Development of an Environmental Audit Tool for Hospital Pharmacy

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To cite: Roy C, Fox K, Tangedal K. Development of an environmental audit tool for hospital pharmacy. *Can J Hosp Pharm.* 2024;77(4):e3591. doi: 10.4212/cjhp.3591

ABSTRACT

Background: Health care contributes significantly to greenhouse gas emissions, and pharmacy departments have many opportunities to reduce their emissions.

Objective: To describe the development and implementation of an environmental audit tool for hospital pharmacy departments.

Methods: A pharmacy environmental audit tool was developed by modifying a generic workplace audit tool to include pharmacy-specific content. The audit tool contained 22 categories, with scoring on a 4-point scale (from 0 to 3). Members of a volunteer committee completed the audit by observing practice areas. The lowest-scoring categories were then prioritized for action.

Results: Overall, the 4 main pharmacy sites in Regina, Saskatchewan, scored 23/66 (35%). Areas of strength identified in the audit included reuse of packaging materials, carpooling, and paperless meetings. Areas for improvement prioritized by the committee included paper use, plastic use, and recycling.

Conclusions: The pharmacy environmental audit tool described here can facilitate reflection on current practice, benchmarking, and goal setting. Pharmacy professionals have a role in leading change for the benefit of planetary health.

Keywords: hospital, pharmacy, environmental sustainability, audit tool, planetary health

RÉSUMÉ

Contexte : Le secteur des soins de santé contribue de manière significative aux émissions de gaz à effet de serre et les départements de pharmacie ont de nombreuses occasions de réduire leurs émissions.

Objectif : Décrire l'élaboration et la mise en œuvre d'un outil de vérification de l'impact environnemental pour les départements de pharmacie hospitalière.

Méthodologie : Un outil de vérification de l'impact environnemental des pharmacies a été mis au point en modifiant un outil de vérification générique pour les lieux de travail existant. Un contenu spécifique aux pharmacies y a été inclus. Cet outil comprenait 22 catégories avec une notation sur une échelle de 4 points (de 0 à 3). Des membres d'un comité bénévole ont réalisé la vérification en observant les domaines de pratique. Les catégories ayant obtenu les notes les plus basses ont ensuite été classées comme étant prioritaires.

Résultats : Les 4 principaux sites de pharmacies de Regina, en Saskatchewan, ont obtenu un score global de 23/66 (35 %) à l'aide de l'outil de vérification. Les forces dégagées comprenaient la réutilisation des matériaux d'emballage, le covoiturage et les réunions sans papier. Les domaines d'amélioration prioritaires définis par le comité comprenaient l'utilisation du papier, l'utilisation du plastique et le recyclage.

Conclusions : L'outil de vérification de l'impact environnemental des pharmacies décrit ici peut faciliter la réflexion sur les pratiques actuelles, l'analyse comparative et la définition d'objectifs. Les professionnels de la pharmacie ont un rôle à jouer dans la conduite du changement pour le bien de la santé de la planète.

Mots-clés : hôpital, pharmacie, durabilité environnementale, outil de vérification, santé de la planète

INTRODUCTION

Evidence is clear that climate change is occurring, largely due to human activity.[1,2] The summer of 2023 saw record-breaking temperatures and wildfires across Canada, which led to displacement of communities and loss of infrastructure.[3] Health care in Canada is a major contributor to greenhouse gas emissions (with Canada being ranked as the fifth-highest emitter out of 68 nations in terms of health care–related emissions), which trap heat and cause global warming.[4,5] The annual emissions total of 20.46 megatonnes of carbon dioxide equivalents makes Canada's one of the most carbon-intensive health care systems, on a per capita basis, in the world.[6] Pharmaceuticals account for one-quarter of these emissions, largely due to upstream manufacturing and transportation.[7,8] Pharmacists and pharmacy technicians have a vital role to play in environmentally sustainable medication management.[9]

The hospital drug distribution system is a specific area of environmentally harmful practices. Within this system, medications are often repackaged into unit-dose formats using single-use plastic products. During drug distribution,

patient-specific prescriptions are dispensed in plastic bags, which may then be placed in an additional plastic bag for delivery to the ward. Ideally, unused medications are returned to the pharmacy for reuse, provided the drug remains packaged and stored appropriately (e.g., tamper tape intact, refrigerated if required). Automated dispensing cabinets may reduce unnecessary repackaging; however, a recent study found that 12.5% of inhalers are withdrawn unnecessarily and wasted.[10] Upstream manufacturing contributes 90% of pharmaceutical greenhouse gas emissions,[5] which pharmacies can influence by advocating for, and purchasing from, manufacturers with sustainable practices. Aside from the drugs themselves, opportunities exist to reduce unnecessary waste attributed to pharmacy department operations (e.g., printing of reports, paper journal subscriptions, energy use through lights).

