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## **Climate change and the health of pediatric populations**

### **Part III: Physician roles in advocating for climate change mitigation and adaptation**

Developed by Marc Beaudin, Stephanie Unrau, and Dr. Melanie Lewis for PedsCases.com  
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#### **Introduction**

Hello! My name is Marc Beaudin-- and my name is Stephanie Unrau--. We are third year medical students from the University of Alberta, in Edmonton, Canada. This podcast was developed with Dr. Melanie Lewis, Pediatrician and Professor at the University of Alberta. This is part 3 of a 3-part podcast on climate change and the health of children. In part 1, we focused on describing how climate change affects pediatric populations. In part 2, we discussed your role as a clinician to counsel patients and families mitigate and adapt to climate change. In this third and final part, we will review how you as a healthcare professional can take your advocacy to the next level including changes to your work environment, be it the office, laboratory, operating room, hospital, or the healthcare system. This podcast will have the following objectives:

#### **Objectives**

1. Delineate the difference between mitigation and adaptation strategies, as well as the difference between policy and outreach approaches to climate change.
2. Recognize that environmental advocacy that is pertinent to healthcare professionals can focus on a variety of specific issues contributing to climate change, and list which characteristics may help guide a clinician select a topic for which they can effectively advocate.
3. Identify different options for environmental advocacy pertinent to healthcare professionals at different systems levels including office, laboratory, operating room, hospitals, and healthcare system settings.
4. Discuss the value of participating in societal disaster readiness preparations, as climate change is associated with increased natural disaster's frequency and severity.
5. Discuss how stewardship of medical resources also falls under environmental advocacy, and the environmental impact of current common medical practices.
6. Demonstrate a general approach to initiating policy changes that advocate for systematic climate change mitigation.

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## Case

You are a physician who is passionate about educating your patients on the health and environmental benefits of plant-based diets. Whenever you discuss diet with your patients, you educate them on the benefits of plant-based diets, from the mitigation and health perspective. You become increasingly skilled at explaining to your patients the consequences of eating meat based leaning on the best scientific evidence, and some of them modify their diets accordingly for health and environmental reasons. However, you don't feel that you are doing enough. Let's talk about the various ways a healthcare professional can invest in advocating for environmental sustainability.

## Policy and Outreach

Advocating for the planet and mitigating climate change is important, and there is plenty that can be done. There are many people playing a role in this, and understandably, you may want to leverage the skills that you've developed in medical school and in healthcare to have a greater impact. The good news is that as current or future healthcare providers, we are in a better position to understand the impacts of climate change on health, and whether it's fair or not, physicians are in a position of privilege and power in society, which means that your voice carries a lot of weight for politicians, stakeholders, and other decision-makers.

If you are planning to take action on something you feel needs change, that's great! However, keep in mind that advocacy requires commitment and patience, as policy and outreach are powerful tools that develop relatively slowly. Hence, when choosing a topic for research, we suggest that you carefully choose a cause where you can lend your expertise and for which you are passionate so that you will be able to stick with and complete your project.

Unfortunately, it is very difficult to provide a good set of topics for addressing climate change, as each country and organization faces a unique set of policies, circumstances, and goals. However, in general, work can focus on changing the population's behavior voluntarily, or by setting new rules. We can generally classify action into climate change mitigation and adaptation. In mitigation, the goal is to reduce the quantity that the climate will change, which is achieved through reduction of greenhouse gas emissions, reducing energy consumption, reducing our environmental harm, and improving our accountability towards the environment. On the other hand, adaptation assumes that climate change cannot be stopped, and takes action to improve resilience and protect humans against the effects of climate change. Both are important.

Once you've selected a topic, it's important to figure out whether you want to address the problem by focusing at the policy level or at the outreach level. At the policy level, the goal is to convince decision-makers to set new rules and guidelines for the

population that they serve. Some general policy tools include: taxes, tariffs, quotas, funding, bans, monitoring, and enforcement. People often think of federal or regional policy, but please recognize that policy also exists at the corporate, institutional, and municipal level. Outreach, on the other hand, serves a purpose to change people's affect, behaviour and cognition, in order to achieve a goal. Outreach requires careful messaging that will stick in a large group of people's minds to the point that they change their actions. Some actions include behaviour around voting, consumption, and transportation. This 3-part podcast, for example, has a goal of helping listeners understand why children need extra protection against climate change, change how they feel and think about climate change, and encourage them to take action. Of course, both policy and outreach are important and interrelated.

