

Health Consultation

AGUA FRIA HIGH SCHOOL MERCURY SPILL INCIDENT

Residential Exposures after the Incident

AVONDALE, MARICOPA COUNTY, ARIZONA

**Prepared by the
Arizona Department of Health Services**

MAY 17, 2010

Prepared under a Cooperative Agreement with the
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

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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 or ATSDR's Cooperative Agreement Partner which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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HEALTH CONSULTATION

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Residential Exposures after the Incident

AVONDALE, MARICOPA COUNTY, ARIZONA

Prepared By:

Arizona Department of Health Services
Office of Environmental Health
Environmental Health Consultation Services

Under a Cooperative Agreement with the
U.S. Department of Health and Human Services
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Summary

In the Agua Fria High School mercury spill event, Arizona Department of Health Services' (ADHS') purpose is to serve the public by using the best science, taking responsive public health actions, and providing trusted health information to prevent people from coming into contact with harmful toxic substances.

US Environmental Protection Agency asked ADHS to conduct this health consultation. The purpose of this health consultation is to evaluate the public health risk for school students and their family members who may have come into contact with elemental mercury detected in their homes.

On February 12th, 2009, some Agua Fria High School students discovered a large amount of elemental mercury in a Science classroom. The students played with it and eventually split it into at least three containers. The students then took the mercury to their next period classes, including a computer room and the boy's locker room. At least three students each had a container of the mercury and reportedly poured or spilled mercury in most or all of these locations. Eventually, at least two of the students boarded school buses and admitted to pouring the mercury out in the buses. The three students each brought their container home (or to a relative's house) and some spread contamination in their respective residences. The incident was first discovered by a relative who reported children playing with mercury to the Avondale Fire Department (FD), who responded to the home and ultimately notified the school of the contamination problem.

All data used in this health consultation were provided by EPA. With respect to the classrooms and school buses, no data was collected prior to the start of clean-up activities, and therefore no evaluation was able to be conducted. However, EPA conducted interim monitoring and post-cleanup monitoring to determine that the classrooms were cleaned up to appropriate standards.

ADHS reached the following conclusions:

At the time of the spill, ADHS deemed the event an urgent public health concern given the presence of children, estimated amount and scale of the spill and toxicity of mercury. Prior to the start of clean-up activities, no data were collected in the classrooms and school buses. However, EPA conducted interim monitoring and post-cleanup monitoring to ensure that the classrooms were cleaned up to appropriate standards. Parents were also contacted, given a list of symptoms associated with mercury exposure, and encouraged to have anyone in the household experiencing similar symptoms to seek medical care.

House ID: 81

Before remediation: The detected concentrations of mercury vapor in House ID: 81 were at levels exceed the public health concern. Based on the available information, ADHS concludes that breathing too much of the contaminated air in House ID: 81 could harm people's health, including children and pregnant women, and posed an

urgent public health hazard. If any individual is concerned or feels perhaps some symptoms were sustained, s/he should consult a doctor.

After remediation: ADHS does not expect any current exposures that will harm people's health in House 81 due to actions taken.

House ID: 248

ADHS determined that the detected levels of mercury contamination in the air of House ID 248 are not expected to cause adverse health effects in the exposed population, including children and pregnant women. However, if residents are concerned, they are encouraged to consult a doctor.

Other Investigated and Remediated Houses

Since the mercury spills have been investigated and properly remediated, ADHS does not expect residents to experience adverse health effects.

To address the community's concern, ADHS worked with EPA and Agency for Toxic Substances and Disease Registry (ATSDR) to prepare site specific factsheets about health effects of mercury. ADHS also worked with Maricopa County to prepare talking points for families and students and to help answer questions regarding health effects of mercury.

All individuals with confirmed or suspected exposures should consult with their physician if they experienced any adverse health effects or would like more information about the health effects of mercury exposure. However, no further cleanup activities are needed by Agua Fria High School or other agencies, regarding this incident.

