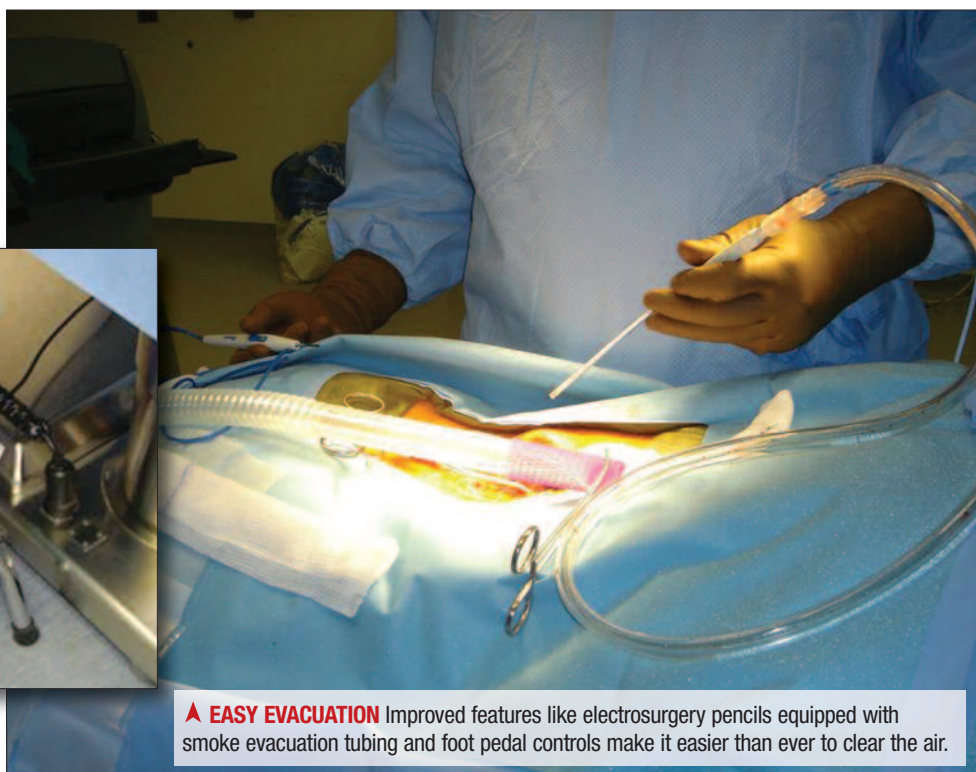


# 14 Irrefutable Reasons to Eliminate Surgical Smoke

Share this list with surgeons whose rooms reek of electro-surgery's toxic haze.



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**▲ EASY EVACUATION** Improved features like electrosurgery pencils equipped with smoke evacuation tubing and foot pedal controls make it easier than ever to clear the air.

**N**ext time a surgeon challenges your mandatory smoke evacuation policy, have these 14 fast facts at the ready. They're a mix of evidence-based reasons as well as practical and financial incentives that make eliminating electrosurgery plume from your ORs tough to argue against.

## 1 Surgical smoke causes respiratory problems.

When energy-based tools are used to cut and coagulate tissue in surgery, they release a plume of toxic vapor and particulate matter into the air. We know it smells bad — but is it really bad for you? Common sense says yes, and so does the evidence. A stark reminder of the long-lasting effects airborne contaminants can have on the respiratory system came in 2006, when Mount Sinai Medical Center

reported that about 70% of nearly 10,000 people who worked at the ground zero site after the 9/11 terrorist attacks suffered from new or substantially worse respiratory and related gastrointestinal problems up to 2½ years after their exposure to the dusty air.<sup>1</sup> For nurses, surgical techs, anesthesia providers and other personnel who spend hours each day in the operating room breathing in surgical smoke, the negative health effects have been well-documented: OR nurses have as much as twice the incidence of some respiratory problems, such as sinus infections, allergies, asthma and bronchitis, compared to the general public.<sup>2</sup>

**2 Surgical smoke is as harmful as cigarette smoke.** Research shows it's potentially *more* harmful. Stretching as far back as 1981, Japanese

researchers found that breathing in 1 gram of surgical laser smoke was equivalent to smoking 3 cigarettes, and breathing in 1 gram of electrosurgery smoke was equivalent to smoking 6 cigarettes.<sup>3</sup>

### 3 Surgical plume can carry infectious material.

Do you want to breathe in tiny particles of vaporized blood and tissue from patients that may carry bacteria and other infectious material? Neither do your nurses. Several studies have shown the presence of intact viral DNA in laser and electrosurgical plume. In 1991, a Norwegian surgeon who used a laser to ablate anogenital condyloma developed laryngeal papillomatosis; a biopsy showed that his throat lesions contained the same DNA types as his patients' genital warts.<sup>4</sup>



#### ON THE WEB

**SPREAD THE WORD** AORN has a series of posters you can use to spread awareness of the risks of surgical smoke exposure. Download the Surgical Smoke Evacuation Tool Kit at [www.aorn.org/practiceresources/toolkits/surgicalsmokeevacuationtoolkit](http://www.aorn.org/practiceresources/toolkits/surgicalsmokeevacuationtoolkit).

