ehp Environmental Health Perspectives

Environmental Health Perspectives is pleased to present this abstract on behalf of the International Society for Environmental Epidemiology (ISEE). This abstract was presented at a past ISEE annual meeting and has not been peer reviewed.

Approaching personal exposure assessment at population scale: The Holy Grail is not made of gold

Abstract Number: P3-287

John Volckens*, Casey Quinn, David Leith, John Mehaffy, Charles Henry, and Daniel Miller-Lionberg

Abstract

Introduction: Assessing personal exposure to air pollution has proven challenging, especially at scales relevant for epidemiologic research. The exposure monitors themselves pose technological limitations (cost, noise, weight) that restrict research to relatively modest sample sizes. Further complicating this problem are issues of reliability and user compliance, both of which are exacerbated when conducting research in resource-limited environments.

Methods: We developed a new monitor, an ultrasonic personal aerosol sampler (UPAS) through advances in low-cost electronics, open-source programming, and additive manufacturing. The UPAS is a time-integrated aerosol monitor that features a novel, virtually silent micro-pump. The UPAS was tested for pump and battery performance, flow accuracy, sampling efficiency, and through chamber tests against an EPA-certified reference method for $PM_{2.5}$.

Results: The UPAS prototype weighs 190g, emits under 40 dB of noise, and can operate continuously for 48 or 24 hr on a single battery charge at either 1 or 2 L/min of flow, respectively. The UPAS cyclone inlet performed within 5% of the EPA federal reference method (FRM) for $PM_{2.5}$. Chamber tests relative to the FRM sampler showed low bias (accuracy of 5.5 +/- 4.8% at one

standard deviation), good precision (6.1% relative standard deviation among co-located devices), and high linearity across a broad range of $PM_{2.5}$ concentrations (20-1000 ug/m3) that are relevant to household air pollution.

Conclusions: The UPAS shows promise for increasing our ability assess personal PM exposures by reducing the size, weight, and cost of personal samplers. As a result, sampling can be conducted at scales that are more relevant to epidemiologic and community-based research.

ISEE 2016

INTERNATIONAL SOCIETY FOR ENVIRONMENTAL EPIDEMIOLOGY
ISEE
STUDYING HUMAN HEALTH AND THE ENVIRONMENT

28th Annual Conference

International Society for Environmental Epidemiology

"Old and new risks: challenges for environmental epidemiology"

September 1-4, 2016

Rome, Italy

DEP Lazio
Department of Epidemiology
Lazio Regional Health Service
Italy (ex ASL RomaE)

SISTEMA SANITARIO REGIONALE
ASL ROMA 1

REGIONE LAZIO

P3-265 **Co-benefits for climate and public health within ClimBHealth: 2. Assessment of physical activity**
Hanns Moshammer, Willi Haas, Ulli Weisz, Christian Lauk, Karl Steininger, Brigitte Wolkinger, Robert Griebler, Peter Nowak, Charlotte Klein, Jennifer Delcour, Michaela Theurl, Christian Kurz, Cem Ekmekcioglu, Peter Wallner, Michael Kundi, Hans-Peter Hutter*

P3-266 **Co-benefits for climate and public health within ClimBHealth: 3. Assessment of meat reduction**
Hanns Moshammer, Willi Haas, Ulli Weisz, Christian Lauk, Brigitte Wolkinger, Robert Griebler, Peter Nowak, Charlotte Klein, Jennifer Delcour, Michaela Theurl, Christian Kurz, Cem Ekmekcioglu, Peter Wallner, Michael Kundi, Hans-Peter Hutter*

P3-267 **Comprehensive Health Impact Assessment for Active Travel: the**
David Rojas-Rueda, Mark Nieuwenhuijsen, Natalie Mueller, Elisabeth Raser, Regine Gerike, Audrey de Nazelle, Anna Clark, Annika Nilsson, Carsten Rothballer, Christian Brand, Christian Schweizer, Francesca Racioppi, Evi Dons, Jurgen Buekers, Luc Int Panis, Sandra Wegener, Sonja Kahlmeier, Thomas Goetschi*

P3-268 **Effect of the September 2009 Sumatra earthquake on health impact facilities in the city of Padang, Indonesia: a one-half year post-quake assessment**
*Defriman Djafri**

P3-269 **Generation of exposure response relationships for short term health effects related to urban air pollution**
Priscilla Johnson, Sheela Ravinder, Santu Ghosh, Padmavathi Ramasamy, Kalpana Balakrishnan*

P3-270 **Impact of climate and emission change on ozone induced mortality in Europe with combining effect of heat**
Hans Orru, Camilla Andersson, Christofer Åström, Tanel Tamm, Kristie Ebi, Bertil Forsberg*

P3-271 **Pioneering mobile data capture: using mobile phones in the post event coverage survey of vitamin A supplementation and measles immunisation in Sierra Leone, May 2012**
Habib Issa Kamara, Mary H. Hodges, Mohamed Turay*

