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Topic of the Speech:
Fabric Performance during (IR) Heat Radiation Exposure

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Professor Uwe Reischl is a Professor in the Department of Public Health and Populations Science at Boise State University, USA.

Dr. Reischl is a public health physician with research interests in occupational health, ergonomics and human factors. He received his undergraduate and graduate training at the University of California at Berkeley obtaining the Ph.D. degree in Environmental Health Sciences from the School of Public Health. He received his medical training at the University of Ulm in Germany where he obtained the M.D/Ph.D. degrees in clinical medicine.

Professor Reischl's current international research collaborations include projects with the University of Zagreb in Croatia and Khalifa University in Abu Dhabi, United Arab Emirates.

ABSTRACT SUBMISSION
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Fabric Performance during (IR) Heat Radiation Exposure

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ABSTRACT (NO MORE THAN 500 WORDS:)

Workers exposed to outdoor solar heat radiation in hot and dry climates are often at increased risk of experiencing heat related disorders. Exposure to heat radiation from the sun is a major contributor to heat stress. Protective clothing can be used to reduce such exposures. However, the attenuation of infrared heat by the garment can be offset by an increase in temperature build-up due to the retention of metabolic heat inside the clothing. This heat build-up can "counteract" the IR attenuation benefits offered by the clothing. An accurate understanding of such a "trade-off" relationship is needed to optimize the selection of fabrics in managing heat stress resulting from exposure to solar IR heat radiation.

Laboratory experiments were performed on multiple layers of Cotton, Nylon, Wool and Polyester fabric samples to evaluate their heat insulation characteristics and IR heat attenuation properties. The relationship between fabric layers and IR attenuation properties was evaluated under controlled temperature conditions.

The results of this study showed that fabric insulation heat gain and corresponding IR radiation attenuation was proportional to the number of fabric layers used. However, the IR heat radiation attenuation was significantly greater with each additional fabric layer than the heat gain "penalty" associated with fabric insulation. This suggests that multiple fabric layers can significantly reduce the risk of IR heat radiation overexposure while limiting the metabolic heat build-up inside protective clothing.

The study confirms that by selecting the appropriate number of fabric layers it is possible to optimize the IR heat radiation exposure protection while limiting metabolic heat build-up inside the clothing.

Keywords: Solar heat stress, IR heat attenuation, Multi-layered clothing, Fabric insulation