This clear need to increase the sustainability of operations and clinical practices was the basis for a local, 18-member (including all 3 authors) employee-initiated wellness and environmental committee in the Saskatchewan Health Authority (SHA) – Regina. This committee, comprising pharmacist and pharmacy technician volunteers, has a mission to promote and implement initiatives for environmental sustainability applicable to the workplace and the home. As a first activity, we sought to establish a baseline understanding of current processes and opportunities. To our knowledge, no hospital pharmacy–specific environmental audit tool exists. The purpose of this article is to describe the development and implementation of an environmental audit tool for goal setting and benchmarking within a hospital pharmacy department.

METHODS

This environmental audit tool was developed by modifying a generic workplace audit tool, the Canadian Union of Public Employees (CUPE) Eco-Audit.[11] The CUPE audit tool, which included sections on environmental awareness and workplace use of paper, bottled water, energy, cleaning products, and transportation, was adapted to include pharmacy department–specific content. Categories identified by committee members to be of interest, actionable, and related to the environmental sustainability of the department were added, including disposal of organic waste, recycling, and use and disposal of pharmaceuticals (Appendix 1). Each of the 22 categories was scored on a 4-point rating scale, with 0 representing the least and 3 representing the most environmentally friendly practices.

The audit tool was reviewed by committee members for face validity, completeness, clarity, and usefulness. Committee members found the tool to be useful and easy to complete, and their feedback was incorporated into the audit tool. Committee members then used the final version of the tool to complete a departmental audit (at 4 sites), observing the practice areas and interviewing staff. For each category in the audit tool, the committee recorded a single score that best represented all 4 sites (as determined by consensus) and then tallied an overall score. In addition, committee members recorded comments within the same audit tool. The lower-scoring categories (those with a score of 0 or 1) were then prioritized for improvement interventions by means of an electronic survey that was sent to all pharmacy staff. In the survey, respondents were first asked to select 3 environmental initiatives (from among those with low scores in the audit tool) on which the committee should focus attention; the survey also included 3 open-ended questions regarding current practices, barriers, and other environmental ideas.

RESULTS

All main pharmacy sites within the SHA–Regina pharmacy department were audited, specifically 2 tertiary care hospitals, 1 long-term care facility, and 1 outpatient clinic facility. Overall, our department scored 23/66 (35%), which is considered by the CUPE eco-audit[11] as a "Good start, your workplace has taken some first steps toward greening its operations" (Table 1). The department's strengths included reusing some packaging materials (e.g., bubble wrap), having a workplace policy that encouraged carpooling and use of available shuttles between sites, and hosting primarily virtual and paperless meetings. Of the audited areas with the lowest scores, the committee selected categories that were "easy wins" and were within the department's circle of control and then surveyed staff within the pharmacy department for input and prioritization. These categories were paper use, energy use (e.g., lights, heating), recycling (e.g., paper and plastic), single-use plastic use, pharmaceutical use (e.g., medication optimization, minimizing unnecessary use of medications, minimizing use of metered dose inhalers, and minimizing medication stockpiles), pharmaceutical disposal, transportation, and bringing one's own food and drinks. The environmental committee used these survey results to form goals for the following year, which were to reduce paper use, reduce plastic use, and review recycling practices.

DISCUSSION

We created and implemented an environmental audit tool specific to the hospital pharmacy setting to facilitate reflection on current practice, benchmarking, and goal setting. There was variability across the 4 facilities audited in this study; however, common areas for improvement emerged that allowed for goal setting by the SHA–Regina wellness and environmental committee. These initial "easy win" goals were to reduce use of plastic and paper and to review recycling practices, with longer-term goals focused on reducing pharmaceutical and inhaler use.

TABLE 1. Summary of Audit Results for 4 Pharmacy Sites in the Authors' Institution, According to Score by Category[a]

Score Obtained	Categories with Designated Score
0	Organic waste Cleaning products Pharmaceutical use—inhalers Pharmaceutical use—anesthetic gases Pharmaceutical distribution process
1	Paper use Junk mail Cardboard recycling Plastic recycling Water/bottled water Food and drinks Energy conservation, heating, and cooling Lighting Transportation Pharmaceutical use—multidose products Pharmaceutical disposal system Climate change
2	Other recycling (e.g., Styrofoam, bubble wrap) Pharmaceutical use—overall Pharmaceutical supply chain Environmental awareness
3	Workplace meetings
Total = 23/66 (35%)	

[a]See Appendix 1 for description of each category.