P3-272 **The Scope and Magnitude of the Public Burden from PM2.5 between 1980 and 2010 in the Contiguous U.S.**
Neal Fann, Sun-Young Kim, Lianne Sheppard*

P3-273 **Developing Malaria Susceptibility Area in Sabah, Malaysia using Spatial Analysis**
Siti Aisah Mokhtar, Jamal HIsham Hashim, Farrah Melissa Muharam, Rozita Hod, Ummi Kalthom Shamsudin*

P3-274 **The Public Health Consequences of Hygenically Clean**
*David F Goldsmith**

P3-275 **Risks and Policies Focused on Hospital Infections and Contaminated Textiles**
David F Goldsmith, Dirk Hoefer*, Kwok-Yung Yuen*, M.P. Muller**

P3-276 **Survey of dermatophytes on the haircoat of free-ranging golden-headed lion tamarins (Leontopithecus chrysomelas)**
Juan Justino A. Neves, Adriano Pereeira, Marina Galvao Bueno, Jose Luiz Catao-Dias, Camila Molina, Maria Cecilia M Kierulff, Alcides Pissinatti, Selene Dall' Acqua Coutinho*

P3-277 **Environmental occurrence of microsporidia in water sources: a necessity of development a standard detection method**
Adriano Pereira, Ronalda Silva Araújo, Maria Anete Lallo*

P3-278 **The seasonality and effects of temperature and rainfall on Campylobacter infections**
Gordon Nichols , Lora Fleming, Gianni Lo Iacono, Christophe Sarran, Anthony Kessel , Richard Elson , Iain Lake, Trevor Bailey, Sari Kovats , Felipe J Colon-Gonzalez , Chris Lane , Jan Semenza, Christophe Höser*

AREA 4—Air Pollution, Cancer & Disasters

P3-279 **Use of ventilation as a control banding tool in quantifying exposure concentration of particulates in biomass using rural kitchens of South India– a pilot study**
*Krishnendu Mukhopadhyay**

P3-280 **Asthma Symptoms among Children 7 Years after the Hebei Spirit Oil Spill**
Jung-Ah Kim, Myung-Sook Park, Yeonhee Chu, Seung-Hwa Lee, Young-Hyun Choi, Mina Ha, Hae-Kwan Cheong*

P3-281 **Respiratory Sympthoms in Childhood associated to a tire fire in Bogotá D. C. 2014.**
David Mauricio Muñoz, Jhon Jairo Abella, Monica Montaña, ivan Miranda, Rodrigo Sarmiento, Samuel Osorio*

P3-282 **Environmental Epidemiology and Population Engagement: the Manfredonia Environment and Health Project**
Annibale Biggeri, Rosa Porcu, Emilio Antonio Luca Gianicolo, Bruna De Marchi, Antonella Bruni, Cristina Mangia, Marco Cervino, Maria Angela Vigotti, Manfredonia Environment and Health Project Collaborative Group*

P3-283 Air pollutant emissions patterns by cooking fuel type among Sri Lankan households
Sumal nandasena, Nalini Sathiakumar, Rod Larson, Anuradhini Kasturiratne, Meghan Tipre, Udaya Wimalasiri, Rajitha Wickreme Singhe*

P3-284 **Air Pollution and Cardiorespiratory Mortality in São Paulo, Brazil – a times series study**
Simone Miraglia, Karina Abe*

P3-285 **Air pollution exposures among pregnant women in a United States - Mexico border town**
Kirsten Koehler, Ana Rule, Natalie Johnson, Jairus Pulczinski, Josias Zietsman, Suriya Vallamsundar*

P3-286 **An Assessment of enhanced personal exposure monitoring among children using the Ghana Randomised Air Pollution and Health Study (GRAPHS) Platform**
Kwaku Poku Asante, Darby Jack, Kenneth Ae-Ngibise Ayuurebobi, Ellen Abrafi Boamah, Mohammed Mujtaba, Ashlinn Quinn, Kaali Syram1, Ryan Chartier, Patrick Kinney, Seth Owusu-Agyei, Steven Chillrud*

P3-287 **Approaching personal exposure assessment at population scale: The Holy Grail is not made of gold**
John Volckens, Casey Quinn, David Leith, John Mehaffy, Charles Henry, Daniel Miller-Lionberg*

P3-288 **Assessing Exposure to Ambient Fine Particulate Matter Based on Digital Imagery**
Tamar Yacobi, Yael Etzion, Rohan Jayaratne, Md Mahmudur Rahman, Lidia Morawska, Barak Fishbain*

P3-289 **Assessing personal exposure to traffic air pollution - traffic map and mobile phone tracking technologies**
Hai-Ying Liu, Erik Skjetne*

P3-290 **Association between PM_{10} and mortality at municipalities' level in Slovenia: ecological spatial study (LIFE MED HISS LIFE12 ENV/IT/000834)**
Andreja Kukec, Simona Percic, Ivan Erzen, Lijana Zaletel-Kragelj, Peter Otorepec, Ennio Cadum, Xavier Basagaña*