Phasing down the use of dental amalgam and managing its associated waste: from knowledge to action

Webinar, Monday 18 December 2023
Opening remarks and scene setting

Kenneth Davis, Chemicals and Health Branch, UNEP
For the smooth running of the webinar, please:

- Keep microphones off unless when making an intervention, cameras are optional.
- Use the “Chat” to ask technical questions or share views.
- The meeting will be recorded. Please indicate if you have any objection.
Opening remarks and scene setting (2:30 pm), Kenneth Davis, Chemicals and Health Branch, UNEP

Available knowledge and existing actions (2:35 pm), facilitated by Benoit Varenne, World Health Organization

- Dental amalgam and the Minamata Convention: latest updates pursuant to COP5, Eisaku Toda, Minamata Convention Secretariat
- Best practices for dental amalgam waste management in health facilities, Nicolas Martin, Sheffield University
- International developments in policies and regulatory framework and momentum building towards a global phase out of dental amalgam, Michael Bender, Zero Mercury Working Group, Florian Schulze, European Network for Environmental Medicine

Questions and Answers

- Phasing down the use of dental amalgam: project overview and current progress, Gabriela Sardon, World Health Organization
- Challenges in the management of dental amalgam waste, Kumar Rajan, World Health Organization South-East Asia Regional Office
- Best practices and current approaches for the sound transport, treatment and final disposal of mercury in dental wastes, David Hunter, BATREC

Questions and Answers

Closing remarks (3:55 pm), Grace Halla, GEF Chemicals and Waste Unit, UNEP
Available knowledge and existing actions

facilitated by Benoit Varenne, World Health Organization
Fifth meeting of the Conference of the Parties to the Minamata Convention on Mercury (COP-5)

More than 800 participants and 115 Parties represented

21 decision adopted
COP-5 Decisions

- The effects of mercury pollution on Indigenous Peoples and on local communities
- Mercury supply sources and trade
- Study of the global supply, trade and use of mercury compounds
- Amendments to annexes A and B
- Preparation of a report on cosmetics listed in part I of annex A to the Minamata Convention on Mercury
- Information on the Economic and Technical Feasibility of Mercury-Free Catalysts in VCM Production
- Artisanal and small-scale gold mining
- Mercury emissions
- Guidance on BAT/BEP to control releases
- Mercury waste thresholds
- Review of the financial mechanism

- Capacity building, technical assistance and technology transfer
- National reporting
- First effectiveness evaluation of the Minamata Convention on Mercury
- Gender action plan
- Knowledge management
- Contribution of the Minamata Convention to the Kunming-Montreal Global Biodiversity Framework
- Enhanced international cooperation and coordination
- Cooperation between the secretariat of the Minamata Convention on Mercury and the BRS secretariat
- Programme of work and budget for 2024-2025
- Dates and venue of COP-6
### Annex A Part II

<table>
<thead>
<tr>
<th>Mercury-added products</th>
<th>Provisions</th>
</tr>
</thead>
</table>
| 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:  
(i) .... (ix)...

In addition, Parties shall:
(i) ... (ii)...

In addition, Parties that have not yet phased out dental amalgam shall:
(i) Submit to the secretariat a national action plan or a report based on available information with respect to progress they have made or are making to phase down or phase out dental amalgam every four years as part of national reporting.
The Conference of the Parties

6. **Decides** to consider at its sixth meeting the proposal to amend part I of annex A by adding the following entry:

<table>
<thead>
<tr>
<th>Mercury-added products</th>
<th>Date after which the manufacture, import or export of the product shall not be allowed (phase-out date)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental Amalgam</td>
<td>2030</td>
</tr>
</tbody>
</table>

7. **Decides** to consider at its sixth meeting the proposal to amend part II of annex A by adding the following provision:

<table>
<thead>
<tr>
<th>Mercury-added products</th>
<th>Provisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental Amalgam</td>
<td>In addition, Parties shall:</td>
</tr>
<tr>
<td></td>
<td>(iv) [[Exclude or not allow] [Phase down], by taking measures as appropriate, the use of dental amalgam in government insurance policies and programmes.]</td>
</tr>
<tr>
<td></td>
<td>(Alternative to (iv)) [Take measures, as appropriate, to exclude, not allow, [or phase down] dental amalgam in government policies or programmes]</td>
</tr>
</tbody>
</table>
Question 4.3: Has the party taken two or more measures for the mercury-added products listed in part II of annex A in accordance with the provisions set out therein? (para. 3)

- Yes
- No

If yes, please provide information on the measures.

