



MAKING MEDICINE MERCURY FREE

A 2005 Report on the Status of Virtual Mercury Elimination in the Health Care Sector

EXECUTIVE SUMMARY

A 1997 EPA study found that medical waste incinerators were the fourth largest source of anthropogenic mercury emissions to the environment.¹

Hospitals for a Healthy Environment (H2E) was launched in 1998 when the U.S. Environmental Protection Agency (EPA) and the American Hospital Association (AHA) signed a Memorandum of Understanding (MOU) to address health care's contribution to mercury pollution, among other serious environmental concerns related to the sector. H2E is now a collaborative effort of the EPA, AHA, the American Nurses Association, and the nonprofit coalition Health Care Without Harm.

The MOU called for the nation's hospitals to:

- Virtually eliminate mercury-containing waste from hospitals' waste streams;
- Reduce the overall volume of waste (both regulated and non-regulated) by 50 percent by 2010; and
- Identify hazardous substances for pollution prevention and waste reduction opportunities, including hazardous chemicals and persistent, bio-accumulative, and toxic pollutants.

Since 1998, H2E has been providing the health care sector with technical assistance and information on mercury waste management. H2E's work in more than 4,400 facilities nationwide has been influential in these facilities' mercury elimination efforts. According to a 2005 AHA survey, 97.3 percent of hospital respondents² across the country are aware of the problem with mercury and have taken steps to address the issue. The same survey reported that 73.5 percent of those hospitals credited H2E for influencing their decision to reduce mercury in their facilities. Other influences included information from colleagues, state hospital associations, state programs, state and federal regulations, and fish advisories. In addition to these influences, H2E's efforts with group purchasing organizations (GPOs) to remove mercury products from their hospital contracts have reshaped the market for mercury-containing products and significantly reduced the amount of mercury entering the health care sector.

These efforts have had a wide-ranging impact. Since 1988, over 6000 medical waste incinerators have closed. That fact, combined with the phase-out of mercury containing devices and improved waste management practices in general, mean that today the health care sector is no longer a leading source of mercury emissions, and in fact has reduced measured overall emissions from medical waste incinerators by 99%. However, while the sector should be proud of how far it's come, there is still work to be done to virtually eliminate mercury from the delivery of health care.

This report briefly outlines the historical uses of mercury in health care, the human health concerns associated with mercury, and where we stand today on mercury elimination efforts in the health care sector. In addition, this report makes recommendations for continued work to "make medicine mercury free."

¹ U.S. Environmental Protection Agency - 452/R-97-004. "Mercury Study Report to Congress, Volume II: An Inventory of Anthropogenic Mercury Emissions in the United States." December 1997.

² The AHA Mercury Survey had 554 respondents.

MERCURY USES IN HEALTH CARE AND HEALTH CARE FACILITIES

Mercury is the only common liquid metal. Its usefulness stems from its unique combination of weight, ability to flow, electrical conductivity, chemical stability, high boiling point and relatively low vapor pressure. For centuries, mercury was the ideal choice for use in medical devices that measure temperature (thermometers) and pressure (sphygmomanometers), and in other applications where density and flexibility were needed (esophageal dilators). In chemicals, including pharmaceuticals, mercury was used as a preservative. In facilities, mercury's electrical conductivity combined with its ability to flow prompted its widespread use in electrical switches and gauges. For these and many other applications, mercury-containing devices and materials had been an integral part of health care facility operations for decades. A typical large hospital might easily have contained over one hundred pounds of mercury onsite, incorporated into hundreds of different devices in dozens of separate locations.

THE PROBLEM WITH MERCURY

Mercury is a potent neurotoxin, a global priority pollutant and a PBT – a persistent bioaccumulative and toxic chemical. It persists in the environment for a long time; it bioaccumulates, meaning that it is stored in animal tissues in increasingly high concentrations up the food chain; and it is extremely toxic in small amounts. Mercury is a neurotoxin, meaning it impacts the central nervous system. Exposure to it can damage the brain, spinal cord, kidneys and liver. Mercury easily crosses the placenta, passing from mother to unborn child, where it can impact neurological development of the fetus. A July 2000 National Academy of Sciences (NAS) report indicates that more than 60,000 children may suffer from exposure to methylmercury while in-utero. According to the Centers for Disease Control, 1 in 8 women in the United States has a blood mercury level high enough to impact fetal development.

