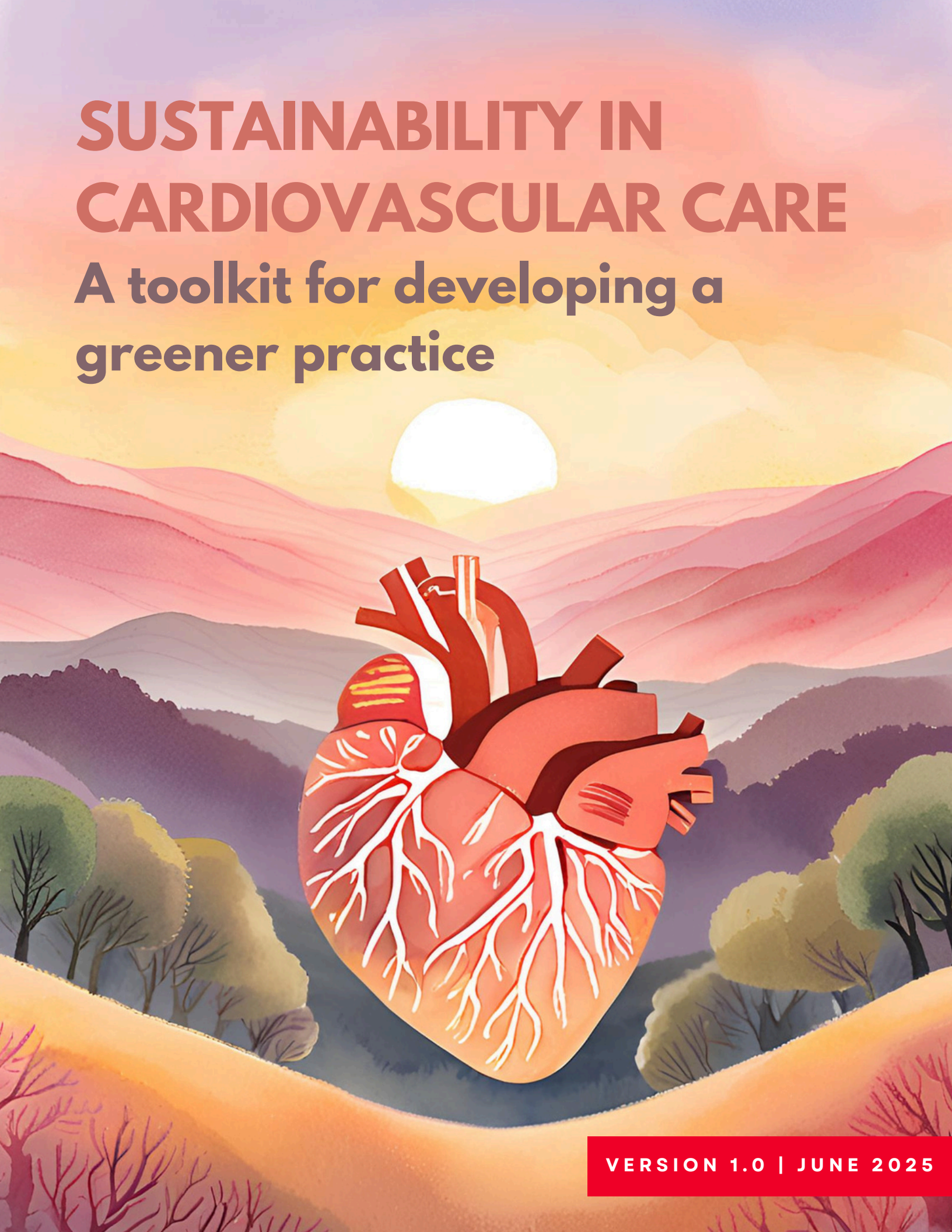
SUSTAINABILITY IN CARDIOVASCULAR CARE

A toolkit for developing a greener practice



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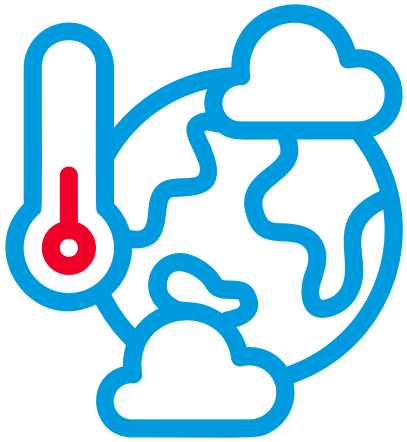
PURPOSE AND SCOPE

Climate change is the biggest threat to humanity in the modern day. Almost every sector in our community has contributed to the climate crisis in one way or another — and the health care system is no exception. We are only just beginning to understand the ways in which the state of our planet can profoundly impact human health.

