Consultation Response Form SCHER preliminary report on "The environmental risks and indirect health effects of mercury in dental amalgam"

Do you agree with the observations made by the SCHER?

<table>
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<th>Do you agree with the observations made by the SCHER?</th>
<th>Disagree</th>
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<tr>
<td>If you chose the option ‘mostly disagree’ or ‘disagree’, explain why:</td>
<td>Unsatisfactory conclusion from the scientific point of view</td>
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<td></td>
<td>Relevant information missing from the analysis of the situation</td>
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Please provide the scientific/technical evidence to improve the overall assessment (with complete references)

*max. 4.000 characters with spaces included (approximately 1 page)*

The SCHER has failed to consider all pathways of mercury releases, emissions and exposures due to dental amalgam. The SCHER has underestimated dental mercury conversion to methylmercury. The SCHER has discounted or ignored large amounts of relevant data and information that indicate a significant risk. The SCHER has used an inadequate risk assessment methodology. The SCHER has largely ignored highly relevant and peer-reviewed information and analysis on the basis that it has not been published in a scientific journal. If the SCHER properly addresses all of these issues and consults the attached references, the following conclusions are inescapable: 1. Considering the whole life cycle (municipal waste incineration and landfill, medical waste disposal, wastewater treatment sludge incineration/disposal, cremation, etc.), dental amalgam is a significant
continuous contributor to anthropogenic atmospheric mercury emissions in the EU - in the range of 15-20%, corresponding to an estimated 23 tonnes of mercury annually; For example, when amalgam waste is discarded in municipal waste, some mercury will be released into the atmosphere from landfill vapours or leachate, or the mercury will vaporize if the waste is incinerated. 2. Via another pathway to the environment, dental amalgam is also an important contributor to the mercury concentration in municipal wastewater, where the mercury originates from dental clinics as well as (large quantities of) human wastes carrying (low concentrations of) mercury released by normal wear of amalgam fillings; 3. The studies used related to the occurrence of mercury in wastewater from dental clinics are very few and not representative for the whole of the EU. The occurrence of mercury in the wastewater stream of dental clinics is a particularly sporadic and discontinuous event. The SCHER should be relying on the many studies that demonstrate that dental clinics are the origin of typically 40-50% of all Hg in the wastewater going to wastewater treatment plants, since the majority of EU member states have not yet installed and properly maintain separators, and amalgam waste is not fully treated as hazardous waste. 4. In general terms, atmospheric mercury emissions are directly linked to subsequent mercury deposition and runoff; 5. The mercury carried by deposition and runoff is directly reflected in increased concentrations of mercury in surface waters; 6. The total mercury burden in surface waters, including not only dental mercury via the pathways described above, but also contributions from dental mercury accumulated in the environment (in sediments, wastewater piping systems, leaching from landfills, etc.) during previous years, is directly reflected in the methylmercury burden in surface waters; 7. Since not all pathways above were taken into account, the amount of mercury and therefore methylmercury in the environment is underestimated, considering that to the direct methylmercury emissions we need to add the methylmercury from transformation. 8. The main source of methylmercury exposure to wildlife is fish and other aquatic organisms, whose uptake of methylmercury is proportional to the methylmercury burden in surface waters; 9. There is ample and accumulating evidence that the methylmercury burden in surface waters is directly responsible for excessive methylmercury exposure of wildlife, and is causing significant harmful effects to a range of species; 10. Therefore, as long as dental amalgam remains a significant contributor to anthropogenic mercury emissions and, in turn, to the methylmercury burden in surface waters, then dental amalgam is also heavily implicated in environmental risks.

References
References referred to in your comments should be sent as PDF-Files to the following mailbox: Sanco-Sc8-Secretariat@ec.europa.eu. Please indicate the name of contributor in your email and use the following structure for the filenames of documents: Last name of first author_publication year_name of journal (short Medline name)_topic (optional).pdf Please ensure that the maximum length of filenames is 40 characters.


Question 2: Is it scientifically justified to conclude that mercury in dental amalgam could cause serious effects on human health due to mercury releases into the environment?

Do you agree with the response given? Disagree

If you chose the option ‘mostly disagree’ or ‘disagree’, explain why:

Unsatisfactory conclusion from the scientific point of view
Relevant information missing from the analysis of the situation

Please provide the scientific/technical evidence to improve the overall assessment (with complete references)