**4 Perioperative nurses are particularly at risk.** For a number of reasons: They're in the trenches, day in and day out, breathing in surgical smoke during the roughly 80% to 90% of surgical procedures that use some form of electrosurgery or

## Waste Anesthetic Gases, the *Other* Air Hazard

With all the talk of surgical smoke, it's easy to overlook another occupational hazard lurking right under your nose: waste anesthetic gases leaked from the anesthesia breathing circuit or expired by patients recovering from surgery. The Department of Health and Human Services officially recognizes waste anesthetic gases as an occupational hazard for healthcare workers.

Exposure to high concentrations of nitrous oxide and halogenated anesthetics (isoflurane, desflurane and sevoflurane, for example) can cause headaches and nausea, irritability, fatigue, coordination difficulties, and even liver and kidney disease, while long-term exposure to low concentrations has been linked to miscarriages, cancer and genetic damage among OR workers, according to the National Institute for Occupational Safety and Health (NIOSH), which outlines several ways you and your staff can limit the presence of waste anesthetic gases:

- Install an anesthetic gas scaveng-

ing system that removes waste gases from the OR at their source.

- Inspect and maintain anesthesia machines, breathing circuits and scavenging systems regularly to identify and correct gas leaks or malfunctions. The anesthesia delivery system should be inspected before each use.

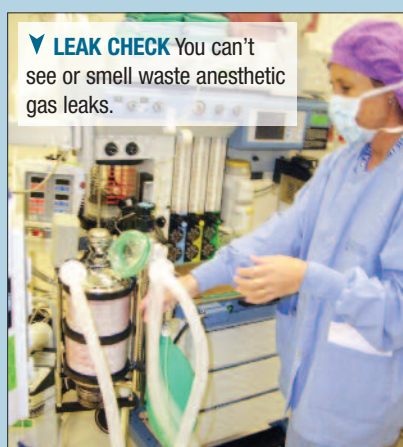
- Have your ventilation system regularly circulate and replenish air in the OR (at least 15 changes per hour, including at least 3 changes of fresh air) and in recovery rooms (at least 6 air changes per hour, including at least 2 changes of fresh air).

- Assign a staffer to monitor air quality in the OR and the effectiveness of your waste-gas control system.

- Check the patient's breathing circuit for negative pressure and positive pressure relief.

- Make sure the room and local ventilation system is turned on and scavenging equipment is properly connected before every case.

- Start the gas flow after the laryn-



geal mask or endotracheal tube is installed. Turn off the gas before shutting off the breathing system.

- Use the lowest anesthetic gas flow rates possible.
- Make sure masks fit patients properly and that uncuffed endotracheal tubes create a completely sealed airway.
- Educate workers about the hazards of waste anesthetic gases and train them to prevent and control exposures.

— Irene Tsikitas

**SOURCE:** NIOSH Publication No. 2007-151. "Waste Anesthetic Gases: Occupational Hazards in Hospitals." Download at [www.cdc.gov/niosh/docs/2007-151](http://www.cdc.gov/niosh/docs/2007-151)



“hot tool” to cut or coagulate tissue. They’re the surgical team members who are least empowered to demand that smoke evacuation be used in every case. And, according to a 2007 study published in the *New England Journal of Medicine*, “long-term exposure to fine particulate air pollution is associated with the incidence of cardiovascular disease and death among postmenopausal women”<sup>5</sup> — a significant portion of the OR nurse population.

**5 Surgeons are vulnerable, too.** Invincible? Share with them the story of the Norwegian doctor who developed laryngeal papillomatosis, possibly because he ablated genital warts without evacuating the plume. That should get their attention.

**6 It’s also a patient safety issue.** During endoscopy, surgical smoke is generated internally, causing patients to absorb the contaminants

of the plume in their bodies. In the interest of protecting our patients from the potentially harmful effects of these contaminants, smoke evacuation must always be employed during laparoscopic and endoscopic procedures.

