Local Acts

CONVERTING A POTENTIAL AGENCY CRISIS INTO COMMUNITY SUCCESS: MERCURY RECYCLING PROGRAM FOLLOWING ELEMENTAL MERCURY EXPOSURES IN AMARILLO, TEXAS, 2004

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Elemental mercury has a number of industrial uses. It is used in scientific instruments, dental amalgams, vaccine preservatives, and as an additive to fossil fuels. It is liquid at ambient temperature and slowly vaporizes with time. Liquid mercury is not usually toxic even if swallowed, but the vapor form can cause damage to the lungs, stomach, and nervous system. Exposure to mercury over weeks or months can be dangerous, especially to young children. Thus, the presence of mercury in the environment can represent a human health hazard.[1–4]

Acute exposure of children to elemental mercury often creates an urgent crisis for local environmental and public health agencies. A hazardous materials response is required, environmental cleanup is laborious and technical, and monitoring of human health effects can be challenging in children.[4–9] Previously reported experiences of local health departments note a major drain on local resources, as well as difficulties with media and public misperceptions.[10,11]

We recently experienced an acute elemental mercury exposure involving a public school and children of five households. A cooperative effort with local, state, and federal agencies led to a rapid and successful response and also resulted in the voluntary surrender of large amounts of elemental mercury by local citizens.

INITIAL RESPONSE

On September 1, 2004, our fire department responded to a hazardous materials call from a local elementary school. A teacher reported that a child had brought liquid mercury into a classroom. The Fire Marshall contacted the City of Amarillo Departments of Environmental Health and Emergency Management, as well as the Texas Commission on Environmental Quality (TCEQ). The City of Amarillo Department of Environmental Health was declared the lead agency, coordinated the response, and conducted an investigation within a unified command structure.

Upon initial investigation, it was determined that three children had taken mercury to three residences and one elementary school. Initial testing by the Texas Environmental Health Department concluded that the residences were contaminated with mercury, while mercury levels in the school were undetectable. The City of Amarillo Department of Environmental Health recommended evacuation of the contaminated houses and evaluation of exposed residents by the City of Amarillo Department of Public Health (COA DPH). The Environmental Protection Agency (EPA) was contacted on September 7, 2004.

The next day, EPA representatives confirmed the presence of high levels of mercury in the three residences. Air monitoring in the residences indicated mercury levels in excess of 20 $\mu g/m^3$ throughout the air column of all three homes. The reading in one residence was as high as 80 $\mu g/m^3$. After further questioning of household occupants, two more residences were tested and also found to be contaminated by mercury.

OUTCOME

The investigation ultimately determined that five families involving 25 people (including 16 children) had mercury releases in five residences after children brought home containers of mercury they had found in an unsecured nearby junkyard. On September 10, 2004, the COA DPH interviewed all five families. In consultation with the Texas Department of Health and the Agency for Toxic Substances and Disease Registry, one pregnant adult and all 11 children younger than age 13 were examined and tested for mercury intoxication. No mercury toxicity was detected in the pregnant woman or any of the children. Minimal levels of mercury were detected in timed urinary collections from four of the children. These children were subsequently followed over the next six months at the COA DPH. No evidence of mercury toxicity was found in any of the children on follow-up evaluation six months later.

An EPA Emergency Response Removal Services contractor collected free mercury from the floors of these homes and removed personal belongings and furniture

from the houses. After the houses were emptied of contaminated furniture, decontamination of carpets, floors, and walls continued. Decontamination efforts in a fifth home were limited to the disposal of mercury-contaminated items (i.e., mop, shoes, clothing). After decontamination efforts, all homes met cleanup criteria of mercury less than 1 $\mu g/m^3$. These homes were restored to a livable condition after analytical sample results confirmed that the homes were below EPA cleanup criteria (<1 $\mu g/m^3$). The remediation effort took more than six weeks. The cost, approximately $445,000, was paid from federal funds.

Three times during this process, the Department of Environmental Health held press conferences involving multiple agencies, and emphasized potential adverse health effects of elementary mercury. Given the public interest in the story, the amount of mercury involved in this episode, and the fact that our local voluntary industrial recycling program had garnered little public attention and participation in the past, the Department of Environmental Health Director discussed the possibility of a well-publicized voluntary mercury surrender program with EPA officials. The EPA agreed to assist with disposal of mercury collected during such a program. The local fire department agreed to organize and sponsor the effort, and the local media agreed to advertise it. Citizens were encouraged to voluntarily turn in elementary mercury (i.e., mercury-containing thermometers and any containers holding liquid mercury) to neighborhood fire departments.

Over the next six weeks, nearly 40 citizens voluntarily surrendered elemental mercury that had been in their possession, including some thermometers, but mostly jars, cans, and other containers holding various quantities of liquid mercury. Many of these citizens had possessed the mercury for years. Ultimately, this public education campaign and recycling effort resulted in the voluntary surrender of 620 pounds of elemental mercury.

LESSONS LEARNED

Prompt notification and involvement of multiple local, state, and federal agencies resulted in successful and rapid response, without overwhelming local resources

Similar to the experience of others,[12] we found that using a local multiagency response and getting the TCEQ and EPA involved early on allowed us to garner the necessary resources to adequately assess the extent of the mercury contamination. State and federal partners rapidly provided technical expertise, equipment, and personnel that were not available locally.

Identification of a lead agency from the local jurisdiction resulted in a coordinated response by multiple agencies

After notification by the Fire Marshall, the Director of the City of Amarillo Department of Environmental Health initiated a standard emergency management response and was identified as the Incident Commander. Her leadership was recognized by all agencies throughout the response and resulted in a coordinated effort. Because she was from the local jurisdiction, she was able to keep local elected and health officials informed and coordinate a local media response. Jurisdictional disputes were settled early because all agencies ultimately reported to her as Incident Commander.

A proactive and cooperative approach with the media helped minimize public concern and sensationalism

The Incident Commander called a press conference on the first day of the event and willingly responded to media requests. Regular press conferences throughout the cleanup process avoided sensationalism and ultimately resulted in media cooperation with announcement of the voluntary mercury surrender campaign.

Monitoring the health effects in a largely immigrant population can pose unique challenges

Most of the affected children and adults did not speak English as a primary language, and did not have a regular health-care provider. Examinations and urine collections were coordinated by the local Department of Public Health, which provides translators and is generally viewed with less suspicion by immigrants in our community. The local school was given contact information and facilitated follow-up. Nonetheless, all the affected families left our area within one year of this event.

A convenient neighborhood turn-in site over several weeks resulted in a successful volunteer surrender campaign

Mercury was collected during a six-week period at a mercury recycling site located at the Central Fire Station. Using a convenient, familiar site contributed to the program's success. Firemen were friendly, knowledgeable, and able to address citizens' concerns. Others also reported the benefit of local turn-in sites that collected mercury during a period of several days as opposed to single-event exchanges.[13]

CONCLUSIONS

This elemental mercury exposure in our community involved a public school, five residences, and 25 people. We had initially anticipated an exhausting effort that might have overwhelmed local resources and resulted in media sensationalism. However, by initiating a cooperative effort with local, state, and federal agencies early on, identifying a local lead agency, and establishing a proactive response with the media, we were able to provide a prompt and effective solution. Furthermore, we used this event to educate and motivate citizens to successfully eliminate potentially hazardous materials from our local community.

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