The purpose of this guidebook, which is a living document that will continuously be updated, is to focus on three broad domains in which sustainable recommendations can be implemented: general cardiology (including both inpatient and outpatient settings), cardiac surgery, and procedural labs. Some of these recommendations can be implemented from day one, while others will require careful planning with multiple stakeholders to execute.

This guidebook also represents a call to action — it is imperative that cardiovascular specialists embrace environmentally conscious approaches to patient care. Collaboration is key: healthcare providers will need to work alongside hospital administrators and suppliers to enact long-term solutions to the current climate crisis.

ADVANCING HEALTH CARE IN A SUSTAINABLE FUTURE



WHY IS THIS IMPORTANT?

The recent COVID-19 pandemic has taught us that we can focus the health care system's attention on a clear purpose when there is a looming threat. Climate action is required from all sectors of society, including health care. This effort is crucial in order to achieve the Canadian government's goal of net-zero carbon emissions goal by 2050. In addition, building climate-resilient health care institutions and supply chains is urgently needed to prevent disruption by extreme weather events.

In Canada, health care systems contribute 4.6% of greenhouse gas (GHG) emissions, which is higher than both the airline and shipping industries. This puts Canada as one of the worst per-capita healthcare polluters in the world. Accordingly, the Canadian Medical Association has advocated for a net-zero healthcare system. The influence that health care can have in reducing emissions is significant and should not be dismissed.

New government accreditation standards across federal, provincial, and municipal levels now require health care organizations to integrate environmental stewardship into their strategic plans. This will affect enterprise risk management plans, capital investment plans, procurement policies, practices, and budgeting. Health care governing boards, senior executives, and clinical staff all play a key role that extends beyond the boundaries of their organizations.

As trusted leaders, health care professionals have the power to inspire positive change among staff, patients, visitors, suppliers, and entire communities. With its public reach, the health care system is uniquely positioned to set a strong example of environmental stewardship. Together, we can not only improve the cardiovascular health of our society but also improve the health of our planet.

HEALTH CARE MUST ACKNOWLEDGE THE NEEDS OF PEOPLE AND THE PLANET

REWARDS AND BARRIERS TO ACTING NOW

REWARDS

SUSTAINABLE HEALTH CARE PRACTICES OFTEN BENEFIT BOTH THE PATIENT AND THE PLANET

- Leadership in your local community which fosters positive staff culture
- Locking yourself into future net-zero pathways and supply chains with increased resiliency

"Improving planetary health benefits the cardiovascular health of Canadians - the air they breathe, the water they drink, the activities they can pursue. This guidebook outlines strategies cardiovascular specialists can use to reduce waste, improve energy efficiency, and increase the sustainability of professional practices. Through these changes, they will become champions for cardiovascular and planetary health."

-Thomas Green, Senior Climate Advisor,
David Suzuki Foundation

BARRIERS

SOLUTIONS

Upfront investment costs are unjustifiably expensive	Strategic planning can mitigate many costs and optimize long-term payoffs
Climate anxiety can demoralize staff, leading to decreased efficiency	Involving staff in the planning of sustainable interventions can promote a culture of resiliency

ACTION ITEMS

Items marked with a star are sourced from the latest Choosing Wisely Canada recommendations!

GENERAL CARDIOLOGY

UNIVERSAL RECOMMENDATIONS

- ☐ Engage in conversations regarding your patient's prognosis, preferences, and goals of care [1]
- ☐ Consider switching to energy-efficient LED light bulbs in your facility, and turn off lights when not in use or switch to motion-activated lights that automatically shut off [9]
- ☐ Appoint departmental or in-office "Green Leaders" who can oversee the implementation of new sustainability initiatives and provide guidance where needed
- ☐ Monitors and other devices (e.g. computers, printers) should be unplugged when not in use rather than be left in standby mode to prevent the "phantom load" effect [9]

