that I don't ask the simple question; I frame it in safety terms...because that's the way the JCAHO surveyors most likely will ask the question.

Put simply, an “area of refuge” is a “safe” area on the other side of a fire or smoke wall where employees and patients would move if they had to evacuate until they could be relocated to another area where they could reestablish operations. In most patient care areas and offices, the “area of refuge” is within the building or medical center complex. It just doesn't make sense to try to move sick patients or essential workers outside of a building that is fully sprinkled and was designed to control the spread of smoke and fire.

All employees must know where the designated evacuation site or “area of refuge” is, and they need to know it in terms that JCAHO will use. In order to prepare employees for their role in evacuation response, managers must first identify the evacuation site(s), put that information in the written departmental fire and evacuation plans, and then educate staff. Introduce your employees to the language that JCAHO will use so that they will understand the question when they're asked.

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