

# MERCURY AND DENTAL AMALGAMS

FACT SHEET, MAY 2007

STAY HEALTHY!  
**STOP MERCURY**



## What is the concern about mercury in dental fillings?

Mercury comes in different forms, most of which are toxic to humans, ecosystems and wild-life. High doses can be fatal to humans, but even relatively low doses of mercury containing compounds can have serious adverse neurodevelopmental impacts, and have recently been linked to possible harmful effects on the cardiovascular, immune and reproductive systems.

The second largest use of mercury in Europe is for dental amalgams. In 2000, 70 tonnes were used in the old 15 member states alone.<sup>1</sup> It is estimated that the use of amalgam in the new EU member states is even higher than in the old 15 EU members. The so-called “silver fillings” used to fill dental cavities contain around 50% mercury and are the largest source of exposure to elemental mercury for people who have fillings.<sup>2</sup> The exposure comes both from inhalation of the elemental vapours during installation/removal of the fillings, and of mercury vapours released during different mouth actions (chewing or ingesting hot foods and liquids – see below)<sup>3</sup>. Approximately 80 percent of inhaled mercury vapours are absorbed by the lungs. (See the Table on Exposure Routes and Toxicity of different Mercury forms in the Mercury and Health Factsheet). Studies indicate that inhaled elemental mercury is converted to inorganic mercury in the body<sup>4</sup> and that mercury from amalgam is passed to babies via the placenta and through breast milk<sup>5</sup>. As much as 50 percent of the mercury in dental fillings can be vaporised after 5 years, and 80 percent after 20 years.<sup>6</sup> Common habits such as chewing gum, drinking hot liquids, tooth brushing, and grinding of teeth greatly increase the amount of mercury vapours released and thus individual exposure to a highly absorbable form of mercury and total body burden<sup>7</sup>.

While in some studies health effects have been observed,<sup>8</sup> there is no general scientific consensus on the significance of these exposures in the general population. The absorbed mercury is excreted by the body and enters the waste water systems, making its way into fish in the form of methylmercury, and eventually into people through seafood consumption. (For the health implications of mercury and methylmercury exposure, please see our factsheets on Mercury and Health; Mercury and Fish Consumption; and our report “Halting the Child Brain Drain” at [www.env-health.org/stopmercury](http://www.env-health.org/stopmercury)).

An additional source of mercury to the environment from dental fillings is from crematoria<sup>9</sup>. At the EU level, there are no mandatory limits on mercury emissions from crematoria and it is estimated that between 2 and 3.5 tonnes of mercury is released annually from crematoria in the EU. There are national

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emission standards which require gas cleaning at new or large crematoria in Austria, Belgium, Germany, The Netherlands, and Sweden (as well as Norway). Denmark, France and the U.K. do not have these gas cleaning standards. As there are an estimated 1,300-2,200 tonnes of mercury in fillings in EU and EFTA states at present, emissions from crematoria need to be subject to control at the EU level, and the use of mercury fillings needs to be reduced.<sup>10</sup>

In terms of occupational health, dentists and their assistants are exposed to more mercury than are people with dental amalgams, due to their highly frequent direct exposure to mercury vapours.<sup>11</sup> General dentists have been shown to average twice the body burden of mercury as the general population. Mercury and its compounds may be absorbed through the skin, the gastrointestinal tract and the lungs. The principal source of occupational exposure to mercury poisoning is mercury vapours.<sup>12</sup>

As reported in documentaries broadcast on television in Norway, Denmark and Sweden (soon to be shown in France and other EU countries), dental assistants have reported significantly higher occurrence of neurotoxic symptoms, such as memory disturbance, tremor and anxiety and depression due to their direct and continuing exposure to mercury in dental offices.<sup>13</sup> Partly as a result of the enormous public response to these documentaries, Norwegian government authorities have announced revised plans to study occupational exposure of dental personnel to mercury, and the incidence of long term effects. In February 2006 the Danish employment minister also announced the start of a comprehensive mercury investigation. The Danish investigation includes a meeting of Nordic experts, a thorough literature search, clinical and epidemiological studies, and a program of medical examinations for dental workers.

