

SUSTAINABLE ANATOMICAL PATHOLOGY

Why • The Case for Change
What • The Tools for Change
How • The Strategy for Change

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NAVIGATION



Click on a topic on the table found on the right to navigate the document

<u>Introduction</u>	3
<hr/>	
<u>Why: The Case for Change</u>	5
<ul style="list-style-type: none">• Climate change and healthcare• Calculating and reducing GHG emissions in Anatomical Pathology	
<hr/>	
<u>What: The Tools for Change</u>	8
<ul style="list-style-type: none">• Reduce unnecessary testing<ul style="list-style-type: none">◦ Create an evidence-based list of material exempt from submission from the operating room to the lab◦ Create an evidence-based list of material exempt from microscopic examination◦ Ensure appropriate specimen submission practice• Follow other sustainable lab practices<ul style="list-style-type: none">◦ Waste management◦ Energy conservation◦ Water conservation◦ Sustainable procurement and asset management◦ Other: green chemistry, sustainable travel, sustainable events	
<hr/>	
<u>How: The Strategy for Change</u>	<u>25</u>
<ul style="list-style-type: none">• Governance and networking• Education• Green lab certification and incentives• Quality assurance	
<hr/>	



INTRODUCTION

CASCADES develops playbooks as step-by-step guides to implementing well-evidenced change ideas for high-quality, low-carbon, sustainable and/or climate-resilient healthcare and health systems.

Playbooks are developed in collaboration with partners and experts and include key sustainability opportunities, references to evidence, examples, and implementation resources.

CASCADES developed guidelines for [Integrating Environmental Sustainability into Clinical Laboratories](#), an in-depth discussion of actions that clinical labs can take to be more sustainable. Most of these guidelines are also applicable to anatomical pathology (AP) labs.

This Playbook comprises a summary of information relevant to AP, with added actions specific for AP labs to reduce greenhouse gas (GHG) emissions and other harmful environmental effects.

The target audience for this Playbook are anatomical pathologists, and anatomical pathology laboratory technical managers and supervisors.



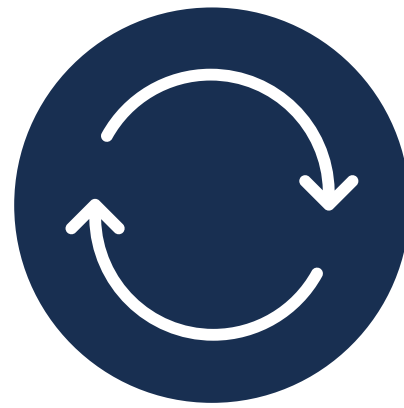
Suggested citation

Laurette Geldenhuys, Erica Schollenberg, Gillian Bethune, Maxine Adams-Small, Syndy Leblanc, Katherine Chornenko, Michael Bonert. Sustainable Anatomical Pathology. Version 1.0 (2025). [Internet]. CASCADES (Creating a Sustainable Canadian Health System in a Climate Crisis). [DATE]. Available from <https://cascadescanada.ca/resources/sustainable-anatomical-pathology/>





PLAYBOOK STRUCTURE



WHY

The Case for Change

An introduction to the issue being addressed in the playbook



WHAT

The Tools for Change

A structured presentation of the opportunities for action and resources to plan and implement change



HOW

The Strategy for Change

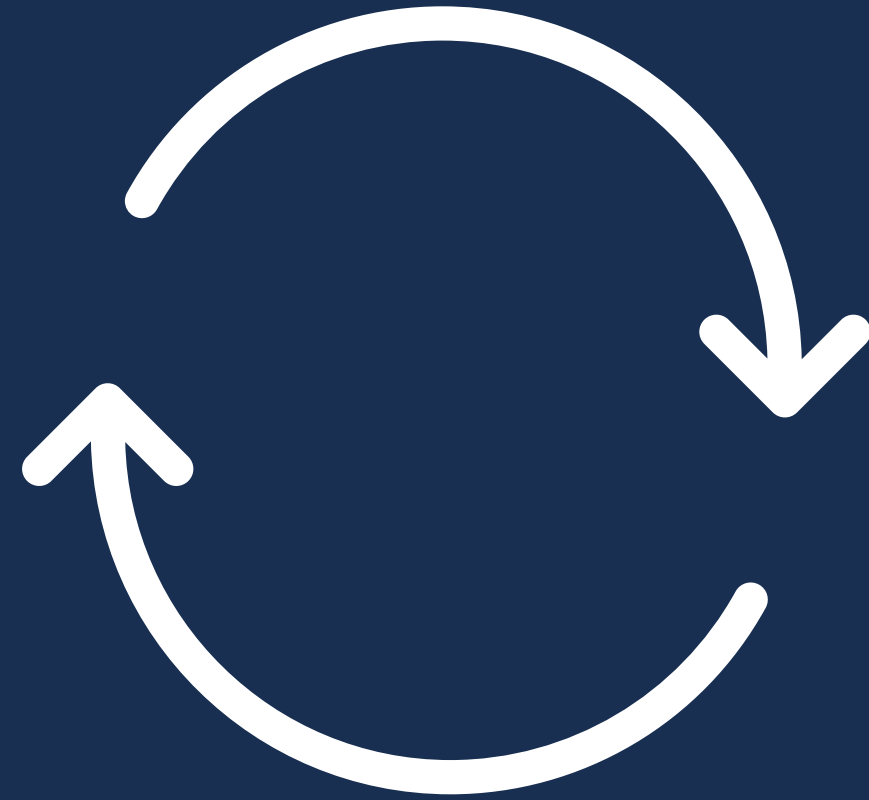
An outline of strategies for sustaining change





WHY

The Case for Change



- 1 Climate Change and Healthcare
- 2 Calculating and Reducing Greenhouse Gas Emissions in Anatomical Pathology