HISTORY OF THE MERCURY PROBLEM RELATED TO THE HEALTH CARE SECTOR

A few facts:

There can be up to 50 times more mercury in medical waste than in general municipal waste.³ According to 1990 data, medical waste incinerators emitted 50 tons of mercury per year (tpy).⁴

A 1997 EPA study found that medical waste incinerators were the fourth largest source of anthropogenic mercury emissions.⁵

Hospitals contributed about 5% of the total wastewater mercury load in some areas,⁶ and mercury fever thermometers contributed about 17 tons of mercury to solid waste landfills annually.⁷

³ "Mercury in Medical Waste: Keeping Mercury out of Medical Waste." U.S. EPA Region V.. www.p2pays.org/ref/01/00792.htm

⁴ Baseline National Toxics Inventory

⁵ EPA-452/R-97-004. "Mercury Study Report to Congress, Volume II: An Inventory of Anthropogenic Mercury Emissions in the United States." December 1997.

⁶ "Making Medicine Mercury Free: A Resource Guide for Mercury-Free Medicine." Health Care without Harm 2001. www.noharm.org

⁷ U.S. Environmental Protection Agency, 1996, Mercury Study Report to Congress, Science Advisory Board Review Draft, Vol. 2, p. 4-19, p. ES-3.

Since 1988, there has been a significant decrease in medical waste incinerators in the U.S, as shown in Table 1 below. Most of these incinerators were on-site hospital incinerators.⁸

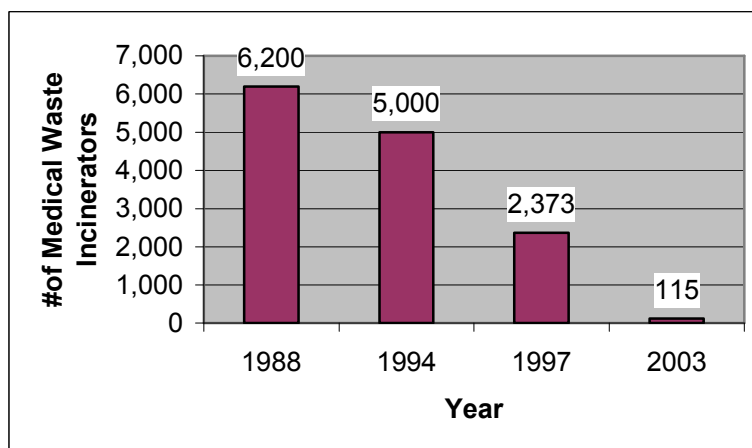


Table 1

CURRENT STATE OF MERCURY AIR EMISSIONS

We have come a long way. As of June 2004, there were 110 medical waste incinerators left in the U.S., and only 96 were in use.⁹ Total mercury emissions from medical waste incinerators have been reduced by 99.6 percent, decreasing from 49.7 tpy in 1990 to 0.2 tpy in 2002.¹⁰ There is no sign that the mercury pollution from medical waste incinerators is shifting to municipal waste combustors, as mercury emissions from municipal waste combustors have also been reduced by 92 percent, decreasing from 56.7 tpy in 1990 to 4.2 tpy in 2002.¹¹ There is also no indication that mercury pollution has shifted to landfills, as landfill emissions data has remained constant at about 0.14 tpy.¹² For recommendations on continued improvements to landfill emissions, please see the Conclusion and Recommendations section at the end of this report.

Collectively, medical waste incinerators are no longer a significant source of anthropogenic mercury. In 1990, medical waste incinerators accounted for 24 percent of national mercury air emissions. Twelve years later, they accounted for less than 2 percent of the total mercury emissions.¹³ It is important to note that this reduction is due in large part to the number of incinerator closures across the U.S. in recent years; individual incinerators may still be a source of mercury pollution. Ultimately, the goal of mercury pollution elimination efforts is to end the use of mercury-containing items and to prevent mercury from entering the waste stream at all, whether the waste is going to an incinerator, the landfill or is being disposed via wastewater.

