



Smoke Evacuation Systems Clearing the Air in the OR

By Kris Ellis

As evidence continues to mount on the potential health threats of surgical smoke and laser plume, many facilities are moving to protect their surgical staff and patients by instituting surgical smoke evacuation systems in the operating room (OR). Some believe a shift in initiative is necessary to make this effort most effective. "There have been documented concerns regarding surgical smoke for well over 20 years," says Daniel Palmerton, vice president of sales and marketing at Buffalo Filter. "This type of workplace safety issue needs to be shifted from a clinical responsibility to infection control and risk management responsibility to assure compliance with a growing number of federal, professional and state regulations and standards."

Smoke evacuation can provide protection to patients and healthcare workers (HCWs) in many ways. "During laparoscopic and endoscopic procedures, patients can be protected from their own autologous plume," says Palmerton. "Although more work needs to be done to investigate long-term patient outcomes, the absorption of smoke plume in the peritoneal cavity, regardless of how it is generated, has been shown to be cytotoxic, carcinogenic and mutagenic."

Effective smoke evacuation can prevent exposure to possible contaminants in smoke. "HCWs are protected from inhaling fugitive particulate matter—dead and live cellular matter, blood fragments, viruses, toxic gases, vapors and bio aerosols," Palmerton explains. "Most of these particles are of respirable particulate size (0.3-0.5 microns)."

Filtration is an important component of protection. "The properties of the filter itself provide excellent protection," says Randy Tomaszewski, RN, BSN, MBA, vice president of marketing at Skytron. "Skytron uses a combination of HEPA and ULPA filter. HEPA filters provide an efficiency of 99.97 percent when tested with 0.3 micron dioctylphthalate (DOP) aerosol, ULPA filters have 99.999 percent efficiency with 0.12 micron latex spheres."

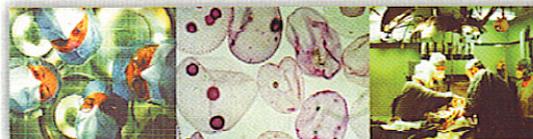
Tomaszewski says this highly efficient filtration is able to capture and neutralize bacterial, viral and fungal infectious agents as well as smoke plume, glues, bone dust and other surgically generated by-products. Other benefits include enhanced vision at the surgical site and elimination of odors within the OR.

Systems may be incorporated into existing ORs in different ways, depending on the manufacturer. "Today's stand-alone smoke evacuation systems can be easily incorporated into existing ORs because they are smaller, quieter and more portable," says Palmerton. "Many smoke evacuators can be used with ESU carts, or can be built into surgical booms or service heads."

While there is still much to be learned about the specific dangers of surgical smoke and laser plume, prevention of exposure via smoke evacuation remains the method of choice for many. Unanimity may not yet exist, but, as Palmerton says, "To the best of my knowledge, there is no regulatory body or agency in the world that believes it is a good idea to breathe ablated human tissue." **ICT**

When was the last time you
considered surgical smoke as
a possible SOURCE of
contamination in the OR?

Consider it.



Over 95% of all surgical
procedures create smoke.

Published studies & recommendations from organizations such as ANSI, CDC, ECRI, NIOSH & OSHA have indicated that surgical smoke plume contains respirable airborne contaminants which contain gaseous toxic compounds, bio-aerosols, dead & live cellular materials, and human viruses.

Buffalo Filter® is the world's leading supplier of surgical smoke evacuation equipment and accessories. These products create a cleaner and safer work environment for patients and OR staff. To learn more about our products and the hazards of smoke plume contact us directly.



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The use of a mechanical smoke evacuation system with a highly efficient filter is widely recommended as a means of providing optimal protection from surgical smoke. This type of system should also include a device to capture smoke at its source that does not impede a surgeon's ability to perform the procedure and an effective vacuum source. Such a system is endorsed by many agencies such as the Centers for Disease Control and Prevention (CDC), the National Institute for Occupational Safety and Health (NIOSH) and the American National Standards Institute (ANSI).

For facilities that have not yet enacted a method of smoke evacuation or filtration of any kind, Petersen recommends education and action. "I would first of all do a literature search to find information on exactly what's in the smoke and the possible outcomes associated with it," she says.

Once awareness of the potential threat has been established, HCWs will often be more likely to embrace procedural changes designed to protect themselves and patients. "The transition is not much of an issue if you know it's something that you should be extremely concerned about," says Petersen. "I would make sure that everybody on the team was willing to move forward with a plan of action."

Only You Can Prevent OR Fires

In addition to creating dangerous smoke, lasers and ESUs have the potential to ignite fires in the OR. Although this scenario is relatively rare, with about 100 OR fires occurring each year in the United States, the results can be devastating for patients and surgical staff. ⁷ Facilities must take measures to ensure that HCWs are properly equipped and informed to prevent fires from occurring. HCWs must also be educated and prepared to take appropriate action if they do occur.

"When they're doing lasers, if it's anywhere around the face or on the trachea, the patient will be intubated and they need to have a special protective layer on them, otherwise the laser will go right through," says Petersen. "The environment is oxygen-rich and it doesn't take much to start a fire."

In "A Clinician's Guide to Surgical Fires: How They Occur, How to Prevent Them, How to Put Them Out," several specific recommendations are given in regard to both ESUs and lasers. For ESUs, they include:

- Place the electrosurgical pencil in a holster when not in active use.
- Allow the pencil to be activated only by the person wielding it.
- Deactivate the pencil before removing it from the surgical site.
- If open oxygen sources are employed, use bipolar electrosurgery whenever possible and clinically appropriate (bipolar electrosurgery creates little or no sparking or arcing).

For lasers:

- Place the laser in standby mode whenever it is not in active use.
- Activate the laser only when the tip is under the surgeon's direct vision.
- When performing laser surgery through an endoscope, pass the laser fiber through the endoscope before introducing the scope into the patient (this will minimize the risk of fiber damage). Before inserting the scope, verify the fiber's functionality.
- Use appropriate laser-resistant tracheal tubes during upper-airway surgery and follow product directions.

If a fire should break out, an immediate and decisive response is vital. Small fires on the patient can usually be extinguished by smothering with a towel or gloved hand. Larger fires on the patient require more steps such as stopping the flow of oxygen to the patient, removing and extinguishing the burning materials and swiftly caring for any injuries to the patient.

A fire in the OR can be a sudden and confusing event. For this reason, many facilities decide to institute a fire safety plan. Identifying and resolving potential issues such as evacuation routes and the logistics of evacuating anesthetized patients, for example, can give HCWs the ability to react quickly and efficiently in an actual fire emergency. As with laser and surgical plume, preparation and knowledge are the keys to safety.

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