# Phasing down of dental amalgam use – future challenge-

**Hiroshi Ogawa DDS, MDSc, PhD**

WHO Collaborating Centre for Translation of Oral Health Science

Niigata University

# Topics

- Minamata convention and dental amalgam
- Pathways of mercury in dentistry
- Challenges

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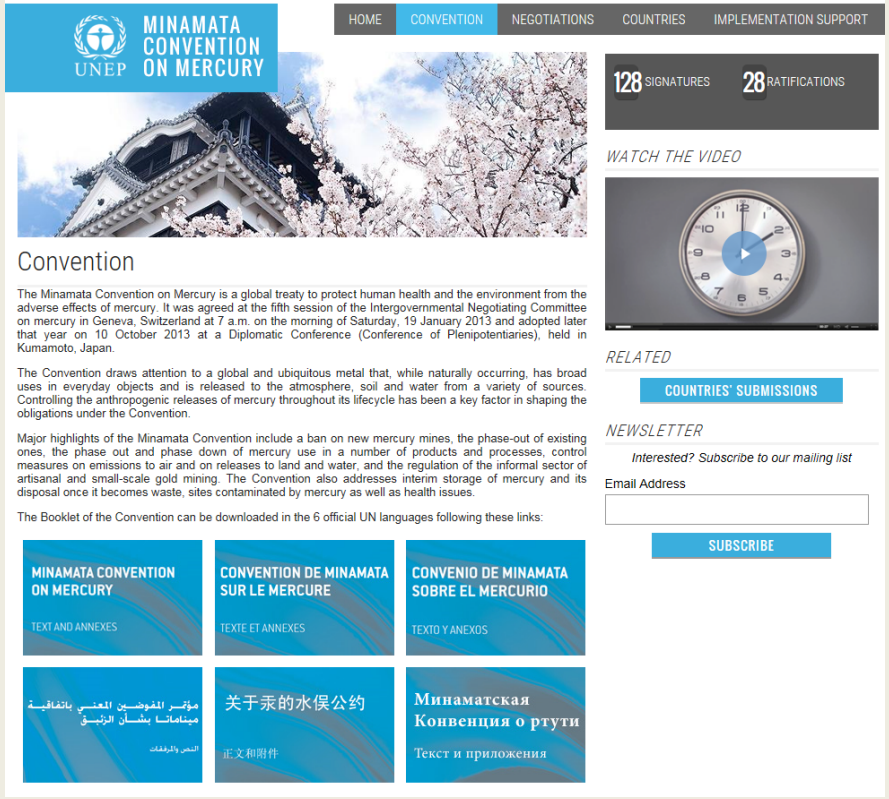
# The Minamata Convention and dental amalgam 10 October 2013




- The Convention's provisions for dental amalgam—a mercury-added product containing 50% mercury—make it highly relevant to the dental profession.

- **Dental amalgam is the only mercury-added product subject to a phase-down.**

# Status

- Dental amalgam is a widely employed restorative material that contains approximately 50% mercury (WHO 2011).
- The material has been employed for more than 150 years for dental care, in hundreds of millions of patients around the world (CDA 2006).
- Approximately 370 million restorations were carried out in 2010, of which 125 million were done with amalgam based on estimates for the European Union (DG ENV 2012).

# Status

- The choice of materials for dental caries management depends on a number of factors such as:

  **the tooth,**

  **site and size of the caries lesion,**

  **healthcare provision and financing,**

  **patient preference,**

  **health care provider preference,**

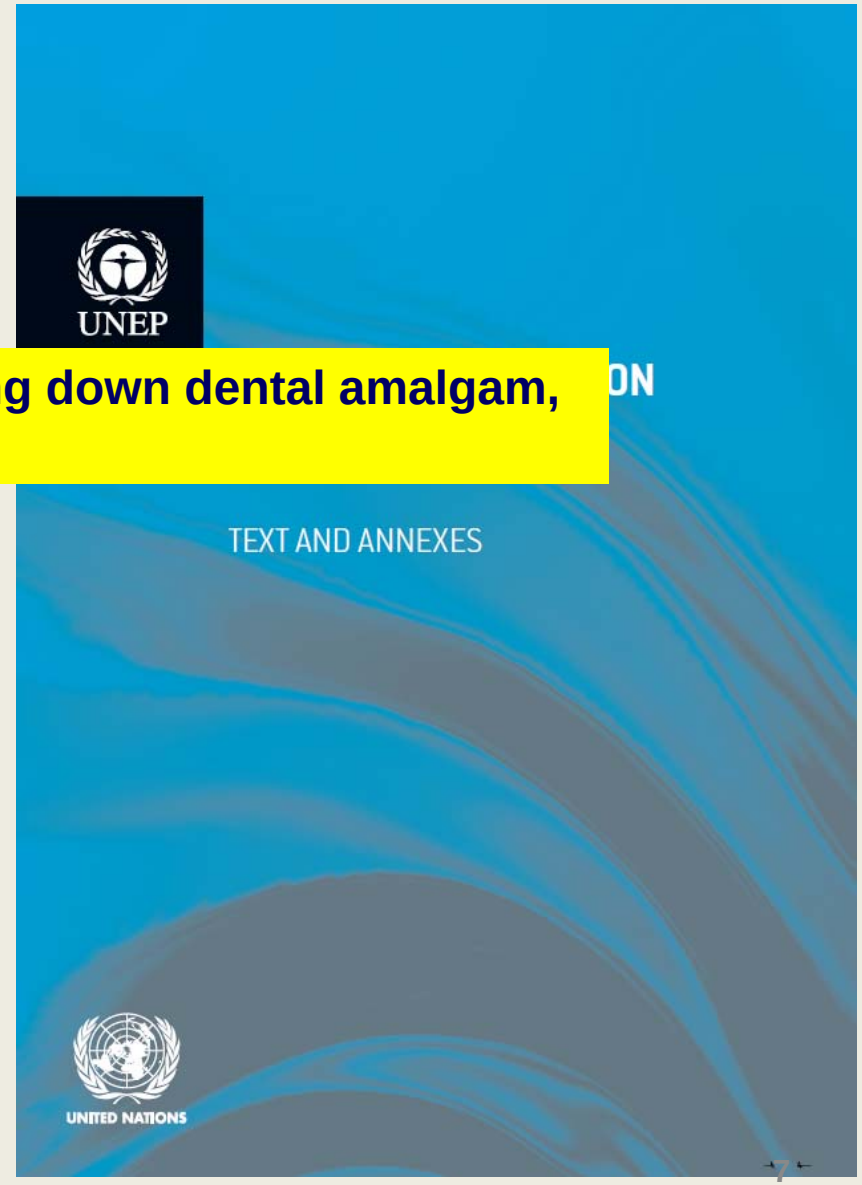
  **technology,**

  **cost and environmental factors**

| Mercury-added products | Provisions |
|---|---|
| Dental amalgam | Measures to be taken by a Party to phase down the use of dental amalgam shall take into account the Party's domestic circumstances and relevant international guidance and shall include two or more of the measures from the following list:<br>(i) Setting national objectives aiming at dental caries prevention and health promotion, thereby minimizing the need for dental restoration;<br>(ii) Setting national objectives aiming at minimizing its use;<br>(iii) Promoting the use of cost-effective and clinically effective mercury-free alternatives for dental restoration;<br>(v) Encouraging representative professional organizations and dental schools to educate and train dental professionals and students on the use of mercury-free dental restoration alternatives and on promoting best management practices;<br>(vi) Discouraging insurance policies and programmes that favour dental amalgam use over mercury-free dental restoration;<br>(vii) Encouraging insurance policies and programmes that favour the use of quality alternatives to dental amalgam for dental restoration;<br>(viii) Restricting the use of dental amalgam to its encapsulated form;<br>(ix) Promoting the use of best environmental practices in dental facilities to reduce releases of mercury and mercury compounds to water and land. |