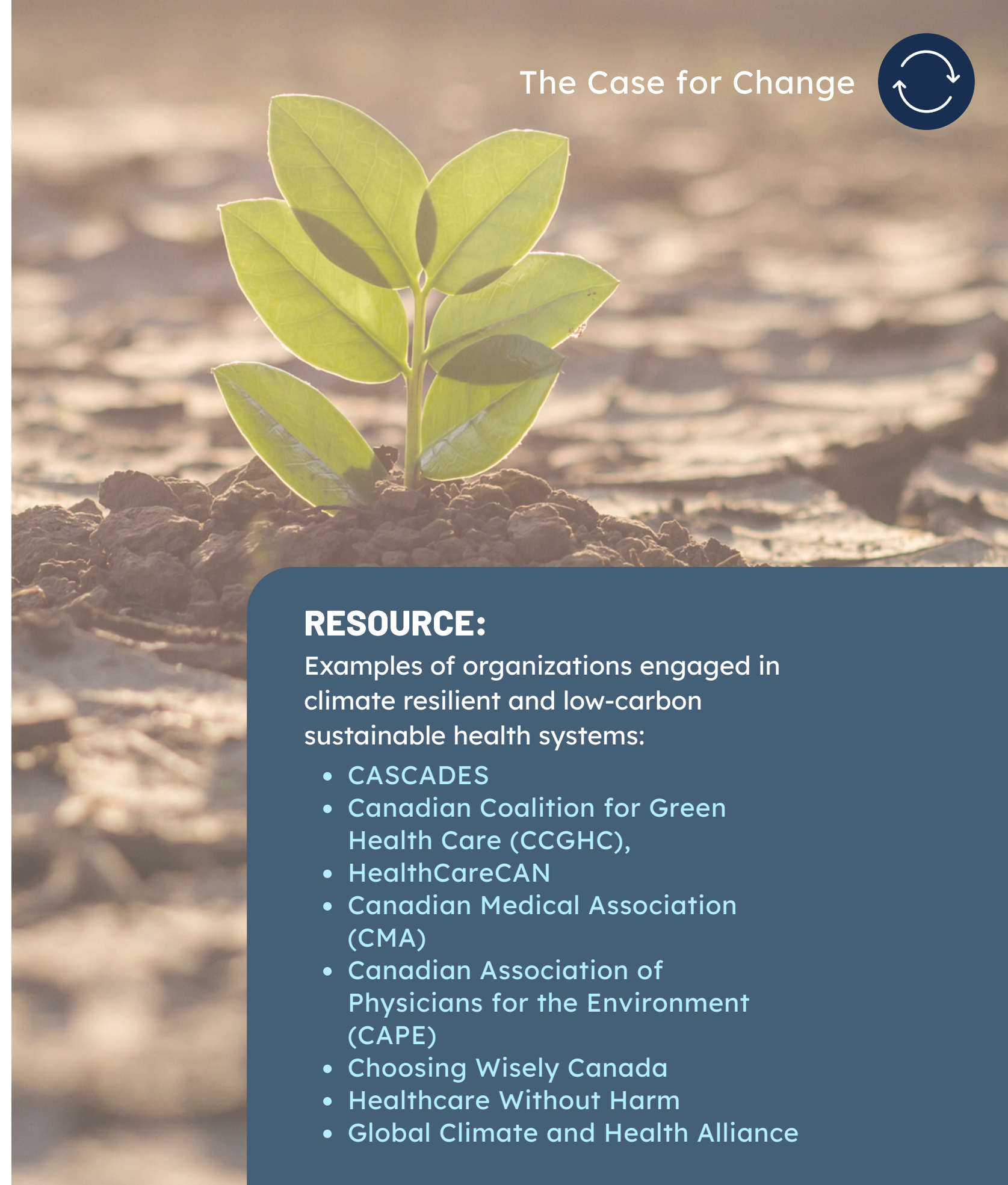
Climate Change and Healthcare



This section makes a case for why members of the **AP lab team** should be concerned about the health effects of climate change and GHG emissions and other environmentally harmful effects of healthcare and be involved in green healthcare activities.

The World Health Organization (WHO) has identified climate change as this century's single biggest **health threat**. Climate change results in increasing heat domes, droughts, wildfires, floods, sea level rise and infectious diseases. **Vulnerable** communities who contributed least to climate change are most at risk from the effects. Canada is warming at more than **twice** the global rate.

The **health system** is responsible for **4.6%** of Canada's total GHG emissions, more than both aviation and shipping. In 2021, at COP26 Canada was one of more than 50 countries to sign on to the WHO's [Alliance for Transformative Action on Climate and Health](#), an initiative to develop climate resilient and low-carbon sustainable health systems. (1)



RESOURCE:

Examples of organizations engaged in climate resilient and low-carbon sustainable health systems:

- CASCADES
- Canadian Coalition for Green Health Care (CCGHC),
- HealthCareCAN
- Canadian Medical Association (CMA)
- Canadian Association of Physicians for the Environment (CAPE)
- Choosing Wisely Canada
- Healthcare Without Harm
- Global Climate and Health Alliance





Calculating and Reducing Greenhouse Gas Emissions in AP

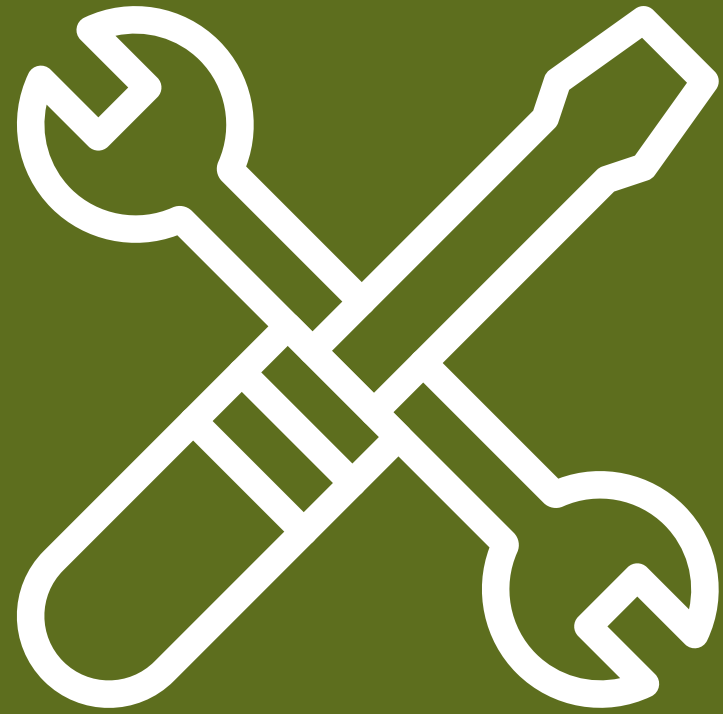


Constance Béchu and colleagues estimated the **carbon footprint of a surgical pathology lab** in Lille, France in 2021. (1) They found that the ratio of the carbon footprint of the lab to that of the hospital was proportional to its relative surface area. The greatest contribution was the supply chain, particularly that of chemicals, and particularly monoclonal antibodies used for immunohistochemistry (IHC). Staff commuting, specimen transportation, ultra-low freezers and cryostats also contributed significantly.

Alexis Trecourt and colleagues evaluated the carbon footprint of a **routine histology section, a frozen section, and an IHC section** at a surgical pathology lab in Lyon, France in 2021. (2) They found that a frozen section examination produced almost 3 times the emissions of a routine section. They mention that in addition to global warming potential, other effects of AP lab practices to consider include “acidification, particulate matter, eutrophication, ozone depletion, ecotoxicity potential, and human health cancer and non-cancer effects.” They suggest several mitigation strategies, including reducing material received, reducing retention of material, recycling formalin, reducing electricity consumption and teleworking.

Other footprint estimations have been made for tests in clinical labs, and for gastrointestinal and prostate biopsies. (3-5) Cary Chisholm and colleagues describe environmental **stewardship activities** in a dermatopathology lab in Texas, USA. (6) The lab recycles formalin, xylene, alcohol, plastic, and paper, and made several efforts to reduce electricity consumption.





WHAT

The Tools for Change

- 1 Reduce Unnecessary Testing
- 2 Follow Other Sustainable Lab Practices





Reduce Unnecessary Testing

Create an evidence-based list of material exempt from submission from the operating room to the lab

Create an evidence-based list of material exempt from microscopic examination

Ensure appropriate specimen submission practice

Sustainable Lab Practices

Waste management

Energy conservation

Water conservation

Sustainable procurement and asset management

Other: Green chemistry, sustainable travel and sustainable events





Reduce Unnecessary Testing



CREATE AN EVIDENCE-BASED LIST OF MATERIALS EXEMPT FROM SUBMISSION FROM THE OR TO THE LAB

This section shares suggestions for specific actions that the AP lab team can take to reduce GHG emissions and other harmful environmental effects, and the first is to reduce unnecessary testing.

Choosing Wisely Canada guidelines are central to reducing unnecessary testing. In addition to the current guidelines there is much that can be done to choose wisely in the AP lab.

GENERAL PRINCIPLES

1. Laboratory resources, including pathologist and staff time, should be allocated where possible in proportion to the diagnostic and clinical importance of specimens.
2. Environmental impacts of laboratory workflows and diagnostic processes should be minimized where possible.
3. Not all tissues, organs, and/or objects removed from a patient during an operation or other medical procedure require submission to a pathology laboratory.
4. Both costs and diagnostic utility should be considered when formulating exemption lists. (See [OR exemption list resource](#))

OVERVIEW

It is standard practice to send any tissue or organ removed during a medical procedure to a pathology laboratory. Policies regarding exemption of certain specimens—diverting them directly to biohazardous waste incineration—vary widely between places. These policies are shaped by legal regulations, local conventions, and evidence of diagnostic value. This last factor, especially relative to cost, should be central to decision making on this topic, given the growing focus on improving efficacy, saving money, and reducing waste within the Canadian healthcare system.

For each type of specimen, the following monetary, environmental, and human workload costs should be considered: cost of transport to laboratory; cost of routine accessioning and workflow in the laboratory; cost of specimen preservation (refrigeration or fixation) for recommended four weeks after final report;^[1] cost of fixative and its environmentally responsible recycling or disposal; cost of paraffin, cassettes, slides, and stains; cost of long-term archiving; cost of over-diagnosis and follow-up on non-specific “findings”; and maybe most importantly, pathologists’ assistant, histotechnologist, pathologist, and support staff time.

