

## The Uses of Mercury Equipment and Products in Irish Healthcare

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### Abstract

Mercury is a naturally occurring metal, one of the most toxic metals within the food chain and has a number of uses in the Irish health care sector. This paper reports on a mercury survey in Ireland with the purpose to present a picture of mercury use in health settings. The findings show 50% of health settings free of all mercury medical equipment. Mercury spills occur within 30% of health settings, with no training provided in handling mercury equipment, in the management of mercury spills and only 10% of health services have mercury clean up kits. With 50% of mercury waste disposed inappropriately, a number of recommendations are advanced for reducing the amount of mercury in the health settings alongside awareness and education for health professionals.

### Introduction

Mercury is a naturally occurring metal, which has several forms, is non-essential and one of the most toxic metals within the food chain<sup>1</sup>. Mercury has a number of uses in health care, where it is found in medical instruments: thermometers, sphygmomanometers, gastrointestinal tubes, dilation and feeding tubes<sup>2</sup>. Mercury has a broad influence on the health of the Irish community. Mercury thermometers are found in the list of top poisonous agents in the 2004, 2005 and 2006 reports of the National Poisons Information Centre in Ireland<sup>3</sup>. The Food Safety Authority of Ireland, in 2004, advised pregnant and breastfeeding women, women of childbearing age and young children to limit intake of predatory fish, specific to limit tuna due to high levels of

mercury found in fish.<sup>4</sup> A joint research project between the Irish Doctors Environmental Association (IDEA) and the Health and Environment Alliance (HEAL) was designed to explore the issues around mercury use in health care services in Ireland<sup>5</sup>.

### Methods

A survey of mercury-related activities in Ireland was conducted with the purpose of presenting a picture of mercury use in Irish health care services. The survey was directed towards doctors, nurses, and hospital environmental managers and was completed during the first two months of 2007. A descriptive statistical analysis of the survey was carried out and the results are divided under six headings, mercury survey and demographics, safety

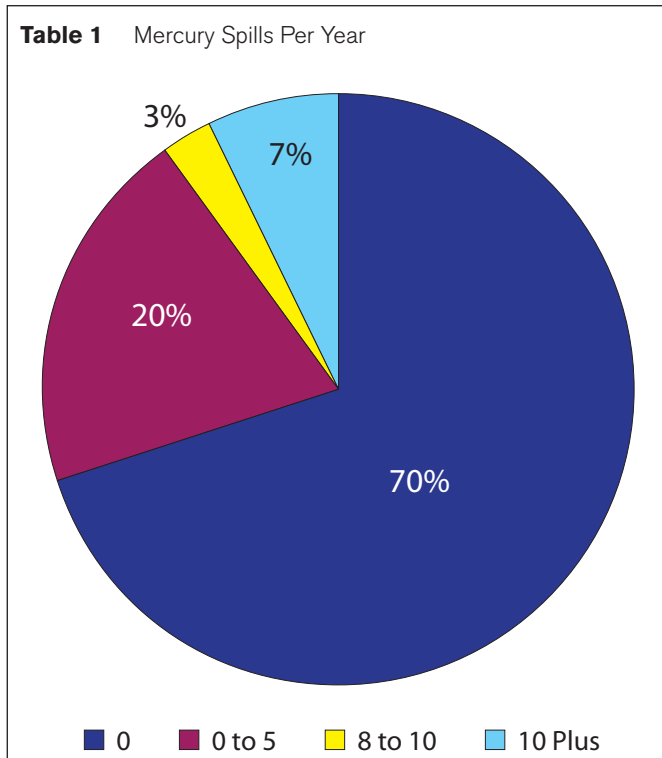
practices, purchasing practices, disposal practices, open ended question and professional category analysis.

**Results**

*Mercury survey and demographics*

Nurses appear as the main profession to partake in the survey followed by doctors, and environmental managers. A variety of health settings are reported on, 41% from the primary health care sector followed by the hospital sector at 33%. 46% of Irish health services are using mercury free devices, 19% are using mercury devices and 35% did not know about mercury use. Mercury thermometers and sphygmomanometers are the main mercury instruments used in health care settings. Gastrointestinal tubes with mercury and mercury batteries are still in use in diminishing quantity. 30% of health care services reported mercury spills over the last year and 70% had no mercury spills. (Table 1)

**Table 1** Mercury Spills Per Year



*Safety practices*

3% of respondents reported receiving training in health and environmental issues relating to mercury equipment. (Table 2) 86% did not receive training in health and environmental issues relating to mercury equipment. In the management of mercury spills, 97% of respondents had no training or were not aware of staff training on mercury spills. In the health care settings, 61% had no mercury cleanup kit available and 28% of health care professional were not aware of the availability of a cleanup kit. Only 11% of health services had a mercury cleanup kit available in their service.