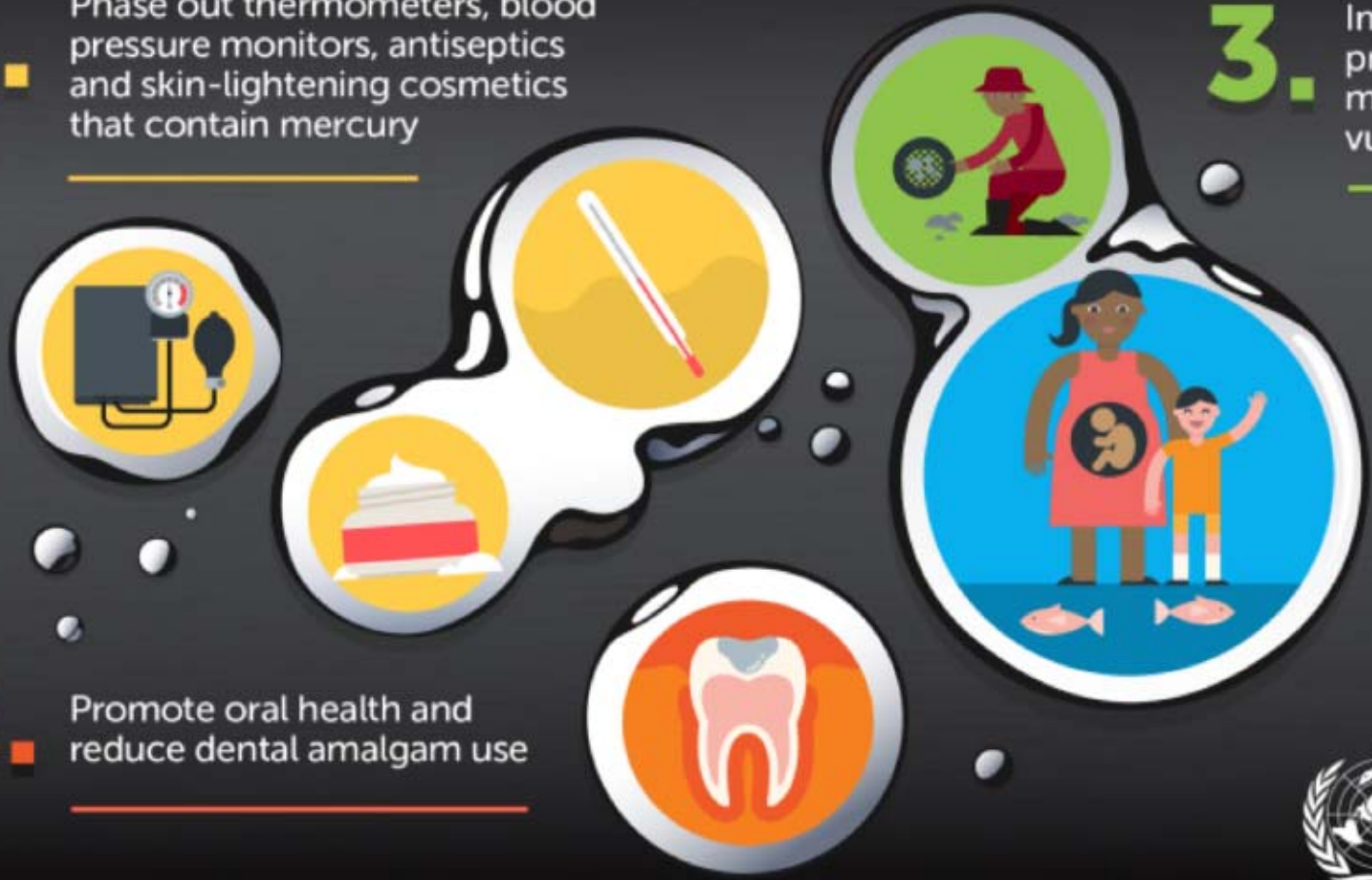
**interconnected and interdependent nature of phasing down dental amalgam, and reinforce the need for a multipronged approach**

# The Convention sets out nine measures to phase down the use of dental amalgam



# THE HEALTH SECTOR'S ROLE IN THE MINAMATA CONVENTION

**1.** Phase out thermometers, blood pressure monitors, antiseptics and skin-lightening cosmetics that contain mercury



**2.** Promote oral health and reduce dental amalgam use

**3.** Implement strategies to protect small-scale gold miners and other vulnerable groups

**4.** Monitor mercury exposure and provide health advice

World Health Organization

# Implementation of the Minamata Convention on Mercury for WPRO and SEARO (2017)

**WHO Statement to the Asia Pacific Regional Preparatory Meeting on the Minamata Convention, 5 July 2017**

On 29 – 30 June, the World Health Organization, Ministry of the Environment and Ministry of Health Labour and Welfare of Japan and the Minamata City Government co-organized a workshop for ministries of health from the WHO Western Pacific Region on health sector involvement in implementation of the Minamata Convention on Mercury. The meeting was co-chaired by the Republic of Marshall Islands - by the Minister of Health, and by the Ministry of Health Malaysia and was attended by Ministries of Health from 18 countries as well as health institutions and experts.

Like the WHO South East Asia Region, the countries in the Western Pacific Region are at different stages of addressing the health issues in the Convention, ranging from big countries like China which has ratified the Convention to some of the smallest countries, the Pacific Island Countries. Despite these differences, the workshop identified a number of shared issues and concerns and provided an opportunity to exchange knowledge and experience in addressing them. For example, the countries discussed how to approach the work needed on mercury thermometers and sphygmomanometers in health care, and the urgent need to find a solution to the issue of mercury health care waste. Plans were made to share health sector capacity assessment methodologies and analyses with those that have yet to undertake this step. The small island countries are keen to work together to develop their health action plans and to collaborate on implementation because their human and other resources are too small to address all the issues alone.

There was agreement on the importance of getting political buy-in, for example through upcomng Health Ministerial meetings in the region, and on the value of improving health information for this purpose as well as to raise awareness among vulnerable populations. Countries saw an opportunity to follow up on the UNEP/WHO Global Monitoring Project which will produce Standard Operating Procedures for biomonitoring studies and would like to collaborate on studies in the region. Countries also prioritized training of health care workers, the work to be done on dental amalgam and, for some countries, on ASGM and contaminated sites. For some, high consumption of predatory fish was a concern as well as the effect mercury pollution has on their livelihoods due to dependence on fish exports.