UNEP/MC/COP.5/INF/23: Article 21 synthesis report

UNEP/MC/COP.5/INF/30/Rev.1: WHO and ILO reports to COP-5
Best practices for dental amalgam waste management in health facilities – Awareness & action

Professor Nicolas Martin
18th December 2023
Waste Dental Amalgam

- The need for careful and safe management
- The fate of waste amalgam
- The fate of waste mercury
- Best Practice
Partnership Objective:

“to minimize and, where feasible, eliminate unintentional mercury releases to air, water, and land from waste containing mercury and mercury compounds by following a Life Cycle Management approach”

- Identify and disseminate information on environmentally sound collection, transportation, treatment and disposal techniques and practices for different types of mercury wastes to reduce mercury releases from waste by following a Life Cycle Management approach.

- Assess environmental impacts of current waste management practices and processes, including providing support to countries to assess their national situation and needs.

- Promote public awareness of the hazards associated with mercury wastes and their management and support community engagement in the activities of the Partnership Area.
Partnership Objective:
“to minimize and, where feasible, eliminate unintentional mercury releases to air, water, and land from waste containing mercury and mercury compounds by following a Life Cycle Management approach”

- **placement and removal** of fillings
- **dental waste** - degradation of amalgam in setting and release of human excretion
- **end of life** following burial and emissions from cremation

- **Air** – Cremation or incineration of medical waste
- **Earth** – Interment, landfill and sewage sludge spreading
- **Water** – Indirect discharges via wastewater treatment
Waste Dental Amalgam at chairside

- Amalgam particles
- Dissolved elemental mercury
- Inorganic mercury
- Methyl mercury
Amalgam in wastewater streams

Accumulation in:

• Wastewater lines
• Tanks and pipework
• Potential for biogenesis of MeHg

Dental wastewater lines are an ideal environment for methyl mercury genesis

(anaerobic bacteria, temperature, pH, Oxygen levels, organic matter, sulphate levels and speciation of Hg)
Amalgam in waste water –

- Sedimentation and accretions
- Anaerobic bacteria
- Higher temperatures

Amalgam separators –
The most effective way to mitigate the effect of waste Hg from Amalgam

- A minimum mercury removal efficiency of 95% of particulate mercury (ISO 11143)
- Effective clinical governance:
  - Local waste collection
  - ICP guidelines and protocols
  - Municipal water management legislation
IPC & Waste dental amalgam in the dental practice

**IPC – Infection Prevention Control**

- International standards (ISO 11143 and ISO 45006)
- National legislation (e.g. UK: HTM 01-05)
- Engagement with waste disposal services
- Water lines flushed with non-detergent enzymatic vacuum cleaners

The waste ‘sludge’ in the amalgam separator is now ‘safe’ for collection and disposal

Use of appropriate PPE and waste containers
**IPC – National Legislation**

**e.g. In the UK:**

**HTM 01-05**

(HTM 01-05) Decontamination in primary care dental practices

Document first published: 26 March 2013

Page updated: 13 November 2023

Topic: Estates

Publication type: Guidance

HTM 01-05 is intended to raise the quality of decontamination work in primary care dental services by covering the decontamination of reusable instruments within dental facilities.

The Infection Prevention Society have produced a [dental audit tool](#) to help practices to self-assess compliance with HTM 01-05.

HTM 01-05 is not available to order in hard copy. It is intended to be read online or for private print purposes only.

Some of these documents are not fully accessible. If you require any of these documents in a different format, please contact: england.estatesandfacilities@nhs.net
Good Waste Management is Key

- Good management
- Separators
- Regulated collection system
- Simple guidelines essential

The environmental impact of dental mercury is mainly due to the poor management of dental amalgam waste.

The use of amalgam separating devices reduces the amount of amalgam-contaminated water released from dental clinics.

A regulated collection system for mercury-contaminated solid waste, especially extracted teeth with amalgam fillings, will prevent mercury vapour release during the combustion of mercury-contaminated solid waste.

