Title: A Community-Based Approach to Developing a Mobile Device for Measuring Ambient Air Exposure, Spatial Location and Respiratory Health

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Abstract

In west Eugene (Oregon), community research indicates residents are disproportionately exposed to industrial air pollution and exhibit increased asthma incidence. In Carroll County (Ohio), recent increases in unconventional natural gas drilling sparked air quality concerns. These community concerns led to the development of a prototype mobile device to measure personal chemical exposure, location, and respiratory function. Working directly with the environmental justice (EJ) communities, the prototype was developed to (1) meet the needs of the community and; (2) evaluate the use in EJ communities. The prototype was evaluated in 3 community focus groups (n=25) to obtain feedback on the prototype and feasibility study design to evaluate the efficacy of the device to address community concerns. Focus groups were recorded and qualitatively analyzed with discrete feedback tabulated for further refinement. The prototype was improved by community feedback resulting in 8 alterations/additions to software and instructional materials. Overall, focus group participants were supportive of the device and believed it would be a useful environmental health tool. The use of focus groups ensured that community members were engaged in the research design and development of a novel environmental health tool. We found that community-based research strategies resulted in a refined device as well as relevant research questions, specific to the EJ community needs and concerns.