Promoting Dental Amalgam Phase-Down Measures Under the Minamata Convention and Other Initiatives, For "Especially Women, Children and, Through Them, Future Generations"

14-15 May 2018

Workshop report

CRI Convention Center
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World Alliance for Mercury-Free Dentistry

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The World Alliance for Mercury-Free Dentistry and all participants from across the globe express their profound appreciation to UN Environment: to Executive Director Erik Solheim, who opened the workshop with an inspirational speech via videotape; to Jacob Duer, Chief of the Chemicals and Health Branch, who authorized the workshop; to Desiree Narvaez and Jacqueline Alvarez in Geneva, who provided overall coordination; and to Kakuko Nagatani-Yoshida and Masato Motoki in Bangkok, who provided guidance and support throughout.

Sincere appreciation is expressed to Nina Cromnier of Sweden, Member of the Bureau of the Minamata Convention; to the host Chulabhorn Research Institute, especially Daam Settachan; to the government of Thailand and its Ministry of Natural Resources and Environment, especially Teeraporn Wiriwutikorn and Napaporn Tangtinthai; and to Michael Bender of the Zero Mercury Working Group and Sylvia Dove of Consumers for Dental Choice.

We thank each of the speakers, each of the group leaders, and each participant – all of whom were instrumental in making the workshop not only a memorable experience but also a landmark in the march toward establishing the Minamata Convention on Mercury as a prototype for a 21st century treaty addressing toxins.

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Cover photo credit: San Francisco Bay View: National Black Newspaper, accessed at <http://sfbayview.com /2011/04/dental-pipeline-serves-low-income-san-franciscans/>

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Promoting Dental Amalgam Phase-Down Measures Under the Minamata Convention and Other Initiatives, For "Especially Women, Children and, Through Them, Future Generations"

Coordinated by
UN Environment and the World Alliance for Mercury-Free Dentistry
CRI Convention Center, Bangkok, Thailand
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Executive summary

The Minamata Convention on Mercury was ratified in August 2017 with its main objective "to protect the human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds." As stated in the Convention's preamble, this includes awareness of the "health concerns, especially in developing countries, resulting from exposure to mercury of vulnerable populations, especially women, children, and, through them, future generations," which is reflected in the workshop title. In Part II of the Convention's Annex A, each Party is to take measures to phase down the use of dental amalgam, including (but not limited to) "two or more" of the nine provisions listed, while taking into account "the Party's domestic circumstances and relevant international guidance."

On 13 July 2017, in response to a letter from 73 non-governmental organizations (NGOs) from 44 countries, UN Environment Executive Director Erik Solheim requested the NGOs to explore the possibility of a workshop to focus on promoting non-use of amalgam for children. It was subsequently agreed that the two-day global workshop would take place 14-15 May 2018 in Bangkok, Thailand, co-sponsored by UN Environment Chemicals and Health Branch ("UN Environment") and the World Alliance for Mercury-Free Dentistry ("World Alliance"), under the auspices of the UN Environment Global Mercury Partnership in the spirit of the Minamata Convention.

Working in collaboration with the World Alliance, UN Environment invited over 60 representatives of government, NGOs, manufacturing and dentistry to be proportionately represented geographically. The African Union Commission, the European Commission, the Minamata Convention Bureau, and the dental materials industry were all represented as well.

Participating governments attending the workshop included (east to west) Vietnam, Thailand, Bangladesh, India, Sri Lanka, Mauritius, Tanzania, Nigeria, Côte d'Ivoire, European Commission on behalf of 28 European Union governments, African Union Commission on behalf of 55 African governments, Sweden and Uruguay. Participating NGOs came from (east to west) Indonesia, Vietnam, China, Bangladesh, Nepal, India, Mauritius, Lebanon, Ethiopia, Kenya, Tanzania, Nigeria, Côte d'Ivoire, Germany, Uruguay, Costa Rica and the USA. The diversity of the dental profession worldwide was represented through the following disciplines: by one country's chief dental officer, an army chief dental officer, the dean of a dental school, the secretary-general of a national dental association, the chief dental officer of a national hospital system, dental school professors, the chief dental officer of an NGO, the chair of a state dentist oversight commission, as well as two young dentists representing the emerging generation of dentistry. Participating dentists were from (west to east) Peru, Uruguay, the U.K., Nigeria, Cameroun, Tanzania, India, and Bangladesh.

As noted by Executive Director Solheim, who opened the workshop with a videotaped message, the transition in the European Union to mercury-free dentistry began in Norway. It was soon matched by Sweden, as Minamata Convention Bureau Member Nina Cromnier confirmed later in the program. Most recently, as a legal expert for the Environment Directorate of the European Commission explained during his workshop presentation, the European Union decided to virtually end amalgam use for children, pregnant women and breastfeeding women effective 1 July 2018. That legally binding decision, covering more than 510 million persons of diverse means and circumstances, demonstrated the feasibility of the workshop objectives.

The 2016 UN Environment publication, *Lessons from Countries Phasing Down Dental Amalgam Use,* provided a framework for the workshop, and identified many common measures taken by countries that had effectively eliminated or significantly reduced the use of dental amalgam, especially in children. The two-day workshop covered the following main topics:

- Appreciating the Minamata Convention, especially Article 4;
- Understanding the diverse pathways of dental mercury to the environment and health, reviewing the measures required for environmentally sound management of dental mercury releases, and appreciating the challenges and costs of implementing the necessary measures to deal with those releases;
- Delivering a preventive and integrated approach to oral health and environmental health, including UN collaborations and financial support, preventive oral health programs and minimally invasive mercury-free restoration procedures for maximum preservation of tooth structure;
- Collaborating with the dental industry, including collaborations between dental associations and civil society, and ongoing research and development from the dental materials and equipment manufacturers' perspective;
- Restricting amalgam use in children through regulation, health ministry initiatives, and legislation;
- Modifying government programs or insurance to cover mercury-free alternatives, including the potential role of the UN Environment Finance Initiative;
- Raising parent and consumer awareness of mercury-free restoration materials suitable for children; and
- Updating curricula/guidelines for dental schools, with the aim of teaching dental professionals not only about oral and general health and prevention of dental diseases, but also about using mercury-free dental restoration materials, environmental impacts, toxicology of dental restorative materials, modern minimally-invasive approaches to caries management, atraumatic restorative treatment, safe amalgam removal techniques, etc.

After discussion of a checklist developed from the 2016 UN Environment report, *Lessons from Countries Phasing Down Dental Amalgam Use*, participants collaborated in formulating "roadmaps" including possible measures, approaches, stakeholders, etc., to consider when phasing down the use of dental amalgam, especially in children and pregnant and breastfeeding women. Since the workshop participants were not fully representative of every country in their region, the resulting regional roadmaps should not be seen as recommendations, but rather as possible elements of regional or national strategies to be further discussed with stakeholders.

Nevertheless, the workshop participants agreed that the roadmap toward mercury-free dentistry would typically include a series of proven and effective phase-down steps:

- update dental school curricula to train dentists in mercury-free dentistry instead of amalgam;
- educate consumers and parents that amalgam is approximately half mercury (by weight) and that quality mercury-free alternatives exist;

- modify insurance coverage to favor mercury-free alternatives;
- modify government programs to favor mercury-free alternatives;
- adopt a timetable for the non-use of amalgam for children;
- adopt a timetable for the non-use of amalgam for pregnant and breastfeeding women;
- promote the non-use of amalgam in stand-alone healthcare delivery systems such as hospitals and the armed forces; and
- monitor the trade and stop the inflow of mercury and dental amalgam from other countries and/or donor agencies.

Based on experiences presented at the workshop, the environmental impacts of dental amalgam can be substantially reduced by phasing down its use as a restorative material, and by switching to quality mercury-free alternatives per best environmental practice. As demonstrated throughout the workshop, there is intense interest in greatly reducing dental amalgam use. A complete phase-out of amalgam for children, pregnant women and nursing mothers was deemed realistic or feasible by representatives from both developing and developed nations alike, and there was a general consensus that relevant measures focusing on source reduction should be pursued more vigorously than at present.

In addition, participants noted that mercury use in dentistry has not declined much over the past decade, according to the Global Mercury Assessment and other data. In order to effectively measure progress in phasing down the use of amalgam under the Minamata Convention, consensus was also reached on the need to improve monitoring of the quantity of mercury used for dental purposes, along with establishing better baseline data.

After discussion, there was also general agreement that amalgam separators are not a viable control measure for most developing nations because there is typically little if any infrastructure to remove, transport and store collected hazardous amalgam waste from dental clinics and to dispose of it in an environmentally sound manner. Scarce resources would generally be more effectively used to help dental practices transition to mercury-free dentistry. Overall the non-use of amalgam, rather than continued use of amalgam in combination with efforts to improve hazardous waste management, was recognized as the best environmental practice for dental facilities. After implementing effective measures to phase down current amalgam use, enforcing best management practices for amalgam waste should be considered where financially and practically feasible, as a means to address historical amalgam use.

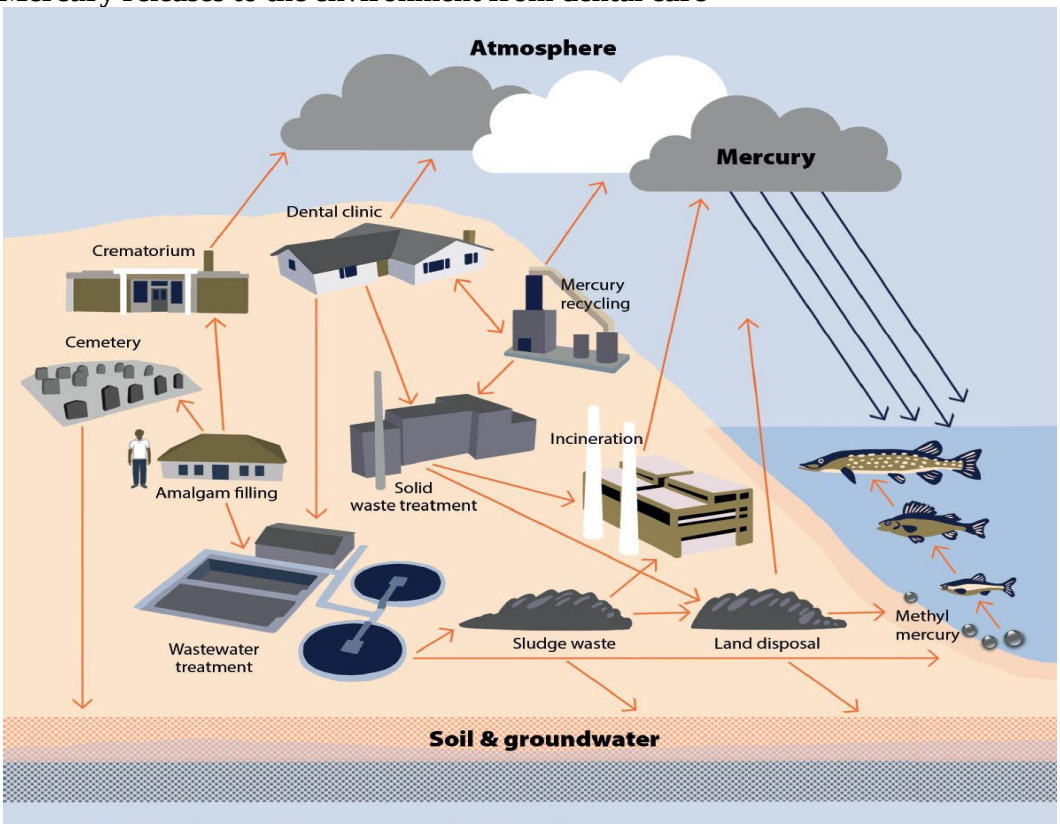
Finally, participants discussed how the Minamata Convention could be viewed as a model treaty for dealing with toxic substances in the 21st century, analogous to the importance of the Montréal Protocol in the 20th century. This workshop marks significant progress toward that ideal and could serve as a guide for interested Parties to the Minamata Convention at COP2 and COP3.

1 Background

1.1 Context

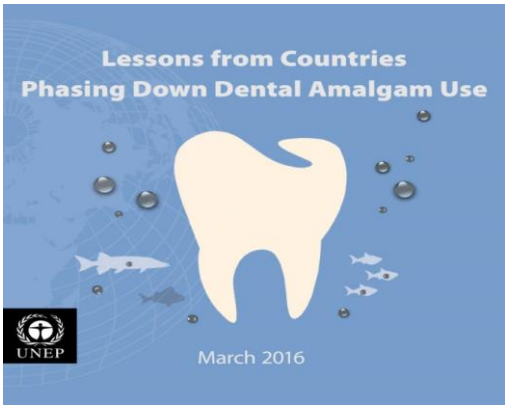
Dental amalgam is a combination of metals, about 50 percent mercury in elemental form along with silver, tin, copper, and other trace metals. It has been used for at least 150 years for dental restoration due to its mechanical properties and the long-term familiarity of dentists with its use. However, it has come under increasing scrutiny due to the various advantages of mercury-free alternatives (such as their adhesive properties and the fact that they preserve more healthy tooth structure than amalgam), the significant quantities of mercury used for dentistry, waste disposal challenges and the many pathways of dental mercury to the environment and humans (see the figure below).

Mercury releases to the environment from dental care



Source: Concorde East/West (2007)

The Minamata Convention on Mercury was ratified in August 2017 with its main objective "to protect the human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds." As stated in the Convention's preamble, this includes awareness of "health concerns, especially in developing countries resulting from exposure to mercury of vulnerable populations, especially women, children, and, through them, future generations." The theme and title of the workshop reflect these elements from the preamble. In Part II of the Convention's Annex A (see Appendix I), each Party is to take measures to phase down the use of dental amalgam, including (but not limited to) "two or more" of the nine provisions listed, and taking into account "the Party's domestic circumstances and relevant international guidance."



Based on the experiences of a number of countries, it is clear that the environmental impacts of dental amalgam can be substantially reduced by phasing down its use as a restorative material and switching to quality mercury-free alternatives. The 2016 UN Environment publication, "Lessons from Countries Phasing Down Dental Amalgam Use,"[1] identified various measures taken by countries that had effectively eliminated or significantly reduced the use of amalgam. Norway, Sweden, Denmark, the Netherlands and Finland have all demonstrated that ending or restricting amalgam use in children is an effective initial phase-down step. As a next step, some countries modified or strengthened

[1] https://archive.zoinet.org/web/sites/default/files/publications/Dental_Amalgam_spreads.pdf

legislation and/or regulation. Norway and Sweden, for example, introduced step-by-step legislation that allowed time for industry and for dental practitioners to adapt to the new restrictions or guidelines.

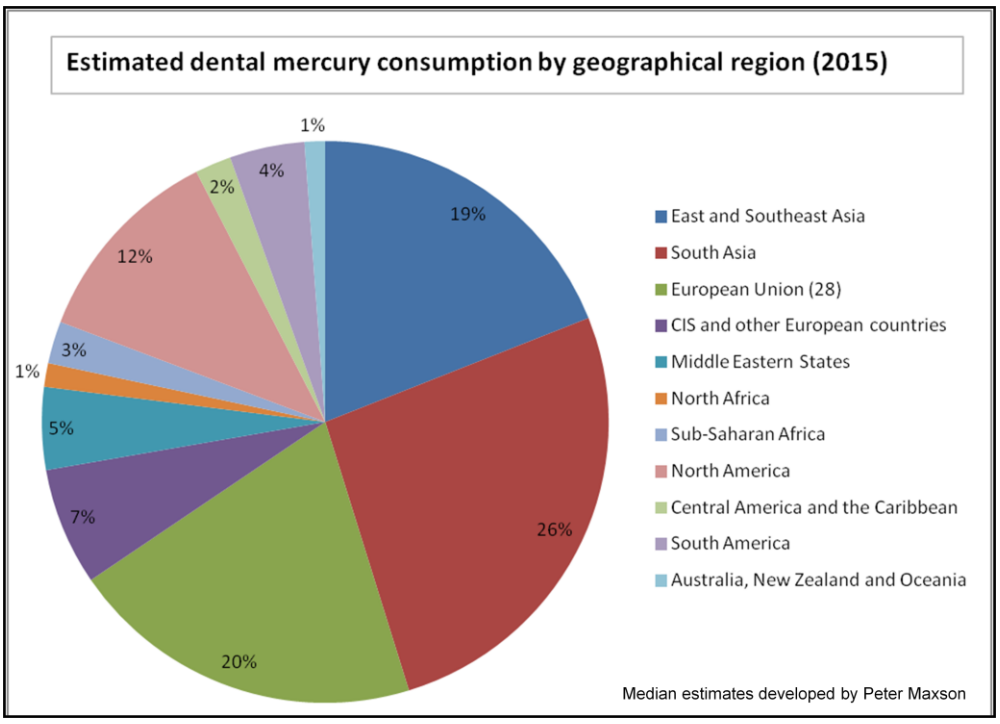
As presented in the figure below, despite reductions in some countries, the use of mercury in dentistry does not appear to have decreased over the past decade. Yet developing more accurate estimates of mercury use in dentistry is difficult due to the paucity of reliable data. For example, there are gaps and inconsistencies in world trade data, which do not yet differentiate between dental amalgam and mercury-free dental restoration materials.

Estimated global use of mercury in dentistry (metric tons)

Year	2005	2010	2015
Dental applications	240-300	270-341	226-322

Sources: Global Mercury Assessment (2013); P. Maxson

It is also important to note that annual amalgam use varies significantly by geographical region, as shown below, and is not necessarily correlated with the size of the regional population.



