

Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR)

Request for a scientific opinion:

Health Effects of Artificial Light

1. Background

Within the context of the promotion of the wide-spread use of energy saving lamps such as compact fluorescent lamps, and the upcoming phase-out of incandescent lamps, the Commission mandated SCENIHR in April 2008 to look into the claims of light sensitive citizens' associations such as Right to Light, Spectrum Alliance and Lupus UK that the symptoms of some diseases are or could be aggravated in the presence of energy saving lamps (mainly compact fluorescent lamps).

In reply to this mandate, the SCENIHR delivered an opinion on Light sensitivity on 23 September 2008, which identified blue light and ultraviolet radiation "as a potential risk factor for the aggravation of the light-sensitive symptoms in some patients with such diseases as chronic actinic dermatitis and solar urticaria". The committee also noted that "some single-envelope compact fluorescent lamps (CFLs) emit UVB and traces of UVC radiation. Under extreme conditions (i.e. prolonged exposures at distances <20 cm) these CFLs may lead to UV exposures approaching the current workplace limit set to protect workers from skin and retinal damage." However, "the use of a second lamp envelope or similar technology could largely or entirely mitigate both the risk of approaching workplace limits on UV emissions in extreme conditions and the risk of aggravating the symptoms of light-sensitive individuals."

Since the publication of the opinion and the adoption of Commission Regulation 244/2009 setting ecodesign requirements for non-directional lamps (in practice phasing out incandescent lamps by 2012), further claims and facts relating to light sensitivity and to the potential health effects of artificial light have been brought to the attention of the Commission:

1. Light sensitive citizens' associations have contested some of the conclusions of the SCENIHR opinion on light sensitivity, arguing that a wider range of disease states are affected by the light of compact fluorescent lamps than those identified by SCENIHR. They also question the effectiveness of the technology supposed to prevent the aggravation of their symptoms in the presence of compact fluorescent lamps (second lamp envelope or other similar technology).
2. Light sensitive citizens' associations claim that some of their members experience an aggravation of their symptoms when exposed to the light of screw-base halogen bulbs with improved efficiency. The potential effect of light emitting diode (LED) lamps on light sensitive patients is also largely unknown, although there are already reports of LED lamps aggravating symptoms.
3. Measurements provided by the European Lamp Companies Federation show that the proportion of UVC radiation of tungsten halogen lamps may be quite high compared to total UV radiation (up to 67% of total UV radiation for a 70W halogen capsule with G9 cap, ie 0.074 mW/klm UVC out of 0.11 mW/klm total UV). For higher wattage lamps without UV block, UVC radiation is high also in absolute terms (0.973 mW/klm for 300W lamps). The harmonised standards applicable to the UV radiation of tungsten halogen lamps (EN 60432-2 and EN 60432-3) allow up to 2 mW/klm total UV radiation, however they do not have separate requirements for UVC radiation. To the Commission's

knowledge, it has not been explored yet whether it would be justified to set out a separate UVA, UVB and UVC radiation limits for tungsten halogen lamps and other light sources and if yes, what those values should be.

4. Some press articles claim that according to recent research, artificial light with a strong blue component could affect human circadian cycles and the hormonal system, and could result in diseases ranging from sleep disorders, immune system disorders, macula degeneration, cardiovascular diseases, diabetes and osteoporosis to breast cancer. Some comparisons of the light of different artificial light sources claim further health disadvantages related to fluorescent lamps as compared to incandescent lamps.

Taking into account the above, it is considered necessary to ask SCENIHR to update the conclusions of its opinion on Light sensitivity as appropriate and to carry out an analysis of a wider range of lighting technologies and of associated potential health risks. Considering the scarcity of scientific evidence in relation to many of the questions raised, the assessment of the plausibility of the alleged health effects followed if needed by the identification of potential research needs is likely to be an important part of SCENIHR's work.

2. Terms of reference

Against the above background, SCENIHR is requested:

- A. To explore and report scientific evidence on potential health impacts on the general public caused by artificial light of which the main purpose is to radiate in the visible range (as opposed to artificial light where the invisible part of the radiation is the main purpose, e.g. suntanning lamps or infrared lamps). The impacts of the light from all available electrical lighting technologies should be studied, both in the visible and invisible range (with specific analyses of the ultraviolet radiation subtypes UVA, UVB and UVC).
- B. To update the SCENIHR report on light sensitivity (from 23 September 2008) in light of further evidence, and to examine the aggravation of the symptoms of pathological conditions in the presence of lamp technologies other than compact fluorescent lamps (including conventional incandescent and halogen lamps, halogen lamps with improved efficiency and light emitting diode lamps).
- C. If health risks are identified under point A or B, to estimate the number EU citizens who might be at risk and identify the level of emission/exposure safeguarding the health of citizens and/or means to mitigate or entirely prevent the impact of the problematic parameter of the light technology in question.
- D. To identify potential research needs related to the areas where the lack or scarcity of scientific evidence prevents SCENIHR from coming to firm conclusions.

The scope of the analysis under points A and B should cover all electrical lamp technologies, including conventional incandescent and halogen lamps, halogen lamps with improved efficiency, single-capped (compact) and double-capped fluorescent lamps, high-intensity discharge lamps and light emitting diode lamps. The full range of possible lamp luminous fluxes and lamp voltages (mains voltage, extra low voltage and other low voltages) should be covered by the analysis of each technology, and if appropriate separate conclusions should be drawn for the different voltage / luminous flux categories.

3. Deadline: 30 September 2011