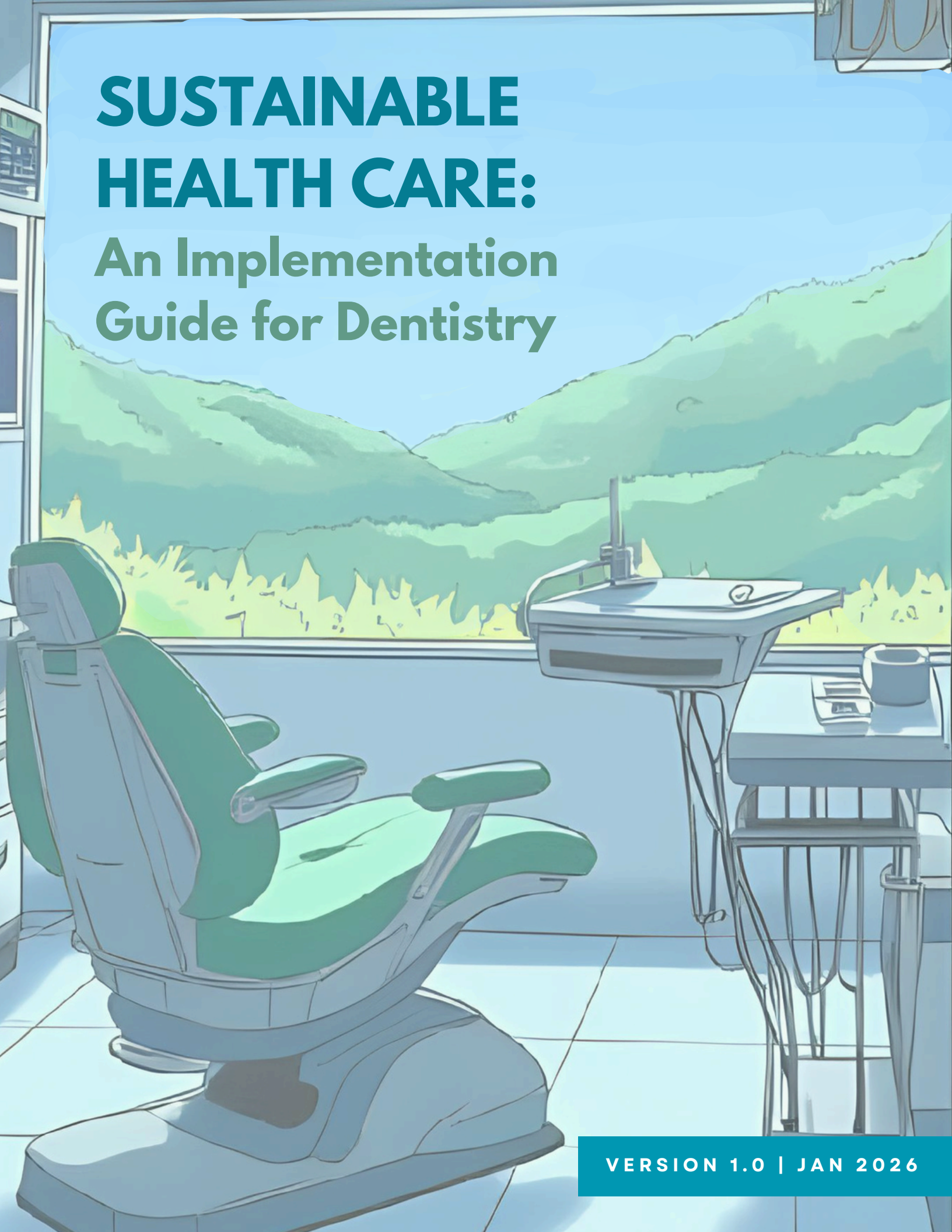
SUSTAINABLE HEALTH CARE:

An Implementation Guide for Dentistry



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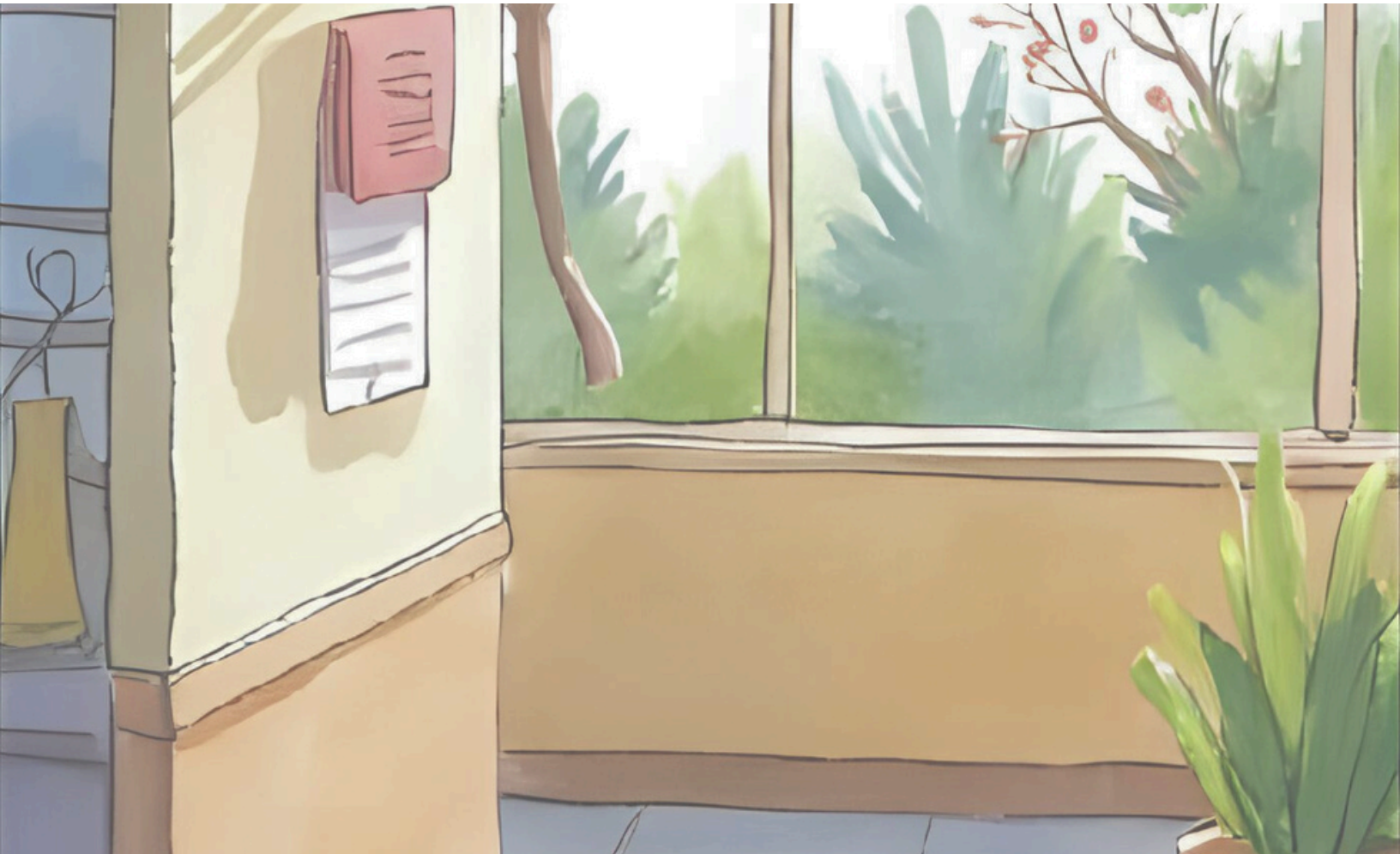
PURPOSE AND SCOPE

