

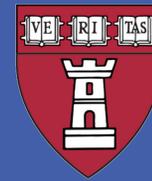
Dental Waste and Environmental Impact: An Urgent Global Issue



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INTRODUCTION

Environmental degradation disproportionately affects vulnerable populations. Dental caries (cavities) are the most common non-communicable disease worldwide, and there is a push to improve global oral health. As oral health initiatives expand, especially in low-middle income countries (LMICs), management of dental waste must be considered as a forethought in order to avoid worsening health disparities.



From 2010-2016, air pollution increased in ~70% of urban centers in LMICs, adversely affecting respiratory and cardiovascular systems¹



~5.25 trillion pieces of plastic float in our oceans² and when ingested by marine life, prompts physiological issues such as liver damage³



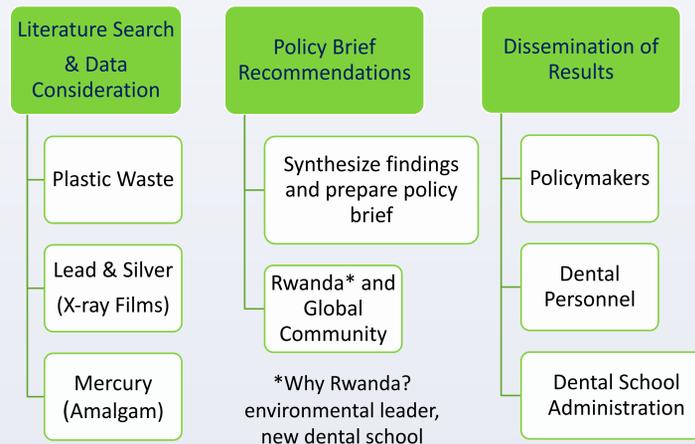
Toxic waste metals (such as mercury, lead and silver) can lead to reproductive toxicity, neurotoxicity, and hypertension⁴

How does dental waste affect environmental health, and what can we do about it?

OBJECTIVES

- Discuss **dentistry's contribution** to global environmental waste of plastic, lead and silver, and mercury
- Review current published literature on dental waste and propose **evidence-based recommendations** regarding management of dental waste
- Pose questions** for next steps and future research

MATERIALS & METHODS



RESULTS

Plastic

- Toothbrushes are not recyclable, and ~23 billion toothbrushes become trash annually⁵
- Burning them releases toxic substances such as Dioxins, which can cause neurological damage⁶
- Discarding them litters the earth, and they can become more harmful by absorbing organic pollutants found in oceans³



- Toothpaste contains plastic microbeads ($\leq 1\text{mm}$) which often escape wastewater treatment plants⁷
- 8 trillion microbeads enter aquatic environments daily,⁷ and cause cellular necrosis, inflammation, and laceration of tissue⁸



- Plastic trash generated in dental offices (patient bibs, disposable cups, headrest covers, suction tips¹²) can represent over 90% of total waste volume of a dental office¹⁵

Lead & Silver

- Dental x-ray films are wrapped in lead foil¹¹
- Lead can also be found in lead aprons and collars^{10,11}



- Undeveloped x-ray films are hazardous due to their silver ion component⁴
- Silver compounds exist in used processing chemicals



- Improperly disposing of lead and/or silver leads to adverse environmental impact.^{10,11}
- Lead and silver cause several health issues, including impaired brain development, carcinogenicity, renal function, and immunological disorders⁴

Mercury

- In the U.S., ~10-70% of mercury loading of many municipal public sewage treatment plants is dental in nature¹²
- In Canada, the practice of dentistry discards ~686 kgs of mercury into wastewater every year¹³
- The toxic effects of mercury are distributed throughout the human body, particularly causing neurotoxic and nephrotoxic effects^{11,14}
- The Minamata Convention on Mercury is a key multi-lateral agreement with a goal of mitigating mercury release into the environment to avoid these harmful effects



FUTURE WORK

We are currently evaluating our findings, synthesizing the information, and developing suggestions. We are focusing on the case study of Rwanda.

Potential areas of policy recommendations may include awareness campaigns, waste disposal protocols, and monitoring. Upstream considerations may focus on packaging and alternative methods.

Our next step is to create a policy brief that will be shared with Rwanda and the global community at large.

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