

EVACUATE SURGICAL SMOKE! EVERYONE HAS THE RIGHT TO BREATHE CLEAN AIR

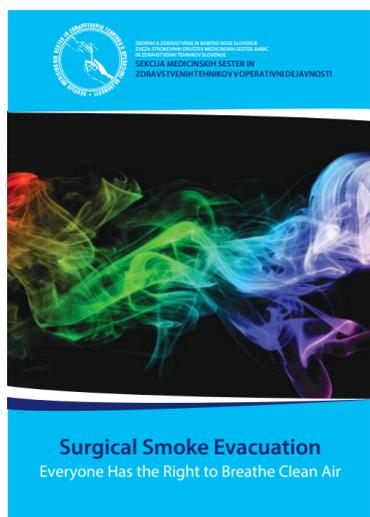
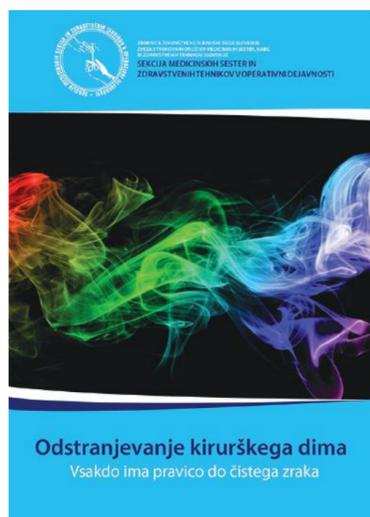
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PURPOSE

To protect the health of employees and patients in the operating room, the Slovenian Operating Room Nurses Association created an information brochure on the topic of surgical smoke to inform employees and patients about the dangerous effects of surgical smoke and effective measures for its removal. The brochure also presents the guidelines and recommendations adopted by regulatory agencies and global organizations around the world regarding the most effective system for the surgical smoke evacuation.



WHAT WE KNOW ABOUT SURGICAL SMOKE?

Surgical smoke is the gaseous by-product formed during surgical procedures. Surgical smoke is produced by various surgical instruments including those used in electrocautery, lasers, ultrasonic scalpels, high speed drills, burrs and saws. Generally, the composition of surgical smoke and aerosol is 95 % water vapor and 5 % solid particles (chemicals, blood and tissue particles, viruses and bacteria).

Potential infections from aerosols

- ▶ HIV (Human Immunodeficiency Virus)
- ▶ HPV (Human Papilloma Virus)
- ▶ HBV (Hepatitis B Virus)
- ▶ other Virus and Bacteria

Gases/odours in surgical smoke

- ▶ Toxic gases (some carcinogenic)
- ▶ Benzene, Toluene, Formaldehyde
- ▶ Furfural, Xylene
- ▶ Carbon Monoxide, Hydrogen Cyanide
- ▶ Methane, Phenol, Styrene + many more

Effects on personal health

- ▶ Headache
- ▶ Eye irritation
- ▶ Skin irritation
- ▶ Nausea
- ▶ Fatigue
- ▶ Respiratory problems

RECOMMENDED PRACTICES, GUIDELINES, STANDARDS AND REGULATIONS FOR THE PROTECTION AGAINST SURGICAL SMOKE

- ▶ AORN - Association of periOperative Registered Nurses, USA
- ▶ International Federation of Perioperative Nurses - IFPN, Canada
- ▶ Occupational Safety and Health Administration - OSHA, USA
- ▶ The National Institute for Occupational Safety and Health - NIOSH, USA
- ▶ International Council on Surgical Plume - ICSP, USA
- ▶ The Joint Commission, USA
- ▶ EORNA - European Room Nurses Association
- ▶ European Directive 2000/54/EC

STANDARD PROTECTION IS NOT ENOUGH - WHY?

▶ Ventilation in operating rooms

If there is no adequate ventilation in operating rooms, this does not allow sufficient evacuation of the resulting surgical smoke.

▶ Surgical mask

A significant proportion of the particles in the surgical smoke are in the range of 0.5-5.0 µm, which is too small to be effectively filtered through the surgical mask. Aerosol-borne diseases require a high filtration-efficiency face mask (FFP3).

▶ Medical vacuum system

Wall suction systems are not suitable for smoke plume removal. The accumulation of particles over time eventually decreases suction capability in theatre evacuation systems. All evacuated airborne particles are deposited into a central vacuum system, which can become blocked and bacteria can then multiply.

HOW MUCH DO YOU SMOKE PER DAY?

Mutagenicity

Smoke from 1 gram of cauterized tissue = 6 cigarettes without filter

Daily smoke produced in the operation room = 27 - 30 unfiltered cigarettes



Hill, D. S., et al., 2012. Surgical smoke—a health hazard in the operating theatre: a study to quantify exposure and a survey of the use of smoke extractor systems in UK plastic surgery units. *Journal of Plastic and Reconstructive Aesthetic Surgery*, 65(7): pp. 911-916.

PORTABLE SMOKE EVACUATION SYSTEM

The portable smoke evacuation systems are currently the most effective way of protecting employees and patients from inhaling the constituents of the surgical smoke. It can be used as a stand-alone smoke evacuator, or an evacuation system that is incorporated into the electrocautery or laser system.



Implementation of recommendations and guidelines that ensure the consistent use of the methods of surgical smoke evacuation and support measures, creates a safer working environment that reduces the hazardous effects of surgical smoke.

Based on a review of international recommendations and guidelines, the Slovenian Operating Room Nurses Association recommends that hospitals develop guidelines for the elimination of surgical smoke. In this context, we refer to the AORN guidelines and recom-

mendations that provide evidence of the hazards of surgical smoke for patients and employees, and discuss methods and parameters for the safe and effective evacuating of surgical smoke during open and laparoscopic surgery.

Based on the European Directive 2000/54/EC and the recommendations of international associations, the Slovenian Operating Room Nurses Association recommend the use of a portable system for the evacuation of surgical smoke as the best choice. The portable system should include an efficient filtering system, which is the most effective method for protecting employees and patients from the hazardous effects of surgical smoke.

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