



TFCOS Lifestyle Report: Impact of environmental conditions on the ocular surface



Manika Ahluwalia^{a,*}, Penny Ashbell^b, Mural Dogru^c, Giuseppe Ciaramitaro^d, Antonio Cirio^e,
 Emma Gregory^f, Dong Hyun Kim^g, Maria Cecilia Martin^h, William Ngoⁱ, Anne Srinivasa^j,
 Ian J. Salloum^k, Silvestro Viliani^l, Taka Hiroshi Wakamatsu^m, Nilsrudra Triⁿ, Frank Stapleton^o

^aDepartment of Ophthalmology, Royal Free Hospital, University College London, London, UK

^bDepartment of Ophthalmology, University of Warwick, Warwick, UK

^cDepartment of Ophthalmology, University of Michigan, Ann Arbor, MI, USA

^dDepartment of Ophthalmology, University of Bari Medical School, Bari, Italy

^eDepartment of Ophthalmology, Hospital General de Valencia, Valencia, Spain

^fDepartment of Ophthalmology, University of Liverpool, Liverpool, UK

^gDepartment of Ophthalmology, Seoul National University College of Medicine, Seoul, South Korea

^hDepartment of Ophthalmology, Hospital General de Valencia, Valencia, Spain

ⁱDepartment of Ophthalmology, Royal Free Hospital, London, UK

^jDepartment of Ophthalmology, University of Warwick, Warwick, UK

^kDepartment of Ophthalmology, Royal Free Hospital, University College London, London, UK

^lDepartment of Ophthalmology, University of Bari Medical School, Bari, Italy

^mDepartment of Ophthalmology, University of Tokyo, University of Tokyo, Japan

ⁿDepartment of Ophthalmology, University of Warwick, Warwick, UK

^oDepartment of Ophthalmology, University of Warwick, Warwick, UK

ARTICLE INFO

Keywords

TFCOS

Quality of life

Environmental factors

Work

Travel

Urban pollution

Health-related quality of life

Systematic review

ABSTRACT

Environmental factors have been proposed as major contributors to the ocular surface and associated with eye surface inflammation, conjunctival redness, discomfort, pruritus and possible corneal epithelial damage. We conducted a systematic review.

Environmental factors can be air quality related (temperature, humidity, wind speed, altitude, air pollution, ultraviolet light, ionising radiation) or the weather and climate related (snow, precipitation, storms, and other extreme weather conditions). Temperature affects ocular mucin layer homeostasis directly and indirectly (altering ocular surface structure and its composition, including ocular surface lipids) or indirectly (associated with air ionisation). There is little data on wind speed and humidity. High altitude and ultraviolet light exposure is associated with dryness, ocular surface inflammation and epithelial damage. Humidity is associated with dry eye symptoms and conjunctivitis. Heavy nitrogen exposure is associated with exposure to chemical irritants. Ionising radiation is associated with air ionisation. Solar radiation, VDU 'glaring' or blue light exposure associated with eye irritation. Most ocular surface conditions are multifactorial and several environmental factors may contribute to specific issues.

A systematic review was conducted to answer the following research question: "What are the environmental factors which contribute to ocular surface and eye symptoms in the workplace or leisure?" The top three contributors were air pollution (heat, fog and cold pollution), blue light exposure (leisure time or pollution from air) and VDU.

These results should ultimately assist in customising lifestyle measures and occupational exposure. We conclude that findings including occupational exposure.

* Corresponding author.

E-mail address: m.ahluwalia@ucl.ac.uk (M. Ahluwalia).