



**Topic of the Speech:**

Impact of Cosmetic Hairspray on Fabric Flammability

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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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### Impact of Cosmetic Hairspray on Fabric Flammability

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#### ABSTRACT (NO MORE THAN 500 WORDS:)

Hairspray is commonly used in shaping personal coiffures. However, chemicals contained in hairsprays are flammable and can pose significant health problems due to an increased risk of burn injury. Commercially available hairsprays usually include various combinations of polymer-based adhesives, liquid solvents and propellant gases. The propellant gases dissipate in the air after application while the liquid solvents evaporate over time. This sequence leaves behind an adhesive residue (glue) which allows hair to stick together to maintain a desired hairstyle. However, during application, a significant amount of overspray reaches the clothing, creating an unwanted film. This chemical film has recently gained attention on social media as a protective barrier to prevent makeup stains on clothing.

The objective of this research program was to identify changes in fabric flammability resulting from “overspray” onto different fabrics. Included in the tests were Silk, Cotton, Wool, Polyester and Cotton fabric samples. All test samples were exposed to an equal amount of hairspray and allowed to dry over a 24-hour period while the control samples remained free of hairspray. Maximum flame temperatures and total burn times were recorded for both the exposed and the control samples. All tests were conducted inside a temperature and humidity controlled laboratory. A total of 50 fabric samples were exposed to hairspray and 50 fabric samples served as “controls”.

The results of this study showed that the flammability characteristics of Silk, Wool, and Cotton were not impacted by the exposure to hairspray. However, the flame temperatures for the Polyester samples increased by 140% while the burn times increased by 74%. The maximum flame temperatures for the Nylon samples increased by 178% and the burn times increased by 75%. Differential Scanning Calorimetry and Confocal Raman Microspectroscopy were applied to investigate the chemical nature of the films and the micro-structural impact on the fabrics

The study demonstrated that the risk of burn injury increased significantly for the synthetic fabrics but not for the natural fabrics. This information will be helpful in the identification of future risks posed by exposure of different clothing materials to cosmetic products.

**Key words:** Hairspray, Flammability, Natural and Synthetic Fabrics, Burn Injury Risk, Public Health.