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Project Number: 1R01ES026980-01

Title: NEAR HIGHWAY POLLUTION: FROM RESEARCH TO ACTION

Contact PI / Project Leader: BRUGGE, DOUG

Awardee Organization: TUFTS UNIVERSITY BOSTON

Abstract Text:

Abstract Ultrafine particles (UFP) are elevated locally near areas of concentrated **Motor Vehicles**. Evidence is strong that living near highways or major roadways is associated with increased risk of **respiratory**, **Cardiovascular** and other adverse health outcomes. In recent work, we have shown associations between chronic exposure to UFP and blood biomarkers of **Cardiovascular** disease risk. Our work has been conducted as community-based participatory **research** (CBPR) with involvement of community representatives in all aspects of the science. We have published almost 30 papers showing capacity for high productivity. This proposal builds on what we have learned regarding UFP characterization, risk assessment, and exposure mitigation. We propose a youth- engaged (N=45) project that translates our current knowledge base about use of air **Filtration** in building ventilation systems into practice in two of our partner communities. We will use an adaption of the Interactive Systems Framework for Dissemination and Implementation (ISF) as a guide and we map each step of the process for translation onto this framework. We start with **research** on the surprisingly understudied problem of benefits of reducing exposure **to** traffic pollution. We will conduct exposure experiments with 75 adult participants from our two partner communities. Participants will be exposed **to** unfiltered and filtered air from a building ventilation system while their blood pressure and heart rate are measured. We will evaluate air quality indoors and outdoors by measuring UFP, black carbon and PM2.5 concentrations. Next, we will translate our research results into practice using Health Impact Assessments (HIAs) and a community-engagement process. The HIAs will assess the potential health benefits of widespread use of improved **Filtration** in building ventilation systems in the communities. The subsequent community engaged process will consist of design charrettes (architectural planning exercises) followed by attempts **to** influence actual building designs. The charrettes will engage multidisciplinary teams seeking **to** alter the design of new or retrofitted housing or schools so that they use more protective air **Filtration**. The process of moving our **research** knowledge into practice will be the subject of social science studies. We will use validated and standard scales as well as qualitative data to assess whether youth participation increases active citizenship and environmental health literacy. There will be a qualitative evaluation of the community processes **to** learn more about how the relevant science can influence community-level practice. The use of design charrettes in public health **research** is, **to** our knowledge, novel. Our proposed **research** is highly significant and innovative in that millions of Americans live near heavy traffic and little rigorous work has addressed either the health benefits of air **Filtration** or how to influence air handling system design in communities. The combined impact of this work will be improved understanding of how **to** mitigate the effects of UFP exposure in local communities which could contribute to improving public health.

Public Health Relevance Statement:

Project Narrative Air pollution from traffic represents a serious public health risk. We seek **to** better understand and **to** develop protective responses **to** locally ultrafine particles at the community level with extensive youth engagement. Our aims include assessing the benefits of **Filtration** in building ventilation systems and translating our knowledge base into practice using a guiding framework. We will unfold community implementation that includes use of design charrettes and health impact assessments. We will use social science studies **to** evaluate the impact on youth civic engagement and environmental health literacy.

Project Terms:

abstracting; Acute; Address; Adult; Air; air filter; air **Filtration**; Air Pollution; American; Area; Attention; Authorship; Biological Markers; Biomass; Blood; Blood Pressure; **Boston**; **Breathing**; Caliber; Carbon Black; **Cardiovascular** Diseases; **Cardiovascular** disorder risk; **Cardiovascular** risk factor; **Cardiovascular** system; Cessation of life; Chemicals; Chronic; Chronic Disease; Coal; cohort; Collaborations; Communities; community based participatory **research**; Community Developments; community planning; Cross-Sectional Studies; Data; Data Collection; demographics; density; design; Drops; Education; Environmental air flow; Environmental Health; Exercise; experience; Exposure **to**; **Filtration**; Foundations; Funding; Goals; Health; Health Benefit; health literacy; Heart Rate; high school; Housing; improved; Indoor Air Quality; innovation; Knowledge; knowledge base; Lead; Learning; Life; Literature; Maps; Measures; member; meter; Methods; metropolitan; Modeling; Morbidity - disease rate; mortality; **Motor Vehicles**; multidisciplinary; novel; **Observational Study**; Outcome; Paper; Participant; particle exposure; Particulate Matter; Petroleum; Policies; pollutant; Pollution; Process; Productivity; Public Health; public health **research**; Publishing; **Puerto Rican**; Qualitative Evaluations; **research**; **research** Design; **research** Project Grants; **research** study; residence; **respiratory**; response; Risk; Risk Assessment; **Risk Factors**; Role; School Teachers; School-Age Population; Schools; Science; Social Sciences; success; System; Testing; Time; traffic-related air pollution; trafficking; Training; Translating; Translation Process; ultrafine particle; Work; young adult; Youth

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