Considering the availability of alternative filling materials, the irrelevancy of the longevity of fillings in (short-lived) milk teeth, and the higher failure rate for amalgam in these teeth, mercury-free fillings appear to be more appropriate for children. Following the lead of Norway and Sweden, some other European countries (Denmark, France, Germany) followed a similar precautionary approach by strictly limiting the use of amalgam in the "milk teeth" of children. As a result of its step-by-step measures, dental amalgam use in Swedish children was reduced from 30% of restorations in 1991 to 1.5% in 1995, and subsequently Sweden imposed a ban on amalgam fillings for all young persons. Likewise, Norway began a process to phase down amalgam use in the late 1990s, and amalgam use in children especially was reduced by 90% between 1995 and 2002.

Amalgam use in Danish children was restricted in 2003. In the Netherlands, amalgam use has declined significantly in children and adults after it was initially discouraged in children. As discussed further below, the European Union has recently adopted a regulation for all of its 28 member states requiring that dental amalgam must not be used in deciduous teeth, for children under 15 years, for pregnant women or for breastfeeding women, except when deemed strictly necessary by the dental practitioner based on the specific medical needs of the patient. This regulation enters into force on 1 July 2018.

The restriction on the use of dental amalgam in children has proven successful in developed countries as per the previous examples. With the increasing availability and decreasing cost of mercury-free filling materials, it would appear that restricting the use of dental amalgam in children is also feasible in developing countries. As mentioned above, the 2016 UN Environment publication found that this was frequently the first measure undertaken by countries in a more comprehensive step-by-step phase-down of amalgam use, in combination with an integrated approach including preventive oral healthcare, dental health promotional efforts, dental mercury awareness-raising, appropriate insurance schemes and government programs, dental education, continued research on alternatives to amalgam, etc.

1.2 The workshop

In light of the above evidence of successful strategies for phasing down amalgam use, the World Alliance for Mercury-Free Dentistry, along with 72 other NGOs, submitted a letter to the Executive Director of UN Environment on 13 July 2017 requesting support for a workshop to assist in this process, especially with regard to more vulnerable populations as specified in the Minamata Convention. The positive response of the Executive Director, commending the civil society sector for its initiative, may be found in Appendix II.

It was agreed to organize a two-day workshop on 14-15 May 2018 in Bangkok, Thailand. Participants would include government (health and/or environment ministries), environmental NGOs, dentists, dental academia, consumer groups, dental manufacturers, and UN agency officials. The workshop ensured regional inclusiveness by engaging participants from the African, Latin America-Caribbean and Asia-Pacific regions, with some non-funded participants from wealthier nations. It also strived for a gender balance among participants and speakers.

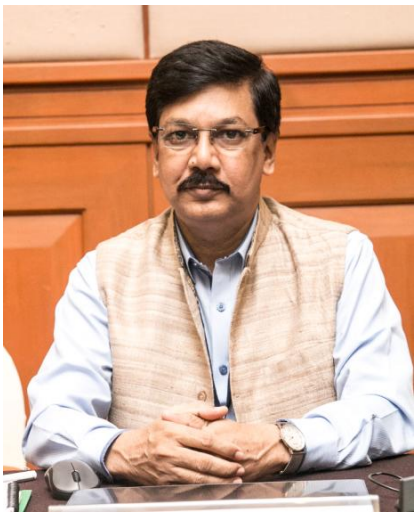
1.3 Structure of the report

The core structure of this workshop report follows the structure of the workshop agenda, which is included as Appendix III.

The authors take this opportunity to apologize to the many workshop participants with doctorates and other advanced degrees and certifications. Following the standard UN protocol, we have opted to identify everyone with a simple “Ms.” or “Mr.” title.

2 Introductory session

On Monday morning, 14 May 2018, Ms. Sayda Shejuti called the workshop to order, welcomed the participants, read out a brief biography of Mr. Shahriar Hossain, Workshop Co-Chair, and then introduced him.



Mr. Shahriar Hossain, Executive Vice President, World Alliance for Mercury-Free Dentistry, introduced the distinguished guests at the head table, including his Co-Chair, Ms. Desiree Narvaez, Program Manager, UN Environment.

Ms. Desiree Narvaez, Program Manager, UN Environment, subsequently introduced the pre-recorded video message of the Honorable Mr. Erik Solheim, Executive Director, UN Environment.

Mr. Erik Solheim, Executive Director, UN Environment, reiterated the importance of the workshop and thanked Minamata Convention Bureau Members Ms. Nina Cromnier and Mr. David Kapindula (who unfortunately could not attend) for agreeing to serve on the welcoming panel. Mr. Solheim further noted how the ratification of the Minamata Convention on Mercury had effectively turned the tragedy of Minamata into a victory over mercury. He observed how far we have come since that period and pointed out that there is no safe level of mercury exposure. Mr. Solheim reminded the participants that children comprise one of the most vulnerable groups to the toxic effects of mercury exposure. He recalled how Norway had phased out dental amalgam use, he noted how much positive feedback he had received since then, and he emphasized that the time has come to take that movement to the global level. Mr. Solheim also presented the Montreal Protocol as a model agreement for the 20th century, and suggested that the Minamata Convention could become the model for the 21st century.

Ms. Narvaez reiterated UN Environment's strong support for phasing down dental amalgam use, and thanked the UN Environment Chemicals and Health Branch and the UN regional office in Bangkok for co-hosting the workshop. Ms. Narvaez then read a speech from Ms. Dechen Tsering, regional co-host of the workshop and Regional Director for Asia and the Pacific, UN Environment.

Ms. Dechen Tsering, regional co-host of the workshop and Regional Director for Asia and the Pacific, UN Environment, in her prepared speech, greeted all workshop participants, noting that dental amalgam can release mercury at several different stages of its lifecycle. Ms. Tsering also highlighted that in many countries dental uses are the largest source of mercury in wastewater, and she noted that there are many other pathways of dental mercury releases to the environment. For these and other reasons, she encouraged participants to discuss the global phase-down of dental amalgam use, and other measures to reduce mercury pollution and its toxic effects.

Ms. Nina Cromnier, Director of the Swedish Chemicals Agency, and Bureau Member, Minamata Convention, then explained her own long personal engagement in the Intergovernmental Negotiating Committee meetings, as well as various working groups and conferences leading up to the signing of the Convention, followed by the first Conference of the Parties in September 2017. According to Ms. Cromnier, Sweden has had a very long history of dealing with mercury, and some years ago strived for a total phase-out of the use of dental amalgam and other mercury-added products and processes. To achieve the phase-out, Sweden adopted a step-by-step approach, and one of the early steps was a phase-out of the use of amalgam in vulnerable groups, i.e., women and children.

Ms. Suwanna Tiansuwan, Deputy Director General, Pollution Control Department, Ministry of Natural Resources and Environment, Thailand, then greeted the group on behalf of the host nation government. Ms. Tiansuwan noted that Thailand was the 66th Party to ratify the Convention. In Thailand, dental schools have already introduced training in mercury-free restoration techniques, according to Ms. Tiansuwan, and there is strong support of best environmental practice in dental clinics, along with widespread awareness-raising of both the hazards of mercury and the advantages of quality mercury-free filling materials.

Participants were then asked to introduce themselves. The complete list of workshop participants may be found in Appendix VI.

3 Setting the scene

Sessions 1 and 2 of the workshop were designed to develop a general consensus around the issue, especially with regard to vulnerable groups, and to discuss the Minamata Convention provisions and related UN Environment initiatives.

3.1 Session 1 – The Minamata Convention on Mercury

3.1.1 Overview of the Minamata Convention

Ms. Nina Cromnier, Director of the Swedish Chemicals Agency and Bureau Member, Minamata Convention, provided a comprehensive overview of the Minamata Convention. She spoke of the mercury problem in general and the lead-up to the Convention. In 2001, the first Global Mercury Assessment was published, but it was not until 2009 that there was a decision by the international community for a legally binding instrument on mercury. In 2013, the Minamata text was adopted in Japan, and the Convention finally entered into force on 16 August 2017.

Ms. Cromnier pointed out that the Minamata Convention was the first UN Environment convention to address human health issues, explaining that the uptake and bioaccumulation of methylmercury in fish, for example, was responsible for the Minamata disaster, and resulted from mercury releases to the environment. The Convention is also the first to cover the entire life-cycle of a pollutant, including sources, storage, products, processes, manage-

ment and disposal. She said this was because of the ability of mercury to easily diffuse into all environmental media, and the realization that mercury concentrations in the environment and other indicators were increasing. There was an appreciation that fetuses and young children are among the most vulnerable groups, and a gradual consensus developed of the need to take action at the global level.

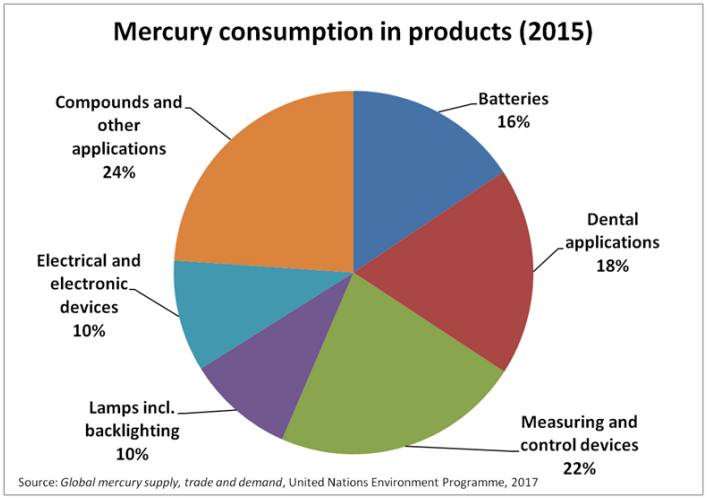
Ms. Cromnier described the different areas that the Convention addresses such as supply, trade, artisanal and small-scale gold mining (ASGM), emissions, products and processes, waste and storage. As yet, the Convention does not require a Party to develop a National Implementation Plan, but this may arise from, and be a logical result of a country's Minamata Initial Assessment (MIA). There was also significant financial support included in the Convention, along with implementation and compliance mechanisms.

Ms. Cromnier said that as of 8 May 2018 there are 92 Parties to the Convention and 128 signatories, highlighting the interest of many countries to join the Convention.

3.1.2 Overview of Article 4 of the Convention, and Annex A, Part II

Ms. Desiree Narvaez, UN Environment, thanked the Chulabhorn Research Institute and the Thai hosts for their excellent organization and support of the workshop.

Ms. Narvaez shared her engagement with the voluntary UN Global Mercury Partnership and how it had contributed to the development of the Minamata Convention. She then explained the details of Article 4 of the Convention and focused on Annex A, Parts I and II, with its restrictions on mercury-added products, including the phase-down of dental amalgam use. She noted that at a future Conference of the Parties (COP), the Parties to the Convention could propose new products for inclusion in Annex A.



Ms. Narvaez highlighted the 2017 UN Environment report, "Global mercury supply, trade and demand," and mentioned the ongoing use of mercury in several product categories. It was noted that dental applications comprise some 18% of the mercury used globally in all mercury-added products. Under the Convention, several mercury-added product groups are to be phased out by 2020, with a few permitted exceptions. Annex A, Part II of the Minamata Convention (see Appendix I) states that measures to phase down the use of dental amalgam should take into account a Party's domestic circumstances and relevant international guidance, and should include two or more of the nine measures listed in Part II. She emphasized that preventing all caries (i.e., avoiding the need for any restorations at all) would be the ideal objective, and highlighted the need to continue improving the quality of mercury-free restorative materials. Also, another measure that would be helpful is to encourage insurance schemes that favor alternatives to amalgam.

3.1.3 UN Environment report on phasing down dental amalgam use

Mr. Michael Bender, International Coordinator, Zero Mercury Working Group, and co-author of the UN Environment report, "Lessons from Countries Phasing Down Dental Amalgam Use"[2] (published in 2016), provided an overview of the report. At that time, most of the information available on countries that had significantly phased down or phased out the use of dental amalgam was from European countries (Norway and Sweden were a few of the first), so their experiences along with several other countries, including Japan, were collected and summarized in the report as potentially valuable guidance for others.

Mr. Bender explained that the key measures taken by countries were: 1) consultations with the dental sector; 2) raising public awareness about the presence of mercury in dental amalgam; 3) modifying and strengthening legislation; 4) adherence to the precautionary[3] and product substitution approaches;[4] 5) improving oral healthcare, preventing caries and adopting a minimally invasive approach to treating caries; 6) adapting insurance schemes; and 7) reducing environmental releases. He stressed that consultation with the dental sector is key and that dental schools can play a pivotal role in the process. However, as explained in the 2016 UN Environment report, despite extensive programs in preventive oral healthcare, dental restorations are still common. It was noted that countries phasing out amalgam often initially addressed vulnerable populations such as children and pregnant women, which helped to set the stage for wider reaching legislation and/or regulations. Another useful measure was the product substitution principle, which mandated the use of mercury-free products instead of mercury-added products, wherever possible.

Finally, Mr. Bender also mentioned that hand-mixing of amalgam continues to be an important source of occupational mercury exposure in many dental clinics, particularly in developing countries, as evidenced by a recent study in Pakistan by NGO colleagues.[5] Overall, the phase-down and eventual phase-out of amalgam use can help minimize occupational exposure and greatly reduce a number of interrelated environmental health issues.

3.1.4 Q&A Session 1

The main issues raised in questions included the following:

- The Chemicals and Health Branch of UN Environment deals with mercury, lead and many other different chemicals. One of the tasks that the branch needs to work on is the potential interaction of these chemicals and their possible joint effects of exposure. The branch tends to deal with individual chemicals but is aware of possible synergistic effects.
- In some countries there is a high level of exposure of metal plating workers. Minamata has a mechanism in Annexes A and B to deal with mercury-added products and processes, but metal plating is not one of those processes. However, there is a provision in the Convention to discuss proposed changes to these annexes after 5 years, and Parties to the Convention are the ones that can propose these amendments. It was also noted that the UN Environment Global Mercury Partnership could initiate activities that go beyond the

[2] https://archive.zoinet.org/web/sites/default/files/publications/Dental_Amalgam_spreads.pdf

[3] The approach that when an activity raises threats of harm to the environment or human health, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically.

[4] The understanding that products should, wherever possible, be replaced with alternatives that have a lesser impact on the environment.

[5] See <https://docksci.com/mercury-poisoning-dentistry-high-level-indoor-air-mercury-contamination-at-selec_5afe16c3d64ab2e697fe7734.html>

Minamata Convention, and Parties are also encouraged to take measures to phase down the use of dental amalgam that go beyond the list of nine provisions.

- A participant shared his concern regarding the Convention requirement for dental amalgam capsules (as compared to using bulk elemental mercury) as this practice simply continues the use of mercury in dentistry. It was explained that where dentists insist on continuing to use amalgam, the Minamata Convention prescribes amalgam capsules because the encapsulated form ensures a pre-measured amount of the material and is an effective step to reduce mercury contamination and exposure, including accidental mercury spills.
- Another topic raised concerned World Customs Organization Harmonized System coding of internationally traded commodities, as under the current coding nomenclature it is often not possible to differentiate mercury-free from mercury-added products. There is a need to determine whether countries using the harmonized system coding would be interested in adapting the system to provide better data on mercury-added products. One possibility currently being explored by the UN Global Mercury Product Partnership is to survey countries to determine support for adding 2 or 4 digits to the present codes in order to differentiate between mercury-added and mercury-free products. The importance of obtaining accurate baseline data on dental amalgam use is necessary to monitor the effectiveness of the Minamata Convention.
- The workshop presented information on the regional consumption of mercury in amalgam. These estimates are ranges based on the best available information such as technical papers and MIAs, but these sources are not available for all individual countries. Where better information is not available, some extrapolations had to be made from neighboring countries and/or regions.

3.2 Session 2 – The environmental perspective

3.2.1 Dental amalgam: Mercury releases and cost implications

Mr. Peter Maxson, environmental expert and Director of Concorde East/West Sprl, described the diverse pathways of dental mercury to the environment (and to people) through the solid waste stream, wastewater, cremation, etc. The quantities of dental mercury ending up in the environment in a typical year are substantial, as seen in the figure below for 2015. Mr. Maxson stated that once mercury is emitted to the atmosphere or to wastewater, it can be released into a water body, then methylated and bioaccumulated in fish, and expose people who consume fish. He described the ability of methylmercury to biomagnify in the environment, and summarized the many environmental impacts of mercury releases, including physiological, neurological, behavioral, reproductive, etc. In addition, Mr. Maxson discussed the human health effects of mercury exposure, especially on the developing nervous system, cardiovascular system, etc. He added that there are direct occupational and patient mercury exposure risks during hand-mixing of dental amalgam, placing of new amalgam, drilling of failed or previously placed amalgam, extraction of teeth containing amalgam, from solid waste disposal bins, low-level emissions from mercury fillings in teeth, and emissions into the clinic from the water drainage system.

