



UK Health Security Agency

Dr Luke Price (UKHSA) gave evidence to the UK House of Lords' Science and Technology Select Committee for the inquiry into the effects of artificial light and noise on human health¹.

Research activities at UK Health Security Agency included validation of satellite imagery real-time UV-Index retrieval against 17 ground-based measurements² in Europe, validation of a satellite-based solar UV-A dosimeter for mobile healthcare applications³ and global verification of a model for determining daylight photodynamic therapy (dPDT) dose⁴.

The studies on impact of COVID-19 lockdown on UV exposure of UK office workers⁵ and impact of exceptionally sunny spring 2020 in the UK on SARS-CoV-2 viral inactivation⁶ were completed.

Assessment of safety of home-use UV disinfection products⁷ and self-reported side-effects of these devices⁸ were published.

Results of the studies on post-exposure persistence of nitric oxide upregulation in skin cells irradiated by UV-A⁹ and seasonal differences in sunlight UV-A exposure, nitric oxide metabolites and blood pressure¹⁰ were also published.

Work on recommendations for light exposure for healthy circadian rhythms and sleep¹¹ aimed at national and international health policy makers and other stakeholders. Work on metrology^{12,13} for light exposure related to circadian entrainment and survey of light exposure of shift-working Nurses in London and Dortmund for was carried out¹⁴.

There were no new UK policies or legislations relevant to optical radiation.

The forecast of the UV Index, safety messages and advice on sun and health via short blog-style stories and accessible videos are communicated by the UK's national weather service-the Meteorological Office (Met Office)¹⁵. UV Index data for 11 UK locations are provided by UK Health Security Agency and University of Manchester and displayed in near-real time to the public with an indication when sun protection is needed¹⁶. The UV Index and sun safety messages are also available on SmartSun UV Global App for the UK and many popular holiday destinations¹⁷. Outreach activities included presentations and interactive activities about importance UV protection and light exposure for health.

References

¹UK House of Lords' Science and Technology Select Committee for their inquiry into the effects of artificial light and noise on human health. Available at:

<https://committees.parliament.uk/work/7256/the-effects-of-artificial-light-and-noise-on-human-health/>

²Kosmopoulos, P.G., Kazadzis, S., Schmalwieser, A.W., Raptis, P.I., Papachristopoulou, K., Fountoulakis, I., Masoom, A., Bais, A.F., Bilbao, J., Blumthaler, M. and Kreuter, A.. Real-time UV-Index retrieval in Europe using Earth Observation based techniques and validation against ground-based measurements. Atmospheric Measurement Techniques 14, 5657–5699, 2021.

³Morelli, M., B Michelozzi, E Simeone and M Khazova. Validation of a satellite-based solar UV-A radiation dosimeter for mobile healthcare applications. *Journal of Atmospheric and Solar-terrestrial Physics*, 215C (2021) 105529.

⁴O'Mahoney, P., M Khazova, Ethan LaRoche, B Pogue, S H Ibbotson and E Eadie. Global verification of a model for determining daylight photodynamic therapy dose. *Photodiagnostic and Photodynamic Therapy*, V 34, June 2021, 102260.

⁵Baczynska, KA, Rendell, RJ, and Khazova, M, 2021. Impact of COVID-19 Lockdown on Sun Exposure of UK Office Workers. *Int. J. Environ. Res. Public Health* 18, 4362.

⁶Rendell, R., Khazova, M., Higlett, M. and O'Hagan, J., 2021. Impact of High Solar UV Radiant Exposures in Spring 2020 on SARS-CoV-2 Viral Inactivation in the UK. *Photochemistry and photobiology*, 97, 542-546, 2021.

⁷Khazova, M. L Johnstone, D Naldzhiev and J B O'Hagan. "Survey of Home-Use UV Disinfection Products." *Photochemistry and Photobiology* 97.3 (2021): 560-565.

⁸Adams, Z., Bechlivanidis, C., Osman, M., O'Hagan, J. and Naldzhiev, D., 2022. Self-reported Side-effects of Ultraviolet-C Disinfection Devices. *Photochemistry and Photobiology*.

⁹Hazell, G., M Khazova, H Cohen, S Felton and K Raj. Post-exposure persistence of nitric oxide upregulation in skin cells irradiated by UV-A. *Scientific Reports*, (2022) 12:9465.

¹⁰Brown, T.M., Brainard, G.C., Cajochen, C., Czeisler, C.A., Hanifin, J.P., Lockley, S.W., Lucas, R.J., Münch, M., O'Hagan, J.B., Peirson, S.N., Price, L.L., Roenneberg, T., Schlangen, L.J., Skene, D.J., Spitschan, M., Vetter, C., Zee, P.C. and Wright Jr, K.P., 2022. Recommendations for daytime, evening, and nighttime indoor light exposure to best support physiology, sleep, and wakefulness in healthy adults. *PLoS biology*, 20(3), p.e3001571.

¹¹Liddle L., Monaghan C., Burleigh M., Baczynska K, Muggeridge D., Easton C., Seasonal differences in sunlight exposure, nitric oxide metabolites and blood pressure: A pilot study. *Accepted for publication in European Journal of Preventive Cardiology*

¹²Price L.L. and Blattner P., 2022. Circadian and visual photometry. In: Santhi N., Spitschan M., editors. *Circadian and Visual Neuroscience*. Elsevier: Progress in Brain Research 273(1), pp.1-11.

¹³Schlangen, L.J. and Price, L.L., 2021. The lighting environment, its metrology, and non-visual responses. *Frontiers in Neurology*, 12, p.624861.

¹⁴Price, L.L., Khazova, M. and Udovičić, L., 2022. Assessment of the Light Exposures of Shift-working Nurses in London and Dortmund in Relation to Recommendations for Sleep and Circadian Health. *Annals of work exposures and health*, 66(4), pp.447-458.

¹⁵UK Health Security Agency and University of Manchester solar monitoring UV Index. Available on: <https://uk-air.defra.gov.uk/data/uv-index-graphs>

¹⁶SmartSun UV Global App. Available on: <https://www.who.int/news/item/21-06-2022-sunsmart-global-uv-app-helps-protect-you-from-the-dangers-of-the-sun-and-promotes-public-health>

¹⁷Met Office: UV and Sun. Available on: <https://www.metoffice.gov.uk/weather/warnings-and-advice/seasonal-advice/health-wellbeing/uv/uv-and-sun-health>