

# Future Use of Materials for Dental Restoration



World Health  
Organization

# **Future Use of Materials for Dental Restoration**

**Report of the meeting convened at WHO HQ,  
Geneva, Switzerland**

**16th to 17th November 2009**



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## **Executive summary**

Dental caries is a major public health problem globally. Despite much effort in health promotion and disease prevention, dental restorations are still needed. Dental amalgam, a restorative material that contains mercury, has been widely used for some 150 years. In the past decades, the awareness and recognition of the environmental implications of mercury have increased and alternative filling materials have become increasingly more popular.

Jointly with the World Health Organization (WHO), the United Nations Environment Programme (UNEP) has strengthened the work to reduce risks to human health and the environment from the use and release of mercury. UNEP is supporting the work of the Intergovernmental Negotiating Committee established to elaborate a legally binding instrument on mercury. The mandate of this committee is set out in UNEP Governing Council decision 25/5. In seeking to reduce mercury use and release, the treaty may have implications on the delivery of oral health care worldwide.

On this background, the WHO Global Oral Health Programme - in cooperation with UNEP Chemicals - organized a two-day meeting to discuss the implications and the way forward. The aim of the meeting was to assess the scientific evidence available on dental restorative materials and the implications to countries of using alternatives to amalgam for dental restorative care.

Twenty-nine participants from 15 countries of all 6 WHO regions attended the meeting, representing international oral health researchers, scientists, university academics, WHO CCs, ministries of health, Non-Governmental Organizations (NGOs), dental professionals, and UNEP. Following opening statements from Dr Ala Alwan, Assistant Director General, Non-communicable Diseases and Mental Health and Mr Per Bakken, Director, UNEP Chemicals, Dr Poul Erik Petersen outlined the scope, purpose, objectives and structure of the meeting. This was followed by a number of presentations and discussions. Day One discussed the availability of different restorative materials, and their advantages and disadvantages in dental care. Experiences from both developed and developing countries of all WHO regions were shared in Day Two, which highlighted the implications for oral healthcare and future challenges.

The meeting considered the importance of strengthening oral health promotion and disease prevention as the strategy to reduce the use of restorative dental materials. In case of tooth decay, the best care possible should be provided to meet patients' needs. The meeting recognized the variation in dental practice between countries and the challenges faced by middle- and low-income countries providing dental care. This will likely result in different approaches to dental caries management in countries that need to be considered in oral health policy, development and planning

of public health programmes. Implications for training of dental personnel and costs to society as well as the individual are significant.

The meeting noted that only a few countries had phased out the use of amalgam. If not existing, other countries require systems for waste management to prevent release of mercury to the environment.

In several countries dental amalgam is still widely used. The choice of materials for dental caries management in these countries depends on a number of factors such as: the tooth, site and size of the caries lesion, as well as healthcare provision and financing, patient preference, health care provider preference, technology, cost and environmental factors. Following a review of existing evidence and much deliberation, the meeting recognized the huge challenges faced in dental restoration, disease prevention and oral health promotion globally. As a result, the meeting considered that all currently existing methods and materials to manage dental caries would need to remain available to the dental profession in the short- and medium-terms.

Furthermore, the meeting noted that while alternative dental restorative materials are desirable from an environmental health perspective, a progressive move away from dental amalgam would be dependent on adequate quality of these materials. Existing alternative dental materials are not ideal due to limitation in durability, fracture resistance, and wear resistance. Therefore, the meeting recognized the need for strengthening of research into the long-term performance, possible adverse effects, and viability of such materials.

It may be prudent to consider ‘phasing down’ instead of ‘phasing out’ of dental amalgam at this stage. A multi-pronged approach with short-, medium- and long-term strategies should be considered. Alternatives to dental amalgam exist but the quality of such materials needs to be further improved for use in public health care. The meeting suggested important strategies that can be put in place while waiting for new materials to be developed. The role of WHO, UNEP, NGOs such as the International Association for Dental Research (IADR) and the World Dental Federation (FDI), user groups and the industry is critical. A further meeting must be convened to discuss the way forward and to develop strategies to address issues in both developed and developing countries.

# 1. Introduction

## 1.1 The global burden of dental caries

Dental caries (tooth decay) has historically been considered the most important component of the global oral disease burden. Dental caries is still a major public health problem in most high income countries as the disease affects 60-90% of school-aged children and the vast majority of adults. At present, the distribution and severity of dental caries vary in different parts of the world and within the same region or country (1-4). For the permanent dentition, the severity of dental caries is measured by the Decayed, Missing and Filled Teeth index (DMFT). According to the WHO Global Oral Health Data Bank (5), the global dental caries index among children aged 12 years is 1.6 teeth on average, however, there are marked differences in severity amongst regions. The disease level in children of this age is relatively high in the Americas and in the European region; the index is somewhat lower among children of the Eastern Mediterranean and Western Pacific regions, while at the moment dental caries is less severe in South East Asia and in the African region. The WHO Global Oral Health Data Bank also provides information on the time trends in dental caries experience of children. In most low and middle income countries, dental caries levels were low until recent years while dental caries prevalence rates and dental caries experience have tended to increase rapidly with changing lifestyles and growing consumption of sugars, inadequate exposures to fluoride, and lack of national programmes for prevention of oral disease (1,3). In contrast, a caries decline has been observed in most high income countries over the past 20 years or so. This pattern is seen as the result of a number of public health measures, including effective use of fluoride, coupled with changing living conditions, lifestyles and improved self-care practices, and establishment of school oral health programmes (1,3).

Worldwide, dental caries prevalence is high among adults as the disease affects nearly 100% of the population in the majority of countries (1,3). Most high income countries and some countries of Latin America show high DMFT values (1-3).

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