CANADIAN DENTAL ASSISTANTS ASSOCIATION
ASSOCIATION CANADIENNE DES ASSISTANT.E.S DENTAIRES

Canadian Dental Assistants Association (CDAA) POSITION STATEMENT

Dental Office Waste, the Dental Assistant and the Environment

The CDAA Code of Ethics describes Dental Assistants responsibilities to the public and community as including environmental protection:

> **"*The dental assistant will take every measure in the fulfillment of their duties to minimize their impact on the environment and to promote environmentally friendly practices*".**

The practice of dentistry contributes to pollution and climate change by consuming large quantities of water and electricity while generating significant quantities of waste- it is incumbent upon Canadian dental assistants to endeavour to minimize this negative impact and practice in an environmentally sustainable way in the discharge of their duties. Some waste (eg hazardous and infectious waste), has mandated disposal methods according to municipal, provincial and federal regulations but a majority of dental office waste may be classified as general waste and disposed of (or not!) accordingly. The environmental impact of dentistry may be of most concern to dental assistants (DAs) because, as the staff member primarily responsible for infection control and prevention (IC or IPC) and for inventory control in the dental office, the amount of waste generated is most visible to DAs in the normal course of our duties.

The CDAA supports:

- Minimizing the environmental impact of dentistry through **compliance with municipal, provincial and federal guidelines**
- Minimizing the dental office carbon footprint through sustainable purchasing, practice management and patient treatment protocols
- Implementation of environmentally friendly practices in infection prevention and control (IPC) without compromise to patient and staff health and safety

The CDAA recommends Dental Assistants and dental teams institute the following:

- **Reduce** consumption of resources such as water and electricity through informed practice and purchasing

- **Reduce** the release of chemicals into the environment through familiarization with and adherence to municipal, provincial and federal waste regulations
- **Reduce** the release of chemicals into the environment by selecting biodegradable products for cleaning, disinfecting and sterilizing
- **Reduce** waste by selecting recyclable and biodegradable materials whenever possible
- **Reduce** waste through sustainable purchasing practices including avoidance of unit-dose materials whenever possible
- Select **reusable** items and products whenever possible
- Make every effort to **recycle** all possible materials and encourage recycling efforts by all dental team members
- **Rethink** maintenance and re-processing methods to extend the life cycle of instruments and equipment
- **Rethink** methods to decrease the negative environmental impact of dentistry and increase sustainable, environmentally friendly practices
- And **dental education**, in particular, **rethink** curriculum content and learning activities to incorporate sustainable and eco-friendly dental practices

Where dental assistants cannot autonomously effect change, they should take a leadership role in initiating positive change in the interests of patients, dental teams and society at large.

Rationale:

According to the World Dental Federation "dentistry should reduce the consumption of energy, water, paper and any materials which could be harmful to the environment, as well as emissions to air and releases to water" (FDI, 2020). A recent systematic review of ecological dental practices found, "a high level of knowledge but low level of implementation about eco-friendly strategies" (Khanna & Dhaimade, 2018). Over half of the dental clinics in the study had not implemented programs to reduce or recycle waste and according to Farahani (2007), the most significant barriers to environmentally friendly practice of dentistry are the cost and availability of products and services. The health and wellness of dental workers, patients and society must override convenience and financial concerns; price and expediency must not be the only measure by which a product or method is selected.

Reducing energy and water consumption:

Travel and transport to and from the dental office has been shown to be one of the largest contributors to the dental office carbon footprint (Duane et al, 2017; Mulimani, 2017). Dental offices can minimize these emissions by encouraging staff and patients to use active travel (eg. walking, cycling) and public transit. Carbon footprint associated with transport can be minimized by implementing an "environmentally preferable

purchasing" (EPP) policy which privileges suppliers who demonstrate environmentally responsible practices (Duane et al., 2017; Mulimani, 2017; Richardson et al., 2016). A further method to minimize patient travel is through increased use of teledentistry and technology such as intraoral scanners and 3D imaging for communication (Duane et al., 2017; Mulimani.2017). **Dental practices can also conserve energy by simply switching to LED lights and routinely turning off equipment not in use** (Khanna & Dhaimade, 2018).

