Mercury Exposure Among Residents of a Building Formerly Used for Industrial Purposes—New Jersey, 1995

In January 1995, pools of elemental mercury were discovered in a five-story factory building that had been converted to residential use in Hoboken, New Jersey. The mercury was initially found in the subflooring of a fifth-floor condominium unit that was being renovated. The tenants' association hired a private contractor to remediate the contamination; health authorities were not notified. During remediation, mercury-contaminated debris was removed from the unit, which was unoccupied. In March 1995, detectable levels of mercury vapor were found on the third, fourth, and fifth floors. The highest levels of mercury were 5 micrograms per cubic meter (µg/m³) in breathing zone areas and 888 µg/m³ in areas where liquid mercury was visible. Both levels were recorded on the fifth floor (ATSDR. Health consultation;[A288]; Hoboken, New Jersey. Atlanta: US Department of Health and Human Services, Public Health Service, 1996). At other residential properties contaminated with mercury, the Agency for Toxic Substances and Disease Registry (ATSDR) has recommended that indoor residential air mercury levels be no higher than 0.3 µg/m³ (0.0003 milligrams per cubic meter [mg/m³]) to protect public health (1, 2).

In late 1995, fourth-floor residents saw drops of mercury in their living spaces, including on stove and countertop surfaces. In November 1995, mercury vapor levels in breathing zone air samples from the fourth-floor unit ranged from 7 to 21 µg/m³ and from 14 to 26 µg/m³ at wall and floor openings. Urine mercury levels for the residents of the two fourth-floor units in

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late November and early December 1995 ranged from 11 to 65 μg of mercury per liter (L) of urine (normal: ≤20 μg mercury per liter of urine).

On December 22, 1995, the maximum levels detected on the third, fourth, and fifth floors were 10–50 μg/m³, with a detection limit of 10 μg/m³ (i.e., levels ≤10 μg/m³ may not be reliably detected). On December 27, after residents had been encouraged to increase ventilation and lower heat to reduce the concentrations of mercury vapors to which they were being exposed, mercury vapor was detected in 9 of 15 units at levels as high as 13 μg/m³, and elemental mercury was visible in a fifth-floor unit.

On December 27, the New Jersey Department of Health (NJDOH) conducted an exposure investigation. Urine specimens were collected from 28 of 37 residents. Analyses were performed by an NJDOH laboratory. Urine mercury levels ranged from 4.8 to 133 μg mercury per gram creatinine. Twenty residents, including 5 of the 6 children tested, had urine mercury levels ≥20 μg mercury per gram creatinine. In occupational exposure studies, biochemical markers of nephrotoxicity have been seen in workers with urinary mercury levels greater than 35 μg/g creatinine (3).

On December 29, the Hoboken Health Department, Hudson Regional Health Commission, and NJDOH met with residents to provide them with results of the urine tests and to assist them in interpreting the urine and air mercury results. The health agencies urged residents to relocate as soon as possible. Although elemental mercury and mercury vapors had not been detected in every unit in the building, the nature of the contaminant made every unit susceptible to future contamination. Results of the air and urine tests showed that all residents were being exposed to mercury vapors. Vapors in the building and mercury-contaminated
possessions also posed a threat to other people. Citing these concerns, ATSDR issued a public health advisory† (ATSDR. Public health advisory [A288]; Hoboken, New Jersey. Atlanta: US Department of Health and Human Services, Public Health Service, 1996) declaring the site an imminent health hazard to residents of the building. On January 7, 1996, the 37 residents, including 6 children, were temporarily relocated by EPA. Residents’ belongings were screened for contamination before being removed. Residents were referred for medical evaluation at an environmental and occupational health specialty center. Assistance was also offered to anyone who had been employed on the premises. EPA is conducting an environmental investigation of the building to determine whether it can be remediated.


Editorial Note: The exposures described in this report are noteworthy because the industrial contamination remained undiscovered until after the building was converted to residential use. Elemental mercury is a silver-gray liquid at room temperature that vaporizes readily, and the effect is enhanced by heat. The vapor caused the exposures described in this report. Mercury vapor is heavier than air and tends to settle to the floor, in a child’s breathing zone. Children are particularly susceptible to mercury’s effects (4); five of the six children in this investigation had urine mercury levels ≥20 μg/g creatinine.
Mercury affects the central and peripheral nervous systems and the kidneys. Fine tremors in the fingers, eyelids, and lips are early signs of mercury toxicity. With increasing exposure, tremors in the hands and arms may interfere with precise movements and impair skills such as handwriting. Common behavioral symptoms of mercury toxicity include depression, irritability, exaggerated response to stimuli, excessive shyness, insomnia, and emotional instability (5). Several valid neurobehavioral tests are available to assess the effects of mercury and other neurotoxic agents (6). Standardized test batteries have been used to assess groups of adults exposed to such agents in environmental (7,8) as well as occupational (9) settings, and pediatric tests are also available (10).

Exposures to mercury and other hazardous substances can pose risks to public health that must be considered when industrial sites are converted for residential use. The building in this case had formerly been used in the manufacture of mercury vapor lamps. The rapid response by health authorities probably prevented additional injury to residents, but the lengthy delay in discovering and reporting the contamination caused exposures to continue unnecessarily. Not only residents but also former factory workers and workers involved in the renovation of such buildings are at risk of exposure. These people and their employers are asked to consult the New Jersey Department of Health at (609) 984-1863.

References


2. Taueg C, et al. Acute and chronic poisoning from residential exposures to elemental


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