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SUSTAINABILITY

Sustainable pharmacy practice: What is it and how can we practice it?

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By the Environmental Pharmacy Initiative Committee

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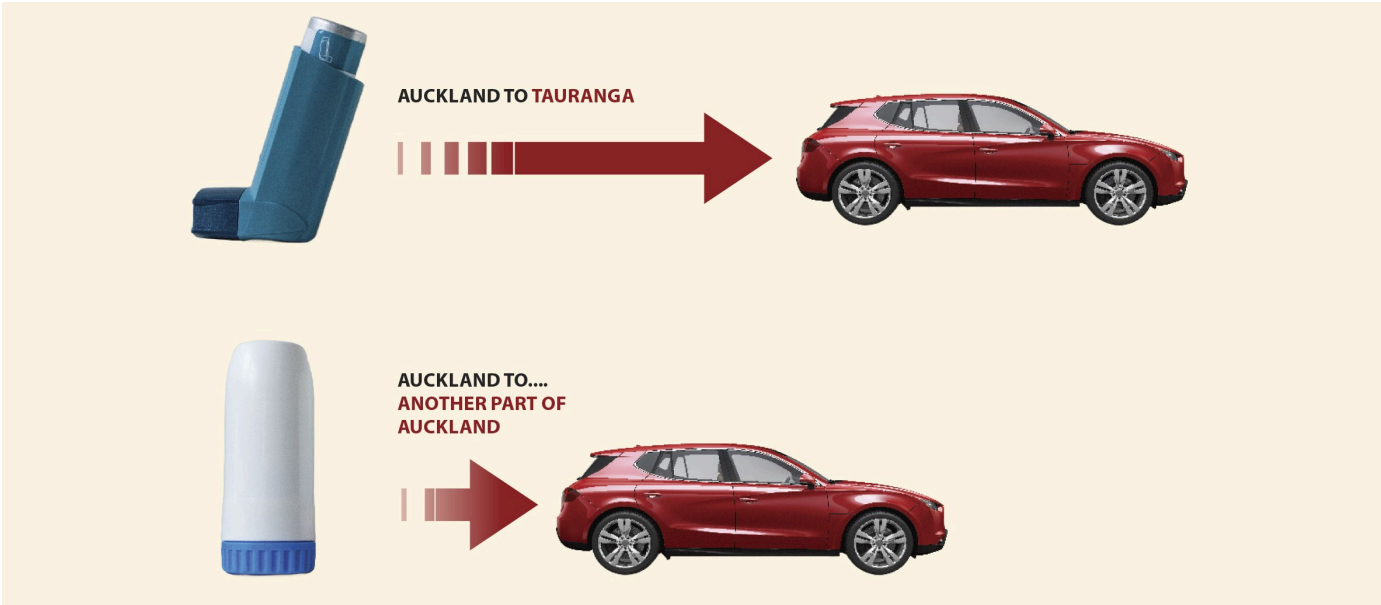

A 200-puff salbutamol inhaler has an estimated carbon footprint of 28kg of carbon dioxide equivalents, which is comparable to driving from Auckland to Tauranga (~225km) [Image: Vladimiroquai and Cristina Moliner on iStock]

This article is a summary of the work completed to date by the **Environmental Pharmacy Initiative Committee**, with an explanation of why the healthcare impact on climate change is important and ways we can contribute towards sustainable pharmacy

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The title of this article was the question put to a new working group from the New Zealand Hospital Pharmacy Association – the Environmental Pharmacy Initiative Committee (EPIC). The working group was formed in August 2023 and asked to spend 12 months looking into the question, and then to report back to NZHPA with recommendations for future work in this area. The EPIC team aims to understand how New Zealand pharmacy teams can work together in understanding and implementing actions to reduce the global harm caused by the healthcare sector.

There is an increasing global burden due to climate change, and the healthcare sector has been found to be contributing, especially the pharmaceutical industry. Medicines manufacturing, distribution, use and disposal are adding to the carbon footprint and negatively impacting on the environment. Internationally, pharmacists are taking active steps to reduce this.

The EPIC team consists of David Woods (chair), Stacey Woods (Hauora a Toi Bay of Plenty), Isabelle Yong (Wellington Hospital), Mary Young (Waitaha Canterbury), Rajeshni Naidu (Counties Manukau) and Debbie Bassett-Clarke (community pharmacy). We are in the process of confirming a Māori representative and actively looking for a technician to join our team.

We meet monthly by Zoom, and although EPIC is currently focused on sustainable *hospital* pharmacy practice, we are interested in hearing from community and primary care pharmacists who have an interest, or are developing policies, in this area.

In our work, we have created links with groups in New Zealand working in this area and with pharmacy colleagues overseas engaged in similar projects – we have been networking with the Te Whatu Ora sustainability team, local health professionals, and overseas pharmacy leaders working on climate change and sustainability issues to see what has already been done that could be adapted or shared nationwide.

