

Current Environmentally Sustainable Practices in Dental Offices



Samantha Best DDS; Fadra Whyte DMD, MPH

NYU Langone Dental Medicine, Advanced Education in Pediatric Dentistry Residency, San Diego, CA

NYU Langone Dental Postdoctoral
Residency Programs

INTRODUCTION

- Currently, in the United States, environmental sustainability in every aspect of life, including healthcare, is an important issue due to the detrimental effects of unsustainable practices on the Earth. Climate change has been described as “one of the biggest global threats to human health of the 21st century”¹.
- Research has shown that health care as a whole contributes 5% of the worldwide carbon emissions, directly showing the significant environmental impact providers have^{2,5,6}.
- Duane et al used information from multiple databases in England to estimate portions of carbon emissions of different aspects of dentistry³. Their results showed that the highest contribution to carbon emissions in a practice was due to travel (64.5%) followed by materials and services procured to run a dental practice (19%), energy usage (15.3%), nitrous oxide (0.9%) and water and waste (0.3%)⁷.
- While studies with similar topics have been done in other countries and within the medical field, this ia a poorly studied area of dentistry in the United States. With the significant impact healthcare can have on the environment, this is an important gap in research in the United States that needs to be addressed.

PURPOSE

- The purpose of this study is to determine current environmental sustainability of dental offices in the United States. The hypothesis is that dental practitioners currently are not using sustainable practices in their offices and that there are areas for improvement within the dental profession.