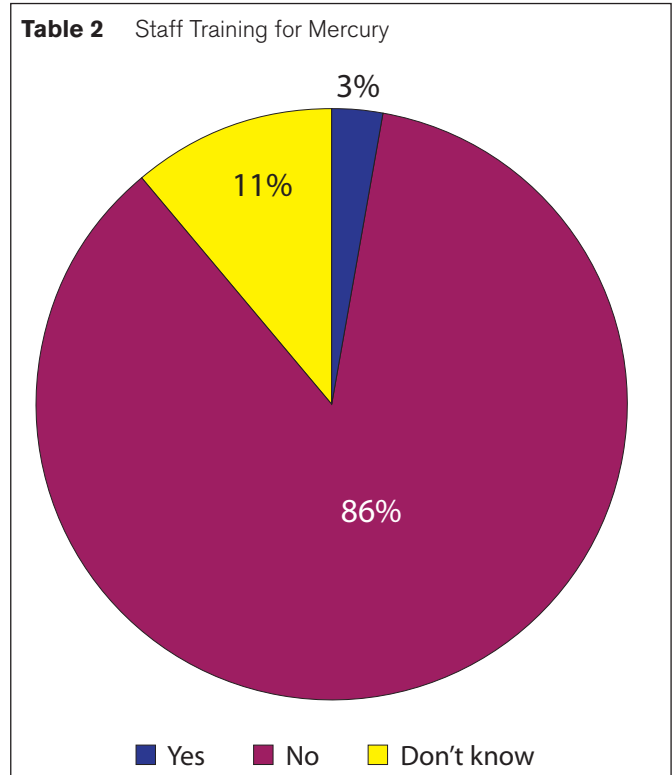
*Purchasing practices*

6% reported that their service had a purchasing policy on mercury, 39% reported not having a policy and 55% did not know if there was a purchasing policy on mercury. An aspect to consider is that doctors and nurses may not be involved in the purchasing practices and this is indicated by the 55% who did not know about their health service purchasing policy.

*Disposal practices*

A small number of health professionals at 4%, put mercury waste in the general waste stream, 48% used the healthcare risk waste stream and 48% put mercury in an individual hazardous waste

**Table 2** Staff Training for Mercury

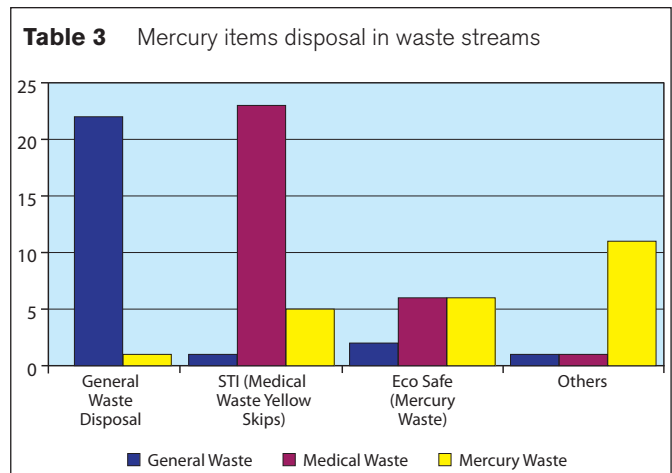


stream. This indicates that over 50% of mercury waste is put into the wrong waste disposal stream. (Table 3) Both general waste and healthcare risk waste stream are not designed to manage mercury waste. All mercury waste requirements should be managed separately from other waste in an individual hazardous waste material stream and never mixed with other waste streams<sup>6</sup>.