**7 Masks don’t keep the particulates out.** Surgical masks, which often aren’t secured properly anyway, cannot filter out all the particulates in electro-surgical plume. The only PPE you could wear to ward off the health risks would be a respirator mask that needs to be fit-checked routinely, not exactly a practical solution.

**8 We do it for lasers — why not for electro-surgery?** Because laser surgery was introduced relatively recently, it was easy to instill in users the importance of evacuating laser plume from the beginning of the technology’s adoption. Indeed, research

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shows most facilities appear to routinely evacuate laser plume appropriately. But electrosurgery has been around since the 1920s, long before the risks of surgical smoke were widely known. Therefore, many clinicians refuse to believe that this tried-and-true practice could be improved upon with smoke evacuation techniques. But the ease with which clinicians have accepted smoke evacuation for laser surgery indicates that it is possible to carry this good habit over to electrosurgery with the right mix of evidence, persuasion and technological improvements.

## 9 Smoke evacuation is easier than ever.

If you haven't observed or trialed surgical smoke evacuation equipment in the last few years, you may be under the misconception that these devices are noisy, disruptive and hard to use. That was true in the old days, but not so much anymore. Manufacturers have responded to your complaints with new, lower-profile devices that range widely in design and cost, but all represent improvements over the clunky evacuators of yore. They have better padding and noise control and user-friendly features, such as a sensing system that automatically turns the evacuator on and off when plume is generated. These improvements have made smoke evacuation a nearly mindless job: Just plug in the device when electrosurgery is anticipated and let it do all the work.

Electrosurgery pencils also now come adapted for smoke evacuation. These slim, easy-to-use pencils have the same feel as electrosurgery pencils without smoke evacuation tubes and provide immediate smoke evacuation while tissue is being cut or coagulated. The blade of the pencil and smoke tube can be extended to reach within deeper body cavities, while swivel joints make the device easy to manipulate and control.

Bring these newer-generation smoke evacuation

devices into your facility for a hands-on trial to give your clinicians and staff a feel for how easy they are to use. Every operating room should be equipped with one, so there's no running out of the room to retrieve the equipment when it's needed.

*Surgical masks, which often aren't secured properly anyway, cannot filter out all the particulates in electrosurgical plume.*



**10** You're not really "smoke-free" until you eliminate surgical smoke. At a time when a growing number of states, municipalities and businesses are enforcing smoke-free workplaces, there's no reason why surgical facilities should continue to expose their workers to harmful electrosurgery plume. Is surgical smoke any less

harmful and offensive than cigarette smoke?

**11** It keeps you in OSHA compliance. There are no specific federal mandates requiring the evacuation of surgical smoke, but if your staff are exposed to potentially hazardous airborne contaminants and no effort is made to fix the problem, they'd have grounds to report your facility under the Occupational Safety and Health Administration's General Duty Clause. (They wouldn't be the first.) The clause states that employers "shall furnish ... a place of employment which is free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees." These days, it's not unusual for accreditation surveyors to ask to see your smoke evacuation policy and observe whether you're following it. Although no facilities are required to have such a policy, those that do are expected to abide by such policies.

**12** It can be a recruitment and retention tool. Although gaining steam, the movement for routine surgical smoke evacuation has still been slow to catch on in many surgical facilities, so here's a great opportunity to distinguish your facility

from the pack. Be the hospital or surgery center in your area that can truly say, "We offer a smoke-free work environment." At a time when facilities have to fight to recruit and retain the best and the brightest from a dwindling pool of experienced perioperative nurses, showing your commitment to surgical smoke evacuation can make a huge impact.

**13** **Healthy staffers take fewer sick days.** Having trouble justifying the cost of smoke evacuation equipment? Think of it this way: Surgical smoke can cause chronic respiratory problems in your staff, which means recurring bouts of coughs, colds, asthma, sinus infections and other ailments that force staff to stay home and recuperate. In the long run, these ailments could cost you a great deal more in inefficiencies and cancelled cases than a few smoke evacuators will cost you in dollars and cents. If that's not convincing enough, think of the potential OSHA fines and lawsuits you'll avoid by maintaining a healthy work environment.

**14** **Surgical smoke stinks.** Have you breathed that stuff in lately? Take the time to stand by during a case using electrosurgery and experience it for yourself. Aside from the health

hazards, the odor of surgical plume can be overwhelmingly nasty. Think how much you could gain in surgeon and staff satisfaction by alleviating this daily bur-

den on their nostrils. **OSM**

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