The committee has been researching and discussing various pharmaceutical issues, such as waste management, reuse of returned medicines and the carbon footprint of inhalers. EPIC recognises that climate change and sustainability issues are more than just these.

What's already happening?

In New Zealand

Initiatives already in place include the Return Unused Medicines (RUM) campaign in the Nelson Marlborough region, which launched in September 2023 (**tinyurl.com/twonm-RUM**). The campaign focus is to help make communities safer by encouraging people to take unused or expired medicines to a pharmacy.

They promote the three Rs (adapted from the Australian RUM campaign with their permission):

1. **Read** the labels on your medicines, checking the expiry dates.
2. **Remove** unused or expired medicines and store them securely in a bag out of reach.
3. **Return** unused medicines to a pharmacy, where pharmacists will happily take them off your hands.

This campaign has three sustainability elements:

Return of unwanted medicines to community pharmacies from homes for whānau safety and suicide prevention.
Safe environmental disposal of returned medicines and recycling of consumables, where possible, to protect the whenua.

Reuse of appropriate unwanted medicines in the Pacific Islands via Medical Aid Abroad.

The EPIC team has been liaising with Caroline Allen and the team involved in RUM, who are now working on a national rollout with Te Whatu Ora backing – the aim is for this to happen in September 2024, so watch for more communication about this.

To discover what initiatives are already in place in New Zealand hospital pharmacies, EPIC has developed a survey and sent it to all hospital pharmacies. This aims to find out what they are doing in terms of waste management, promoting deprescribing and sustainable practices. The survey results are expected in mid-March.

One year on from Cyclone Gabrielle, we also want to future proof medicine supply and pharmacy practice from further climate change events. Learnings from the 2010/11 Christchurch earthquakes need to be considered, not forgotten. These include backup power supply/generators, torches that don't require batteries, and some forward planning on what types of medications might be needed and planned for/purchased in the event of another major weather event.

We have also been fact finding about New Zealand pharmaceutical waste collection. Approximately 1160 pharmacies (hospital and community) use Interwaste, but what happens to the waste after it leaves your facility?

Collection methods vary across the country. In the Auckland region, Interwaste collects from each individual hospital or community pharmacy, but in smaller regional centres, pharmaceutical waste is returned to the hospital pharmacy as a central collection point for Interwaste to collect from.

The waste is transported in bunded trucks (meaning any liquids released during transport are collected in a containment tank underneath the truck) to the treatment facility in Hampton Downs, south of Auckland. The trucks are also GPS tracked to ensure they only travel approved routes. Upon arrival, all waste is autoclaved (steam sterilised) and disposed of in a nearby landfill.

The disposal site was chosen because underground conditions make it difficult (near impossible) for any liquids to trickle down and contaminate underground water sources, or to flow to other sensitive areas, such as swamps and rivers. The life expectancy of the landfill is approximately 100 years. Each year, a new cell is cleared and flattened, liner plastic is laid down, then clay and gravel put over the top, before any waste is placed in the landfill.

Interwaste and EnviroWaste are keen to implement recycling and waste minimisation programmes to reduce requirements for landfill.

Overseas

EPIC has also looked at what is currently happening overseas. The Canadian Association of Pharmacy for the Environment (**caphe.ca**) started in a very similar place to where we are now about three years ago. We have linked with them and hope to learn from their work and adopt what we can into our New Zealand context.

Doctors for the Environment Australia (**dea.org.au**) support human health and wellbeing by advocating for a pollution-free environment capable of producing nutritious food and promoting a planet rich in biodiversity, thus prolonging life on earth for future generations.

Health equity

Health equity is also a factor in climate change issues – climate change disproportionately affects disadvantaged populations with poorer health.[1,2] During Cyclone Gabrielle, communities in the Hawke's Bay, Wairoa and East Coast were affected to a much greater extent. Since these regions also have a higher representation of tangata whenua, the EPIC team feel it is important to not only consult with Māori on this project but also to have Māori representation on our team.

Reduce, reuse, recycle

Pharmacists have various opportunities to reduce medication waste throughout the pharmaceutical supply chain

A 2018 study by Charlotte Bekker and colleagues found the most frequently reported activities used by pharmacists to reduce medication waste were stock management (*dispensing phase*; 86 per cent), followed by collecting unused medications (*leftover stage*; 77 per cent) and performing medication reviews (*dispensing phase*; 68 per cent). The study concluded pharmacists have various opportunities to reduce medication waste throughout the pharmaceutical supply chain, but not all are widely implemented because pharmacists are less certain about the feasibility of implementation in practice.[3]

Pharmacists must think about reducing and managing pharmaceutical waste, such as using tablets or powders instead of suspensions for children, considering refills and recyclable inhalers, and deciding how to dispose of sharps, tubing and intravenous bags. Use of Pyxis (electronic dispensing system) has reduced a lot of paper wastage at Te Whatu Ora Counties Manukau.