The purpose of this guidebook is to support dental offices across Canada in integrating sustainability into their daily operations, clinical practices, and long-term planning. As oral health care professionals increasingly recognize their role in mitigating environmental harm, this resource provides practical, evidence-informed strategies to reduce waste, conserve energy and water, limit greenhouse gas emissions, and promote environmental stewardship. Designed with the realities of busy dental clinics in mind, the guidebook aims to make sustainability both accessible and actionable, while enhancing patient care and aligning with broader public health goals.

The scope of the guidebook encompasses the full range of dental office activities, including procurement, infection prevention and control, waste management, energy and water use, patient education, and office design. It highlights best practices while offering checklists, tools, and recommended resources tailored to various dental settings, from small independent practices to large group clinics. The guide also addresses the unique environmental challenges of the dental sector, supporting teams to confidently move toward greener, more resilient operations.



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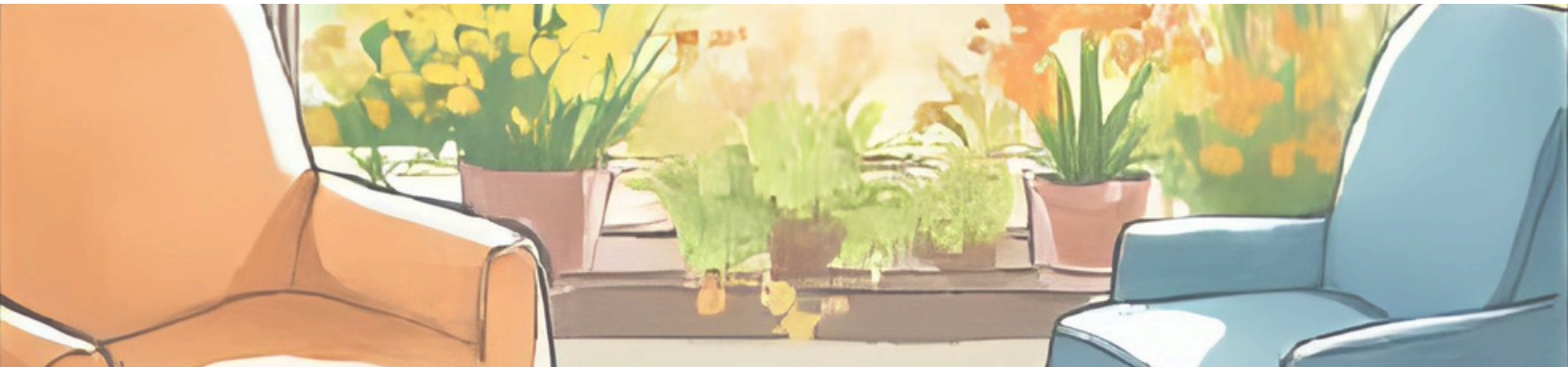


DENTISTRY AND THE CLIMATE CRISIS

The need for change in all sectors of society, with a move towards more sustainable practices is clear; that includes dentistry. There are multiple ways we can make our practices, and our lives, more sustainable. Science tells us this is necessary: **seven of nine planetary boundaries have been transgressed, and our planet is now outside of the safe operating space for humanity** (1).

Last year, Earth Overshoot Day fell on August 21st 2024; this marks the day when humanity's consumption exceeded the Earth's capacity to regenerate those resources for the year (2). Paradoxically, Canada's health care system contributes 4.6% to total national greenhouse gas emissions, which increases the need for health care services due to the consequences of those emissions (3).

Additionally, research continues to accumulate indicating the potential health consequences of microplastic and nanoplastic particles; all plastics eventually break down into these tiny particles, which are capable of attracting toxins (4). Dental materials research indicates that dental practices are using 21 single-use plastic items on average per dental procedure (5).

There are many reusable, sustainable products now available for dentistry, and many have been developed by small Canadian start-up companies. These include Health Canada–approved reusable masks, which can be washed up to 100 times; Health Canada–approved sterilization pouches and wraps, which can be washed up to 75 times; reusable patient bibs, which can be appropriately wiped with disinfectant (according to the manufacturer's instructions) and reused 2,000 times or more; and reusable cotton wipes, which can be reused at least 10 times (again following the manufacturer's washing instructions).

While cotton cultivation is resource-intensive in terms of land and water use, cotton wipes do not shed plastic particulates or degrade water quality in the way synthetic fibres do. By contrast, a single laundry load of synthetic clothing can release hundreds of thousands of plastic microfibres into wastewater (6).