Countries learned about tools and resources available to undertake the important work ahead, including the support that can be provided by the WHO Collaborating Centre at the National Institute of Minamata Disease and the WHO Collaborating Centre on Oral Health Research Translation at Niigata, Japan, as well as from WHO and other UN partners. In conclusion, the workshop identified a number of practical short and longer term steps, and established a network of contacts in health ministries for follow up.

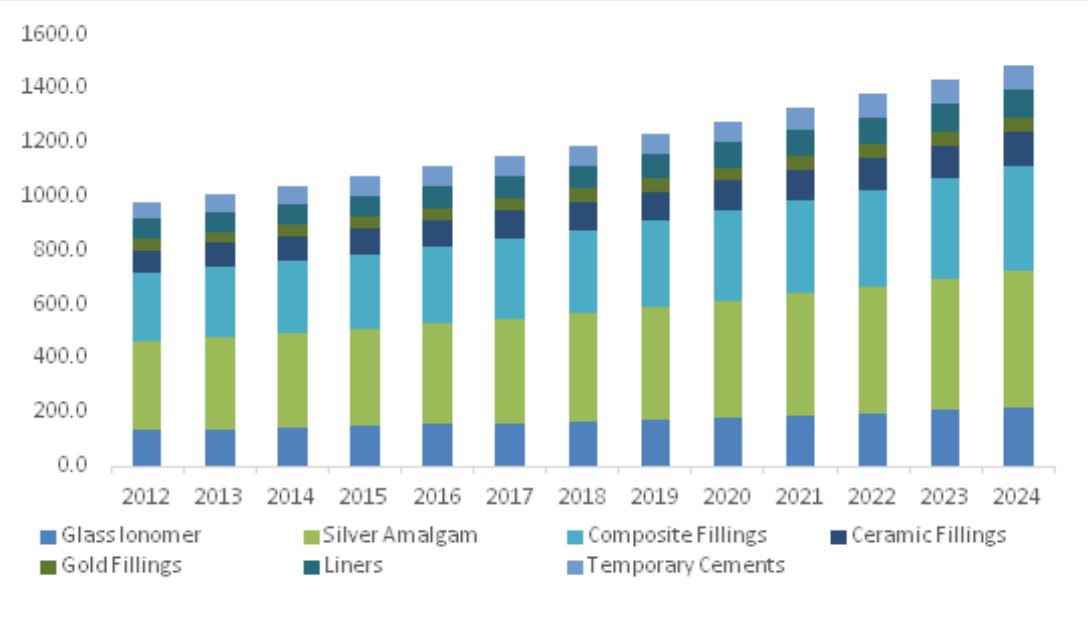
WHO would like to thank our Japanese co-organizers in particular the Ministry of the Environment for their financial support for the workshop. On behalf of the workshop participants we also thank the Japanese government for the learning experience and the honour of participating in the Entry-into-force events for the Minamata Convention that took place on 1 July.

# Topics

- Minamata convention and dental amalgam
- Pathways of mercury in dentistry
- Challenges

# Main pathways of mercury in dentistry

- Manufacturing and selling amalgam products to the dental trade;
- Placing and removing amalgam fillings in dental practices;
- Disposing, recycling or storing amalgam products and wastes;
- The final fate of any amalgam fillings in the deceased via burial or cremation.