When working on policy or outreach, share the load by including others! Join or make a multistakeholder team of advocates that fulfill various roles, such as website design, researching the cause and educating the team, coordinating between stakeholder groups, writing position statements, copy-editing for professional publications, meeting with politicians and decision-makers, and contacting the press. Don't let your vision be the only vision as other people's perspectives are very important in designing robust policy and outreaching. We also wanted to highlight and refer you to the work of Dr. Laura Betcherman, Dr. Katie Boone, and Dr. Amelia Kellar who created 3-part PedsCases, both in French and English, specifically designed to help you through advocacy and policy work, with references to their material in the show notes<sup>52-57</sup>.

## Mitigation

As mentioned previously, there are many things that we, as a people, can do to reduce our impact on the planet. Some ideas to curb climate change that you may feel passionate about advocating for include family planning, plant-based diets<sup>1,5,7</sup>, better indigenous control of their traditional territories<sup>37,38</sup>, investment in renewable energy<sup>1,8</sup>, carbon tax, funding accessible green transit infrastructure<sup>1,4,8</sup>, funding green spaces<sup>1,4,8</sup>, smarter community design<sup>8</sup>, consuming locally, and shifting pollution outside cities via electric vehicles.

Although climate change is a global problem that requires everyone to play a role, you may be wondering how a physician has a distinct role to play in reducing climate change. Remember from part 1 that children will be more affected than adults, and children often rely on adults to speak out on their behalf to protect their current and future interests.

You can also play a role as an educator and expert by providing testimony at hearings<sup>8</sup>, writing articles<sup>8</sup> (e.g. op-eds), and advising officials<sup>1</sup> on the health impacts of climate change<sup>8</sup> on children. Of course, if you are playing the role of an expert, you should stay within your field of expertise. For example, describing how more accessible birth control

could save up to 200 million pregnancies per year<sup>3</sup> may be more appropriate than subjects like brownfield management<sup>8</sup>, low-toxicity approaches to insect and plant control<sup>8</sup>, or the benefits of recycling.

Although we recognize that large-scale action is essential, we are also cognizant that regional and federal campaigns may be beyond the scope of what you, as a busy patient-centered healthcare practitioner, have the bandwidth to focus on. And so, we wanted to provide you with some options where you can create a positive impact within your work setting, be it in the office, in laboratories, in the operating room, or in hospitals.

### **Mitigation in office settings**

To reduce our carbon footprint in any office setting, it is possible to reduce electricity consumption, improve water usage, reduce waste, and purchase more responsibly, which can be achieved by changing the office culture or having company policies. Some tangible actions to reduce electricity consumption include turning on machines only when in use<sup>20,35</sup>, monitoring and auditing energy consumption<sup>20,35</sup>, reducing heating/cooling load<sup>20</sup>, using energy efficient LED lighting<sup>20</sup>, and purchasing green energy<sup>20</sup>. Water usage can be improved by turning off the water heater<sup>20</sup> (temperature of water for washing hands for microbial removal does not matter<sup>17-19</sup>, although timing and soap does), and auditing water consumption<sup>20</sup>. Office paper should be reduced<sup>20,35</sup>, written on both sides when possible<sup>35</sup>, recycled<sup>35</sup>, and audited<sup>35</sup>. Reducing packaging<sup>20,35</sup> and recycling waste<sup>20</sup> reduces GHG emissions. It is also possible to adopt an environmentally sound purchasing policy (e.g. recycled paper<sup>20</sup>, no styrofoam<sup>20</sup>, refillable ink cartridges<sup>20</sup>, no disposable water bottles/coolers<sup>20</sup>, eco-friendly cleaning supplies<sup>20</sup>, eco-friendly soap<sup>20</sup>). This can be extended to purchasing re-usable batteries<sup>28,29</sup> and refillable toner cartridges, and have a recycling program once rendered unusable. In new builds and renovations, it is possible to include better renewables<sup>1</sup>, waste reduction<sup>1</sup>, energy efficiency<sup>1</sup>, and infrastructure promoting active transport<sup>1</sup>.

### **Mitigation within the operating room**

As operating rooms (ORs) can produce over 20-33% of a hospital's waste<sup>23</sup> and consume more energy per unit area than other hospital units<sup>22,23</sup>, they are an area of focus for waste and energy management. Some actions that would reduce GHGs in the OR include making judicious use of anesthetic gases which are themselves an astonishing pollutant, reformulating surgical kits, implementing recycling of medical plastics, encouraging the use of reusable materials and equipment, and reprocessing medical equipment.