Our society tends to emphasize recycling over reusing items. While recycling plays an important role, reducing waste at the source remains the most sustainable approach (7). Recycling processes can be energy intensive, involve transportation emissions, and contribute to the release of microplastics and nanoplastics into waste water (8). Therefore, prioritizing reuse and waste reduction offers greater environmental benefits than relying on recycling alone. ,

It is also worth noting that only 9% of plastic waste in Canada, and generally globally, is recycled (9). Plastics are complex materials made up of thousands of different chemicals, which makes recycling them economically and technically challenging (10). That said, recycling programs are available for items that currently lack reusable alternatives-such as gloves and responsibly recycling this PPE waste is preferable to sending it into the landfill. While some nitrile glove manufacturers market their products as "biodegradeable" and/or "compostable", these gloves may break down within five years, instead of over 100 years. However, several manufacturers have confirmed that the **breakdown process still results in small plastic particles**. Greenwashing has become commonplace by manufacturers, and we must remain vigilant in assessing the true sustainability of products in our supply chain.

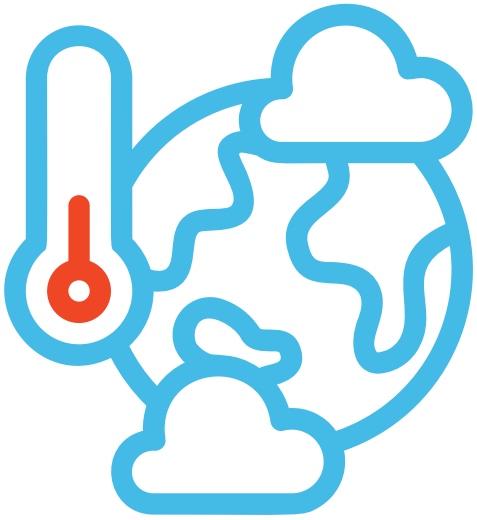
WHAT CAN WE DO?

REDUCE OUR FOOTPRINT

Dentists can significantly reduce their environmental footprint by adopting sustainable practices in daily operations.

Waste reduction is a key area, including minimizing single-use plastics by switching to reusable instruments when safe, managing amalgam waste with separators to prevent mercury pollution, and properly disposing of hazardous materials like sharps and chemicals. Going digital with records and impressions also reduces paper and material waste.

Energy and water efficiency are equally important—upgrading to ENERGY STAR-rated equipment, using LED lighting, installing motion sensors, and adopting dry vacuum systems can greatly reduce resource consumption. Low-flow faucets and toilets, leak checks, and energy audits help conserve water and power while lowering operating costs (11).



WISE PRACTICES

Sustainable procurement and conscientious staff and patient engagement further support plnaetary-friendly operations.

Choosing truly biodegradable, refillable, or bulk products, and partnering with green suppliers helps minimize waste and emissions.

Promoting preventive care reduces the need for resource-intensive treatments, and educating patients on sustainable oral health choices, such as scrap maple wood toothbrushes sourced and made in Canada, extends environmental awareness beyond the clinic. Staff can contribute by following energy- and waste-saving routines.

Dental practices can also enhance sustainability through thoughtful design—using low-VOC (volatile organic compounds) materials, improving air quality, and considering renewable energy sources such as solar or geothermal. Encouraging green commuting options and optimizing scheduling to reduce travel further lowers environmental impact.

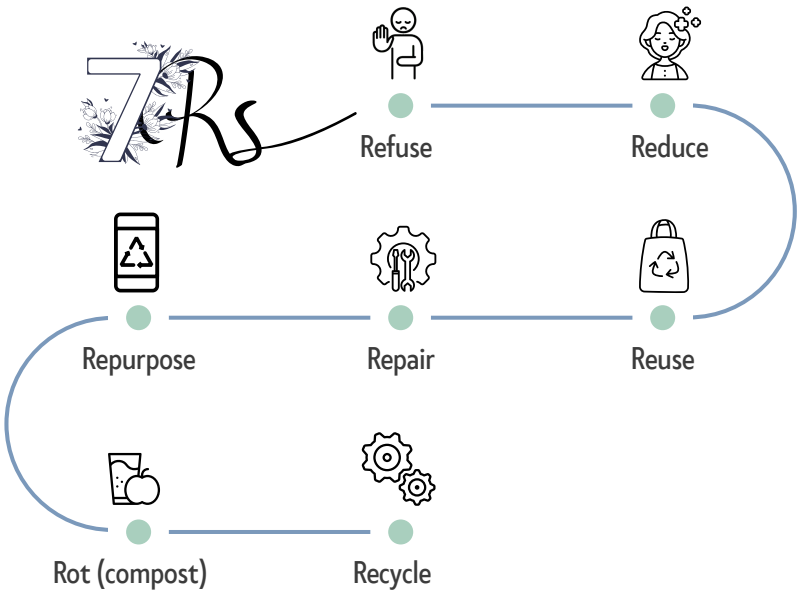
To benchmark progress, practices can assess their practices by taking the Green Office Challenge or pursue certifications like GreenDOC™ and track energy and resource use, setting measurable goals for continuous improvement. By implementing these strategies, dental practices can provide excellent care while supporting the health of the planet.

EFFECTIVE STRATEGIES

A “best case scenario” for sustainability in the dental office includes having an onsite laundering facility with a filter on your machine to collect plastic microfibres, such that reusable gowns, reusable surgical wrap or pouches (used in conjunction with reusable stainless steel instrument cassettes, rather than the single use paper/plastic pouches), reusable masks, scrubs, and surgical caps are all laundered at the office to reduce environmental footprint from both the manufacturing process, and from the transportation of goods. If this is not feasible, an alternative to on-site laundering is creating a partnership with a sustainability-minded laundering company.

There are also several Canadian companies that have created innovative sustainable oral care products, including wooden toothbrushes, tooth powder,tablets and paste (in more sustainable packaging), natural fibre-based floss in sustainable non-plastic packaging, and reusable silicone floss thread.

The most effective strategies for promoting sustainable practices lie in the principles of refuse, reduce, reuse, repair, repurpose, rot (compost), only then followed by recycle:



SETTING PRIORITIES

- **Refuse** to use products that you don’t really need, such as paper tray covers and plastic barriers (which are not sterile and which have no scientific basis with respect to transmission of infection
- **Reduction** involves minimizing the need for materials at the patient and consumer level by emphasizing preventive care and promoting good oral health. This approach helps decrease the demand for restorative products and the plastic packaging they require.
- **Reuse** can be implemented throughout the supply chain, particularly by clinical end-users when safety permits. Reusable items are generally more environmentally sustainable than single-use disposable alternatives, such as masks, pouches, wraps, bibs, and wipes. Autoclaves which still function properly but are not IPAC-compliant (do not have temp/pressure readouts) can be donated to a developing country.
- **Repair** equipment whenever reasonably possible rather than trashing it into landfill to reduce manufacturing footprint.
- **Repurpose** items such as autoclaves, which still function properly but are not IPAC-compliant (do not have temp/pressure readouts) and can be donated to a developing country.
- **Rot (compost)** food and other organic waste, which can be easily be accomplished in a sanitary fashion, to prevent formation of the greenhouse gas methane in landfills.

