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# Toward a Smoke-free OR

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The hazards of surgical smoke are well documented. So why are many smoke evacuation systems going unused?

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You can write all the surgical smoke evacuation policies in the world, spell out exactly what you expect to be done and provide the resources needed for compliance, but if you ignore the human element — the surgeons and staff who populate your ORs — then you aren't going to change behavior. Here's how you can educate your teams about the hazards of surgical smoke and get them to use evacuators when necessary.

## Slow to catch on

Thanks to forceful statements from such organizations as AORN and the National Institute for Occupational Safety and Health, and a growing body of research showing that the smoke produced by lasers and electrosurgery poses a potential health risk to the surgical team, there's a good chance you've already got the policies and equipment in place to evacuate surgical smoke from your ORs. But are those policies actually being followed? Or are the smoke evacuation systems you diligently purchased still sitting in the corner collecting dust?

Many managers are still having trouble getting their staffs to use smoke evacuation equipment in the OR, suggests a 2007 Web-based survey. Analyzing data from 623 individuals from healthcare facilities across the United States and Canada, Duke University Medical Center researchers Ben E. Edwards, MS, CLSO, RRPT, and Robert E. Reiman, MSPH, MD, found that "effective engineering controls," such as local exhaust ventilation systems, "are being used in fewer than half of the facilities represented by the survey respondents for most laser procedures and in very few facilities for most electrosurgery, electrocautery or diathermy procedures.... These results suggest that personnel at most healthcare facilities are not adequately protected from exposure to surgical smoke." Results of a Survey on Current Surgical Smoke Control Practices," AORN Journal, April 2008, Vol. 87, No. 4)

In many cases, it's the surgeon who stands in the way of compliance. He's likely to present a number of arguments against evacuation: It's not necessary for this case. The machine's too noisy. He doesn't want the patient to be charged extra. It's not on his preference card. A particularly bold surgeon may even admit he just can't be bothered.

The underlying cause of the surgeon's resistance is a lack of understanding about the consequences of failing to evacuate smoke. Because they don't spend as much time in one particular room or facility as nurses and techs, surgeons may be less attuned to the potentially harmful effects of regular exposure to surgical smoke, which carries particulate matter, chemicals and potentially infectious microorganisms.

Plume produced during electrosurgery presents a particularly big challenge. Compliance with the evacuation of surgical smoke created during laser surgery doesn't seem to be an issue, because smoke evacuation is included as an integral part of the training and credentialing process for laser surgery. But physicians aren't required to attend special classes or conferences dealing with smoke from electrosurgery, so many surgeons are unaware that plume created when electrosurgery devices are used presents the same hazards to the surgical team that laser smoke does.

The nurses and techs, however, are often very aware of the hazards associated with surgical smoke. They may even have experienced some of the harmful effects of surgical smoke, such as nausea, irritated eyes and upper respiratory problems. Wendy Winer, RN, BSN, CNOR, a member of AORN's Smoke Evacuation Task Force, suspects that her frequent exposure to smoke in the OR may have been one of the causes of the chronic bronchitis she experienced for more than a year. Now she doesn't take "no" for an answer when she asks for smoke to be evacuated during a procedure. The key to getting the rest of the team on board, says Ms. Winer, is education. "Breathing in this stuff is not good for anybody," she says. But, she adds, once you explain the consequences of not evacuating surgical smoke to your surgeons and colleagues, "usually they're very receptive to" smoke evacuation.

### Stocking Up for Smoke Evacuation

When shopping for smoke evacuation devices, trial as many products as you can, and involve frontline workers so they can help choose the best devices to suit your facility's needs. Next to price, the biggest question surgeons have about smoke evacuation equipment is, "Will this interfere with my ability to perform surgery?" The good news: Manufacturers of electrosurgery and smoke evacuation devices are constantly working on developing new devices that can quickly and safely evacuate plumes without interfering with the procedure and distracting from patient care. Be sure to choose equipment that your physicians are comfortable using. An even better strategy is to choose devices that your staff can easily operate, lifting the burden from the surgeon altogether.

In its Position Statement on Surgical Smoke and Bio-aerosols, AORN recommends two types of equipment to reduce the risks posed by surgical smoke:

**1. Local exhaust ventilation (0.1 micron filtration at 99.999-percent efficiency)**

- central smoke evacuation systems
- portable smoke evacuation units
- wall suction with in-line filter
- laparoscopic evacuation/filtration systems

**2. Personal protective equipment**

- high filtration surgical masks
- protective eyewear
- skin protection, such as gloves

To read the full statement, go to www.aorn.org/ PracticeResources/ AORNPositionStatements/ SurgicalSmokeAndBioAerosols

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## Education before evacuation

Groups like AORN have done a great job of spreading awareness among leaders in the nursing community about the hazards of surgical smoke and proper evacuation methods. Now it's time to impart that knowledge to your surgeons and staff, using a different approach for each group.