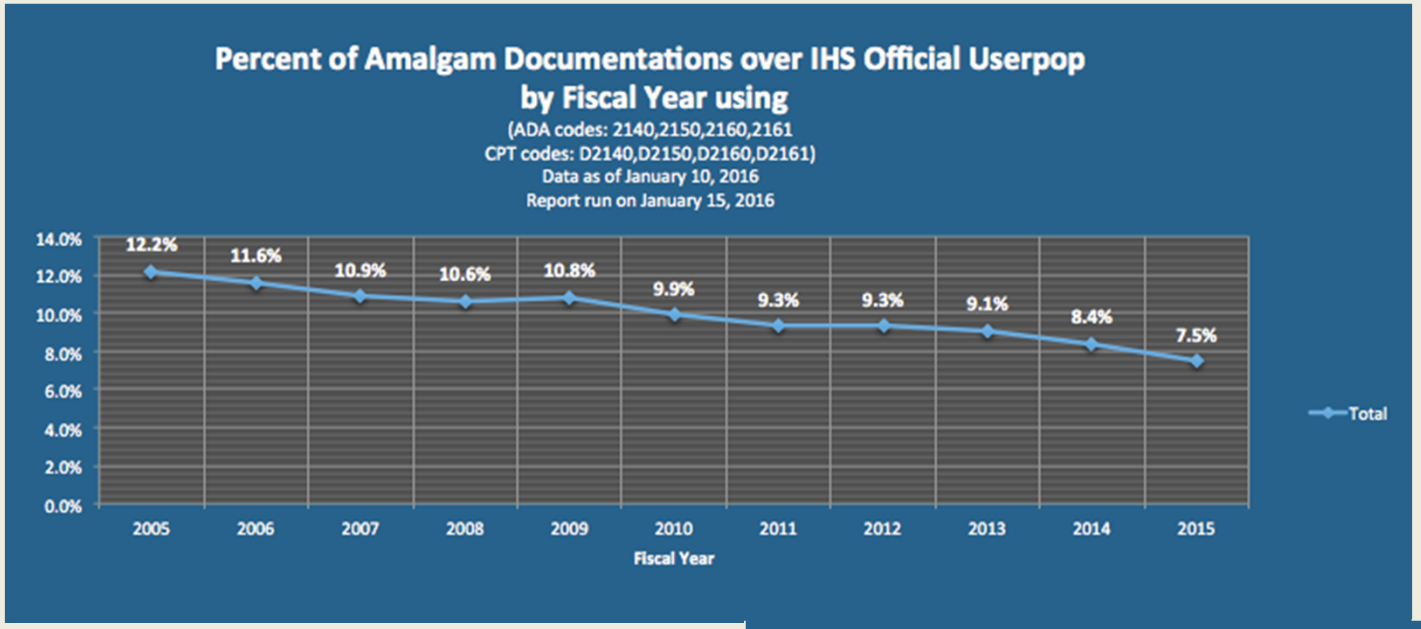


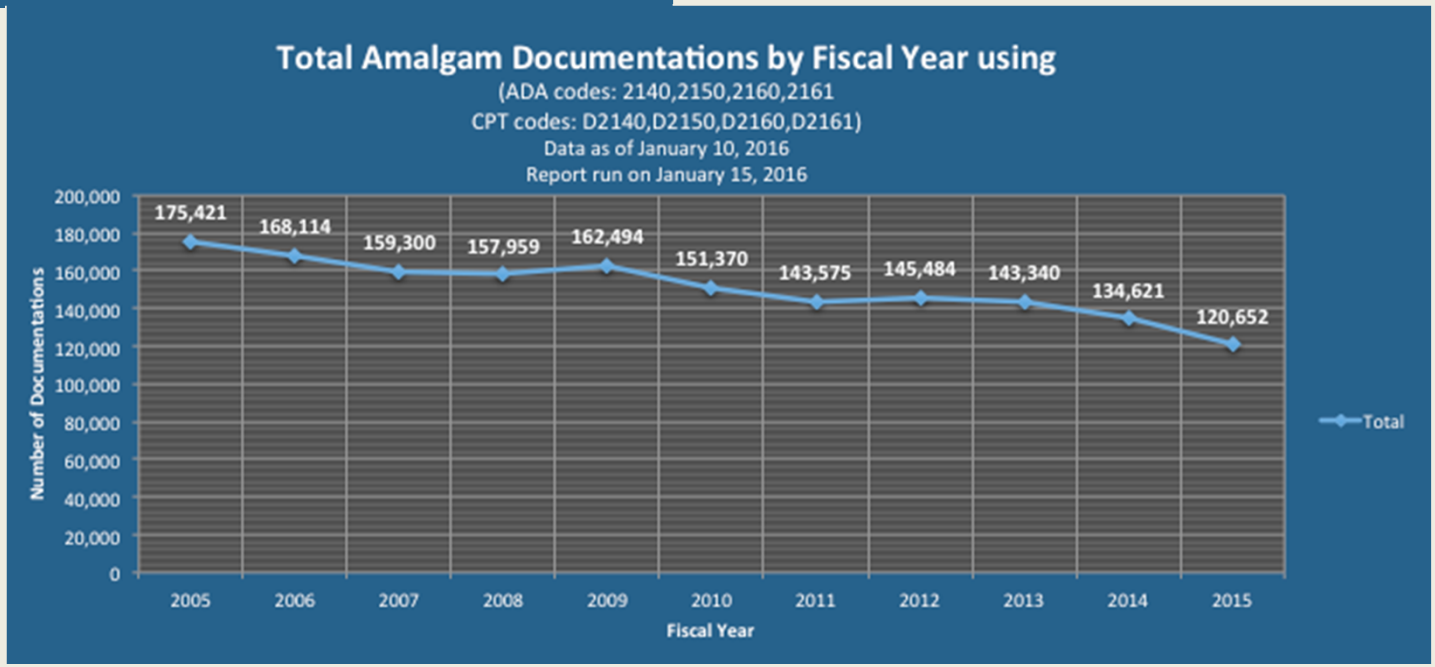

Europe Tooth Filling Materials Market size, by product, 2012-2024

Silver amalgam dominated the tooth filling materials market share, exceeding USD 360 million in 2015 set to experience robust growth to exceed USD 506 million by 2024.

*Tooth Filling Materials Market Size - Industry Share Report 2024*

From 1 July 2018, in the European Union,
dental amalgam shall not be used in the treatment of deciduous teeth, children younger than 15 years and pregnant or breastfeeding women,
except when strictly deemed necessary by the practitioner on the grounds of specific medical needs of the patient.

