

UVC LAMPS AND SARS-COV-2

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ICNIRP Note on use of UVC lamps to kill/inactivate the coronavirus (SARS-CoV-2)

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The current pandemic caused by the novel coronavirus - SARS-CoV-2 - has led to an escalation in the number of UV lamps being marketed to inactivate this virus. ICNIRP does not recommend that consumers use such lamps in the home or elsewhere.

UV radiation is classified into three different wavebands that have somewhat different biological effects:

UVC: 100 to 280 nm – called 'germicidal' radiation because of its ability to kill bacteria and inactivate viruses. UVC can cause injury to the skin (e.g. erythema, also known as sunburn) and eye (i.e. inflammation of the cornea or photokeratitis). Solar UVC is blocked by the ozone layer in the atmosphere, so does not reach the earth's surface.

UVB: 280 to 315 nm – waveband most associated with sunburn, skin cancer and cataracts.

UVA: 315 and 400 nm – waveband most associated with skin aging; can cause other effects depending on the dose received and the presence of any photosensitizer.

See <https://www.icnirp.org/en/frequencies/uv/index.html> for more information about UV.

UVC or 'germicidal' lamps have been used for decades in healthcare and other settings to kill bacteria (e.g. tuberculosis), or viruses in air (inside light-tight air ducts), and for sterilization of drinking water. UVC radiation has been shown to inactivate the SARS-Coronavirus¹. Historically, the most common UVC lamp in use has been the low-pressure mercury vapor lamp which emits > 90% of its radiation at 253.7 nm. Newer lamps becoming available emit mainly at 222 nm and hold promise to be less dangerous for skin and eye exposure.² However, these lamps are not yet widely available, and caution is needed as there is evidence that some models may have minor emissions at longer wavelengths that are more hazardous.

UVC lamps have also been installed in the upper regions of rooms to be disinfected, but lamps must be pointed upward to minimize the chance of people being exposed. There have been reported cases of skin and eye burns resulting from the improper installation of UVC lamps in rooms occupied by people.³ This type of installation is only recommended in rooms with high ceilings and installed by knowledgeable technicians. There are also more recent types of UVC lamps that are intended to be used to disinfect spaces that are unoccupied, e.g. in hospitals. UVB radiation could also be used for disinfection purposes, but it is less effective, and potentially more hazardous to humans, than UVC radiation, thus safety measures to prevent accidental human exposure are critically important.

There has recently been a rapid increase in the number and variety of UVC lamps being marketed to consumers for home use to inactivate the SARS-CoV-2 virus. These lamps are associated with a high risk of overexposure to UVC and injuries have been reported⁴. Some of these lamps also emit ozone, which is irritating to breathing passages (nose, throat and lungs), particularly for those who have respiratory sensitivity such as asthma or allergies. In addition, most of the lamps being sold to consumers lack adequate instructions for use with respect to the exposure time that would be necessary to inactivate the SARS-CoV-2 virus. For all of these reasons, ICNIRP does not recommend that consumers use such lamps in the home or elsewhere.

References

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<https://www.ara.com/sites/default/files/MitigateShortageofRespiratoryProtectionDevices.pdf>
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4. Leung KC and Ko TC. Improper use of germicidal range ultraviolet lamp for household disinfection leading to phototoxicity in COVID-19 suspects. *Cornea*, doi: 10.1097/ICO.0000000000002397.