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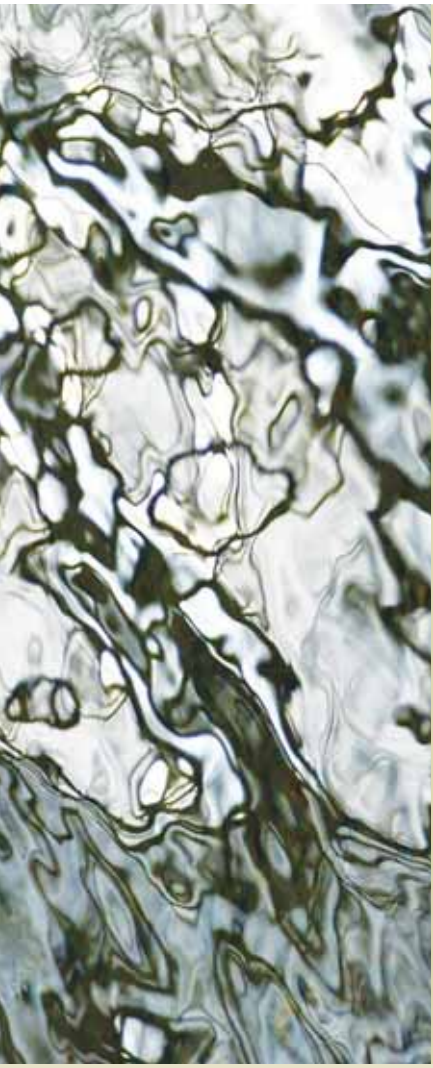

PROMOTING THE PHASE DOWN OF DENTAL AMALGAM IN DEVELOPING COUNTRIES

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We wish to thank our partners and all stakeholders who contributed to the implementation of the East Africa Dental Amalgam Phase-Down Project (EADAP).

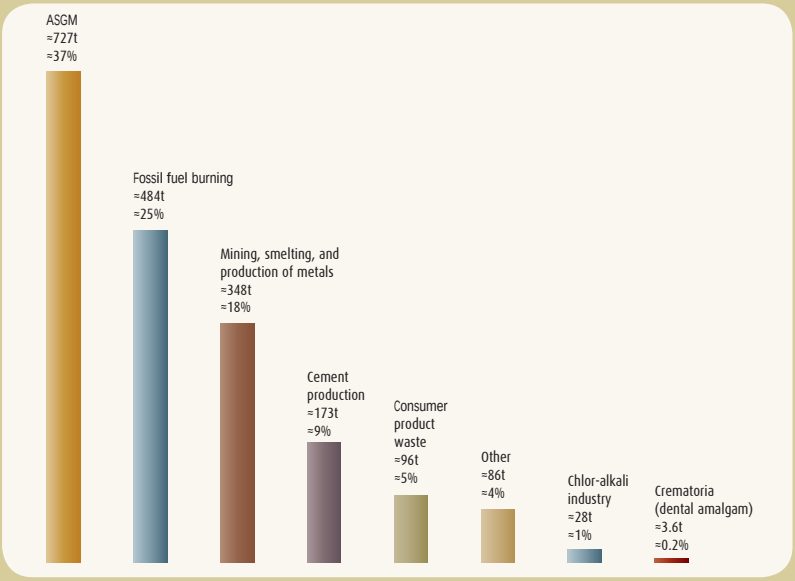
WHAT IS DENTAL AMALGAM?

Dental amalgam is a combination of metals, about 50 per cent of mercury in elemental form and the other metals being silver, tin, copper, and other trace metals. It has been used in the last 150 years for dental restoration due to its mechanical properties and the long term familiarity of dentists with its use.

(UNEP and WHO, 2008)

The UNEP Global Mercury Assessment Report 2013 revealed that emissions from cremation of the dead having dental amalgam accounts for 3.6 metric tonnes or 0.2 per cent of total global anthropogenic emissions.

Global anthropogenic atmospheric emissions



Source: UNEP, Global Mercury Assessment, 2013.