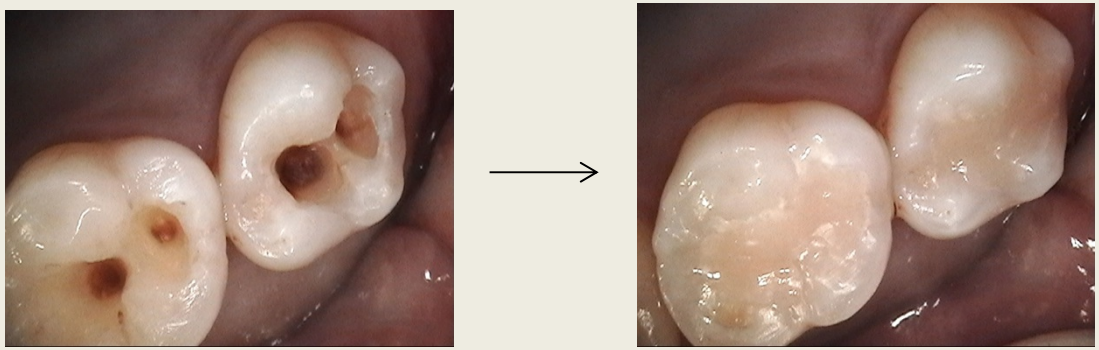



The Indian Health Service Division of Oral Health is already in compliance with phase down dental amalgam use.

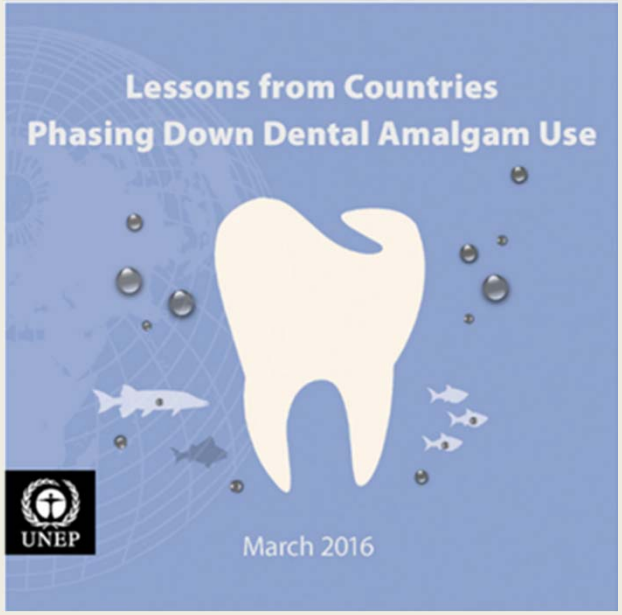
# Alternative materials

- Alternative restorative materials (Composite Resin, Glass Ionomier) are desirable from an environmental health perspective
- Minimal intervention to teeth (Less cavity preparation for filling)
- Patient preference (cosmetic advantage)



# Lessons from Kenya, Uganda and United Republic of Tanzania

- low- and middle-income countries might face challenges in encouraging the use of such mercury-free materials.
- In rural settings, health facilities often lack a reliable supply of electricity and water, a necessary condition for the proper use of resin-based composites,(which are more temperature sensitive and less tolerant to water during placement than dental amalgam).



# Dental mercury releases to water, soil and air

- Because the removal and replacement of old amalgam is not a 'closed system,' the mercury wastes and releases generated by dentistry are difficult to monitor and control.
- The majority of dental mercury (about two-thirds) is eventually released to the environment as indicated in the right table.

Major pathways of mercury due to use of dental amalgam every year

| Main pathways | Mercury (metric tonnes/ year) |
|---|---|
| Atmosphere | 50 – 70 |
| Surface water | 35 – 45 |
| Groundwater | 20 – 25 |
| Soil | 75 – 100 |
| Recycling of dental amalgam | 40 – 50 |
| Sequestered, secure disposal | 40 – 50 |
| Total | 260 – 340 |

Source: World Health Organization, Future Use of Materials for Dental Restoration, 2011. Available at: http://www.who.int/oral_health/publications/dental_material_2011.pdf

- a potential health risk to oral health personnel from mercury exposure exists if working conditions are not properly organized.

