

Executive Summary

The Houston Exposure to Air Toxics Study (HEATS) is a two-year project that will link personal exposure measurements to ambient measurements of air toxics by evaluating exposure to populations that reside adjacent to the Houston Ship Channel, and comparing those exposures to a socio-demographically-matched population distant from the Ship Channel region. HEATS is funded by multiple sponsors at \$1.1 million. The TERC contribution is \$50,000. The study consists of four phases:

1. Laboratory testing of passive sampling devices for air toxic compounds of concern in the Houston region. This phase occurred in 2006 and the first half of 2007 and culminated in the choice of Perkin Elmer (PE) tubes as the method for collection of VOC compounds. This extensive methods development phase allowed the study team to perform an intensive evaluation of several different air toxics samplers, and to select the best overall volatile organic compounds (VOC) sampler for Houston's extreme weather conditions.
2. Recruitment of participants and field-testing of all methods on a sub-sample of the population as a pilot study. This pilot study was conducted from September 1 to October 3, 2007. This pilot study provided data and information that allowed the study team to enhance recruiting and refine questionnaires and analytical techniques.
3. Collection of personal exposure measurements during a variety of seasonal weather conditions. Collection of risk perception and self-reported health effects from the exposure study population. Phase III is in progress, and will continue through September 2008.
4. Preparation of a final report, which will be completed in early 2009.

HEATS will provide data on source contribution ratios, averaging time comparisons, and amount and duration of exposure. The results will show whether, and to what degree, actual personal exposure differs from ambient results collected at fixed-monitoring sites. The results will also elucidate similarities and differences between personal exposure in two sociodemographically-matched Houston neighborhoods that differ in terms of proximity to the Houston Ship Channel industrial and transportation emissions sources. Linking personal exposure data for air toxics to ambient air monitoring data will allow resources to be more effectively targeted in specific geographical or societal areas of concern.

The study will provide information that the Texas Commission on Environmental Quality (TCEQ), the U.S. Environmental Protection Agency (EPA) and other research organizations can use to determine the relative contribution of point, mobile and area source emissions to actual exposure, develop strategies to reduce population risks, design health effects studies that incorporate ambient and personal exposure information, evaluate the performance of currently used exposure models and develop air toxics exposure and concentration models.

This data will also be useful in other, yet to be developed applications. For example, some air toxics of concern have been decreasing at ambient monitors in industrial regions in recent years due to new regulatory, technology and voluntary programs. Data from HEATS may provide some basis for comparing older measured or modeled personal exposure data with current exposure data to determine if decreases at ambient monitors resulted in decreases in personal exposure. In addition, the key VOCs sampled in this project are also ozone precursors. As the

state and other policymakers assess ozone ambient and personal exposure data (not collected as a part of this study) and other information for the State Implementation Plan (SIP), the HEATS data may become an important adjunct data source for this analysis. If state or federal policymakers wish to assess the benefits of multi-pollutant strategies on human health, the HEATS data sets will prove unique and invaluable. Finally, this data source will be usable by other researchers, states, and the EPA policymakers for comparisons with data in other states and regions, and as a strong contribution to the body of literature on personal exposure sampler development.