- ☐ Minimize the printing of reports/results, including ECGs, Holter reports, patient charts, prescriptions, and educational materials; utilize electronic alternatives when possible
- ☐ Avoid using non-sterile disposable gloves when hand hygiene is sufficient [1]
- ☐ Implement relevant teaching on sustainable healthcare in cardiology curricula or other academic events → one example can be found at https://ccs.ca/climate-change/
- ☐ Avoid disposing medications in sinks, drains, toilets, or garbage bins and ensure patients are aware that their community pharmacies can safely dispose of medications
- ☐ Consider using video communication technologies in place of in-person conferences and meetings where possible

INPATIENT RECOMMENDATIONS

- ☐ Collaborate with stakeholders such as hospital administration to implement a greater variety of plant-rich food options, such as those featured in the Mediterranean diet, in hospital menus, as they have been shown to have beneficial effects on overall cardiovascular health [8]
- ☐ Consider biking or walking to/from the hospital or arranging ride-share opportunities for staff. Provide the necessary infrastructure (e.g. bike racks, lockers) for staff who choose to bike to work [9]

More information on elements of green healthcare facilities, including leadership, supply chains, building design, and food, can be found HERE.

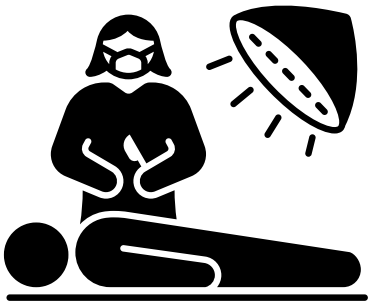
INPATIENT RECOMMENDATIONS (CONT.)

- [ ] Consider investing in EV charging stations for the hospital parking, or provide discounts on parking rates for staff who choose to commute to work via more sustainable means [9]
- [ ] Use reusable hospital gowns where possible
- [ ] Replace intravenous drugs with oral alternatives when possible [10]
- [ ] Aim to discharge patients on the same medications they were previously on rather than a new medication of the same class if the original would have been equally effective
- [ ] Myoglobin or CK-MB should not be tested when diagnosing acute myocardial infarction (AMI). Instead, use troponin I or T [1]
- [ ] Avoid performing stress cardiac imaging or advanced non-invasive imaging as a pre-operative assessment in patients scheduled to undergo low-risk non-cardiac surgery [1]
- [ ] Avoid stress cardiac imaging or advanced non-invasive imaging in the initial evaluation of asymptomatic patients unless high-risk markers are present [1]
- [ ] Routine daily blood tests on hospitalized patients may not be required if they will not change management. Consider being selective when choosing blood tests, rather than ordering comprehensive sets of bloodwork [1]

OUTPATIENT RECOMMENDATIONS

- [ ] Consider offering home-based cardiac rehabilitation programs for adults with myocardial infarction, angina, heart failure, or those who have undergone revascularization [1]
- [ ] Consider conducting virtual assessments rather than in-person visits where equivalent clinical value is offered and is preferred by the patient [1]
- [ ] Consider the benefits of daily exercise, plant-rich diets, and nature prescribing for management of hypertension and dyslipidemia [11, 12]
- [ ] Aim to recycle the paper used on exam tables whenever possible, or avoid using paper altogether in favour of environmentally-safe disinfectants
- [ ] Promote deprescribing practices where applicable, and work with patients to opt for lifestyle changes that can contribute towards preventing CVD progression → one example can be found at https://www.healtheuniversity.ca/en/cardiaccollege [3]
- [ ] Avoid performing annual ECGs for low-risk patients without symptoms [1]
- [ ] Avoid annual stress cardiac imaging or advanced non-invasive imaging as part of routine follow-up in asymptomatic patients [1]
- [ ] Avoid performing echocardiography as routine follow-up for mild, asymptomatic native valve disease in adult patients with no change in signs or symptoms [1]