*Waste management*

*Amalgam separators can be attached to dental chairs to capture waste mercury, keeping it out of waterways*

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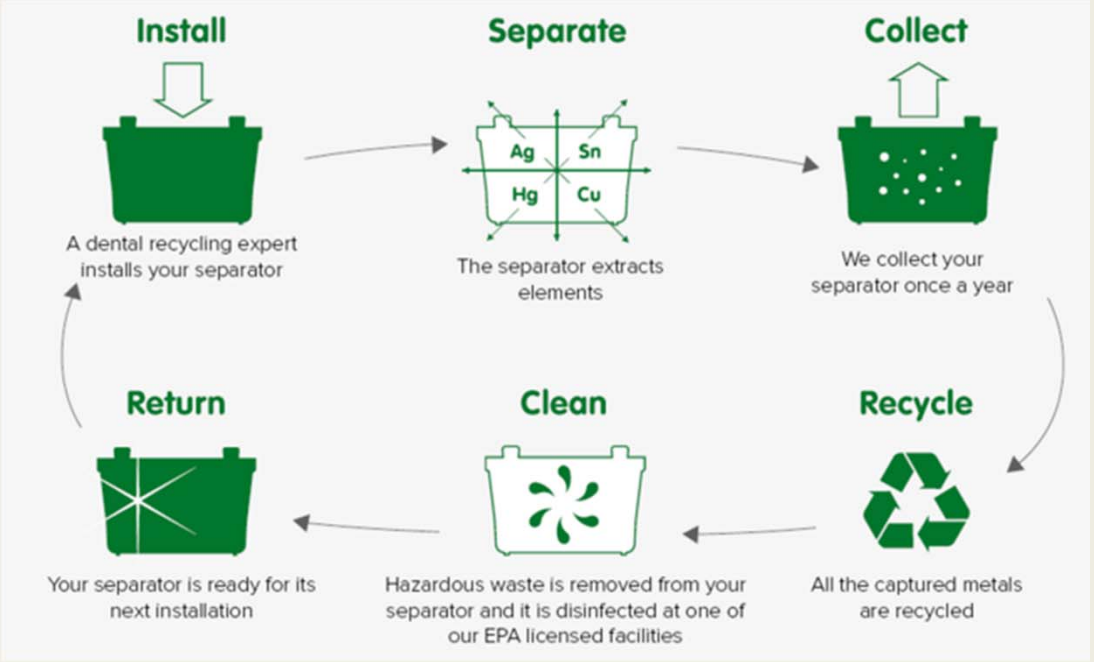

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# Challenges related to dental mercury

- Trade in dental mercury
- Customs declarations and tariff codes generally label dental amalgam as “medical device”. It is impossible to separate from other statistics in the same category.

**Disaggregate data on the supply and trade of bulk mercury for dental use as opposed to the encapsulated dental amalgam form is not available at a global level.**

categories.

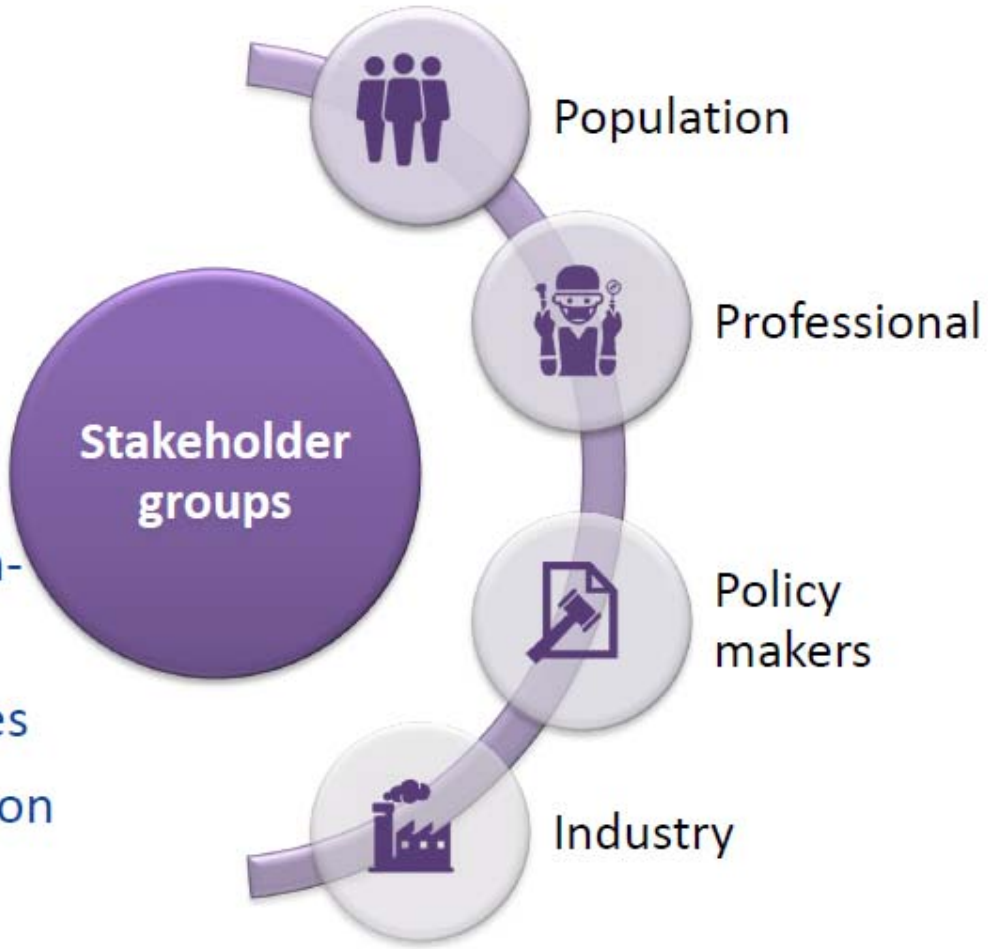
- Some dental amalgam are mixed by hand, others are used in form of capsules.
- Few countries specifically track dental mercury use.