ADHS' epidemiologists will follow up with residents of House ID: 81 to see if they need additional assistance. ADHS will remain available as needed for future consultation at this site.

Purpose

This health consultation reviews an elemental (or metallic) mercury spill incident at the Agua Fria High School located at 530 East Riley Drive, Avondale, AZ, approximately 25 miles west of Phoenix. This incident required response from Avondale Police and Fire Department, Goodyear Fire Hazmat, the Maricopa County Department of Public Health, the Arizona Department of Health Services (ADHS), the Arizona Department of Environmental Quality, the Agency for Toxic Substances and Disease Registry (ATSDR) and the U.S. Environmental Protection Agency (EPA).

Exposure to high levels of mercury vapor can lead to many acute health effects. Respiratory symptoms may predominate (cough, sore throat, shortness of breath). Gastrointestinal effects are frequent in the initial set of symptoms (metallic taste, nausea, vomiting, diarrhea, abdominal pain) as are central nervous system effects such as headache, weakness, and visual disturbances (ATSDR 1999). The incident raised potential urgent public health concerns given the presence of pre-teen and teenagers, estimated amount and scale of the spill and the toxicity of mercury which required a rapid cooperative and coordinated response by all agencies and interested parties.

ADHS was requested to help interpret risks from exposures at residences based on the initial residential assessment prepared by EPA. The purpose of this report is to summarize health concerns associated with the mercury spill and to ensure proper cleanup of residential homes. With respect to the classrooms and school buses, no data was collected prior to the start of clean-up activities, and therefore no evaluation was able to be conducted. Yet, EPA conducted interim monitoring and post-cleanup monitoring to determine that the classrooms were cleaned up to appropriate standards.

ADHS epidemiologists partnered with the Maricopa County Department of Public Health to develop talking points and to contact families whose students were exposed. Staff contacted families in order to ensure that they know the symptoms of mercury poisoning and had an opportunity to talk to a nurse about any health related questions. A summary of results is provided in the following section: Investigation of Exposure.

Background

The ADHS received a call from the Avondale Fire Department on February 15 regarding a mercury spill at Agua Fria High School. The amount of mercury is unknown. The Avondale Fire Department first estimated 12 ounces of mercury was released. However, subsequent estimates have been as high as three pounds.

On February 12th, 2009, some Agua Fria High School students discovered a large amount of elemental mercury in a Science classroom, which was used for demonstration by a Science teacher. The students took the mercury from her desk. The students played with it in the classroom and eventually split it into at least three containers. The students then took the mercury to their next period classes, including a computer room and the boy's locker room. At least three students each had a container of the mercury and reportedly poured or spilled mercury

in most or all of these locations. Eventually, at least two of the students boarded school buses and admitted to pouring the mercury out in the buses.

The three students each brought their container home (or to a relative's house) and some spread contamination in their respective residences. The incident was first discovered by a relative who reported children playing with mercury to the Avondale Fire Department (FD), who responded to the home and ultimately notified the school of the contamination problem.

Cleanup Activities and Approach

The Avondale FD hired a contractor (Kary Environmental Services, Inc., Mesa, AZ) to clean up the affected public areas (outside the fence line of the affected residences), and decontaminated members of the affected household, bagged their clothing and restricted them from their houses. The Avondale FD notified the school and the school began an investigation to determine where the mercury came from and where it might have been spread. The school was closed on February 13th as a result of the Fire Department's warning.

The Agua Fria Unified School District took the lead on the response and agreed to perform a voluntary cleanup with the assistance and oversight of the EPA. The school district retained the cleanup contractor hired originally by the Avondale FD to address the contaminant and potential contamination. An industrial Hygienists group (Clark Seif Clark, Inc., Tempe, AZ) was also contracted to provide incident management and technical support.

While the initial information was that one classroom was contaminated, it soon became clear that other rooms of this 1,700-student high school may have been impacted and that a thorough assessment and cleanup would be necessary. In addition, the school district identified that approximately 470 students and faculty were potentially exposed. The initial EPA resource assessment indicated that the contractors were not capable to address a release of this magnitude due to limited equipment and resources. Therefore, on Saturday, February 14th, additional resources and equipment were mobilized from EPA Superfund Technical Assessment and Response Team (START) and Environmental Response Team (ERT).