DENTAL MERCURY RELEASES TO WATER, SOIL AND AIR

A significant source of mercury pollution, dental amalgam is:

- often the largest source of mercury in municipal wastewater
- in the soil via wastewater sludge, land disposal and the burial of deceased persons with dental fillings
- an increasing source of mercury air pollution from wastewater sludge incineration and crematoria (due both to the rise in cremation and the increasing percentage of amalgam retained in the teeth of the deceased

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

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

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

CHALLENGES RELATED TO DENTAL MERCURY

Trade in dental mercury

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

> Trade databases have no specific code for dental amalgam; trade data may be included in different categories
> Some dental amalgam are mixed by hand, others are used in form of capsules
> Few countries specifically track dental mercury use

The real cost of dental mercury

> Dental amalgam is cheaper for the patient
> Negative externalities (impact on the evironment) associated with the use of dental amalgam are not factored in the actual price of dental amalgam restorations
> Phasing-down yields environmental and health benefits

(Source: EU- DG ENV, BIO Intelligence Service. *Study on the potential of reducing mercury pollution in the environment*, March 2012. Available at: http://ec.europa.eu/environment/chemicals/mercury/pdf/BIO_Draft%20final%20report.pdf)

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The environmental impacts of dental amalgam can be sustainably avoided by phasing down the use of dental amalgam as a restorative material and switching to quality mercury-free alternatives.

WHO-UNEP EXPERT GROUP MEETING ON DENTAL RESTORATIVE MATERIALS

WHO, in cooperation with UNEP, organized an Expert Group meeting in Geneva on the "Future Use of Materials for Dental Restoration", from 16-17 November 2009. At the meeting, the value of a global "phase down" of dental mercury use worldwide was recognized. UNEP and WHO are initiating demonstration projects to phase down dental amalgam in different regions of the world.

The following priorities were identified:

- Focus on strengthening oral health promotion and disease prevention
- "Phasing down", instead of "phasing out"
- Research and development of quality alternative materials
- Environmentally sound management of waste in dental clinics
- Promotion of measures to reduce releases during trade and supply as well as from dental clinics
- Strengthening the awareness of the general public to dental amalgam alternatives
- Training dental professionals in the use of alternatives

The first project – the East Africa Dental Amalgam Phase-Down Project (EADAP) – focused on three countries: Kenya, Tanzania and Uganda.

EAST AFRICA DENTAL AMALGAM PHASE-DOWN PROJECT

The East Africa Dental Amalgam Phase-Down Project (EADAP) was implemented in Kenya, Uganda, and Tanzania. Its aim was to demonstrate the phase-down approach of dental amalgam use. Under the coordination of UNEP Chemicals and the WHO Oral Health Programme, the project brought together a variety of stakeholders and was finalised in December 2013.

The collaborative project engaged the Ministries of Environment and Health in Kenya, Tanzania and Uganda, as well as the iLima (an African NGO), the World Dental Federation (FDI), the International Association of Dental Manufacturers (IDM) and National Dental Associations. The project also examined supply and trade patterns, raised awareness of preventive dental care, encouraged alternatives and promoted environmentally sound waste management practices. The findings are useful for other countries aiming to phase down the use of dental amalgam.

PROJECT COMPONENTS AND ACTIVITIES

Trade study and survey of dental amalgam waste management practices

Selection of national project coordinator and social preparation

Development of awareness raising materials on disease prevention and available alternatives for dental restoration

Inception workshop

Demonstration activities

Results workshop

- Investigation of trade flows of dental restorative materials and supply of dental amalgam and materials alternative to dental amalgam and distribution systems

- Participation of national and local governments, civil society representatives and other stakeholders

- Development of awareness raising materials led by WHO Oral Health programme, in partnership with a WHO Collaborating Centre for Community Oral Health Programmes and Research in Copenhagen

- Validation of data on supply and trade and information on current waste management practices
- Confirmation of project design and demonstration activities in the context of the phase down approach

- Implementation of country-level activities by the national project coordinators

- Presentation of project results and discussion on ways to expand to other clinics and countries
- Discussion of lessons learned and dissemination to other developing countries, defining further the phase down approach