The application of simple guidelines for mercury waste handling will reduce the environmental concerns of dental waste to an insignificant level without compromising dental amalgam’s important role in dentistry.
Thank you for your kind attention

Professor Nicolas Martin
n.martin@sheffield.ac.uk
International developments in policies and regulatory framework and momentum building towards a global phase out of dental amalgam

UNEP Global Mercury Partnership Webinar on:
Phasing down the use of dental amalgam and managing its associated waste: from knowledge to action

18 December 2023

Michael Bender
Co-Lead, Mercury in Products Partnership Area of the Global Mercury Partnership
Executive Director, Mercury Policy Project
Co-Coordinator of the Zero Mercury Working Group
www.zeromercury.org

Florian Schulze
Managing Director
European Network for Environmental Medicine
http://environmentalmedicine.eu
Who we are:

Zero Mercury Working Group:
• An international coalition of more than 110 public interest, environmental and health non-governmental organizations from over 55 countries from around the world.
• Aim: Reduce/eliminate mercury supply, use, emissions, exposure, implementing the Minamata Convention

European Network for Environmental Medicine:
• We are committed to reduce environmental exposures, promoting research into health links and treatments, better aligning medical care with these findings, and facilitating patient access to analysis.
Challenges of managing amalgam especially without hazardous waste infrastructure in place

Table 1: Mercury used in dentistry - pathways to the environment

<table>
<thead>
<tr>
<th>Global releases/pathways</th>
<th>Mercury (metric tons/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atmosphere</td>
<td>50-70</td>
</tr>
<tr>
<td>Surface water</td>
<td>35-45</td>
</tr>
<tr>
<td>Groundwater</td>
<td>20-25</td>
</tr>
<tr>
<td>Soil</td>
<td>75-100</td>
</tr>
<tr>
<td>Recycling of dental amalgam</td>
<td>40-50</td>
</tr>
<tr>
<td>Sequestered, secure disposal</td>
<td>40-50</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>260-340</strong></td>
</tr>
</tbody>
</table>

Sources: Maxson 2009, as cited in WHO 2011 and AMAP/UNEP 2013

NOTE: As you can see in the last column, crematoria installation costs are quite high and for most countries, they are cost prohibitive.

Tons of mercury released each year from cremation, crematoria

### Table 4: Country statistics on controlling mercury releases from cremation

<table>
<thead>
<tr>
<th>Country</th>
<th>% units with mercury controls</th>
<th>Requirements and/or date required</th>
<th>Cremations per year</th>
<th>Installation costs per crematorium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweden</td>
<td>64% (2009)</td>
<td>95% removal rate required at large units</td>
<td>70,000 (82% at facilities with mercury removal)</td>
<td>Around 100,000 USD, 10% cost for mercury contaminant removal</td>
</tr>
<tr>
<td>Switzerland</td>
<td></td>
<td></td>
<td>20,000 (2011)</td>
<td>Ranges from 1,000,000 USD to 1,500,000 USD</td>
</tr>
<tr>
<td>Finland</td>
<td></td>
<td>23% of units by 2015-2016</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Norway</td>
<td>62.5% (2012)</td>
<td>Large crematories (&gt;200 cremations-/yr.) regulated in 2007</td>
<td>15,544 (2012) 37% at facilities with mercury removal</td>
<td>Investment cost mercury filter (144,000 USD)</td>
</tr>
<tr>
<td>Denmark</td>
<td></td>
<td>2011</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Netherlands</td>
<td>&gt;90%</td>
<td>Requirements on large units first: smaller ones required by 2012</td>
<td>75,000 (2008) 55.8% at facilities with mercury removal</td>
<td>Costs for installing devices for 50 crematoria estimated at 32 million USD</td>
</tr>
</tbody>
</table>

Sources: Survey questionnaire responses from Sweden, Switzerland, Finland, Norway, Denmark and the Netherlands

Global overview of countries phasing out dental amalgam
Global overview of countries phasing out dental amalgam

👉 19 Countries ban Dental Amalgam by law (incl. 4 EU countries, 4 with narrow exceptions, for 4 countries the ban has yet to enter into force)

👉 8 Countries declared not to use Dental Amalgam at all

👉 9 Countries have withdrawn Dental Amalgam from public programs, effectively phasing it out

👉 The EU 27 are currently discussing the COM proposal for an overall dental amalgam ban by 1 January 2025, which will affect 23 EU Countries.