BEYOND RECYCLING

Recycling should be a last resort, and prioritized at the manufacturing and distribution stages, focusing on energy-efficient production methods, the development of recyclable products, reducing excessive packaging, and improving distribution logistics (12).

RECYCLING SHOULD BE A LAST RESORT, AND PRIORITIZED AT THE MANUFACTURING AND DISTRIBUTION STAGES

RENEWABLE ENERGY

Transitioning to renewable energy sources in our professional and private lives can have a huge impact: the use of fossil fuels to generate heat and electricity accounts for 75 percent of global greenhouse gas emissions and roughly 90 percent of all carbon dioxide emissions (13).

Indeed, renewable sources of energy are now often more economical than fossil fuel-based energy sources, although humanity's thirst for fossil fuels continues on an upward trend, decreasing our chances of meeting climate targets proposed by the Paris agreement (14, 15).

Choosing to demonstrate leadership with respect to sustainability in both your office and personal life will create a "ripple effect" with all of the individuals you interact with.

MAKING CHANGES

The following guidebook is meant to give dentists a fairly comprehensive approach to reducing their environmental impact and emissions.

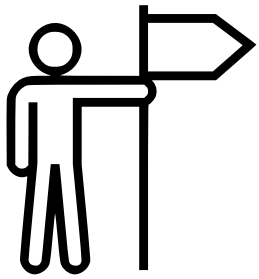
Choosing to act upon any of these items will help our society move in the right direction, although some actions have far greater impact than others, such as a comprehensive prevention program, moving to renewable energy resources, and mitigating transportation footprint by combining family appointments and multiple procedures (judiciously and ethically) for one patient (16).

Choosing to demonstrate leadership with respect to sustainability in both your office and personal life will create a "ripple effect" with all of the individuals you interact with.

Let's change our profession for the benefit of our patients, our families, and our members, by delivering more sustainable and economically feasible alternatives, while also improving our niche in healthcare in terms of environmental impact, for the betterment of society and our world.

ACTION ITEMS

LEADERSHIP



- ☐ Take a continuing professional development course in sustainability (17), such as the FDI MOOC or CSH's Sustainable Dentistry.
- ☐ Communicate your desire to create a sustainable working environment to staff and patients; create a green team, and designate someone in the clinic as the sustainability officer.
- ☐ Display posters (not flyers) in the waiting room educating your patients about your green initiatives; and share your achievements in sustainability on your office website and via social media.
- ☐ Extend your sustainability initiatives to your personal decision-making, including purchases, travel, and investing (18). Consider divesting from industries that promote fossil fuel consumption and consider investing in companies that promote renewable energy (19).
- ☐ Consider calculating your personal carbon footprint (household, transport, lifestyle) using the UN carbon footprint calculator.
- ☐ Research local, provincial, and national incentives for sustainability certification.
- ☐ Partner with businesses that promote sustainable principles when choosing your suppliers, bank, office designer, contractors, investment specialists, and other service corporations.

PREVENTION

- **Continuously promote oral health education to your patients to create effective behavioural change.** Patients prefer advice to be emailed to them; 72.9% felt a digital risk assessment form providing advice improves their understanding of their oral health (20).

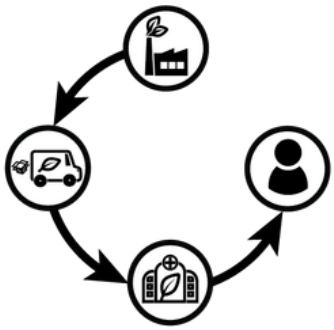
- **Promote community water fluoridation (CWF) in your area.** CWF reduces the incidence of tooth decay, thereby decreasing the carbon footprint of dentistry by mitigating the need for treatment, and particularly affects families of lower socioeconomic status (21).

- **Consider supporting a provincial or federal sugar tax initiative;** the World Health Organization has created a manual for governments who wish to give this concept consideration (22). Supporting such policy change improves health outcomes by reducing diabetes, obesity, and tooth decay, which reduces healthcare costs, increasing government revenue (which can be put towards healthcare), and improving health equity (23).

- **Consider the use of topical silver diamine fluoride** to arrest caries rather than fulsome excavation of decay, which may end up in either root canal treatment or extraction of teeth. This treatment is easy, cost effective, and may mitigate environmental impact of more extensive treatment (24).

- **Consider using topical fluoride varnish** packaged in bottle form for multiple applications, rather than single use packaging. You can dispense a small amount right on to your metal dental tray, or on to a reusable dispensing well, and use a small cotton pellet to apply the varnish on to teeth.

SUPPLY CHAIN



- **Question your suppliers about their sustainability initiatives:**
  - Do they know the carbon footprint/environmental impact of their company?
  - Are they implementing Environmental/Social/Governance (ESG) initiatives into their strategic plan (25)?
  - Are the manufacturers they use socially and environmentally responsible?
  - Are they decreasing packaging, using local manufacturers whenever possible, and engaging in sustainable transportation initiatives, such as all-electric vehicles?

- **Regularly audit stock, purchase consumables in bulk, and judiciously order specialty items** such that you are buying only what you consume (26).

- [ ] Choose reusable stainless steel or autoclavable plastic high volume suction tips, stainless steel prophy heads, stainless steel impression trays (when not using digital), reusable autoclavable plastic bond handles, stainless steel double ended instruments, and reusable high quality burs. Follow instructions for reprocessing by the manufacturer.

- [ ] Choose reusable isolation gowns, surgical caps, booties, sterilization wraps/pouches, surgical masks, and wipes, and launder all items in-house, with a washing machine with a microfibre filter (to prevent microplastic contamination of the wastewater), and consider a heat pump drier (energy efficient). Only use an external laundering service if you have to, as this increases environmental impact. Most of these items can be sourced by Canadian manufacturers and can be washed 75-100 times, according to Health Canada. Single use masks shed egregious amounts of microplastics into our noses, and are covered with PFAS as a moisture barrier. Consider your own health as well as the health of the planet.