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## Solutions

As stated by the Swedish Chemical Inspectorate, there is strong evidence for banning amalgam for environmental reasons, while for health protection there is every reason to apply a precautionary approach.<sup>14</sup> A number of dental filling composites exist that provide good alternatives to amalgams.

Sweden provides a good example. In 1991, the Swedish government began a phasing-out process in which amalgam would cease to be used in dentistry for children and young people from 1 July 1995 and for the general public entirely by 1997. Through significant cooperation among the National Board of Health and Welfare, Parliament, City Councils, and the Swedish Chemical Inspectorate, use was significantly reduced, but not entirely eliminated. To make amalgam more cost-neutral compared with other filling materials, the Parliament decided in 1999 that no financial support should be given for amalgam fillings through the national dental insurance<sup>15</sup>. It is estimated that less than 6% of all new fillings in Sweden now contain mercury.<sup>16</sup> Currently, Swedish dentists use different types of composites (i.e. polymer resin-based materials) as alternatives to amalgam. Other materials used are ceramics (including porcelain), zirconium oxide and glass-ionomers. Also used are combinations of materials, e.g. "compomers" that are modified composites. In addition,

there are prefabricated ceramic cones, which are pressed into composite fillings to reduce shrinkage of the filling. The use of amalgam continues to decline. It is estimated that the shares of dental filling materials, measured by weight, are:

Composites	78 %
Glassionomers	13 %
Amalgam	6 %
Compomers	3 %
Ceramics	<1 %.

Note that since composites are lighter than amalgam, one kilo of composites will fix many more teeth than one kilo of amalgam. So if measured by the number of restored teeth, the composites' share will increase and amalgam's share will decrease even further<sup>17</sup>.

While there are some questions about the toxicity of the composites, a thorough assessment of their health implications is not yet on hand, not only because of the lack of resources being directed to this end, but also because of the many variables involved. Both the individual materials, and how they act in the mixtures which composites comprise need greater examination; as do the issues of individual compatibility. In the meantime, avoidance of mercury fillings is still desirable.

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## National Policies and Actions

Many EU Member States have no restrictions on the use of mercury in fillings. However, there are several countries that have significantly reduced the use of mercury, through combinations of voluntary approaches and regulations, as alternatives have become increasingly available.

### DENMARK

With the aim of significantly reducing both mercury use and releases, Denmark only permits amalgam in molar teeth where there are fillings already in place. Denmark is ready to ban the remaining use of dental amalgam, as soon as the Danish National Board of Health is satisfied that the non-mercury alternatives have full substitution capabilities.<sup>18</sup>

### NORWAY

The Directorate for Health and Social Affairs has recommended that the use of amalgam should be restricted as much as possible for environmental reasons and to prevent possible injury to health. The new national guidelines for dental filling materials became effective in July 2003.<sup>19</sup> The guidelines state for example that mercury amalgam should not be the first choice of material; it should be avoided during pregnancy; every effort should be made to reduce patient and dental personnel exposure; and water cooling and suction shall be used when removing old dental fillings.

### FRANCE

The French government, (the Conseil Supérieur d'Hygiène Publique de France (CSHPF)) does not regard mercury in dental amalgams as a problem. The CSHPF has nevertheless advised that pregnant and breastfeeding women avoid the installation or removal of dental amalgams, and that people with numerous amalgams avoid frequent mastication of chewing gum.<sup>20</sup> The French agency in charge of health products, the AFSSAPS (Agence française de sécurité sanitaire des produits de santé) has decided against any recommendation that mercury not be used for children, except in cases of allergy or renal attack. But in 2005, it recommended that alternative materials should be used on pregnant women (AFSSAPS, 2005).<sup>21</sup>

**GERMANY, FINLAND, AUSTRIA, and CANADA** have also all sought to a greater or lesser extent to reduce or phase out mercury use by dentists - especially in pregnant women, children and those with impaired kidney functions.<sup>21</sup> Health Canada, Canada's federal health agency, has advised a precautionary approach whereby pregnant women, children under six, and persons with kidney problems should never receive mercury amalgam fillings.<sup>23</sup>