The school district implemented a plan to call students to bring their potentially effected belongs back to the school for screening. On Sunday, February 15th, the school district began calling students and drop-offs were scheduled. A total of 477 students dropped off their clothes and/or belongings. EPA used the ATSDR recommended action level for cloth to determine whether students' homes may be of concern. If the student's cloth exceeded 10,000 ng/m³, then EPA attempted to screen the residence for mercury. Approximately 60 homes were screened. Six had moderate contamination levels and two had elevated contamination levels. Two families were temporarily evacuated during the clean-up process. A pollution report (POLREP) prepared by EPA is available at: http://epaossc.net/site_profile.asp?site_id=4743%20

Investigation of Exposures

As part of the investigation, the epidemiologists at the Office of Infectious Disease Services, ADHS, in conjunction with Maricopa County, designed a survey instrument to assess symptoms

and exposure of all potentially exposed students and staff. Interviews were conducted by Student Aid for Field Epidemiology Response (SAFER), a volunteer student group, between February 20 and 24. Eligible participants included persons who attended school on February 12 and whose belongings tested over 10,000 ng/m³ for mercury by EPA. The one-page survey (see Appendix A) was conducted over the phone and included questions on demographics, exposure location and symptoms. Parental permission was obtained for individuals less than 18 years of age. Participants had the choices to answer any questions they wished and end the interview at any time. All participants were instructed to contact the Maricopa County Department of Public Health and see a healthcare provider if they developed any symptoms associated with mercury poisoning.

As of February 24, 2009, the belongings of 66 individuals contained mercury levels over 10,000 ng/m³. Of these, 32 (50%) were contacted and asked to participate in the survey. Of 32 contacted, 5 (16%) refused and 27 (84%) agreed to participate in the survey. Of note, we have limited information on non-respondents and a comparison between respondents and non-respondents will not be included in this report. Below is a summary of the results from the survey.

- the mean age was 15 years
- the mean household size was 5 persons
- 7% were pregnant
- 72% were male
- 41% were exposed in the boys locker room
- 6% were exposed at home
- 72% touched the mercury directly
- 3% inhaled the mercury
- 3% heated the mercury
- 59% washed their contaminated clothes at home
- 56% placed their contaminated clothes in the dryer
- 88% had their houses screened and cleaned by the U.S. Environmental Protection Agency
- 37% had guests come to their house before the EPA inspection and cleaning
- 63% did not report any symptoms associated with mercury poisoning
- Among symptomatic individuals
 - 33% had a cough
 - 22% had diarrhea
 - 22% had red eyes
- 14% sought medical care

Statement of Issues

Mercury is a metal that occurs naturally in small amounts in the environment. It affects the brain, liver, and kidneys and can cause developmental disorders in children. Young children and developing fetuses are especially at risk. Elemental mercury remains liquid at room temperature, and like any other liquid it evaporates into the air, where it can be inhaled. When spilled, mercury can pose significant health threats, especially in a small, poorly-ventilated room. Vary small amounts of elemental mercury (i.e. a few drops) can raise air concentrations of mercury to levels that may be harmful to health. In addition, elemental mercury and its vapor are difficult to remove from clothes, furniture, carpet, and other porous items. If these items are not properly disposed or cleaned, the mercury can linger for months or years, continuing to pose a health threats.

Discussion

Determining the Mercury Vapor Level

USEPA used a Lumex 915+ mercury vapor analyzer to screen potentially contaminated areas and personal belongings such as shoes and clothing. Lumex 915+ mercury vapor analyzer is a portable, atomic absorption spectrometer designed to determine the mercury vapor content in ambient air, water, soil and natural and stack gases. The instrument can detect low-level mercury vapors (~2 nanograms per cubic meter, ng/m^3). ADHS determined that the mercury measurements taken with a Lumex 915+ were of sufficient quality to allow proper evaluation. A total of 63 homes were screened. The mercury concentrations detected in the breathing zone ranged from 3 to 172,000 ng/m^3 .