CARDIAC SURGERY



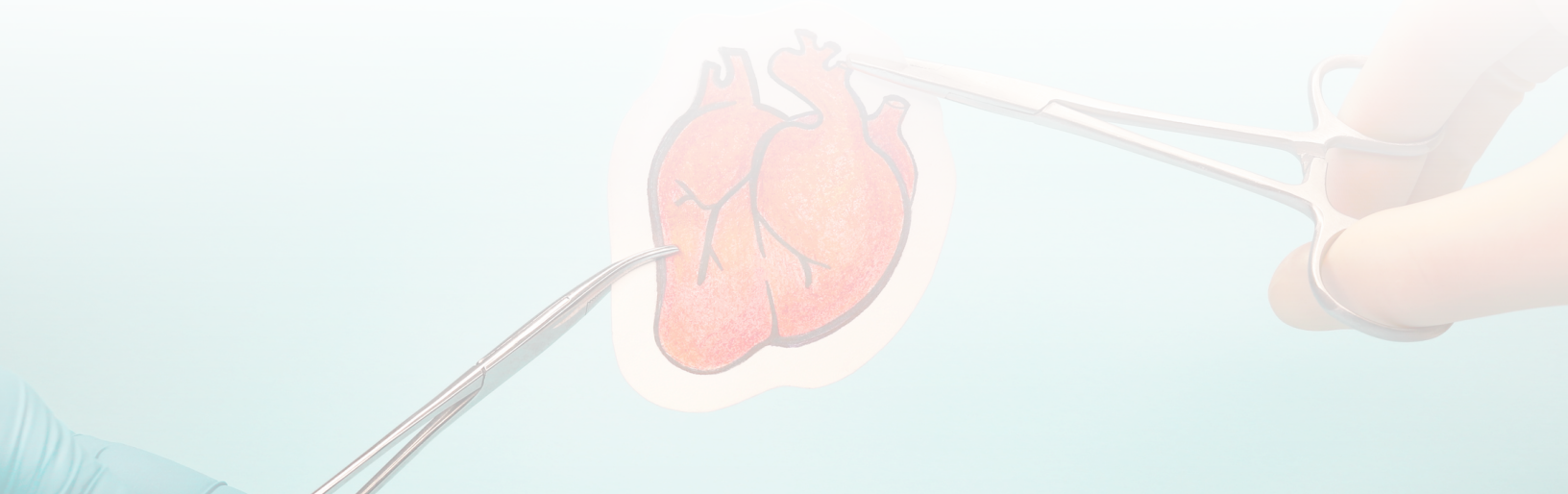
- ☐ **Consider switching over to reusable surgical gowns and other surgical equipment/tools in the operating room → studies show that the majority of emissions stemming from cardiac surgery (i.e. excluding anesthetic emissions) arise from single-use surgical equipment [4]**

- ☐ **Avoid insufflation of the cardiac surgical field using CO_2 for cerebral protection, as it does not appear to result in better patient outcomes compared to standard de-airing maneuvers [7]**

- ☐ **Adopt personalized OR "pick lists" in which OR staff can specify their desired equipment to decrease the consumption of redundant/unused surgical tools**

  ↳ **Broad reductions in the usage of surgical instruments such as retractors or clamps can greatly decrease waste generation and costs associated with sterilization but also contribute towards a more efficient surgery [6]**

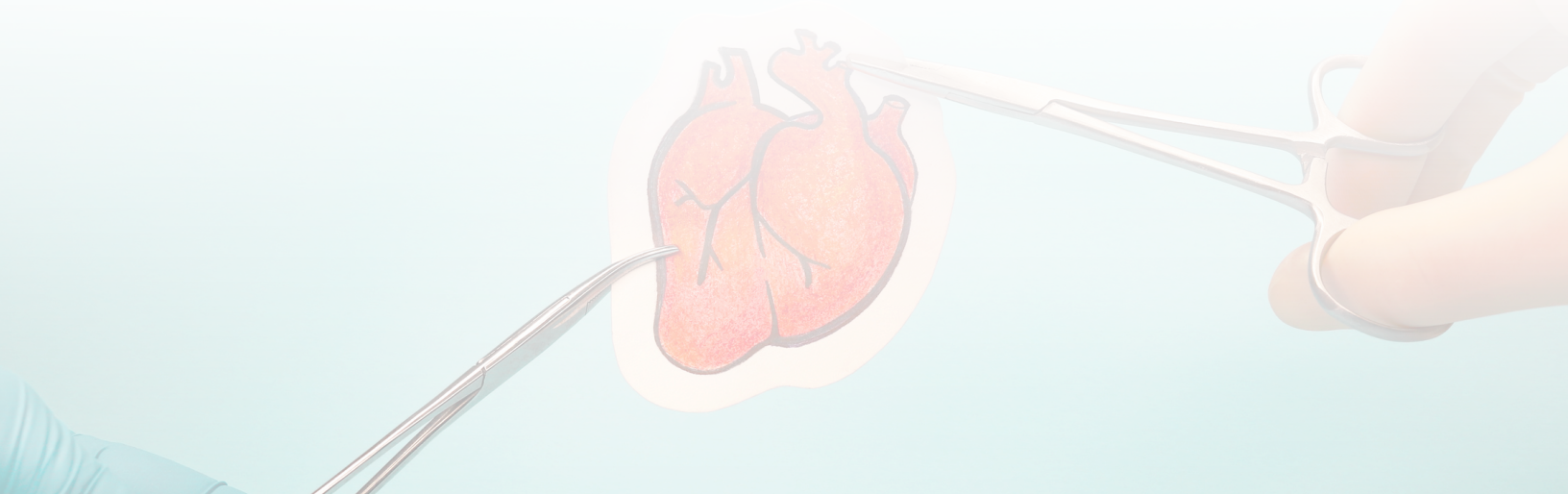
The "Green Surgery Checklist" prepared by the Society for Cardiothoracic Surgery in Great Britain & Ireland can be found HERE.



