

Controlling exposure to plume in health care

Plume is an airborne contaminant created during surgical procedures that cut, cauterize, or destroy tissue (such as skin, hair, fat, organs, or bones) with heat-producing devices. Plume may contain:

- Particles (for example, carbon-based materials)
- Biological agents (such as bacteria, viruses, or fungi)
- Chemicals (for example, carbon monoxide and carcinogens such as benzene or formaldehyde)

Health care workers may not always be able to see or smell plume.

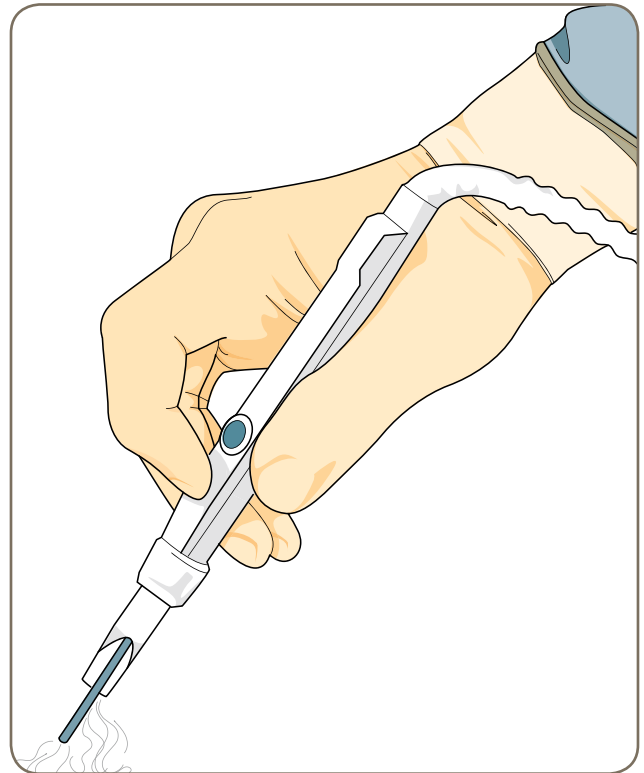
Exposure to plume can cause a number of health effects, such as:

- Headaches
- Nausea
- Eye irritation
- Upper respiratory tract irritation

In some cases, viral and bacterial infections may have been contracted from occupational exposure to plume. Given the potential for adverse health effects, employers must minimize worker exposure to plume.

Some examples of medical devices that generate plume include:

- Lasers
- Electrosurgical generators
- Broadband light sources
- Ultrasonic instruments



- Plasma generators
- Bone saws and drills

Health care workers who may be exposed to plume include:

- Physicians (for example, surgeons, ophthalmologists, urologists, gynecologists, anesthesiologists, and podiatrists)
- Dentists
- Registered nurses
- Workers providing surgical support

Use local exhaust ventilation to reduce the risk

The most effective way of minimizing worker exposure to plume is to use local exhaust ventilation (also known as a *plume scavenging system* or PSS). Respirators with a filtering medium cannot be relied upon as the primary means of minimizing exposure.

Plume scavenging systems are either portable or permanently installed. When selecting a PSS, make sure to get input from user groups as well as the joint health and safety committee or worker health and safety representative (where applicable).

A PSS must be used and maintained in accordance with the manufacturer's instructions and the relevant standards. The effectiveness of the PSS needs to be evaluated both initially and periodically.

Section 7.23 of the Occupational Health and Safety Regulation requires medical laser users to adhere to one of the following standards:

- *ANSI Standard Z136.3, Safe Use of Lasers in Health Care*
- *CSA Standard Z386, Safe Use of Lasers in Health Care*

The current versions of both of these standards reference *CSA Standard Z305.13, Plume Scavenging in Surgical, Diagnostic, Therapeutic, and Aesthetic Settings*.

Plume requires an exposure control plan

If workers may be exposed to plume, employers must include plume as part of an exposure control plan (ECP) designed to minimize worker exposure. An ECP includes elements such as:

- A statement of purpose and responsibilities
- Risk identification, assessment, and control

- Written work procedures
- Education and training
- Documentation

The ECP must be reviewed at least once a year and updated as necessary by the employer, in consultation with the joint health and safety committee or the worker health and safety representative (where applicable).

Resources

Occupational Health and Safety Regulation and Guidelines

- [Section 5.54, Exposure control plan](#)
- [Guideline G5.54-1, Exposure control plan](#)
- [Section 6.36, Controls \(for biological agents\)](#)
- [Section 7.23, Standards for use of equipment \(lasers\)](#)

Standards

- [CSA Standard Z305.13, Plume Scavenging in Surgical, Diagnostic, Therapeutic, and Aesthetic Settings](#)
- [CSA Standard Z386, Safe Use of Lasers in Health Care](#)
- [ANSI Standard Z136.3, Safe Use of Lasers in Health Care](#)

Other resources

- [Work Health and Safety - Controlling Exposure to Surgical Plume](#) (New South Wales Ministry of Health, Australia)