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## EU Standards

Dental amalgams are regulated under the Medical Devices Directive, but there is currently no restriction on the use of mercury in amalgams. However, mercury-containing dental amalgam waste is considered hazardous waste in the European Union, and must be disposed of in accordance with applicable laws.<sup>24</sup>

In its Mercury Strategy, the European Commission has recognized that as the chlor-alkali industry phases out mercury cells, dental amalgam will become the major use of mercury in the EU. On this basis, they recommend a re-examination of the possibilities for substitution and have asked the Medical Devices Expert Group to consider the use of mercury in dental amalgam. The Commission is also seeking an opinion from the Scientific Committee on Health and Environmental Risks on the environmental impacts of amalgams and from the Scientific Committee on Emerging and Newly Identified Health Risks on the health implication of amalgams. The opinions from both Committees are due to be published by the end of 2007, after which the Commission may consider whether additional regulatory measures are appropriate.<sup>25</sup>

The European Council, in their Conclusions on the European Commission's Mercury Strategy, stressed the necessity of addressing the residual use of mercury within the Community, and specifically of dental amalgam.<sup>26</sup>

The European Parliament has also recommended urgent consideration of restrictions on the marketing and use of mercury in dental amalgams, particularly with regard to high-risk sections of the population.<sup>27</sup> In its resolution on the European Commission's Mercury Strategy in March 2006, the Parliament called on the Commission to come forward by the end of 2007 with a proposal to restrict the use of mercury in dental amalgam. At the same time, it urged the Commission to take measures ensuring that the Community requirements regarding treatment of dental waste are properly applied, and to investigate whether additional measures are needed to ensure that amalgam does not enter the waste stream<sup>28</sup>.

