

Health Consultation

Mercury Exposure Incident

FAIRHAVEN HIGH SCHOOL

FAIRHAVEN, MASSACHUSETTS

JULY 8, 2008

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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HEALTH CONSULTATION

Mercury Exposure Incident

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FAIRHAVEN, MASSACHUSETTS

Prepared By:

Massachusetts Department of Public Health
Bureau of Environmental Health

Environmental Toxicology Program and Coordinated Environmental Response Program
Under cooperative agreement with the Agency for Toxic Substances and Disease Registry

BACKGROUND

Statement of Issues

The Massachusetts Department of Public Health (MDPH) Bureau of Environmental Health (BEH) was contacted on January 18, 2008, by the Fairhaven Board of Health regarding an elemental mercury exposure incident at Fairhaven High School. The MDPH BEH Coordinated Environmental Response Program (CERP) assisted the Fairhaven Health Agent and Fairhaven Police Department to obtain details of the mercury exposure event and coordinate an offer to conduct biomonitoring in order to assess exposures and possible health effects. CERP staff coordinated response efforts with BEH Indoor Air Quality (IAQ) and Environmental Toxicology Programs (ETP) as well as the Bureau of Laboratory Sciences (BLS), Environmental Chemistry Laboratory.

Summary of Events

The mercury exposure incident at Fairhaven High School occurred on January 18, 2008, at approximately 1:00 pm. Fifteen students and one teacher working in a chemistry lab were exposed to a small amount of elemental mercury (according to the Health Agent it was less than ½ teaspoon) mixed in with glass beads contained in a beaker (DFS 2008). The chemistry teacher did not become aware of the elemental mercury in the beaker until after class ended. Upon discovery, the teacher disposed of the contaminated materials using a mercury spill kit and alerted the school administration. Following disposal the teacher noticed that there were additional micro-droplets of elemental mercury around the lab. According to the teacher the students were exposed for approximately 25 to 30 minutes while in class and did not wash their hands following the end of class (before leaving for lunch).

Once the school administration was alerted, the local police department, Massachusetts Department of Environmental Protection (MDEP) and the Fairhaven Department of Fire Services (DFS) Hazmat team were notified. The classroom in question was quartered off and ventilated to the outside. Students were immediately called and isolated; parents of the students were also notified. Using a Jerome meter, DFS checked the individuals

around the upper body, arms, and hands (with sweatshirts/jackets removed). Eight students and one teacher had some level of mercury contamination on their hands; mercury levels detected ranged from 0.033 mg/m³ to 0.088 mg/m³ (DFS 2008). The initial readings showed that some of the students' levels were above the National Institute for Occupational Safety and Health (NIOSH) recommended exposure limit of 0.05 mg/m³ [based on a time weighted average (TWA) assuming workplace exposure for 8 hours/day for 40 hours/week]. The mercury readings reportedly decreased to non-detect after washing vigorously with soap and water and the students were cleared (DFS 2008). Hazmat and MDEP handled decontamination of the individuals and surveyed the classroom for contamination; school administration contracted with an industrial hygienist to do necessary clean-up and certify that the classroom was safe for re-entry. Following decontamination students were sent home with their parents, and parents were advised to seek medical consultations. One student went to the hospital reporting she had a "metallic taste in her mouth" (DFS 2008).

At around 2 pm, MDPH BEH received a call from the Fairhaven Health Agent regarding concerns raised by parents of students who were involved with the mercury exposure incident. MDPH BEH and the MDPH BLS collaborated to offer mercury urinalyses for those individuals exposed. The protocol for collecting urine samples was provided to the Fairhaven Health Agent, who then contacted all individuals potentially exposed to offer urine sampling and analysis for mercury. At 4:10 pm, the Health Agent notified MDPH BEH that approximately seven individuals were requesting analyses.

The sampling was planned for Saturday morning and the Health Agent was provided with contact information for the MDPH BLS and BEH staff to address any questions that may come up.

METHODS

MDPH BEH and MDPH BLS collaborated with the Fairhaven Board of Health to arrange for urine sampling. On Saturday January 19, 2008 at 9am, the school nurse for Fairhaven High School took urine samples from seven individuals using standard urine sampling cups and obtained signed consent. Following sample collection, the Fairhaven Health Agent delivered the samples directly to the MDPH Laboratory in Jamaica Plain. Urine mercury analysis was performed by the MDPH BLS Environmental Chemistry Laboratory using Cold Vapor Atomic Absorption Spectroscopy (CVAAS). The reporting limit for these analyses was 12 ug/L, or 12 parts per billion (ppb). The final urinary mercury levels were reported as (1) total mercury in urine (micrograms of mercury per liter of urine, ug/L) and also (2) mercury concentration in urine adjusted for creatinine (micrograms of mercury per gram of creatinine, ug/g). It is a common laboratory method to adjust for creatinine content as this adjustment corrects for variable dilutions among spot urine samples (Barr et al., 2005). MDPH BEH received results of urine analyses for interpretation and notification to the individuals tested. BEH CERP maintained communication and coordination throughout the course of this incident and response.

RESULTS

Urine samples were collected from seven individuals involved with the elemental mercury exposure incident at Fairhaven High School. Urinary mercury results for all seven samples were reported as non-detect (ND), which means the levels were below the reporting limit of 12 ug/L for this laboratory analyses (Table 1). Because the samples were non-detect creatinine adjustment levels were not calculated.