These national reductions in mercury pollution numbers have resulted in localized ecological improvements. For example, research in south Florida has linked a combination of pollution

⁸ December 1988: "Hospital Waste Combustion Study-Data Gathering Phase," U.S. Environmental Protection Agency.

⁹ EPA-452/R-97-004. "Mercury Study Report to Congress, Volume II: An Inventory of Anthropogenic Mercury Emissions in the United States." December 1997. (Docket#A-91-61, Item IV-A-007)

¹⁰ "June 2004 HMIWI Inventory" <http://www.epa.gov/ttn/atw/129/hmiwi/rihmiwi.html#IMP>

¹¹ 1990 National Emissions Inventory and Draft 2002 National Emissions Inventory

¹² 1990 National Emissions Inventory and Draft 2002 National Emissions Inventory

¹³ There is no 1990 NEI data for landfills. The NEI data is from 1999 at 0.1 tpy and from 2002 at 0.14 tpy

¹⁴ 1990 National Emissions Inventory and Draft 2002 National Emissions Inventory

prevention and incinerator regulations to a 93% decline in mercury emissions between 1985 and 2000. The emissions declines have been linked to reductions, ca. 80%, in mercury in fish and wildlife of the Florida Everglades.¹⁴

FACTORS THAT CONTRIBUTED TO THE CURRENT STATE

The MACT Rule

The U.S. EPA's 1995 medical waste incinerator maximum achievable control technology (MACT) rule forced the closure of incinerators across the country that could not meet pollution control standards, and it also prompted many hospitals to evaluate their medical waste and incineration practices. The MACT rule was expected to reduce mercury emissions by 85 percent,¹⁵ but in fact led to a 99.6 percent reduction in mercury emissions, the result of a variety of factors. Most importantly, the sheer number of operating incinerators, most being onsite hospital incinerators, dropped by over 99%. The MACT rule, coupled with the health care sector's commitment to virtually eliminate mercury and implement vastly improved waste segregation programs, with help from programs like Hospitals for a Healthy Environment (H2E), allowed hospitals to be less reliant on incinerator technology in favor of safer and equally effective solutions.

H2E ASSISTS HEALTH CARE INSTITUTIONS ACROSS THE NATION TO ELIMINATE MERCURY

Hospitals recognize the mercury problem and have responded with new policies

Since 1998, H2E has been providing technical assistance and information to the health care industry on mercury waste management. H2E's work in over 4,400 facilities nationwide has been influential in these facilities' mercury elimination efforts. According to a 2005 American Hospitals Association (AHA) survey, 97.3 percent of survey responses indicated that hospitals were aware of the mercury issue and had already taken steps to address the problem in their facility.¹⁶ The survey also reported that 73.5 percent of hospitals credited H2E for influencing their decision to reduce mercury in their facilities. Other influences included information from colleagues, state hospital associations, state programs, fish advisories and state and federal regulations. More than 54 percent of hospital survey respondents had already established a facility policy statement to virtually eliminate mercury in their facility, and almost 60 percent of the respondents had implemented a mercury management policy.

Hospitals have changed their purchasing behavior

The market for mercury-containing medical products has been all but eliminated, and the amount of mercury entering health care has sharply decreased.

- Hospitals are removing mercury-containing medical devices from their facilities. According to the AHA survey, 80.2 percent of respondents had eliminated mercury thermometers completely and another 73 percent had removed all mercury sphygmomanometers in their facilities. Over 70 percent of responding facilities had eliminated mercury filled gastro-intestinal tubes as well. In addition, over 86 hospitals have received the Hospitals for a

¹⁴ Correspondence with Tom Atkeson, Florida Department of Environmental Protection on October 13, 2004.