Finally, taking the costs of confirmed environmental and health damages into account, Mr. Maxson summarized the "real" costs of using dental amalgam. In the clinic these include the collection and storage of amalgam waste, the installation and maintenance of amalgam separators, and the air removal systems within dental clinics. Regarding costs outside the clinic, collection and management schemes, including waste recycling and environmentally sound disposal of hazardous waste were identified. Additionally, he added that one needs to consider the public costs, such as municipal waste treatment, wastewater treatment, hazardous waste treatment, waste incineration and cremation control technology, and government enforcement of regulations. He concluded by stating that the real costs of amalgam to the environment and society are far in excess of the price one would pay for a mercury-free dental restoration. Therefore, even from a pure cost-benefit perspective, it makes good socioeconomic sense to promote mercury-free restorations rather than amalgam fillings.

Mercury used in dentistry -- Pathways to the environment

Global releases/ pathways	Mercury (metric tons/year, rounded)
Atmosphere	40 - 60
Surface water	30 - 40
Groundwater	15 - 25
Soil	70 - 95
Recycling of dental amalgam	35 - 50
Sequestered, secure disposal	35 - 50
Total	**225 - 320**

Source: P. Maxson, 2018

3.2.2 Dental amalgam waste management

Ms. Desiree Narvaez, Chemicals and Waste Branch, UN Environment, presented an overview of the management of dental amalgam waste. She stated that the ideal situation would be optimal oral healthcare and prevention of dental caries, which would imply significant source reduction in the use of mercury in dental care. She described the challenges of managing amalgam waste, and reminded participants that mercury from amalgam is a legacy issue and dental mercury releases will continue well after amalgam fillings are no longer placed.

The Minamata Convention differentiates among three types of mercury wastes, and the thresholds for identifying mercury waste are harmonized with the relevant bodies of the Basel Convention:

- waste consisting of mercury or mercury compounds,
- waste containing mercury or mercury compounds (e.g., dental amalgam), or
- waste contaminated with mercury or mercury compounds.

While recognizing several disposal pathways, Ms. Narvaez described the best management practices (BMP) for amalgam waste, which are a series of waste handling and disposal practices that can reduce mercury discharges to the environment from dental clinic wastewater. She also referred to the "Practical sourcebook on mercury waste storage and disposal" published in 2015 by UN Environment, which states that environmentally sound management (ESM) of mercury-added products (including dental amalgam) and wastes should optimally consist of proper source separation, collection, transportation, treatment, storage and disposal.

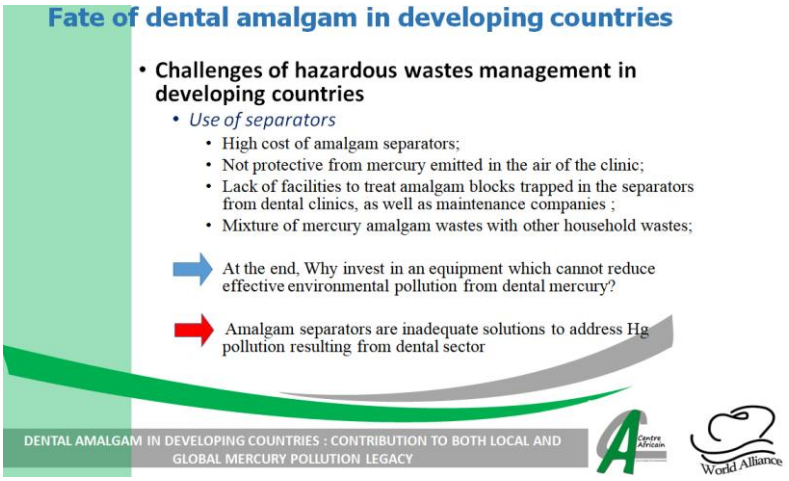
Ms. Narvaez reminded participants that the export of mercury waste needs to be compliant with the Basel Convention. She emphasized that storage and disposal of mercury waste in an environmental sound manner is one of the most challenging issues for governments to deal with; therefore, minimizing the waste volume through source reduction can be very useful. Different countries have different capacities (if any) for management of hazardous wastes like dental mercury. It was suggested that countries needed to first assess their current waste management

system and infrastructure to determine the feasibility of financing any collection and disposal scheme for the management of dental amalgam waste.

Additionally, Ms. Narvaez pointed out that there is a need to anticipate the environmental impact of mercury-free alternatives, although glass ionomer is considered to be one of the least problematic.

3.2.3 Dental amalgam in developing countries

Mr. Dominique Bally, African Center for Environmental Health, discussed dental amalgam's end-of-life impact on developing countries. Mr. Bally first presented an overview of the composition of dental amalgam, and then explained the risks and hazards described on a typical amalgam product data sheet. He then discussed how amalgam had been used for a very long time to restore teeth, because it was a material resistant to mastication forces, it had an apparent low cost, and it was commonly used for training in dental schools.



Mr. Bally explained that although there exist responsible methods for handling mercury waste in dental clinics, the use of dental amalgam in developing countries inevitably leads to air, water, soil and waste contamination. Environmentally sound waste management systems are costly; therefore they are not available in many developing countries, and there is no environmentally sound waste disposal alternative as a result. He noted the obvious value of waste segregation, but then explained why this is not a realistic, affordable or practical solution in most developing countries. Some of the challenges mentioned were the lack of appropriate hazardous waste management facilities, and the high cost of installation, maintenance and management of amalgam separators and the collected hazardous waste. Mr. Bally explained that amalgam separators are therefore inadequate solutions to dealing with mercury pollution from the dental sector in developing countries.

He noted that mercury-free restorative materials, on the other hand, are promising solutions. In reference to possible concerns about mercury-free materials, Mr. Bally explained that there are now mercury-free alternatives without bisphenol A (BPA), and these are a practical solution for those concerned about BPA. He said the cost of a mercury-free restoration is typically only 10% higher than amalgam in Côte d'Ivoire, and the cost of an amalgam filling does not take into account the environmental impact of the mercury in amalgam.

3.2.4 Q&A Session 2 and other remarks

The main issues raised in questions and remarks include the following:

- Countries implementing amalgam provisions under the Convention will likely involve inter-agency coordination and work in collaboration with dentists or dental schools.
- Discussions of waste incineration imply controlled burning of waste, but often there is open burning in Nigeria and many other developing countries. Open burning is presently not covered by the Convention, but the Secretariat has been asked to do a study of open burning and this issue could be raised at COP 2.
- The Convention focuses on phase-down of amalgam use because this is what was agreed to during the negotiations. However, countries that wish to phase out dental amalgam use (especially in vulnerable populations) are completely free to do so.
- The Convention lists the use of pre-dosed amalgam capsules as one of the phase-down measures. While they contain mercury, their use may result in less mercury contamination (and lower occupational exposure), although this measure may not significantly reduce amalgam use.
- Recycling and disposal of amalgam waste in an environmentally sound manner is not a viable option in most developing countries due to inadequate or non-existing waste management infrastructure. Likewise, separators are not viable in many countries due to their cost, difficulty of ensuring the necessary maintenance required to keep them operating properly over time, inadequate waste collection and disposal options and the expense of enforcement measures.
- Although considerable amalgam waste is generated in many developing countries, there are few environmentally sound management or disposal options. There is a similar problem with mercury-added medical products (especially thermometers and sphygmomanometers) which are increasingly put in storage at the end of their life, but still need to be disposed of in an environmentally sound manner. This is a major challenge for most developing countries, and the question was raised whether it is prudent to collect mercury without first having a safe disposal option that is inexpensive enough for waste generators to ensure it will be used. As one example of a relevant project, it was mentioned that Peru carried out a pilot project for a chemical stabilization plant for mercury waste within a hazardous waste facility in 2017.
- There are several references between the Minamata and Basel Conventions with regard to mercury waste management. Article 11 of the Minamata Convention makes reference to the Basel Convention.
- UN Environment is striving to create a level playing field with regard to waste management. They recognize the need to deal with mercury waste, but are also aware of the value of source reduction. Mercury stabilization technologies are not available in developing countries, but some stabilization companies are thinking of providing the service, for example with mobile waste minimization units. The 2015 UN Environment sourcebook on mercury waste storage and disposal outlines many of the steps and the technology needed. Ideally, mercury should be extracted, recovered, stabilized and disposed of in an environmentally sound manner, yet there is a recognition of the enormous challenges of both cost and lack of environmentally sound disposal options throughout the world.
- Environmental and/or waste issues associated with mercury-free restoration materials are occasionally mentioned, for example with regard to micro-plastics and nanoparticles of resin-based composites entering the waste stream. Research carried out so far on mercury-free restoration materials generally concludes that there is no significant personal or environmental toxicity from the use of these materials. While the number of new restoration materials and combinations of chemical substances continues to expand,

there appears to be so little evidence of environmental risk that the funding of a broad based research program has not been viewed as a priority.[6]

- Many dentists who have long worked with mercury have questions about their own health, which can be answered only through extensive physical testing. To identify a medical condition directly related to mercury use is difficult since there are numerous variables to consider. However, many studies have identified mercury related health effects in dental practitioners. Occupational exposure can be reduced by reducing amalgam use, but can only be (nearly) eliminated by wearing full protective gear since dentists will need to treat patients with previously placed or failed amalgams even if they do not place amalgam themselves.

[6] For example, ten years ago the European Union's Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR 2008) pointed out that information on environmental effects was very limited, and explained how a rigorous assessment would have to be structured: "...the assessment of environmental impacts of the substitute would require two complementary studies: a … risk assessment for the relevant environmental compartments, and a life-cycle assessment covering non ecotoxicological impacts such those related to energy and natural resources consumption, atmospheric emissions including greenhouse gases, waste production, etc." Available at <http://ec.europa.eu/health/scientific_committees/opinions_layman /en/dental-amalgam/l-3/7-environmental-risk-tooth-filling-materials.htm#2p0>

4 Existing initiatives

Sessions 3 through 8 of the workshop elaborated on the range of measures available to phase down the use of dental amalgam.

4.1 Session 3 - Preventive and integrated approach for oral health, particularly for children

Mr. Masato Motoki, UN Environment, Asia-Pacific Region, Environmental Health, noted that the UN Environment Assembly (UNEA) 3 Resolution on Environment and Health (December 2017) was the first joint environment/health resolution. The Resolution, with chemicals and wastes as one of the main topics, called for a partnership among the World Health Organisation, the Food and Agriculture Organisation and other UN agencies, the private sector (especially for life-cycle approaches), and other stakeholders. The Resolution recognizes the existing gaps in knowledge, infrastructure and implementation, as well as key challenges such as limited leadership by financial institutions and industry, lack of internalization of pollution costs in decision making and insufficient recognition of the environmental consequences of consumer choices.

The Resolution requests UN Environment to accelerate capacity-building, education and awareness-raising of chemical and waste issues. It requests governments to reinforce their efforts to achieve by 2020 the environmentally sound management of chemicals and wastes throughout their life cycle. And it requests other actors to help implement the multilateral environmental agreements and, among other things, to take all appropriate legal and other measures to minimize the risks posed by chemicals, including heavy metals, in particular to pregnant women, infants and children.

Ms. Thérésia Tantoh Zonepoh epse Bouetou, Dental Surgeon, Chief Medical Officer, Vice-President - Dental Order, Dental Department, Etoug-Ebe Baptist Hospital, Yaoundé, Cameroon, was unfortunately unable to attend the workshop, but was able to participate via pre-recorded video. Ms. Tantoh Zonepoh explained that she has practiced dentistry for 22 years and leads a hospital system with a network of dental clinics that provided oral care to approximately 47,000 patients in 2016. In 2005 she started to read about amalgam use and mercury toxicity, the environmental impact (including pathways of mercury from the dental amalgam of deceased patients), how hazardous waste management was not adequate, and how mercury that reaches the environment can cycle back and affect human health. Subsequently, between 2005 and 2007 she worked to phase out amalgam use in the hospital system's dental department. It was not always easy – some colleagues had problems or lacked experience working with alternatives, others were accustomed to working only with amalgam, and some patients had a preference for amalgam. So she implemented a series of measures including stopping amalgam purchasing, gradually reducing amalgam use, encouraging staff to use alternatives such as composites and glass ionomers, and organizing workshops and on-the-job training. The cost differential was also a challenge, but as part of their commitment to the phase-out, the dental department allowed patients to pay the same price for a mercury-free restoration as for amalgam.

Once Ms. Tantoh Zonepoh's colleagues learned more about the toxicity of mercury, they began to look for ways of phasing down/out other mercury-added products such as thermometers, sphygmomanometers, etc., so that now the entire hospital is in the process of phasing out all equipment using mercury. She hoped that sharing her experiences would help others to phase down or phase out dental amalgam use.

Mr. Graeme Munro-Hall, Chief Dental Officer, World Alliance for Mercury-Free Dentistry, presented an overview of minimally invasive restoration procedures and materials, i.e., for maximum preservation of the natural tooth structure.

Mercury-free adhesive filling materials such as compomer, composite, glass ionomer and ceramic are appropriate for children.[7] Amalgam is not adhesive and requires significant removal of healthy tooth tissue in order for the filling to be mechanically anchored in place. Unlike amalgam, mercury-free fillings and procedures offer the opportunity to preserve more healthy tooth structure during placement, the potential for easier and less invasive treatment of tooth decay, and the facilitation of concurrent caries prevention measures (like sealing adjacent pits and fissures at the same time). In addition to these advantages, recent studies show that some mercury-free materials can last longer than amalgam, although the longevity of the restoration is not relevant to children's milk teeth, which tend to fall out before any restoration fails.

Atraumatic Restorative Treatment (ART) is one mercury-free procedure that offers a practical option in many cases, especially for children. ART uses glass ionomer material and can be placed with only hand instruments; no electricity or expensive equipment is required. ART requires less time than amalgam to place, can be done at a lower cost, can be performed by non-dentists (although training is needed) and does not cause mercury pollution. ART could be a cost-effective option for many primary oral healthcare programs.

While caries prevention programs are very important – UK children (especially lower socio-economic groups), for example, are faced with increasing tooth decay, which seems to be a worldwide trend – they have not been shown to effectively reduce amalgam use. Concurrent with the many programs undertaken to enhance preventive oral healthcare in higher income countries, there appears also to be a high level of amalgam use. Therefore, a preventative and integrated

[7] According to the European Union's Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR 2015): "Alternative materials have now been in clinical use for well over thirty years, initially in anterior teeth and more recently also for restorations in posterior teeth. Existing clinical experience has revealed little evidence of clinically significant adverse events. It is also important to note that the composition of available materials has changed substantially in recent years with reduced bioavailability of harmful components from use of improved polymerisation processes and particular improvement in the adhesive systems and the filler parts. There is no evidence that infants or children are at risk of adverse effects arising from the use of alternatives to dental amalgam." Available at <https://ec.europa.eu/health /scientific_committees/emerging/docs/scenihr_o_046.pdf>

approach to phasing down amalgam use should initially focus on a transition to minimally invasive mercury-free fillings that protect both oral health and the environment.

4.1.1 Q&A Session 3 and other remarks

The main issues raised in questions and remarks include the following:

- In a recent survey in Indonesia, 80% of dentists claimed not to use amalgam and reported that it is no longer included in the dental school curricula. However, the dentists responding were generally not well informed about safe removal of amalgam or the environmental effects of discharging mercury to wastewater. The environmental issues are not well appreciated in many countries. For the safe removal of amalgam, there are protocols that have been published, and these should be part of the normal training.
- There is plenty of information on the environmental impacts of dental mercury and how it should be managed, but it was suggested that mercury-free restoration materials may also have risks. As mentioned previously, there is little evidence that these materials pose a risk to the environment. Nevertheless, especially as this field is rapidly evolving, it could be useful to monitor and require more transparency on the chemical composition, properties, potential risks, etc., of mercury-free restoration materials.
- There is no "perfect" dental filling material as all represent a trade-off between chemical content and desirable material properties. However, glass ionomers and photo-cured composites may be the most environmentally friendly options for now.
- It was mentioned again that non-dentists can practice ART. Therefore it would make sense to increase the number of persons trained to do ART, especially in developing countries and rural areas, in order to bring more dental care to the population. However, in some places non-dentists performing ART could be seen as a threat to the business of professional dentists. Alternatively, ART practitioners could be restricted to very limited procedures and then refer patients to dentists for more significant treatments.
- WHO has published a number of documents about ART, especially oriented toward populations in the Americas.[8]
- The experience of Sweden – before the move to phase out amalgam use – showed that a strong initial focus on preventive programs not only increased access to care, but also served to increase the use of amalgam.
- In Germany, during discussions of a phase-out of the use of amalgam in children, insurance companies have recently claimed that the present level of reimbursement for amalgams can be maintained for mercury-free fillings as the time to place the filling is apparently similar, and inexpensive mercury-free materials can be used.

4.2 Session 4 – Dental industry collaboration

Mr. Humayun Kabir Bulbul, Secretary General of the Bangladesh Dental Society (BDS), which has more than 10,000 members, presented a partnership between a dental association and an environmental organization. Already in 2017, the Environment and Social Development Organization (ESDO) and BDS proposed changes in the dental school curriculum at a roundtable meeting. Together with ESDO, the BDS has committed to completely phase out dental amalgam

[8] For example, see <http://apps.who.int/iris/handle/10665/64325?mode=full> and <https://www.paho.org/hq/index.php?option=com_content&view=article&id=7411&Itemid=675&lang=en>

use in Bangladesh by 2020. The first phase is to ban dental amalgam in pregnant women, nursing mothers and children during 2018. Some 30 Chambers have already received recognition from BDS and ESDO as Mercury-Free Dental Chambers. Moreover, four dental institutions have been awarded a Plaque of Appreciation as Mercury-Free Dental Institutions. Mr. Bulbul finished by describing the ongoing campaign and outreach for mercury-free dentistry.

