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Comments regarding the nomination of “shiftwork involving light at night” into the Report on Carcinogens

Dear Dr. Ruth Lunn:

I would like to thank your agency for looking into the issue of exposure to light at night (LAN). While we are aware of the IARC report and others linking shiftwork to melatonin suppression and circadian disruption, concerns exist for exposure to LAN in sleeping areas. This may come in the form of leaving bedroom lights on, leaving the TV on, to mandatory lighting in a barracks or institution. Examples of this include:

Tennessee Prison Standards (Rule 1400-1-.04, continued)

(e) Sleeping areas in new facilities shall have lighting of at least five (5) footcandles, on the average, to be measured three (3) feet off the floor. Applies to Types I,II,III,IV, and V.

Temporary Labor Camps – OSHA Regulations 1910.142 (Rule 1910.142(g))

"Lighting." Where electric service is available, each habitable room in a camp shall be provided with at least one ceiling-type light fixture and at least one separate floor- or wall-type convenience outlet. Laundry and toilet rooms and rooms where people congregate shall contain at least one ceiling- or wall-type fixture. Light levels in toilet and storage rooms shall be at least 20 foot-candles 30 inches from the floor. Other rooms, including kitchens and living quarters, shall be at least 30 foot-candles 30 inches from the floor.

Two of the studies within the IARC report reference illumination levels of 0.2 and 0.21 lux impacting laboratory animals. Additionally, Dr. Blask's paper entitled [*Circadian regulation of molecular, dietary, and metabolic signaling mechanisms of human breast cancer growth by the nocturnal melatonin signal and the consequences of its disruption by light at night*](#), mentions "An interesting aspect of this study was that dim LAN (0.08 lW/cm² or 0.2 lux) which induced approximately a 65% suppression of the amplitude of the nocturnal melatonin signal in the blood resulted in a stimulation of tumor growth, signal transduction, and metabolic activity that was nearly complete and equivalent to that observed in constant bright light-exposed tumor-bearing rats with complete melatonin suppression." The lighting levels for Tennessee prisons and temporary labor camps are 250 and 1500 times this level respectively.

To support your review I have been compiling databases of research papers relevant to exposure to LAN. These are updated as new research becomes available and can be downloaded at:

Human Health implications

http://www.trianglealumni.org/mcrol/References-With_Abstracts.pdf

Environmental implications

<http://www.trianglealumni.org/mcrol/LAN-Environmental-References.pdf>

Combined, these have over 1800 references.

Current studies have also showed the wavelength plays a critical role in melatonin suppression. Christiana Papamichael's paper entitled *[Human Nonvisual Responses to Simultaneous Presentation of Blue and Red Monochromatic Light](#)* states "Under the current experimental conditions, the primary determinant of the melatonin suppression response was the irradiance of blue 479 nm light, and this was unaffected by simultaneous red light administration." By discussing the impacts of both wavelengths and intensity, we may be able to identify lighting strategies that minimize the impact of LAN on human health.

Sincerely,

[Redacted]

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