

Why Mercury Is A Problem

Introduction

The purpose of this section of our web site is to help hospitals start mercury pollution prevention programs or accelerate programs that have already begun. New federal regulations greatly reduce the amount of mercury that is allowed to be discharged from a municipal wastewater system or an incinerator. By implementing the best management practices described in this manual, you can reduce the level of mercury in the environment and avoid the need for increased regulations in the years to come.

The information in this section of our web site offers general guidance on how to initiate a program and technical guidance for implementing the program. This information includes:

- Information about mercury and its impact on people and the environment
- Overview of pollution prevention strategies
- How to start a mercury pollution prevention program in your hospital
- How to monitor your program, educate staff and measure success
- Alternatives for mercury-containing products
- Best management practices for handling, recycling and disposing of mercury-containing products still in use
- Contacts for further information, case studies and other information

Background on Mercury

Mercury is a toxic metal that occurs naturally in the environment. There are both inorganic forms and organic forms of mercury. Many of the forms of mercury circulate in the environment, moving from land or water to air and back again, and the forms of mercury may change from one to another as they circulate.

Human activities significantly redistribute mercury and release it into the environment. They allow mercury that was formerly unavailable to the biosphere* to be mobilized and carried to new areas via air and water. In the water or soil, microorganisms can convert inorganic mercury into a more toxic organic form, methylmercury. Fish take in methylmercury from their diet and from water passing over their gills. They bioaccumulate the methylmercury in their bodies because the rate of intake of methylmercury is much greater than its elimination. Methylmercury bioaccumulates in the tissues of a fish throughout its lifetime. It can build up to high levels in predator fish at the top of the aquatic food chain -- levels that are tens of thousands to millions of times above the level found in the surrounding water. Fish with high levels of methylmercury may be caught and consumed by humans, waterfowl or other wildlife.

Health Impacts of Mercury Exposure

All forms of mercury are toxic to humans, but the various forms of organic and inorganic



mercury have different toxicity. Generally, organic forms are much more toxic than inorganic forms.

The organic forms of mercury are primarily neurotoxins. Therefore exposure can damage the brain and nervous system. The developing brain of a fetus or child is especially vulnerable to organic mercury exposure. Inorganic forms of mercury primarily affect the kidney, but are also neurotoxins. Other organs and systems of the body can be harmed by exposure to mercury.

A human can be exposed to mercury via all three routes of exposure: inhalation, ingestion, and dermal. The most likely routes of exposure are inhalation of inorganic mercury vapor after a spill or during a manufacturing process, or ingestion of methylmercury from contaminated fish. The fetus of a mother who eats contaminated fish can be exposed to methylmercury via the mother's blood, and an infant can be exposed by ingestion of breast milk. Mercury cannot be removed from fish before they are eaten because methylmercury accumulates in the muscle, not the fat. Most of the states in the U.S., including New York State, issue cautionary advisories about eating the fish caught in some of their waterways because of the presence of mercury. These advisories represent conservative measures to protect human health.

Mercury in Medical Facilities

The following lists show some of the common uses of mercury that may be found in hospitals.

Medical uses:

- Thermometers
- Sphygmomanometers (blood pressure monitors)
- Esophageal dilators (also called bougie tubes)
- Cantor tubes and Miller Abbott tubes (used to clear intestinal obstructions)
- Feeding tubes
- Dental amalgam
- Laboratory chemicals (fixatives, stains, reagents, preservatives)
- Medical batteries

Non-medical uses common in medical settings:

- Cleaning solutions with caustic soda or chlorine that were contaminated with mercury during the production process
- Batteries
- Fluorescent lamps and high-intensity lamps
- Non-electronic thermostats
- Pressure gauges
- Some electrical switches used for lights and appliances

There is minimal risk of mercury exposure during normal use of products that are handled correctly. However, problems may occur if the mercury in a product is exposed to air, or if a product is not properly discarded so as to keep mercury out of the environment.

Mercury Pollution Prevention

Concerns about the health impacts of mercury are leading to mercury pollution prevention programs at the federal, state and local levels. The highest priority of any pollution

prevention program is source reduction, which means not using mercury in the first place. For example, some states have banned the deliberate use of mercury in certain products for which alternatives are available.

When adequate mercury alternatives are not available and mercury must be used, it may be possible to recycle it. Recycling is the second priority of mercury pollution prevention. Disposal of mercury should be the last resort. It is expensive and increases the potential of mercury being dispersed into the environment.

Pollution prevention programs are driven by voluntary efforts and by increasingly strict federal and state regulations. Some of the regulations govern occupational exposures and waste disposal. Other regulations result from the federal Clean Air Act Amendments of 1990. The 1995 federal Great Lakes Water Quality Guidance (also referred to as the Great Lakes Initiative) sets strict water quality standards for mercury in the eight Great Lakes States.

Best Management Practices (BMPs) for the management of mercury within hospitals might involve:

- Use of alternatives for products that contain mercury
- Recycling of mercury-containing products when they can no longer be used
- Correct handling and disposal of mercury, mercury-containing equipment and laboratory chemicals
- Proper cleanup of spills involving mercury
- Hospital policies that support BMPs

The BMPs are intended to result in the greatest reduction in mercury discharge to the environment that is currently feasible for hospitals.

Benefits of Mercury Pollution Prevention

Mercury pollution prevention in the hospital provides many benefits:

- Protection of human health and wildlife by reducing occupational exposures and releases of mercury to the air, water and land from wastewater discharges, spills, landfilling or incineration
- Avoidance of the costs associated with the use of mercury, such as disposal or recycling, collection and storage prior to disposal, paper work for tracking hazardous waste disposal, training and equipment for spill response, training for hospital employees who handle mercury-containing products, and liability for environmental problems or worker exposure
- Avoidance of increased regulation in the future
- Increase in the public's awareness about the dangers of mercury through publicity about the hospital's program
- Enhancement of the positive public image of the medical facility due to publicity about success stories