DISCUSSION

Results of the urinary mercury analyses showed no detectable mercury in any sample. Urinary mercury analysis is reliable and simple, and it provides rapid identification of individuals with elevated mercury levels (ATSDR 1992, 1999). A review of scientific literature indicates no clinical or subclinical effects have been reported for urine mercury levels below 20 ug/L (ATSDR 1992, 1999, 2006; Risher 2008). Thus, no health effects from this incident would be expected based on the urinary mercury analysis.

CONCLUSIONS

ATSDR requires that one of five conclusion categories be used to summarize findings of health consultations and public health assessments. These categories are: (1) Urgent Public Health Hazard; (2) Public Health Hazard; (3) Indeterminate Public Health Hazard; (4) No Apparent Public Health Hazard; and (5) No Public Health Hazard. A category is selected on the basis of site-specific conditions, such as the degree of public health hazard based on the presence and duration of human exposure, contaminant concentration, the nature of toxic effects associated with site-related exposures, the presence of physical hazards, and community health concerns.

In response to a reported elemental mercury exposure event at Fairhaven High school, the MDPH offered urinary mercury testing to provide information on the extent of exposures and potential for health effects. Results of the urinary mercury analyses and available environmental sampling data indicate that opportunities for exposure to elemental mercury during the incident at Fairhaven High School would not be expected to result in health effects. Therefore, according to ATSDR criteria, ATSDR would conclude that this elemental mercury incident resulted in “no apparent public health hazard.”

RECOMMENDATIONS

MDPH recommends that all schools discontinue the use of mercury and dispose of it in a manner consistent with federal and state hazardous waste disposal statutes and regulations.

Table 1:
Fairhaven HS Mercury Exposure Incident - Urinary Mercury Analysis Results

MDPH BLS #	Sample Collection Date	Creatinine Results (mg/dL)	Mercury Results (ug/L)	Creatinine Adjusted Results (ug Hg/g creatinine)
27542	1/19/2008	172.0	ND	N/A
27543	1/19/2008	219.0	ND	N/A
27544	1/19/2008	245.0	ND	N/A
27545	1/19/2008	266.5	ND	N/A
27546	1/19/2008	141.9	ND	N/A
27547	1/19/2008	177.3	ND	N/A
27548	1/19/2008	190.1	ND	N/A

ND = Non-detect, based on the BLS reporting limit of 12 ug/L for this analyses.

N/A = Not applicable. Creatinine adjusted levels were not calculated because mercury levels were non-detect.

MDPH BLS = Massachusetts Department of Public Health Bureau of Laboratory Sciences.

REFERENCES

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological Profile for Mercury. Atlanta, GA: U.S. Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ATSDR). 2006. ToxFAQs/Chemical Agent Briefing Sheet for Mercury (CABS). Atlanta, GA: U.S. Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ATSDR). 1992. Case Studies in Environmental Health for Mercury. Atlanta, GA: U.S. Department of Health and Human Services.

Barr, Dana B., Wilder, Lynn C., Caudill, Samuel P., Gonzalez, Amanda J., Needham, Lance L., Pirkle, James L. 2005. Urinary Creatinine Concentrations in the U.S. Population: Implications for Urinary Biologic Monitoring Measurements. *Environmental Health Perspectives*, Vol. 113 (2), pgs. 192-200.

Department of Fire Services (DFS). Incident Narrative for Fairhaven High School mercury exposure incident. Fairhaven, MA. January 18, 2008.

Risher, John. 2008. Discussion on urinary mercury background levels and interpretation of testing results. (Personal communication: January 23, 2008). Agency for Toxic Substances and Disease Registry (ATSDR). Atlanta, GA: U.S. Department of Health and Human Services.

U.S. Department of Labor Occupational Safety & Health Administration. NIOSH/OSHA/DOE Health Guidelines for Mercury Vapor. Web page accessed February 2008. <http://www.osha.gov/SLTC/healthguidelines/mercuryvapor/index.html>

PREPARER OF HEALTH CONSULTATION

This document was prepared by the Bureau of Environmental Health of the Massachusetts Department of Public Health. If you have any questions about this document, please contact Suzanne K. Condon, Associate Commissioner, BEH/MDPH, 7th Floor, 250 Washington Street, Boston, Massachusetts 02108.

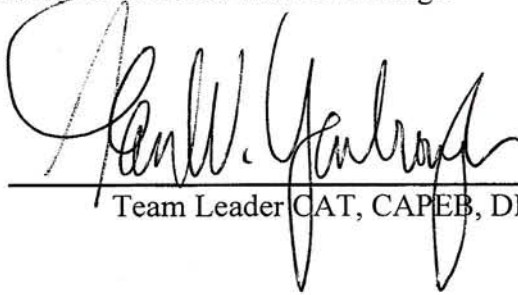
CERTIFICATION

The Health Consultation for Fairhaven High School, Fairhaven Massachusetts was prepared by the Massachusetts Department of Public Health under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodologies and procedures existing at the time this health consultation was initiated. Editorial review was completed by the cooperative agreement partner.



Technical Project Officer, CAT, CAPEB, DHAC, ATSDR

The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this health consultation and concurs with its findings.



Team Leader CAT, CAPEB, DHAC