World Health Organization

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REQUEST FOR PROPOSALS:

Evidence-based knowledge on clinical effectiveness, costs and toxicological, ecotoxicological and safety information of mercury-free dental materials used in caries management.

A series of rapid reviews of systematic reviews and/or primary studies

1. Introduction

This request for proposals (RFP) is made by the World Health Organization's (WHO) Oral Health Programme. The programme seeks proposals to determine the level of evidence-based knowledge on the clinical effectiveness, cost-effectiveness and safety of mercury-free dental materials used for the prevention (e.g. professionally-applied topical fluorides, fissure sealants, etc.) and control of dental caries (e.g. caries arresting agents, restorations, etc.). The work will identify their potential health risks for patients and health personnel and environmental impact (including material sourcing, manufacturing, distribution, clinical use, and waste management aspects associated with such materials). The resulting evidence will inform, guide and be incorporated into the new technical guidance on "environmentally friendly and less-invasive dentistry" aimed at supporting countries with their implementation of the Minamata Convention on Mercury.

2. Background

The environmental impact of the oral health care system is a great concern, as shown in the Minamata Convention on Mercury, a global treaty that requires, *inter alia*, parties to implement measures to phase down the use of dental amalgam, which contains 50% mercury. Building better and more climate-resilient and environmentally sustainable health systems is part of the WHO's response to the challenges of climate change while contributing to broader environmental sustainability goals.

The provisions related to dental amalgam, as amended by the fourth and fifth meetings of the Conference of the Parties, are detailed in Annex A Part II of the Minamata Convention on Mercury. Implementing the Convention's provisions for dental amalgam needs a thorough understanding of their quality mercury-free alternatives. In that regard, Article 17 of the Convention on Information Exchange requests parties "to facilitate the exchange of (a) scientific, technical, economic and legal information concerning mercury and mercury compounds, including toxicological, ecotoxicological and safety information" and "(c) information on the health and environmental risks of technically and economically viable alternatives to mercury-added products".

WHO is mandated by Member States, through two World Health Assembly resolutions (WHA67.11 and WHA74.5) to support countries in the implementation of the Minamata Convention on Mercury. The WHO Global Oral health Action Plan 2023-2030[1] has set specific targets and/or actions to phase down the use of dental amalgam in its strategic objective 1- oral health governance and strategic objective 4 - oral health care. This is further reinforced through ongoing work by WHO to mobilize political action towards universal health coverage (UHC) for oral health, grounded on several guiding principles including a 'public health approach to oral health' which focuses on dental caries prevention and health promotion, thereby minimizing the

[1] WHO Global Oral health Action Plan 2023-2030: https://www.who.int/publications/m/item/draft-global-oral-health-action-plan-(2023-2030)

need for dental restorations, in alignment with the first measure of Annex A Part II of the Minamata Convention.

Enhanced information sharing on the characteristics of dental materials, their selection and use to prevent, control and treat dental caries is a key step in phasing down the use of dental amalgam. The 2009 WHO report on the Future Use of Materials for Dental Restoration acknowledges that non-mercury alternative materials could be used to treat and manage caries, and thus, they include more than those conventionally classed as tooth filling materials (i.e. dental amalgam, glass ionomer cement, and resin-based composites). Fluoride, glass ionomer cements and 38% silver diamine fluoride were added to the WHO model list of essential medicines in 2021. Moreover, resin-based composites (low-viscosity and high-viscosity) were also added to the list in 2023.

In collaboration with the United Nations Environment Programme, WHO is executing a Global Environment Facility (GEF)-funded project entitled "Accelerate implementation of dental amalgam provisions and strengthen country capacities in the environmentally sound management of associated wastes under the Minamata Convention" (GEF7 Phasing Down Dental Amalgam project). The project will seize relevant opportunities to disseminate results and make recommendations on how to phase down dental amalgam and properly manage its associated wastes. As part of this project, and in response to the WHA 74.5 resolution on oral health, WHO is requested to develop a "technical guidance on environmentally friendly and less-invasive dentistry to support countries with their implementation of the Minamata Convention on Mercury, including supporting preventative programmes". The technical guidance will be based on the previous 2009 WHO guidance Future Use of Materials for Dental Restoration. The content update will include the latest evidence available on health risks and environmental impact from the use of dental materials through rapid reviews of existing literature, key findings from the GEF7 Phasing Down Dental Amalgam project, and input received as part of a global consultation process with a technical working group of independent experts.

The objectives and potential content outline for the technical guidance are provided below.

Objectives of the technical guidance:

- Present clinical effectiveness, cost-effectiveness, toxicological, ecotoxicological and safety information of mercury-free dental materials used in the prevention and control of dental caries in an environmentally sustainable manner.
- Provide the most recent information and findings for the selection and use of materials for the prevention and control of dental caries, with a focus to promote preventive regimes, mercury-free materials and minimal intervention procedures.
- Identify the role, contribution and responsibilities of industry in the supply chain activities (material sourcing, manufacturing and distribution) and support to oral healthcare in respect of environmentally sustainable materials.
- Share best waste management practices of materials used and materials replaced in oral healthcare facilities, including technical options and business models for dental waste management over the long term.
- Share cost-effective preventative programmes for dental caries at health care facilities level.

Technical guidance potential content outline (subject to change):

- Background and rationale
- Introduction
- Purpose and objectives of technical guidance
- Types of dental materials for the prevention and control of dental caries (including strengths and weaknesses, restoration longevity, biological/toxicological, ecotoxicological and safety information, financial/economic aspects, logistic aspects of implementation)
- Best waste management practices of materials used and materials replaced in oral healthcare facilities
- Training of oral health personnel and other health care workers (i.e. primary care teams, nurses, midwives, paediatricians, medical doctors, pharmacists, etc.)
- Implications for future research
- Perspectives towards a safe and environmentally sound oral health care system to achieve UHC for all by 2030 and contribute to the sustainable development goals
- Annex: Case studies on effective measures to phase down the use of dental amalgam (success stories from GEF 7 Phasing Down Dental Amalgam).