¹⁵ "Mercury in Medical Waste: Keeping Mercury out of Medical Waste" U.S. EPA Region V.
www.p2pays.org/ref/01/00792.htm

¹⁶ The AHA Mercury Survey had 554 respondents.

Healthy Environment “Making Medicine Mercury Free” Award. In total, winners of this award alone have removed nearly 4900 pounds¹⁷ of mercury from their facilities.

- Because of their participation in H2E, group purchasing organizations (GPOs) are removing mercury-containing devices from their contracts and replacing them with non-mercury alternatives, influencing the purchasing behavior of hospitals. H2E’s member GPOs represent over \$52 billion or 96 percent of all contract health care purchases made in the U.S.¹⁸

According to a 2005 survey of H2E member GPOs:

- ❖ Three of the 5 largest U.S. GPOs have implemented mercury-free purchasing policies that ban items from contracts except where a non-mercury alternative is not available.
 - ❖ Four of 6 H2E member GPOs have eliminated mercury thermometers and sphygmomanometers from their contracts.
 - ❖ Overall, H2E GPOs report that the sales of mercury-containing devices are decreasing and those of non-mercury alternatives are increasing. During this market shift GPOs have not experienced a decrease in total sales, which seems to indicate that consumers are not simply buying mercury-containing items from other vendors.
- To keep pace with GPO demands, manufacturers have changed their product lines. Many companies that previously led the mercury products market are now offering mercury take-back programs. This provides incentives for hospitals to remove their mercury products at no cost and replace them with safer non-mercury substitutes. For example, Welch Allyn ended its production of mercury sphygmomanometers and took back 10,000 mercury devices last year alone, removing about 1 ton of mercury from health care.¹⁹
 - The distribution of mercury products is also declining. In a 2004 survey conducted by the Health Industry Distributors Association, the majority of respondents characterized the demand for mercury-containing products as “decreasing.”

Hospitals are eliminating mercury beyond clinical devices

Health care facility managers are replacing mercury-containing switches and gauges. H2E’s “Making Medicine Mercury Free” Award criteria require the labeling of all mercury-containing devices and the documented existence of a plan to replace them with non-mercury devices when the equipment is replaced. The AHA Survey indicates that 72.4 percent of responding facilities had inventoried all devices and labeled them as mercury-containing where appropriate.

All fluorescent light bulbs also contain mercury – even the energy efficient “green tip” bulbs. The current solution is to recycle them. The AHA survey indicates that 80% of respondents recycle their fluorescent bulbs.

Chemicals, including pharmaceuticals, contain mercury, primarily as a preservative. Replacing mercury-containing chemicals is a challenge. The good news, according to the AHA survey, is that facility managers are making significant progress. Of survey respondents, almost 80% had replaced some or all of lab chemicals; over 64% purchase mercury-free pharmaceuticals (thimerosal), and over 81% purchase mercury-free cleaning chemicals.

¹⁷ As determined by number of beds per facility x 92.6 g of Hg/per bed prior to elimination efforts.

¹⁸ Werner, Curt. “HPN Survey: GPO contract purchases top \$54 billion in 2002” Health Purchasing News. June 2003.

¹⁹ Correspondence with Tom Scott at Welch Allyn.

Mercury Education

For decades, mercury-containing items have been used throughout the health care setting; the serious problems concerning mercury were not widely known. Just 10 years ago, a nurse might have thought she was doing the right thing by disposing of a broken thermometer in the red bag and sending it to be incinerated.

Because of the hard work of organizations like Hospitals for a Healthy Environment, there has been a broad shift in health care's thinking. Today, the majority of health care workers can tell you that a broken thermometer or sphygmomanometer is a serious issue that requires a specific and immediate response. Moreover, health care facilities have played a tremendous role in improving community awareness of the dangers of mercury. Many have either hosted or participated in mercury thermometer exchange events where literally thousands of mercury thermometers are swapped for non-mercury alternatives, and where information about the hazards of mercury is widely disseminated. Today, it is almost impossible to purchase a mercury thermometer at a drug store or supermarket in the U.S., since more than 90% of chain pharmacies, including the top ten largest, have stopped selling them.