For each type of specimen, the following utility factors should be considered: diagnostic value of gross examination; necessity and diagnostic value of microscopic examination; pre-test probability of uncovering unexpected pathology; pre-test probability of uncovering clinically actionable pathology; sensitivity of pathologic examination; risks associated with missing certain pathologies; and alternatives to examination in the laboratory.

There is no consensus cutoff for what percentage of unexpected pathology warrants examination of all cases in a category. Some have argued that even a pick-up rate of less than 0.5% (in gallbladders) is important, whereas others have argued the opposite for a similar diagnostic yield (in “benign” hysterectomies). (See [OR exemption list resource](#))





SUMMARY OF RECOMMENDATIONS

1. Exemption lists should be co-developed by pathologists and relevant clinicians.
2. The pathology laboratory should receive, examine, and report on any specimen specifically requested by a clinician.
3. Laboratories should not require routine submission of medical and non-medical foreign objects and materials.
4. Laboratories should not require routine submission of normal-appearing tissue removed incidentally for access or a functional procedure.
5. Laboratories should not require submission of specimens for which clinical diagnosis or macroscopic examination by the proceduralist is sufficient.
6. Laboratories should limit the use of gross-only examinations.
7. Laboratories should implement conditional, rather than routine, pathologic examination for certain types of specimens.
8. Laboratories operating with legally mandated exemption regulations should be aware of their obligations. Pathologists working under these regulations should advocate to their provincial Ministers of Health to amend regulations stipulating submission and exemption requirements. (See [OR exemption list resource](#))

CONCLUSIONS

Specific recommendations on which specimens to exempt are evolving. Each jurisdiction (laboratory, health authority, province) should consider the recommendations above in formulating a list and can use the specimens listed in [Table 1](#) as a useful starting point for discussions. Ideally, evidence, shared knowledge, consensus, and a commitment to appropriate resource utilization should guide decision making on this matter.

It is anticipated that these exemption lists may generate some lively debate. Many pathologists (and some clinicians) will have anecdotes about important unexpected pathology found in innocuous “routine” specimens, and pathologists as a general rule are inclined to a high degree of accuracy and sensitivity in our work. However, as in everywhere else in medicine, perfect sensitivity can usually only be achieved at very high expense, and we should strive to find appropriate balance. Resource constraints and environmental impacts should motivate laboratories and health systems to critically develop and continually reassess evidence-based routine pathology exemption lists. (See [OR exemption list resource](#))

Review the detailed document at the link below.





CHOOSING WISELY IN ANATOMICAL PATHOLOGY IN HALIFAX: REDUCING RESOURCE USE BY EXPANDING LABORATORY EXEMPTION LIST

Authors: Laurette Geldenhuys^{1,2,*} MBBCH, FFPATH, MMed, FRCPC, MAEd, FCAP; Geoff Peladeau¹ MLT; Alma Cameron¹ BSc, MLT.

“Introduction: In 2012 the American Board of Internal Medicine launched the Choosing Wisely Campaign to improve utilization in health care. In 2019 a Choosing Wisely working group in Anatomical Pathology at the Queen Elizabeth II Health Sciences Centre in Halifax expanded the list of materials from the operating rooms exempt from submission to the laboratory. We performed a study to evaluate the impact of this initiative.

Materials and Methods: We compared the number of specimens on the updated exemption list received in 2018 to that in 2020, and calculated the savings in laboratory staff time, pathologist time, and laboratory costs.

Results: From 2018 to 2020, the total number of surgical pathology specimens received decreased from 67,018 to 60,152, or by 10%. The number of specimens in the updated exemption list decreased from 3,935 to 421, or by 89%. This resulted in savings of approximately \$36,205.28 in the laboratory alone, as well as 0.27 technical staff full-time equivalents (FTE) and 0.25 pathologist FTE.

Conclusion: Eliminating submission of material to the anatomical pathology laboratory that does not add value to patient care releases precious human resources and health care dollars to redirect to activities that do add value to patient care.” (1)

[Learn more](#)

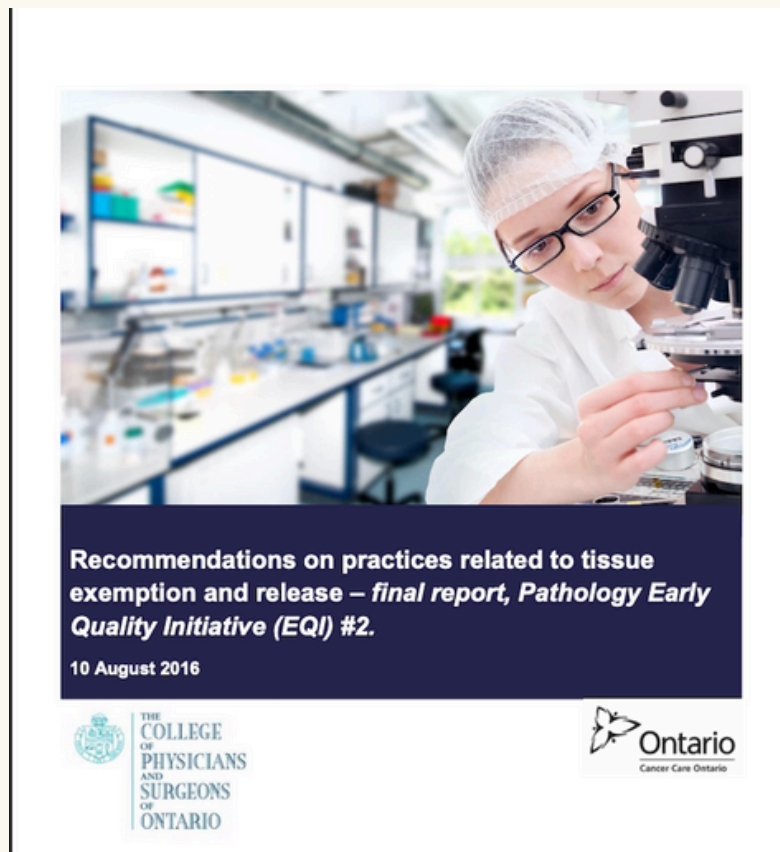




CREATE AN EVIDENCE-BASED LIST OF MATERIAL EXEMPT FROM MICROSCOPIC EXAMINATION

The Quality Management Partnership, a collaboration between Cancer Care Ontario and the College of Physicians and Surgeons of Ontario undertook an environmental scan of legislation and literature related to tissue exemption; compared tissue exemption practices in Ontario to other jurisdictions; and made recommendations on exemption of material from submission to the lab or microscopic examination. If a lab decides not to exempt an item from submission to the lab, it could consider exempting it from microscopic description, performing gross examination only.

These, as well as a few additional items are listed in Figure 1. in Suggested Specimens for Primary Pathological/Gross Examination only. Recommendations on practices related to tissue exemption and release – final report, Pathology Early Quality Initiative (EQI) #2. 10 August 2016



See Figure 1. Suggested Specimens for Primary Pathological/Gross Examination only.






OTHER HISTOPATHOLOGY AND CYTOPATHOLOGY OF LIMITED OR NO CLINICAL VALUE

The Royal College of Pathologists in the UK produced best practice recommendations on histopathology and cytopathology of limited or no clinical value.

