

A person wearing a white lab coat is holding a teal inhaler in their right hand. The inhaler is cylindrical with a silver nozzle at the top and a white mouthpiece at the bottom. The background is a soft, out-of-focus blue.

# Inhaler Disposal

# What is the impact of responsible inhaler disposal?

- Research has shown that up to 95%–98% of the emissions from MDIs occur at the use-phase.<sup>1</sup>
  - Reason for why switching to low-volume MDIs or DPIs and educating patients on correct technique is important.
  - Manufacturing and disposal in life cycle analyses are shown to contribute to less of the carbon footprint for MDIs.
- **However, due to use errors and difficulties in determining emptiness, many MDIs are thrown out with significant remaining doses in the inhaler**
  - A collection of 481 returned inhalers over 90 days by Musgrove Park Hospital in the UK showed that 71.8% of DPIs and 79.9% of MDIs had doses remaining.<sup>2</sup>
  - Another study of returned inhalers showed that 48% of doses remain in MDIs and 27% in DPIs.<sup>1</sup>
- Due to the remaining propellant left in disposed inhalers, and the risk of medications seeping into the environment through landfill, responsible inhaler disposal can help to reduce the overall environmental impact of inhalers.

1. Wilkinson AJK, Braggins R, Steinbach I, et al. Costs of switching to low global warming potential inhalers. An economic and carbon footprint analysis of NHS prescription data in England. *BMJ Open* 2019.

2. Dipper, A., Anning, L., Zorzi, A., Thrush, L.E., Schulz, T., Higbee, D.J., Nalwaya, P., Maidwell-Smith, A., & Pepperell, J.C.. Reducing plastic waste, carbon footprint and cost: inhaler recycling at Musgrove Park Hospital. *Ethics and Economics* 2018.

# What's the environmentally preferred way to dispose of inhalers?

- Recycling the materials and recapturing the propellant would be the most environmentally preferred
- Incineration is the currently available environmentally preferred option of disposing of inhalers
  - Incineration is preferred over landfill for MDIs since HFC gases undergo thermal degradation to decrease their global warming potential.<sup>1</sup>
  - We have not yet determined the exact temperature needed to incinerate HFCs in MDIs, however incineration at temperatures over 1000°C has been widely accepted for the destruction of ozone-depleting gases such as CFCs and HCFCs.<sup>3</sup> This is within usual temperatures for biomedical waste incineration.
- DPIs should also be incinerated to avoid medication discharge into the environment.

1. Wilkinson AJK, Braggins R, Steinbach I, et al. Costs of switching to low global warming potential inhalers. An economic and carbon footprint analysis of NHS prescription data in England. *BMJ Open* 2019.

3. Castro, P.J., Araújo, J.M.M., Martinho, G., Pereira, A.B. Waste Management Strategies to Mitigate the Effects of Fluorinated Greenhouse Gases on Climate Change. *Appl. Sci.* 2021, 11, 4367.

# What should providers advise patients to do with their empty inhalers?

- Main recommendation is **encouraging patients to return their inhalers back to the pharmacy** (all types)
- Can be any pharmacy, doesn't have to be the one they dispensed from
- You can use the [Health Products Stewardship Association \(HPSA\)](#) website to [find a local pharmacy that takes back inhalers](#), or call nearby pharmacies to ask if they take back old medication
  - A pharmacy that takes back any medication should be able to take back inhalers, but more education is needed to make pharmacists more aware of inhaler disposal
  - BC, MB, ON, and PEI

# What infrastructure or programs currently exist to properly dispose of inhalers?

- [Health Products Stewardship Association](#) (HPSA) take-back program accepts inhalers
  - Vendor-funded (extended producer responsibility)
  - Inhalers are incinerated
  - Participation is voluntary and free of charge
  - Many pharmacies already participate
  - Operates in **BC, MB, ON, and PEI** (expansion planned)
    - In BC and PEI, the medications undergo a “waste-to-energy” process
  - Exploring recycling and/or product redesign



**6,110**

Participating Pharmacies

Since its inception in 1999, HPSA has collected over 4,222,000 kg of pharmaceutical products and 2,700,000 kg of medical sharps.

**British Columbia:**  
98,166.90 kg \* of unwanted medication

**Ontario:**  
318,677.32 kg \* of unwanted medication

407,911.55 kg \* of used medical sharps

**Manitoba:**  
17,915.45 kg \* of unwanted medication

22,350.13 kg \* of used medical sharps

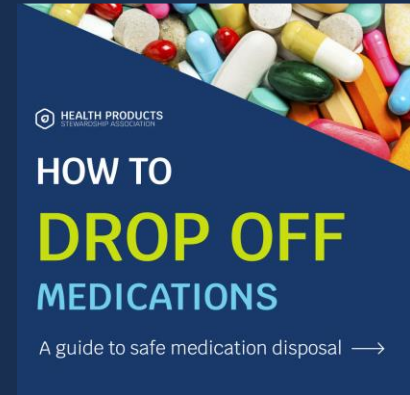
**Prince Edward Island:**  
3,779.90 kg \* of unwanted medication

8,444.50 kg \* of used medical sharps

### Pharmacies on board



**90%+** Pharmacies registered in HPSA's programs in the provinces where available (B.C., Manitoba, Ontario, P.E.I.)



\*2021 Collections

# Disposal outside of HPSA

- Formal programs exist in Alberta, Saskatchewan, and Nova Scotia
- Other provinces (Quebec, New Brunswick) have informal programs where medications can be returned to most pharmacies.