Surgical kits contain a pre-defined group of devices used for certain types of surgery; however, some tools are almost never used, but are discarded or require sterilization after every operation. Thus there is an opportunity to reformulate surgical kits<sup>22,23</sup> by removing items that are not used in certain operations, without removing devices that will cause critical delays during surgery should the missing item be required.

Anesthetic gas can account for 4-63% of OR GHG emissions<sup>26</sup>, depending on the choice of anesthetic. For example, each kg of desflurane will be equivalent to 2540 kg of CO<sub>2</sub>, whereas 1 kg of sevoflurane is equivalent to 130 kg of CO<sub>2</sub>. While the choice of anesthetic agents must account for potency, duration and patient factors, environmental impact should be a factor in consideration<sup>25</sup>. Some hospitals have invested in air filters to which all collected anesthetic gases are directed and even reused<sup>58</sup>. Further, CO<sub>2</sub> absorbers can reduce the anesthetic requirements<sup>25</sup>.

Reprocessing medical equipment encompasses cleaning, reconditioning, function testing, disinfecting and sterilizing to ensure the safe reuse of the equipment. While many devices are labeled single-use by the manufacturer, it has been demonstrated that many can be safely reused<sup>21</sup> at a much lower cost than purchasing it new. Some examples<sup>21</sup> include cardiac catheters, orthopedic surgical blades, DVT compression sleeves, laparoscopic instruments, tourniquet cuffs, saw blades, ultrasound catheters, laparoscopic shears, cardiac stabilizers, and pulse oximetry sensors. However, there is some apprehension about their use<sup>21</sup>.

Other equipment and materials can be reused in the OR<sup>30</sup> with sterilization before discarding or reprocessing, such as suction canisters, pulse oximetry probes, basins/pitchers, positioning devices, blood pressure cuffs, tourniquets, and sharps containers, and surgical linen, which include gowns, drapes, covers, and towels. Finally, some medical plastics can be recycled.

For each of the above, champions are required to take the initiative, collaborate with stakeholders, assess the benefit, create pilot studies, and implement the change. If you are performing any procedures in the OR, all the ideas above have online toolkits designed to help these ideas gain traction within your hospital setting<sup>21,22,23,25,30</sup>, which you can find in the podcast notes on PedsCases.com.

## **Mitigation for lab tests and labs**

Clinicians can play an important role in mitigating GHG emissions by reducing the number of unnecessary laboratory tests ordered. Laboratories particularly have high energy consumption intensity, 3-6 times more than office space per unit area<sup>35</sup>. Laboratory tests are expensive and each test has a carbon footprint. For example, in an Australian study a complete blood count produces 116 gCO<sub>2</sub>e<sup>36</sup>, urea and electrolytes 99 gCO<sub>2</sub>e<sup>36</sup>, coagulation profiles 82 gCO<sub>2</sub>e<sup>36</sup>, and arterial blood gases 49 gCO<sub>2</sub>e<sup>36</sup>. Over a year, the 17.8 million<sup>26</sup> hematology and 56.2 million<sup>36</sup> biochemistry tests account

for 12.4% of overall healthcare spending<sup>36</sup> and are responsible for roughly 10,000 tCO<sub>2</sub>e/y. However, no clinical indications existed for 12-44% of pathology tests ordered<sup>36</sup>. There are initiatives to provide guidelines to help physicians judiciously select high-yield clinically relevant laboratory tests, such as Accelerating Change Transformation Team<sup>32</sup> in Alberta, previously known as Towards Optimized Practice. When multiple tests are required, consider having them done on a single sample<sup>35</sup> (*i.e.* using a single serum-separation tube), by batching tests and by requesting tests to be performed on previously-drawn specimens. Recognize that by having less tubes containing blood, it may mean that tests need to be performed sequentially instead of in parallel<sup>35</sup>, which may result in some delays. Beyond changing your own behaviour on the lab tests you order, you can change the way tests are ordered. Outreach to other physicians, publish on your findings, or help set policies on how tests are ordered!

People working in laboratories can play a role in mitigating climate change as well, with the old adage reduce, reuse, recycle. Some actions include reducing the number of tests by rejecting unnecessary tests<sup>35</sup>, removing outdated tests<sup>35</sup>, and clinician education on unnecessary laboratory tests. Identify items that can be reused in the laboratory, and the number of times that the item can be reused while ensuring the integrity of the materials. Some of these items include plastic specimen bags<sup>35</sup> and 24h urine bottles<sup>35</sup>, which are often discarded after a single use. Organic solvents such as xylene and formalin can be locally reprocessed for reuse, with a 2-year return on investment on an onsite recycler<sup>35</sup>. When working with suppliers, consider a green purchasing policy<sup>20,35</sup> for environmentally friendly reagents<sup>35</sup>, analyzers<sup>35</sup> and packaging materials<sup>35</sup> that can be sent back to the supplier for reuse.