Clean water is an abundant resource in Canada, but this should not incite squandering. Conventional suctions, or dental vacuum systems, use around 24,600 gallons of water per year, all of which can be saved by replacing old systems with dry vacuums (Mulimani, 2017). Additional benefits of dry vacuum systems are the absence of filters for amalgam and other sludge which minimizes maintenance and contamination and the absence of oil use in some of the new units which prevents even more pollution. Eco-friendly water purification systems using an iodine base are now available which avoid the necessity of adding chemicals and flushing water lines. Other possible water conservation measures include flow-restrictors and infra-red sensors for water taps and the use of medical grade hand sanitizers instead of washing hands between patients (Mulimani, 2017). **Another method for dental personnel to conserve water is to encourage patients to interrupt water flow during tooth brushing- up to 90 cups of water can be wasted down the drain when the tap is left running** (Khanna & Dhaimade, 2018).

Reducing consumption of paper and materials harmful to the environment:

A recent Australian study showed **materials used to support infection control constituted up to 91% of total waste produced in a dental office** (Richardson et al., 2016). An estimated minimum of 680 million paper and plastic barriers are used and discarded minutes later in dental offices each year and the estimated annual global consumption of sterilization bags by dental offices is 1.7 billion pouches (Khanna & Dhaimade, 2018).

Biodegradable paper and aluminum foil provide environmentally friendly alternative materials which can be used for barriers and tin foil can also be sterilized for surgical situations. Farahani (2007) suggests recycling sterilization bags after separating the plastic and paper; this can reduce landfill contribution by at least 4680 pieces annually. Grose (2016) suggests removal of cassette sterilization wrap ("blue wrap") from treatment areas before it becomes contaminated; wrap made of No. 5 polypropylene plastic can be recycled into resin for other purposes and a case study shows this could reduce waste by 5 kg weekly (Richardson et al. (2016); Workman, 2017).

Exam gloves are a significant source of dental office waste; **wearing reusable nitrile utility gloves for cleaning and disinfection tasks avoids creating excessive glove waste and may be safer to use because they are less permeable to chemicals**

(this also is aligned with new COID-19 protocols). Goddards[1] study refers to a method for reprocessing exam gloves which includes cryogenic freezing followed by creation of a powder and repurposing into new plastics; it is unclear if this process is possible for all gloves or only non-contaminated exam gloves such as are produced by educational institutions in simulation situations but it represents a viable method for reducing glove waste (the same company also provides recycling of saliva ejectors[2]).

Plastic waste can also be minimized by substituting metal A/W tips, metal impression trays and sterilizable high volume suction tips for disposable versions. Broken hand instruments are subject to a "take-back" system with some companies who may even issue credits towards future purchases. Dental practices increasingly use a variety of electronic equipment (eg. digital sensors, cordless curing lights, vitalometers…) and waste electrical and electronic equipment (WEEE), or e-waste has become the fastest growing waste stream in the world (Mulimani, 2017). The dental team should take care to select equipment which can be repaired and repurposed rather than disposed of as landfill.

There is no available data by which to measure the carbon footprint of specific dental materials such as polymers and manufacturers are encouraged to develop Sustainable Development Units (SDU), published guidance for users (Duane et al., 2017). According to Mulimani (2017) polymer products are integral to the practice of dentistry and according to Nasser (2012) there is a need for studies to demonstrate what proportion of dental office waste is plastic and whether interventions such as environmental audit can decrease the amount of dental office plastic waste. Expired polymers such as composite resins and bonding agents pose a disposal challenge because the containers cannot be recycled without emptying the contents. Automix systems for impression materials and temporizing materials are popular but generate a significant plastic waste in cartridges and mix tips. Farahani (2007) and others have identified a paucity of environmentally friendly products but hopefully demand from the dental community "can spur the manufacturers to innovate, design and supply more 'green' products and adopt measures like reduced packaging" (Mulimani, 2017).