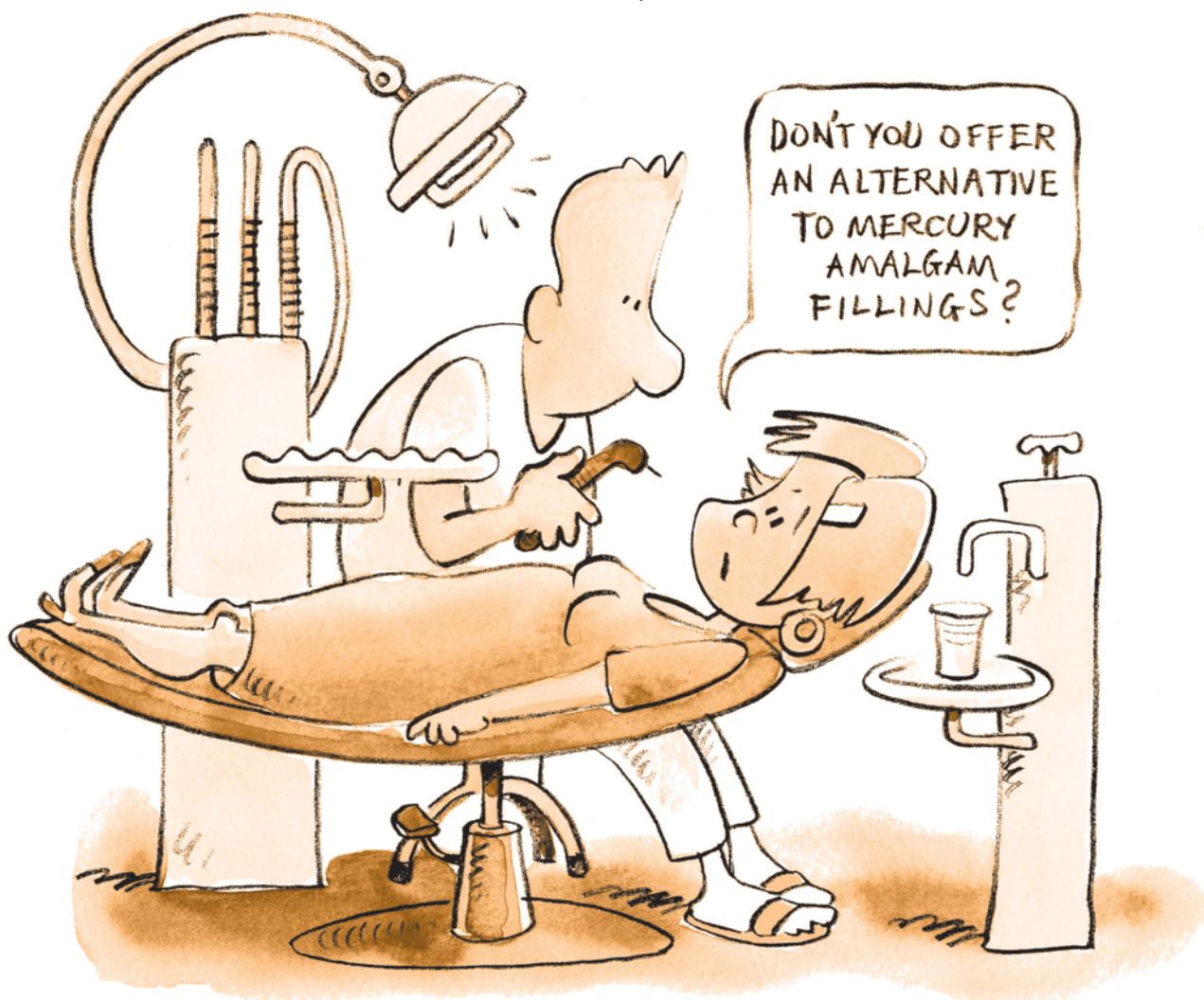
## Our Recommendations

The Health & Environment Alliance and Health Care Without Harm Europe advocates restrictions on the use and marketing of dental amalgams containing mercury and the promotion of safer substitutes. Restrictions on the use and marketing of dental amalgams should be fostered through voluntary incentives, technical assistance and legal mandates to require dentists to:

- Offer proven alternatives to amalgam fillings to patients, with priority for children, youth and pregnant women
- Adhere to stringent best management practices;
- Install amalgam separators in dental facilities which can reduce mercury discharge by 95 percent or more;
- Clean and replace mercury-laden pipes and plumbing fixtures in dental facilities;
- Manage quantities of excess elemental mercury properly;
- Submit annual reports on dental mercury reduction initiatives, including the quantities of mercury used and recycled.

Recommendations for the reduction of exposure to dental personnel include:

- Amalgam should not normally be the first choice for dental fillings;
- Dental tissue-conserving techniques should be chosen when dental fillings are necessary;
- Contact with materials before they are hardened should be avoided;
- Recap single-use capsules after use, and store them in closed containers;
- Ensure well-ventilated work areas, with sufficient fresh air circulation and external exhaust;
- Undertake periodic checks of the dental surgery atmosphere for mercury vapours;
- Use water cooling and suction when removing old dental fillings;
- Avoid contact between amalgam and other metals when placing new dental fillings;
- Remove professional clothing before leaving the workplace.