Exposure Pathway Evaluation

In evaluating this and every site, ADHS uses established methodologies for determining how people may be exposed to contamination from a site and what effects, if any, may result from exposure to those contaminants. The ways that people may come into contact with chemical contaminants (such as breathing air and drinking water) are called exposure pathways. There are five elements to be considered when identifying exposure pathways:

- a *source* of contamination,
- a *media* such as soil or ground water through which the contaminant is transported,
- a *point of exposure* where people can contact the contaminant,
- a *route of exposure* by which the contaminant enters or contacts the body; and
- a *receptor* population

Exposure pathways are divided into three categories: completed, potential, and eliminated. A completed exposure pathway is observed when all five elements are present. In a potential exposure pathway, one or more elements of the pathway cannot be identified, but it is possible that the element might be present or might have been present. In an eliminated exposure

pathway, at least one element of the pathway is not present and either will never be present or is extremely unlikely to ever be present. Identifying an exposure pathway does not necessarily indicate the presence or concentration of potential contaminants; it is simply a way of determining the possibility of exposure as if the contaminants were present in the medium.

The routes of exposure for elementary mercury are ingestion (swallowing), skin absorption and inhalation of mercury vapors. Of those three, exposures via ingestion and skin absorption are usually not biologically significant because dermal and gastrointestinal absorption of elemental mercury is limited (ATSDR 1999). Therefore, vapor exposure to elemental mercury spills are typically of greatest concern. In this case, the exposure pathway was complete (See Table 1).

Table 1. Exposure pathway evaluation

Exposure Pathway Elements					Time Frame	Type of Exposure Pathway
Source	Media	Point of Exposure	Route of Exposure	Estimated Exposed Population		
Mercury spill	Air	Ambient Air	Inhalation	Students, stuff, and their family members	Past	Completed

Comparison to health-based comparison values

The health-based comparison values are screening tools used with environmental data relevant to the exposure pathways. The health-based comparison values are concentrations of contaminants that the current public health literature suggest are “safe” or “harmless.” ADHS typically uses comparison values as follows: if a contaminant is never found at levels greater than its CV, ADHS concludes the levels of corresponding contamination are “safe” or “harmless.” If, however, a contaminant is found at levels at greater than its comparison value, ADHS designates the pollutant as a contaminant of interest and examines potential human exposures in greater detail. Comparison values are based on conservative assumptions. Depending on site-specific environmental exposure factors (e.g. duration and amount of exposure) and individual human factors (e.g. personal habits, occupation, and/or overall health), exposure to levels greater the comparison value may or may not lead to a health effect. Therefore, the comparison values should not be used to predict the occurrence of adverse health effects.

Comparison values used in this evaluation are acute values for exposure duration of 14 days or less. The values considered are: (1) the Emergency Exposure Limit (EEL) for 24 hour of exposure at 200,000 ng/m³ which is recommended by the National Research Council’s Committee on Toxicology ; (2) the Occupational Safety and Health Administration’s (OSHA) permissible exposure limit-ceiling limit (PEL-C) of 100,000 ng/m³ (ceiling means this level should at no time be exceeded); and (3) the California Office of Environmental Health Hazard

Assessment's (OEHHA) reference exposure level (REL) for one hour of exposure at 1,800 ng/m³.

Note: It is possible that the EEL and PEL-C are not protective enough for a residential setting where pre-teen and teenage kids are exposed. However, neither ATSDR nor EPA has developed a comparison value for acute exposure to elemental mercury.

As shown in Table 2, none of the inspected houses had mercury concentration above the EEL. House ID: 81 had mercury concentration above OSHA PEL-C and OEHHA REL. House ID: 248 had mercury concentration above OEHHA REL. ADHS retained these two homes for further evaluation because of the levels of mercury.

