



## Sink Your Teeth into Sustainability

### GLOBAL IMPACT ARTICLE SERIES

**S**ustainability is a concept that can be applied across all professions, even those that may not immediately come to mind, like dentistry. But how dentists conduct their practices have both environmental and economic sustainability implications. The U.S. Environmental Protection Agency estimates that dental offices are the single largest source of mercury, a potent neurotoxin, at sewage treatment plants. Water treatment removes the mercury from water, but the element can still get into water or air supplies when disposing of sewage sludge.

Mercury waste is clearly a major environmental issue, but not the only one that is endemic to dentists. High use of disposables, like gloves and masks, and other toxic waste materials are also problems. So, what more sustainable solutions are possible and how can they be more widely implemented throughout dental practices? These are the types of questions a U-M Dow Sustainability Fellows team wanted to answer. But sustainability in dentistry has been largely overlooked in the literature of both fields. It's "an issue that needs to be addressed," says Shivani Kamodia, a member of the team and the first dental student to receive the Dow Fellowship. "There's so much work to be done."

The team aimed to address the dearth of data and resources on sustainable dentistry through a three-part study of 1) a review of current sustainable practices in medical and dental facilities, 2) a case study at the U-M School of Dentistry, and 3) a sustainability toolkit for dental clinics that draws on the results of the review and the dentistry case study.

#### THE TRIPLE BOTTOM LINE

One way to examine how different aspects of sustainability can fit together in any business, healthcare or otherwise, is known as the "Triple Bottom Line." This theory is an accounting framework where businesses are encouraged to pay attention not only to profits and losses but also to social and environmental implications. As Tim Hindle explains in *The Economist*, "The triple bottom line consists of three Ps: profit, people, and the planet. It aims to measure the financial, social and environmental performance of the corporation over a period of time. Only a company that produces a triple bottom line is taking account of the full cost involved in doing business." This framework helped the Dow team approach the question of sustainability in dentistry.

#### DO NO HARM

In healthcare, the main priority is always the patient. "Being green" just isn't at the forefront of practitioners' minds. Understandably, in the intense, chaotic atmosphere of hospitals or even slower paced clinics, healthcare workers are focused on their patients and following strict—and important—sanitation and protection regulations. Figuring out how to deal with those regulations in a sustainability context was "one of the biggest challenges [for me]" says Robert Meyer, another member of the team. Which regulations have flexibility and which are inviolable? A major, and surprisingly simple, way to figure that out, commented Kamodia, is observing clinic procedures and asking, "Why are we doing this?"



The Dow team identified several organizations working to direct the healthcare field towards a “do no harm” ethic focused on patients and the environment. These include Practice GreenHealth, Healthcare Without Harm, and the Eco-Dentistry Association.

Although their literature review resulted in just one case study on sustainability in a dental clinic, the Dow team found that multiple larger healthcare institutions, such as hospitals, have successfully integrated sustainability into their mission without compromising patient care. These institutions managed to reduce their environmental impact, and by doing so, the majority have reported either cost-neutral or cost-savings outcomes. Additionally, using cleaning products that are less environmentally impactful, like non-toxic, intermediate-level hospital grade disinfectants, or other EPA-recommended disinfectants, can help keep both patients and practitioners away from harmful chemicals. This practice aligns with doing the least harm to the planet and patients.

## A DENTIST’S PERSPECTIVE

After gaining insight into the current state of sustainability in healthcare, the team wanted to understand the perspectives of the emerging generation of dentists on sustainability. To do so, they conducted a case study at the School of Dentistry focused on 142 third-year dental students. The study consisted of a pre-survey on dental students’ attitudes toward sustainability and toward proposed changes to the student clinic that would increase its sustainability. Students were also asked how many disposable materials they used during the most common clinic procedures. The students then participated in a 15-minute educational session on sustainable dentistry and were given a “Best Practices” card containing tips for reducing the environmental impact during dental procedures. Two weeks later, the team conducted a post-survey. Their results showed reductions in glove, mask, paper sheet, and blue tape use. Seventy-four percent of the students believed sustainability was important to them on a personal level. However, some of them expressed concern about the potential for increased time constraints if more sustainable practices were routinely implemented in the set-up and clean-up necessary for each patient visit.

## OPPORTUNITIES FOR CHANGE

The U-M Board of Regents approved a redesign of the School of Dentistry in September 2016 using sustainable design elements. This effort coincided with the Dow team’s assessment of the role of sustainability in dentistry. The team’s project has been well-received within the dental school community and is helping to guide dental students, and practicing dentists, toward establishing greener clinics.

The team distilled their findings into a “Greening the Dental Clinic” Toolkit, based on the Practice GreenHealth’s “Greening the Operating Room” Toolkit to facilitate this transition. The dental toolkit provides assessments of current practices and guidance on implementing sustainable practices in four key areas: 1) organizational development, 2) waste prevention, 3) environmentally preferred purchasing, and 4) the built environment. The school launched a pilot study on reusable safety

## U-M PROJECT TEAM MEMBERS

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## PARTNERS

Practice GreenHealth

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- Full project report
- Dow Global Impact Series:  
<http://sustainability.umich.edu/dow/media/global-impact-series>

glasses. As a result of implementing the Dow team’s recommendations, the school is saving money and resources. The team is currently working with Practice GreenHealth to disseminate their dental toolkit as a resource on the organization’s website and hopes to publish a paper in a dental journal to increase awareness of this new resource.

## SUSTAINABLE DENTAL PRACTICES

A younger generation of dentists are concerned about the environment, and many believe in actively pursuing more sustainable practices in dental clinics. The dental toolkit is a comprehensive guide to integrating these values into the workplace and creating a culture of sustainability within the dental profession.