*Open ended question*

The results of an open-ended question are divided into 4 themes of awareness, purchasing, training and disposal. Firstly, answers referred to a certain lack of awareness of mercury within the health care profession. "I didn't realise the environmental implications when a thermometer breaks which obviously happens from time to time". Secondly, there appears to be an unwritten rule within many health services not to purchase medical equipment with a mercury component. "Unwritten not to purchase...". Thirdly, the hospital porters were identified as the people who are trained to manage a mercury spill. "The porters who work on transport are the ones who are trained". The final theme looked at the breakage and disposal of mercury waste where health professionals are uncertain of how to dispose of old mercury products. "Unsure how to disposal of old products". Answers

**Table 3** Mercury items disposal in waste streams



referred to, "Breakage of mercury thermometers is a daily occurrence". Professional category analysis: The results of the survey were filtered to look at the answers each professional category provided and are divided into 4 categories, doctor, nurse, environmental manager and others. Doctors reported that they mainly use mercury sphygmomanometers, did not consider themselves as working in a mercury free environment and were not aware of a mercury free purchasing policy.

Doctors have had no training in mercury, in the management of mercury spills, and no access to mercury clean up kit. They may be involved in a small number of thermometer breakages and used the correct waste streams available for disposal of mercury waste. Nurses reported that they use mercury thermometers and sphygmomanometers and receive no training in mercury, in the management of mercury spills and only 10% had access to mercury clean up kit. Nurses' reported to be the profession most likely to be involved in a mercury spill incident. Nurses reported to have disposed of mercury waste products in a variety of waste streams, with only 48% using the correct waste streams. Environmental hospital managers reported that their service is 100% mercury free, had no training in mercury, in the management of mercury spills and no mercury clean up kit available in their service. The environmental manager reported no mercury spills within their service and had a mercury free purchase only policy. Any mercury waste reported to their department was correctly disposed off through a hazardous waste company and this was mainly old mercury sphygmomanometers.

### Discussion

Many different health professionals use medical equipment containing mercury in both acute and primary health settings. Up to 50% of health settings considered their service free of all mercury medical equipment. In support of the health settings that still have mercury equipment, it is recommended that a planned withdrawal and replacement of mercury thermometers and sphygmomanometers should be carried out. This can be carried out by the substitution of alternative non-mercury equipment and is regarded as the most powerful measure for preventing mercury pollution, as it reduces the amount of mercury in circulation<sup>7</sup>. The common danger associated with using mercury equipment is a mercury spill. While the majority of services have no spills recorded, one or two health services have a significant number of spills. There is no specific training in handling mercury equipment or in the management of mercury spills for health professionals and only 10% of health services have mercury spill clean up kits. There is no significant health and safety knowledge on mercury use in the health care sector or training in the prevention and management of mercury spills. Where there is health and safety equipment to manage mercury spills there may not be a suitable person trained to use the equipment given only 3% of responses have had training in the cleaning up of a mercury spill. It is recommended that a mercury spill kit and a health and safety policy are provided and available in all health settings. This recommendation is required in mercury free settings as a visiting patient or practitioner may unintentionally bring equipment with mercury into a mercury free settings.

The lack of knowledge on the proper procedures to clean up mercury signifies that a dangerous situation can be made even more dangerous by not knowing what to do. Common cleaning practices can lead to an increased danger from a mercury spill by the contamination of an area escalating and potential contaminating other people. A review of the 2006 Health Service

Executive training courses revealed a generic training in the use of chemicals in health care, but made no reference to mercury<sup>8</sup>. It is recommended that health and safety training in mercury awareness and mercury cleanup practices are necessary and should be available to all health care settings big and small. Mercury spills occur within 30% of health care settings, with thermometers the most likely sources of mercury spills followed by sphygmomanometers. The most likely professional found to be involved in a mercury spill was the nurse. Given the overall lack of awareness of mercury, it could be implied that spills do occur, are not reported and are not managed or disposed of correctly.

It is recommended that mercury awareness is included in the curriculum of all health professional education and training programs, fundamentally in nursing and medical training programs. While over time Ireland may become mercury free, the movement of health professionals around the globe means that they may still come into contact with mercury medical equipment. The fact that the thermometer is small and easily concealed in the midst of general rubbish, allows for it to be disposed of incorrectly. While it may not seem an enormous issue with one thermometer, an accumulative number of thermometers in one area can contaminate the environment, people, and children in that area. It is recommended that the disposal of mercury equipment in health care settings be reviewed to provide clear guidelines and points of disposal for the largest hospitals to the smallest rural clinic. There are no clear legal guidelines on the use of mercury medical equipment and no legislative purchasing policy of mercury equipment provided to guide health care settings<sup>9</sup>. It is recommended to develop clear national guidelines and an explicit national purchasing policy for all health care settings for any equipment that contains mercury.

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