According to Khanna & Dhaimade (2018), the majority of dental office waste is semi-household waste and can be recycled. Sitterson (2017) suggests **accessible recycling containers in strategic areas and training on recycle number codes to encourage increased recycling and also to ensure the contents are destined for a recycling center and not a landfill.** The adoption of paperless administrative systems and digital patient records can significantly reduce non-clinical waste but according to a study by Grose, "information about what constitutes clinical waste was often provided by the waste contractors themselves" and there may "a perverse incentive amongst some

[1] Unpublished dissertation

[2] https://www.ecobeeworld.com/saliva-ejectors * The CDAA is not endorsing the use of this company

waste contractors to encourage the use of clinical waste bags over more economical forms of waste disposal" (2016).

Reducing environmentally harmful emissions to air and releases to water:

Goddard identified a lack of available research on eco- friendly practices in dentistry and Richardson et al. (2016) suggest concern over amalgam deflected the focus from other environmental considerations. The use of dental amalgam has long been a subject of controversy and amalgam and mercury waste remain of significant environmental concern with an estimated 3.7 tons of mercury waste is created by dental practices globally (Khanna & Dhaimade, 2018). A 2007 progress report on compliance and evaluation with mercury from dental amalgam waste by the Canadian Council of Ministers of the Environment (CCME) found Canadian dental practices had failed to achieve the 95% waste reduction target of the Canada Wide Standard (CWS) and that an estimated 452 kg of amalgam waste continue to enter Canada's waste water stream. Only Nova Scotia, Nunavut, Ontario and Prince Edward Island achieved the target of 95% reduction between 2000 and 2005 and the report recommended Environment Canada take further actions to assist jurisdictions in achieving the target (CCME, 2007). It has been estimated between 3% and 70% of the total mercury load entering wastewater treatment facilities comes from dental practice (Hiltz, 2007). Approximately 70% of Canadian dental practices use an ISO certified amalgam separator and 1.2% have engaged a licensed waste carrier for removal. According to Hiltz (2007), "Regardless of the means of disposal…, practitioners should not flush contaminated wastewater down sinks, rinse chair-side traps or vacuum filters in sinks". According to Richardson et al (2017) "successful implementation of an environmentally sustainable approach to waste management will be dependent on the practicalities involved and the financial incentives for adopting such practices. It is therefore unlikely that significant change will be affected without the influence of government".

Traditional analog radiography systems remain a significant source of toxic waste with 4.8 million lead foils and 28 million liters of toxic fixer generated annually (Khanna & Dhaimade, 2018). A study by Farahini (2007) found 3 out of 5 dentists recycled the lead foil generated in the office while according to Hiltz (2007) manufacturers reported only about 5% of products sold are returned for recycling. Silver thiosulfate in used radiographic fixer solution is another environmental toxin which must not be flushed down the drain into the sewage system; dentist can install recovery units or arrange for removal by a certified waste agency. **Many dental practices are shifting away from traditional analog systems to digital radiography systems which do not generate either lead foil or silver thiosulfate but proper recycling and disposal of these toxic wastes remain an ethical obligation on the practices which continue to use them.**

Conclusion

Identification, classification, handling and proper disposal of dental office waste is a complex task that requires education, training and resources. Dentists see an average of 63 patients a week (CDA, 2020) and spend an average of 87% of their time providing direct patient treatment (ODQ, 2006). It is the legal and ethical responsibility of the dentist as the employer to ensure compliance with regulatory requirements. **Time-consuming tasks such as waste removal and infection control are routinely delegated to dental assistants who require appropriate education, training, and resources including designated work time in order to safely and effectively carry out these important tasks.** At a minimum, it is in the public interest to incorporate concepts of sustainable practice into dental education and to have rigorous inspection and reporting standards to ensure compliance with municipal, provincial and federal waste removal guidelines. **In the interest of future generations, it is critical the dental team adapt their practices to reduce consumption of natural resources and reduce toxic emissions into our air and water.**

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