- [ ] Choose reusable wipeable Canadian-made patient bibs. These are IPAC compliant when using a hospital-grade disinfectant such as hypochlorous acid.

- [ ] Choose sustainable oral care products, such as Canadian-made maple wood toothbrushes, corn or silk-based floss, reusable silicone floss threads, tooth powders, tablets, or paste, bulk prophy paste, and bottled multi-use fluoride varnish, all in more sustainable packaging, some of which are refillable.

- [ ] Eliminate paper tray covers and plastic barriers, and properly disinfect all surfaces with sustainable disinfectant such as economical hypochlorous acid, which can be made on site. Reusable wipeable silicone barriers for keyboards can replace single use plastic ones.

- [ ] Reduce aerosol products by reusing and autoclaving LA plastic shells, filling them with water, and freezing them, to create ice pencils, which may be more accurate for testing tooth vitality

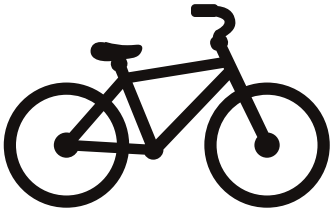
- [ ] Ditch patient cups and bags (for oral care products), unless absolutely necessary.

- [ ] Email or text patient reminders and remove all necessary emails/texts (remaining compliant re record keeping) to eliminate paper/forest use and water/energy use from storing digital data. Use digital journals; not paper.

READ MORE

Check out this Table of Sustainable Dental Products Alternatives

TRANSPORT

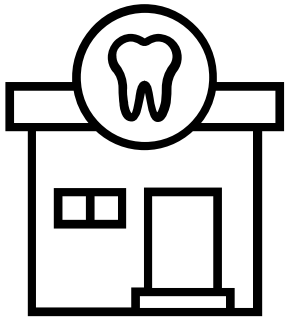


- **Promote sustainable travel with both patients and staff** (walk, cycle, carpool, or take public transit) **Transportation to and from the dental office accounts for up to almost 65% of total carbon** footprint (27).
- **Provide bike racks** for your patients and staff to promote active, sustainable travel, so they can safely secure their bicycles when attending your office. Also, consider installing an **EV charger** to encourage the use of electric vehicles, which reduces both greenhouse gas emissions and other pollutants (28).
- **Combine family appointments** such that several patients are coming in the same vehicle together, reducing carbon footprint significantly, especially if they are using a nonelectric or hybrid vehicle.
- **Combine procedures**, as appropriate, for a single patient, so they are not making multiple trips to the office if this is avoidable.
- **Give your lab plenty of notice** to pick up analogue impressions, so they can properly organize their transportation footprint for this service.
- **Combine multiple personal and/or office errands into one car trip** rather than making separate trips.

NATURAL SYSTEMS

- **Consider indoor plants** (if compliant with regulatory requirements) to help filter the air and create a softer ambience, decrease noise, filter the air, and decrease absenteeism (29).
- **Consider planting native trees and pollinators** outside when landscaping, as this will provide a habitat for birds and insects, while providing shade/shelter to decrease ambient temperature in the area (especially in urban centres) in the summer, and provide shelter/warmth in the winter (30,31).

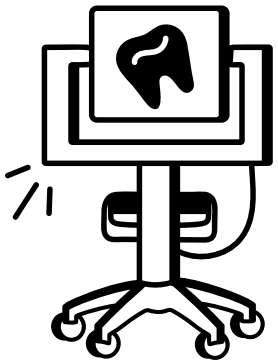
BUILDINGS AND ENERGY



- [ ] Minimize office space while maximizing natural lighting and ventilation if building a new office to reduce needed energy requirements and use a contractor who is educated in sustainable/ recycled building materials. This will also save you money (32).
- [ ] Perform a professional energy audit on any existing structure and follow through with recommendations (33).
- [ ] Windows: Use low-E triple glazed, use sustainably sourced awnings and blinds, caulk all windows and use weather stripping, and open windows when appropriate to circulate fresh air and decrease the need for mechanical temperature control.
- [ ] Install an energy efficient heat pump system to recirculate warm air in the winter and remove hot air in the summer or alternatively, or in addition to, consider installation of solar panels. High efficiency heat pumps, both air sources and geothermal, and solar greatly improve and cut emissions significantly (34,35, 36). Clean or replace filters as required for your energy system, and use a programmable thermostat and ceiling fans to decrease energy needs.
- [ ] Use energy/water-efficient appliances (and shut them off when not in use) (37).
- [ ] Consider switching to a green energy provider such as Bullfrog Power, that offsets energy use with renewable initiatives.
- [ ] Recycle aluminum, paper, computers, other electronics, hazardous waste; reupholster dental chairs/furniture; reface cabinetry; refill photocopy ink cartridges; use rechargeable batteries.
- [ ] Consider a fuel-less generator for outages, and solar chargers for electronic devices.
- [ ] Use chlorine-free/bamboo/hemp/recycled paper products (photocopy paper/toilet paper) and VOC-free paint and plastic-free packaging, don't overpackage.

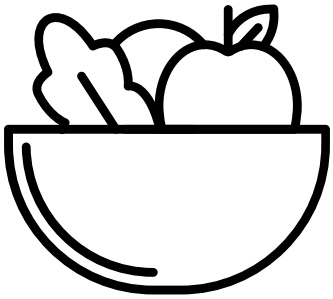
READ MORE » More Action Items in Appendix (Page 24)

