WORLD HEALTH ORGANIZATION

Mercury in Health Care

POLICY PAPER

1 - Background

Mercury is a naturally occurring heavy metal. At ambient temperature and pressure, mercury is a silvery-white liquid that readily vaporizes and may stay in the atmosphere for up to a year. When released to the air, mercury is transported and deposited globally. Mercury ultimately accumulates in lake bottom sediments, where it is transformed into its more toxic organic form, methyl mercury, which accumulates in fish tissue.

Mercury is highly toxic, especially when metabolized into methyl mercury. It may be fatal if inhaled and harmful if absorbed through the skin. Around 80% of the inhaled mercury vapour is absorbed in the blood through the lungs. It may cause harmful effects to the nervous, digestive, respiratory, immune systems and to the kidneys, besides causing lung damage. Adverse health effects from mercury exposure can be: tremors, impaired vision and hearing, paralysis, insomnia, emotional instability, developmental deficits during fetal development, and attention deficit and developmental delays during childhood. Recent studies suggest that mercury may have no threshold below which some adverse effects do not occur.

2 - Contribution from the health-care sector and Regulation

Health-care facilities are one of the main sources of mercury release into the atmosphere because of emissions from the incineration of medical waste. The Environment Minister of the Canadian province of Ontario declared on December 2002 that emissions from incinerators were the fourth-largest source of mercury.
In the United States, according to US Environmental Protection Agency (EPA) in a 1997 report, medical waste incinerators may have been responsible for as much as 10% of all mercury air releases.

Health-care facilities are also responsible for mercury pollution taking place in water bodies from the release of untreated wastewater. According to a 1999 report, health-care facilities may also have been responsible for as much as 5% of all mercury releases in wastewater. Environment Canada estimates that more than one-third of the mercury load in sewage systems is due to dental practice.

Dental amalgam is the most commonly used dental filling material. It is a mixture of mercury and a metal alloy. The normal composition is 45-55% mercury; approximately 30% silver and other metals such as copper, tin and zinc. In 1991, the World Health Organization confirmed that mercury contained in dental amalgam is the greatest source of mercury vapour in non-industrialized settings, exposing the concerned population to mercury levels significantly exceeding those set for food and for air.
(Source:http://www.who.int/ipcs/publications/cicad/en/cicad50.pdf)

According to a report submitted to the OSPAR Commission, in the United Kingdom, annually 7.41 tonnes of mercury from dental amalgam are discharged to the sewer, atmosphere or land, with another 11.5 tonnes sent for recycling or disposed with the clinical waste stream. Together, mercury contained in dental amalgam and in laboratory and medical devices, account for about 53% of the total mercury emissions.

Waste incineration and crematoria are also listed as major sources of mercury emissions. Many countries, such as Armenia, Cameroon, Ghana, Honduras, Pakistan, and Peru, recognize the contributions from hospital thermometers, dental amalgams, hospital waste and/or medical waste incinerators but lack quantitative data. Despite the lack of data, there is good reason to believe that mercury releases from the health sector in general are substantial.

Some countries have restricted the use of mercury thermometers or have banned them without prescription. A variety of associations have adopted resolutions encouraging physicians and hospitals to reduce and eliminate their use of mercury containing equipment.

3 – Occupational health hazard

The most common potential mode of occupational exposure to mercury is via inhalation of metallic liquid mercury vapours. If not cleaned up properly, spills of even small amounts of elemental mercury, such as from breakage of thermometers, can contaminate indoor air above recommended limits and lead to serious health consequences. Since mercury vapour is odourless and colourless, people can breathe mercury vapour and not know it. For liquid metallic mercury, inhalation is the route of exposure that poses the greatest health risk.

A variety of studies demonstrate that mercury containing health-care equipment will invariably break. Small spills of elemental mercury on a smooth, non-porous surface can be safely and easily cleaned up with proper techniques. However, beads of mercury can settle into cracks or cling to porous materials like carpet, fabric, or wood, making the mercury extremely difficult to remove. Spilled mercury can also be tracked on footwear. Inadequate cleaning and disposal may expose already compromised patients and health-care staff to potentially dangerous exposures.

4 – Alternatives

A recent study found that at least one manufacturer of the non-mercury alternative was identified where the cost differences between mercury and non-mercury technologies were minimal. The research findings suggest that many non-mercury alternatives are available to address the full range of functions required by consumer products. For health care, these include blood pressure devices, gastrointestinal devices, thermometers, barometers, and in other studies, include the use of mercury fixatives uses in labs.

Both mercury and aneroid sphygmomanometers have been in use for about 100 years, and when working properly, either gives accurate results.
Of all mercury instruments used in health care, the largest amount of mercury is used in mercury sphygmomanometers (80 to 100g/unit), and their widespread use, collectively make them one of the largest mercury reservoirs in the health-care setting. By choosing a mercury-free alternative a health-care institution can make a tremendous impact in reducing the potential for mercury exposure to patients, staff and the environment. Aneroid sphygmomanometers provide accurate pressure measurements when a proper maintenance protocol is followed. It is important to recognize that no matter what type of blood pressure measurement device is used both aneroid and mercury sphygmomanometers must be checked regularly in order to avoid errors in blood pressure measurement and consequently the diagnosis and treatment of hypertension.

5 – International Conventions

The UNEP Governing Council concluded that there is sufficient evidence of significant global adverse impacts from mercury to warrant further international action to reduce the risks to humans and wildlife from the release of mercury to the environment. The UNEP Governing Council decided that national, regional and global actions should be initiated as soon as possible and urged all countries to adopt goals and take actions, as appropriate, to identify populations at risk and to reduce human-generated releases.

6 – Strategy

To understand better the problem of mercury in health-care sector, it is recommended that countries conduct assessments of current mercury usage and waste management programs. WHO proposes to work in collaboration with countries through the following strategic steps.

Short-term: Develop mercury clean up and waste handling and storage procedures. Until countries in transition and developing countries have access to mercury free alternatives it is imperative that safe handling procedures be instituted which minimize and eliminate patient, occupational, and community exposures. Proper procedures should include spill clean up response, educational programs, protective gear, appropriate waste storage containment, staff training, and engineered storage facilities. Countries that have access to affordable alternatives should develop and implement plans to reduce the use of mercury equipment and replace them with mercury-free alternatives. Before final replacement has taken place, and to ensure that new devices conform with recommended validation protocols, health-care facilities will need to keep mercury as the " gold" standard to ensure proper calibration of mercury sphygmomanometers.

Medium-term: Increase efforts to reduce the number of unnecessary use of mercury equipment. Hospitals should inventory their use of mercury. This inventory should be categorized into immediately replaceable and gradually replaceable.
Replaced devices should be taken back by the manufacturer or taken back by the alternative equipment provider.
Progressively discourage the import and sale of mercury containing health-care devices and mercury use in health-care settings, also using global multi lateral environmental agreements to this end. Provide support to countries to make sure that the recovered mercury equipment is not pushed back in the supply chain.

Long-term: Support a ban for use of mercury containing devices and effectively promote the use of mercury free alternatives. Support countries in developing a national guidance manual for sound management of health-care mercury waste. Support countries in the development and implementation of a national plan, policies and legislation on mercury health-care waste. Promote the principles of environmentally sound management of health-care waste containing mercury, as set out in the UN Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. Support the allocation of human and financial resources to ensure procurement of mercury free alternatives and a sound management of health-care waste containing mercury.

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