The SCHER has failed to consider all pathways of mercury releases, emissions and exposures due to dental amalgam. The SCHER has underestimated dental mercury conversion to methylmercury. The SCHER has discounted or ignored large amounts of relevant data and information that indicate a significant risk. The SCHER has used an inadequate risk assessment methodology. The SCHER has largely ignored highly relevant and peer-reviewed information and analysis on the basis that it has not been published in a scientific journal. If the SCHER properly addresses all of these issues and consults the attached references, the following conclusions are inescapable: 1. Considering the whole life cycle (municipal waste incineration and landfill, medical waste disposal, wastewater treatment sludge incineration/disposal, cremation, etc.), dental amalgam is a significant continuous contributor to anthropogenic atmospheric mercury emissions in the EU - in the range of 15-20%, corresponding to an estimated 23 tonnes of mercury annually; 2. Via another pathway to the environment, dental amalgam is also an important contributor to the mercury concentration in municipal wastewater, where the mercury originates from dental clinics as well as (large quantities of) human wastes carrying (low concentrations of) mercury released by normal wear of amalgam fillings; 3. In general terms, atmospheric mercury emissions are directly linked to subsequent The studies used related to the occurrence of mercury in wastewater from dental clinics are very few and not representative for the whole of the EU. The SCHER should be relying on many studies which demonstrate that dental clinics are the origin of typically 40-50% of all Hg in the
wastewater going to wastewater treatment plants, since the majority of EU Member States have not yet installed and properly maintain separators, and amalgam waste is not fully treated as hazardous waste. 4. The mercury carried by deposition and runoff is directly reflected in increased concentrations of mercury in surface waters; 5. The total mercury burden in surface waters, including not only dental mercury via the pathways described above, but also contributions from dental mercury accumulated in the environment (in sediments, wastewater piping systems, leaching from landfills, etc.) during previous years, is directly reflected in the methylmercury burden in surface waters; 6. Since not all pathways above were taken into account, the amount of mercury and therefore methylmercury in the environment is underestimated, considering that to the direct methylmercury emissions we need to add the methylmercury from transformation. 7. The main source of methylmercury exposure to humans is fish and other aquatic organisms, whose uptake of methylmercury is proportional to the methylmercury burden in surface waters; 8. It has been well established that as dental mercury releases increase the load of mercury to both the local and global environment, such releases also increase human exposures to methylmercury through the fish that people eat. 9. Fish consumption advisories are pervasive (and increasing, as seen in EEB/ZMWG comments to the SCHER report February 2008) in order to reduce scientifically proven health risks. 10. There is a broad scientific consensus that anthropogenic mercury emissions need to be drastically reduced (e.g. calculations from Sweden call for a reduction of 80% in some areas and close to 100% in others; similarly, the Northeast region of the US has set targets of 86-98% reduction) in order to reduce the food-chain related methylmercury risks to a level where there would be little or no concern for effects on humans; 11. Therefore, as long as dental amalgam remains a significant contributor to anthropogenic mercury emissions and, in turn, to the methylmercury burden in surface waters, then dental amalgam is also heavily implicated in health risks.

References

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Question 3: Comparison of environmental risks from use of mercury in dental amalgam and use of alternatives without mercury

Do you agree with the general observations made by the SCENIHR? Mostly agree

Please provide the scientific/technical evidence to improve the overall assessment (with complete references)

$max. 4.000$ characters with spaces included (approximately 1 page)

However, there is no need to make a comparison of environmental risks from the use of mercury in dental amalgam and the use of mercury-free alternatives, since there is ample evidence that the former should be phased out for (indirect and direct) health reasons. (Please see also IAOMT comments to SCENIHR concerning direct health effects of dental amalgams vs. mercury-free alternatives.) Just as the direct health effects of dental amalgams are significantly higher than those of mercury-free alternatives, it may also be assumed that the environmental risks of amalgam releases are far higher than any releases related to mercury-free alternatives. Finally, and importantly, it has been demonstrated that it is far more cost effective to reduce mercury emissions related to dental amalgam use (in particular, shifting to mercury-free alternatives, installing and maintaining amalgam traps and separators, and improving amalgam recycling and disposal practices) than it is to pursue other opportunities for significantly reducing mercury emissions (Hylander and Goodsite 2006). Major reduction of amalgam related releases may be achieved in the near term by greatly expanding the use of separators, and in the near to medium term by phasing out amalgams, for which there are economically viable alternatives (KemI 2005).

References
Question 4: If the Committee under its work finds out that more information is needed, for one or more questions, the Committee is asked to provide a detailed list on what this kind of information is needed to carry out the tasks.

Do you agree with the general observations made by the SCENIHR?

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If you chose the option ‘mostly disagree’ or ‘disagree’, explain why:

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More information could be considered always useful. However, this is not a risk assessment that lends itself to a precise response, no matter how much information is provided. It is not clear which pieces of information SCHER has used. When the call for
information was made in spring 2007, the information sent by the public was not made
publicly available, nor it was clarified which of these documents were accepted by the
SCHER. The available information is perfectly adequate to determine that health and
environmental risks from amalgam releases to the environment in the EU are significant.
The SCHER should consult the following documents, among others:

References

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AMSA (2002a) - “Mercury Source Control & Pollution Prevention Program Evaluation, Final
Report,” Association of Metropolitan Sewerage Agencies, July 2002. Andersson and
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House Subcommittee on Domestic Policy of the Committee on Oversight and Government
“Substance Flow Analysis of Mercury Intentionally Used in Products in the United States
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(2001) - Dental amalgam fillings and the amount of organic mercury in human saliva.
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the mouth with dental amalgams. Lindberg et al. (2007) - “A synthesis of progress and
uncertainties in attributing the sources of mercury in deposition.” Håkanson L et al.
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(2003a). Critical levels of atmospheric pollution: criteria and concepts for operational
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modelling efforts. Munthe et al. (2007a) - “Recovery of mercury-contaminated fisheries.”
Munthe et al. (2007b) - Mobilization of mercury and methylmercury from forest soils after
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County Department of Public Works, Madison, Wisconsin, 27 August 2007. Rowland et al.
(1975) - The methylation of mercuric chloride by human intestinal bacteria. Rudd et al.
(1980) - Mercury methylation by fish intestinal contents. Stone et al. (2003) -
Determination of methyl mercury in dental-unit wastewater, Swain et al. (2007) -
“Socioeconomic consequences of mercury use and pollution.” Ambio 36, 45-61. UNECE

**Contact details**

<table>
<thead>
<tr>
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<th>Elena Lymberidi-Settimo, Project Coordinator “Zero Mercury Campaign”</th>
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<tbody>
<tr>
<td>Address</td>
<td>34, Boulevard de Waterloo Brussels B-1000 Belgium</td>
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<td>Do you write as an individual or on behalf of an organisation?</td>
<td>Organisation</td>
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<th>European Environmental Bureau / Zero Mercury Working Group</th>
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<th><a href="mailto:elena.lymberidi@eeb.org">elena.lymberidi@eeb.org</a></th>
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