Ms. Dorah Swai, of the NGO AGENDA, could not be present at the workshop, so her presentation was given by **Mr. Griffings Ochieng**, from the Center for Law, Justice, and Environment, Nairobi, Kenya. The presentation focused on civil society outreach to dental associations in Tanzania and Kenya.

In Tanzania AGENDA has organized public awareness-raising through print and electronic media such as newspapers, radio, television, blogs, Facebook and listserves of SAICM East Africa. Other outreach activities AGENDA has undertaken in Tanzania include:

- Formed task force (12 members from key stakeholders in Tanzania).
- Sensitized the dental school to review its curriculum.
- Contributed to African Centre for Environment and Health Facebook page.
- Engaged other East African CSOs (in Uganda, Burundi, Rwanda, Zambia and Ethiopia) in amalgam phase-down activities.
- Working with the Ministry of Health to develop a guideline to ban amalgam for women of childbearing age and children.
- Participating in Tanzania Dental Association events.
- Sensitized members of the Tanzania Consumer Advocacy Society to participate in amalgam phase-down initiatives.
- Outreach to stakeholders (government, dental schools, dental clinics and NGOs).

Members from Tanzania Dental Association and other stakeholders at a CSO workshop

Source: AGENDA for Environment and Responsible Development

Outreach efforts in Kenya are less advanced but already include the following:

- The Centre for Environmental Justice and Development (CEJAD) engaged with the Kenya Dental Association at both the national and county levels. Among other initiatives they began a county pilot for mercury-free dentistry in 2016.
- At the request of the county, the Ministry of Environment convened a meeting to sensitize Mombasa County officials on the Minamata Convention and the need for phasing down dental amalgam use.

Mr. Saibal K. Sen, former President of the West Bengal State Dental Council, Kolkata, India, gave a presentation on the ongoing use of amalgam in India. He mentioned that India boasts nearly 18% of the world population and uses about 120 MT of mercury per year for all uses. India continues to use amalgam but demand is decreasing in urban areas (30% of the population), while rural areas are not well served by dentists. The dental teaching institutions all over the country use amalgam during training because it is in their syllabus and less expensive. Some still believe amalgam to be longer lasting than modern mercury-free restorative materials. Recent dental graduates prefer using light-cured composite resin if given the choice, but they have difficulty getting training in these techniques. Mr. Sen also warned that a filling material known as (high) copper amalgam appears to be still available on the market, often exported to neighboring countries. The use of copper amalgam is strongly discouraged as it is known to present significant health risks.[9]

[9] See research conducted in Norway at <http://www.sjweh.fi/show_abstract.php?abstract_id=2878>

Mr. Hidetaka Yamada, Director, GC Asia Dental Pvt Ltd., a dental product manufacturer, discussed mercury-free dental filling materials for children and compared them with amalgam. Amalgam contains mercury and involves invasive removal of tooth tissue, which weakens the tooth. Composites tend to be more technique sensitive and usually more expensive, but they are strong and less invasive. Glass ionomers are not technique sensitive and are quite affordable, particularly because of the time saved in placing them. Especially a new generation of glass ionomer materials can even be used for class II restorations. Supported by up to 7-year survival rates in Class I restorations during clinical evaluations, they are quite competitive with other materials in terms of lifetime and compression strength. They are also fast-setting, suitable for fast bulk placement, moisture tolerant, require less removal of tooth tissue, and can help prevent caries because they release fluoride. This new generation of glass ionomers is therefore very promising in the dental field, but they are (for now) more expensive than previous glass ionomers.

4.2.1 Q&A Session 4 and other remarks

The main issues raised in questions and remarks include the following:

- A suggestion was made for the manufacturer of the new glass ionomer material to reconsider the high price of the material as there could be a very large market for this, especially in developing countries.
- Some believe Indian dentistry will be mercury-free in the future. The Minamata Convention should focus especially on countries with such large populations and their potential environment and health impacts.
- If we wish to convince the government to support an amalgam phase-down, we will also need a strategy to convince most of the politicians.
- Following a February 2016 meeting, there is a nationwide program in India on oral health led by the Ministry of Health. They are preparing guidelines for dental checkups for children, according to which any child found with caries would be referred to an amalgam-free dentist.
- The Indian Ministry of Health has agreed to promote alternatives, train private practitioners, phase out or limit mercury use, and two agencies have been identified to accept mercury waste. While the standard curriculum still teaches amalgam placement, there are steps to revise it.
- There is a need for more robust information on dental restoration materials. Scientists and the dental community could benefit from more reviews such as a meta-analysis that could help the global community to select from among the different restorative materials. In addition to material properties, however, such an analysis might also include the cost and availability of the materials, the amount of time it takes to place a filling with a given material, the extent of training needed to become proficient, the typical mark-up (for businesses) when a new material is put on the market, etc.
- There is convincing evidence that the “real” cost of amalgam (including impacts on the environment and society) is far higher than the real cost of mercury-free alternatives. It is necessary to externalize these hidden environmental and social costs that are not included in the fee paid by the patient or the insurance company for an amalgam restoration.

4.3 Session 5 – Measures for restricting amalgam use in children

This session was intended to focus on restricting amalgam use in children via a) regulation, b) health ministry initiatives, and c) legislation, based on experiences of countries that have taken measures to restrict or end amalgam use.

Mr. Rajiv Beedassy, Divisional Environment Officer, Environment and Sustainable Development Division, Ministry of Social Security, National Solidarity, and Environment and Sustainable Development, Mauritius, presented a case based on the experience of his country. Public healthcare is free in Mauritius, but there are also private clinics if people are prepared to pay more for healthcare. Ten years ago, the Ministry of Health and Quality of Life made the decision to phase out the use of amalgam for pregnant women and children under 10 years old. Among other things, the public awareness-raising program included a video of the dangers of mercury for the household sector, a video about the alternatives to mercury for the household sector, and a poster on the dental sector.

The reduction in the number of school children receiving amalgam fillings has been dramatic, and has been accompanied by a somewhat slower reduction in amalgam fillings for adults. Private sector clinics usually now use composites. In 2015, about 60% of the public health service fillings were still amalgam, however. A 10-year oral health plan is now being discussed, which may include specific national objectives for phasing down amalgam use, as well as a mandate that mercury-free fillings should be covered by the health insurance program. Meanwhile an interim storage facility for hazardous waste has been established, but the dentist has to pay for the waste to be placed in the facility.

Mr. David Grimeaud, Legal Officer, Directorate-General for the Environment, European Commission, Brussels, provided an overview of the new EU mercury regulation.[10] Setting the scene, Mr. Grimeaud pointed out that in 2012 there were five EU member states using less than 5% amalgam fillings, 11 member states using more than 35% amalgam, and the other 11 member states were somewhere in the middle. The total dental mercury used in 2012 was between 55 and 95 MT, and expected to decline to 27-43 MT in 2025 under a "business as usual" scenario.

The new EU Mercury Regulation, which took effect on 1 January 2018, builds on the existing mercury export ban and includes, among other things:

- a prior informed consent (PIC) procedure for mercury imports,
- a ban on dental amalgam by 1 July 2018 for deciduous teeth, children under 15 years old, pregnant and breastfeeding women,
- a requirement for amalgam separators and proper waste management in dental clinics,
- a requirement that from January 2019, dental amalgam will only be used in dental amalgam capsules,
- the preparation of publicly available national amalgam phase-down plans by July 2019,
- a mandate for a further study by 2020 of the possibility of phasing out the use of dental amalgam in the EU, and if so, preferably by 2030.

[10] Regulation (EU) 2017/852 of the European Parliament and of the Council of 17 May 2017 on mercury, and repealing Regulation (EC) No 1102/2008. Official Journal of the European Union L 137/1 (English). 24 May 2017.

Excerpt from the "Regulation (EU) 2017/852 of the European Parliament and of the Council of 17 May 2017 on mercury, and repealing Regulation (EC) No 1102/2008"

Article 10

Dental amalgam

1. From 1 January 2019, dental amalgam shall only be used in pre-dosed encapsulated form. The use of mercury in bulk form by dental practitioners shall be prohibited.

2. From 1 July 2018, dental amalgam shall not be used for dental treatment of deciduous teeth, of children under 15 years and of pregnant or breastfeeding women, except when deemed strictly necessary by the dental practitioner based on the specific medical needs of the patient.

3. By 1 July 2019, each Member State shall set out a national plan concerning the measures it intends to implement to phase down the use of dental amalgam.

Mr. Grimeaud noted that dental amalgam was a sensitive issue during the negotiation of the EU mercury regulation.

Mr. Florian Schulze, Founder, IG Umwelt Zahn Medizin, Berlin, Germany, works closely with physicians who deal with a range of toxicology issues, many of which are increasingly related to heavy metals exposure. He first reviewed the major steps in the EU leading up to the decision to phase out amalgam use in children. This began with a 2002 Swedish study on the health effects of amalgam, continued through the 2005 EU mercury strategy, 2008/9 Scandinavian bans on amalgam, the 2012 BIOIS report on amalgam and batteries, and finally the 2017 EU Mercury Regulation, with a further study of an amalgam ban scheduled.

Mr. Schulze is also investigating a number of regulations that need to be reviewed or revised to deal adequately with health and other issues related to the use of amalgam. He pointed out that there are still nine member states of the EU without legal requirements for separators, while the EU Mercury Regulation stipulates that "Member States shall lay down the rules on penalties applicable to infringements of this Regulation and shall take all measures necessary to ensure that they are implemented." He also noted that, while there is a corrosion rate limit for metallic materials in dentistry (ISO 22674), there is still no corrosion rate limit for amalgam, despite the evidence of mercury releases. However, the EU Medical Devices Directive will require estimates of potential patient or user exposure from amalgam and alternative filling materials when it enters into force on 26 May 2020.

Excerpt from Material Safety Data Sheet for dental amalgam

15 Regulations

· ***Labelling according to EU guidelines:***
The product has been classified and marked in accordance with EU Directives / Ordinance on Hazardous Materials

· ***Code letter and hazard designation of product:***

T Toxic
N Dangerous for the environment

· ***Risk phrases:***
23 Toxic by inhalation.
33 Danger of cumulative effects.
50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

· ***Safety phrases:***
1/2 Keep locked up and out of the reach of children.
7 Keep container tightly closed.
45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
60 This material and its container must be disposed of as hazardous waste.
61 Avoid release to the environment. Refer to special instructions/safety data sheets.

· ***National regulations***

· ***Waterhazard class:*** *Water danger class 3 (Assessment by list): extremely hazardous for water.*

Mr. Schulze finished by presenting a range of high quality mercury-free restoration materials readily available in the marketplace.

4.3.1 Q&A Session 5 and other remarks

The main issues raised in questions and remarks include the following:

- The EU commissioned a 2012 (BIOIS) study that addressed the economic impact and the feasibility of a dental amalgam ban, and it came out strongly in support of a ban. The planned 2020 study (of the possibility of phasing out the use of dental amalgam in the EU) will assess the overall impact of amalgam use. It is anticipated that the study will review previous research focusing on dental amalgam, it will consider various options in light of member state health services, the environmental and other impacts, the mercury-free alternatives, the economic feasibility of a phase-out, etc. The Environment Directorate (of the European Commission) website on mercury is being updated and will include a specific section on dental amalgam.
- There are a number of member state obligations and deadlines inherent in the new EU mercury regulation, and a series of penalties for countries that do not comply. However, the imposition of such penalties in the EU is not a quick process. Currently only three member states have notified the Environment Directorate that they have assimilated the EU mercury regulation into national law. Part of the implementation process typically includes notifications by the European Commission of member state obligations.
- The EU mercury regulation includes an export ban on mercury, including metallic mercury as waste. Mercury waste must be safely managed inside the EU. The export of the more common mercury compounds is also banned, but other compounds can be exported.

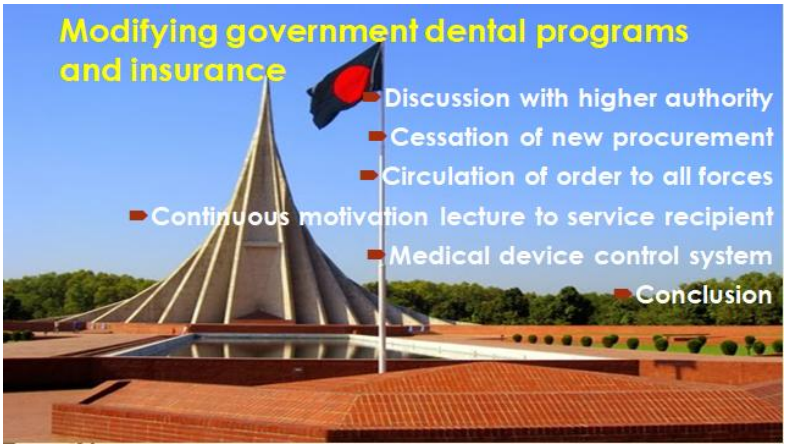
4.4 Session 6: Modifying government dental programs and insurance

At the beginning of the second day of the workshop, Mr. Hossain welcomed back the participants and introduced Ms. Kakuko Nagatani-Yoshida from UN Environment, and the Co-Chair for the second day's proceedings. Following the reading of a brief biography of Ms. Nagatani-Yoshida, Mr. Hossain returned to the agenda and welcomed the first session of the day.

4.4.1 Armed forces dental program

Mr. Golam Mohiuddin Chowdhury, Army Dental Corps, Bangladesh, is a Major General and dental surgeon in the Bangladesh army who joined the Environment & Social Development Organisation (ESDO) in 2011, and in 2016 he got involved with the World Alliance for Mercury-Free Dentistry. He said he was motivated to stop using dental amalgam as a result of the complications of mercury used in oral cavities. One of his first steps was to identify a similar motivation among fellow dentists and to establish contacts with these colleagues. Mr. Chowdhury mentioned that in 2017 there was finally a decrease in the procurement of dental amalgam capsules in the army as a result of phasing out the use of the material, and this led to discussions with other authorities.

Finally, from January 2018, there was no longer any new procurement of dental amalgam for the armed forces in Bangladesh. This decision circulated to all forces including the army, navy, air force and Border Guards Bangladesh (BGB) – about 1.5 million persons under treatment. Along with this, there are ongoing lectures and discussions with patients concerning the prevention of dental diseases and the harmful effects of dental amalgam. Lastly, he stated that in the national medical device control system, mercury is classified in group D, which is the strictest control group. This means that whenever the material is imported, its purpose is scrutinized by the authorities.



Source: Presentation of Major General Golam Mohiuddin Chowdhury

4.4.2 A stepwise approach to end amalgam use

Ms. Nina Cromnier, Swedish Chemicals Agency and Bureau Member, Minamata Convention, provided an overview of the Swedish experience in phasing out dental amalgam. She began by stating that although Sweden has taken many measures to reduce and eliminate mercury, mercury deposition remains a problem in the country. Mercury deposition in Sweden in 1990 was estimated at 5.4 tonnes, and in 2011 it was still 4 tonnes.

By the 1980s most of the point sources of emissions had been greatly reduced, but there was a need to deal with emissions related to products and processes. This resulted in a strategy that involved phasing out mercury products and processes, and collecting and treating mercury waste. It was also decided not to recycle the mercury waste and to ban its export to other countries. Ms. Cromnier mentioned that in Sweden, dental amalgam was the single largest source of mercury in sludge from wastewater treatment plants. Due to the concentration of mercury found in their lakes, the Swedish government also worried about the consumption of fish. Some of the environmental measures taken by Sweden were to limit the mercury discharge per dental unit, the mandatory use of amalgam separators, as well as classifying amalgam waste as hazardous waste. Ms. Cromnier shared a graphic showing how mercury in sludge has substantially decreased since 1980. Despite all of these measures, however, 50% of lakes in Sweden still have mercury concentrations above WHO recommended levels. It was stated that 70% of adults in Sweden still have mercury fillings, and it is estimated that Swedish people have approximately 40 tonnes of mercury in their mouths. As additional information, Ms. Cromnier also mentioned that approximately 50% of Swedish corpses are cremated.

She then described the actions taken to reduce dental amalgam, which involved a combination of legal requirements, voluntary agreements with industry, and raising consumer awareness of health and environmental effects. In 1991 Sweden decided to gradually phase out amalgam in

milk teeth by 1993, then in children and adolescents in general by 1995, then in adults by 1997, and by 1999 Sweden also eliminated insurance reimbursements for amalgam. Finally, in 2009 there was a general (national) ban with some exemptions. These exemptions allow for amalgam use only in adults in hospitals or clinics, and only if the following three prerequisites are also fulfilled: (1) specific medical conditions can be referred to, (2) other treatment methods cannot give a good enough result on a case by case basis, and (3) the clinic has taken full measures to meet environmental requirements. Currently there are only about ten amalgam restorations per year in Sweden. This is a substantial decrease from 1980, when 65% of all fillings were dental amalgam. In conclusion, Ms. Cromnier noted that the key success factors in the Swedish experience were raising awareness of mercury risks (which is a major political driving force), implementing a step-wise approach starting with children, improving the availability of mercury-free restoration materials and making changes in the dental insurance system.