Table 2. Detected mercury concentration in ambient air

Location	Number of measurements	Elemental mercury concentration (ng/m ³)	Number of measurements exceeded EEL	Number of measurements exceeded OSHA PEL-C	Number of measurements exceeded OEHHA REL
Residences	63 homes	3 – 172,000	0 home	1 home	2 homes

Public Health Implication

Acute exposure (14 days or less)

Many acute health effects are associated with exposure to high levels of elementary mercury vapor. Respiratory symptoms may predominate (cough, sore throat, shortness of breath). Gastrointestinal effects are frequent in the initial set of symptoms (metallic taste, nausea, vomiting, diarrhea, abdominal pain) as are central nervous system effects such as headache, weakness, and visual disturbances (ATSDR 1999).

Mercury vapor is heavier than air and tends to settle to the floor. This puts children at increased risk, because they are closer to the ground and are more likely to breathe mercury vapor which has settled. They also tend to have extensive skin contact with carpets or other flooring. Direct contact with the skin can lead to dermatitis. A syndrome called acrodynia, or “pink disease” can sometimes happen in children exposed to mercury vapor. Its symptoms include: severe leg cramps, irritability and painful pink fingers with peeling hands (ATSDR 1999). Based on available information, none of the students or their family members was diagnosed with acrodynia.

House ID: 81

On February 14, 2009, detected mercury concentrations ranged from 18,000 to 172,000 ng/m³. The average concentration was 137,400 ng/m³, which is within the level recommended by the National Research Council's Committee on Toxicology. However, it exceeded the OSHA's

PEL-C and OEHHA's REL. The National Research Council's Committee on Toxicology suggested that a 24-hour continuous exposure at 200,000 ng/m³ could be tolerated without ill effects (BEST 2000). The OSHA comparison value is full-day time-weighted average for 8 hours of exposure. OEHHA's acute REL for mercury vapor is based on developmental effects in the offspring of female rats. Central nervous system effects in pups were noted following exposure of dams to 1.8 mg/m³ (i.e. 1,800,000 ng/m³) for 1 hour per day during gestation. A cumulative uncertainty factor of 1,000 was used because the animal findings were based on a LOAEL, there was extrapolation from animals to humans, and because of the variability in expected response in human populations. Given the presence of pre-teen and teenage kids and the exposure duration (approximately 2~3 days before remediation was initiated), ADHS determined the mercury contaminated air was an urgent public health hazard. Breathing too much of the contaminated air could harm people's health, including children and pregnant women. If any individual is concerned or feels perhaps some symptoms were sustained, s/he should consult a doctor.

House ID: 248

On February 17, 2009, detected mercury concentrations ranged from 1,200 to 3,400 ng/m³. These levels were well below the recommendation of the National Research Council's Committee on Toxicology (approximately 60 to 166 times of the detected mercury concentrations) and the OSHA PEL-C (approximately 30 to 83 times of the detected mercury concentrations). The highest detected mercury concentration was approximately 1.8 times of the OEHHA's acute REL, but it is still more than 500 times lower than the concentration which is known to cause the adverse health effects. ADHS determined that the mercury contaminated air was not expected to cause adverse effects in the exposed population, including children and pregnant women. However, if any individual is concerned or feels perhaps some symptoms were sustained, s/he should consult a doctor.

Chronic exposure (365 days or more)

Repeated or continuous exposure to elemental mercury can result in accumulation of mercury in the kidneys and brain with the potential for permanent damage to the nervous and renal system. Symptoms of chronic poisoning vary, but may include tremors, psychological changes, insomnia, loss of appetite, irritability, headache and short-term memory loss (ATSDR 1999).

