





Public Health

Are LED lights safe for human health?

This summary of the scientific Opinion on 'Potential risks to human health of Light Emitting Diodes (LEDs)' by the Scientific Committee on Health, Environmental and Emerging Risks (SCHEER) covers some of the Opinion's key points and goes more in depth than the one-page [factsheet](#) , on the same topic, also available on this website. An abstract and a shorter but more technical summary are also included in the [scientific Opinion itself](#) . Information about data and methodology and the science behind LEDs and eye and skin optics are also found in the Opinion and are not covered here.

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1. BACKGROUND

1.1. What is a LED?

A light-emitting diode (LED) is a semiconductor device that emits optical radiation when an electric current passes through it. Most LEDs emit a narrow band of wavelengths ranging from infrared (at a wavelength of approximately 1000 nanometers) to ultraviolet (about 300 nanometers). LEDs are used in remote controls; security lighting; screens for phones, tablets and computers; TV sets; light pointers; home lighting; outdoor lighting; street and garden lighting; traffic signals and increasingly in the automotive industry, to name just some of the applications.

LED lights are up to 90% more energy efficient than incandescent (glowing) light bulbs and last much longer than conventional light sources, making them much more economical and environmentally friendly. They also do not suddenly burn out, leaving people in the dark, but slowly lose their brightness over time. In addition, their flexible size and shape makes it possible to adapt their use to suit various needs. Unlike incandescent light sources, LED emitters are cool. However, the drive electronics may be hot and require cooling for ensure they are not damaged, and they may also occasionally fail.

These are some of the advantages of LED lights which have led to their widespread use. Their increasing popularity, in turn, led the European Commission to ask the Scientific Committee on Health, Environmental and Emerging Risks (SCHEER) to review recent evidence in order to assess if there

would be any potential risks to human health from these innovative light sources. The result of that review is published in the SCHEER Opinion on Potential risks to human health of Light Emitting Diodes (LEDs).

1.2. How could exposure to LEDs pose any risk?

LED lights emit optical radiation that could only in certain circumstances potentially damage the eyes and skin depending on several variables that have to be taken into account. These variables include the spectrum (or wavelength distribution) of the LED light source, the intensity of the lighting (especially in the blue-band), the duration of exposure, the health of the eye and how someone is looking at the LEDs – staring at them without blinking or actively moving the eyes, and looking at them straight-on or in their peripheral vision.

Any exposure to optical radiation from LEDs, however, is likely to be insignificant compared with exposure to natural light outdoors. The primary source of optical radiation is the sun. Other types of lighting, like regular lightbulbs, also expose people to optical radiation, which is just part of the electromagnetic spectrum that is divided into radio wave, microwave, terahertz (or sub-millimetre) radiation, optical radiation (infrared (IR), the visible light (VIS), ultraviolet (UV)), X-rays and gamma rays.

The human eye is exposed to high levels of natural and artificial sources of optical radiation of different spectra and intensities over a lifetime. A lifetime of this combined exposure to optical radiation may contribute to degenerative eye diseases, such as age-related macular degeneration.