Surgeons. To overcome surgeon resistance to surgical smoke evacuation, focus your educational efforts on two points:

**1. The hazards posed by surgical smoke.** Any procedure in which you're using a hot tool on tissue — whether it's a laser or an electrosurgery device — may produce plumes carrying microscopic particles that can clog standard wall or ceiling suction systems and even travel through standard surgical masks.

The surgical team faces a number of health risks when exposed to the smoke, including nausea, eye and respiratory irritation and the inhalation of toxic gases such as carbon monoxide, formaldehyde, hydrogen cyanide, benzene and some of the same carcinogenic elements found in cigarette smoke. Although there's a lack of substantial research to prove direct transmission of pathogens within surgical smoke, the undisputed fact that surgical smoke can contain intact viral and bacterial contaminants supports the possibility of disease transmission.

Many educational resources are available online to help you spread the word of these risks to your surgeons. A great place to start is www.becomenasti.com, the Web site of a Canadian-based organization, Nurses Advocating Smoke-free Theatres Immediately (NASTI). The site includes a list of articles and recommendations covering everything from the harmful effects of surgical smoke to sample policies and procedures for evacuation practices. The companies that manufacture smoke evacuation systems also provide study guides on surgical smoke concerns for you to pass along to your surgeons and colleagues.

OSHA has resources and guidelines for dealing with laser and electrosurgery plume on its Web site, www.osha.gov/SLTC/laserelectrosurgeryplume. The agency's General Duty Clause mandates that healthcare facilities are responsible for maintaining a work environment that's "free from recognized hazards that are causing or are likely to cause death or serious physical harm," and staff can notify OSHA if devices are not available to evacuate surgical smoke appropriately and adequately.

**2. The ease of evacuating surgical smoke.** The good news: Technology is available to safely and effectively evacuate hazardous smoke from the surgical site without disrupting the procedure. Part of physicians' resistance may be a lack of understanding of how that technology works. When you purchase mechanical smoke evacuators or other evacuation devices and supplies, be sure to thoroughly educate all team members. Demonstrate how the smoke evacuation equipment and supplies work, so your surgeons become familiar with the process, the sound the machine makes and the ease with which the devices can be deployed during a procedure. Once they see how effective and easy it is to employ smoke evacuation practices, their resistance to smoke evacuation is likely to dissipate.

Staff. Your frontline staff is probably already aware of the hazards of surgical smoke and receptive to the policies and procedures you have in place for evacuating it. The next step is to educate them to work as a team to powerfully and assertively, yet delicately, confront surgeons about the reasons for evacuating all surgical smoke.

Arm your frontline workers with information about the real health risks posed by surgical smoke and how to mitigate them. Encourage them to speak up when they smell a malodorous plume or begin to feel nauseous in the OR. Ms. Winer notes that often the surgeon is so focused on other aspects of the procedure that he doesn't notice that plume is being produced. Any surgical team member should feel free to initiate smoke evacuation practices when plume is generated.

Consider instituting a system the surgical team can use to identify and recognize willful, non-compliant behaviors when they see

them. For instance, if a nurse encounters a physician who refuses to evacuate surgical smoke, she can call a "Code Pink," which summons the rest of the team to her side to confront the physician as a group.

You should also create a system for reporting and reprimanding surgeons and staff who fail to comply with surgical smoke policies and rewarding and recognizing those who do. Under the General Duty Clause, staff have the power to report a facility to OSHA if any workplace safety policies aren't being enforced — all the more reason to take a firm stand against those who impede compliance.

## On the Web

For more information on specific products and manufacturers, see "Thinking of Buying...A Smoke Evacuation System" from the June 2008 issue of Outpatient Surgery Magazine: www.outpatientsurgery.net/ 2008/ 06/ thinking_of_buying_a_smoke_evacuation_system.php

## Clear the path

When you're trying to encourage people to change their behaviors, you've got to remove any obstacles that may stand in the way of that change. In the case of surgical smoke evacuation, that means budgeting for the necessary equipment, taking the time to educate those who'll be using the equipment and having a clearly defined protocol for setting up the machines.

Your policy must be clear about when an evacuator should be used and when an in-line suction device will suffice, so there's no confusion in the OR. And consider providing your staff with high-filtration surgical masks (0.1 micron filtration) instead of standard masks (5 micron filtration) to wear during smoke-generating procedures to protect against any residual plume floating in the air that has escaped capture by smoke evacuation methods. The easier it is for staff to take precautionary measures against surgical smoke, the more likely they are to do so.