👉 37 Countries have phased out Dental Amalgam for Children up to 15 years, pregnant and breastfeeding Women

Global Dental Amalgam Tracker - EnvMed Network
According to the Minamata Conventions...
https://environmentalmedicine.eu/
mercury-free-dentistry-for-
planet-earth/
Countries banning dental amalgam use

Norway: 2008 with limited exemption period for 3 years
Sweden: 2009 (exemptions ceased in 2018)
Mongolia: 2011
New Caledonia (FR territory): September 2019 (immediate*)
Moldova: 2020 (15 month)
Kuwait: January 2020 (11 month)
Qatar: July 2021 (9 days)
Bahrain: Reported without specification (Ban on use of mercury 2002)
UAE: Reported without specification (UAE Cosmetics Control System)
Indonesia: December 2021 (14 month)
Philippines: June 2023 (3 Years)
Gabon: October 2023 (immediate)

Nepal: August 2024 (5 Years)
Panama: January 2025 (4 Years)
Tanzania: December 2029 (8 Years)
Slovakia: December 2030 (11 Years)

*with narrow exemptions

Switzerland: September 2015
Liechtenstein: September 2015
Denmark: July 2018
Lithuania: May 2021

*time between the adoption and the entering into force of a regulation
Implementing the COP4 “Children’s Amendment”

By **28 September 2023** parties shall:

Exclude or not allow, by taking measures as appropriate, or recommend against the use of dental amalgam for the dental treatment of deciduous teeth, of patients under 15 years and of pregnant and breastfeeding women, except when considered necessary by the dental practitioner based on the needs of the patient.

Countries not allowing the use of Dental Amalgam for Children up to 15 years, pregnant and breastfeeding Women:

- **Soviet Union**: 1982 (due to direct health risks)
- **Sweden**: 1995
- **23 EU**: July 2018 ($1$ year* + Phase Out Plans)
- **Bangladesh**: July 2018 (4 month)
- **Vietnam**: April 2019 (6 days + Phase Out Plan)
- **Iceland**: July 2019 (3 weeks + Phase Out Plan)
- **Nepal**: August 2019 (immediate + Phase Out: 21 August 2024)
- **Philippines**: June 2020 (2 weeks + Import Stop + Phase Out: June 2023)
- **Saudi Arabia**: 2021 according to first full Reports
- **Albania**: July 2021 (2 years + Phase Out Plan)
- **Tanzania**: September 2021 (20 month + Phase Out: December 2029)
- **Panama**: January 2021 (immediate + Phase Out: January 2025)

*Time between the adoption and the entering into force of a regulation*
National Action Plans for dental amalgam required by COP5

Minamata Convention Requirements for Parties that have not yet phased out dental amalgam shall:

Submit to the secretariat a national action plan or a report based on available information with respect to progress they have made or are making to phase down or phase out dental amalgam every four years as part of national reporting.

The next full national reporting is due by 31 December 2025

Examples of National Action Plans from the EU (2019)

- 12 Member States presented a general phase-out plan
- 7 Member States plan to provide insurance reimbursement for alternative restorations in the same amount as amalgam.
- **Poland** directly replaced dental amalgam in the public health insurance
- **Portugal** and **Romania** planned to require informed consent to use dental amalgam
- **Germany**, **Latvia** and the **Netherlands** ended the teaching of amalgam placement in its dental schools.


Thank you!
Questions and Answers

facilitated by Benoit Varenne, World Health Organization
GEF7 PHASING DOWN DENTAL AMALGAM PROJECT

GEF ID: 10936

Gabriela Sardon Panta
Oral Health Programme, NCD Department, WHO
BACKGROUND

• Dental caries (tooth decay) is the most common non-communicable disease worldwide and a major public health problem, affecting more than 2.5 billion people, including 514 million school-aged children.

• Dental caries across the life-course, affecting deciduous and permanent teeth

• Dental caries is preventable

Note: Data are from GBO 2019 (4).
BACKGROUND

• Dental amalgam is
  o a filling material used to treat cavities caused by dental caries for over a 175 years.
  o composed of a mixture of metals, consisting of elemental mercury (~50%) and a powdered alloy composed of silver, tin, and copper, therefore, it is a significant source of mercury pollution.

• Estimates suggest that approximately two thirds of dental amalgam is eventually released to the environment. 1

• The consumption of mercury in the dental amalgam sector for 2019 was estimated to be in the range of 200 – 500 metric tons. 2

1. UNEP, 2016, Lessons from countries phasing down dental amalgam use
2. UNEP/MC/COP.5/INF/22 - The first effectiveness evaluation of the Minamata Convention on Mercury Draft report on mercury trade, supply and demand
MONITORING PROGRESS IN PHASING DOWN DENTAL AMALGAM USE

Annex A Part II, Dental amalgam provisions:

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:

(i) Setting national objectives aiming at dental caries prevention and health promotion, thereby minimizing the need for dental restoration;
(ii) Setting national objectives aiming at minimizing its use;
(iii) Promoting the use of cost-effective and clinically effective mercury-free alternatives for dental restoration;
(iv) Promoting research and development of quality mercury-free materials for dental restoration;
(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;
(vi) Discouraging insurance policies and programmes that favour dental amalgam use over mercury-free dental restoration;
(vii) Encouraging insurance policies and programmes that favour the use of quality alternatives to dental amalgam for dental restoration;
(viii) Restricting the use of dental amalgam to its encapsulated form;
(ix) Promoting the use of best environmental practices in dental facilities to reduce releases of mercury and mercury compounds to water and land.

