

UV LIGHTS IN THE DUKE OPERATING ROOMS

Information for personnel



Ultraviolet Light FAQs

WHAT IS ULTRAVIOLET LIGHT?

Ultraviolet light is the part of the electromagnetic spectrum that lies between X-Rays and visible light. It has wavelengths between 100 and 400 nanometers. (1 nm = 10⁻⁹ m)

IS ALL ULTRAVIOLET LIGHT HARMFUL?

UV with wavelengths below 180 nm is readily absorbed by air. Therefore, only the higher wavelengths cause a health concern. This part of the spectrum is divided into three parts:

UV-A, 315 - 400 nm: A component of sunlight, causes tanning and wrinkling, and exacerbates sunburn.

UV-B, 280 - 315 nm: A component of sunlight, causes sunburn and increases cancer risk.

UV-C, 100 - 280 nm: Attenuated by the ozone layer, but artificial sources can cause skin and eye burns.

DOES ULTRAVIOLET LIGHT KILL MICROORGANISMS?

UV-C is germicidal. In the Duke Operating Rooms, 254-nm lights are present for infection control purposes. These are used for highly invasive procedures: total joints, spines with instrumentation, and implants lasting longer than two hours.

HEALTH EFFECTS OF 254 NM UV LIGHT

The UV lights in the operating rooms emit 254 nm UV light, which can harm the outer layer of the skin and eyes.

Eyes	Photokeratitis , a visually incapacitating injury, affects the outer layer of the eye (sclera or conjunctiva). Symptoms are redness, a sensation of sand in the eye, and possibly swelling of eyelids, photophobia, and tearing. Symptoms occur 6 - 12 hours after exposure and last up to 48 hours. Permanent injury is very rare.
Skin	Erythema can be mild to serious depending on exposure. Symptoms are redness, swelling, and a localized sensation of heat. Repeated burns can accelerate skin aging, while frequent severe burns may lead to precancerous conditions.

Consult Employee Health if you are photosensitive!

IF YOU ARE INJURED

Contact Employee Occupational Health and Wellness at 684-3136. Go to the Emergency Room if your condition is urgent or EOHW is closed. To report your injury, complete the [Report of Work-Related Accident, Injury or Illness](#) on the Duke Human Resources Website.

SAFE EXPOSURE LEVEL & PPE

Most people can be safely exposed to **6 millijoules per square centimeter (mJ/cm²)** over an entire workday. **This is a level of ultraviolet energy per unit of surface area.** This level was set by the **ACGIH** (American Conference of Governmental Industrial Hygienists) and **NIOSH** (National Institute of Occupational Safety and Health).

At Duke, an unprotected person on the OR table would be overexposed in only 20 minutes!

PROTECTING YOUR EYES

Protect your eyes from all angles to minimize exposure to UV light. Acceptable eye protection includes either:

Surgeon's bubble hood or	Visor AND one of these: UVEX safety glasses, lightweight splash goggles, prescription glasses w/ UV protective coating AND side shields, or orange surgical mask with face shield
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DO NOT LOOK UP AT THE LIGHTS!!!

PROTECTING YOUR SKIN

Cover all exposed areas of the skin. More opaque (tighter weave, thicker) materials are generally more protective. The Occupational and Environmental Safety Office (OESO) tested PPE available in the Operating Rooms and rated it as follows:

BEST (Blocks > 99.9%) >33 hours permissible exposure time (PET)	Sterile reusable surgical gowns, Stryker zipper toga (sleeves only), surgical gloves, green towels (for neck), visors, face shield, and DeRoyal splash glasses.
GOOD (Blocks 98 – 99.9%) 1.8 - 33 hours PET	Surgical green cloth gown, cloth skull cap, and yellow surgical mask w/ shield.
FAIR (Blocks 95 <98%) 0.7 – 1.7 hours PET	Green surgical mask, disposable ortho skull cap w/ drape (doubled), Stryker T4 disposable hood.
POOR (Blocks < 95%) <0.7 hours PET	These items do not provide adequate protection alone: Visitor PPE including bunny suit (should be worn with long sleeves), ortho cap w/ drape, bouffant, and skullcap (these caps may work for people with thick hair); surgical masks (blue, duck bill, and green w/ shield), and Astound sterile disposable gown.

Note: If you are very fair-skinned, you may find some items to be inadequate. Sunscreen under protective clothing should help.

To reduce your exposure, minimize your time under the lights and maximize your distance from them.

Questions?

Call the Occupational and Environmental Safety Office (OESO) for information on the following topics:

- Additional information on appropriate Personal Protective Equipment (PPE) for UV light
- Health effects of UV light
- Exposure standards for UV light

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