DRUGS AND DEVICES



- [ ] Consider the multiple advantages of digital records, images, and impression-taking. However, keep in mind the massive carbon footprint, energy use, freshwater use, and land use of processors that store digital data (38).
    - Go digital (paperless) with charts and other records; this is more efficient, and with templates easier to comply with record keeping regulatory requirements.
    - Go digital with impression taking whenever possible; this mitigates some transportation and material footprint (including, in some cases resin model necessity).
    - Go digital with radiography; this is more sustainable while also decreasing exposure time to your patients.
- [ ] Run the dishwasher and the hydrim (dental instrument washer/ disinfector) only when full. Do not overfill these devices, negating infection control.
- [ ] Use metal sterilization cassettes in a hydrim (washer/disinfector) for pre-autoclaving protocol, then wrap with reusable surgical wrap. This precludes safety hazards for your staff, is more labour efficient (saving money), and the wrap can be used to lay out your instrument tray rather than using paper tray covers.
- [ ] Run your autoclaves only when full (but do not overfill and risk inadequate sterilization).
- [ ] Use a dry vacuum system for suction rather than a wet vacuum (they cost more up front but consume less water and electricity (39).
- [ ] Replace and recycle vacuum pump filter screens with regularity according to manufacturer's recommendations.
- [ ] If using an analogue imaging system, recycle the lead foil, fixer, and developer from your radiography system.
- [ ] Consider in-house 3D printed versions of orthodontic aligners if possible; this also mitigates transportation footprint. Hopefully, compostable, truly biodegradable materials for these aligners will be available in the near future. About 25 million aligners end up in landfills annually, along with the resin models they are created on; Terracycle is recycling these aligners at a cost in select regions.
- [ ] Follow the Choosing Wisely recommendations for dentists when prescribing, including judicious use of antibiotics and analgesics (40).
- [ ] Only use nitrous oxide if absolutely necessary (41, 42).

FOOD



- ☐ Implement an office and home composting program to dispose of food waste responsibly, so as not to generate methane gas, but rather create nutrients for growing plants (43, 44, 45).
- ☐ Take actions to reduce food waste (46).
- ☐ Drink tap water using a refillable metal container; around 60 million plastic bottles end up in landfills globally every day and we are ingesting 240,000 nanoplastic particles with every litre of bottled water (47, 48).
- ☐ Use a coffee maker with a reusable metal filter or reusable coffee pod, and refillable thermal container to keep coffee warm (49).
- ☐ Encourage staff to bring meals to work in reusable glass containers (storing food in plastic and microwaving in plastic is not advisable). Provide reusable cutlery, dishes, and a microwave so you and your staff can bring leftovers to cut down on single use containers and food waste (50, 51).

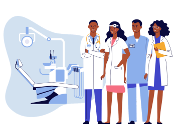
A ROADMAP TO ENVIRONMENTAL STEWARDSHIP

The Road to Environmental Stewardship can be rocky starting out, but once you have people and a plan in place it will build momentum

START

1. Initiate Action

Identify this as a priority for the Office and present a vision of your goals and activities.



2. Identify People

Assign a Lead to organize and promote the initiative and establish a green team.

3. Engage Team

Disseminate this and other documents, and follow up with presentations to the office staff.

4. Build a New Strategic Plan

Include environmental stewardship in your strategic discussions and your strategic plan.

5. Identify Partners

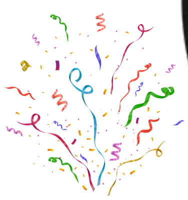
Contact organisations who could assist you to coordinate your planning.

6. Choose initial Projects

Begin with a few projects which have high impact, are relevant and relatively easy to implement and will engage staff members.

7. Evaluate

Set targets and measure the impact of your individual initiatives and your progress towards meeting overall office goals.



8. Celebrate

Recognize your accomplishments to help build momentum and encourage others to act as well.

GLOSSARY

Carbon Footprint: A measure of the total amount of carbon dioxide and other carbon products emitted during the consumption of fossil fuels. This is measured in tons of emissions per unit of comparison ie per year, per person, per km travelled; per kg of protein

Circular Economy: A systematic approach to economic development designed to benefit business, society and the environment. It moves beyond recycling to keeping products in use, eliminating waste streams and regenerating natural systems.

Climate Adaptation: Measures which are taken to protect a community or an ecosystem from the impacts of climate change.

Climate Mitigation: Measures which are taken to decrease or prevent the emission of heat- trapping greenhouse gases into the atmosphere.

Divesting Foundation Funds: Encouraging dentists to move money from standard portfolios with fossil-fuel investments to lower carbon portfolios

Greenhouse Gas (GHG) Emissions: GHGs are made up of carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4) and fluorinated greenhouse gases (F-GHGs).

Green Office Challenge - The annual primary care challenge survey of environmental performance carried out by the Canadian Coalition for Green Health Care to identify areas of excellence and opportunities to further implement sustainable practices.

Nature-based solutions: Implementing sustainable designs and natural features into the built environment to promote adaptation and resilience. These solutions would include natural grasses, pollinator gardens, rain gardens, trees and green roofs.

Phantom Load - The phenomenon wherein electrical devices continue to use power despite being turned off but kept plugged in

Sustainable Prescribing: This involves optimizing medications for patients, typically resulting in less medications prescribed. Also, in some cases, prescribers can switch from one medication to another one which produces less GHGs.

Sustainable Procurement: Building environmental sustainability factors into the rating system for the acquisition through purchase or lease of real property, goods or other products, works or services.

ACCESSIBLE RESOURCES

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CCGHC RESOURCES

Preparing Canada's Health Care Buildings for Net-Zero

This project aims to accelerate the readiness of the Canadian health care workforce and leadership to undertake climate change mitigation initiatives that will reduce greenhouse gas (GHG) emissions from health care buildings such as hospitals, health centres, clinics and long-term care homes.
https://greenhealthcare.ca/net-zero-ready/

Circular Clinical Care: Reducing Single-Use Plastics in Health Care

This project aims to reduce single-use plastic usage within Canadian health care facilities by advising on reduction, reuse, recycling, and storage options tailored to facility needs.
https://greenhealthcare.ca/plastics/

