

# Modern Healthcare

THE ONLY HEALTHCARE BUSINESS NEWS WEEKLY | JULY 14, 2014 | \$5.50

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Regional Hospital burst into flames.  
“Lots of confusion,” a nurse later told  
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# 'All of a sudden, there was fire'

By Joe Carlson and Sabriya Rice

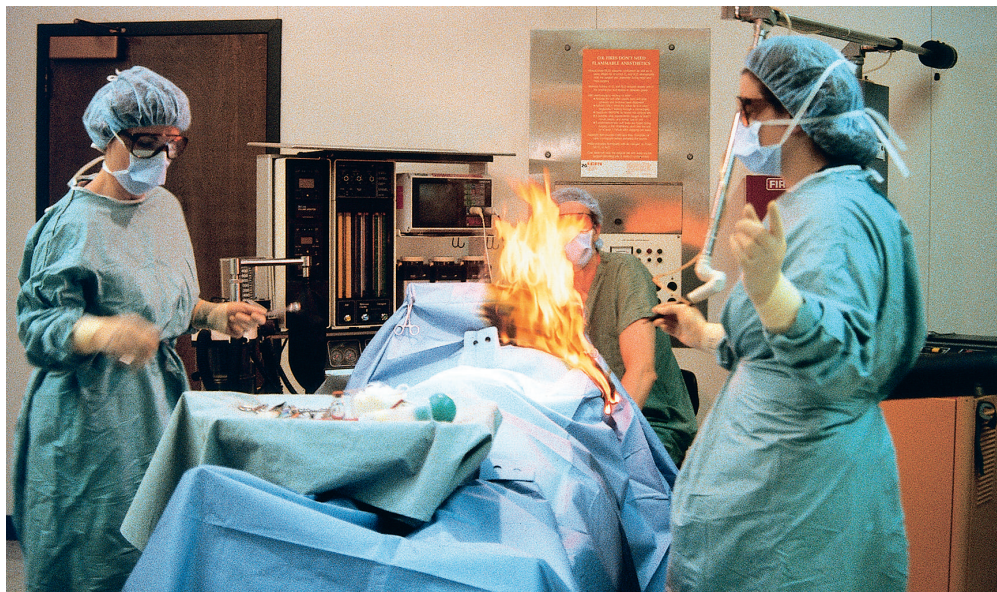
It was a chaotic scene in the operating room just moments before a critically ill patient at FirstHealth Moore Regional Hospital burst into flames. There was "lots of confusion," a surgical technician later told hospital inspectors.

The patient who arrived at the emergency department in Pinehurst, N.C., in June 2013 needed an immediate tracheostomy. His grossly swollen tongue from an allergic reaction was preventing him from breathing. A surgeon was summoned from another operating room.

The surgeon "was standing there with knife in hand and he says, 'Somebody prep the patient,'" according to a CMS report on the incident. As blood gushed from the neck incision, the surgeon deployed an electric cauterizing tool. It ignited the alcohol-based disinfectant used at the incision site, leaving the patient with second-degree burns on his neck and shoulders.

Officials at the 379-bed hospital told inspectors that fire-prevention policies were in place. Yet that initial scramble in the operating room, as described in the report, led to violations of several well-established best practices for safe-equipment use to prevent surgical fires. They are included in the Preventing Surgical Fires Initiative, which has been aggressively pushed by the Food and Drug Administration for the past three years.

The hospital has since strengthened its fire-safety rules, including banning alcohol sterilizers in most emergency procedures. The surgical team "responded to the incident appropriately" and finished the operation after putting out the fire, FirstHealth of the Carolinas CEO David



**ECRI Institute conducted laboratory tests to explore the risk of fire in oxygen-enriched environments. As oxygen concentrations increase, so does fire risk. This image, taken during an experiment, does not depict an actual patient.**

Kilarski said in a statement.