In addition, Parties shall:

(i) Exclude or not allow, by taking measures as appropriate, the use of mercury in bulk form by dental practitioners;
(ii) Exclude or not allow, by taking measures as appropriate, or recommend against the use of dental amalgam for the dental treatment of deciduous teeth, of patients under 15 years and of pregnant and breastfeeding women, except when considered necessary by the dental practitioner based on the needs of the patient.

Implementation of two or more of the nine original measures and both mandatory measures adopted at COP4 to phase down the use of dental amalgam, September 2023

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of WHO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Implementation of two or more of the nine original measures and both mandatory measures

- Yes
- No
- Data not available
- Not applicable

Data Source: WHO Phasing down the use of dental amalgam - survey on the progress of implementation

Map Production: WHO HQ/UCN/NCD/NAO unit

Map Creation Date: 19 October 2023

MONITORING PROGRESS IN PHASING DOWN DENTAL AMALGAM USE

Implementation of two or more of the nine original measures and both mandatory measures adopted at COP4 to phase down the use of dental amalgam, September 2023

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GEF7 PHASING DOWN DENTAL AMALGAM PROJECT SCOPE: OBJECTIVE AND COMPONENTS

Project objective

To protect human health and the environment from harmful effects of mercury through implementation of policies and improved practices to phase down the use of dental amalgams

Timeline:
March 2023 – February 2026

Multisectoral collaboration between Ministry of Health and Ministry of Environment in project countries

Establish an inventory of dental amalgam and mercury-free alternatives

Conduct a national situational assessment on the dental amalgam/mercury waste management schemes and the possibility of a health system-wide approach on mercury management

Select dental/health facilities to demonstrate sound management practices to handle dental amalgam and their wastes

Manage and dispose of dental amalgam waste collected in an environmentally sound manner

Disseminate project results through the Project Knowledge Hub (UNEP Global Mercury Partnership) and WHO project webpage.

Conduct awareness raising events, present project results at national, regional and international events.

Development of global products:
1) Global database to inform project outputs/results, relevant decisions of Conference of the Parties and reporting
2) Technical guidance on environmentally friendly and less invasive dentistry.
## CURRENT STATUS AND TIMELINE

<table>
<thead>
<tr>
<th>2023</th>
<th>2024</th>
<th>2025</th>
<th>2026</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>Q2</td>
<td>Q3</td>
<td>Q4</td>
</tr>
</tbody>
</table>

### 1. Phase down the use of dental amalgam through improved policies and technical capacity
- **Q2 2023**: Kick-off meeting
- **Q3 2023**: Knowledge hub goes live
- **Q4 2023**: Global survey on phase down progress (Collab with MC Sec)
- **Q2 2024**: Mid-project country visits
- **Q3 2024**: Development of global database to monitor phase down
- **Q4 2024**: Ongoing updates to global database
- **Q1 2025**: Ongoing updates to the project knowledge hub
- **Q2 2025**: Development of technical guidance on environmentally friendly and less invasive dentistry
- **Q3 2025**: Awareness-raising events (national, regional, global) and present project findings
- **Q4 2025**: Implement project gender action plan
- **Q1 2026**: Wrap up meeting

### 2. Improve management of mercury and hazardous waste from dental use
- **Q1 2023**: ToR for national assessments
- **Q2 2024**: National situation assessments
- **Q3 2024**: WHO SEARO development of online course
- **Q4 2024**: Install separators
- **Q1 2025**: Select facilities
- **Q2 2025**: Training
- **Q3 2025**: Manage and dispose of dental amalgam waste (collection, transport, treatment, final disposal)
- **Q4 2025**: Produce technical report on best environmental practices of materials used in dental restoration
- **Q1 2026**: *Only for Senegal and Thailand*