Green Office Challenge

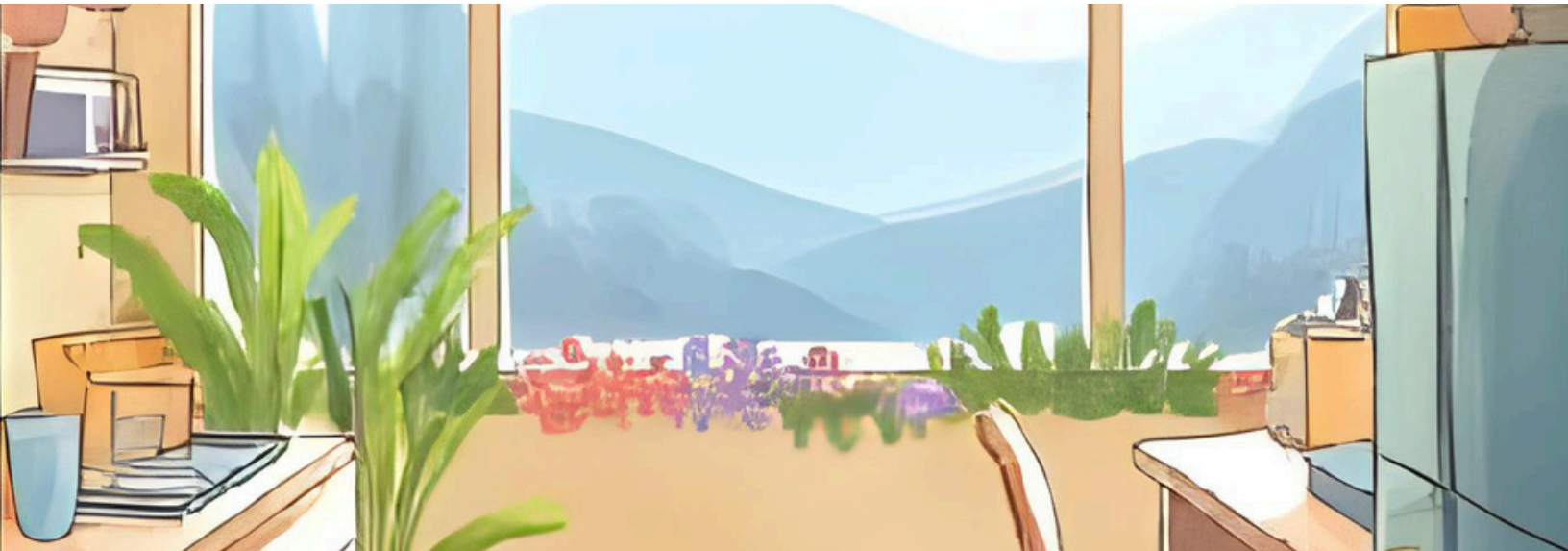
Take the questionnaire to identify areas of excellence and opportunities to further implement sustainable practices in primary care offices.
https://greenhealthcare.ca/green-office-challenge/

Working Groups and Networking Hubs

CCGHC offers the opportunity to collaborate, dialogue, reflect and share with others in a variety of groups and network hubs, These include the Low Carbon Network Hub, Green Team Network Hub, Clinic Network Hub, Sustainable Prescribing Working Group, Sustainable Food Services Committee and the Sustainable Procurement Working Group.
https://greenhealthcare.ca/groups-and-hubs/

Environmental Stewardship Guidebooks

Environmental stewardship implementation guides for boards, executive leaders, and clinical staff in a variety of practice contexts, including intensive care, radiotherapy, psychiatry, rheumatology and so on.
https://greenhealthcare.ca/guidebooks/



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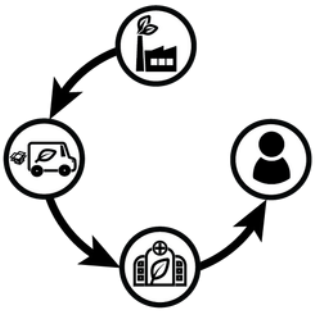
APPENDIX: MORE ACTIONS

SUPPLY CHAIN



- Use reusable stainless steel impression trays instead of single plastic trays, if you are using analogue impression techniques. Note that digital impression taking eliminates the need for polyvinylsiloxane impression material, plastic trays, and transportation footprint of the dental lab picking up your impression.

- Use bulk jars of prophy paste with autoclavable stainless steel prophy thumb cup dispensers. Check that the brand of jar of prophy paste has antimicrobial additives that ensure safety for extended use, and dispense prophy paste from the jar in a hygienic manner.

- Use biodegradable disposable patient cups rather than plastic ones. If permitted by your regulatory body, consider using reusable stainless steel or ceramic patient cups that are washed appropriately with hot water in a dishwasher (however, if you are required to use a hydrim instrument washer and autoclave, the carbon footprint is actually higher than using disposables).

- Use reusable autoclavable brush handles with disposable brush tips instead of throwing out single use microbrushes. Alternatively, consider compostable microbrushes (however, be aware that these products may require ideal conditions to be truly compostable).

- Consider using compostable wooden wedges rather than plastic-based ones; wooden wedges are available with anatomic contours and do not compress in the same manner that plastic ones do, which may improve interproximal contacts.

- Well-made reusable dental burs can be reprocessed according to MIFUs, are higher quality than single use burs, and not only cut down on the waste generated from the single use burs, but the plastic waste associated with the packaging of the single use burs.

- Consider using hand-mixed versions of cement, such as zinc phosphate cement or available hand-mixed versions of glass ionomer cement for cementation of zirconia and other metal crowns; zinc phosphate cement only uses 2 bottles for mixing on a cold glass slab, as opposed to multiple single use plastic components with resin cements, and it is a fraction of the price. Also, note that many resin-based cements still attract bacteria, although research continues in this field (1).

- Use double-ended instruments whenever possible to cut down on autoclave loads, and make your instrument kit as efficient as possible. Avoid reprocessing unnecessary instruments that are rarely used routinely, which can be packaged separately, and accessed as necessary.

- Switch to reusable patient bibs and ditch the single use paper/plastic type that creates microplastics in landfills.

- **Only use plastic barriers if necessary**, as per current regulatory requirements. The Manufacturer Instructions for Use (MIFU) for some European dental chair units indicate that the units can be wiped down with a suitable hospital-grade, or better, disinfectant. **Eliminate use of paper covers on examination tables** and disinfect thoroughly between patients (2).

- **Choose reusable silicone shields for your operative keyboard cover rather than single use plastic barriers.** These shields can be properly wiped down with a hospital-grade disinfectant

- **Use reusable respirators and surgical masks instead of single use**. Health Canada has approved reusable, washable surgical masks made in Quebec for 100 uses that do not contain "forever chemicals", which single-use masks do (as a barrier to moisture); these reusable masks could be colour-coded so every staff member has their own set of reusable masks. Latest research indicates that microplastics are accumulating everywhere in the body, and indicates that polypropylene (which single use masks are made of) is the most common type of plastic found in human samples of olfactory bulbs (3, 4).

- **Use reusable disinfection wipes with biodegradable hospital level surface disinfectants. Consider the use of hypochlorous acid as a disinfectant**; it can be made on site, with readily available inexpensive ingredients (5).