Both of the ATSDR and EPA developed health guidance values for chronic exposure to elemental mercury via inhalation. These health guidance values are based on both animal studies and human epidemiology studies that detail the health effects of inhalation of mercury contaminated air. ATSDR has developed a chronic Minimal Risk Level (MRL) of 200 ng/m³ that is based on a 1983 study of workers exposed to an average Lowest Observed Adverse Effect Level (LOAEL) of 26,000 ng/m³ over an average of 15 years. This workplace average exposure was adjusted from a 40 hour per week exposure to a 168 hour per week exposure (i.e. 24 hours/day, 7 days/week) and then divided by an uncertainty factor of 30 to account for the use of LOAEL and the different sensitivities of individuals. In addition, EPA has used the same study to develop a Reference Concentration (RfC) of 300 ng/m³, using different assumptions and uncertainty factors. ADHS considers the RfC and the chronic MRL to be the same value for all

practical purpose. An MRL is defined as an estimate of the daily exposure level to a hazardous substance (in this case, elemental mercury) that is likely to be without appreciable risk of adverse, non-cancer health effects over a specific exposure route and duration of exposure (ATSDR 1999, 2000; EPA 2003).

No regulatory standards are applicable for the cleanup of elementary mercury. For this spill event, the staff in the ATSDR Division of Toxicology and Emergency Medicine recommended the following clearance levels as long as there is no visible mercury present:

- 1,000 ng/m³ for homes and school based on 24-hour exposure
- 3,000 ng/m³ for school buses and outdoor based on 8-hour exposure

These suggested levels are extrapolated from health guidance values independently developed by two federal agencies, ATSDR and EPA. For residences, ADHS would prefer no one ever be chronically exposed to concentration above the MRL. However, experience has shown cleanup operation in a response to concentration below 1,000 ng/m³ can be extremely disruptive to individual and family quality of life. While this concentration is slightly above health guidance values, this level is still 25 times lower than the human LOAEL on which the MRL is based. An indoor air concentration of 1,000 ng/m³ is considered safe and accepted by ADHS, provided no visible elemental mercury is present. The action/clean-up levels for school bus and outdoor contaminated areas were developed based on residential occupancy level but adjusted for the shorter duration exposure.

ADHS determined that exposures were likely to be minimal following remediation. After reviewing all available information, ADHS does not expect chronic exposure levels above levels of health concern due to actions taken at the school and residences, and therefore concluded that living in and breathing in air in the homes post-remediation is not expected to harm people's health.

ATSDR Child Health Concern

ATSDR recognizes that the unique vulnerabilities of infants and children demand special emphasis in communities faced with contaminants in environmental media. A child's developing body systems can sustain permanent damage if toxic exposures occur during critical growth stages. Children ingest a larger amount of water relative to body weight, resulting in a higher burden of pollutants. Furthermore, children often engage in vigorous outdoor activities, making them more sensitive to pollution than healthy adults.

Mercury vapor is heavier than air and tends to settle to the floor. This puts children at increased risk, because they are closer to the ground and are more likely to breathe mercury vapor which has settled. They also tend to have extensive skin contact with carpets or other flooring. Direct contact with the skin can lead to dermatitis. A syndrome called acrodynia, or "pink disease" can sometimes happen in children exposed to mercury vapor. Its symptoms include: severe leg cramps, irritability and painful pink fingers with peeling hands (ATSDR 1999).

In this document, ADHS evaluated the available environmental data, toxicological literature, and addressed child health concerns about mercury exposure as a result of this event. All health analyses in this report take into consideration the unique vulnerability of children.

Conclusions

At the time of the spill, ADHS deemed the event an urgent public health concern given the presence of children, estimated amount and scale of the spill and toxicity of mercury. Prior to the start of clean-up activities, no data were collected in the classrooms and school buses. However, EPA conducted interim monitoring and post-cleanup monitoring to ensure that the classrooms were cleaned up to appropriate standards. Parents were also contacted, given a list of symptoms associated with mercury exposure, and encouraged to have anyone in the household experiencing similar symptoms to seek medical care.

House ID: 81

Before remediation: The detected concentrations of mercury vapor in House ID: 81 were at levels exceed the public health concern. Based on the available information, ADHS concludes that breathing too much of the contaminated air in House ID: 81 could harm people's health, including children and pregnant women, and posed an urgent public health hazard. If any individual is concerned or feels perhaps some symptoms were sustained, s/he should consult a doctor.