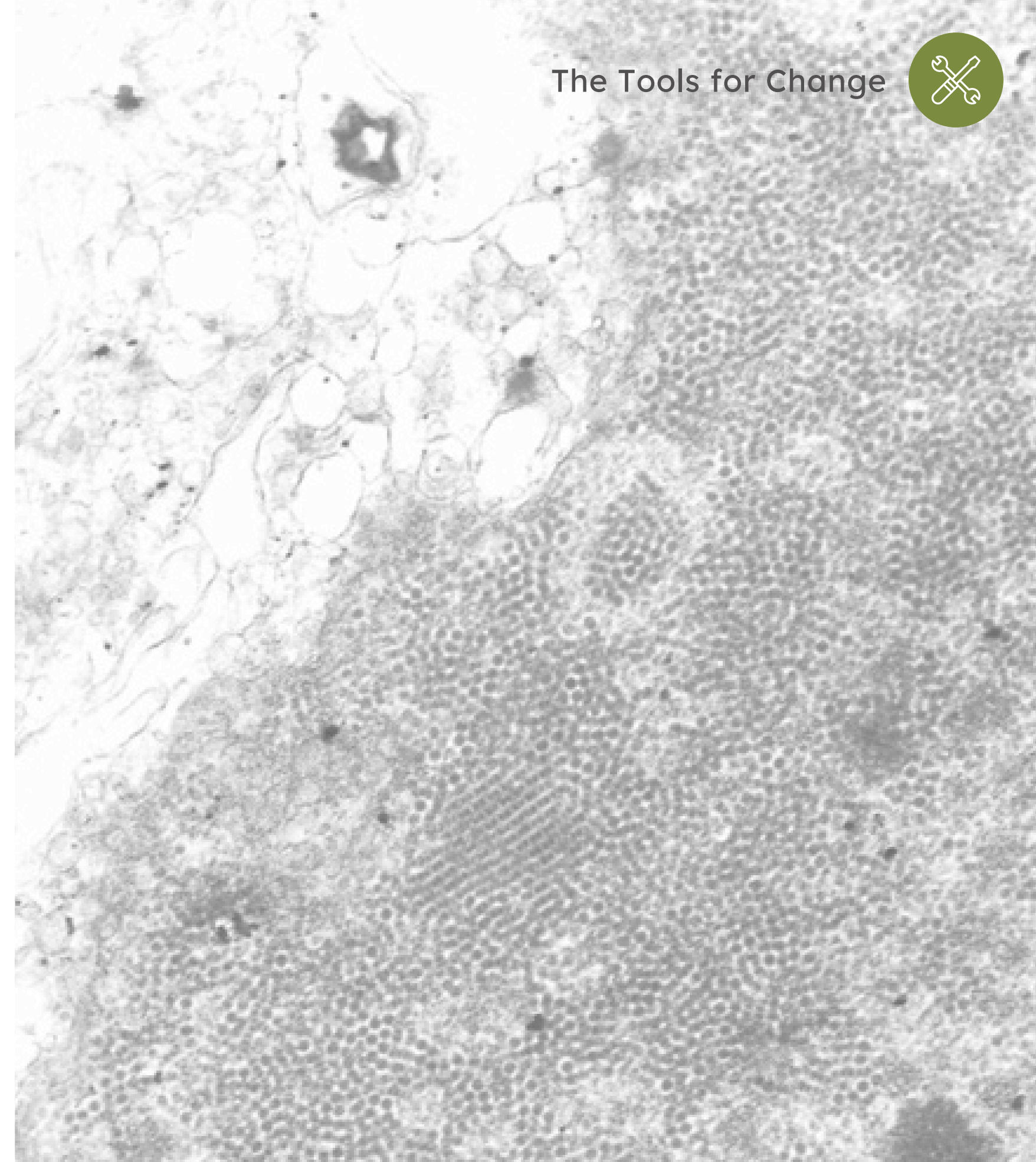
The guidelines are divided into general and subspecialty sections and include items that could be exempt from submission to the lab or microscopic description, and a variety of other Choosing Wisely type recommendations.

The College stresses that “these guidelines should be discussed and agreed at a local level with clinical colleagues. Implementation will vary depending on local circumstances, such as the degree of training, staffing and research interests.”

The document was [reviewed by a team](#) of Canadian academic subspecialist pathologists who confirmed that most of the recommendations were reasonable and relevant to the Canadian context. (1)



**Best practice recommendations:
Histopathology and cytopathology
of limited or no clinical value**



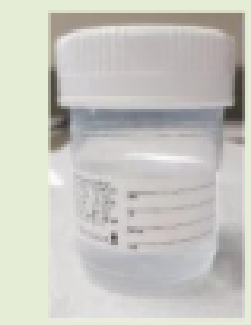


ENSURE APPROPRIATE SPECIMEN SUBMISSION PRACTICE

Providing specimen submission guidelines to users of the lab will not only improve quality and patient safety but will also reduce waste by avoiding excessive quantities of plastic and formalin being submitted to the lab.

Here is an [example](#) of submission guidelines of serous cavity fluid, bronchial washings or sputum that can be used as a template.



CYTOLOGY SAMPLES: SEROUS CAVITIES / BRONCHIAL WASHINGS/SPUTUM			
CONTAINER AND FIXATIVE	CONTAINER PICTURE (MAY VARY)	STORAGE AFTER COLLECTION	DELIVERY TO LAB
Sterile container with 3:1 ratio of sample to CytoLyt fixative	 Standard 60mL container	Room temperature. Refrigeration is recommended for all samples collected on weekends/after-hours/holidays, or if a delay in transport of more than 1 hour is expected.	Send ASAP

REQUISITION: NON-GYNECOLOGIC CYTOLOGY REQUISITION

- This guideline is for serous cavity fluids including pleural, peritoneal, pericardial, and joint fluid samples, as well as bronchial washings and sputum samples.
- Large volume samples (e.g., 1L of ascitic fluid) are unnecessary, as only a small portion will be processed.
- **Questions? Call the Cytology Laboratory.**

1 If LYMPHOMA is Suspected:

- A second sample should be sent in RPMI fixative to Flow Cytometry.

2 Container Label Must Include:

- Patient's legal name
- Patient's health card number or another unique identifier
- Date and time of collection
- Sample type and site collection

3 Requisition Forms Must Include:

- Patient's legal name
- Patient's health card number or another unique identifier
- Patient's date of birth
- Date and collection time
- Sample type and site of collection
- Physician's full name, ID#, and address
- Clinical history





Follow Other Sustainable Lab Practices, General and AP Specific

This section summarizes other sustainable lab practices relevant to the AP lab and described in detail in Sustainable Clinical Laboratories CASCADES, My Green Lab and the McGill Sustainable Labs Guide in the form of **general action checklists**.

In addition, items more specific **for the AP lab** are suggested.

WASTE MANAGEMENT

GENERAL ACTION CHECKLIST

- Redesign, reduce, reuse, and recycle where possible.
- Recycle **batteries** and **printer** cartridges.
- **Print** only when necessary, and then double sided and in black and white if possible.
- Use chlorine-free **paper** with recycled content.
- Use suppliers' **take-back** programs.
- Reuse or recycle **gel-packs** or use to fill empty space in freezers.
- **Educate** staff about waste categories and guidelines for municipal and special waste.
- **Post** signage on what goes where.
- Conduct a lab waste **audit**.
- Follow lab guidelines for safe disposal of **toxic** chemicals.



RESOURCES:

- Integrating Environmental Sustainability into Clinical Laboratories, CASCADES
- My Green Lab
- McGill Sustainable Labs Guide





FOR THE AP LAB

- Improve **special AP waste sorting**.
 - Reuse **packaging material** for shipping of consults and movement of case material within the Department.
 - Unused **patient labels** can be disposed of in a shredder.
 - Unused **microtomy tissue ribbons** can be disposed of in general waste rather than in biohazardous waste.
 - Reuse **microtome blades** used to cut blocks for molecular testing for routine cutting.
 - Plastic containers slated for disposal or cardboard containers with double yellow bag lining and labeled **"SHARPS"** can be used for discard of histology slides.
- **Recycle solvents**, including formalin, xylene, alcohol. Formalin is associated with significant GHG emissions and environmental toxic effects, and recycling formalin will not only be good for the environment but also save the organization money! (1)
- Follow **retention guidelines** by discarding specimens retained beyond the required periods. (2)
- Use **IHC antibodies beyond their expiration date** when appropriate. After studying the performance of nominally expired antibodies for IHC, Anthony Henwood made the following conclusions. "Discarding expired localization antibodies when they have been shown to be fit-for-purpose is costly. ... deciding which antibodies should eventually be discarded should be based on performance criteria rather than a time-based criterion." (3)
- Use **PPE** only when needed and use reusable PPE if possible.
- Use **gloves** only when needed, reuse, recycle, and discard in general garbage, rather than biohazardous waste, unless indicated.
- Consider using **cut resistant reusable gloves** for autopsies and grossing. (4)
- Implement **online entry of case information** eliminating paper requisitions to reduce paper usage and improve quality, accuracy, timeliness, and completeness of case information entry.