Despite a slew of news accounts about patients being set on fire in operating rooms across the country, adoption of precautionary measures has been slow, often implemented only after a hospital experiences an accident. Advocates say it's not clear how many hospitals have instituted the available protocols, and no national safety authority tracks the frequency of surgical fires, which are thought to injure patients in one of every three incidents. About 240 surgical fires occur every year, according to rough estimates by the ECRI Institute, a not-for-profit organization that conducts research on patient-safety issues. But fires may be underreported because of fear of litigation or bad publicity.

"Virtually all surgical fires are preventable," said Mark Bruley, vice president of accident and forensic investigation for ECRI, which has been tracking operating-room fires for 30 years. He blames the persistence of the problem on the slow migration of best practices across the hospital industry.

Five months after the FirstHealth fire, disinfectant manufacturer CareFusion warned doctors and hospitals to stop using electrosurgical tools near some of its alcohol-based cleansers. Experts warned that these tools should not be used around purified oxygen, which ignites quickly in concentrations above 35%. Surgical teams should also drape extra towels to prevent pooling of the flammable materials, and follow

FirstHealth's own policy to have saline water available during procedures with high fire risk.

Several of these protocols were violated at FirstHealth, according to inspection reports. A nurse not only administered an alcohol-based skin cleanser, but the person administering the anesthesia began the patient with 100% oxygen. The electrocautery tool was used without waiting the recommended three minutes for the alcohol to dry, state investigators were told.

"All of a sudden, there was fire," the anesthetist told hospital inspectors who investigated the fire. "Fire was going up my arm, and I began patting out the fire on myself." Meanwhile, the surgeon patted out the flames covering the patient's neck and shoulders.

The steady incidence of surgical-room fires alarms safety experts and advocates. "They should never happen," said Lisa McGiffert, director of the Safe Patient Project at the Consumers Union. The group supports mandatory reporting of severe patient safety events.

In addition to the FDA initiative, similar public-awareness campaigns have been launched by the National Quality Forum, the Joint Commission, the Anesthesia Patient Safety Foundation and by patient advocate Catherine Reuter, founder of surgicalfire.org. While anecdotal evidence suggests the number of surgical fires has declined in recent years, it hasn't stilled calls to action.

"The FDA has been committed since

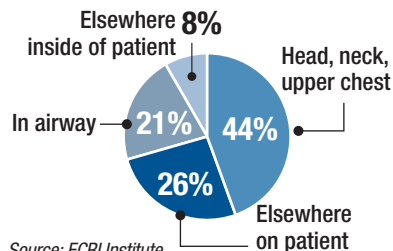


## Surgical fires

**240** Estimated number of surgical fires in the U.S. each year

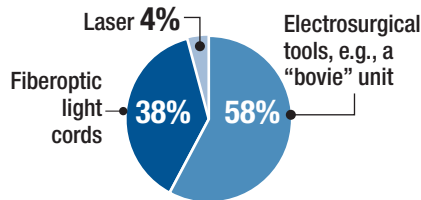
Source: ECRI Institute

### Body locations



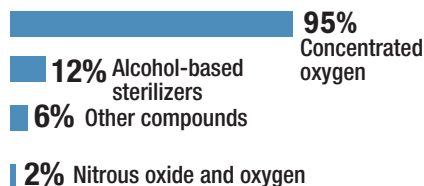
Source: ECRI Institute

### Source of ignition



Source: Pennsylvania Patient Safety Authority

### Source of fuel



Note: Some fires had multiple fuel sources.  
Source: Anesthesiology 2013

2010 to working in collaboration with public and private organizations to reduce the occurrence of surgical fires, preventable events that can be disfiguring and even fatal for the patients involved," an FDA spokeswoman said. The agency is working with a coalition of 28 groups to raise awareness.

Most surgical fires involve the ignition of concentrated oxygen by electrosurgical tools used in upper-body procedures, where patients receive the highly flammable gas through face masks and nasal devices. But a growing number are linked to the ignition of alcohol-based antiseptics.