### 3. Knowledge management and global awareness
- **Q1 2023**: ToR for national assessments
- **Q2 2024**: National situation assessments
- **Q3 2024**: Adapt online course to national context
- **Q4 2024**: Develop awareness raising materials and case studies
- **Q1 2025**: Ongoing updates to the project knowledge hub
- **Q2 2025**: Develop gender action plan
- **Q3 2025**: Approval
- **Q4 2025**: COP 6
- **Q1 2026**: COP 5

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**Today**

- National situation assessments
- Global technical report on inventory of dental amalgam and Hg-free alternatives
- Facilitate the establishment or improvements in:
  1. regulations/policies;
  2. insurance policies and programmes;
  3. health workforce education and training curricula
- Develop awareness raising materials and case studies
- Develop gender action plan

---

**Facilitate the establishment or improvements in:**
- regulations/policies;
- insurance policies and programmes;
- health workforce education and training curricula

---

**ToR for national assessments**

---

**Knowledge hub goes live**

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**Global survey on phase down progress (Collab with MC Sec)**

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**Develop awareness raising materials and case studies**

---

**Ongoing updates to the project knowledge hub**

---

**Development of technical guidance on environmentally friendly and less invasive dentistry**

---

**Awareness-raising events (national, regional, global) and present project findings**

---

**Implement project gender action plan**
KEY MESSAGE

• WHO strongly advocates for close collaboration between Ministry of Health and Ministry of Environment to effectively phase down the use of dental amalgam and, in some cases when appropriate, even a phase out.

• This can be achieved by creating a national roadmap with a time-bound agenda including clear roles, deadlines, key stakeholders, and sufficient resources that should be aligned to the WHO Global Oral Health Action Plan (2023-2030)
Thank you very much for your attention

For more information, contact:
  varenneb@who.int, sardong@who.int

Visit the project knowledge hub:
www.unep.org/phasedowndentalamalgam
Challenges in the management of dental amalgam waste:
From knowledge to action

UNEP Global Mercury Partnership
18 December 2023

Kumar Rajan
WHO SE Asia Regional Office/ HPN

Picture courtesy: CDER, AIIMS & WHO SEARO
Thankfully, encapsulated form and amalgamators have improved working conditions.
Stakeholders – managing mercury & dental amalgam (DA) waste

- Educational & research institutions
  - Course curriculum
  - Studies on impact on health

- Oral health professionals
  - Primary user
    - Purchase
    - Storage
    - Handling
    - Disposal

- Laboratories – developing products
  - Restorative materials containing mercury

- Dental traders & suppliers
  - Import/ export
  - Maintaining stocks for sale

- Manufacturers of dental amalgam separators
  - Provide necessary equipment
Stakeholders – managing mercury & dental amalgam (DA) waste (slide - 2)

- **Regulatory agencies**
  - Governmental bodies
  - Health & safety authorities
  - Compliance monitoring

- **United Nation agencies**
  - Knowledge sharing
  - Developing guidance

- **Environmental organizations**
  - Advocacy
  - Push for stricter regulations

- **Waste management companies**
  - Collection
  - Transportation
  - Processing

- **Local communities**
  - Concerned for DA waste
  - Health & environmental impact
  - Patient safety groups
Challenges

- Patient demand for most affordable treatment
- Coverage under insurance plans
- Lack of information on regulatory compliances
- Lack of national plan on phasing out dental amalgam
- Training of staff
- Limited resources - smaller dental practices (PPE, high volume suction, rubber dam application etc.)
- Record keeping
- Regular monitoring & auditing
- DA waste collection systems
- Appropriate disposal

Dental amalgam separators

- Availability
- Purchase cost
- Installation
  - Feasibility
  - Renovation
- Maintenance
- Replacement
Awareness & educating oral health professionals on Mercury

Dental school/college students (dentist, specialist, hygienist, laboratory technician, dental nurse, dental therapist, dental assistant)

Dental practitioners
1. Older professionals – usage
2. Newer professionals – removal of dental amalgam

Purchase
- Why to buy
- Options
- DA separator

Storage
- Where to store
- How to store
- Designated containers

Handling
- Liquid Mercury
- Encapsulated form
- Trituration, mulling, squeezing, carving
- Removal of DAR
- Managing spills

Disposal
- Knowledge of regulations
- How and where to store
- Extracted tooth with DAR
- Knowledge of waste collector

Institutions, National Dental Associations & Specialty Associations
Environmentally Sound Management of Mercury Waste Generated From the Health Care Facilities

Cabinet approves Ratification of the Minamata Convention on Mercury

The Union Cabinet chaired by the Prime Minister Shri Narendra Modi has approved the proposal for ratification of Minamata Convention on Mercury and depositing the instrument of ratification enabling India to become a Party of the Convention.