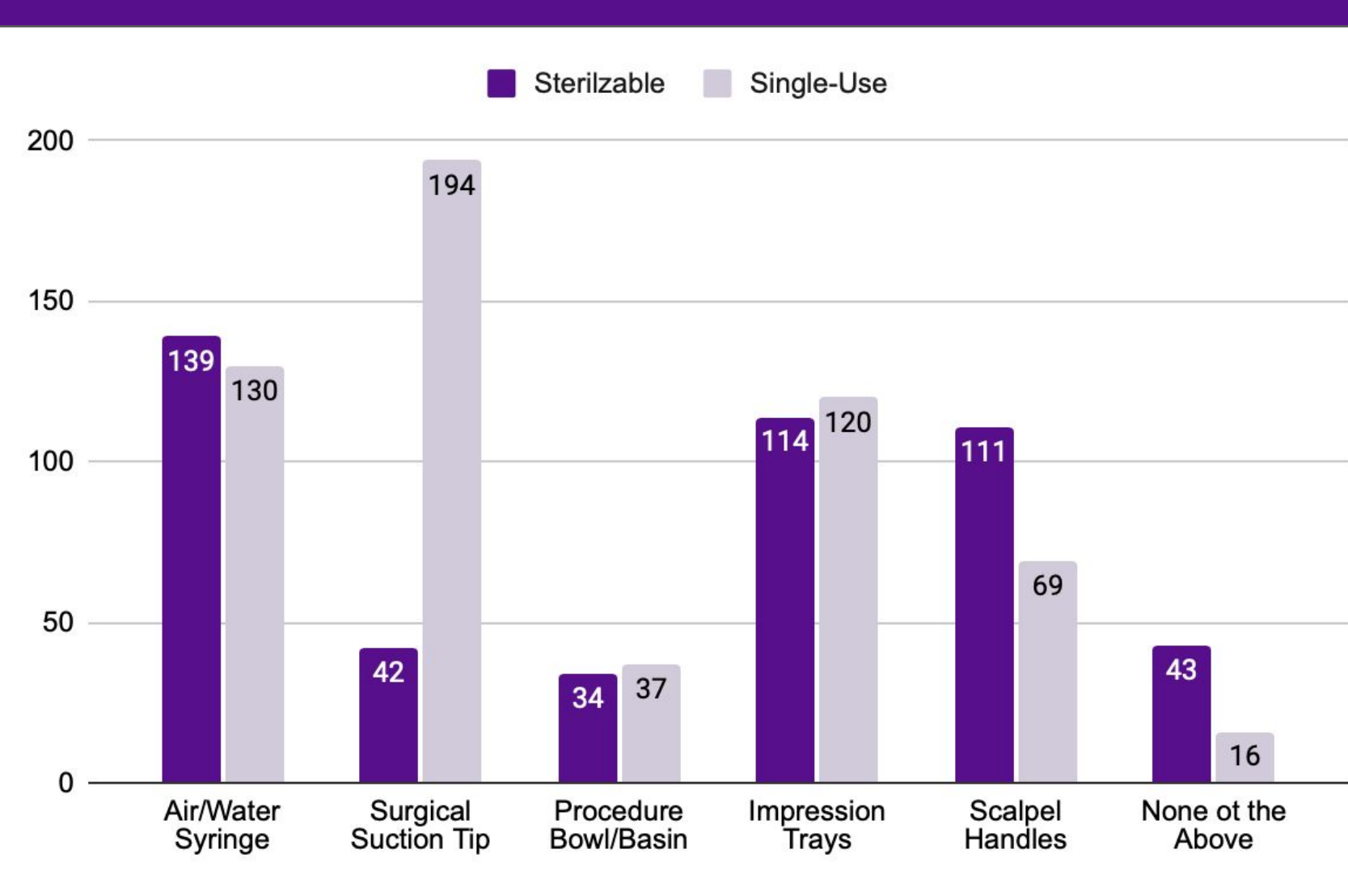
METHOD

- Participants**
 - Active members of the American Academy of Pediatric Dentistry (AAPD).
- Procedure**
 - This study was a closed-ended electronic anonymous email survey sent to active members of the American Academy of Pediatric Dentistry (AAPD). Participates were provided with a link to a 22-question survey in REDCap regarding practices currently used in their office.
 - Demographic variables collected included capacity in which the participant works (associate vs practice owner), number of years practiced and location of the practice. Survey responses of practice owners only were used for analysis.
- Statistical Analysis**
 - Data was collected in RedCap (NYU Langone Hospital in New York). Chi-square test was conducted to determine if there is a statistical association between the variables. Further logistic regression was conducted for binary categorical variables to assess predictors of main outcome variables. Significance level set p=0.05.

TABLE 1 Participant Demographics (Practice Owners)

| | | |
|--------------------|-------------------|-------------|
| Practice Specialty | Pediatric Dentist | 236 (96.3%) |
| | General Dentist | 9 (3.7%) |
| Region of Practice | Northeast | 40 (16.3%) |
| | South Atlantic | 54 (22.0%) |
| | South Central | 17 (6.9%) |
| | Southwest | 19 (7.8%) |
| | Midwest | 54 (22.0%) |
| | Western | 61 (24.9%) |
| Years Practiced | 1-5 years | 12 (4.9%) |
| | 5-10 years | 28 (11.4%) |
| | 10-15 years | 40 (16.3%) |
| | 15 + years | 165 (67.3%) |

CHART 1 Reported use of Sterilizable vs Single Use items



