Abstract 12

Workplace Exposures and Health Outcomes of South Los Angeles Haircare Professionals in Black Hair Salons

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Objectives: 1. To determine specific occupational health and safety exposures faced by workers in Black hair salons; 2. To determine occupational health outcomes faced by workers from salon hazards; 3. To determine the prevalence of personal protective equipment (PPE) and ventilation use in salons.

Methods: 63 salon workers in South Los Angeles were invited to participate in the Healthy Hair Initiative Project survey. The survey questions were designed to assess physical, ergonomic and chemical workplace exposures encountered in salons. The questions included years in the industry, past workplace health and safety training, services provided, haircare products used, frequency of PPE use, ventilation use, and health symptoms and conditions experienced while working. Surveys were collected from salon workers (n=22) and were analyzed using statistical methods. The data collected was used to create a safety training program.

Results: Analysis of the survey responses collected showed that while 54% of hair care professionals had over 12 years of experience in the field, fewer than 39% of workers had received any health and safety training on workplace hazards. Analysis of reported health outcomes showed that 65% of workers experienced fatigue, 56% experienced pain in wrists and fingers, and 48% experienced leg or foot problems. In addition reports of physician diagnosed asthma, carpal tunnel, and reproductive health disorders were documented. PPE use varied, with protective aprons being the most used and face masks being used the least.

Conclusions: The group surveyed had a wide array of health concerns that may be attributed to work in the salon setting. Implementation of a health and safety training program for hair professionals may limit the exposures and health outcomes faced by salon workers. These results help us to target future work including training programs, policy recommendations, and advocacy efforts on behalf of salon workers.

Abstract 13

Permeation of Limonene through Disposable Nitrile Gloves Using A Dynamic and Static Robotic Hand

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Objectives: To compare the permeation of pure limonene as a low volatile solvent through different disposable nitrile gloves (blue, purple, sterling, and lavender from Kimberly Clark Professional) in a dynamic and static robotic hand as a whole glove permeation model.

Methods: A Yeager robotic hand was assembled to provide a 20-second clench cycle. A circulating water system using Viton tubing connected to a peristaltic pump was used to transfer water at 35°C from the glove to the sampling point. Experiments were in triplicate. Aliquots of 1 mL were taken at permeation time intervals of 1.0, 10, 20, 40, 60, and 80 min, 2.0, 4.0, 6.0, and 8.0 h., and deposited into 1.5-mL vials. The analytical method was based on capillary column gas chromatography-mass spectrometry with temperature programing and the internal standard method (4-bromophenol). The pre and post-permeation glove thicknesses were measured by a digital micrometer.

Results: The average thicknesses after permeation for all specific glove types were greater than 10% of the original ones ($P \leq 0.05$). The average permeation rate for the lavender gloves for the moving robotic hand (0.490 ± 0.031 μg/cm^2/min) was higher than for the non-moving hand ($P \leq 0.05$),unlike for the other gloves. The average standardized breakthrough times at 0.1 μg/cm^2/min for the moving and static hands were not different ($P \leq 0.05$). These times increased with glove thickness.

Conclusions: None of the gloves passed the Kimberly Clark Professional permeation breakthrough time criteria or the Ansell criteria. They should not be used as PPE for exposure to limonene, even for very short exposure periods. Nitrile blue gloves may be safe for short exposures of less than 20 minutes.

Abstract 14

Black Carbon and Ultrafine Particle Infiltration through HVAC System

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Objective: To identify the correlation of diesel exhaust and indoor air pollutants. Complaints of diesel exhaust odor within office spaces at the Fielding School of Public Health raised suspicion of infiltration through ventilation system, since diesel exhaust can cause premature mortality and increased cancer risk prompting administrative concern and scientific investigation. This 7 story, 2 basement building has roughly 1,800 occupants comprised of academic and administrative staff, and students.

Methods: DustTraks, SMPS, Q-Trak, and Aethalometer measured simultaneously the indoor and outdoor air concentrations of $PM_{2.5}$, ultrafine particles, carbon dioxide, and black carbon, respectively. Instruments placed inside offices measured indoor air concentrations. Instruments placed through a sealed window of the second floor office that faces the loading dock measured outdoor air concentrations. Twenty-four hour sampling was done from January 10–18, 2014. Time series of data and linear regression of outdoor and indoor concentrations were graphed.

Results: Results indicate consistent infiltration of diesel exhaust due to diesel truck traffic in the loading dock where the HVAC is located. Spikes in indoor air pollutant concentrations are observed throughout the day that correspond to outdoor air pollutant concentration. Outdoor air concentrations and indoor air concentrations have similar trends. R-squared analysis of black carbon reached up to 0.63, $PM_{2.5}$ peaked at 0.62, ultrafine particles was up to 0.93, and carbon dioxide's highest r-square was 0.86. Differences in correlation is explained by chemical and physical properties of ultrafine particles, $PM_{2.5}$, black carbon, and carbon dioxide. Peaks in concentrations occurred during the

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