Last November, the FDA allowed CareFusion, the maker of popular alcohol-based antiseptic ChloraPrep, to change the antiseptic's label to warn

that some versions of the cleanser should not be used near electrosurgery tools. The labels on other formulations now call for allowing longer drying times before using electrosurgery tools.

Solid numbers on the incidence of operating-room fires do not exist. ECRI's latest estimate of 240 operating-room fires each year between 2004 to 2011 was revised down from earlier estimates of 650 fires a year between 2004 to 2007.

While that suggests there has been improvement, studies of anesthesia malpractice claims suggest there's been a rise in incidents. "There is an inherent problem in preventing relatively rare events," said Dr. John Clarke, clinical director of the Pennsylvania Patient Safety Authority. People think "it is not likely to happen to you in particular," he said.

As one of the few states to aggressively push hospitals to adopt best safety practices, Pennsylvania officials say their public-awareness campaign is getting results. "As these things become more known, people can appreciate that this is an ideal opportunity to learn from someone else's mistake," Clarke said.

The FDA and the Joint Commission maintain public reports of surgical fires, but they are based on voluntary patient complaints that are not representative of epidemiological trends. Modern Healthcare identified a dozen such incidents in public hospital-inspection reports.

In July 2012, for example, a surgical team at 325-bed Riverside Medical Center in Kankakee, Ill., burned a surgical outpatient's face, hand and shoulders during a surgery to remove a forehead lesion. In February 2012, a patient at the 47-bed Fairview Lakes Medical Center in Wyoming, Minn., who was receiving a pacemaker, was burned on the head, neck and hand after an electrosurgical tool ignited oxygen in a tube, allowing the fire to spread to the surgical mask.

In 2009 and 2010, the 1,268-bed Cleveland Clinic had a series of operating-room fires that left three patients with burns that hospital inspectors said were caused by setting alcohol-based antiseptics on fire. Each situation triggered a severe "immediate jeopardy" warning that led to extensive staff training on fire preven-

tion. Officials with each hospital declined to comment on the fires.

Experts say the most common ignition source is a class of electrosurgical tools commonly called "bovie" pens, named for their inventor William T. Bovie. The electric tools are used in place of traditional metal scalpels in more than 80% of all surgeries because they are more convenient, and can be used to cauterize wounds during surgery. The Bovie Surgical Corp., which manufactures a line of bovie pens, warns its products pose a fire or explosion hazard if used in the presence of flammable materials.

Many of the best fire-safety practices developed in recent years stem from the work at Christiana Care Health System, Newark, Del., after two patients caught fire in operating rooms within eight months in 2003.

They pioneered their own process, which involves discussing the risk of fire during the scheduled time-out before surgery. The hospital hasn't burned a patient since.

Protocols like Christiana's have been widely disseminated. Yet, Christiana says it still get calls several times a month from hospitals that are just starting to implement a system. "It's a bit of an uphill slog," said Dr. Kenneth Silverstein, chairman of Christiana's department of anesthesiology. "The bottom line is, in order to have a culture of safety in your institution, you have to get people behind it." ●

## MH STRATEGIES

**Keep oxygen concentrations less than 30%:** Determine in advance if supplemental oxygen is needed. "This is the most important practice for managing the risk of surgical fire," according to a Pennsylvania Patient Safety Authority report.

**It's about proximity:** There is a risk of fire anytime oxygen and heat come into close proximity.

**Effective communication is key:** That's especially true between the surgeon, who typically is in charge of the heat source or device, and the anesthesia professional, who controls the oxygen flow.

**Be able to react quickly:** Use a wet sponge, wet towel, water or saline to douse flames.

**Let it dry:** Give alcohol preps at least three minutes for full evaporation. The Pennsylvania safety authority advises a longer drying time for areas with lots of hair.