REFERENCES

- Martin M, Sheppard M, Gorasia G, Arora P, Cooper M, Mulligan S. Awareness and barriers to sustainability in dentistry: A scoping review. Journal of Dentistry 112, June 2021.
- Kiang K.M., Behne C. Delivering environmental sustainability in healthcare for future generations: Time to clean up our own cubby house. Journal of Pediatrics and Child Health. 2021. 57;1767-1774.
- Duane B, Berners Lee M, White S, Stancliffe R, Steinbach I. An estimated carbon footprint of NHS primary dental care within England. How can dentistry be more environmentally sustainable? British Dental Journal. Oct 2017. Vol 223(8) 589-593.
- Duane B, Harford S, Steinbach I, Stancliffe R, Swan J, Lomax R, Pasdeki-Clewer E, Ramasubbu D. Environmentally sustainable dentistry: energy use within the dental practice. British Dental Journal. March 2019. Vol 226(5) 367-373.
- Duane B, Stancliffe R, Miller F.A., Sherman J, Pasdeki-Clewer E. Sustainability in Dentistry: A Multifaceted Approach Needed. Journal of Dental Research. 2020. Vol 99(9) 998-1003.
- Lyne A, Ashley P, Saget S, Porto Costa M, Underwood B, Duane B. Combining evidence-based healthcare with environmental sustainability: using a toothbrush as a model. British Dental Journal. Sept 2020. Vol 229(5) 303-309.
- Lyne A. Environmental sustainability in quality improvement: A starter guide for paediatric dentists. Int J Paediatr Dent. 2022;32: 60-63.
- Jamal H, Lyne A, Ashley P, Duane B. Non-sterile examination gloves and sterile surgical gloves: which are more sustainable? J Hosp Infect. 2021;13:S0195-S6701.

