

Comment on “Surgical smoke: Risk assessment and mitigation strategies” and chemical adsorption by activated carbon N95 masks



To the Editor: We have read with interest the review article by Georgesen and Lipner about implementation of respiratory safety standards in dermatologic surgery.¹ This article addresses important safety standards related to protection from the effects of surgical plume. Although chemical, pharmaceutical, and painting industry personnel are generally aware of the standards for respiratory personal protective equipment, a large knowledge gap exists for physicians regarding standards of practice on air quality and safety in clinic and operating rooms. This knowledge and clinical gap usually begins in medical school, when students might be exposed to high concentrations of formaldehyde in anatomy laboratories² without the use of proper masks for chemical protection.

For specific respiratory protection against chemicals present in electrosurgical and laser smoke, high-efficiency particulate air filters, mentioned by Georgesen and Lipner, indeed arrest fine particles effectively but are not effective filters of chemical molecules. If the physician and his team have routine exposure to surgical smoke, which contain volatile organic compounds and chemical vapors, the mask should also contain a specific chemical filter, such as an activated carbon layer (Fig 1). The combination of high-efficiency particulate air filters with an extra layer of activated carbon is sometimes called high-efficiency gas adsorption filters. Cartridges in gas masks are necessary for adsorption of higher volumes. Although reusable masks (gas masks) with disposable cartridge filters exist, they tend to be heavier and interfere with head movement and vocal communication. Thus, they are not practical for the nuisance chemical levels seen in the operating room. Although aspirators with chemical filters are available and removal of fumes can be assisted with ventilator exhausters, the surgeon is close to the site of smoke production, and masks with activated carbon are still needed as personal protective equipment.

The use of disposable activated carbon masks is a simple procedure that could be adopted by all medical personnel to avoid the risk for chemical inhalation during brief nuisance exposure to chemicals and volatile organic compounds,³ such



Fig 1. Disposable activated carbon N95 mask with exhalation valve. The exhalation valve prevents respiratory vapors from condensing and blurring the surgeon's glasses, personal protection eyewear, or laser safety eyewear.

as exposure to laser and electrosurgical smoke. The same masks could be used for brief formaldehyde exposure during anatomy classes and are currently recommended for phenol-croton oil peels.⁴ Other potential uses of these masks include surgeries for necrotic wounds, examination of infected wounds, myiasis infestations, and other exposures to noxious odors. In addition to use of a fine particle filter mask, we aim to bring awareness to the necessity of using a chemical filter for protection against volatile molecules present in surgical plume.

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