Previously published articles looking at sustainability strategies for pharmacy services have often focused directly on the medication dispensing process or were not specific to hospital practice.[12,13] As such, they did not encompass all potential areas of a pharmacy department's environmental impact, such as staff transportation or energy use. Additionally, some available tools can be labour intensive, and we wanted a tool that front-line staff could apply with minimal time commitment to identify high-yield areas for change. Generic workplace audit tools (such as CUPE's eco-audit) did not include pharmacy-specific categories, which are important to assess, given the significant contribution of medication distribution practices to a pharmacy's carbon footprint. Therefore, a strength of our tool was its ability to assess both generic workplace environmental considerations and processes specific to a hospital pharmacy.

Additional strengths of the audit tool and our process included the grassroots approach in engaging staff to lead important change through an innovative committee and increasing awareness of this important issue among staff and leadership.

Limitations of our audit tool involved a lack of validation, including lack of validation of the scoring system. When the tool was used in practice, the most meaningful section was found to be the comments section, as these notes identified areas for intervention. Another limitation was the lack of evidence to support which interventions would be the most meaningful; as such, although we identified goals and priorities based on the audit, we are unable to determine which will bring the most long-term benefit. This tool may not be generalizable to all pharmacy settings, and given the rapidly changing field of planetary health in pharmacy practice, it will likely need updating as further evidence emerges. Lastly, while yearly follow-up is planned, it was unclear at the time of writing whether the goals and interventions identified using the audit tool have been upheld and whether they will produce a lasting impact on departmental practices.

CONCLUSION

Health care is a significant contributor to climate change, with pharmacy department operations and medication use having been identified as large contributors to the carbon footprint. Pharmacy professionals need to be leaders of transformational change to ensure positive planetary health outcomes, for which our audit tool can serve as a baseline assessment for benchmarking environmental practices and setting future goals.

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Competing interests: None declared.

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Funding: None received.

Acknowledgement: The authors thank the Pharmacy Professionals Wellness and Environmental Committee (also known as Living Well) of the Saskatchewan Health Authority – Regina, for providing input to development of the audit tool and completing the departmental audit.

Submitted: January 24, 2024
Accepted: June 26, 2024
Published: November 13, 2024

APPENDIX 1 (part 1 of 3): Pharmacy department environmental audit tool. Adapted with permission from *Eco-audit: Calculate Your Score*, a resource created by the Canadian Union of Public Employees; available from: https://cupe.ca/cupe-eco-audit-0

Site: _____ Job area: _____ Date: _____

	Score Category[a]				Comments of Concern or for Improvement
Category	**0**	**1**	**2**	**3**	
PAPER, PLASTIC, and RECYCLING					
Paper use	No paper recycling	Paper is recycled	Only necessary information is printed (e.g., reports; personally or automatically) All documents printed double-sided	Workplace uses only fully recycled paper derived from sustainable sources	
Junk mail	Junk mail is received and not disseminated or recycled	Junk mail is organized and recycled by recipients	Unwanted journal subscriptions are cancelled	Unwanted faxes received are responded to with request to please stop future transmissions; all journal subscriptions are electronic	
Organic waste	No composting at the workplace	Individual compost program(s) in place (e.g., department driven)	Workers have been encouraged to compost organic waste at work	Workplace composting program in place for the organization	
Cardboard recycling	No recycling or waste diversion for cardboard at the workplace	Recycling program in place at work	Workers have been encouraged to recycle and reduce cardboard use	Workplace uses only recycled cardboard	
Plastic recycling	Plastics are not recycled	Plastics are recycled	Single-use plastic is minimized	Workplace uses only recycled plastics and recyclable plastics	
Other recycling (e.g., Styrofoam, bubble wrap)	Disposed in waste receptacle	Repurposed for storage/packing purposes	Repurposed through shipping company	Workplace only procures from environmentally sustainable sites	
Water/bottled water	Bottled water is used at work	Empty bottled water containers are recycled at workplace	Workplace uses only tap municipal-source water	A full workplace water conservation program (e.g., low-flow toilets, rainwater capture and use) is in place	
Food and drinks	Workers often purchase meals or drinks (often sold in single-use plastics like Styrofoam or plastic wrap)	Workers are encouraged to bring their own meals and drinks in reusable containers	The workplace supplies reusable containers, dishes, and cutlery for staff	The workplace uses only reusable and recyclable containers for food and drinks	

APPENDIX 1 (part 2 of 3): Pharmacy department environmental audit tool. Adapted with permission from *Eco-audit: Calculate Your Score*, a resource created by the Canadian Union of Public Employees; available from: https://cupe.ca/cupe-eco-audit-0