MAJOR ACTIVITIES

Major activities were conducted in three pilot dental clinics (one private, one government, one teaching institution/university). The following are some examples of these activities:

- EADAP-iLima Survey on the Use and Management of Dental Amalgam in Kenya, Tanzania, and Uganda
- EADAP- Training of Trainers by World Dental Federation (FDI), Kampala Uganda
- EADAP Installation of Dental Amalgam Separators by the International Dental Manufacturers (IDM) in Kenya, Tanzania and Uganda
- Creation of flyers and posters to raise awareness on dental amalgam and its impact on the environment by UNEP and WHO. These provided information to the Ministry of Health/Chief Dental Officers, National Dental Association, dentists and patients

Photos: UNEP

Capacity building/Training activities

Topics covered

- Mercury life cycle and impacts
- UNEP Global Mercury Partnership and the Minamata Convention
- Best management practices (BMP) on dental amalgam usage and environmentally sound waste management (ESM) as well as a practical demonstration
- Alternative materials for dental restoration
- Clinical demonstration with patients
- Clinical preventive dentistry
- Action planning/ next steps in the EADAP project

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Further references:

UNEP. *Summary of Supply, Trade, and Demand Information on Mercury*. Geneva, November 2006. Available at: http://www.unep.org/hazardoussubstances/LinkClick.aspx?fileticket=3JANdK_QmP0%3d&tabid=3593&language=en-US

PROJECT OUTPUTS

The survey revealed the following results:*

	KENYA	TANZANIA
DENTAL RESTORATION MATERIALS		
Use of dental amalgam	50% use dental amalgam, with 92% using the encapsulated form	80% use dental amalgam
Use of alternatives	Some use resin composite, glass ionomers, compomers and ceramics	
SURVEY OF MANAGEMENT OF WASTE (ESM)		
	– 80% of dentists are aware of BMP – 40% apply BMP	
Best management practices* (BMP)	– 44% practice segregation by putting amalgam waste in separate containers – 10% use amalgam separators – 20% of dentists have written plans for disposal	The most common form of disposal is by mixing with general waste (47%) followed by storage in separate containers (20%), and then by hazardous waste (13%) – 20% segregate dental amalgam waste from the rest of clinic waste – 10% use amalgam separators – All had no waste disposal plans
Remarks and recommendations:	Respondents are aware of the implications of the use of dental amalgam. At the same tim about the potential toxicity of composites (bisphenol A) – There is urgent need for continuous training of dentists and all clinic personnel on BMP – Recycling facilities do not exist in the three countries, so there is urgent need for further providers based in Africa	
SUPPLY AND TRADE		
	– All traders surveyed supply both encapsulated and liquid mercury as well as alternatives to dental amalgam – Traders report that dentists still demand for amalgam	– No traders were identified – Supplies of dental restoration materials are from the Ministry of Health and universities
Remarks and recommendations:	– Governments need to regulate supply (importation) of dental amalgam – Partnering with Food and Drug Authorities and Revenues Authorities are recommended to suppliers and traders	

[1] Best management practices include, side chair traps, amalgam separators, waste labelling and proper collection

National trade and waste validation surveys were held. The target of the survey were: Kenya: 25 dentists and 9 traders; Tanzania: 15 dentists; Uganda: 50 dentists and 10 traders.

UGANDA
82% use dental amalgam, with 50% still using elemental mercury
– Only 5% practice segregation (i.e. putting empty capsules in separate containers) – 48% dispose in the biohazard waste – 14% dispose in general waste – Not a single respondent had an amalgam separator
e, one dentist was also concerned
and ESM of dental amalgam waste investigation on potential service
– Suppliers of dental restoration materials are from China (6), UK (2), USA (2), Australia (4), Iran (1), Turkey (1), Germany (1) and India (2) – There is demand for both encapsulated amalgam and non-amalgam
improve data collection from

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*For further information, please visit: www.unep.org/chemicalsandwaste/

PROJECT OUTPUTS (CONTINUED)