Stepwise approach and timeline to end amalgam use

Source: N. Cromnier presentation

4.4.3 UN Environment Finance Initiative

Ms. Kakuko Nagatani-Yoshida, UN Environment, Asia Pacific Region, introduced the UN Environment Finance Initiative (UNEP FI). Ms. Nagatani-Yoshida praised the committed NGOs that are instrumental in keeping the issue of dental amalgam in front of policy-makers. She noted that COP 2 is approaching, and she said that UN Environment, Asia-Pacific Region, representing 41 countries, will try to support measures to phase out amalgam use in children and pregnant women if they are raised at the COP.

She drew some parallels between the Swedish phase-out measures and the Montreal Protocol process, in which viable alternatives were available, but political will was needed to change the status quo; also changes in insurance schemes (public or private) were important. She proposed that there are three important questions to consider during the phasing down of dental amalgam use. These are: 1) Are alternatives available locally?, 2) Is the government officially committed to meet the restrictions on dental amalgam in the Minamata Convention? and 3) Is the insurance scheme supportive of a phase down?

She presented the UNEP FI, which can work with insurance companies and others to be more responsible and to better address environmental, social and governance (ESG) risks.
It is important to differentiate between public and private insurance schemes, and whether it is a healthcare insurance scheme, or specific only to dental. UNEP FI has a number of existing partners in banking, investments and insurance companies. Specific to insurance, there is a drive to develop a global guideline on the integration of ESG risks into insurance underwriting. The insurance sector is ideally placed to take more responsibility here as it is both a risk manager and an investor.

Ms. Nagatani-Yoshida emphasized that this work is very necessary as there is no global guidance available. She concluded by recommending an in-depth global review of the role of insurance programs in the dental amalgam phase down. It is important to know whether insurance schemes promote or constrain the use of dental amalgam. This depends partly on each country's regulations, and also on the details of the public-sector insurance scheme.

4.4.4 Q&A Session 6 and other remarks

The main issues raised during questions and remarks include the following:

- Although there was significant opposition to various measures, Sweden was able to achieve what it did through strong political commitment and engagement of the industry and consumers. Environment and health NGOs were very active in the case of dental amalgam, and in fact played an important role in all mercury issues.
- Sweden restricted all mercury imports for dental purposes, controlled mercury devices, and managed hazardous mercury waste through stabilization and environmentally safe storage and disposal.
- It was difficult to determine whether, as a result of public campaigns regarding the harmful effects of mercury used in dentistry, there was an increase in the number of persons seeking the removal of amalgam fillings that were still intact. In any case people reserve the right to have amalgam removed even if the filling has not failed; however, this measure was not promoted/advised as part of the awareness campaign.
- Japan has universal health insurance, but for dental procedures there is a complicated discussion about what should be covered and what not. This is further complicated by discussion of how much dentists are permitted to charge for a filling.
- It was noted that the handling and management of dental amalgam waste in the Bangladesh army was not optimal and there is still no system for disposal of mercury waste. This was a main driver to phase down/phase out dental amalgam in the army. The army in Bangladesh has played a leading role in reducing the use of amalgam, and they wish to become an example for the rest of the country. With regard to other mercury-added products, there are exemptions for some essential military uses but they are working on implementing a phase out of mercury-added products. Sphygmomanometers have been mostly phased out but mercury thermometers remain in general use.
- The three main challenges with regard to phasing out amalgam for certain groups of users appear to be cost, political will and local availability of alternatives. It was suggested by one participant that if these challenges were overcome, a country could phase out amalgam in children in only two years, with another two years to phase out amalgam in adults. The Swedish experience, for example, may be a good benchmark for other countries as it allowed time for dentists to adapt and receive training in the use of alternatives, where necessary.
- Under universal healthcare coverage there are many amalgam fillings being placed due to the lower cost, etc. However, Africa is known for leapfrogging to new technologies (for

example, skipping widespread installation of landline telephones, and leaping directly to mobile phones), so it is possible they could do the same with regard to mercury-free fillings.

- In 2011 there was an effort of the UNEP Finance Initiative to encourage insurance companies to be more socially and environmentally responsible. The idea of an in-depth global review of the role of insurance programs in relation to the dental amalgam phase down was supported by several participants. This would include a global survey on the company policies with regard to dental restorations.
- An issue was raised regarding a European country that had ended dental amalgam use domestically, but amalgam was still being manufactured in the country and exported to other countries. It was noted that multilateral environmental agreements encourage countries to develop a scheme that includes trade controls. The initial focus is typically on domestic uses, sales and imports, followed sometimes by guidelines or controls on domestic production. When a product is still a legally traded commodity, domestic production and exports are difficult areas to regulate.
- A question was raised regarding the underdeveloped insurance schemes presented in developing countries and whether there was a specific structure or a model that can work in this context. Many developing countries are quite advanced with regard to micro-financing for commercial ventures, as well as crop insurance that helps people to survive in the event of poor harvests. It is possible they could be equally innovative in support of improved and mercury-free dental care. An in-depth survey, as mentioned, would provide a better understanding of the ability of insurance to support the phase down of dental amalgam use. The Minamata Convention is the only MEA that has provisions on collaboration with insurance companies to phase down dental amalgam use.
- In the public system of Peru, up until 2016 dental amalgam was the material of choice for posterior restorations in many healthcare facilities. Today, as a ratifying country of the Convention, the government is looking at options in the dental sector to phase down the use of dental amalgam and increase the availability of mercury-free alternatives. There is a need for governments to address this issue under universal health coverage.
- The German government has been consulting with insurance companies and the dental association about the EU-wide ban on amalgam for children and pregnant women that will take effect on 1 July 2018. The option of not changing the reimbursement for a filling is being considered as dentists are already experienced in working with mercury-free alternatives, and they may use glass ionomer as a restoration material for these patients after 1 July. Although the older glass ionomers may be less durable than other mercury-free materials, they are also less costly, and there is no need for longevity when used in children's milk teeth.
- It was suggested that the cost of environmental and health effects should be included in the final cost of dental restorative materials.
- In the event of a complete phase-out of certain mercury-added products, it will be easy to determine whether some targets of the Minamata Convention have been achieved. Unfortunately, at present there is no good baseline from which to measure progress in phasing down dental mercury use. This is exacerbated by our lack of knowledge of the manufacturers of amalgam, where they are located, how much amalgam they produce and export, etc. It was suggested that one way to get a baseline would be to oblige manufacturers to report their use of mercury. Another method to generate better data is for interested countries to work together to create some new commodity codes in the Harmonized System (used to identify internationally traded goods for customs tariffs and balance of trade purposes) that would better identify amalgam products in cross-border commerce.

4.5 Session 7: Raising public awareness about amalgam use

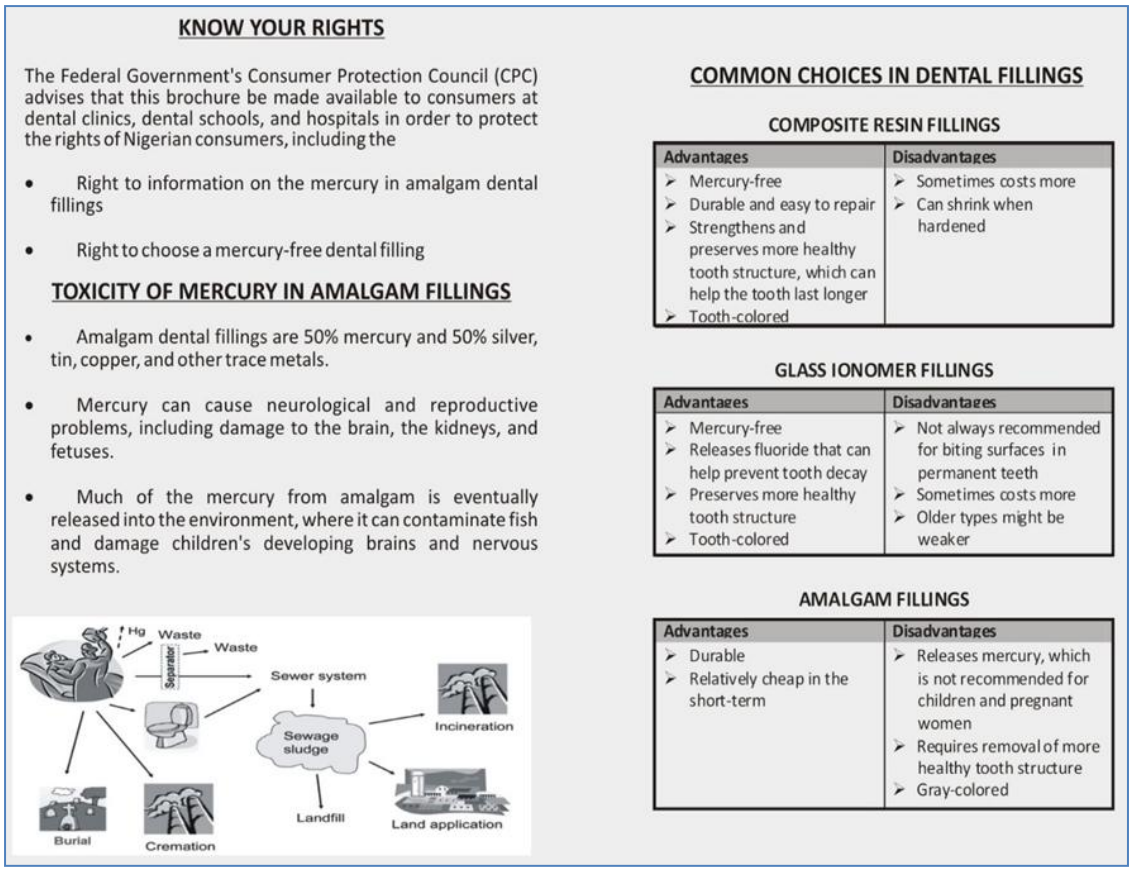
This session looked at raising public awareness about amalgam use, alternatives available, and the phase down provisions of the Minamata Convention.

4.5.1 Informing parents and consumers in Nigeria

Mr. Leslie Adogame, Executive Director of SRA Development Organization, Lagos, Nigeria, described the recent development of a brochure for parents and consumers of dental services in Nigeria. One of the very first steps of awareness-raising was to identify the key players. Stakeholders were identified from the health sector, environment sector, Consumer Protection Council (CPC), NGOs, universities, and others. Mr. Adogame explained that the stakeholder approach to promote the phase-down of dental amalgam use was made through many bilateral meetings, advocacy visits, workshops and conferences. Another tool to raise awareness was a case study on mercury levels in dental clinics and exposures.

The CPC has also been sensitized to the rights of consumers with regard to dental care. Most Nigerian consumers are unaware of the mercury in "silver fillings" and would prefer to be able to make an informed choice, typically opting for a mercury-free alternative where available. CPC concluded that it is a consumer right to be made aware of the pros and cons of amalgam and alternative restoration materials so as to make an informed choice. Mr. Adogame then shared

Excerpt from Nigerian consumer information brochure



KNOW YOUR RIGHTS

The Federal Government's Consumer Protection Council (CPC) advises that this brochure be made available to consumers at dental clinics, dental schools, and hospitals in order to protect the rights of Nigerian consumers, including the

- Right to information on the mercury in amalgam dental fillings
- Right to choose a mercury-free dental filling

TOXICITY OF MERCURY IN AMALGAM FILLINGS

- Amalgam dental fillings are 50% mercury and 50% silver, tin, copper, and other trace metals.
- Mercury can cause neurological and reproductive problems, including damage to the brain, the kidneys, and fetuses.
- Much of the mercury from amalgam is eventually released into the environment, where it can contaminate fish and damage children's developing brains and nervous systems.

COMMON CHOICES IN DENTAL FILLINGS

COMPOSITE RESIN FILLINGS

Advantages	Disadvantages
➢ Mercury-free ➢ Durable and easy to repair ➢ Strengthens and preserves more healthy tooth structure, which can help the tooth last longer ➢ Tooth-colored	➢ Sometimes costs more ➢ Can shrink when hardened

GLASS IONOMER FILLINGS

Advantages	Disadvantages
➢ Mercury-free ➢ Releases fluoride that can help prevent tooth decay ➢ Preserves more healthy tooth structure ➢ Tooth-colored	➢ Not always recommended for biting surfaces in permanent teeth ➢ Sometimes costs more ➢ Older types might be weaker

AMALGAM FILLINGS

Advantages	Disadvantages
➢ Durable ➢ Relatively cheap in the short-term	➢ Releases mercury, which is not recommended for children and pregnant women ➢ Requires removal of more healthy tooth structure ➢ Gray-colored

Source: Presentation of Mr. Leslie Adogame

with other participants the brochure that was developed with the CPC for this purpose. The brochure highlighted the consumers' choices and rights, the health and environmental risks of mercury, and the pros and cons of dental amalgam and its alternatives. He concluded by mentioning that collaboration with CPC and extensive stakeholder engagement was a useful strategy.

With this increased awareness, the Nigerian Minamata Initial Assessment (MIA) actually presented as its second priority: "measures to phase down the use of dental amalgam." The first priority was to ratify the Minamata Convention.

4.5.2 Milestones towards phasing down the use of dental amalgam in Tanzania

Mr. Msafiri Nicodemus Kabulwa, Principal Dental Officer, Ministry of Health, Tanzania, was slated to make a presentation but was unable to participate. Instead, his slides were read by Mr. Graeme Munro-Hall, Chief Dental Officer, World Alliance for Mercury-Free Dentistry.

The presentation first provided an overview of the provision of dental services in Tanzania, where 37 dentists and dental officers are graduated each year, along with some 60 dental hygienists. In all of Tanzania there are 779 oral healthcare providers. There are 359 (mostly public) healthcare facilities where oral healthcare is provided, although the most common procedure remains extraction of the tooth. Some of the challenges identified were late reporting, non-functioning of equipment, and out of stock of dental supplies

In 2013, a UN Environment funded demonstration project targeted the phase down of dental amalgam. Since then, NGOs encouraging mercury-free dentistry (AGENDA, WAMFD) have become involved, resulting in developing guidelines orienting dental professionals towards using dental amalgam alternatives, advocating changes in the dental training curricula, capacity building for dental providers regarding the use dental amalgam alternatives, improving the availability of toothpaste with bioavailable fluoride, as well as raising public awareness with regard to oral health. One of the milestones achieved in Tanzania is that an oral health policy guideline is being developed. Another milestone is that it is expected to include a ban by 2022 on the use of dental amalgam among children and women of child-bearing age.

4.5.3 Q&A Session 7 and other remarks

The main issues raised during questions and remarks include the following:

- It was strongly suggested to not raise public awareness of dental health issues unless one has an alternative solution readily available; otherwise one's program will be seen as a failure and the public may have less trust in further initiatives. One example of a major failure of this sort is waste management, where people were informed of the hazards but their country or local region was not able to provide a viable waste management system.
- It may also be useful to try to measure the impact of training workshops or other awareness-raising initiatives.
- There was some interest in building on the experience of awareness-raising in Nigeria, and using that as a model for other African countries. The MIAs of many African countries, especially those using the UN Environment Toolkit Level 2 guidelines, could be centralized and reviewed by the African Union to better understand the current situation at the regional level. The MIAs include inventories, the legal regulatory

framework, the national capacity, the agencies in the countries, and also the gap analysis. In the inventory there is an assessment of how much mercury is being consumed and released. The MIAs of different African countries could be analyzed in order to identify more efficient regional phase-down options.

- As dental amalgam is an environmental and health issue, ministerial declarations addressing dental amalgam phase down have a very high profile. SAICM was also mentioned as a platform to discuss the agreements of the region, bring together the issues of environment and health and prioritize the issue of chemicals.
- India is in the process of developing a national oral healthcare policy that will include measures to phase down dental amalgam use.
- Nigeria also has a plan to phase down the use of dental amalgam which includes, but is not limited to, establishing a committee for this purpose, stakeholder consultations, review of legislation and guidelines, implementation of Best Management Practices (BMP) and Environmentally Safe Management (ESM), use of mercury-free alternatives under the national insurance scheme, use of dental amalgam capsules, and a ban on the use of dental amalgam among children and pregnant women.

4.6 Session 8: Updating dental school curricula and clinics

This session focused specifically on initiatives to update curricula/guidelines for dental schools, with the aim of bringing more information on restorative materials in general, and on mercury-free restorative materials in particular to dental students during their studies and training period.

4.6.1 Case study of dental school in Nigeria

Mr. Godwin Toyin Arotiba, Immediate Past Dean, Faculty of Dental Sciences, University of Lagos, Nigeria, explained how we should use lessons learnt from dental mercury releases to update the dental curriculum for the training of modern dentists. He emphasized that the training of modern dentists should also include instructions in oral and general health, environmental pollution, toxicology of dental restorative materials, modern approaches to caries management, prevention of dental diseases, minimum intervention dentistry, atraumatic restorative therapy, posterior tooth colored restorative techniques and safe amalgam removal techniques. He submitted that ‘technology and mechanics should not take precedence over biology’ because one cannot adequately manage the diverse array of dental restorative materials without reference to their effects on the rest of the body and the environment. He stressed the need for dental schools to urgently update their curricula to include these elements.

Considering the largely inadequate solid and liquid waste treatment systems in many developing countries, including the lack of safe management of hazardous waste, resources should not be wasted on promoting, installing and maintaining amalgam separators in Africa. Caries prevention initiatives and promotion of mercury-free restorations should take precedence.

He concluded that Faculties of Dentistry in Africa should be the focal point of dental amalgam phase-down activities. They should update their curricula, become mercury-free and promote mercury-free dentistry, e.g. through conferences and workshops, run regular continuing professional development courses for general dental practitioners, be fully integrated into all national phase-down activities and committees, and their simulation laboratories should be upgraded. He named several national and international funding sources that could be interested to support these objectives.