Site: _____ Job area: _____ Date: _____

Category	Score Category[a] 0	1	2	3	Comments of Concern or for Improvement
BUILDING and TRANSPORTATION					
Energy conservation, heating, and cooling	No program in place to conserve energy at work	Workers are able to control heating and cooling levels	Workers are trained and encouraged to conserve energy at work	Workplace is designed to use and promote passive (non–energy-using) heating and cooling	
Lighting	Lights are left on throughout the day, even when room is not in use	Lights are turned off when workers leave for the day	Lights are turned off when workers leave an area, even if for a short time	Lights use motion-sensor switches	
Cleaning products	Cleaning products have not been assessed for their environmental and health effects	Workers have called for an assessment of the cleaning products used at their workplace	Some toxic cleaners have been replaced with greener and cleaner alternatives	Only legitimate green and healthy cleaning products are used in the workplace	
Transportation	No public transportation assistance or program exists at the workplace	Employer provides financial assistance with public transit passes	To get to work, carpooling, walking, and bicycling are strongly encouraged, and single-occupancy driving is discouraged or there is an organization-specific shared transit system	Air travel has been cut back and is discouraged and replaced with green transportation (e.g., rail)	
Workplace meetings	No environmental consideration is given to meetings and planning meetings	All materials from meetings are recycled (e.g., paper, food, containers)	Meetings are paperless	Teleconferencing, videoconferencing, or online meetings are used to eliminate travel to meetings	
PHARMACEUTICALS					
Pharmaceutical use—overall	Environmental considerations related to pharmaceuticals are not included in decision-making	Workers are aware of environmental issues related to pharmaceuticals	Environmentally friendly pharmaceutical use is encouraged	Workplace initiatives guide environmentally friendly pharmaceutical use	
Pharmaceutical use—multidose products	No specific considerations for multidose products	Multidose products are tamper taped to be reused if not opened	Multidose products are not automatically dispensed for all patients when ordered	Multidose products are sent home with patients on discharge	
Pharmaceutical use—inhalers	No consideration of environmental impact of inhalers	Workers are aware of environmental issues related to MDIs	Alternatives to MDIs (e.g., DPIs, SMIs) are on formulary, and their use is encouraged	Alternatives to MDIs are utilized on order sets, and maintenance therapy MDIs are not routinely stocked outside of pharmacy (e.g., in controlled access cabinets)	
Pharmaceutical use—anesthetic gases	No consideration of environmental impact of anesthetic gases	Workers are aware of environmental issues related to anesthetic gases	Use of the most potent GHG emission gases (e.g., desflurane) is minimized	Most potent GHG emission gases are delisted from formularies	

APPENDIX 1 (part 3 of 3): Pharmacy department environmental audit tool. Adapted with permission from *Eco-audit: Calculate Your Score*, a resource created by the Canadian Union of Public Employees; available from: https://cupe.ca/cupe-eco-audit-0

Site: _____ Job area: _____ Date: _____

Category	Score Category[a] 0	1	2	3	Comments of Concern or for Improvement
PHARMACEUTICALS (*continued*)					
Pharmaceutical distribution process	No consideration of environmental impact in distribution process	Waste is minimized during distribution process	Distribution process uses only recyclable materials	Distribution process uses reusable containers or materials that come from recycled materials	
Pharmaceutical disposal system	Pharmaceuticals are disposed of in the garbage or water	Pharmaceuticals are disposed of through proper systems from the pharmacy	All pharmaceuticals at the site are returned to the pharmacy for proper disposal or reuse (if appropriate)	Patients and health care professionals are educated on proper pharmaceutical disposal procedures	
Pharmaceutical supply chain	No consideration of environmental impact of supply chain	Distribution system allows for reusing pharmaceuticals returned to pharmacy (e.g., unit-dose system)	Distribution system uses inventory system to minimize overstocking (e.g., Kanban system)	Department procures pharmaceuticals from manufacturers with environmentally friendly practices	
AWARENESS					
Climate change	Climate change has not been mentioned at the workplace	Workers have met to discuss climate change issues	The workplace has a climate change policy to cut its greenhouse gases	The workplace participates in political actions on climate change	
Environmental awareness	The workplace doesn't consider environmental issues important	Individual workers take some steps, but only at home	The workplace is aware of environmental issues, but change is required	The workplace is achieving optimal environmental operations	

Total score[b] = _____ / 66

DPI = dry powder inhaler, GHG = greenhouse gas, MDI = metered-dose inhaler, SMI = soft mist inhaler.

[a]Scores 1–3 compound, whereby scoring in category 2 or 3 requires successful completion of criteria in the previous scoring section.

[b]Interpretation of overall score: Score 0–12: Uh-oh, your workplace is a step or two behind environmentally. It's time to go green! Score 13–32: Good start, your workplace has taken some first steps toward greening its operations. Score 33–49: Well done, your workplace has many effective environmental programs. Score 50–66: Congratulations, your workplace is a leader on environmental actions!