GLOVE RECYCLING PROGRAM IN THE PATHOLOGY DEPARTMENT AT MCGILL UNIVERSITY HEALTH CENTRE

Jonathan K Lai, Lara Richer, Chelsea Maedler-Kron
Department of Anatomical Pathology, McGill University Medical Centre,
Montreal, Quebec

“In 2019, the pathology department at McGill University’s Royal Victoria Hospital purchased and consumed 314,150 gloves, which produced approximately 1,220.3 kg of waste. In order to reduce the waste generated, we secured a grant from the McGill-Wide Green Labs Initiative Sustainability Project Funds to recycle non-soiled nitrile and latex gloves in various locations within the pathology department. Terracycle waste management has offered to recycle these and convert them into pellets for the future manufacturing of gloves. In order to decrease the waste generated and to identify the barriers to recycling in a pathology lab setting, we set an initiative to divert 193.0 kg (50%) of the unsoiled gloves from landfills, which represents approximately 15% of total amount of total gloves consumed by the department.” (5)

[Learn more](#)

NOVA SCOTIA HEALTH AP WASTE MANAGEMENT INITIATIVE

This AP waste management initiative reduced AP special waste by approximately 85%! The team audited waste, familiarized themselves with their institution’s waste disposal policy, consulted their institution’s Biosafety Officer and Infection Control and Prevention team, pathologists and staff, implemented changes and audited the results.



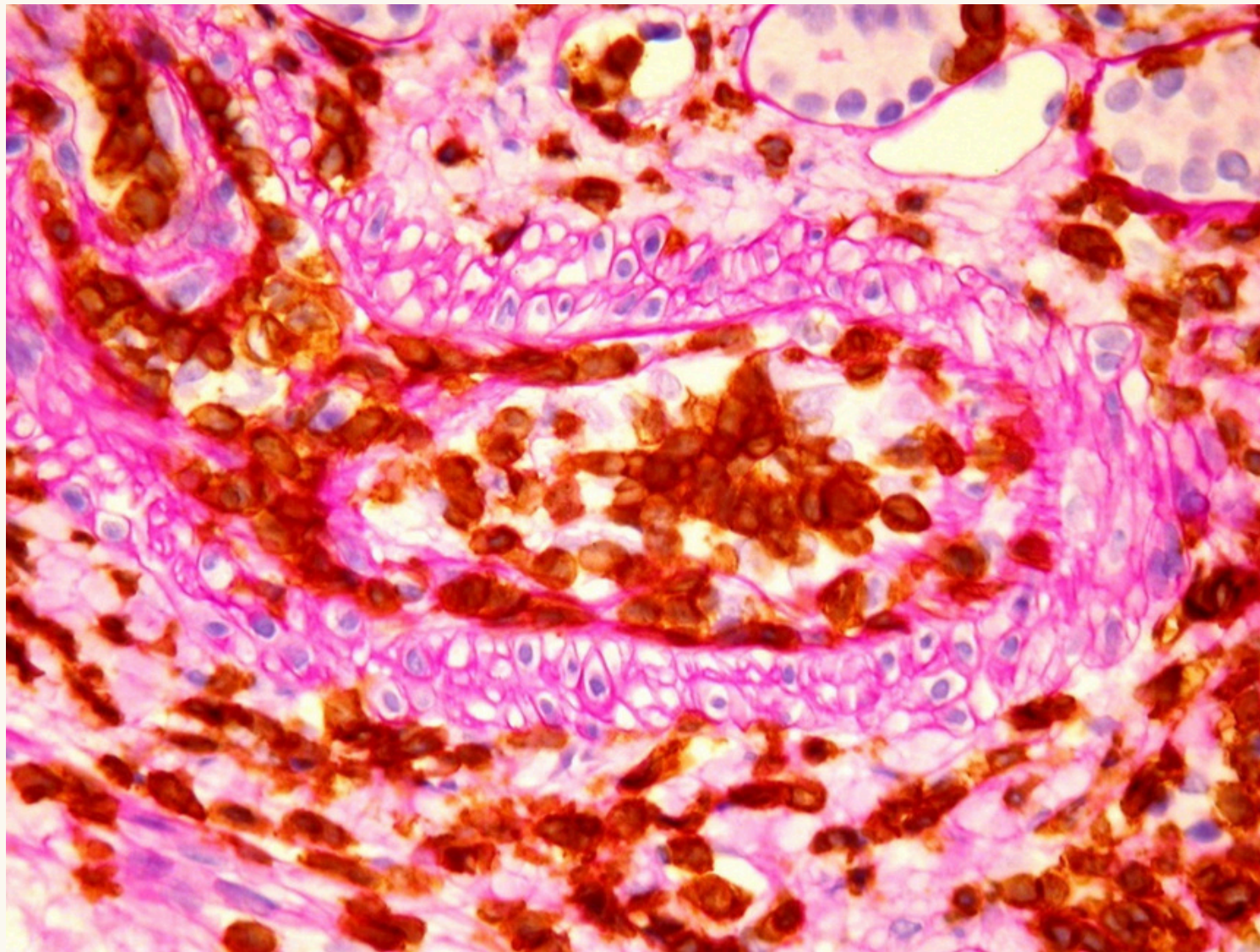
[Learn more](#)





A PROCEDURE TEMPLATE FOR USING EXPIRED IHC ANTIBODIES

Here is an example of a procedure for using expired IHC antibodies that can be used as a template.



Purpose

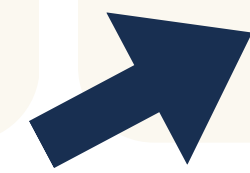
- This procedure provides instructions on the use of expired primary antibodies after the manufacturer's expiry date.

Procedure

- Expired primary antibodies can be used in the following carefully monitored situation:

STEP	ACTION
1.1	If the test is verified to be still performing at the expected and desired level of sensitivity based on performance of the control tissue, then the test can be released to the pathologist.
1.2	If the test is not performing at the expected and desired level of sensitivity based on performance of the control tissue but the test is deemed positive in the patient material, the case should be retested. If working well, continue to use the antibody. If still not optimal, dispose of the expired antibody.
1.3	If the test is not performing at the expected and desired level of sensitivity based on the performance of the control tissue and the test is deemed negative in the patient material, then the test could be falsely negative and should not be released to the pathologist. Dispose of the expired antibody.

The technologist is responsible for notifying the IHC Lead Pathologist of all primary expired antibodies. The IHC Lead Pathologist will give direction regarding reordering or using the expired antibody. Expired antibodies will be aliquoted and frozen if the antibody is freezable with information entered in the IHC log on the shared drive.





ENERGY CONSERVATION



Fume hoods and **ultralow freezers** are top energy guzzlers in general, and so are **cryostats** in the AP lab.

GENERAL ACTION CHECKLIST

FUME HOODS

- Shut the **sash**.
- Turn off the **light** when not in use.
- Place **prompts** to remind staff.
- Convert unused fume hoods to a **dormant** state.

LAB EQUIPMENT

- **Turn off** when not in use.
- Use **timers** where needed.
- Place **prompts** to remind staff.
- Repair and **maintain** equipment.

OTHER ACTIONS

- Install **LED** lights.
- Turn off **lights** at the end of the day.
- Install **motion-sensitive** ceiling lights.
- Turn off **computers** or put them to sleep when not in use.

COLD STORAGE

- Purchase energy-efficient cold storage units with an **Energy Star rating**.
- Regularly **maintain** clean, including the coil at the back, and defrost.
- Maintain a record of **inventory**.
- **Discard** unnecessary samples.
- Reset ultralow freezers from - 80 to **- 70 degrees Celsius**
- Complete the **International Freezer Challenge**, a quick and easy exercise for labs to improve their cold storage practices.



