



Mortality among workers in the Pooled Uranium Miners Analysis (PUMA)

David Richardson, Estelle Rage, Paul A Demers, Minh Do, Nora Fenske, Michaela Kreuzer, Johnathan Samet, Charles Wiggins, Mary Schubauer-Berigan, Kaitlin Kelly-Reif, et al.

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ratios across exposure groups that have been mutually standardized to a common target population. We propose models that facilitate empirical assessment of these conditions. We used simulations to illustrate this approach, along with an empirical example.

Results: Under minimal heterogeneity in the difference in log risk ratios, as signaled by our estimated model parameters, this disease risk score-based model yields trend estimates that are equivalent to those quantified using inverse probability of exposure-weighted marginal structural models for the average effect of exposure among the exposed.

Conclusions: This approach should facilitate examinations of exposure-response trends in standardized risk ratios when disease risk scores are advantageous.

Mortality among workers in the Pooled Uranium Miners Analysis (PUMA)

Richardson D^{1,2}, Rage E², Demers P³, Do M³, Fenske N⁴, Kreuzer M⁴, Samet J⁵, Wiggins C^{6,7}, Schubauer-Berigan M⁸, Kelly-Reif K⁸, Tomášek L⁹, Zabłotska L¹⁰, Laurier D²

¹University of North Carolina At Chapel Hill, ²Institute for Radiological Protection and Nuclear Safety, ³Occupational Cancer Research Centre, ⁴Federal Office for Radiation Protection, Department of Radiation Protection and Health, ⁵Colorado School of Public Health, ⁶University of New Mexico, ⁷New Mexico Tumor Registry, ⁸National Institute for Occupational Safety and Health, ⁹Radiation Protection Institute, ¹⁰University of California

TPS 791: Occupational health 1, Exhibition Hall, Ground floor, August 26, 2019, 3:00 PM - 4:30 PM

Background: The Pooled Uranium Miners Analysis (PUMA) study draws together information about workers employed in uranium mining in Canada, the Czech Republic, France, Germany, and the United States. We compared mortality in PUMA to expectations based upon national mortality rates.

Methods: The cohort includes over 120,000 uranium miners and over 50,000 deaths. Vital status and cause of death were ascertained and standardized mortality ratios (SMRs) were computed; SMRs were tabulated by categories of attained age, calendar period of follow-up, duration of employment as a miner, and calendar period of first employment as a miner.

Results: Overall, the miners in PUMA experienced all cause mortality rates near those for the general population (SMR=1.0; 95%CI: 1.0, 1.0). There were more deaths than expected due to cancer of the lung (SMR=1.8; 95%CI: 1.8, 1.9), larynx (SMR=1.1; 95%CI: 0.9, 1.3), and liver (SMR=1.1; 95%CI: 0.9, 1.2). Non-malignant respiratory disease mortality also was in excess in PUMA (SMR=1.1; 95%CI: 1.0, 1.2). The relative excesses of mortality due to lung cancer and non-malignant respiratory disease persisted into more recent decades of follow-up, tended to increase with duration of employment as a uranium miner, and tended to decrease with more recent year of first employment as a uranium miner. While lung cancer was elevated in all of the PUMA cohorts, the relative excess of lung cancer was greatest among US Colorado Plateau (SMR=4.7; 95%CI: 4.3, 5.1) and Czech miners (SMR=2.9; 95%CI: 2.8, 3.1), intermediate for US New Mexico (SMR=1.9; 95%CI: 1.6, 2.1) and German Wismut (SMR=1.9; 95%CI: 1.8, 1.9) miners, and smallest among French (SMR=1.3; 95%CI: 1.2, 1.5), Canadian Ontario (SMR=1.3; 95%CI: 1.3, 1.4), and Canadian Eldorado (SMR=1.3; 95%CI: 1.2, 1.4) miners.

Conclusions: PUMA provides evidence of excess mortality among uranium miners and underscores the importance of long term follow-up to identify the effects of occupational exposures.