Conclusions: Phase-down activities for Faculties of Dentistry

Conclusion

- Faculties of Dentistry should:

THE FOCAL POINT OF ALL PHASE DOWN ACTIVITIES.

1. Update their curricula to reflect a new philosophy of training modern Dentists.
2. Develop and hold regular CPD courses for General Dental Practitioners in posterior tooth colored filling techniques.
3. Promote mercury free dentistry via conferences and workshops.
4. Be fully integrated into and actively participate in all National Phase Down activities and committees.
5. Should plan to be mercury free as soon as possible.

Source: Presentation of Mr. Godwin Arotiba

4.6.2 Case study of dental school in Uruguay

Ms. María Renée Romero Benvenuto, Professor of Pharmacology and Therapeutics, School of Dentistry, University of the Republic, Uruguay, presented a case study of eliminating mercury from her School of Dentistry. One of the first steps the university took was to limit the use of dental amalgam to its encapsulated form, and to take precautions with regard to children and pregnant women. She mentioned that since 2010 there was no longer any procurement of dental amalgam, and it is no longer being taught. Ms. Romero revealed that this dental school was one of the few in South America that had eradicated the use of dental amalgam. Instead, they use compomer or glass ionomer restoration materials. These materials have desirable qualities that dental amalgam does not, such as aesthetics, adhesion, requiring less removal of the natural tooth structure, etc.

One of the goals of the university is the implementation of the Pharmaco-Eco Vigilance approach at the School of Dentistry as a clinical practice, which combines the need to detect, evaluate, understand and prevent the adverse effects of pharmaceutical products in human and ecological health. The School of Dentistry is committed to raising awareness in the University of the best methods to deal with pharmaceutical products, and has committed to supporting the concept of sustainable cities, which is also a goal of the capitol city of Montevideo.

4.6.3 Case study of dental school in Bangladesh

Mr. Alim Al Razee (Aalif), Senior Lecturer, Department of Oral and Maxillofacial Surgery, Mandy Dental College and Hospital, Bangladesh, presented a case study of a mercury-free non-governmental dental college established in 2008 in Bangladesh. The college has 50 faculty members and 300 students along with 30 intern doctors. He mentioned that the university has on average 40-45 patients that are treated on a daily basis.

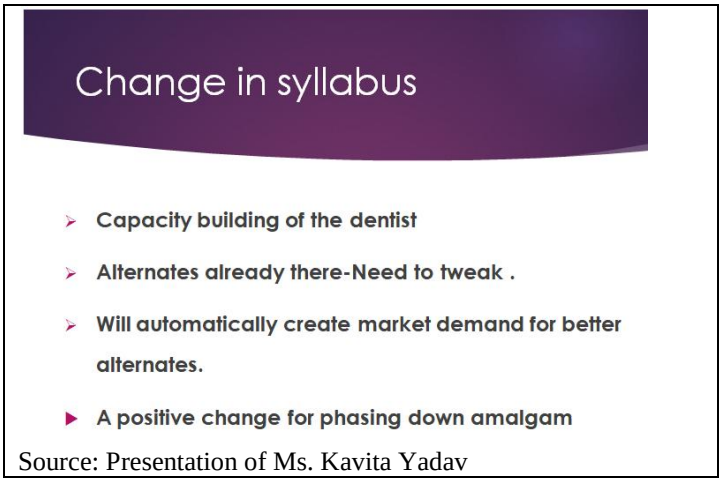
He explained that in their curriculum there is no instruction on preparing dental amalgams. Instead, the students learn about the hazards and adverse effects of mercury-added filling materials. He mentioned that patients are generally advised to choose a mercury-free dental restoration material, for example composite, compomers or glass ionomers. Due to the visit to Mandy Dental College and encouragement of the World Alliance for Mercury-Free Dentistry,

there is now a trend among many Bengali dental colleges that consider mercury-free dentistry to be the modern path to follow.

4.6.4 Case studies in India

Ms. Kavita Yadav, a dentist working for Toxics Link, India, described the traditional curriculum for dental students, and the challenges of shifting to a stronger emphasis on mercury-free restorative materials. She revealed that dental amalgam was a major part of the dental curriculum. It was pointed out that the number of hours devoted to dental amalgam are far more than the ones attributed to alternatives. This results in a strong bond between the dentist and dental amalgam use. Dentists are taught about the hazards of mercury so they are theoretically inclined to use best management practices; however, this is often not economically feasible for a new dental school graduate. Unfortunately, when these dentists try to shift to alternatives, this is very challenging as they are less trained in their use.

One solution to this problem is to make a change in the curriculum, which would include capacity-building of the dentist and a stronger emphasis on mercury-free materials, which will automatically create market demand for better alternatives and support the phase-down of dental amalgam use.



Source: Presentation of Ms. Kavita Yadav

Ms. Yadav recognized the challenges involved in making changes to the current curriculum. The present campaign by Toxics Link includes working with dental colleges and a media campaign. Initial resistance has gradually softened and the Indian Dental Association is now supportive. Other prominent dental voices have started to lend their voices to the campaign, adding pressure on the Dental Council of India to revise the curriculum. Finally, in May 2017, the need to revise the curriculum was accepted and its draft is still undergoing development. Meanwhile a similar campaign has begun in Odisha.

Mr. Satish Sinha, Toxics Link, India, explained that there have already been significant moves to reduce mercury in other sectors in India, such as the chlor-alkali industry, the lighting sector, many hospitals that are already mercury-free or in transition, etc. It was pointed out that India had already been taking many measures to address the mercury issue well before the Minamata Convention. He revealed that less than 1.5% of India's GDP goes to health care, but the part of that allocated to dental care is not clear. In recent years, there are some 30,000 new dentists educated each year, but most end up in urban areas with the result that the rural areas (70% of the total population of India) are poorly served, with only one dentist per about 250,000 people.

The armed forces and Indian Railways are phasing out amalgam, and many private dental chains do relatively little work with amalgam. He explained that there is a preference among urban dentists to use alternatives. Some of the triggers for change have been aesthetics, the higher income of the urban population, published research results and campaigns. However, amalgam is still considered the "gold standard" by many, the alternatives tend to be more expensive, there is a lack of consumer awareness that amalgam contains mercury, and young dentists tend not to be

so well trained in using mercury-free materials. There is also a fair amount of informal or "roadside" dentistry, where mercury is commonly used when the tooth is not simply extracted.

Transition in India away from dental amalgam

Voluntary

- Phase out in Armed Forces
- Indian Railways phased down by 90%
- Private dental clinics and dental chains shift, dental schools
- Urban dentists preference for alternatives (region specific as well)

Source: Presentation of Mr. Satish Sinha

Mr. Sinha stressed the need for regulatory, economic and informative instruments. He also highlighted the importance of safeguarding vulnerable populations. The way forward to phase down dental amalgam use will involve a change in the basic dental curriculum, better consumer awareness, more local manufacture of alternative materials, restrictions on amalgam use for vulnerable populations, inclusion of the preference for mercury-free dentistry in the national oral health program, a reduced duty or tax on imported mercury-free dental restorative materials and/or a method to internalize environmental and health costs in the price of amalgam and other mercury-added products.

4.6.5 Q&A Session 8 and other remarks

The main issues raised during questions and remarks include the following:

- Toxics Link, an Indian NGO, was acknowledged for its long work on mercury in India, for example its successful efforts to phase out the mercury process in the chlor-alkali industry and to increase scrutiny of mercury use in other sectors.
- There was a question whether the update of dental school curricula in India could be accelerated as it had already been a year since authorities agreed they should be reviewed.
- The representative of the Indian Ministry of Environment conceded that his government may perhaps reconsider its previous decision to require the installation of more amalgam separators, and instead make the phase-down of amalgam use a higher priority. Via its India Oral Health Program, the country is developing centers for oral healthcare that are intended to be mercury-free.
- In the case of Uruguay, a survey showed that 58% of children (up to 11 years old) and pregnant women are being given mercury-free dental care.
- Although amalgam separators have been mandated in many wealthier countries to remove amalgam particles from the wastewater system, there was a repeated concern that amalgam separators are not a viable or sustainable model for developing countries. Some questioned international funding going for separators in countries that do not have viable management systems for ensuring environmentally sound disposal of mercury waste.
- Changing public healthcare procurement guidelines could also help to change the traditional markets for dental amalgam and contribute to the phase-down.

5 Next steps

The final session of the second day of the workshop was devoted to developing strategies for phasing down the use of dental amalgam, including phase-out opportunities in vulnerable groups.

5.1 Introduction to small group discussions

Mr. Michael Bender, International Coordinator of the Zero Mercury Working Group, introduced the group strategy exercise, "Roadmap For Phasing Down Dental Amalgam, Including Phase-Out Opportunities For Children" that was developed in part from the "Checklist" (mentioned earlier) derived from the 2016 UN Environment report. He explained how a similar exercise was well received in May 2017 in Nairobi, Kenya, during a meeting of the UN Environment Global Mercury Product Partnership for the African Region.[11]

Mr. Bender introduced the "Checklist" (see Appendix IV) developed from the UN Environment report, "Lessons from Countries Phasing Down Dental Amalgam Use,"[12] which provided specific guidance drawn from experiences that countries had already gone through to phase down the use of dental amalgam. He also pointed out how all of the different sessions covered by the Bangkok workshop were aligned with that report.

Mr. Bender then presented the "Roadmap" (see Appendix V) that had been prepared for the workshop, which provides general guidance in the form of four key strategic elements:

1) development and implementation of a stakeholder engagement strategy,
2) situation assessment,
3) capacity building and related measures, and
4) key project deliverables.

He emphasized that what was presented in the Roadmap was envisioned as a "thought starter" to generate ideas and discussion; it was not meant to limit the scope of the workshop exercise.

Mr. Bender suggested to consider all of the above during the upcoming small group discussions at the regional level. He then referred back to the African meeting at which this approach was embraced because participants left that meeting having a better understanding of what steps needed to be taken in their own countries. By way of example, he asked Mr. Leslie Adogame to present a brief overview of the process involved in developing such a roadmap for his country.

Mr. Leslie Adogame, Executive Director, SRADev Nigeria, presented the steps involved in the development of a Roadmap for Phasing Out Mercury-added Products in Nigeria, which was subsequently embraced by the government. Among the things Mr. Adogame highlighted, he mentioned that it is important to identify all the key stakeholders and their roles from the beginning so they are engaged in the whole process. A series of meetings were held to review the plan. He elaborated on the need, in Nigeria's case, to hire consultants for some steps of this roadmap, such as for developing an inventory of mercury-added products, for carrying out a legal gap analysis and for an institutional analysis.

[11] The focus at that meeting was on phasing out mercury-added products under Article 4 of the Minamata Convention. While dental amalgam is also listed under Article 4, the focus is on phase down. For more information, see Mr. Bender's presentation at: http://www.zeromercury.org/phocadownload/Checklist_Final_Nairobi_May_2017-final.pdf

[12] https://archive.zoinet.org/web/sites/default/files/publications/Dental_Amalgam_spreads.pdf

5.2 Small group discussions and presentations

Participants were then divided into four regional groups in order to discuss the elements of roadmaps for phasing down the use of dental amalgam in their regions, including opportunities for phasing out amalgam use in children. In addition, participants were also encouraged to discuss country initiatives and regional collaboration, including steps to measure progress, including monitoring the reduction in dental amalgam use in children. The four groups roughly represented the following regions:

- South Asia
- East and Southeast Asia
- Europe and the Americas
- Africa

They were asked to prepare to present their findings to the larger group for comparison and further reflection using general guidance, if they considered it useful, from the Roadmap.

5.2.1 South Asia

The South Asia group was represented by participants from Bangladesh, India, Nepal and Sri Lanka. The strategic elements they considered to be most relevant for their countries are summarized below.

5.2.1.1 Development and implementation of a stakeholder engagement strategy

- Stakeholder mapping: Stakeholders were identified and divided into groups:
  - Primary: Ministry of Environment, Ministry of Health, and Ministry of Commerce.
  - Secondary: Dental council, state dental associations, and dental industries.
  - Tertiary: Consumer associations, drug regulation authorities, NGOs, research organizations, dental institutions, private sector.
- Set up a steering committee to make broad decisions and serve as a center for collaboration and communication between the working group and the ministries.
- Set up a working group charged with implementation of the strategy. The group should have several divisions for specific purposes, e.g., liaison officer, information department, spokesperson, health research, etc.
- Legal implications: Develop a new regulation concerning import and export of mercury, reduction in duties on alternatives, waste disposal regulations, reporting mechanisms and a regulatory framework for all materials used in the oral cavity.

5.2.1.2 Situation assessment

The working group will carry out the following functions:

- Situational analysis: secondary literature review, primary research if needed, development of terms of reference for import and export regulations.
- Development of training materials and module for current dentists and new graduates.
- Monitoring and evaluation of the strategy.
- Finance.

5.2.1.3 Capacity building and related measures

- Develop information, education and communication materials (audios, posters, videos, articles, etc).
- Research the pros and cons of using dental amalgam and its alternatives.
- Training of newer and longer established dentists through collaboration with dental colleges and manufacturers.
- Information technology capacity development for mercury-free alternatives.

5.2.1.4 Key project deliverables

- Definition of roles and responsibilities of relevant ministries to avoid dental amalgam use in children.
- Development of dental school curricula to ensure dentists are trained in the use of mercury-free dental restorative materials, and that they are aware of the need to avoid the use of dental amalgam in children.
- Identification of new legal authorities as needed, reflecting the implementation responsibilities for each of the relevant ministries.
- Identification of target populations for hazard and risk communication initiatives (e.g., dentists, parents, pregnant women, schools).
- Agreement among key stakeholders on key roles and responsibilities for delivery of the above including a schedule, targets, and measurable indicators.

5.2.2 East and Southeast Asia

5.2.2.1 Development and implementation of a stakeholder engagement strategy

- Identify relevant stakeholders at National Level:
  - Ministries (e.g., Ministries of Environment, Health, etc.).
  - Local authorities (provincial/district authorities).
  - Stakeholders (dentists, dental colleges, dental associations, physicians, patient groups, women's organizations, children's organizations, civil society, insurers, manufacturers and suppliers producing/providing alternative materials and amalgam including dental and medical device supplier associations, waste management companies/ association, etc.).
- Form a structure such as a Dental Amalgam Advisory Committee, or work through existing structures to facilitate project input and coordination.
- Identify relevant stakeholders at Regional Level:
  - A group of countries could discuss developing a common declaration/policy on phasing down dental amalgam, such as the ASEAN Working Group on Chemicals and Waste (Thailand is the chair of ASEAN).
- Determine various stakeholder roles, responsibilities, timeline, etc., for moving forward. For example, ministries for policy making, NGOs for a mercury-free dentistry campaign, industries for technological innovation.
- Organize meetings to include dental amalgam in the Working Group session on mercury-added products, identify significant implementation issues and data needs, set project goals, specify the sequence and timing of project milestones, and establish mechanisms for conducting outreach and obtaining input as the project progresses.
- Develop and implement specific strategies and interventions for phasing out dental amalgam in vulnerable groups (children, pregnant/breastfeeding women), with timelines.

5.2.2.2 Situation assessment

- Conduct an inventory of manufacture, trade, donated materials, uses, emissions, releases and disposal of dental amalgam, or otherwise obtain available data on manufacture, trade and use, as needed.

- Assess and confirm availability of mercury-free dental restorative filling materials (e.g., composites and glass ionomers).
- Identify opportunities for application of minimally invasive dentistry and atraumatic restorative treatment in dentistry.
- Assess existing institutional capacity (including technical, financial and legal) to support activities to avoid dental amalgam in vulnerable groups (children, pregnant/breastfeeding women), including information on the availability of mercury-free dental restorative filling materials, dental colleges, trade monitoring, enforcement measures, etc.
- Assess challenges and opportunities related to dental insurance schemes.
- Conduct a legal gap analysis for developing legislation/guidance to codify or otherwise avoid dental amalgam use in vulnerable groups (children, pregnant/breastfeeding women).
- Formulate recommendations for implementation of activities to avoid dental amalgam use in vulnerable groups (children, pregnant/breastfeeding women).

5.2.2.3 Capacity building and related measures

- Create an information platform, as needed, to promote and monitor the use of safe, mercury-free alternatives to dental amalgam in vulnerable groups (children, pregnant/breastfeeding women).
- Develop a program for necessary training of key stakeholders (e.g., dentists, customs, government purchasing officers, laboratory technicians).
- Identify target groups for strategy implementation (e.g., dentists, parents, pregnant women, consumer awareness groups, crematoria, religious groups and waste managers) and carry out hazard and risk communication initiatives (e.g., brochures, letters, meetings).
- Foster data gathering, management and information sharing on mercury-free dental restorative filling materials.
- Encourage collaboration with dental schools in training students to use mercury-free dental restorative filling materials, safe removal of dental amalgam and appropriate healthcare waste management.
- Encourage industries and relevant associations through corporate social responsibility (CSR) to promote safe, mercury-free alternatives, starting in dental schools.