## Mitigation in healthcare systems

In addition to these advocacy ideas, healthcare professionals can be invaluable in advocating for the adoption of environmentally favourable changes in multiple healthcare settings. The healthcare system is approximately 10% of the carbon footprint in the United States<sup>8</sup>.

On average, healthcare facilities produce over 0.15 tCO<sub>2</sub>e/y<sup>35</sup> per square meter, and consume 2.7 times more energy than commercial buildings the same size<sup>35</sup>, so there are actions that can be taken as an individual healthcare professionals to mitigate climate change.

In the role of clinician, you can reduce the quantity of resources used if safe and not compromising patient care, by reusing material, reducing the number of procedures performed, and tests ordered. Another action is to engage medical learners in advocacy for the planet<sup>8</sup>, and be a role model for sustainability and the environment<sup>8</sup>.

There are also actions that require coordination and collaboration with other parties within the healthcare setting, but can result in much larger GHG reduction. First, this includes converting to electronic systems<sup>20</sup>, including prescriptions that are

automatically routed to the pharmacy, scanning files directly onto an online storage system, electronic signatures, billing information, and electronic communications policies. Further, telemedicine, although it doesn't allow physical exams and is reliant on connection speed for synchronous communications, can save time, transportation resources, and hospital resources. This is especially useful for patients in remote communities that require flying into urban centers for appointments, as we have already discussed the high environmental impact of air travel. Second, healthcare professionals can work with the procurement team to purchase reusable and eco-friendly products<sup>8</sup>, such as reusable patient linen<sup>20</sup>. Third, at the end-of-life of products, work on improving recycling and waste streams<sup>27</sup>, by educating staff on proper sorting of regulated waste, which saves money and significantly reduces carbon footprint as the majority of products going into regulated/biohazardous waste are misplaced<sup>8</sup>. Make it easy to stream waste by ensuring that normal receptacles and recycling bins are close to regulated waste receptacles for easy sorting. Fourth, work with hospital foodstaff to divert food from the landfill<sup>24</sup> and to shift to a low-meat menu. This has already been a successful physician-led initiative at multiple hospitals<sup>41-44</sup>. Finally, improve delivery routes and carbon footprint of transporting samples to labs<sup>8</sup>, as well as creating a green ambulance and healthcare fleet, such as by changing the fleet to electric and having idling policies.

## **Adaptation**

Because climate change has an impact on population health, it is crucial and imperative to create healthcare systems that are responsive to the increasing impact of climate change. While it is essential to mitigate climate change in the healthcare setting to “walk the talk”, there is arguably a more immediate need for adaptation measures as people's lives and livelihoods are affected by climate change. No point having a low-carbon footprint hospital if the hospital can't handle helping patients affected by climate change, right?

Some ideas touch on disaster preparedness and response, such as setting up regional disaster response planning<sup>8</sup>, creating early disaster warning systems<sup>5</sup>, building infrastructure that is resilient against flooding and fire risks<sup>4</sup>, funding for researching, tracking and monitoring the health effects of climate change<sup>1,5</sup>, surveillance of climate-related infectious diseases<sup>5,8</sup>, and remote disaster relief planning, and inclusion of the pediatric health sector in climate policy meetings<sup>1</sup>.

To address heat waves, you can outreach for transferring outdoor sports to indoor facilities on poor air quality days<sup>4</sup>, or scheduling summer practices in the morning or evening when temperatures are cooler<sup>6,8</sup>, or for coaches and employers to play a role in preventing heat-related illness<sup>6,8</sup>. You can also take action to prevent people from leaving children in cars, by encouraging vehicles to be designed with “Rear Seat Reminder<sup>6</sup>” to encourage caregivers to look in the rear seat when exiting, or by

advocating for laws, as only 19 states in the USA have laws against leaving children in vehicles<sup>6</sup>. As of 2014, Quebec is the sole Canadian jurisdiction with statutes for leaving children in a vehicle<sup>39</sup>, although people have been charged for negligence in other provinces.

Help protect populations vulnerable to climate change such as children. Reduce the spread of infectious diseases by working on reducing contamination in water and food<sup>8</sup>, and reducing human-animal contact for spread of novel pathogens (e.g. coronavirus). Help the socioeconomically disadvantaged to access food, sunscreen, insect repellent, and shelter from heat.

