Microenvironment Tracker (MicroTrac): Personal Time-Activity Modeling

Background

To better understand people's contact with pollutants and their potential for adverse effects, it's important to estimate how much time people spend in different locations and what activities they do there. Using questionnaires to collect this information has limitations, including the burden on participants and inaccuracies in questionnaire responses.

To address these limitations, there is a growing commitment to use common personal electronic devices – like smart phones, global positioning systems (GPS), and movement sensors – to collect exposure data on personal activities that can be integrated with personal pollutant and health monitoring devices.

What is MicroTrac?

MicroTrac is a model developed by EPA that uses GPS data to estimate time of day and duration that people spend in different microenvironments, such as indoors and outdoors at home, work, school, and inside vehicles.

Using MicroTrac can improve exposure assessments for health studies by helping air pollution scientists determine location and physical activity of study participants prior to adverse health effects. Using smart phones with these data collection capabilities will facilitate and expand the use of MicroTrac in health studies, and will support community applications of MicroTrac, such as modifying behavior for susceptible individuals like asthmatics.

GPS data loggers like this one collect information on a person's location and speed for input into MicroTrac.

How is MicroTrac being used?

MicroTrac has been evaluated using a pilot study in central North Carolina, and additional evaluations are ongoing with North Carolina State University and Hong Kong University of Science and Technology. The model is being applied for various health studies, including a childhood asthmatic health study in Detroit, and a cardiovascular health study in North Carolina.

This research can improve exposure assessments for health studies that provide a scientific basis for air pollution regulations, and for creating public health strategies that help vulnerable people reduce their exposure to air pollution.

Next steps for MicroTrac

EPA scientists are currently developing a smart phone application called MyAir that will allow MicroTrac users to predict their exposure to outdoor-generated air pollution. The app is being currently being developed for iPhone only, and will likely become available for download via the App Store. Developers have not yet set a release date for the app.

Learn more about MicroTrac and download the model at:
www.epa.gov/air-research/microenvironment-tracker-microtrac-model-helps-track-air-quality

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