**Keep children, family and pets**

**RETURN UNUSED MEDICATION TO YOUR PHARMACIST FOR SAFE DISPOSAL**

It's important to regularly dispose of your unused/expired medications, safely. Your medications are meant for you only. They can pose a serious health and safety risk to others, especially to children and pets, if they are not disposed of properly. Your pharmacist will dispose of all medications for you. You just need to follow a few easy steps before taking your unused/expired medications to the pharmacist.

**STEP 1 - DUMP OUT**

- Take all unused/expired pills out of their pill bottles and put them into a sealed plastic bag.
- Keep your inhalers and liquids in their original containers, place them in a separate bag.

**STEP 2 - SCRATCH OUT**

- Scratch out all personal information on medicine.
- Dispose of empty bottles in your home garbage/recycle.

**STEP 3 - TAKE BACK**

- Take all bags of unused/expired pills, liquid medicine, and inhalers to your pharmacist for safe disposal.

**MEDICATION CAN POSE A SERIOUS RISK TO OUR ENVIRONMENT.**  
DO NOT flush medications down the toilet and, DO NOT throw medications, or bottles containing medications, out in your garbage/recycling.

skpharmacists.ca    Contact the Pharmacy Association of Saskatchewan at (306) 359-7277 with any questions.

**PHARMACY ASSOCIATION OF SASKATCHEWAN**

**Nova Scotia Medication Disposal Program**

**ALBERTA PHARMACISTS' ASSOCIATION**

**RETURN OLD OR UNUSED MEDICATIONS FOR ENVIRONMENTALLY FRIENDLY DISPOSAL**

PROUDLY SUPPORTED BY INNOVATIVE MEDICINES CANADA

**Élimination sécuritaire des médicaments périmés ou inutilisés**

You can return expired or unused medication to any pharmacy in Quebec, at any time of the year

# Who is responsible for managing inhaler waste?

- The HPSA is funded primarily through the [Extended Producer Responsibility \(EPR\)](#) policy approach by which a manufacturer is responsible for the post-consumer stage of a product.
  - Pharmaceutical manufacturers have a responsibility for the life cycle of the inhalers they produce
- Some provinces are funded by the government or have pharmacies pay for the disposal program, and in the territories, there are no formal programs in place currently.
  - [2021 Evidence Review on Pharmaceutical Disposal by National Collaborating Centre for Infectious Diseases](#)

# How is inhaler waste managed responsibly in other countries?

- Teva Ireland: Inhaler Recycling
- Take AIR (Take Action for Inhaler Recycling)
  - Ended August 2022
  - Chiesi UK

## The Take AIR (Take Action for Inhaler Recycling) Scheme

**12 million** people in the UK have a chronic respiratory illness

and every year **73 million** inhalers are used.<sup>1,2</sup>

**77%** of people would recycle their inhalers regularly if they could post them to a recycling centre.<sup>3</sup>

The Leicestershire **Take AIR (Take Action for Inhaler Recycling)** scheme, will enable you to safely and effectively recycle your empty, unwanted or expired inhalers through the post. The service is currently only available in the Leicestershire area.

**227** pharmacies in Leicestershire and Rutland have been invited to participate.

**PHARMACY**

Talk to your pharmacist about the **Take AIR** scheme.

**How it works**

- Plastic made into pellets and recycled.
- Aluminum crushed and recycled.
- Non-recyclable materials will be converted into energy through a process called *energy-from-waste*.<sup>4</sup>
- Propellant gas extracted and recycled.
- Each envelope can fit up to four inhalers – any brand and type.
- Sealed envelopes are returned to the recycling plant through your local letter box.

All inhalers - of any brand and type - can also still be returned to ANY community pharmacy for safe disposal.

This is a Chiesi Limited scheme supported by University Hospitals of Leicester NHS Trust and Leicestershire and Rutland Local Pharmaceutical Committee (LPC).

References:

1. ILL. Lung disease in the UK – big picture statistics. Available at: <https://statistics.bhf.org.uk/lung-disease-uk-big-picture>. Last accessed December 2020.
2. Recyclehow: What to do with inhalers. Available at: <https://www.recyclehow.com/what-to-do-with/inhalers-0>. Last accessed December 2020.
3. Chiesi UK Asthma Survey, April 2020. [data on file].
4. Department for Environment and Food affairs. Energy from Waste: a guide to the debate. Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/284612/p614190-energy-waste-201402.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/284612/p614190-energy-waste-201402.pdf). Last accessed December 2020.

Job code: UK-CHI-2020791 Date of preparation: December 2020

Logos: University Hospitals of Leicester NHS Trust, LPC Leicestershire & Rutland, Chiesi, and a recycling symbol.