As climate change is expected to disproportionately impact children in low- and middle-income countries and indigenous reserves, your advocacy can also focus on providing resources to those areas, to improve disaster relief, foreign aid policy, food security, access to medications, infectious diseases treatment, water and sanitation, storm-water management to reduce diarrheal illness<sup>8</sup>, management of tropical diseases including vectors<sup>8</sup>. In the international development sphere, please, please, please, do not participate in voluntourism, where you fly-in to help without adequate training in intercultural communication, cultural appropriateness, or local context to create meaningful change, as part of a vacation. It is a practice that is widely frowned upon by the international development community<sup>32</sup>, as it can create more harm than benefit. There are very smart people in resource-poor countries that are much better equipped at communicating how you can provide your skills to create lasting beneficial capacity.

## Case

Great. Next step is to reach out, so you recruit a team of diverse people with various skills who all contribute in different ways to get a campaign running. Eventually, your group creates an evidence-based position paper, create a website, collect signatures from the public, and reach out to a federal politician who displays their sympathy for your cause and appear to be on your side, but don't budge on policy. One of your team members reaches out to global warming and healthy living groups to create collaborations on a couple projects. Soon, most people in your province have heard that livestock is responsible for approximately 18% of global GHG emissions<sup>5</sup>, and plant-based diets significantly reduce carbon footprints<sup>5</sup>, but most people don't care. Your movement continues to accrue a following over the next six months, with a few media and outreach campaigns, and you reach out to a few other politicians before finding a provincial back-bencher politician who is willing to present the meat tax as a bill. You work with them for two months, making compromises that will not anger too many constituents before it is presented in parliament, and after discussion, passes to become statute. However, you don't want the campaign to stop there, so you organize a couple media campaigns to congratulate the provincial politician for taking this important step, and help convince the public that the meat tax is beneficial for both health and climate change, and you, as a physician continue explaining to the public the health



benefits of plant-based diets while another colleague with different skills focuses on the carbon footprint of animal agriculture. Your team concurrently reaches out to colleagues across the country for the next few months to join the movement, while empowering the politician who helped pass the bill. Eventually, two years later, politicians from other provinces, and even at the federal level, see that this is a move that would not be political suicide to submit a similar bill in parliament. A couple years later most Canadians don't remember about the bill passing, some complain about the higher price of meat, but you notice the rate of gout decreased 15% in clinic, and you accept to mentor a group of med students in their fight for antibiotic-free agricultural practices.

## Take-Home Points and Next Steps

Let's review some of the main points of this podcast.

1. Whether you are a medical student, resident, clinician, or anything else, you can advocate for systematic changes to decrease climate change! The benefits of being environmentally-minded early on in your career especially allow your efforts to accrue maximal benefits over time, and avoid becoming jaded or stuck in environmentally harmful habits.
2. When advocating for societal change, it is possible to affect policy by targeting decision-makers, or to outreach by focusing on changing societal norms by affecting attitude, behaviours and cognition. In climate change advocacy, it is possible to focus on preventing climate change, called mitigation, or to help society become resilient to climate change, called adaptation.
3. There are many societal contributors to climate change (for example pollution in cities based on types of fuel used, meat vs. plant based diets) but the most important factors to consider for effective advocacy are selecting an evidence-based issue that you can remain passionate about for the long term, and conducting your advocacy project with the support of a multistakeholder team for a well rounded and sustainable approach.
4. You have the ability to green your workplace. In the office setting, reduce and monitor energy consumption, use efficient lighting, minimize paper use, reduce and recycle waste. In the OR, select more environmentally friendly anesthetic gases, reformulate surgical kits, reuse and reprocess materials that can be sterilized, and encourage the proper use of waste streams. In the laboratory setting, reuse materials, reject unnecessary tests, remove outdated tests, and educate clinicians on ordering appropriate tests. Finally, in the healthcare setting, be a champion and convert healthcare to electronic systems where appropriate, improve procurement policies, and improve the transportation fleet.
5. Disaster readiness is critical given that climate change increases the frequency and severity of extreme weather events. Physicians have an important role to play on committees that drive preparation for these in a timely manner, and

especially to advocate for special provisions for pediatric needs as children are impacted more severely during these events.

6. Climate mitigation and adaptation policy can have large impacts but often requires more organization and support from others- in other words, saving the world is a team sport! Refer to the advocacy 101 PedsCases podcast for more details.

