



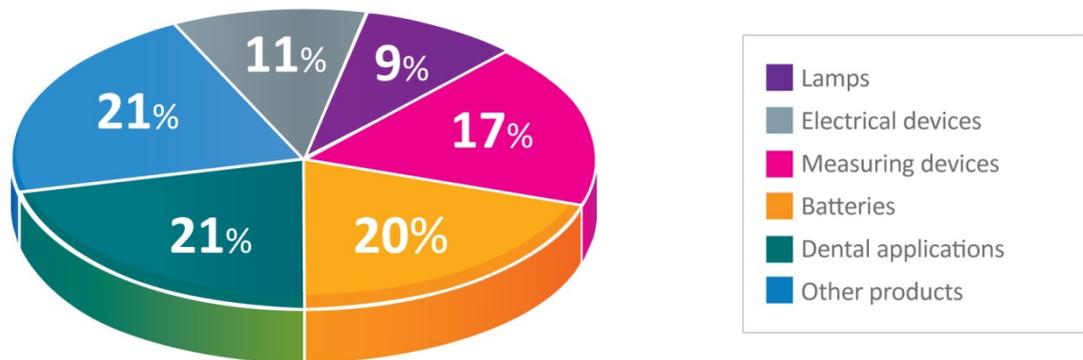
## 4h. *How to*: Minimise the environmental impact from disposal of Dental Amalgam

### Why is it important?

The Minamata Treaty aims to reduce the release of mercury into the environment and for dentistry, this involves the phasing out of amalgam use. Mercury can be neurotoxic and teratogenic, it can accumulate as it rises through the food chain and it can also impact the microbiological activity in soil.

#### Mercury consumption in products, by product category (2010)

Source: AMAP/UNEP 2013



The EU's mercury regulation has the same aim for the territory of the European union, with both documents prescribing a phase-down of the use of dental amalgam for environmental reasons, in line with the domestic circumstances of each country and in tandem with recommendations for prevention programmes and increased research into alternative materials (BDA, 2018).

'Best management practices for the handling and disposal of waste amalgam include the use of chair-side traps, amalgam separators compliant with iso.11143, inspecting and cleaning traps, and using a commercial waste service to recycle or dispose of the amalgam collected. Dental practices in the UK are required by law to use amalgam separators. These have been shown to reduce the amount of mercury in wastewater by 90% in comparison to practices not using separators,' (Mulligan, 2018).

The environmental impacts of alternative dental restoration materials have yet to be fully explored.



## What does sustainable practice look like?

### Real life example

Amalgam was banned as a dental restorative material in Norway in 2008 due to environmental considerations. An electronic questionnaire was sent to all dentists in the member register of the Norwegian Dental Association (NTF) one year later, to evaluate dentists' satisfaction with alternative restorative materials and to explore dentists' treatment choices of fractured amalgam restorations.

Replies were obtained from 61.3%. Composite was the preferred restorative material among 99.1% of the dentists. Secondary caries was the most commonly reported cause of failure (72.7%), followed by restoration fractures (25.1%). Longevity of Class II restorations was estimated to be  $\geq 10$  years by 45.8% of the dentists, but 71.2% expected even better longevity if the restoration was made with amalgam.

Repair using composite was suggested by 24.9% of the dentists in an amalgam restoration with a fractured cusp. Repair was more often proposed among young dentists ( $p < 0.01$ ), employees in the Public Dental Service (PDS) ( $p < 0.01$ ) and dentists working in counties with low dentist density ( $p = 0.03$ ). There was a tendency towards choosing minimally invasive treatment among dentists who also avoided operative treatment of early approximal lesions ( $p < 0.01$ ).

Norwegian dentists showed positive attitudes towards composite as a restorative material. Most dentists chose minimally- or medium invasive approaches when restoring fractured amalgam restorations.<sup>1</sup>

### Modelled example

Gavin is a dentist at a mixed NHS/dental practice, and has been reading about the changes that are being introduced to dentistry as a consequence of the Minamata treaty. With the phasing down of amalgam, he knows the practice needs to make sure their amalgam is pre-encapsulated and that the amalgam separators meet the standards required in each dental surgery.

Gavin includes a course in posterior composite placement as part of his CPD planning, and plans a further one in inlay and onlay placement for the next year. Currently, Gavin can still use amalgam in many cases but he is aware that amalgam may be phased out by 2030 and that other countries do not use it at all.



## Actions

### KEY:

**Implementation:** Easy = 😊😊😊 Less Easy = 😊

**Investment Cost:** Low = 💰 High = 💰💰💰

**Financial return on Investment (ROI):** Low = 🐷 High = 🐷🐷🐷

**Environmental benefit:** Small = 🌍 Large = 🌍🌍🌍

- Inform patients of policy changes via posters, emails or practice websites 😊😊😊💰🐷🌍
- Dental amalgam is only to be used in pre-dosed encapsulated form (use of bulk mercury is prohibited) 😊😊💰🐷🌍🌍
- Amalgam separators are mandatory 😊💰🐷🌍🌍🌍
- Mandatory retention of at least 95% of amalgam particles for separators installed from Jan 2018, and for all separators by 1 January 2021 😊💰🐷🌍🌍🌍
- Amalgam waste to be collected by authorised waste management company 😊💰💰🐷🌍🌍🌍
- No use of amalgam in the treatment of deciduous teeth, children under 15 years and pregnant or breastfeeding women, except when strictly deemed necessary by the practitioner on the ground of specific medical needs of the patient 😊💰💰🐷🌍🌍



## Resources

### More links:

**The Post-Amalgam Era: Norwegian Dentists' Experiences with Composite Resins and Repair of Defective Amalgam Restorations**

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4847103/>

**BDA Dental Amalgam:**

<https://bda.org/amalgam>

**Lessons From Countries Phasing down Amalgam Use:**

<https://wedocs.unep.org/bitstream/handle/20.500.11822/11624/Dental.Amalgam.10> [mar2016.pages.WEB.pdf?sequence=1&isAllowed=y](https://wedocs.unep.org/bitstream/handle/20.500.11822/11624/Dental.Amalgam.10)

**The environmental impact of dental amalgam and resin-based composite materials**

S.Mulligan, G. Kakonyi, K. Moharamzadeh, S. F. Thornton and N. Martin BRITISH DENTAL JOURNAL | VOLUME 224 NO. 7 | APRIL 13 2018

<https://www.nature.com/articles/sj.bdj.2018.229>

Duane B, Ramasubbu D, Harford S, Steinbach I, Swan J, Croasdale K, Stancliffe R. (in press). Environmental sustainability and waste within the dental practice. British Dental Journal.

**Dental Susnet**, online network for improving the sustainability of dental services:

<https://networks.sustainablehealthcare.org.uk/dental-susnet>

<sup>1</sup>SE. Kopperud, FStaxrud, I Espelid, and A Bjørg Tveit. **The Post-Amalgam Era: Norwegian Dentists' Experiences with Composite Resins and Repair of Defective Amalgam Restorations.** Int J Environ Res Public Health. 2016 Apr; 13(4): 441.