## References

1. Maxson, Peter. European Commission. *Mercury Flows in Europe and the World: The Impact of Decommissioned Chlor-Alkali Plants*, February 2004. Page ES-4.
2. Commission Staff Working Paper. Annex to the Communication from the Commission to the Council and the European Parliament on Community Strategy Concerning Mercury Extended Impact Assessment Brussels, 28.1.2005 SEC(2005)101 [http://europa.eu.int/comm/environment/chemicals/mercury/pdf/extended\\_impact\\_assessment.pdf](http://europa.eu.int/comm/environment/chemicals/mercury/pdf/extended_impact_assessment.pdf) accessed 13 June 2005 p. 12
3. J. Mutter, J. Naumann, C. Sadaghiani, H. Walacha, G. Drasch, Amalgam Studies: disregarding basic principles of mercury toxicity. *Int. J. Hyg. Environ. Health* 207 (2004); <http://www.elsevier.de/intjhyg> p. 391
4. (US) National Research Council, *Toxicological Effects of Methylmercury, Risk Characterization and Public Health Implications*, National Academy Press, 2000.
5. Toxicological Profile for Mercury, US ATSDR, 1999; p. 442; <http://www.atsdr.cdc.gov/toxprofiles/tp46-c5.pdf>
6. Pleva J, "Dental mercury - a public health hazard", *Rev Environ Health* 10(1):1-27 (1994); Pleva J, Mercury from dental amalgams: exposure and effects, *Int J Risk & Safety in Med*, 1992, 3: 1-22.
7. Toxicological Profile for Mercury, US ATSDR, 1999; p. 440; <http://www.atsdr.cdc.gov/toxprofiles/tp46-c5.pdf>; Vimy MJ, Lorscheider FL: Serial measurements of intra-oral air mercury; Estimation of daily dose from dental amalgam. *J Dent Res* 64(8):1072-5, 1985; Vimy MJ, Luft AJ, Lorscheider FL, Estimation of Mercury Body Burden from Dental Amalgam Computer Simulation of a Metabolic Compartment Model *J. Dent. Res* 1986 65(12):1415-1419, December, 1986.
8. J. Mutter, J. Naumann, C. Sadaghiani, H. Walacha, G. Drasch, Amalgam Studies: disregarding basic principles of mercury toxicity. *Int. J. Hyg. Environ. Health* 207 (2004); <http://www.elsevier.de/intjhyg> p. 391-394.
9. Mercury from corpses buried in the soil can also contaminate the ground water.
10. COMMISSION STAFF WORKING PAPER Annex to the Communication from the Commission to the Council and the European Parliament on Community Strategy Concerning Mercury Extended Impact Assessment Brussels, 28.1.2005 SEC(2005)101 [http://europa.eu.int/comm/environment/chemicals/mercury/pdf/extended\\_impact\\_assessment.pdf](http://europa.eu.int/comm/environment/chemicals/mercury/pdf/extended_impact_assessment.pdf) accessed 13 June 2005 p. 116
11. See "Neurobehavioral effect from exposure to dental amalgam HgO: New distinctions between recent exposure and Hg body burden," *FASEB J.*, Vol. 12 pp. 971-980, 1998 and "Behavioral effects of low-level exposure to HgO among dental professionals: a cross-study evaluation for psychomotor effects." *Neurotoxicol Teratol*, 1998 Jul-Aug; 20(4): pp.429-39; Ritchie KA, Gilmour WH, Macdonald EB et al. Health and neuropsychological functioning of dentists exposed to mercury. *Occup Environ Med* 2002; 59: 287-93
12. See NIOSH Criteria Documents, Criteria for a Recommended Standard: Occupational Exposure to Inorganic Mercury, 1973, DHHS (NIOSH) Publication No. 73-11024, p. 17.
13. Neurotoxic Symptoms Among Dental Assistants, Bente E. Moen, Bjorg Eli Hollund and Trond Riise, Section for occupational medicine, Institute of Public Health and Primary Health Care, University of Bergen; Abstract, presented on the 28th International Congress on Occupational Health—Milan, Italy, 11-16th June 2006, abstract book page 63. Information about the Norwegian Broadcasting documentaries can be found at: Mercury Girls: <http://www.tv2world.com/programmes/show/109>; Mercury Children: <http://www.tv2world.com/programmes/show/110>
14. KEMI - Swedish Chemical Inspectorate. Mercury – Investigation of a general ban [http://www.kemi.se/upload/Trycksaker/Pdf/Rapporter/Rapport4\\_04.pdf](http://www.kemi.se/upload/Trycksaker/Pdf/Rapporter/Rapport4_04.pdf) accessed 13 June 2005, p. 8
15. KEMI - Swedish Chemical Inspectorate. Mercury – Investigation of a general ban [http://www.kemi.se/upload/Trycksaker/Pdf/Rapporter/Rapport4\\_04.pdf](http://www.kemi.se/upload/Trycksaker/Pdf/Rapporter/Rapport4_04.pdf) accessed 13 June 2005, p. 31
16. KEMI - Swedish Chemical Inspectorate. Mercury – Investigation of a general ban [http://www.kemi.se/upload/Trycksaker/Pdf/Rapporter/Rapport4\\_04.pdf](http://www.kemi.se/upload/Trycksaker/Pdf/Rapporter/Rapport4_04.pdf) accessed 13 June 2005, p. 33.
17. KEMI - Swedish Chemical Inspectorate. "Mercury Free Dental Fillings: Phase Out of Amalgam in Sweden", PM 9/05. Sundbyberg, December 2005.
18. UNEP Global Mercury Assessment Appendix Overview of Existing and Future National Actions, Including Legislation, Relevant to Mercury as of 1 November 2002. <http://www.chem.unep.ch/mercury/Report/Final%20report/final-appendix-1Nov02.pdf> accessed 13 June 2005 p. 59.
19. See <http://www.shdir.no/index.db2?id=11566>
20. See [http://www.sante.gouv.fr/htm/actu/31\\_980519.htm#PATIENT](http://www.sante.gouv.fr/htm/actu/31_980519.htm#PATIENT)
21. <http://agmed.sante.gouv.fr/pdf/5/poster/amalgame.pdf#search=%22centr%20antipoison%20mercure%22>
22. Swedish National Dept. of Health, Mercury Amalgam Review Panel, 1987; Heavy Metal Bulletin, Dec 2000, Vol 6, Issue 3.
23. An FDA Consumer Update (December 31, 2002) informs consumers that Canada limits the use of mercury amalgam in pregnant women; <http://dsp-psd.pwgsc.gc.ca/Collection/H49-105-1996E.pdf>
24. Council Directive 91/689/EEC of 12 December 1991 on hazardous waste Official Journal L 377 , 31/12/1991 P. 0020 – 0027 <http://europa.eu.int/eur-lex/lex/LexUriServ/LexUriServ.do?uri=CELEX:31991L0689:EN:HTML>
25. European Commission. COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT Community Strategy Concerning Mercury{SEC(2005) 101}
26. Council conclusions on the Community strategy concerning mercury 2670th ENVIRONMENT Council meeting, Luxembourg, 24 June 2005, p. 2.
27. Texts adopted by Parliament Wednesday 23 February 2005 <http://www2.europarl.eu.int/omk/sipade2?PUBREF=-//EPI/TEXT+TA+20050223+ITEMS+DOC+XML+V0//EN&LEVEL=3&NAV=X#sdocta10> accessed 27 June 2005
28. European Parliament resolution on the Community strategy concerning mercury (2005/2050(INI)), 14 March 2006; P6-TA(2006)0078; A6-0044/2006.