The approval entails Ratification of the Minamata Convention on Mercury along with flexibility for continued use of mercury-based products and processes involving mercury compound up to 2025.

The Minamata Convention on Mercury will be implemented in the context of sustainable development with the objective to protect human health and environment from the anthropogenic emissions and releases of mercury and mercury compounds.

The Convention protects the most vulnerable from the harmful effects of mercury and also protects the developmental space of developing countries. Therefore, the interest of the poor and vulnerable groups will be protected.

The Minamata Convention on Mercury will further urge enterprises to move to mercury-free alternatives in products and non-mercury technologies in manufacturing processes. This will drive research & development, and promote innovation.

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AKT/VBA/SH

(Release ID: 176356)
### Availability of Common Integrated Treatment, Storage & Disposal Facilities (TSDFs) with Common Incinerators & Secured Landfills

<table>
<thead>
<tr>
<th>S.No.</th>
<th>States/UTs</th>
<th>Integrated TSDFs (with both SLF &amp; Incinerator)</th>
<th>TSDFs with only Common Secured Landfills</th>
<th>TSDFs with Only Common Incinerator</th>
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</thead>
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<tr>
<td>1.</td>
<td>Andhra Pradesh</td>
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<td>5.</td>
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<td>20.</td>
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<td><strong>Total</strong></td>
<td></td>
<td><strong>20</strong></td>
<td><strong>19</strong></td>
<td><strong>11</strong></td>
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</tbody>
</table>
Meeting Notice

Subject: Invitation for Workshop on Phasing Down the Use of Dental Amalgam in India on 23rd August 2018

Dear Sir/Madam,

The Directorate General of Health Services and the Ministry of Health & Family Welfare under the National Oral Health Programme is conducting a workshop on phasing down the use of dental amalgam in India. The meeting is scheduled to be held on 23rd August 2018 in Room 445, A Wing, Nirman Bhawan, New Delhi.

You are requested to kindly participate in the workshop. A tentative programme is as attached in Annexure A. Travel support and dearness allowance (to meet the stay arrangements and other expenditure) for outstation participants have been made available as per Government regulations. Please find attached maximum allowable TA/DA as per grade pay. Please also note that air travel must be done via Air India only (booked through the Air India website or through authorized travel agencies – M/s Balmer Lawrie and Company, M/s Ashok Travels and Tour or IRCTC). TA/DA for Delhi based participants are to be borne from source of salary.

For any queries, please reach out to Dr. Akriti Mehta, National Consultant – NOHP at nohp.india@gmail.com or at 011-23065357.

Yours sincerely,

(Dr. L. Swasticharan)
Chief Medical Officer

Mercury Hygiene Practices in Dentistry

Protocol for Safe Removal of a Dental Amalgam Restoration

Protocol for Management of Mercury Spill in Dental Operatory
safer working conditions & environment

Report of the informal global WHO consultation with policymakers in dental public health, 2021

Monitoring country progress in phasing down the use of dental amalgam

Setting a timeline for achieving the Minamata Convention on Mercury measures to phase down the use of dental amalgam

Thank you
Global Mercury Partnership
Phasing down dental amalgam

Treatment of Mercury wastes
including Dental Amalgam
& Stabilisation of Mercury

Batrec Industrie AG
18th Dec 2023
David Hunter
Batrec is part of the VEOLIA group

European leader for the treatment and recovery of hazardous industrial waste

Specialists in treatment of Batteries, Activated Carbon and Mercury Wastes

- 220,000 No. of Employees
- 6 Geographical zones
- 28,500 Million € revenue
- 48 Million tons of waste treated
BATREC Industrie AG

- 1991 year of Foundation
- 19.47 M € 2022 Turnover
- 90 employees
- ISO 9001, ISO 14001 & OSHAS 18001 Certifications

Services:
- Stabilisation of liquid mercury
- Recycling of mercury adsorbents
- Treatment of mercury materials
- Activated carbon reactivation
- Battery recycling
Mercury Distillation – Capabilities

BATREC’s capability
Treating all kinds of mercury wastes from all over the world

- Sludge & slurries
- Dental waste (amalgams, centrifuges, ...)
- Contaminated soil
- Hg contaminated liquids (e.g. waste water, glycol, ...)
- Activated carbon containing Hg
- Relays, switches, thermometers, blood pressure meters, lamps
- Contaminated PPE
- Button cells, Hg cells
- Filters (amine, glycol, ...)
- Pure / impure Hg
Dental Amalgam
GEF-7 Project – Phasing Down Dental Amalgam Project
Dental Amalgam – Mercury Waste Examples
Dental Amalgam Treatment – Process