5.2.2.4 Key project deliverables

- Definition of roles and responsibilities of all stakeholders to avoid dental amalgam use in vulnerable groups (children, pregnant/breastfeeding women).
- Development and implementation of dental school curricula to ensure dentists are trained in the use of mercury-free dental restorative materials, and that they are aware of the need to avoid the use of dental amalgam in vulnerable groups (children, pregnant/breastfeeding women).
- Identification of target populations for hazard and risk communication initiatives (e.g., dentists, parents, pregnant women, schools).
- Institutional commitment among key stakeholders concerning key roles and responsibilities for delivery of the above, including a schedule, targets and measurable indicators.
- Measurable contribution to national efforts on implementation of the Minamata Convention and Sustainable Development Goals (SDG) targets.

5.2.3 Europe and the Americas

5.2.3.1 Development and implementation of a stakeholder engagement strategy

- Dental sector engagement is necessary from the very beginning for ownership/commitment.
- It is crucial to engage the Ministry of Health and Ministry of Environment, with a preference for civil society (e.g., workers' associations, NGOs) to take the initiative in engaging the government.
- Decisions should always be made by joint collaboration of stakeholders.
- The focal point of the Minamata Convention is the Ministry of Environment, at two levels: those who attend the meetings and those who work in the field.
- Ministries should assign a lead contact in the Government for phase-down measures on dental amalgam, especially a person who can foster collaboration among agencies.
- Need to be sure that alternatives are available before implementing phase-down or phase-out measures.
- An Advisory Committee is needed to show the way forward and make recommendations. It may need to be government-led in order to ensure change. Costa Rica had an experience where there was no government representation in an advisory group and there was little impact at the country level.
- Even if alternatives are available, if insurance is not supportive of mercury-free alternatives, this will hinder progress.
- It is also a problem that no deadlines are specified with the Minamata dental amalgam measures.

5.2.3.2 Situation assessment

- A situational analysis could be done before establishing the amalgam advisory committee.
- Useful baseline data are needed on amalgam use, alternatives, supply.
- It is important to understand the approaches and practices of dentists regarding waste management, which may not be very responsible. If this is better understood, it can help to inform the government and to apply pressure to take action on phase-down measures.
- The environmental cost of using amalgam needs to be included in the baseline.
- Dental college curricula should be reviewed, especially to see if the environmental component and other important elements are included.
- International guidance should be taken into consideration along with the domestic situation, as international measures often influence domestic actions.

- The insurance system that reimburses dental care should be reviewed at the national level to identify gaps that may hinder a phase-down.
- A list of any other barriers to the amalgam phase-down should be provided in the baseline assessment. Typically there are a number of perceived and real barriers that need to be identified and dealt with.

5.2.3.3 Capacity building and related measures

- Dental school curricula need to be reviewed, ideally including an environmental component, toxicology component, informed consent for dental restoration, etc. Dentists should be oriented towards practicing minimally invasive dentistry and prevention/oral health promotion.
- Dental schools that have taken action can play a leading role and set an example for other institutions.
- Need to identify key players to ensure review/changes in the curricula, such as the Ministry of Health, Ministry of Education and dental associations.
- Conduct a survey of new graduates to better understand how appropriate their recent training was to the dental practice demands they face in the real world.
- Procurement needs to be addressed. Government purchasing programs need to take the lead in specifying mercury-free restoration materials.

5.2.3.4 Key project deliverables

- Raising awareness of a range of stakeholders (including parents, patients, etc.) has to be part of the national strategy.
- It is important to take specific measures to protect vulnerable populations from mercury exposure. In the case of pregnant women, there is already a general rule to avoid any dental procedure except in an emergency in order to prevent any unnecessary exposure of the mother or fetus.
- List the reasons for eliminating dental amalgam in children. As this has already been done by some countries and institutions, there is enough evidence to warrant precaution and avoid unnecessary risk.

5.2.4 Africa

5.2.4.1 Development and implementation of a stakeholder engagement strategy

- Identify stakeholders
  - Ministries/departments/agencies (MDAs)
    - Ministry of Environment
    - Ministry of Health
    - Ministry of Women's Affairs
    - Ministry of Education
    - Ministry of Finance
    - Ministry of Trade and Industry
    - Ministry of Science and Technology
    - Customs Authority
    - Public Procurement Agency
    - Ministry of Justice
  - NGOs/associations
    - Chamber of commerce
    - Dental associations
    - Association of medical practitioners
    - Civil society
    - Insurance sector
    - Manufacturers' association
    - Consumers associations
    - Women's associations
  - Academia
    - Universities
    - Dental colleges
  - Military
    - for use of dental care only
- Form a structure to drive the project, such as an Amalgam Advisory Committee; make it a subcommittee for some countries where there is an existing committee already.
  - Composition: dental association, trade groups, civil society organizations, government, academia. It should be led by the Ministry of Health.
  - Roles of MDAs:
    - Environment: Coordination.

  - Health: Fine tune the Roadmap, engage with the range of stakeholders, amalgam phase down/ phase out action plan, implement the road map.
  - Education: Research and curricula development plan.
- Role of Amalgam Advisory Committee: Develop specific strategies and interventions for phasing out dental amalgam in pregnant and breast-feeding women.

- Identify a champion (government expert or an NGO representative) who could kick-start the process by engaging and convincing key people.
- Identify sources of funding.
- Bring on board the Ministry of Health and Ministry of Environment.
- Ministries (Health and Environment) will select committee members based on the initial suggestion submitted to them.
- Arrange for an inception workshop.

5.2.4.2 Situation assessment

- Conduct an inventory, or otherwise obtain available data on manufacture, trade and use of dental amalgam.
- Assess and confirm availability of mercury-free dental restoration materials (i.e., composites and glass ionomers).
- Identify opportunities for minimally invasive dentistry and atraumatic restorative treatment in dentistry.
- Assess existing institutional capacity to support activities to avoid dental amalgam in children, pregnant women and breastfeeding women, including information on the availability of mercury-free dental restoration materials, dental colleges, trade in dental restoration materials, enforcement measures, etc.
- Assess challenges and opportunities for balancing dental insurance schemes.
- Conduct a legal gap analysis for developing legislation/guidance to codify or otherwise avoid or phase out dental amalgam use in children, pregnant women and breastfeeding women.
- Formulate recommendations for implementation of activities to avoid dental amalgam use in children, pregnant women and breastfeeding women.
- Develop ToRs to determine the scope of any required study, the expertise required (BDS, MA, etc.).
- Organize a validation workshop.
- Identify sources of funding.
- Visit customs and other organizations.
- Devise a set of survey instruments (questionnaires).
- Major challenge: the need to revise customs HS Codes in order to secure better baseline information on imports of dental restoration materials.

5.2.4.3 Capacity building and related measures

- Right to Know Information fliers at the moment of dental consultation.
- Identify sources of funding to assist with capacity building.
- Identify the type of training needed from the assessment prepared above.
- Identify the targets for capacity building.
- Identify trainers.
- Develop training manuals, sensitizing materials.
- Identify venues for training (institutions where training would be carried out).
- Identify partners for capacity building (including South-South cooperation).

5.2.4.4 Key project deliverables

- Definition of roles and responsibilities of key stakeholders to avoid dental amalgam use in children and pregnant and breastfeeding women.
- Update dental school curricula to ensure dentists are trained in the use of mercury-free dental restorative materials, and that they are aware of the need to avoid the use of dental amalgam in children and pregnant and breastfeeding women.
- Development of communication strategy appropriate for a range of stakeholder groups.
- Develop Terms of Reference to guide the different sets of activities.
- Identify funding sources.
- Identify target groups.
- Put in place a Monitoring and Evaluation process.

5.3 Plenary discussion

The main issues raised following all of the above presentations included:

- Regarding the need for a timeline in a country's Roadmap to provide guidance and structure for the various measures to be taken, it was confirmed that this is an important element. However, the timeline would need to be fixed through discussion at the national level since the Convention says that the phase-down strategy needs to take into account the country's local circumstances.
- With regard to a point that had not yet received much attention, it was proposed that any donations of free dental materials should also be monitored in order to limit dental amalgams from entering the country.
- It was mentioned that under the Montreal Protocol there were also many measures to train personnel and revise curricula, which were very similar to those being discussed, although for different professions. The Montreal Protocol also had successes and challenges as countries tried to implement it. The target concept with regard to reducing amalgam use is well established, so we now need to identify opportunities where the national practitioners can collaborate and learn from each other. It was noted that while the Montreal Protocol is an "old" Multilateral Environmental Agreement (MEA), it is also an evolving MEA.
- Article 22 of the Minamata Convention states that there need to be measures to evaluate the effectiveness of the phase-down. Without reliable baseline data it is impossible to monitor progress. Since some general estimates of regional use of dental mercury have been developed in support of the Global Mercury Assessment now in preparation, it was recommended that these "baseline" estimates should be included in this workshop report.
- Referring back to an earlier discussion of mercury-free alternatives and the ongoing need for awareness-raising, participants were reminded that it might be a good idea to develop a resource factsheet on amalgam and the main mercury-free alternatives.
- It was noted that the Minamata Initial Assessments (MIAs), gradually being completed for more and more countries, are a source of information on both dental mercury consumption, and quantities of mercury released into the environment from dental amalgam.

5.4 Summary of next steps

Ms. Nagatani-Yoshida provided a wrap-up of the small group discussions and the highlights of the presentations. As she divided her remarks among the four main action areas of the Roadmap, she observed that each group/region had a somewhat different perspective on the issues, although there were many similarities.

Stakeholder engagement
It is critical to engage at the national and local levels. While the Roadmap was mostly oriented toward children's issues, some groups also highlighted the need to include women's groups as stakeholders, and especially such vulnerable groups as pregnant and breastfeeding women. Ms. Nagatani-Yoshida confirmed that it is important to engage with the dental community from the very beginning. It was noted that government ministries are in the best position to lead many of the processes to phase down dental amalgam use, and should lead or play a key role in the advisory committee, but there of course is a need to always involve all relevant stakeholders. Likewise, the better we understand the issues surrounding the use and phase-down of amalgam, the more stakeholder groups we realize are relevant. The Southeast Asia group also mentioned the importance of including some sub-regional groups, along with the national ones.

Situation assessment
Ms. Nagatani-Yoshida mentioned that there had been a lot of agreement with the situation assessment processes listed in the Roadmap, with some groups even suggesting the development of Terms of Reference for such an assessment. She recalled the observation that the donation by some charities or industries of dental materials containing mercury could potentially be a problem. Many groups stressed the importance of addressing the waste management and wastewater treatment practices used by dental and health clinics. She added that from her own experience working with WHO and Ministries of Health, this is a key area that needs assessment, monitoring and improving. Moreover, many times this is not handled by the public sector because some hospitals have their own incinerators and their own waste management systems. She observed that while one of the groups talked about establishing a working group, another group preferred to work with existing agencies and committees. One challenge identified by the Africa group and seconded by others was the need for a better baseline understanding of sources and quantities of dental mercury used in order to effectively measure progress under the Minamata Convention. Among the resources mentioned to improve baseline assessments were the Minamata Initial Assessments and proposed improvements in the commodity (HS) codes used by traders and customs to identify goods being shipped. One group reiterated the importance of a broader baseline assessment in order to better identify what is the best approach, including the optimal composition of the advisory committee, key groups to be targeted, etc.

Capacity building
It was generally agreed by all regional discussion groups that there are a significant number of target groups and responsible stakeholders that would benefit from focused capacity building efforts covering subject areas such as safer removal of failed amalgams, waste management, stakeholder cooperation, and procurement policies and systems.

Deliverables
There were some recommendations on reviewing and updating dental college curricula, and the good suggestion to try to identify 'big wins,' in which the entire society benefits along with especially vulnerable groups. There were also suggestions of an in-depth analysis of insurance practices in order to determine if they are supporting or working against the amalgam phase down, and engaging with manufacturers and other private sector actors who can contribute to the phase-down objective.

Ms. Nagatani-Yoshida concluded her intervention by thanking the participants for their contributions to the roadmap and gave the floor to Mr. Hossain.

6 Closing remarks

Mr. Shahriar Hossain started the closing remarks by thanking Ms. Nagatani-Yoshida for the warm welcome from UN Environment, Asia-Pacific Region, and Mr. Daam Settachan, Research Scientist, Environmental Toxicology Laboratory, Chulabhorn Research Institute (CRI), for the superb coordination and accommodations provided by CRI. Mr. Hossain expressed his deep gratitude to the Government of Thailand for hosting the workshop. He added a special thanks to all of the people who made the workshop possible, and acknowledged Mr. Charles Brown for his extraordinary support of and commitment to the workshop.

Ms. Teeraporn Wiriwutikorn, Director of the Hazardous Substances Division, Ministry of Natural Resources and Environment, on behalf of the government of Thailand, then took the floor to thank UN Environment and the World Alliance for choosing Thailand as the venue for the workshop, and thanked all of the participants for their constructive engagement throughout the 2-day discussion of the dental amalgam issue.

Mr. Daam Settachan took the opportunity to express his pleasure in working with UN Environment and the World Alliance, and hoped that all of the participants had a pleasant stay at CRI and in Thailand.

Ms. Desiree Narvaez thanked the World Alliance for its work in phasing down the use of dental amalgam, the Asia Pacific office of UN Environment for its good collaboration, and the participation of Mr. Bender and Mr. Maxson especially in developing the workshop agenda and producing the workshop report. Ms. Narvaez concluded by thanking all of the participants for their work on the important issues addressed by the workshop, and for their active involvement and dedication to a successful workshop.

Ms. Nina Cromnier stated that she was very pleased to have participated in the rich workshop discussions, she was proud that Sweden could be held up as an example of the way forward, and she greatly appreciated the opportunity to hear of the varied experiences of the participants.

Mr. Charles Brown congratulated all of the participants for sharing their experiences and suggestions about accelerating the phase down of dental amalgam, especially with regard to vulnerable populations for the benefit of future generations. He stressed the need to involve all stakeholders, highlighting the many kinds of measures that may be taken to phase out dental amalgam and make mercury-free alternatives more available. Mr. Brown repeated his hope that future international funding would be more wisely spent implementing measures to phase down amalgam use rather than be spent on amalgam separators that are generally not appropriate to the circumstances of developing countries, as confirmed during the workshop discussions. Lastly, he reminded participants of the two key steps in dealing

with dental amalgam: first, to end the use of amalgam for vulnerable groups, and second, to phase out dental amalgam for all.

Mr. Hossain thanked everyone for their closing remarks and proceeded to declare the workshop closed at 6 pm on 15 May 2018. One of the subsequent publicity articles published about the workshop is included as Appendix VII.

APPENDIX I – Minamata Convention on Mercury

Annex A – Mercury-added products

Part II: Products subject to Article 4, paragraph 3

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: (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.

APPENDIX II – Letter from the Executive Director

Letter from the UN Environment Executive Director in response to the NGO letter

Executive Office

UN environment
United Nations Environment Programme

Reference: Economy/Executive-0950-2017

13 July 2017

Dear Mr. Brown, dear Charlie,

It was a great pleasure meeting you in Nairobi.

Engagement by civil society partners to phase down dental amalgam is very much appreciated, as part also of supporting countries to implement the Minamata Convention on Mercury. Our joint commitment and dedication is paying off as more and more countries are implementing measures to phase down such amalgam. I personally had the privilege of witnessing its ban in Norway in January 2009 when I was the Minister of Environment.

Thank you also for seeking our support to co-sponsor a workshop to promote such a measure for children. We would be very happy to explore further with you the possibility of jointly raising resources. We could provide technical assistance and see how together we could partner with the private sector, in particular manufacturers of alternatives to dental amalgam. Please if your team could contact Mr. Jacob Duer, Chief of the Chemicals and Health Branch at e-mail.Jacob.Duer@unenvironment.org to take this further.

Thank you for being in touch. We very much look forward to continuing working closely together to protect health and the environment from the toxic effects of mercury!

Best wishes!

