



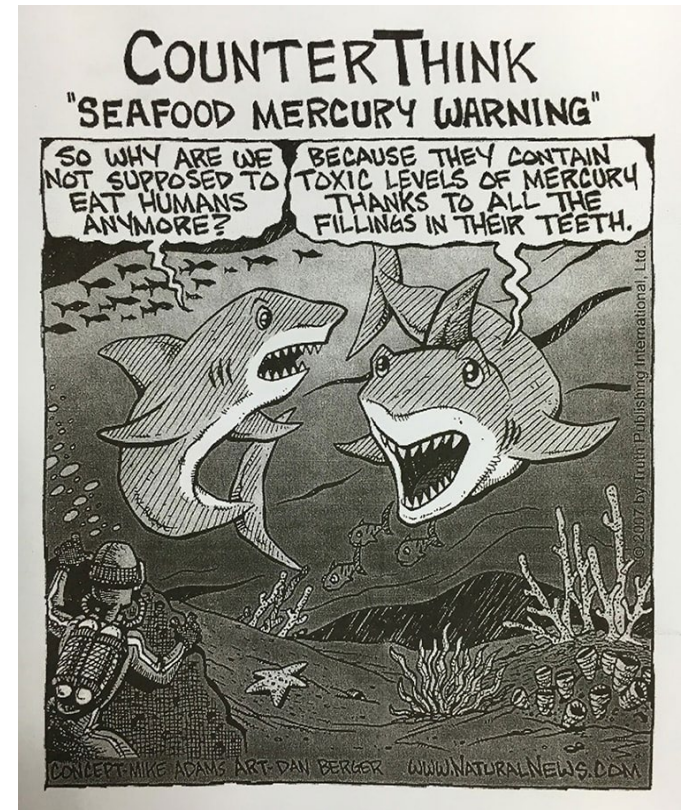
ONE HEALTH & DENTISTRY

Elham Emami



WHY DENTISTRY IMPACTS ONE HEALTH?

- Environmental Contamination
- Climate Impact
- Antimicrobial Resistance



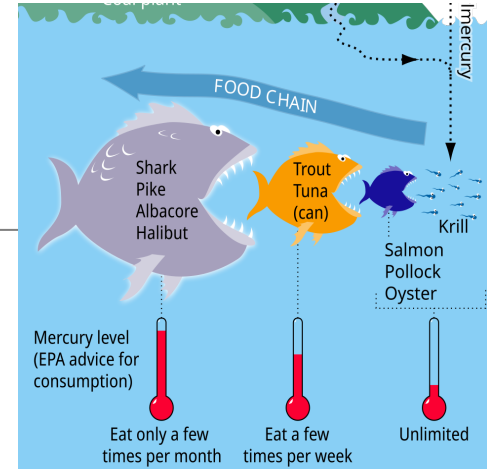
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DENTAL MERCURY POLLUTION

- Dental amalgam accounts for ~10% of global mercury use
- ~50% of restored teeth used amalgam (USA, 2015–2016)
- Mercury released through:
 - **Wastewater:** Released during amalgam placement/removal → enters treatment systems → air & soil contamination
 - **Human waste:** Patients with amalgam excrete ten times more mercury
 - **Cremation & burial:** Mercury released into air or re-deposited into soil
 - **Mercury vapor:** High levels found in air inside and outside dental offices



Briscoe S, et al. Environmental impact of dental amalgam and alternative restorative materials: a systematic review. *BDJ Open*. 2026
Estrich CG, et al. Dental amalgam restorations in nationally representative sample of US population aged ≥15 years: NHANES 2011-2016. *J Public Health Dent*. 2021



DENTAL COMPOSITES, CERAMICS AND METALS

➤ Composite Resins:

- Made from plastics and glass fillers
- Petrochemical-based and non-biodegradable

➤ Ceramics:

- Energy-intensive production and non-biodegradable
- Mining causes habitat damage