CHART 2 Reported form of documents used in the practice

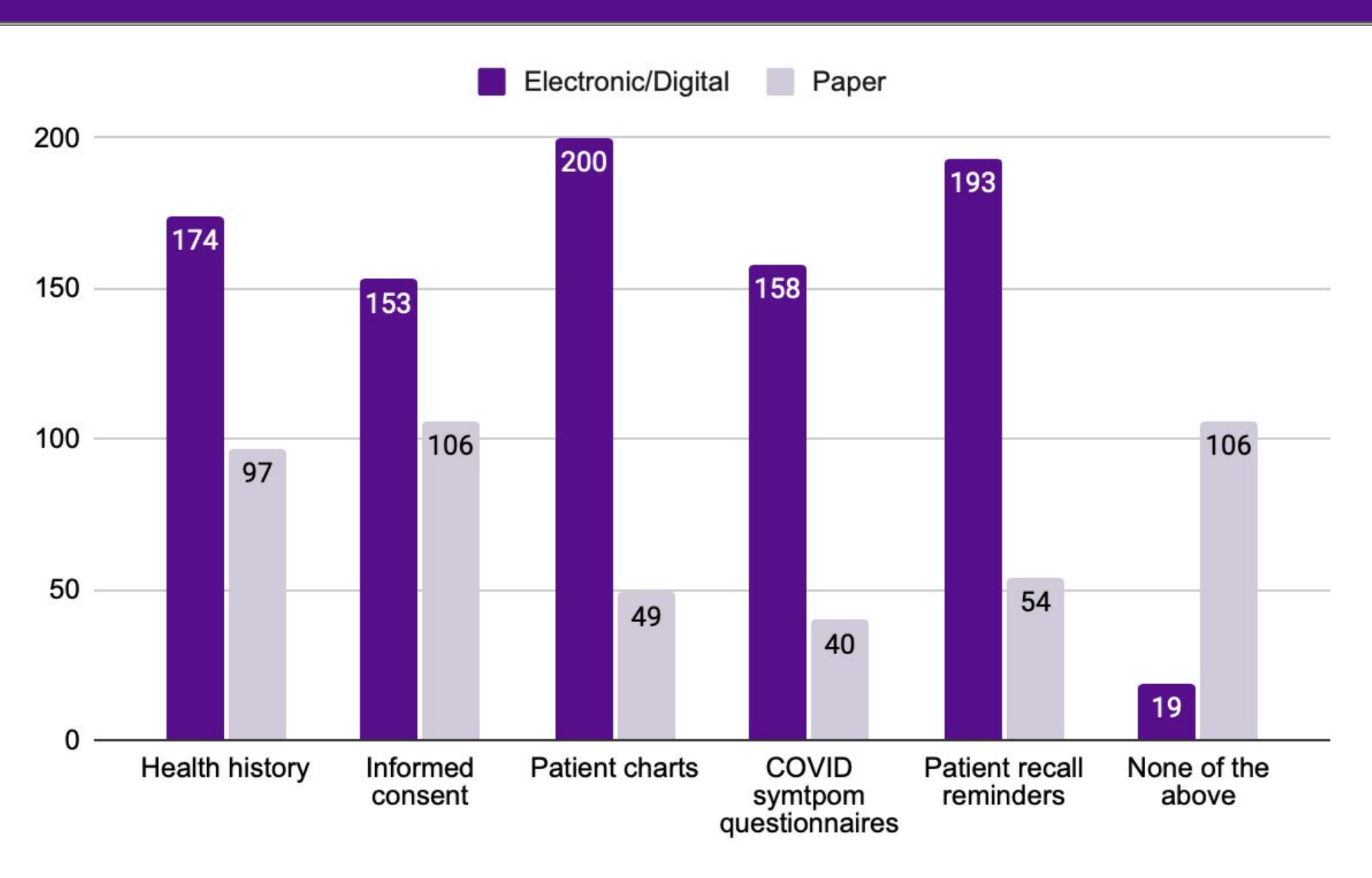


TABLE 2 Reported times when electronic devices are turned off

| | Lights in front office | Lights in operatories | Computers | TVs | Music |
|------------------------------|------------------------|-----------------------|-------------|-------------|-------------|
| Over lunch hour | 64 (26.4%) | 86 (35.2%) | 8 (3.3%) | 49 (20.4%) | 38 (15.6%) |
| When office is closed | 226 (93.4%) | 196 (80.3%) | 154 (63.1%) | 162 (67.5%) | 156 (63.9%) |
| When not in use | — | 94 (38.5%) | 29 (11.9%) | 71 (29.6%) | — |
| When no patients are present | — | — | — | 82 (34.2%) | 39 (16.0%) |
| Always on | 14 (5.8%) | 9 (3.7%) | 79 (32.4%) | — | 14 (5.7%) |
| Never used | — | — | — | 32 (13.3%) | 60 (24.6%) |

RESULTS

- 366 survey responses were received, the 245 responses from practice owners were used for analysis.(Table 1)
- Participants who stated their region of practice to be Northeast, South Atlantic and Western, were 2 times more likely to recycle than those in South Central, Midwest and Southwest.
- The participants who stated their region of practice to be Northeast, South Atlantic and Western, were nearly 3 times more likely to have one document used in electronic form than those in South Central, Midwest and Southwest.
- Participants who practiced for less than 15 years were 5.5 times more likely to have one document used in electronic form than those who practiced for 15 years or more (Chart 2).
- (3.7%) participants responded that solar panels are used as a source of energy in their office in the following regions; Western (4, 44.4%), South Atlantic (2, 22.2%), Northeast (1, 11.1%), South Central (1, 11.1%) and Midwest (1, 11.1%).
- When asked about the importance of having an environmentally sustainable practice, 148 (60.4%) responded somewhat to very important, 63 (25.7%) responded neutral and 34 (13.9%) responded not very important to not important at all. 124 (50.6%) responded that they would be interested in receiving information on how to improve the environmental sustainability of their practice.

DISCUSSIONS

- There are areas for improvement of sustainability of dental practices, specifically in energy use and incorporating more sterilizable over single-use items in an office.
- There is a trend towards more electronic documents in dental offices.
- This study design had limitations, with regards to the demographics and the method in which data was gathered. The survey was sent to members of the American Academy of Pediatric Dentistry, only dentists affiliated with this organization were invited to complete the survey. Participants who reported to be associates in there dental practice were excluded from the study, due to the potential for inaccurate reporting of dental practices in the office. All data gathered is based on subjective reporting, there is a potential for inaccurate or false reporting.
- This study has other potential limitations; therefore, the results should be interpreted with caution.

CONCLUSIONS

- Dental practices in the United States can incorporate more sustainable practices in their offices.
- There is interest amongst the dental community to learn more about ways to make practices more sustainable. This is a topic that can be discussed further at national dental conferences.
- Further research is recommended to continue to explore this topic further and to include more specialties within dentistry. This study was limited almost entirely to pediatric dentists.

ACKNOWLEDGEMENT

- Alberta Twi-Yeboah (NYU Langone Health Division of Biostatistics)
- American Academy of Pediatric Dentistry