3. Objective

The objective of this work is to undertake a series of rapid reviews* of systematic reviews and/or primary studies to establish the existing knowledge base on clinical effectiveness, cost-effectiveness and toxicological, ecotoxicological and safety information of mercury-free dental materials for the prevention (e.g. professionally-applied topical fluorides, fissure sealants, etc.) and control of dental caries (e.g. caries arresting agents, restorations, etc.). The rapid reviews will identify the potential health risks to patients and health personnel and the environmental impacts associated with material sourcing, manufacturing, distribution, clinical use and waste management of mercury-free dental materials.

The series of rapid reviews will identify and synthesise the best available evidence to answer the research questions listed below. They will identify and synthesise recent, relevant systematic reviews addressing these research questions in the first instance and will be expanded to include primary studies in research areas where no systematic review is identified.

(1) What is the clinical effectiveness (longevity and annual failure rate, or equivalent outcome measure) and cost-effectiveness of mercury-free dental materials used for caries prevention and control?

(2) What is the cytotoxicity and biocompatibility of mercury-free dental materials or their chemical compounds (monomers, nanoparticles, etc)?

(3) To what extent are substances (such as residual monomers and nanoparticles) released from mercury-free dental materials into the oral environment (due to residual release or intra-oral degradation)?

(4) What are the health effects (e.g. organ, system, physical and psychosocial function) of mercury-free dental materials on patients and health personnel?

(5) What are the environmental effects (e.g. on water, air, land and wildlife) associated with the manufacturing, distribution, clinical care use and waste management of mercury-free dental materials?

** For the purposes of this RFP, a rapid review is defined as a form of evidence synthesis that is produced using accelerated or modified systematic review method. It retains the core values shared by the evidence synthesis community, including thoughtful scoping and formulation of the review questions; systematic search of the literature; transparency; replicability; careful assessment of the quality of the information incorporated into the review; efforts to minimize bias at every stage; and the clear presentation of information focused on the intended users' needs.*

4. Proposal submission

The following sections and components should be included within the submission (maximum of 5 pages to cover items i to v):

(i) Scope: A detailed description of the scope undertaken, covering the research questions presented in section 3.

(ii) Approach and anticipated challenges: Proposed approach and justification related to literature searches including grey literature, data extraction and analysis, and methods for performing the rapid reviews. Anticipated challenges for this particular project regarding time, organization, and management and how the research team proposes to meet those challenges.

(iii) Organization: Proposed project organization/plan including participating institutions, researchers and their roles and responsibilities.

(iv) Budget: Proposed budget with a breakdown by staff and non-staff costs: staff costs should be presented by staff days by work stream, institution, researcher, etc.

(v) Timeline: Proposed timeline including milestones, deliverables and payment schedule.

(vi) Declaration: Declaration of conflicts of interest for all personnel (see form enclosed).

(vii) Biographies: A short biography for each core team member including relevant experience and the institution being represented. If applicable, please also include a signed cover letter from an institutional official supporting the submission.

5. Deliverables

Once selected, the responsible organization will be expected to submit:

1. A rapid review strategy within 4 weeks of the agreement signature. This should be accompanied by confirmation of protocol registration in PROSPERO.

2. An interim report with the preliminary results of the rapid reviews and their interpretation within 3 months of agreement signature.

3. A final product within 4 months of agreement signature including:

(a) Tables of evidence reflecting extracted data from literature searches.
(b) A summary of evidence using the GRADE quality ranking.

After submitting the above deliverables, the responsible organization is expected to prepare manuscript(s) and submit them for publication in peer-reviewed journals. The manuscript(s) must be approved and co-authored by the WHO team. The responsible organization is expected to respond to reviewers' comments and make the corresponding revisions to the manuscript(s).

WHO reserves all rights to the above-mentioned deliverables including the right to (a) alter them (b) use them or (c) not use them.

6. Eligibility

They will be selected on the basis of:

- ✓ Experience of the principal investigator and the team's expertise conducting and disseminating similar systematic reviews.
- ✓ Methodological rigor of their proposed approach, including feasibility of timelines.
- ✓ Proposed budget/overall value of the project.
- ✓ Demonstrated knowledge and previous expertise related to dental materials for caries management are desirable.
- ✓ Proposed timelines. The ability to complete the work within 6 months of signing the official contract will be considered favourably.

Applicants are expected to disclose any possible conflict of interest capable of influencing their judgments, including personal, political, proprietary, family, academic and financial. A WHO disclosure form for Declaration Conflict of Interest must be completed by all named persons on the research team and submitted with the RFP application.

Upon receipt, WHO Oral Health Programme will screen all applications for completeness and for compliance with the parameters of this competition. WHO Oral Health Programme will rank complete and compliant applications based on the mentioned evaluation criteria.

Final authority on funding approval rests with the WHO Secretariat. WHO will notify the successful applicants directly. WHO is unable to provide individual feedback on unsuccessful applications.

7. How to Apply

Proposals must be submitted by email as an electronic version to Dr Benoit Varenne at varenneb@who.int and to Dr Gabriela Sardon Panta at sardong@who.int. Electronic submission must be received by **5 pm (Geneva time)** on **8 March 2024** and, should include **«Series of rapid reviews of systematic reviews and/or primary studies on mercury-free dental materials used in caries management»** in the subject line. Proposals that are incomplete, or received after the due date, will not be reviewed.