➤ Metals

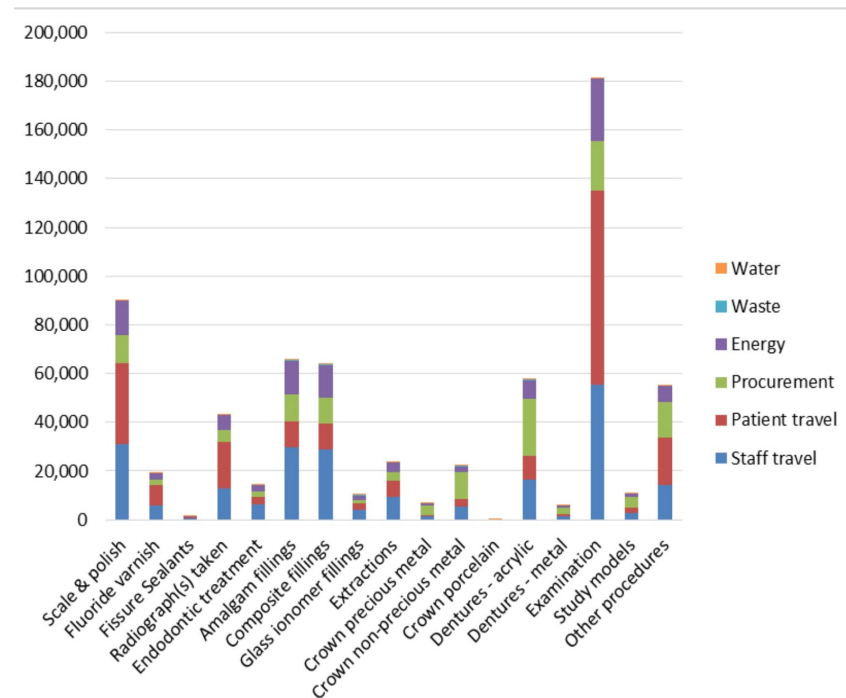
- Mining → deforestation, soil erosion, water contamination
- Refining and processing are highly energy-intensive



Mehta V, et al. Assessing the Environmental Footprint of Dental Materials: A Scoping Review on Pollution and Sustainability. Journal of Applied Dentistry and Oral Sciences. 2025

CARBON FOOTPRINT OF DENTAL CARE

- Dental services:
~3–5.4% of the total healthcare carbon footprint
- In Canada, dental care generated
~1.8 million metric tons of CO₂e



Eckelman MJ, et al. Life cycle environmental emissions and health damages from the Canadian healthcare system: An economic-environmental-epidemiological analysis. PLoS Med. 2018

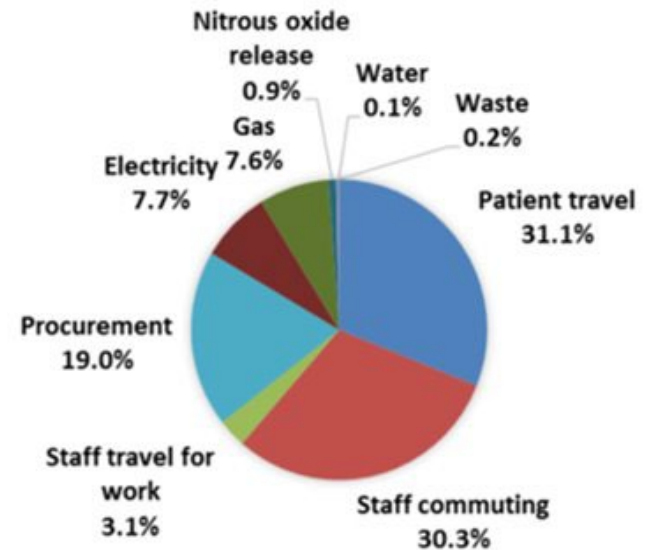
Public Health England, White S, Hurley S. (2018). Carbon modelling within dentistry: towards a sustainable future



MAJOR SOURCES OF DENTAL CARBON EMISSIONS

- Procurement: materials & equipment
- Energy use
- Travel: patients and dental workforce
- In-person dental visits

Total annual carbon footprint of dental services in England – 2013/14



Toreihi N, et al. How do dental professionals perceive sustainable dentistry? A qualitative study. BMC Med Educ. 2025
Public Health England, White S, Hurley S. (2018). Carbon modelling within dentistry: towards a sustainable future



ANTIMICROBIAL RESISTANCE & SYSTEMIC HEALTH

- Oral health has an impact of nutrition, dietary habits, systemic inflammation and microbial biodiversity loss.
- Microbial biodiversity is necessary for maintaining global ecological balance.
- Oral microbiome functions within broader ecological networks, contributing to antimicrobial resistance and impacting systemic health.
- Antimicrobial resistance: 80% of antibiotic prescriptions and prophylaxis are unnecessary.

Curca FR, et al. From Diet to Oral and Periodontal Health: Exploring the Crucial Role of Nutrition-A Narrative Review. Nutrients. 2026
Leydon C, et al. Aligning Environmental Sustainability, Health Outcomes, and Affordability in Diet Quality: A Systematic Review. Advances in Nutrition, 2023
de Carvalho R, et al. The One Health initiative and its importance to oral health. The Journal of the American Dental Association, 2022



ONE HEALTH: PATHWAY TO GREENER DENTISTRY

- Embed One Health principles in dental education and research
- Prioritize prevention and dental public health
- Advance environmentally sustainable dentistry, including waste management and climate mitigation
- Strengthen antimicrobial stewardship
- Leverage digital and e-health solutions
- Promote eco-friendly practices and awareness in dental institutions and communities

Guerra M, et al. Integrating sustainability in dentistry: a pathway towards achieving the UN 2030 agenda. Front Oral Health. 2025