

Special Studies

Volatile Organic Compounds Exposure Monitoring

Public health objective:

Nearly 200 air toxics have been associated with adverse health effects in occupational studies or laboratory studies, but have not been monitored in general population groups. Information on levels of exposure to these compounds is essential to determine the need for regulatory mechanisms to reduce the levels of hazardous air pollutants to which the general population is exposed.

The data will be used to: 1) characterize the distribution of blood levels of selected volatile organic compounds; 2) characterize the distribution of levels of selected volatile organic compounds in home tap water samples; 3) examine the relationship between measures of volatile organic compounds and demographic, economic, and behavioral characteristics; and 4) investigate possible associations between measures of volatile organic compounds and selected measures of health status.

Staff:

Certified phlebotomist

Protocol:

Methods:

- Examinees selected for this component will be asked to collect a sample of tap water from their home and bring it with them.
- A 10-ml vial of blood (approximately one half tablespoon) will be drawn. Blood levels of selected volatile organic compounds will be measured in this sample.
- Information that will be needed to interpret exposure information, including activity data for the exposure measurement period, will be obtained by a short questionnaire administered at the time of the examination.

Time allotment:

- Administering questionnaire about exposures: 5 minutes
- Blood draw: 1 minute

Health measures:

Blood levels of the following organic compounds:

- 1,1,1-Trichloroethane
- 1,1,2,2-Tetrachloroethane
- 1,1,2-Trichloroethane
- 1,1-Dichloroethane

- 1,1-Dichloroethene
- 1,2-Dichlorobenzene
- 1,2-Dichloroethane
- 1,2-Dichloropropane
- 1,3-Dichlorobenzene
- 1,4-Dichlorobenzene
- 2-Butanone
- Acetone
- Benzene
- Bromodichloromethane
- Bromoform
- Carbon Tetrachloride
- Chlorobenzene
- Chloroform
- cis-1,2-Dichloroethene
- Dibromochloromethane
- Dibromomethane
- Ethylbenzene
- Hexachloroethane
- m-/p-Xylene
- Methylene chloride
- Methyl tertiary-butyl ether
- o-Xylene
- Styrene
- Tetrachloroethene
- Toluene
- trans-1,2-Dichloroethene
- Trichloroethene

Levels of the following volatile organic compounds in the home water sample:

- Chloroform
- Bromodichloromethane
- Chlorodibromomethane
- Bromoform
- Methyl tertiary-butyl ether

Eligibility:

A random subsample of persons 20–59 years old (expected sample size:1,000)

Exclusion criteria:

None

Justification for using vulnerable populations:

Not applicable

Risk:

The following are known risks for venipuncture:

- Hematoma
- Swelling, tenderness and inflammation at the site
- Persistent bleeding
- Vasovagal response: dizziness, sweating, coldness of skin, numbness and tingling of hands and feet, nausea, vomiting, possible visual disturbance, syncope and injury from fainting

Rare adverse effects:

- Thrombosis
- Infection which results in thrombophlebitis

Special Precautions:

- Sterile equipment issued with all sample persons.
- Physician on call in case an adverse affect occurs.

Report of findings:

Reported from NCHS:

Water measures:

The Environmental Protection Agency has proposed to define the maximum contaminant level (MCL) for total trihalomethanes to 0.08 mg/L. Total trihalomethanes are chloroform, bromodichloromethane, dibromochloromethane, and bromoform concentrations. Participants will be notified if the sum of concentrations for these compounds exceeds the proposed MCL. There are no regulations covering concentration of methyl tertiary-butyl ether and there will be no report of findings for this substance.

Blood levels of volatile organic compounds:

These findings will not be reported to participants.