	KENYA	TANZANIA
CAPACITY BUILDING/ TRAINING ACTIVITIES		
Dentists, dental assistants, Ministries of Health, dental students, waste management personnel and administrators were trained	– 79 dental personnel were trained from August to September 2013	– 37 dental personnel were trained from mid-April to end of May 2013 – Certain issues related to the strength and longevity of alternative dental materials in comparison to amalgam raised concern among many practicing dentists – The use of hypochlorite solution in separators needs better alternatives
Remarks and recommendations:	– As amalgam separators are expensive, it may take time before the hospitals include them – There is a need to continue raising awareness to all Dental practitioners on effects of me – In all three countries, the project increased awareness of stakeholders on the Minamata Co mechanisms upon entry into force	
ENVIRONMENTALLY SOUND MANAGEMENT OF WASTE		
Legislation	– Existing Kenya legislation (National Solid Waste Policy 2007) on ESM of waste needs to add paragraph on BMP of dental amalgam waste – National Injection Safety (IS) and Related Medical Waste Management (RMWM) policy 2007 – National Environmental Management Authority (NEMA) Regulations made udner the Environmental Management Coordination Act (EMCA) No. 8, 1999	– National Environment Policy of 2007 – Environment Management Act of 2004
Hazardous waste treatment facility	– Of the licensed waste companies, 41% handle general waste whereas 27% handle medical waste – Other than incineration, most of the waste in Nairobi are brought to the Dandora Municipal Dump site	– There are no hazardous waste treatment facilities in Tanzania – 80-90% of solid waste generated in urban areas are not collected – Domestic waste, which accounts for 60% of total solid waste generated daily, is disposed of by burning or burying. The remaining waste ends up in the environment in unacceptable ways – There is a mix of domestic and hazardous waste, and all are dumped in Pugu Miganwezi

In all pilot dental clinics, dental amalgam separators (1 big, 2 small) were installed. Training demonstration on proper waste segregation, collection and storage were provided.

UGANDA
– 80 dental personnel were trained from June to July 2013 – A post-training evaluation showed positive effect on the participants by increasing awareness on dental amalgam phase down
in their budgets rcury and use of alternative dental materials onvention that includes Article 13 on financing
– Existing environmental regulations and standards
– NEMA licensed hazardous waste handlers – There is an engineered landfill at Nakasongola (owned by the Ministry of Defence) which has been improved to incinerate and landfill hazardous waste – Private hazardous waste management companies (such as Envirosery Uganda Limited) are licensed to handle oil and gas waste

UN Photo/Cahail

PROJECT OUTPUTS (CONTINUED)

	KENYA	TANZANIA
ENVIRONMENTALLY SOUND MANAGEMENT OF WASTE (CONTINUED)		
Remarks and recommendations: – All countries recommended the installation of amalgam separators as a requirement for t		
Future plans	– Add paragraph on BMP of dental amalgam waste in the existing implementing rules and regulations of the National Solid Waste Management Act – Engage licensed medical waste management companies to include dental amalgam waste	– The National Environment Management Council prepared a proposal to fund a hazardous treatment facility – Dar es Salaam City Council plans to provide and develop environmentally sound storage/ disposal sites for hazardous waste including mercury waste; – Explore the possibility of utilizing existing international companies that deal with recovery and recycling of mercury waste; – Encourage waste segregation at source of generation

UN Photo/AF

UGANDA
he Ministry of Health licensing of dental clinics
– Develop guidelines for handling mercury waste – Continue the collaboration with MOH/UDA to influence attitude change by the dentists – NEMA/MOH to identify the local waste management company. – Coordinate ESM activities, specifically concerning the > identification of the waste handler used by MOH; and > identification of waste handler licensed by NEMA

Dental amalgam phase down is possible in developing countries by:

- Creating awareness on the environmental risks of dental amalgam
- Promoting alternatives for dental amalgam in dental restoration when clinically indicated
- Building capacities of dentists on oral health promotion and disease prevention
- Supporting best management practices and environmentally sound management of waste
- Ensuring regulatory framework and legislation are in place
- Encouraging waste collection separation and use of facilities for hazardous waste storage and treatment

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