*IFPN Guideline  
for  
Smoke Plume*

**Introduction:**

Healthcare workers are exposed to smoke plume when electro surgery, ultrasonic, or laser equipment is used during surgical interventions. The plume that is released into the atmosphere can contain many harmful substances such as carbonised tissue, blood borne pathogens, viral particulates, bacteria, toxic and/or carcinogenic chemicals and noxious gases, to name but a few potential constituents. On many occasions, smoke plume may actually be visible to the naked eye and usually is perceived as an unpleasant smoke smell. The plume can then be inhaled by perioperative staff and has been known to cause mucous membrane, ocular, respiratory and skin irritation. Further, smoke plume may reduce the surgeon's ability to visualise the surgical field, which can result in unsafe operating conditions.

It is important that Employers and Employees are aware of the problem of smoke plume and ensure that there are policies in place to reduce the exposure to smoke plume and that such policies also comply with workplace health and safety laws, or other legislative guidance, and with International Electro-technical Commission (IEC), standards pertinent to the particular healthcare setting.

**Definitions:**

**Smoke Plume**

This is a vaporous product that is generated when electro-cautery, electro-diathermy, or laser equipment is utilised in perioperative interventions (NATN 2004). It is created by the rapid heating action of this equipment that causes tissue membranes to rupture thus releasing a plume in the form of a bio aerosol that contains noxious and toxic materials.

Guidelines to reduce the risks of smoke plume

1. **Face Masks**

It is recommended that all healthcare workers who are in an environment where smoke plume may be generated wear facemasks of 0.1-micron filtration level. However, it is important to recognise that facemasks do not provide first line of protection for filtration of surgical smoke. (IEC 60825-TR8)

* + Use 0.1-micron facemasks to minimise the level of exposure to surgical smoke and particulate matter
  + Masks must be properly fitted and worn, leaving no loose or gaping edges, which allow for peripheral leakage.
  + As far as possible such masks should be single use and disposable to ensure that they are free from contamination
  + Masks should be disposed of according to appropriate infection control guidelines for items contaminated with blood borne pathogens.

1. **Smoke Evacuation systems**

In order to minimise the risks of smoke plume to all individuals in the perioperative environment, the use of specific smoke evacuation systems is advocated.

* + Smoke evacuation systems should be specifically designed for electro surgery and laser smoke plume, with ULPA filters (ultra low penetrating air filters) that filter out particulates to 0.12 microns in size. This provides filtration of viral particulates. HEPA (high efficiency particulate air filters) provide 0.3 micron filtration, and provide only bacterial filtration, which does not capture viral particles, and should not be used for surgical smoke.
  + Filters and other accessories should be changed/maintained in accordance with the manufacturer's guidance. Consumable items such as air filters that may require regular replacement should be replaced with the manufacturer's specific product/recommendations in order to ensure that the smoke evacuation unit operates at maximum efficiency.
  + Filters, tubing, and all consumable accessories used with a smoke evacuator should be disposed of according to infection control procedures for blood borne pathogen contamination.
  + The collection device of the smoke evacuator, should be in close proximity to the operative site, usually not more than 2cm, in order to ensure maximum smoke evacuation and visibility of the operative field
  + Existing suction units in use in the perioperative environment should not be used for smoke evacuation, as they are not designed for this purpose, unless a 0.1micron in-line filter is placed between the wall outlet and the floor canister.

**References:**

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* International Electrotechnical Commission (IEC) Standards : 60825, 60825-TR8, 2005
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* American National Standards: ANSI Z136.3, section 7: Non-Beam Hazards