Effectiveness of portable air cleaners to reduce indoor PM2.5 and NH3 in an agricultural cohort of children with asthma

Riederer A¹, Krenz J¹, Tchong-French M¹, Min E¹, Torres E², Perez A³, Jansen K¹, Younglove L¹, Karr C¹

¹University of Washington, ²KDNA, ³Yakima Valley Farm Workers Clinic

OPS 33: Health impact of interventions 2, Room 411, Floor 4, August 28, 2019, 10:30 AM - 12:00 PM

Background/Aim: We are conducting a randomized trial of home HEPA air cleaners with NH3 pre-filters. The study involves children age 6-12 years with poorly controlled asthma living in non-smoking homes in Yakima Valley (WA, USA) where agricultural production contributes to ambient PM and NH3.

Methods: Households were recruited through a community farm-worker clinic-based asthma program. Controls received asthma education, a HEPA furnace filter, and green cleaning supplies. Additionally, intervention homes received two portable HEPA cleaners (child's bedroom, living room).

14-d integrated samples were collected at baseline and one-year follow-up in each room using RTI MicroPEMs (PM2.5) and Ogawa Passive samplers (NH3). MicroPEM filters were weighed and Ogawa extracted/analyzed at the University of Washington.

Results: 71 households completed the study. Most were detached single family homes (67.6%), with electric heat (78.9%), electric stove (93.0%), A/C (93.0%), dog and/or cat (62.0%), and mean (SD) 5.3 (1.8) occupants. Intervention and control families did not differ significantly in demographic or home characteristics. HOBO devices indicated HEPA cleaners were on approximately 70% of the time.

Child's bedroom data are presently available for 24 intervention/19 control (PM2.5) and 30 intervention/24 control (NH3) homes. Baseline geometric mean (GSD) PM2.5 and NH3 concentrations were 8.73 (1.87) ug/m3 and 64.70 (1.69) ug/m3, respectively, with no significant difference by group (intervention/control). At follow-up, GM PM2.5 differed by group, with a mean 48.5% (27.5%) drop in PM2.5 from baseline in the intervention homes vs. a 1.8% (53.8%) drop in the controls. Follow-up NH3 concentrations did not differ significantly by group, with a mean decrease of 13.5% (29.6%) in intervention homes vs. a 10.8% (46.5%) increase in control homes.

Conclusions: We observed significant reductions in PM2.5 but not NH3 in rural homes of children with asthma. The PM2.5 reduction is consistent with studies of HEPA air cleaner use in urban settings.

Associations between Ambient Particulate Matter (PM2.5), Endothelial Dysfunction and Inflammation

Riggs D¹, Zafar N¹, Yeager R¹, Krishnasamy S², Rai S³, Bhatnagar A¹, O'Toole T¹

¹Christina Lee Brown Envirome Institute, University of Louisville, ²Department of Medicine, Division of Endocrinology, Metabolism, and Diabetes, University of Louisville, ³Department of Bioinformatics and Biostatistics, University of Louisville

TPS 683: Short-term health effects of air pollutants 2, Exhibition Hall, Ground floor, August 28, 2019, 3:00 PM - 4:30 PM

Ambient air pollution is a complex mixture of particulate matter (PM2.5), gases and metals. Epidemiological evidence suggests that exposure to air pollution is one of the leading risk factors for cardiovascular disease (CVD). While the association between PM2.5 exposure and CVD is particularly strong, the pathophysiologic mechanisms underlying this association are not completely understood. We conducted a cross-sectional study of 100 participants, recruited from the University of Louisville. Peripheral endothelial function in these subjects was assessed by calculating a reactive hyperemia index (RHI) using the EndoPAT device. Urine samples were used to measure isoprostanes (n=90) while 14 cytokines, 2 adhesion molecules, and 2 matrix metalloproteinases were measured in plasma using a Luminex (n=77). Ambient levels of PM2.5 were obtained by calculating the daily average of all regional EPA-validated monitoring stations in the Louisville, KY region. Adjusted associations with ambient PM2.5 levels were tested using generalized linear models. The average age of our participants was 48 years, with 44% male, 62% white, 52% with diagnosed hypertension, and