CATHETERIZATION LAB

- [ ] **Promote a culture of sustainability in the cath lab that examines areas in which changes can be safely implemented [4]**
- [ ] **Conduct QI initiatives to evaluate whether sustainability goals are being met in the cath lab and where improvements could be made [5] → track resource utilization, captured recyclables, waste generation, etc., and compare to provincial/national benchmarks, if available**
- [ ] **Reduce the need for paper instructions in catheter kits by switching to digital instructions and collaborate with medical suppliers to minimize packaging waste through specialized procurement contracts [2]**
- [ ] **Collaborate with recycling facilities to streamline the recycling of precious metals, plastic or electrical components, and packaging from catheter electrodes → however, it is important to ensure that the companies responsible for this are thoroughly vetted beforehand. An alternative to this could be recycling buy-back programs [2]**
- [ ] **Collaborate with suppliers to customize cath lab kits such that seldom-used/redundant items are excluded [4]**

Consider writing to suppliers to recommend reductions in packaging! A sample letter template can be found HERE.



APPROPRIATE USE CRITERIA

The Appropriate Use Criteria are a series of documents prepared by the American College of Cardiology in conjunction with relevant sub-specialty societies. These Criteria are designed to evaluate the clinical indications for testing and interventions in order to decrease unnecessary or wasteful practices. Below are five key Appropriate Use Criteria outlined for consideration.

1. APPROPRIATE USE CRITERIA FOR THE DETECTION AND RISK ASSESSMENT OF CHRONIC CORONARY DISEASE: LINK
2. APPROPRIATE USE CRITERIA FOR MULTIMODALITY IMAGING IN THE ASSESSMENT OF CARDIAC STRUCTURE AND FUNCTION IN NONVALVULAR HEART DISEASE: LINK
3. APPROPRIATE USE CRITERIA FOR MULTIMODALITY IMAGING IN VALVULAR HEART DISEASE: LINK
4. APPROPRIATE USE CRITERIA FOR CORONARY REVASCULARIZATION IN PATIENTS WITH STABLE ISCHEMIC HEART DISEASE: LINK
5. APPROPRIATE USE CRITERIA FOR CORONARY REVASCULARIZATION IN PATIENTS WITH ACUTE CORONARY SYNDROMES: LINK

A comprehensive list of the Appropriate Use Criteria can be found in the Journal of the American College of Cardiology. Note that these criteria may not be entirely applicable in the Canadian context.

NEXT STEPS

When considering the action items in this guidebook, think about:

- *What does our organization need in order to address this action item?*
- *Who do we need to work with both inside and outside our organization to make it happen?*
- *What impact can we expect to have on patients, staff, our community and our bottom line?*
- *How can we encourage green learning, creativity and innovation?*

HOW CAN WE DEVELOP A CULTURE OF SUSTAINABILITY?

In addition to creating a strategy and leadership roles, an organization needs to develop a culture of environmental stewardship in order to get to net zero in all aspects of their operation. Small actions can begin immediately and contribute towards achieving this end goal. Engagement of frontline staff and leaders through education, green teams, peer support and communication can be a call to action. Working towards the adoption of a net-zero strategy by establishing targets, measuring results, and engaging staff to lead projects can affirm that environmental stewardship is an important priority. Implementing and sustaining these kinds of changes must be iterative (ongoing) and bi-directional (top-down and bottom-up).