Thanks for listening!

### **References:**

1. Ahdoot S, Pacheco SE. Global climate change and children's health. *Pediatrics*. 2015 Nov 1;136(5):e1468-84
2. Zhang Y, Bi P, Hiller JE. Climate Change and Disability—Adjusted Life Years. *Journal of Environmental Health*. 2007 Oct 1;70(3):32-8.
3. Sheffield PE, Landrigan PJ. Global climate change and children's health: threats and strategies for prevention. *Environmental health perspectives*. 2011 Mar;119(3):291-8.
4. Buka I, Shea KM. Global climate change and health in Canadian children. *Paediatrics & Child Health*. 2019 Dec 9;24(8):557-.
5. Ahdoot S, Pacheco SE. Global climate change and children's health: Technical report. *Pediatrics*. 2015 Nov 1;136(5):e1468-84
6. Mangus CW, Canares TL. Heat-related illness in children in an era of extreme temperatures. *Pediatrics in Review*. 2019 Mar; 40(3):97-107.
7. Nelson GC, Rosegrant MW, Koo J, Robertson R, Sulser T, Zhu T, Ringler C, Msangi S, Palazzo A, Batka M, Magalhaes M. Climate change: Impact on agriculture and costs of adaptation. *Intl Food Policy Res Inst*; 2009.
8. Etzel RA, Balk SJ. *Pediatric environmental health*, 4th Edition. Itasca IL: American Academy of Pediatrics; 2018.
9. Wynes S, Nicholas KA. The climate mitigation gap: education and government recommendations miss the most effective individual actions. *Environmental Research Letters*. 2017 Jul 12;12(7):074024.
10. Martens P, Su B, Deblomme S. The ecological paw print of companion dogs and cats. *BioScience*. 2019 Jun 1;69(6):467-74.
11. Thomsen KE, Rose J, Mørck O, Jensen SØ, Østergaard I, Knudsen HN, Bergsøe NC. Energy consumption and indoor climate in a residential building before and after comprehensive energy retrofitting. *Energy and Buildings*. 2016 Jul 1;123:8-16.
12. Centers for Disease Control and Prevention. Natural Disasters and Severe Weather. Available from: <http://emergency.cdc.gov/disasters/extremeheat/index.asp> [Accessed August 31, 2020].

13. Centers for Disease Control and Prevention. Division of Vector-Borne Diseases (DVBD). Available from: [www.cdc.gov/ncezid/dvbd/index.html](http://www.cdc.gov/ncezid/dvbd/index.html) [Accessed August 31, 2020]
14. Air Now. Home Page | AirNow.gov. Available from: <https://www.airnow.gov> [Accessed August 31, 2020]
15. American Society of Pediatrics. Children and Disasters: Disaster Preparedness to Meet Children's Needs. Available from: <https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/Children-and-Disasters/Pages/default.aspx> [Accessed August 31, 2020]
16. Department of Homeland Security. Ready. Available from: <https://www.ready.gov> [Accessed August 31, 2020]
17. Carrico AR, Spoden M, Wallston KA, Vandenberg MP. The environmental cost of misinformation: why the recommendation to use elevated temperatures for handwashing is problematic. *International journal of consumer studies*. 2013 Jul;37(4):433-41.
18. Laestadius JG, Dimberg L. Hot water for handwashing—where is the proof?. *Journal of Occupational and Environmental Medicine*. 2005 Apr 1;47(4):434-5.
19. Michaels B, Gangar V, Schultz A, Arenas M, Curiale M, Ayers T, Paulson D. Water temperature as a factor in handwashing efficacy. *Food Service Technology*. 2002 Sep;2(3):139-49.
20. My Green Doctor. My Green Doctor. Available from: [Mygreendoctor.org](http://Mygreendoctor.org) [Accessed August 31, 2020]
21. Practice Green Health. Implementation module: Medical device reprocessing. Available from: [https://practicegreenhealth.org/sites/default/files/2019-03/gorimpmo-meddevicerepr\\_r5\\_web.pdf](https://practicegreenhealth.org/sites/default/files/2019-03/gorimpmo-meddevicerepr_r5_web.pdf) [Accessed August 31, 2020]
22. Practice Green Health. Implementation Module: OR Kit Reformulation. Available from: [https://practicegreenhealth.org/sites/default/files/upload-files/gorimpmo-kitreform\\_r5\\_web.pdf](https://practicegreenhealth.org/sites/default/files/upload-files/gorimpmo-kitreform_r5_web.pdf) [Accessed August 31, 2020]
23. Kagoma Y, Stall N, Rubinstein E, Naudie D. People, planet and profits: the case for greening operating rooms. *Cmaj*. 2012 Nov 20;184(17):1905-11.
24. Practice Green Health. Less Food to Landfill. Available from: [https://practicegreenhealth.org/sites/default/files/upload-files/less-food-to-landfill-get-started-guide\\_0.pdf](https://practicegreenhealth.org/sites/default/files/upload-files/less-food-to-landfill-get-started-guide_0.pdf) [Accessed August 31, 2020]
25. Practice Green Health. Anesthetic gas how-to guide: A guide to climate-smart anesthesia care. Available from: [https://practicegreenhealth.org/sites/default/files/2019-04/anesthetic\\_gas\\_how-to.pdf](https://practicegreenhealth.org/sites/default/files/2019-04/anesthetic_gas_how-to.pdf) [Accessed August 31, 2020]
26. MacNeill AJ, Lillywhite R, Brown CJ. The impact of surgery on global climate: a carbon footprinting study of operating theatres in three health systems. *The Lancet Planetary Health*. 2017 Dec 1;1(9):e381-8.
27. Practice Green Health. Less Waste. Available from: [https://practicegreenhealth.org/sites/default/files/2019-03/hhi-booklet-waste-bu\\_v3.0\\_full.pdf](https://practicegreenhealth.org/sites/default/files/2019-03/hhi-booklet-waste-bu_v3.0_full.pdf) [Accessed August 31, 2020]