- **Use reusable isolation gowns, surgical caps, booties, sterilization wrap/pouches, masks, wipes**, and launder them in-house according to manufacturer's instructions and regulatory protocols, to greatly reduce both microplastic contamination of the environment, and transportation footprint. If you can launder in-house, consider energy saving appliances, including a heat pump drier (6). **If you can't launder in-house, then use a suitable laundry service for reusable versions**.

- **Use reusable, washable certified hospital-grade surgical wrap for instrument cassettes,** (which properly separate your instruments during sterilization) instead of single use polypropylene wrap; this wrap can be used 75 times, saving money and reducing waste.

- **Consider paying for a PPE recycling program** (such as Terracyle, Lifecycle Revive, Vitacore, or Canada Strong) until such time as local governmental regulatory bodies implement a potential mandate for manufacturers to pay for this, which would introduce **Extended Producer Responsibility.**

- **Get rid of aerosol products**. Dr. Gary Glassman, Ontario endodontist, advocates the use of "ice pencils", reusing the plastic casing of our LA needles, sterilizing these shells, filling them with water, and freezing them. Gently roll one end in your hand to remove the cap and voila: ice pencil to check for tooth vitality.

- **Sustainable Oral Care Products:** Consider distributing locally manufactured **scrap maple wood toothbrushes** or locally made plastic toothbrushes with reusable handles, silk or corn-based floss refills that have washable reusable glass containers, compostable floss picks, or **reusable** silicone floss, and fluoridated tooth powder in recyclable metal containers instead of plastic-based products. Refills of such products are even more sustainable, as packaging is minimized and compostable.

- Enroll in the free Terracycle used oral product program and encourage your patients to bring their used oral care products for recycling. This program has no cost to the clinic and can signal to your patients that sustainability matters to you, potentially sparking valuable conversations on the topic.That said, recycling should come after reusable options have been explored, as it can be energy and transport-intensive and may release microplastics into wastewater (7)

- Use water-free alcohol-based hand sanitizer that evaporates rather than using soap and paper towels, whenever possible (8).

- Offer patient products in paper bags rather than plastic-based bags, or consider foregoing bags entirely.

- Send appointment reminders via email, text message, or on recycled paper.

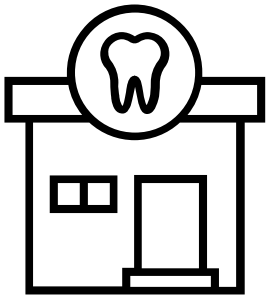
- Use digital versions of journals and books, and recommend to your colleagues that they do the same; if we all used only digital journals, we would mitigate the use of paper, decrease waste and deforestation, and importantly, the carbon footprint associated with transportation.

- Regularly get rid of junk or spam emails you no longer need (being compliant with regulatory requirements) and keep your devices for as long as possible; the CO2 footprint of making new devices is huge and storing unnecessary data may not have a big impact, but it's a good habit to clear those emails.

- Purchase eco-friendly scrubs that are made from recycled materials (such as plastic bottles), or organic materials that do not elicit microplastics when washed, and that come in sustainable packaging when shipped

- Consider installing a microfibre filtration unit on all washing machines to mitigate microplastic contamination of the wastewater; up to 35% of all ocean microplastic contamination may originate from washers. It is better for these microplastics to end up in landfill, rather than our water systems (9,10).

BUILDINGS AND ENERGY



- Consider using recycled building materials (sheet rock, recycled plastic bottles) and eco-friendly insulation materials. There are several Canadian companies that are innovative with respect to these materials.

- Plan an office that maximizes natural lighting and ventilation to decrease energy needs.

- Use a programmable thermostat to decrease energy requirements when no one is in the office awnings and blinds made of sustainable materials (when possible) to minimize energy consumption in the summer.

- Use environmentally sustainable cabinetry, check with your installer.

- Use biodegradable ceiling tiles and wall panels.
- Perform a professional energy audit on any existing structure and follow through with all recommendations (11).
- Purchase low-E triple glazed windows.
- Caulk office windows and use weather stripping to decrease energy loss.
- Use ceiling fans to circulate air and decrease the need for air conditioning.
- Open the windows when appropriate, to get fresh air circulating and decrease the need to mechanically raise or lower the ambient temperature.
- Use dimmer switches to illuminate rooms only as required.
- Use motion detectors and sensors such that lights are only activated as necessary.
- Turn off lights when you leave a room where sensors are not employed.
- Switch to LED lighting.
- Install an energy efficient heat pump system to recirculate warm air in the winter and remove hot air in the summer. High efficiency heat pumps, both air sources and geothermal, greatly improve and cut emissions significantly (12,13)
- Clean or replace filters for heating and air conditioning systems as required.
- Use water saving toilets to save both a valuable resource and money.
- Use faucets operated by sensors or that have fixtures with low-flow or turn off the faucet when lathering your hands
- Use energy-efficient appliances (washer, dryer, dishwasher, refrigerator, microwave) (14).
- Use an energy efficient water heater that is only as big as necessary for your needs.
- Remove TV screens or shut them off when not in use.
- Employ smart power strips for electronics.
- Shut off all electronics, including computers, at the end of the day.

- Consider switching to a green energy provider that offsets energy use with renewable initiatives.
- If possible, consider installing solar panels; they are far less expensive and far more efficient now, and rebates are sometimes available. These can also be added to commercial buildings and parking lots. You may get paid for any excess energy that goes back into the grid (15).
- Consider using solar chargers for cell phones, laptops, and other personal electronic equipment.
- Whenever possible, recycle all aluminum, paper, glass, and steel.
- Use a photocopier with refillable ink or recyclable cartridges.
- Recycle all hazardous waste with a reputable contractor.
- Use rechargeable batteries whenever possible.
- Reupholster dental chairs and office furniture with approved, sustainable fabrics/materials rather than replacing these large carbon footprint items, and avoid seams where possible.
- Reface old cabinetry rather than replacing it.
- Use energy-efficient appliances (washer, dryer, dishwasher, refrigerator, microwave) (14).
- Use shredded paper for packaging, not plastic bubble wrap or styrofoam chips, and minimize the amount of packaging required (don't over-package).
- Use chlorine-free recycled paper products for office and washroom needs.
- Use paint that is free of volatile organic compounds.
- Consider a fuel-less back up generator for power outages.

APPENDIX REFERENCES

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This is a living document which will be revised as this field evolves. We welcome your comments and suggestions. Last Updated: January, 2026

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