After remediation: ADHS does not expect any current exposures that will harm people's health in House 81 due to actions taken.

House ID: 248

ADHS determined that the detected levels of mercury contamination in the air of House ID 248 are not expected to cause adverse health effects in the exposed population, including children and pregnant women. However, if residents are concerned, they are encouraged to consult a doctor.

Other Investigated and Remediated Houses

Since the mercury spills have been investigated and properly remediated, ADHS does not expect residents to experience adverse health effects.

Recommendations

- All individuals with confirmed or suspected exposures should consult with their physician if they experienced any adverse health effects or would like more information about the health effects of mercury exposure.
- No further cleanup activities are needed by Agua Fria High School or other agencies, regarding this incident.

Public Health Action Plan

The following is a summary of activities taken to mitigate exposure from the mercury spill:

Actions completed:

- February 17—20, 2009: ADHS worked with EPA and ATSDR to prepare site specific factsheets about health effects of mercury.
- February 18—21, 2009: ADHS worked with Maricopa County to prepare talking points for families and students and to help answer questions regarding health effects of mercury. Maricopa County Health Department provided a hotline staffed by nurses to answer the community's questions. The kid with symptoms (cough, diarrhea, metallic taste in mouth and hand tremors) was provided with medical services by a doctor. No elevated total mercury concentration was observed in the 24-hour urine test.
- February 20—June 18, 2009: ADHS' epidemiologists teamed up with Maricopa County and Student Aid for Field Epidemiology Response (SAFER) who completed phone surveys of all students whose clothes were considered a hit for mercury by EPA. ADHS epidemiologists provided ADHS Risk Assessment and Health Consultation Services summary results of the survey, which were provided in this document, and a copy of the survey, which is included in the appendix.

ADHS' epidemiologists will follow up with residents of House ID: 81 to see if they need additional assistance.

ADHS will remain available as needed for future consultation at this site.

References

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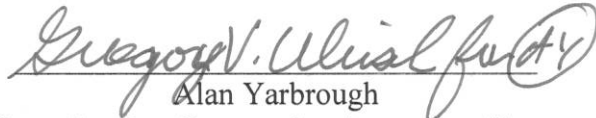
This Health Consultation entitled *Agua Fria High School Mercury Spill Incident, Maricopa County, Arizona* was prepared by the Arizona Department of Health Services under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was initiated. Editorial review was completed by the cooperative agreement partner.



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The Division of Health Assessment and Consultation, Agency for Toxic Substance and Disease Registry, has reviewed this health consultation and concurs with its findings.



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Agency for Toxic Substance and Disease Registry