GLOSSARY

Accreditation Standards - Accreditation Canada surveys hospitals to rate them on the extent to which they meet national standards for quality and hospital operations. New Standards regarding environmental stewardship were adopted for leadership in 2021 and for governing bodies in 2022.

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 - Most hospitals have millions invested in their foundations, thus, by moving money from standard portfolios to low-carbon portfolios, significant greenhouse gases are saved.

Green Hospital Scorecard - The annual benchmarking survey of environmental performance carried out by the Canadian Coalition for Green Health Care provides both comparative and retrospective information for participants.

Greenhouse Gas (GHG) Emissions - GHGs are made up of carbon dioxide (CO2), nitrous oxide (N2O), methane (CH4) and fluorinated greenhouse gases (F-GHGs).

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

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.

Net-Zero - Achieving a balance between the greenhouse gas emissions put into the atmosphere and those taken out. CO2 emissions make up over 80% of GHGs and can be broken down into Scope 1 direct emissions (i.e. heating and cooling), Scope 2 indirect emissions (i.e purchased from utilities), and Scope 3 emissions generated from the operations of the company (i.e. supply chain, travel). In order to prevent the worst climate damages, global net human-caused emissions of carbon dioxide (CO2) need to fall by about 45 percent from 2010 levels by 2030, reaching net-zero around 2050.

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. For example, switching MDI inhalers to low carbon alternatives .

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.

ORGANIZATIONS WITH KEY RESOURCES

LEADERSHIP

- Leadership strategy - https://greenhealthcare.ca/wp-content/uploads/2024/11/EN_Streamline-your-journey-guidebook_2024.pdf
- Divesting from fossil fuels, investing in green energy - https://greenhealthcare.ca/phase-out-fossil-fuel-investments/

EDUCATION

- **Choosing Wisely Canada** - https://choosingwiselycanada.org/recommendations/
- **Calculating your footprint** - https://healthcareclimateaction.org/checkup

SUPPLY CHAIN

- **Procurement contracts** - https://sustainabilityadvantage.com/sp/case/
- **Reusable gowns** - https://journals.sagepub.com/doi/full/10.1177/014107682110015 83
- **Reusable items & OR pick lists** - https://sustainablehealthcare.org.uk/what-we-do/green-surgery-challenge

BUILDINGS AND ENERGY

- **New buildings** - https://www.cagbc.org (see 'zero-carbon')
- **Energy manager, heating systems, and LED lights** - https://practicegreenhealth.org/topics/energy/energy
- **Green office implementations** - https://peach.healthsci.mcmaster.ca/our-impact/guidebooks/ (see 'Green Office Toolkit')

DRUGS AND DEVICES

- **Deprescribing strategy** - https://www.deprescribingnetwork.ca/
- **Anesthetic gases** - https://peach.healthsci.mcmaster.ca/ideal-green-health-facility/ (see 'Drugs & Devices)

FOOD

- **Plant rich diets** - https://www.nourishleadership.ca/sustainable-menus and https://www.toronto.ca/legdocs/mmis/2017/hl/bgrd/backgroundfile-109103.pdf
- **Composting** - https://greenhealthcare.ca/wp-content/uploads/2017/07/CCGHC-Organic-Waste-Case-Study-June17-2013-FINAL.pdf

TRANSPORT

- **Active Transport** - https://cape.ca/resource/active-travel-toolkit-en/
- **EV chargers** - https://chasecanada.org/wp-content/uploads/2021/03/ZEV-BACKGROUNDER-ENG.pdf

NATURE-BASED SOLUTIONS

- **Green space** - https://bcgreencare.ca/wp-content/uploads/2021/10/Green-Design-for-Climate-Resilience-and-Well-being.pdf

RESILIENCY

- **Healthcare Facility Resiliency Toolkit** - https://greenhealthcare.ca/climate-change-resiliency-toolkit/

MORE KEY GREEN ORGANIZATIONS

- https://nordicshc.org/
- **ANZICS Sustainability Toolkit** - A beginners guide to sustainability in the ICU ABN: 19 657 679 556 ISBN: 978-1-876980-56-6

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PEACH

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Canadian Society of Echocardiography

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