Energy efficient buildings and devices are reducing mercury emissions from coal-fired power plants as well, and "green" building design, increasingly embraced by the health care sector as a cost-saving and health improvement measure, excludes the use of mercury-containing devices. All in all, the ripple effects of this sector's shift away from mercury are enormous and continue to increase awareness of the problem in the broader community.

CONCLUSION AND RECOMMENDATIONS:

Over the course of the last 10 years, the health care sector has made significant progress in addressing the serious issue of mercury as an environmental and community health threat. Over 97 percent of surveyed hospitals are aware of and have taken steps to address the mercury issue. Some highlights:

Mercury in clinical devices

- Over 80% of recent AHA survey respondents have completely eliminated mercury thermometers from their facilities, and 18.7% have replaced some or most with a plan in place for eliminating the remainder.
- Over 73% have completely eliminated mercury sphygmomanometers, with 25% having replaced some or most with a plan in place for eliminating the remainder.
- About 75% of respondents have completely eliminated other clinical items (cantor tubes, bougies, etc) with about 10% having replaced some or most with a plan in place for eliminating the remainder.

Mercury in facilities

- Over 72.4% of survey respondents have inventoried all devices and labeled them as mercury-containing where appropriate.
- About 75% are recycling fluorescent bulbs.

Other environmental improvements made in the healthcare sector

- 80.3% of respondents report that they have a waste reduction policy.
- 90% have a regulated medical waste minimization program.

While tremendous progress has been made, there is still work to be done to virtually eliminate mercury from healthcare. Top priorities include continued outreach to facilities that have not made the commitment to a mercury phase-out plan, and addressing issues such as the presence of mercury in

chemicals and other devices. It is also important that as mercury-containing items are removed from service in the U.S. that these devices not be simply exported elsewhere, shifting the burden of mercury pollution to a global level and creating further problems rather than real solutions.

Specific recommendations for continued mercury elimination efforts include the following:

Promote health care purchasing policies that keep mercury out of facilities in the first place and that ensure the sustainability of mercury elimination efforts. Formal purchasing policies that specify a mercury elimination commitment and a preference for non-mercury alternatives, both for equipment and chemicals, should be implemented facility-wide.

The problem of mercury contamination of wastewater must be addressed. Mercury is found in a variety of chemicals, including pharmaceuticals, laboratory and radiology chemicals, and cleaning products. In each category, a full assessment should be done to identify the mercury-containing chemicals and non-mercury alternatives. The Hospitals for a Healthy Environment program is committed to continue work in these areas.

Other sources of mercury in health care must be identified and addressed. These sources include but are not limited to switches on beds, blanket warmers, batteries, computers, telephones, pagers and other medical equipment. These devices must be inventoried and labeled as mercury-containing until properly removed and replaced with non-mercury alternatives.

Proper management and disposal of mercury-containing items must be widely promoted. Fluorescent light bulbs and other mercury-containing “universal wastes” remain one of the largest sources of mercury to landfills. Continued efforts to reduce this pollution must include implementing and sustaining responsible collection programs.

Health care facilities, with H2E’s help, must continue to provide tools for mercury education for all employees. Training - both annually and for all new employees - should be performed and documented for the identification, proper handling, and segregation of items containing mercury. For applicable staff, mercury spill response training should also be provided.

Finally, mercury pollution must be addressed as a global issue. While H2E’s efforts are based in the U.S., H2E strongly discourages the export of mercury-containing items and waste, as these actions simply shift the burden of mercury pollution to other countries rather than providing real solutions. In conjunction with this stance, H2E supports efforts to develop a national mercury disposition plan to ensure that mercury removed from health care facilities does not find its way back into the marketplace, either in the U.S. or globally.

Working collectively, the health care sector must continue to strive toward providing a mercury-free environment. By choosing and promoting safer, non-mercury alternatives, and by providing education to staff, patients and the broader community on mercury’s dangers, the health care sector demonstrates its leadership in promoting human health and the health of our environment.