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PP-30-099
Assessing the Value of Including Global Position System in Personal Exposure Monitoring Studies
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Background/Aims: Time spent in different locations can be a significant predictor of personal particulate matter (PM$_{2.5}$) exposures. Continuous personal PM$_{2.5}$ measurements enable characterization of differential exposure; however, these data are rarely available. Typically, locations are noted in time-activity diaries (TAD). However, these are limited by the following: (a) relatively coarse temporal resolution of reporting, and (b) the subject’s ability to accurately report daily activities. In this study, we use personal global position system (GPS) to examine the role that proximity to point and mobile sources plays in altering exposure profiles.

Methods: Eighteen Hamilton-based pregnant women participated in a 2007 exposure study. To evaluate the accuracy of participant-reported location, TAD entries (15-minute resolution) were compared to activity classifications based on GPS location (1 second time-step). We used GIS software to develop an automated method for classifying participants’ activities at each second of the GPS time series. Other exposure predictors examined included road type and proximity to point sources. This method used various spatial attribute, and temporal decision rules, and used road networks, building, footprints, and so on.

Results: For each of the 18 participants, we often found significant misclassification when comparing participant-reported TAD location, with the location derived using our automated method. For example, on average, subjects over-reported the amount of time spent indoors at home by as much as 10%-15%, when GPS indicates they were either outdoors or travelling in a car. In the worst case, subject misclassification for this activity was as high as 60%. Other misclassifications will be discussed in this presentation.

Conclusion: We found that incorporating GPS data into personal exposure monitoring studies helps to reduce subject-location misclassification found when using TAD. Future work will examine whether classifying continuous PM$_{2.5}$ measurements according to GPS location increases the power to detect different exposure levels across locations. We will also investigate whether road type and proximity to point sources are significant predictors of exposure.

PP-30-100
Water-related Activity Mode and Dermal Exposure Factors of People in Typical Northern City in China
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Background/Aims: There has been a growing awareness of the importance of dermal exposure in recent years. However, researches on the dermal exposure factors of Chinese people so far are still very limited. This study is going to investigate the water-related dermal exposure factors in Chinese people.

Methods: Twenty-five hundred people in Miyang county in Henan province were selected as research subjects in this study. Their water-related activities were acquired by questionnaires and field measurements.

Results: Results showed that surface areas of adults in these subjects are 1.68 m$^2$. The surface areas of male and female are 1.75 and 1.62 m$^2$, respectively, which are 3.6% and 7.3% higher than those of Japanese people, and 10.7% and 4.1% lower than those of American people. The exposed dermal areas vary a little on different situation and in different seasons. The water-related activities and frequencies vary in subject groups with different ages and genders. The water-related activities of adults between genders show significant difference and the male adults spend less time. The concrete time percentages for major water-related activity of the male adults are 51% for bathing, 12% for hands-washing, 12% for face-washing, 9% for clothes-washing, and 9% for head-washing, respectively. However, the concrete time percentages for major water-related activity of the female adults are 29% for clothes-washing, 23% for bathing, 16% for dishes-washing, and 13% for vegetables-washing, respectively.

Conclusion: This pilot study indicates that the exposure factors of people in China are different from the other countries, and it is necessary to carry out further studies on dermal exposure factors in Chinese people.

PP-30-101
Occurrence of Disinfection By-products in Drinking Water in Different Italian Northern Regions
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Background/Aims: Drinking water chlorination treatments produce different disinfection by-products (DBPs) as a consequence of the reaction between chlorine in water and natural organic matter. This study is part of the international project HiWATE (Health Impacts of Long-Term Exposure to Disinfection By-Products in Drinking Water) supported by the EU Sixth Framework programme (FP6). The aim was to investigate the presence of DBPs in drinking water in different northern regions in Italy, where groundwater with low organic matter is generally supplied and where the use of chlorine dioxide as chlorination treatment is widespread.

Methods: Bromate, chloride, chlorate, haloacetic acids and 3-chloro-4-(dichloromethyl)-5-hydroxy-2(5H)-furanone (MX) and trihalomethanes levels were investigated in drinking water samples collected form 12 waterworks located in Emilia Romagna, Friuli Venezia Giulia, and Lombardia Regions. To investigate seasonal variability, water samples were collected for 4 seasons between 2007 and 2008.

Results: MX and haloacetic acids were never detected (detection limit: 0.5 ng/L and 1 µg/L, respectively). Trihalomethanes were always found at very low concentrations regardless of the disinfection treatment (mean: 2.04 µg/L, maximum value: 26.9 µg/L). Bromate was detected only in one waterworks in which disinfection was performed by ozone and chloride dioxide (range: 2–14 µg/L). Chlorite was found only in chlorine dioxide-disinfected drinking water (4 waterworks; mean value: 136 µg/L; range:28–523 µg/L), whereas chlorate resulted the most widespread DBP (>85% of the samples), with concentrations ranging from 1 to 399 µg/L. No consistent general trends were observed, for DBPs seasonal variations, in the investigated Italian drinking waters.

Conclusion: DBPs levels in Italian drinking water appear generally low; however, individual DBPs and levels vary according to the different disinfection treatments: when chlorine dioxide is applied as disinfection method, high values of chlorite and chlorate could have been detected. Because of their potential health effects, the presence of chlorite and chlorate in drinking water deserve further investigation.