Appendix A

<p><u>STUDENT INFORMATION</u></p> <p>1. Full name</p> <p>FIRST </p> <p>LAST </p> <p>2. Age _____</p> <p>98 ? Don't Know 99 ? Refuse to answer</p> <p>3. Sex</p> <p>1 ? Male 2 ? Female</p> <p>98 ? Not Determined 99 ? Refuse to answer</p> <p>4.. How many people live at this address? _____</p> <p>98 ? Don't Know 99 ? Refuse to answer</p> <p><u>EXPOSURE INFORMATION</u></p> <p>Now I'm going to ask just a few questions about (your/your child's) experience with this event.</p> <p>5. Where were (you/was your child) exposed to mercury? (CHECK ALL THAT APPLY) :</p> <p>1 ? At home</p> <p>2 ? At school</p> <p style="padding-left: 40px;">Specify: ? B9 ? E2 ? E3 ? E4 ? weight room</p> <p>3 ? On the bus</p> <p>4 ? Other, specify: _____</p> <p style="padding-left: 40px;">(collect contact information if exposed at classmate's house)</p> <p>98 ? Don't Know 99 ? Refuse to Answer</p> <p>6. When were (you/was your child) exposed to mercury?</p> <p> - - : </p> <p style="padding-left: 40px;">MM DD YYYY H H M M A/P</p> <p>98 ? Don't Know 99 ? Refuse to Answer</p> <p>7. In what way were (you/was your child) exposed to mercury?</p> <p>1 ? Inhaled it or had it near the mouth or nose</p> <p>2 ? Touched it directly</p> <p>3 ? Ingested it – had it in mouth or swallowed it</p> <p>98 ? Don't Know 99 ? Refuse to Answer</p> <p>8. Did (you/your child) or anyone around (you/your child) heat the mercury?</p> <p>1 ? Yes 2 ? No (skip to Q10)</p> <p>98 ? Don't Know 99 ? Refuse to Answer</p> <p>9. If yes, how did (you/your child) heat the mercury?</p> <p>_____</p> <p>10. Were the clothes (you/your child) wore on Feb 12 put in the washer?</p> <p>1 ? Yes 2 ? No</p> <p>98 ? Don't Know 99 ? Refuse to Answer</p> <p>11. Were the clothes (you/your child) wore on Feb12 put in the dryer?</p> <p>1 ? Yes 2 ? No</p> <p>98 ? Don't Know 99 ? Refuse to Answer</p> <p>12. Did the Fire Dept/EPA come inspect your house?</p> <p>1 ? Yes 2 ? No (skip to Q14)</p> <p>98 ? Don't Know 99 ? Refuse to Answer</p>	<p>13. If yes, please give us the date and time.</p> <p> - - : </p> <p style="padding-left: 40px;">MM DD YYYY H H M M A/P</p> <p>14. Between Feb 12 and today, did (you/your child) have any of the following symptoms (CHECK ALL THAT APPLY) :</p> <p>1 ? none (skip to Q16) 2 ? cough</p> <p>3 ? chest pain 4 ? nausea</p> <p>5 ? vomiting 6 ? diarrhea</p> <p>7 ? mouth pain 8 ? metallic taste in the mouth</p> <p>9 ? fever 10 ? red eyes</p> <p>11 ? tremors of fingers, eyelids or lips</p> <p>12 ? rash, Specify location: _____</p> <p style="padding-left: 40px;">texture, color: _____ resolved? ? Yes ? No</p> <p>13 ? other, Specify: _____</p> <p>98 ? Don't Know 99 ? Refuse to Answer</p> <p>15. If yes for any of these symptoms, when did (you/your child) experience these symptoms?</p> <p> - - : </p> <p style="padding-left: 40px;">MM DD YYYY H H M M A/P</p> <p>16. Are (you/is your child) or anyone in your house pregnant?</p> <p>1 ? Yes, Who: _____ 2 ? No</p> <p>98 ? Don't Know 99 ? Refuse to Answer</p> <p><u>CONTACT INFORMATION</u></p> <p>Now I'm going to ask about other people who may have come to your house last week or gotten sick as a result of this exposure.</p> <p>17. Has anyone else living in your house been seen by a doctor between Feb 12 and today?</p> <p>1 ? Yes 2 ? No (skip to Q20)</p> <p>98 ? Don't Know 99 ? Refuse to Answer</p> <p>18. If Yes, list names and ages of persons ill</p> <p>Name 1: _____ Age: _____</p> <p>Name 2: _____ Age: _____</p> <p>Name 3: _____ Age: _____</p> <p>19. Did anyone come to your house between Feb 12 and (DATE from Q13 or Today's date if Q12 is NO) ?</p> <p>1 ? Yes 2 ? No (End interview)</p> <p>98 ? Don't Know 99 ? Refuse to Answer</p> <p>20. If Yes, list names and contact info</p> <p>Name 1: _____ Phone: _____</p> <p>Name 2: _____ Phone: _____</p> <p>Name 3: _____ Phone: _____</p> <p>If you or any family member experience any of the symptoms mentioned above, please contact Maricopa County Dept. of Public Health at 602-747-7111 and see a healthcare provider. That completes our interview. Thank you very much for your time.</p>
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