Transboundary Notification (TFS)

Waste Collector

BATREC

Triage

Manual sorting

Distillation Hg Centre Retort

Bulk Treatment CRP Kiln

Hg Distilled and stabilised for final disposal

Plas...
Dental Amalgam Treatment – International Transport

International Transportation of Mercury Waste - Batrec has experience to support our Partners

Packing and labelling
- UN Approved Packaging
- Correct Labelling – ADR/IMDG/IATA/National regulations
- Batrec can provide guidance

Transboundary Notification Application
- Basel Convention Rules
- 2-6 months
- Batrec has team to support with this process

Road Shipping
- Must Follow ADR Regulations
- 40 ft Truck Load
- Local Overland Transport

Maritime and Road Shipping
- Must Follow ADR and IMDG Regulations
- 20 ft ISO Shipping Container
- Large volume – cheap transport if volume is used

Air and Road Shipping
- Must Follow ADR and IATA Regulations
- Palletised loads
- Small volume – expensive transport
Treatment Process
Decontamination Kiln
THERMAL TREATMENT
- desorption of the pollutants at 750 – 850°C
- destruction of the organic pollutants in the post-combustion chamber

WASTE GAS WET CLEANING
- condensation of Mercury
- removal of Sulfur

WASTE GAS DRY CLEANING
- removal of trace level Mercury
- removal of other pollutants and fine dust
- removal HEPA Filter
Treatment Process
Decontamination Furnace

Spent adsorbents with pollutants (Cl, S, Hg, VOCs...)

input

off-gas to post combustion chamber

output

- Mercury (Hg) without limit
- Chlorine (Cl) up to 25%
- Sulphur (S) up to 20%
- VOCs
- Hydrocarbons up to 15%
Mercury Operations
Mercury Distillation – Process

Mercury Stabilisation
Hg → HgS
Distilled mercury – ready for stabilisation
Why Stabilise Mercury? - The Minamata Convention

2018
Multilateral environmental agreement that addresses specific human activities which are contributing to widespread mercury pollution.

Recycling Hg

1. Recycling of Hg-Waste

Sustainable Resource

Product or Processes requiring Hg

Stop primary production

Innovation

Fossil Fuel

Special Waste

Spread distribution of waste

2. Emissions reduction

3. Stabilisation und Permanent Disposal

Sustainable and safe mercury waste management
Mercury Stabilisation – BATREC’s approach

**Convert Hg into HgS**

Controlled reaction at ambient temperature and pressure ➔ low risk, high conversion and consistent product

Hg(liquid) + S²⁻ → HgS(solid)

- Metallic mercury
- Stabilisation reagent
- Final product

HgS is the most stable mercury compound

HgS is the most insoluble mercury compound

HgS is the natural mineral form [cinnabar] of Hg
Mercury Stabilisation – Process

Capacity: 1.200 t/year

Process characteristics

- batch process
- wet process at low temperatures in a closed circuit limits the risk of Hg emissions
- no Hg vapour in the process
- stabilisation solution is regenerated
  → zero effluents produced
- simple reactants
Mercury Stabilisation – The Result  HgS or Cinnabar
Mercury Stabilisation – Disposal solution

Safe disposal of HgS in a salt mine K+S Herfa-Neurode (Germany)
Long-term-safe removal of hazardous wastes from the biosphere

Acceptance criteria

Restricted acceptance criteria
- Not biodegradable
- Not releasing gases
- Non-liquid
- Not radioactive
- No insufficient stability of geomechanical conditions

Shaft transport

Underground transport

Storage chambers

Sealing of by walls

Natural barriers
- Salt
- Clay
- Bunter stone

Artificial barriers
- Waste packaging
- Brick walls…

Safe disposal of HgS in a salt mine K+S Herfa-Neurode (Germany)
Long-term-safe removal of hazardous wastes from the biosphere
Mercury Stabilisation – Disposal solution - Salt Mine

Ideal geological conditions and technical safety systems

Traceability of all deposits due to detailed documentation

Deposit at depths of 500 to 800 metres, way below the ground water
Thank you for your attention
Questions and Answers

facilitated by Benoit Varenne, World Health Organization
Closing remarks

Grace Halla, GEF Chemicals and Wastes Unit, UNEP