## What can you do?

1. Avoid use of amalgam in dental treatment when pregnant, breastfeeding and for young children.
2. Ask your dentist whether alternative dental filling materials are available.
3. Send a letter to your insurance provider requesting that non-mercury fillings be reimbursed.
4. Find out whether there are any limits on mercury emissions from crematoria in your city/ country.

## Resources

International Academy of Oral Medicine and Toxicology  
[www.iaomt.org](http://www.iaomt.org)

### Norwegian Board of Health

[http://www.helsetilsynet.no/upload/publikasjoner/andrepublikasjoner/use\\_dental\\_filling\\_materials\\_norway\\_ik-2675.pdf](http://www.helsetilsynet.no/upload/publikasjoner/andrepublikasjoner/use_dental_filling_materials_norway_ik-2675.pdf)

### Swedish Government

<http://www.dentalmaterial.gov.se>

### KEMI - Swedish Chemical Inspectorate.

"Mercury Free Dental Fillings: Phase Out of Amalgam in Sweden", PM 9/05. Sundbyberg, December 2005.

[http://www.kemi.se/upload/Trycksaker/Pdf/PM/PM9\\_05.pdf#search=%22kemi%20PM%209%2F05%22](http://www.kemi.se/upload/Trycksaker/Pdf/PM/PM9_05.pdf#search=%22kemi%20PM%209%2F05%22)



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\* Formerly known as EPHA Environment Network (EEN)

## "Stay Healthy, Stop Mercury" campaign

Health and Environment Alliance (HEAL) and Health Care Without Harm Europe (HCWH) are joining forces to mobilise the health community in Europe for a global ban on mercury. The activities are focused on raising awareness of the risks to health, especially for babies and pregnant women, and on working with women and health care professionals on how they can protect themselves and the environment from mercury exposure.