It is also important that we consider the environment when prescribing and dispensing, so both animals and humans are not impacted by current practices. Some issues already identified internationally:

Metformin acts as an endocrine disruptor at environmentally relevant concentrations, which may give rise to intersex fish.[4]
Overuse of antibiotics in food production leads to further potential for the development of antibiotic-resistant bacteria worldwide.[5]
A rapid decline in vulture populations observed in India and Pakistan is likely from diclofenac poisoning after feeding on carcasses of treated livestock.[6]

Inhaler use

> An unintended consequence of switching people to inhalers they can't or don't want to use is that they may have an asthma attack, the treatment of which *increases* global warming

In 2023, Mark Levy (**bigcatdoc.com**) used the following equation to calculate the environmental impact of an asthma exacerbation in the UK, assuming ambulance transportation: (average number of days spent in hospital per patient by discharge type × 125kg carbon dioxide equivalents [CO_2e]) + (average CO_2e for a passenger car × distance to and from hospital × number of visitors × number of days) + 75kg CO_2e.

Dr Levy found the environmental impact of treating an asthma attack to be 507.8kg CO_2e per hospitalisation. After multiplying this by the annual number of asthma-related hospitalisations nationally, the environmental impact was 32,343,813kg CO_2e (32343.8 tonnes CO_2e) per year in the UK. And this model does not account for emissions related to a possible outpatient trip prior to hospitalisation or emissions related to inhaler, oxygen or nebuliser use.[7]

Doctors are being encouraged to switch patients from metered dose inhalers (MDIs) to dry powder inhalers, where clinically possible, to reduce greenhouse gas emissions (see figure at top of page – A 200-puff salbutamol inhaler has an estimated carbon footprint of 28kg CO_2e, which is comparable to driving from Auckland to Tauranga (~225km), assuming average car emissions of 125g CO_2e/km. In comparison, dry powder inhalers have a carbon footprint of less than 1kg CO_2e per inhaler).

However, a caution to this current thinking is that it may in fact not be beneficial to the environment, because although MDIs contain hydrofluorocarbons, they are thought to contribute less than 0.1 per cent to global warming. Further, an unintended consequence of switching people to inhalers they can't or don't want to use is that they may have an asthma attack, the treatment of which *increases* global warming (as calculated above). Dr Levy concludes that doctors should choose the right inhaler for each patient.[7]

In a two-year pilot scheme to recycle MDIs in the UK, 20,049 inhalers (77 per cent of all inhalers returned) were dismantled, and the component parts recycled. The propellant gas was extracted for reuse in the refrigeration and air-conditioning industries. Other inhaler types were incinerated in an energy-from-waste facility. It was estimated that approximately 305 tonnes of CO_2 was captured, and hence prevented from being released into the atmosphere. This scheme was deemed a success, but sadly will not be renewed.[8]

Deprescribing and more rational prescribing should be core goals to prevent more pharmaceutical waste going into landfill. However, we accept that the responsibility is interprofessional, with pharmacists and technicians providing support to other healthcare workers and patients in order to optimise medicines-related outcomes and reduce medication overload.

Summary

Practicing pharmacy sustainably involves implementing environmentally friendly practices in various aspects of pharmacy operations. The EPIC group is keen to find out more about how this can be done and how New Zealand healthcare staff can positively impact on our environment. We recognise that this is a team effort, and doing something is better than doing nothing. We welcome any ideas, contributions and offers of help. Some initial suggestions:

Reduce paper usage – embrace electronic medical records, electronic prescribing, electronic dispensing systems and digital documentation systems to minimise paper consumption and waste. Encourage patients to receive electronic prescriptions and provide online resources for medication information.

Proper medication disposal – educate patients about the safe and responsible disposal of medications, especially those that should not be thrown in the rubbish or flushed down the toilet. Set up drug take-back programmes or collaborate with local authorities for safe medication disposal options (eg, RUM).

Energy-efficient practices – optimise energy consumption by using energy-efficient lighting, equipment and appliances. Implement strategies such as motion sensor lights, programmable thermostats and energy-saving settings on electronic devices.

Sustainable packaging – work with manufacturers and suppliers to prioritise sustainable packaging for medications. Encourage the use of recyclable or biodegradable materials, reduced packaging sizes and minimal use of single-use plastics.

Inventory management – implement strategies to minimise medication waste, such as proper inventory control, monitoring expiration dates and collaborating with healthcare providers to ensure accurate medication orders. This helps minimise the disposal of expired or unused medications.

Green transportation – encourage pharmacy staff to adopt eco-friendly commuting options, such as carpooling, public transportation or cycling. Offer incentives to employees who choose sustainable transportation methods.

Education and awareness – educate pharmacy staff, patients and the community about the importance of sustainable pharmacy practices. Promote the benefits of eco-friendly initiatives and encourage everyone to actively participate in sustainable efforts.

This article was jointly written by the EPIC team and authorised by NZHPA communications contact Kathryn Lawrie, kathryn.lawrie@ccdhb.org.nz

More information on reducing the carbon footprint of asthma treatment can be found at **epic.akohiringa.co.nz/asthma**

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