28. Practice Green Health. Guide to Batteries in Healthcare. Available from: <https://practicegreenhealth.org/sites/default/files/pubs/epp/guidetobatteries.pdf> [Accessed August 31, 2020]
29. Practice Green Health. Planning A Battery Recycling Program for Your Health Care Facility. Available from: <https://practicegreenhealth.org/sites/default/files/2019-02/planbatteryrecycling.pdf> [Accessed August 31, 2020]
30. Practice Green Health. Implementation Module: Moving (Back) to Reusables in the OR. Available from: [https://practicegreenhealth.org/sites/default/files/2019-03/gorimpmo-reusablegowns\\_r5\\_web.pdf](https://practicegreenhealth.org/sites/default/files/2019-03/gorimpmo-reusablegowns_r5_web.pdf) [Accessed August 31, 2020]
31. Alberta Medical Association. Accelerating Change Transformation Team. Available from: [actt.albertadoctors.org](http://actt.albertadoctors.org) [Accessed August, 2020]
32. McLennan S. Medical voluntourism in Honduras: 'Helping' the poor?. *Progress in Development Studies*. 2014 Apr;14(2):163-79.
33. Solomon S, Plattner GK, Knutti R, Friedlingstein P. Irreversible climate change due to carbon dioxide emissions. *Proceedings of the national academy of sciences*. 2009 Feb 10;106(6):1704-9.
34. Drebot MA, Lindsay R, Barker IK, Buck PA, Fearon M, Hunter F, Sockett P, Artsob H. West Nile virus surveillance and diagnostic: A Canadian perspective. *Canadian Journal of Infectious Diseases*. 2003 Mar;14.
35. Lopez JB, Jackson D, Gammie A, Badrick T. Reducing the environmental impact of clinical laboratories. *The Clinical Biochemist Reviews*. 2017 Feb;38(1):3.
36. McAlister S, Barratt AL, Bell KJ, McGain F. The carbon footprint of pathology testing. *Medical Journal of Australia*. 2020 May;212(8):377-82.
37. Waller DM, Reo NJ. First stewards: ecological outcomes of forest and wildlife stewardship by indigenous peoples of Wisconsin, USA. *Ecology and Society*. 2018.
38. Domínguez L, Luoma C. Decolonising Conservation Policy: How Colonial Land and Conservation Ideologies Persist and Perpetuate Indigenous Injustices at the Expense of the Environment. *Land*. 2020 Mar;9(3):65.
39. Ruiz-Casares M, Radic I. Legal age for leaving children unsupervised across Canada. *CWRP Information Sheet E*. 2015 Mar;144.
40. Ho K, Minhas R, Young E, Sgro M, Huber JF. Paediatric hyperthermia-related deaths while entrapped and unattended inside vehicles: The Canadian experience and anticipatory guidance for prevention. *Paediatrics & Child Health*. 2020 Apr 10;25(3):143-8.
41. Practice Green Health. Case Study: Sustainable Food Procurement and Provision. Available from: [https://practicegreenhealth.org/sites/default/files/upload-files/casestudy.dhmc\\_sustainablefood.final\\_0.pdf](https://practicegreenhealth.org/sites/default/files/upload-files/casestudy.dhmc_sustainablefood.final_0.pdf) [Accessed August 31, 2020].
42. Practice Green Health. Balanced Menus. Available from: [https://practicegreenhealth.org/sites/default/files/2019-12/BalancedMenus\\_Hybrid\\_R8\\_Booklet\\_hiRes.pdf](https://practicegreenhealth.org/sites/default/files/2019-12/BalancedMenus_Hybrid_R8_Booklet_hiRes.pdf) [Accessed August 31, 2020]
43. Johns Hopkins Medicine. Johns Hopkins Medicine Recognized for Environmental Sustainability [press release] (2015 Jun 4) [cited 2020 Aug 30]. Available from:

[https://www.hopkinsmedicine.org/news/media/releases/johns\\_hopkins\\_medicine\\_recognized\\_for\\_environmental\\_sustainability](https://www.hopkinsmedicine.org/news/media/releases/johns_hopkins_medicine_recognized_for_environmental_sustainability)

44. Practice Green Health. Case Study: Better Meat: Expanding Antibiotic Stewardship. Available from: [https://practicegreenhealth.org/sites/default/files/2018-12/Hackensack%20UMC\\_better%20meat%20case%20study.pdf](https://practicegreenhealth.org/sites/default/files/2018-12/Hackensack%20UMC_better%20meat%20case%20study.pdf) [Accessed August 31, 2020]
45. Government of Canada. Get Prepared. Available from: <https://www.getprepared.gc.ca/> [Accessed August 31, 2020]
46. Government of Canada. Air Quality Health Index. Available from: [https://weather.gc.ca/airquality/pages/index\\_e.html](https://weather.gc.ca/airquality/pages/index_e.html) [Accessed August 31, 2020]
47. Craig WJ. Health effects of vegan diets. *The American journal of clinical nutrition*. 2009 May 1;89(5):1627S-33S.
48. Rao V, Al-Weshahy A. Plant-based diets and control of lipids and coronary heart disease risk. *Current atherosclerosis reports*. 2008 Dec 1;10(6):478-85.
49. Barnard ND, Katcher HI, Jenkins DJ, Cohen J, Turner-McGrievy G. Vegetarian and vegan diets in type 2 diabetes management. *Nutrition reviews*. 2009 May 1;67(5):255-63.
50. Le LT, Sabaté J. Beyond meatless, the health effects of vegan diets: findings from the Adventist cohorts. *Nutrients*. 2014 Jun;6(6):2131-47.
51. Satija A, Hu FB. Plant-based diets and cardiovascular health. *Trends in cardiovascular medicine*. 2018 Oct 1;28(7):437-41.
52. Kellar A, Boone K, Betcherman L, Spenard S, Cyr A, Piché-Renaud PP, Moore-Hepbrun C. La Défense d'Intérêts : Partie 1 Élaborer une Bonne Idée. *PedsCases: Pediatric Education Online*. 2019 Jan 30.
53. Boone K, Betcherman L, Kellar A, , Moore-Hepbrun C. La Défense d'Intérêts : Partie 2 Planifier votre projet. *PedsCases: Pediatric Education Online*. 2019 Feb 6.
54. Boone K, Betcherman L, Kellar A, , Moore-Hepbrun C. La Défense d'Intérêts : Partie 3 Mise en place et évaluation de votre projet. *PedsCases: Pediatric Education Online*. 2019 Feb 17.
55. Kellar A, Boone K, Betcherman L, Moore-Hepbrun C. Advocacy 101: Part 1 Generating a "Good" Idea. *PedsCases: Pediatric Education Online*. 2019 Jan 30.
56. Boone K, Betcherman L, Kellar A, , Moore-Hepbrun C. Advocacy 101: Part 2 Designing and planning your project. *PedsCases: Pediatric Education Online*. 2019 Feb 6.
57. Boone K, Betcherman L, Kellar A, , Moore-Hepbrun C. Advocacy 101: Part 3 Implementing and Evaluating Your Project. *PedsCases: Pediatric Education Online*. 2019 Feb 17.
58. Braz LG, Braz JR, Cavalcante GA, Souza KM, Lucio LM, Braz MG. Comparison of waste anesthetic gases in operating rooms with or without an scavenging system in a Brazilian University Hospital. *Revista Brasileira de Anestesiologia*. 2017 Oct;67(5):516-20.