# Challenges related to dental mercury

- The real cost of dental mercury
- Dental amalgam is cheaper for the patient
- Negative externalities (impact on the environment) associated with the use of dental amalgam are not factored in the actual price of dental amalgam restorations…

## A MULTI-PRONGED AND MULTISECTORAL APPROACH

- Assessment of existing situation and documenting good practices
- Waste Management
- Reimbursement & insurance schemes (UHC)
- National capacity of oral health professionals towards preventive & non-operative minimal invasive dental care
- Research & development of alternatives
- Curricula of dental professional education
- Public & dental professional awareness
- Health promotion policy development




Ref: http://dx.doi.org/10.2471/BLT.17.203141

| Strategic interventions | Corresponding measures, Annex A Part II |
|---|---|
| **Waste management** | |
| Implementing a strategic approach to integrated chemicals management, one that combines infection-control measures, best management practices and an environmentally sound lifecycle management of dental amalgam waste and quality mercury-free dental materials waste | Measures ii, ix |
| Making the use of dental amalgam in an encapsulated form and amalgam separators mandatory | Measures viii, ix |

*Bull World Health Organ 2018;96:436–438*

- ✓ **Encapsulated form**
- ✓ **Separators**

| Strategic interventions | Corresponding measures, Annex A Part II |
|---|---|
| **Knowledge management** | |
| Carrying out a situation assessment and inventory of trade, supply, regulation and use of dental amalgam and quality mercury-free materials for dental restoration, to develop clear time-bound targets. The assessment will guide and inform a baseline against which progress in achieving the targets can and will be measured | Measures ii, iii<br>✓ **Situation analysis and monitoring** |
| Developing and documenting good practice examples and demonstrating the feasibility of voluntary implementation of the phase down of the use of dental amalgam | Measures i, ii<br>✓ **Increase awareness** |
| Raising public awareness and supporting country-level communication strategies and programmes based on the results of the situation assessment and documentation of voluntary implementation | Measures i, ii, iii, viii, ix, |

*Bull World Health Organ 2018;96:436–438*

| Strategic interventions | Corresponding measures, Annex A Part II |
|---|---|
| **Health system strengthening as an integral part of an equitable and sustainable reduction of the use of dental amalgam** | |
| Integrating strategies to phase down dental amalgam as part of the policy of prevention and control of noncommunicable disease and addressing the social determinants of health | Measure i<br>✓ **Policy should be part of NCD prevention** |
| Improving the affordability of mercury-free materials for dental restoration in the essential list of medicine, products and medical devices and equipment managed by the national and regional authority in charge of purchasing regional and national pharmaceuticals | Measure iii<br>✓ **Improve mercury free materials** |
| Researching and developing quality, affordable and safe alternatives to dental amalgam whose waste can be controlled in an efficient and effective manner in all health-care settings | Measure iv |

*Bull World Health Organ 2018;96:436–438*

| Strategic interventions | Corresponding measures, Annex A Part II |
|---|---|
| Reorientation of the oral health workforce education agenda towards greater social accountability, and of educational curricula to meet local community needs. Increasing national capacity of oral health professionals towards preventive and non-operative minimally invasive dental care by developing training materials and resources | Measures i, v<br>✓ **Reorient education** |
| Encourage and support insurance companies to examine policy and programme options that favour a shift to quality mercury-free materials for dental restoration, including materials that re-mineralise tooth substance and inhibit dentine demineralisation | Measures vi, vii<br>✓ **Insurance should not cover amalgam** |

*Bull World Health Organ 2018;96:436–438*

# Conclusion

- Taking into account the global burden of oral disease and the current reliance on dental amalgam particularly in public oral health services of many countries, “complete ban (of dental amalgam) may not be realistic, practical and achievable”.
- “Multi-pronged approach with short, medium and long term strategies should be considered and developed ”. Short term strategies to restrict the use of dental amalgam to its encapsulated form, and the proper installation and use of dental amalgam separators represent achievable and practical actions for compliance and ratification.

- It is important to take into account and maximize the potential of the Minamata Convention to catalyze inter-sectoral action for oral health: health promotion and integrated disease prevention.

SUSTAINABLE DEVELOPMENT GOALS
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS
SUSTAINABLE DEVELOPMENT GOALS

# Thank you for your kind attention

*Think globally, Act locally*