RESOURCES:

- Energy Star rating
- International Freezer Challenge
- My Green Lab. Evidence -70 degrees works

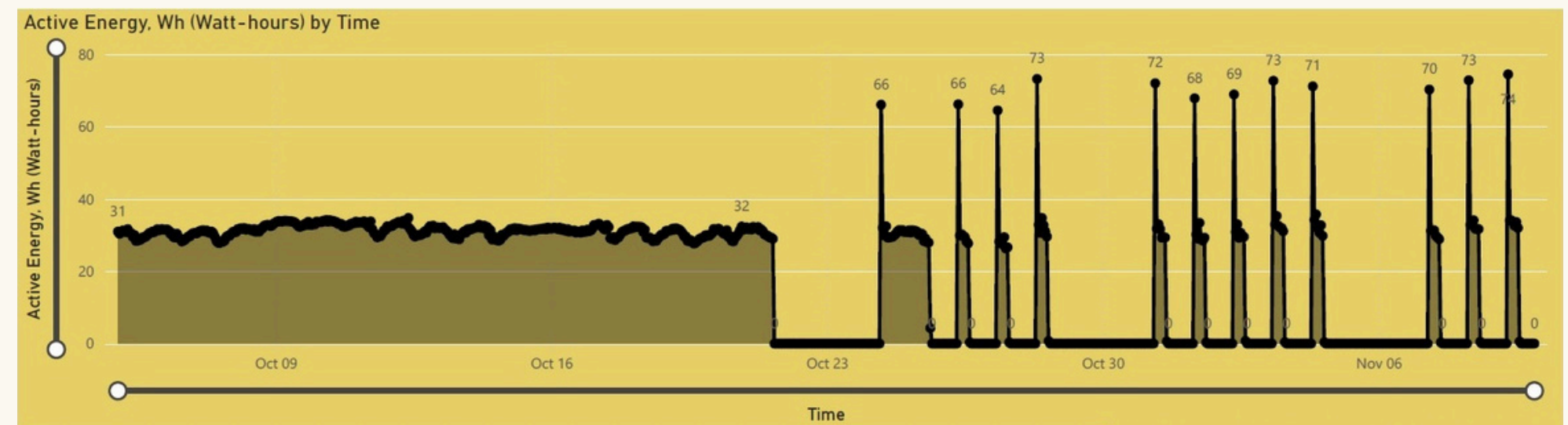
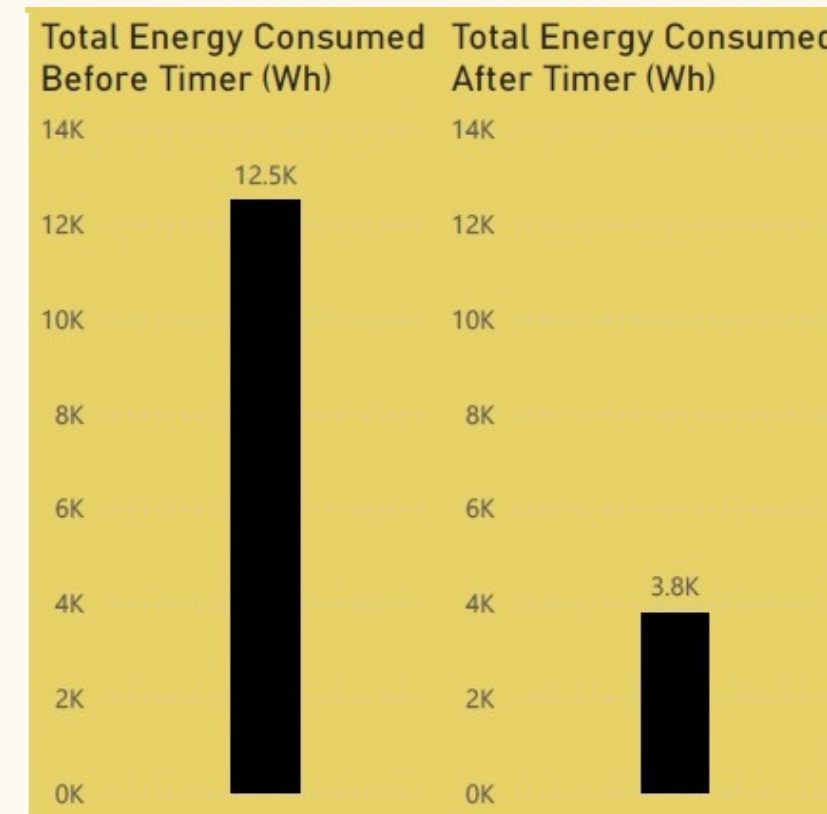




FOR THE AP LAB

- Turn off **cryostats** when not in use and explore turning on remotely for time sensitive use.
- Turn off **incubators** when not in use, using a timer if needed appropriately rated for the amperage of your equipment.
- Ensure **water baths** for cutting and **ovens** for drying slides are set at the optimal temperature.
- Shut the sash in **biosafety cabinets**.
- Avoid **UV light** to sterilize surfaces in biosafety cabinets.
- Consolidate specimens for **transportation** to the lab and streamline pick-up routes while maintaining turnaround time required for prompt large specimen opening and fixation.

EXAMPLE OF HOW INSTALLING A TIMER ON AN INCUBATOR REDUCED ENERGY USAGE BY 70% (4)





WATER CONSERVATION



GENERAL ACTION CHECKLIST

- Promptly repair **leaky** faucets or leaks from equipment.
- Close **taps** when not in use.
- Maximize the **loads** for dishwashers.
- Install **aerators** on taps.
- Use the appropriate **water purity** level for the job.

FOR THE AP LAB

- Develop guidelines for and audit water use in the **special stains and IHC lab**, and the **morgue**, areas in the AP lab at higher risk of waster wastage.