Erik Solheim

Erik Solheim
Executive Director

Mr. Charlie Brown
President
World Alliance for Mercury Free Dentistry
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APPENDIX III – Workshop agenda

Promoting Dental Amalgam Phase Down Measures Under the Minamata Convention and Other Initiatives, For "Especially Women, Children, and, Through Them, Future Generations"

Coordinated by UN Environment and World Alliance for Mercury-Free Dentistry

Date: 14-15 May 2018--Venue: CRI, Bangkok, Thailand

AGENDA DAY 1

Time	Session	Resource Persons	Main themes	Expected outcomes
		8:00-9:00 AM Registration		
9:00-9:30	Welcoming	a) Mr. Shahriar Hossain, Executive Vice President, World Alliance for Mercury-Free Dentistry and Workshop Co-Chair b) The Honorable Mr. Erik Solheim, Executive Director, UN Environment (via video message) c) Ms. Dechen Tsering, Regional Director for Asia and the Pacific, UN Environment d) Ms. Nina Cromnier, Swedish Chemicals Agency, Bureau Member, Minamata Convention, e) Ms. Suwanna Tiansuwan, Deputy Director General, Pollution Control Dept. Ministry of Natural Resources and Environment, Thailand, host nation government	a) Introduction of distinguished guests b-e) Welcoming remarks	Participants are welcomed to the workshop.
		SETTING THE SCENE *Define the problem, discuss the Minamata Convention provisions and related UN Environment initiatives* **Co-Chair: Mr. Shahriar Hossain and Ms. Desiree Narvaez for Day 1**		
9:30-10:10 .	Session 1: The Minamata Convention on Mercury	a) Ms. Nina Cromnier, Swedish Chemicals Agency, Bureau Member, Minamata Convention b) Ms. Desiree Narvaez, UN Environment	a) Overview of the Minamata Convention b) Overview of Article 4 of the Convention with a focus on the provisions in Annex A Part II related to phasing down dental amalgam us	a) Understanding the purpose of the Minamata Convention. b) Understanding the Convention's Article 4 provisions related to phasing out products with a focus on steps for phasing down amalgam use.
		c) Mr. Michael Bender, Zero Mercury Working Group	c) UN Environment report, "Lessons from Countries Phasing Down Dental Amalgam Use"	c) Understanding steps countries have taken to reduce or eliminate amalgam use and release, including involvement of the dental sector, improving public health, best management practices and requiring less hazardous substances, balancing insurance schemes, minimally invasive dentistry, the precautionary approach, avoiding amalgam in pregnant women and children, etc.
10:10-10:30	Session 1: Question and Answer			
10:30-10:50	Coffee break provided by workshop organizers			
10:50-11:30	Session 2: The environmental perspective: Concerns and impact	a) Mr. Peter Maxson, Consultant b) Ms. Desiree Narvaez, UN Environment c) Mr. Dominique Bally, African Center for Environmental Health	a) Dental amalgam production, trade, use and release pathways to the environment (including wastewater, waste disposal, incineration, open burning, crematoria, etc.) and mercury's impacts on the environment, including societal and cost implications b) Best environmental practices (amalgam separators, chair-side traps, disposal, etc.) for dental amalgam waste c) Dental amalgam's impact on developing countries, contributing to both the local and global mercury pollution legacy	a) Raising awareness of the environmental release risks from mercury and understanding the (often externalized) societal costs and impacts of using dental amalgam. b) Raising awareness on how to manage (segregation, collection, storage) and dispose or recycle amalgam waste. c) Understanding the challenges confronting many developing countries due to releases of mercury, including their lack of capacity, resources and infrastructure for managing hazardous wastes in a cost effective and environmentally sound manner.
11:30-11:50	Session 2: Question and Answer			
12:00-1:00	Lunch provided by workshop organizers			

EXISTING INITIATIVES *Describe the range of measures available to phase down the use of dental amalgam*				
1:00-2:00	Session 3: Preventive and integrated approach for oral health, particularly for children	a) Mr. Masato Motoki, UN Environment	a) UNEA 3 resolution on Environment and Health	a) Understanding the strong linkages between environment and health and the need for cross-cutting and preventive approaches, as well as the requested collaboration among UN Environment, WHO, SAICM, and MEAs to support countries in developing integrated environment and health policies and measures.
		b) Ms. Theresia Tantoh Zonepoh epse Bouetou, Dental Surgeon, Chief Medical Officer, Vice President Dental Order Dentistry Etoug-Ebe Baptist Hospital, Yaounde. Cameroon	**b) Via Video**	b) Raising awareness of health promotion programs to increase longevity of teeth through preventative clinical measures to reduce dental caries as well as other practical and cost-beneficial approaches, particularly for developing countries (e.g., avoiding sugar in children.)
		c) Mr. Graeme Munro-Hall, chief dental officer, World Alliance for Mercury-Free Dentistry	c) Overview of minimally invasive restoration procedures, including materials used for maximum preservation of tooth structure and also describing the benefits and application of Atraumatic Restorative Treatment (ART) by trained personnel, particularly in children's teeth Overview of activities to promote oral health and prevent oral diseases	c) Learning about the benefits of minimally-invasive restorative procedures and how ART can be used for removal of carious material in children using hand instruments with no electricity or anesthesia required and how pain, often experienced in conventional cavity preparation, is minimized.
2:00-2:30	Session 3: Question and Answer			
2:30-3:30	Session 4: Dental industry collaboration	a) Mr. Humayun Kabir Bubul, BDS	a) Partnership between a dental association and an environmental organization	a) Learning from the experiences of a dental association taking steps to reduceamalgam use in children
		b) Ms. Dorah Swai, AGENDA (Presented by Mr. Griffings Ochieng, Kenya)	b) Civil society outreach to dental associations	b) Understanding how civil society can reach out to the dental associations
		c) Mr. Saibal K. Sen, Dental Council of State of West Bengal	c) Reforming licensing requirements in India assists in promoting mercury-free dental fillings	c) Highlighting the development or adoption of guidelines that promote the use of mercury-free dental filling alternatives for children.
		d) Mr. Hidetaka Yamada Marketing Director GC Asia	d) Mercury-free dental filling materials for children	d) Understanding what high quality mercury-free materials are currently used, the latest in research and development, and what can be done to increase the production and use of mercury-free fillings from the manufacturers' perspective.
3:30-3:50	Session 4: Question and Answer			
3:50-4:05	Group photo			
4:05-4:20	Coffee break provided by workshop organizers			
4:20-5:05	Session 5: Existing laws and regulations to restrict amalgam use in children	a) Mr. Rajiv Beedassy, Department of Environment, Mauritius b) Mr. David Grimeaud, European Commission **(remotely)** c) Florian Schulze, IG Umwelt Zahn Medizin, Germany	Restricting amalgam use in children through a) regulation, b) health ministry initiatives, and c) by legislation	Learning from the experiences of countries that have successfully restricted or ended amalgam use totally or partially (i.e. in children and pregnant women) and the various methods employed.
5:05-5:25	Session 5: Question and Answer			
5:25-5:45	Summary of first day and preview of second day	a) Ms. Desiree Narvaez, UN Environment Workshop Co-chair b) Mr. Shahriar Hossain, Workshop Co-chair		
7:00 PM Welcome dinner hosted by World Alliance for Mercury-Free Dentistry				

AGENDA DAY 2

Time	Session	Speakers/Sessionists	Main themes	Expected outcomes
9:00-9:15	Welcome back	a) Ms. Kakuko Nagatani Yoshida , (UN Environnement) Co-chair b) Mr. Shahriar Hossain, (World Alliance) Co-chair		
9:15-10:00	Session 6: Modifying government dental programs and insurance	a) Mr. Major General - Golam Mohiuddin Chowdhury, Army Dental Corps, Bangladesh b) Ms. Nina Cromnier, Swedish Chemicals Agency, c) Ms. Kakuko Nagatani Yoshida, UN Environment, to introduce UN Environment Finance Initiative	a) Armed forces dental program modifications that restrictamalgam use b) A stepwise approach to end amalgam use (including national insurance changes) c) UN Environment Finance Initiative is engaging insurance companies	Learning from the experiences of countries that have modified their government programs or insurance to cover mercury-free alternatives. The role of the UN Environment Finance Initiative will be shared.
10:00 - 10:20	Session 6: Question and Answer			
10:20 - 10:50	Session 7: Raising public awareness about amalgam use, alternatives available, and the phase down provisions of the Minamata Convention.	a) Mr. Leslie Adogame, SRA Dev. Organization, Lagos, Nigeria b) Mr. Msafiri Nicodemus Kabulwa, Principal Dental Officer, Ministry of Health (presented by Graeme Munro-Hall)	a) Development of a brochure for parents and consumers in Nigeria b) Role of the Principal Dental Officer working with dental profession and NGOs to end amalgam use in children in Tanzania	Understanding steps taken to raise public and family awareness about alternatives to amalgam use, amalgam's environmental impacts and the overall phase down of amalgam use per the Minamata Convention.
10:50 - 11:10	Session 7: Question and Answer			
11:10 - 11:25	Coffee break provided by workshop organizers			

11:25 - 12:15	Session 8: Updating dental school curricula and clinics	a) Mr. Godwin Toyin Arotiba, School of Dentistry, University of Lagos, Nigeria b) Ms. Renée Romero (Prof. Pharmacology of University of Republic, Representing Ministry Environment-Uruguay c) Mr. Alim Al Razee, FACULTY (oral and Maxillofacial surgery, Mandy Dental College, Bangladesh d) Mr. Satish Sinha and Ms. Kavita Yadav, Toxics Link, India	a) Changing clinical instruction and reducing amalgam use in dental schools in Nigeria b) Case study on Uruguay's dental education curriculum, private dentistry c) Case study on mercury-free dental college in Bangladesh d) Changes in curricula can help new dentists	Understanding initiatives to update curricula/guidelines for dental schools with the aim to teach dental professionals about mercury-free dental filling alternatives
12:15 - 12:35	Session 8: Question and Answer			
12:35 -1:30	Lunch provided by workshop organizers			
	NEXT STEPS *Strategies for phasing down the use of dental amalgam, including phase out opportunities in children*			
1:30-4:00	Discuss how the above measures to phase down amalgam use, including phase out opportunities for children, can be tailored to suit the needs of each country and how countries get started.	a) Small group discussions b) Group presentations	a) Small groups will be divided by regions – Africa, Asia, Americas, etc. – so as to allow more people to speak and discuss b) Each group will present their ideas, insights, and questions for the benefit of the larger group	After a review of a checklist developed from the UN Environment report, "Lessons from Countries Phasing Down Dental Amalgam Use," participants will collaborate in formulating "roadmaps" for phasing down the use of dental amalgam, including phase out opportunities in children.
4:00-4:15	Coffee break provided by workshop organizers			
4:15-5:30	Discuss various initiatives and regional collaboration to phase down amalgam use, including phase out	a) Full group discussion		Participants will discuss country initiatives and regional collaboration, including steps to measure progress, including monitoring the reduction in dental amalgam use in children over time.

	opportunities for children			
5:30-6:00	Review next steps and closing remarks Formally conclude the workshop	a) Mr. Charlie Brown, World Alliance for Mercury-Free Dentistry b) Ms. Kakuko Nagatani Yoshida , UN Environment, Workshop Co-chair c) Mr. Shahriar Hossain, Workshop Co-chair		
7:00 PM Closing dinner hosted by World Alliance for Mercury-Free Dentistry				

APPENDIX IV – Checklist for phasing down dental amalgam use

Checklist for Developing "Road Map"

The 2016 UNEP publication, "*Lessons from Countries Phasing Down Dental Amalgam Use,"* highlighted the following measures:

- ***Involving the dental sector:*** Countries surveyed indicated that *"the committed involvement of the dental sector is necessary in order to achieve an efficient transition to alternatives."* For example, in Finland, an expert group prepared recommendations resulting in amalgam use dropping significantly. Countries also worked with dental schools to develop mercury-free curricula, including guidelines, educational materials and training.

- ***Balancing dental insurance:*** Some countries have examined *"how national insurance practices may be revised to help phase down amalgam use"* because *"addressing imbalances in insurance schemes can be a very important measure for phasing down amalgam use."*

- ***Raising public awareness of mercury in dentistry:*** Countries raised public awareness of the environmental and health issues concerning mercury. Danish dentists were asked to inform patients about different dental restoration materials. Sweden attributes *'high awareness of the environmental and health risks of mercury among patients'* as one of the *'most important explanations'* for that country's ability to virtually eliminate amalgam use.

- ***Substituting less hazardous chemical substances:*** Several countries adhered to a policy of substituting less hazardous materials whenever viable alternatives are available.

- ***Limiting mercury releases to the environment:*** The report outlines a range of measures countries may take to limit pollution. It also states that, *"…if amalgam is not used widely in a given low- or middle-income country, limited resources may be more effectively used to phase down the ongoing amalgam use, rather than for amalgam related waste management."*

- ***Improving public health, promoting oral health and preventing disease:*** Improving global oral health through various preventive measure may contribute to phasing down amalgam.

- ***Promoting minimally invasive dentistry:*** The importance of countries supporting *"minimally invasive dentistry"* was highlighted. In Norway, *"When a dental filling is placed, the technique should involve the least amount of tooth removal,"* and that amalgam *"requires the removal of more healthy tooth tissue then mercury-free fillings."*

- ***Avoiding amalgam use in women and children:*** As a first step toward phasing down amalgam, several countries have restricted amalgam use in children and pregnant women. Norway and Sweden *"started with a recommendation against the use of amalgam for vulnerable populations such as children and pregnant women... In the Netherlands, amalgam use has declined significantly in children and adults after it was discouraged in children."*

Resources

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http://www.euro.who.int/__data/assets/pdf_file/0006/295611/Phasing-Out-Mercury-containing-thermometers-sphygmomanometers-HC-en.pdf

Klif (2012) - *Review of Norwegian experiences with the phase-out of dental amalgam use*, Climate and Pollution Agency, Norway, June 2012
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NBH (1999) - *The use of dental filling materials in Norway,* Norwegian Board of Health, Parliamentary Report no. 58 1996/97, August 1999
https://www.helsetilsynet.no/upload/publikasjoner/andrepublikasjoner/dental_filling_materials_norway_ik-2675.pdf

UNEP (undated) - *Phasing down dental mercury use: Advisory note for the insurance working group of UNEP Finance Initiative*, United Nations Environmental Programme, Chemicals Branch (undated)
http://www.mercury-free.org/UNEP--changing-dental-ins.aspx

APPENDIX V – Roadmap for phasing down dental amalgam use

ROADMAP FOR PHASING DOWN DENTAL AMALGAM, INCLUDING PHASE OUT OPPORTUNITIES IN CHILDREN

NAME OF REGION_____

The Minamata Convention on Mercury represents a major milestone in global efforts to reduce the adverse impacts of mercury, with the preamble highlighting *"…especially in developing countries, resulting from exposure to mercury of vulnerable populations, especially women, children and future generations."* The core objective of the Minamata Convention (Article 1) *"…is to protect the human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds."* Under Article 4 of the Convention, Parties are required to phase down the use of dental amalgam, taking into account the Parties' domestic circumstances and relevant international guidance.

One such guidance is the March 2016 UN Environment Programme report entitled, *"Lessons from Countries Phasing Down Dental Amalgam Use,"* which outlines steps countries have taken to reduce or eliminate amalgam use and mercury releases, including involving the dental sector, balancing insurance schemes, improving preventive oral healthcare, emphasizing minimally invasive dentistry, implementing best management practices to deal with mercury emissions and wastes, replacing amalgam with less hazardous materials, taking the precautionary approach and avoiding amalgam in pregnant women and children, etc.

When planning activities to meet Article 4 Convention obligations, participants may wish to consider the attached draft checklist as well as addressing the following steps:

1.Development and implementation of a stakeholder engagement strategy

For example, some ideas include the following:

- Identify relevant Ministries (e.g. Ministries of Environment, Health, etc.) and stakeholders (dentists, dental colleges, dental associations, physicians, patient groups, women's organizations, civil society, insurers, manufacturers, etc.), and form a structure to facilitate project input and coordination, such as an Amalgam Advisory Committee
- Determine various Ministries' roles, responsibilities, timeline, etc., for moving forward
- Organize an Amalgam Advisory Committee inception meeting, identify significant implementation issues and data needs, set project goals, specify the sequence and timing of project milestones, and establish mechanisms for conducting outreach and obtaining input as the project progresses
- Develop specific strategies and interventions for phasing out dental amalgam in children

DESCRIBE POSSIBLE STEPS TO ENGAGE STAKEHOLDERS

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□ _____

□ _____

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2. Situation assessment

For example, some ideas include the following:

- Conduct an inventory of manufacture, trade and use of dental amalgam, or otherwise obtain available data on manufacture, trade and use, as needed
- Assess and confirm availability of mercury-free dental restorative material fillings (i.e., composites and glass ionomers)
- Identify opportunities for application of minimally invasive dentistry and atraumatic restorative treatment in dentistry
- Assess existing institutional capacity to support activities to avoid dental amalgam in children, including information on the availability of mercury-free dental restorative filling materials, dental colleges, trade monitoring, enforcement measures, etc.
- Assess challenges and opportunities for balancing dental insurance schemes
- Conduct a legal gap analysis for developing legislation/guidance to codify or otherwise avoid dental amalgam use in children
- Formulate recommendations for implementation of activities to avoid dental amalgam use in children

DESCRIBE POSSIBLE STEPS TO ASSESS THE SITUATION

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□ _____

□ _____

□ _____

3. Capacity building and related measures

For example, some ideas include the following:

- Create an information platform as needed to implement avoid dental amalgam use in children
- Develop a program for necessary training of key stakeholders (e.g. dentists, customs, government purchasing officers)
- Identify target groups for strategy implementation (e.g. dentists, parents, pregnant women) and carry out hazard and risk communication initiatives (e.g. brochures, letters, meetings)

- Foster data gathering, management and information sharing on mercury-free dental restorative filling materials
- Encourage collaboration with dental schools in training students to use mercury-free dental restorative filling materials

DESCRIBE POSSIBLE STEPS TO ADDRESS CAPACITY BUILDING

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- _____
- _____
- _____

4. Key project deliverables

For example, some ideas include the following:

- Definition of roles and responsibilities of relevant ministries to avoid dental amalgam use in children
- Development of dental school curriculum to ensure dentists are trained in the use of mercury-free dental restorative materials, and that they are aware of the need to avoid the use of dental amalgam in children
- Identification of new legal authorities as needed, reflecting the implementation responsibilities for each of the relevant ministries
- Identification of target populations for hazard and risk communication initiatives (e.g. dentists, parents, pregnant women, schools)
- Agreement among key stakeholders on key roles and responsibilities for delivery of the above including a schedule, targets and measurable indicators

DESCRIBE POSSIBLE STEPS TO DEVELOP PROJECT DELIVERABLES

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- _____
- _____
- _____
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APPENDIX VI – Workshop participants

Promoting Dental Amalgam Phase Down Measures Under the Minamata Convention and Other Initiatives, For "Especially Women, Children, and, Through Them, Future Generations"

14 & 15 May 2018, Bangkok, Thailand

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