

Frequently Asked Questions

What are the goals of this Project?

- (1) To improve our understanding of the relationship between a low-level environmental exposure and disease in a vulnerable population in a community setting
- (2) To provide evidence to enhance decision-making regarding PCE exposure reduction, and
- (3) To respond to the need for research on the health consequences of PCE exposure

Why does the BU Superfund program need the help of the local water companies?

The success of our study relies on the participation of water company staff to help us access water main records from the years 1968-1980. In most cases, our contacts at the Massachusetts Department of Environmental Protection and the Rhode Island DOH Office of Drinking Water have already provided us with some VLAC pipe location data. But it is imperative that we compare these data to the records at each water company. The accuracy of the exposure model is completely dependent on first finding out the exact installation locations of the VLAC pipe, the dimensions of the pipe, and the year of pipe installation.

How can the BU Superfund Program help me?

Once we obtain the locations of the VLAC pipe we will give you all of our GIS maps of the VLAC pipe in your system to help you make more informed decisions about where to sample for PCE and help you to provide information to your customers.

In exchange for your time we would also like to offer you a seminar on how GIS can be utilized by water suppliers, free of charge by our expert GIS staff at BU. For more info and to express your interest in this seminar please call 617-638-8087.

This work is supported by a grant from the
National Institute of Environmental Health Sciences
Superfund Research Program

5P42ES00738.

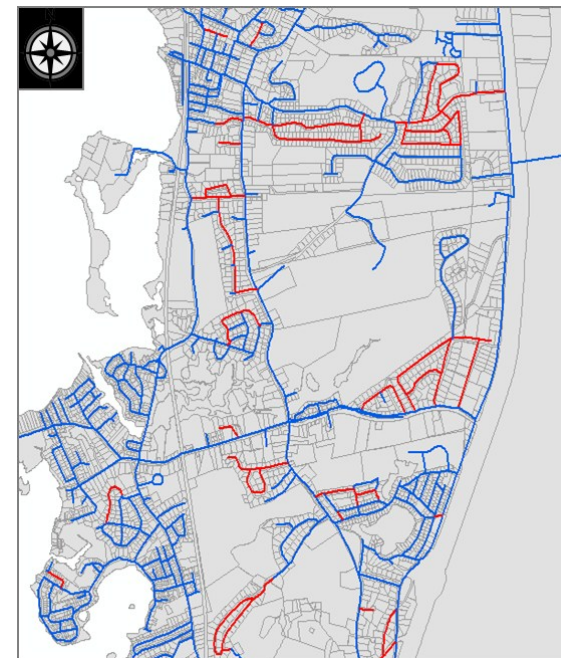


**Boston University
Superfund Research Program**

For more information and for a complete list of study towns in MA and RI please visit www.busrp.org/projects/project-1 or contact our Research Team at 617-638-8087
Boston University School of Public Health
715 Albany Street, Talbot Building
Boston, MA 02118
childrenshealthstudy@busrp.org



Boston University Children's Health Study



**Evaluating Prenatal Exposure to
Tetrachloroethylene (PCE)**

**from Vinyl-Lined Asbestos Cement Pipes
in Massachusetts and Rhode Island**

What is the Boston University Superfund Research Program?

The Boston University Superfund Research Program is an interdisciplinary program that conducts and communicates research on the impacts of improperly managed hazardous waste disposal on reproduction and development in humans and wildlife. The program has five research projects and five cores, which provide support to the program itself, other researchers, and communities. For more information about the Superfund Research Program at BU, our projects and cores, please visit www.busrp.org.

Public Health and EPIDEMIOLOGY

Public health is a multidisciplinary field whose goal is to promote the health of the population through organized community efforts. Key public health activities include assessing health status of the population, diagnosing its problems, **searching for the causes of health problems and designing solutions for them.**

Epidemiology is the study of the distribution and determinants of disease frequency in human populations and the application of this study to control health problems.

What is tetrachloroethylene (PCE)?

Tetrachloroethylene (perchloroethylene, PCE) is a widely used solvent in dry cleaning, textile processing and metal degreasing. Because most of its use occurs in uncontrolled occupational settings, PCE is a common contaminant of U.S. public drinking water supplies and hazardous waste sites.

PCE from Vinyl-Lined Asbestos Cement Pipe (VLAC)

From 1968 to 1990 families across New England were exposed to PCE when it leached into their drinking water from the vinyl-lining of asbestos cement water distribution pipes. Animal and human studies have found that prenatal exposure to PCE, the related solvent trichloroethylene (TCE), and their metabolite trichloroacetic acid (TCA) increase the risk of birth defects. The Children's Health Study investigates the association between exposure to PCE and several types of birth defects.

The study includes mothers whose babies were born in 42 cities and towns whose public drinking water supplies were contaminated when PCE leached from the vinyl-lining of AC water distribution pipes during the time period. Information is being gathered on the birth defects from birth certificates and fetal death records and the mothers will be sent a self-administered questionnaire to gather information on prenatal residential locations and demographic, behavioral, and medical variables. Prenatal exposure to PCE-contaminated drinking water will be estimated by entering their prenatal address and pipe characteristics into a geographic information system (GIS).

How do we calculate historical exposure to PCE from VLAC pipe locations?

Unfortunately, there is incomplete sampling data for all of the communities that were impacted by the VLAC pipe, so we are using a GIS-based leaching and transport model to estimate the mass of PCE that was delivered to each home to estimate a mother's PCE exposure.

The model, which was developed by Drs. Thomas Webler and Halina Brown, estimates the amount of PCE entering the drinking water using the initial amount of PCE in the pipe liner, the pipe's age, and the leaching rate of PCE from the liner into the water.

Our model also requires an estimate of water flow, a function of the configuration of the water distribution system and number of water users. We will estimate water flow and direction by incorporating the Webler and Brown algorithm into EPANET, water distribution system modeling software developed by the US EPA. Originally intended to help utility companies design water quality monitoring programs, EPANET simulates the instantaneous flow of water throughout a town's entire water distribution system.

We will create a GIS schematic depicting the mother's first trimester residence; water source locations; pipe characteristics indicating length, diameter and composition; and nodes, which are points of water consumption. Next, we will use the schematic to assign each mother's first trimester residence to the closest node on the distribution system. The EPANET software will incorporate all of this data to simulate the instantaneous flow of water through the thousands of pipe segments in each town's network and to estimate the mass of PCE in grams delivered to each subject's residence during the prenatal period.