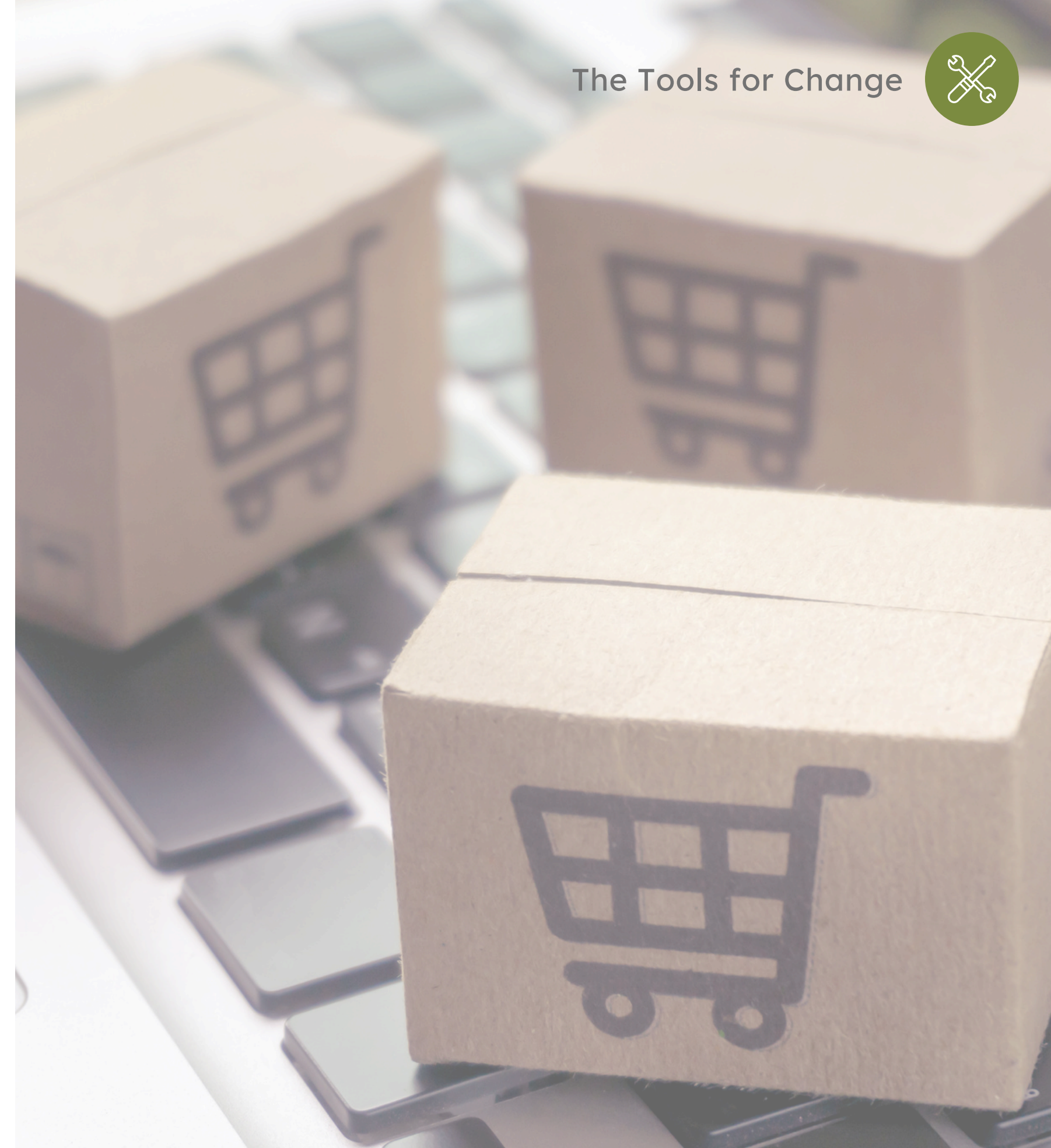




SUSTAINABLE PROCUREMENT AND ASSET MANAGEMENT

The supply chain is the largest source of GHG emissions related to healthcare and the most difficult to influence at the level of an individual lab. Advocacy for creation of sustainability offices or committees at the organizational level to ensure suppliers increase the sustainability of their products is required to address this source of GHG emissions effectively. Here are a few actions labs can take:

- Develop an **inventory** of lab supplies and consumables and check your inventory before purchasing.
- Adopt a **first in, first out** system so that older supplies are used first.
- Determine if the item can be **borrowed** from or **shared** with another lab.
- **Consolidate orders.**
- Source from **local generic** suppliers, rather than remotely from medical suppliers if possible.
- Include **environmental sustainability** in **RFP** scoring.
- Use credible certifications and eco-labels such as [Energy Star](#) for cold storage and the [ACT label inventory](#) to inform your purchases.
- Advocate for sustainable products by using these [letter templates to suppliers](#) from the Canadian Coalition for Green Health Care.





OTHER: GREEN CHEMISTRY, SUSTAINABLE TRAVEL AND SUSTAINABLE EVENTS



SUSTAINABLE TRAVEL

GENERAL ACTION CHECKLIST

- Use **remote conferencing** for meetings when possible.
- McGill created a [sustainable travel guide](#).

FOR THE AP LAB

- **Work from home** if appropriate.
 - The [Royal College of Pathologists](#) in the UK developed a work from home policy.
 - The [Association of Directors of Anatomical and Surgical Pathology](#) published a statement on working from home.

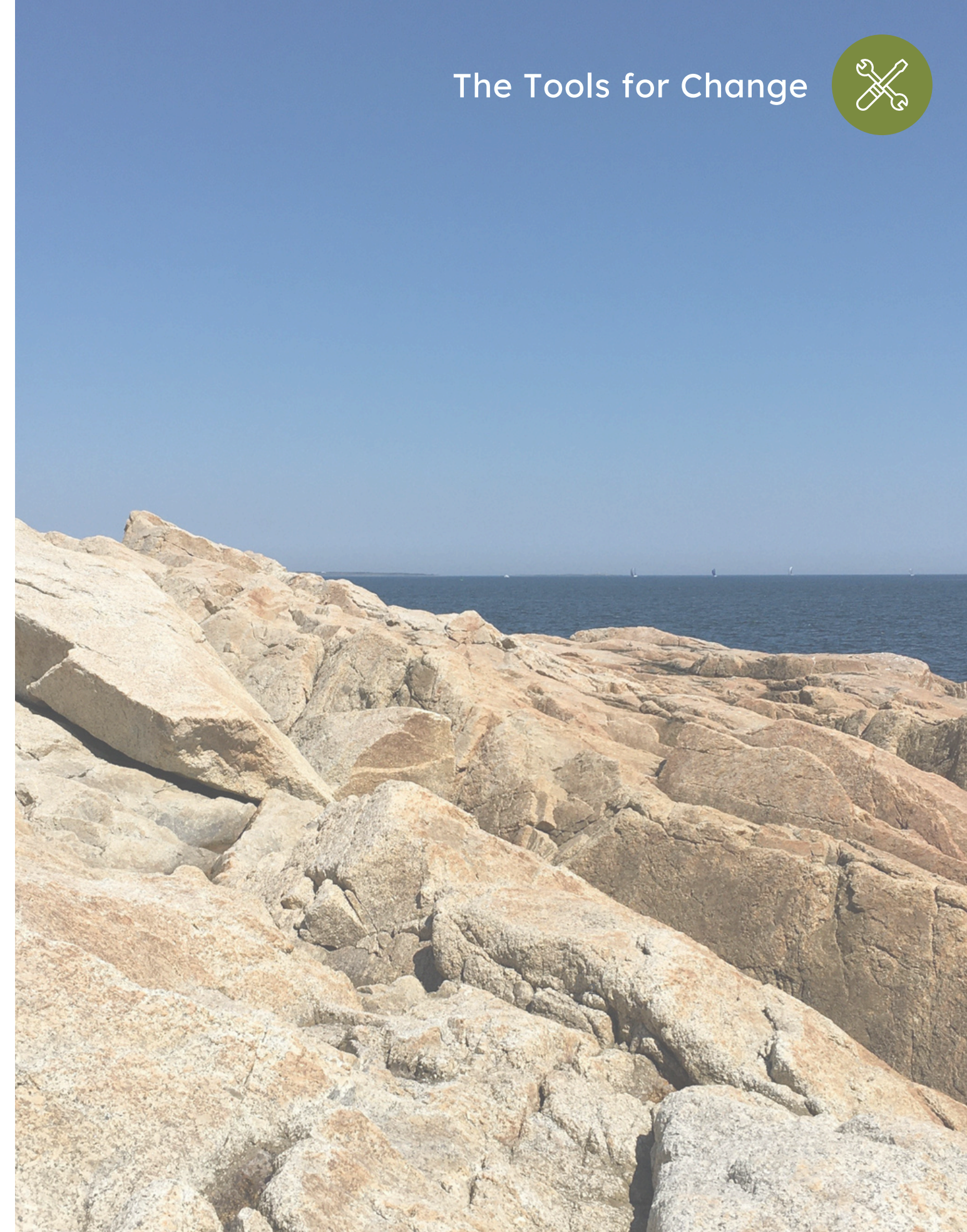
SUSTAINABLE EVENTS

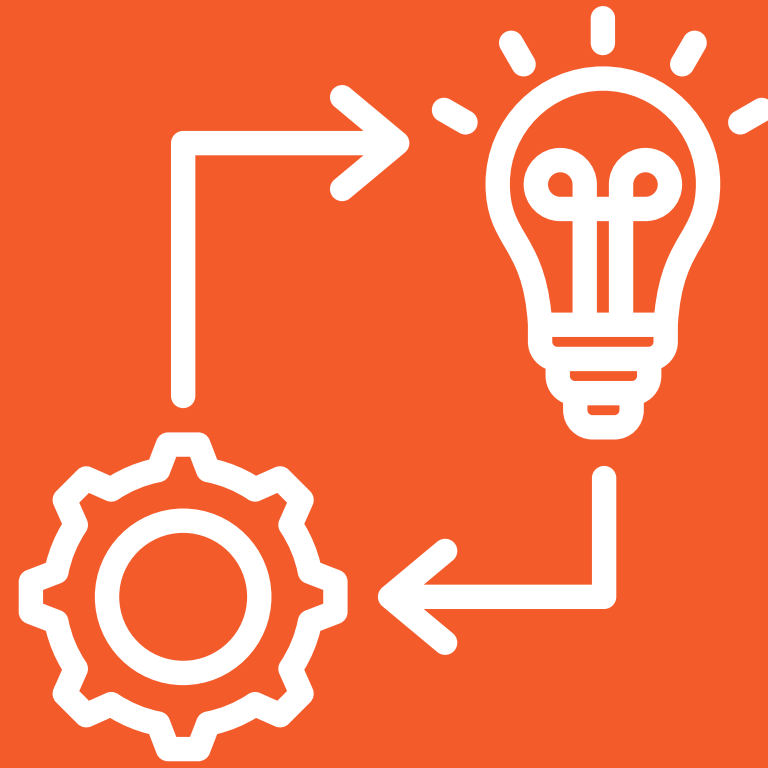
Sustainable event guides and certification are available from several universities.

- [University of Toronto](#)
- [McGill University](#)
- [Dalhousie University](#)

GREEN CHEMISTRY

AP labs have fewer opportunities than non-clinical labs to explore green chemistry. However, measures such as using **alcohol-based thermometers** instead of mercury thermometers and mercury free bulbs for microscopy can be taken.





HOW

The Strategy for Change

- 1 Governance and Networking
- 2 Education
- 3 Green Lab Certification and Incentives
- 4 Quality Assurance





Governance and Networking



This section offers suggestions for how to engage the members of the AP lab team in green healthcare activities.

GOVERNANCE

- Advocate for an **organizational sustainability** office or committee.
 - [Dalhousie University has an Office of Sustainability](#) coordinating many sustainability initiatives across the campus.
- Include sustainability in Departmental and Divisional **strategic plans**.
- Include sustainability as a standing item on staff **meeting agendas**.

NETWORKING

- Form a **green team**. Here is more information about green teams from the CCGHC.
 - [Green Team Project](#)
 - [Starting a Green Team](#)
- **Connect** with other groups at your institution or nationally.
 - For example, the Nova Scotia Regional Committee of [CAPE](#) provides a forum for connection between representatives from several planetary health groups in the province through monthly virtual meetings. These groups include the perioperative, medical teaching unit, lab and Dalhousie medical student green teams, among others.





Education



REGULAR STAFF EDUCATION

- Include sustainability in **orientation** of new staff. An example of an AP Sustainability Checklist can be found here: [AP Sustainability Checklist](#).
- Include sustainability in **periodic** mandatory online staff education.
- Offer sustainability **lunch and learn** sessions.
- Post sustainability educational material on **bulletin boards**.
- Place sustainability **prompts** to remind staff about sustainable actions.

OPTIONAL ONLINE EDUCATION

Suggest **optional online** sustainability educational resources available from these groups:

- [CASCADES](#)
- [CCGHC Environmental Stewardship Guide](#)
- [CAP-ACP Environment Special Interest Group](#)
- [My Green Lab](#)
- [My Green Lab Accredited Professional Program on Lab Sustainability](#)





Green Lab Certification and Incentives



GREEN LAB CERTIFICATION

- Complete **green lab certification**. The purpose of pursuing a certification program for a laboratory is to demonstrate adherence to best practices. Through a green lab certification scheme a laboratory is able to reduce resource consumption without negatively impacting their work or compromising safety. Some institutions have their own certification frameworks, and there are other certification programs that are third-party verified and available to any institution.
 - [McGill University Sustainable Lab Certification](#)
 - [My Green Lab Certification](#) – Third-party verified by Impact Laboratories and recognized by the UN Race to Zero
- Apply for **funding** for green lab initiatives.
- Sign the [million advocates for sustainable science letter](#).

CAP-ACP GREEN LAB AWARD

The [CAP-ACP](#) offers an annual **Green Lab Award**, which recognizes a Canadian laboratory for an impactful initiative or series of initiatives reducing material waste in the laboratory.

The recipient laboratory presents their initiatives at the **Green Lab Symposium** during the week in the week that includes **April 22, Earth Day**.

CYTOPATHOLOGY GOES GREEN IN HALIFAX

Laurette Geldenhuys, Tracy Watts, Glenn Henderson, Carolyn Lohnes, David Bligh, Raymond Carrigan

“The Cytopathology lab underwent green lab certification by My Green Lab as part of the Dalhousie University Office of Sustainability Sustainable Laboratory Initiative. The Cytopathology Green Lab Team completed an initial survey in which the lab was evaluated in 14 areas on sustainable practices. The team received a report with the results of the lab’s preliminary evaluation, a score of 32%, with many suggestions for improvements and linked resources.

The team identified six areas on which to work, and three initiatives that would have a significant impact, namely: replacing fluorescent tubes with integrated LED fixtures; installing a timer on the lab’s incubator, reducing the incubator’s energy use by 70%; and improving waste management in the lab, reducing special waste by 75%. The team completed a final survey in which the lab was evaluated on the same areas as the initial survey, receiving a final report and green lab certification.

The lab was able to improve its score from the initial 32% to 62% on the second survey, obtaining gold level My Green Lab Certification.” (4)

[Learn more](#)





IMPLEMENT A QUALITY ASSURANCE PROGRAM AND INTEGRATE SUSTAINABILITY INTO EXISTING QUALITY IMPROVEMENT PROGRAMS

Environmental sustainability is embedded across the six dimensions in quality healthcare, including safety, effectiveness, patient centeredness, efficiency, timeliness, and equity.

Error in AP, in addition to potentially harming patients, also results in waste.

The Canadian Partnership Against Cancer supported the development of quality assurance recommendations for interpretive pathology by a national expert network of pathologists. You can access the recommendations at the link below.

[Pan-Canadian Quality Assurance Guidelines for Interpretative Pathology](#)

You can learn more about integrating sustainability into quality improvement programs in this playbook developed by CASCADES.

[Integrating Sustainability into Healthcare Quality Improvement Education Playbook.](#)

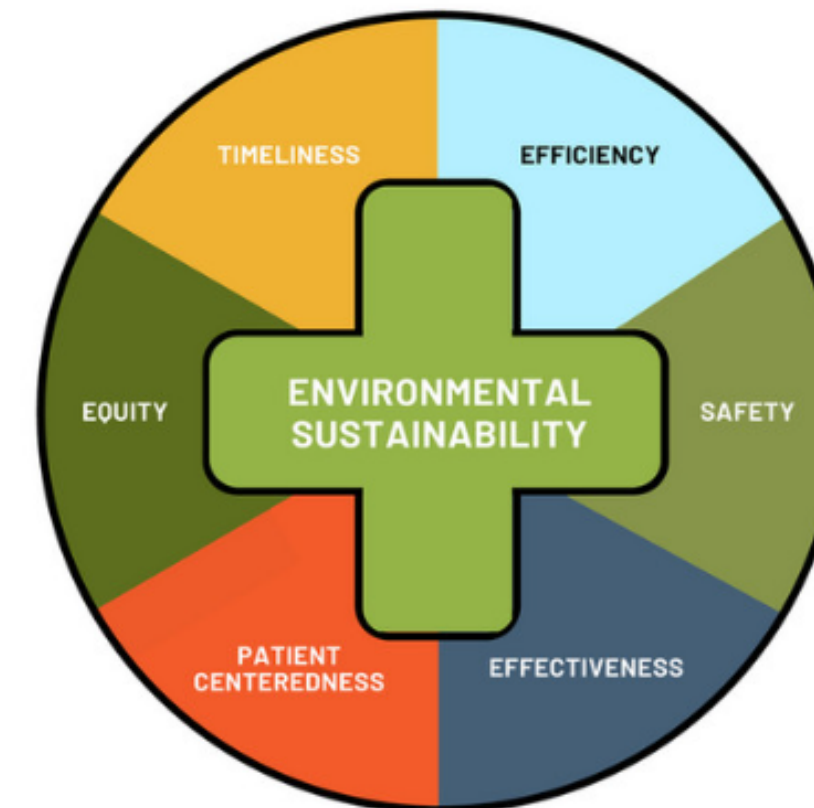


Figure 5: Integrating sustainability across the six dimensions of quality (2)





FOLLOW LEAN SIX SIGMA PRINCIPLES

Lean Six Sigma methods improve quality and safety, and reduce error, waste, and cost.

Lewis Hassell and Stephen Hardy describe Lean Six Sigma:

- “As a customer focused, team oriented and data driven performance improvement and problem-solving technique directed at breakthrough improvement to essential business processes
- With methods that improve quality and satisfaction of workers and customers by delivering consistent, defect free results, services or products at low cost by eliminating waste
- A manner of thinking and approaching problems or design, as well as a methodology with a robust set of special tools
- With a proven record of breakthrough improvements in laboratory and healthcare services, significantly improving quality and safety outcomes.” (1)

Richard Zarbo and Rita D’Angela report how, by using Lean Six Sigma methods, they were able to reduce defects, waste and rework, and enhance value in surgical pathology at the Henry Ford Hospital in Detroit. (2)





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