



Drug dump

Management of post-consumer pharmaceutical waste

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Most pharmacists and many consumers are aware that discarding medications into regular garbage or flushing them into the water system is no longer acceptable. In order to avoid drugs getting into our water supply or soil, medications should be separated from other garbage and incinerated. However, proper disposal of medications remains a concern throughout Canada.

This article focuses on appropriate disposal of medications that consumers purchase either by prescription or over-the-

counter. It is intended to update a 2005 *Pharmacy Practice* article on this subject.⁽¹⁾ In particular, recent developments in two provinces will be highlighted: British Columbia (the first province to regulate post-consumer medication disposal) and Ontario (where disposal of post-consumer pharmaceuticals will be regulated as of July 1, 2010). To provide additional context, we briefly examine special issues relating to medication disposal, including safety and confidentiality, as well as physician samples. We discuss current challenges



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in pharmaceutical waste disposal and suggest measures pharmacists and professional associations can take to enhance proper disposal. Finally, we share some “success stories” that illustrate how some pharmacies deal with pharmaceutical waste issues.

How do consumers dispose of meds?

No one knows exactly how many unwanted medications consumers have on hand. Statistics Canada’s Households and the Environment survey reported that, in 2005, 24% of all households in Canada had leftover or expired medications on hand.⁽²⁾ Nearly half of these households disposed of the medication in an uncontrolled manner (i.e., via regular garbage, down sinks/toilets or burial), while 39% returned the medications to a pharmacy, depot or drop-off centre. Disposal figures varied among provinces: for example, nearly 70% of Newfoundland households disposed of unwanted medications in the garbage or down the sink or toilet, while in Québec and Prince Edward Island, nearly 65% of households used controlled disposal methods. Oddly, in BC, even with its province-wide medication disposal program, fewer than 35% of households used a controlled disposal method. A recent New Zealand consumer survey paints a similar picture.⁽³⁾

A survey of 301 patients at a U.S. outpatient pharmacy demonstrated that more than half of patients stored unused or expired drugs at home or flushed them down the toilet; only 23% returned drugs to the pharmacy.⁽⁴⁾ Of note, fewer than 20% of patients indicated that a healthcare provider had given them advice about how to dispose of drugs. However, the survey found that patients who had been previously counselled on how to dispose of medications were much more likely to return medications to the pharmacy, highlighting the importance of educating patients about medication disposal.

Standards of practice, guidelines

It is important to review the professional

responsibility of pharmacists in disposing of pharmaceutical waste, through examination of codes of ethics as well as standards of practice and applicable guidelines.

The National Association of Pharmacy Regulatory Authorities (NAPRA) provides an excellent website that includes links to each province and territory, typically with links to the current codes of ethics for most jurisdictions.⁽⁵⁾ As well, NAPRA’s 2009 Model Standards of Practice states that pharmacists should ensure that medications are disposed of in a safe, legal and environmentally sound manner.⁽⁶⁾ Pharmacists can contact their provincial/territorial pharmacy licensing bodies and pharmacy associations for information regarding disposal of pharmaceutical waste. Full listings of these organizations across Canada are available through NAPRA and the Canadian Pharmacists Association.^(7,8)

In some jurisdictions, such as Alberta, the professional Code of Ethics states that pharmacists are required to act as environmental stewards, by providing safe disposal of drugs, nonprescription medications and health-related products; as well, pharmacists are expected to support other pharmacy-related environmental initiatives.⁽⁹⁾ The wording used in Nova Scotia is slightly different: pharmacists are to support pharmacy-related environmental issues through promotion of safe disposal of drugs and related products.⁽¹⁰⁾

In addition to standards of practice, pharmacy licensing bodies may have guidelines in place that refer to appropriate disposal of drugs and chemicals. For example, as part of its Pharmaceutical Waste Disposal Program, the Saskatchewan College of Pharmacists has published its Guideline for Pharmaceutical Waste Disposal Services, which states that only licensed disposal services companies should be used, with helpful details on the collection process.⁽¹¹⁾ The Ontario College of Pharmacists’ Guidelines for Compounding Preparations⁽¹²⁾ and Standards for Pharmacists Providing Pharmacy Services to Licensed Long

Term Care Facilities⁽¹³⁾ suggest that pharmacists adhere to appropriate environmental practices for disposal of consumables and destruction of drugs, in compliance with environmental guidelines or requirements.

It is clear from the above that proper disposal of pharmaceutical waste is left up to the individual pharmacist, in accordance with best practices and applicable requirements. We examine legal requirements below.

Regulation of post-consumer pharmaceutical waste disposal

To date, only British Columbia regulates pharmaceutical waste that comes from consumers. Ontario will follow suit in July 2010. While there is much overlap, the definition of what may be collected as “pharmaceutical” waste differs, as each province defines the term differently; however, the practical significance of the difference is not clear.

British Columbia

B.C. regulates pharmaceutical waste disposal under the Recycling Regulation to the Environmental Management Act.⁽¹⁴⁾ Product stewards (e.g., brand owners, such as manufacturers or trademark owners/licensees) pay for the disposal and prepare stewardship plans, which must be approved by the province.⁽¹⁵⁾ The program is managed by the Post-Consumer Pharmaceutical Stewardship Association (PCPSA), a not-for-profit industry-funded organization. Approximately 95% of pharmacies participate, and consumers take their unused medications to pharmacies to be disposed of at no charge. Participating pharmacies receive free disposal containers through the PCPSA and do not pay a fee to participate in the program.

What drugs are covered?

Drugs categorized in the “pharmaceutical product category” consist of all unused or expired drugs, as defined in Canada’s *Food and Drugs Act*,⁽¹⁶⁾ with certain exceptions.⁽¹⁷⁾ Household quantities of prescription and nonprescription drugs



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Our most avid ‘champions’ are our customers. They bring us their outdated and unused medications (prescription and OTC, including injectables) as well as batteries, sharps, outdated blood glucose meters for proper biohazard disposal, whether bought at our pharmacy or not. Customers also bring in their used prescription containers either for re-use (for their own meds) or disposal (plastic, paper/cardboard boxes, glass). We encourage diabetes supply companies to take responsibility for the outdated meters and used batteries.



At the pick-up counter, we ask each customer if they would prefer “a bag or an opportunity to help save the planet.” We offer three cents as incentive for each bag not used. We also offer free re-useable bags made of recycled plastics.

In our day-to-day operations, our other champions are the team of pharmacists, technicians and clerk assistants, whose vigilance ensures all plastics (including bags, stock bottles, wrapping), non-confidential paper, cardboard, glass, broken/outdated medications/injectables, desiccants and batteries are always placed in the appropriate bins for recycle pick-up or biohazard disposal. All confidential paper is shredded and recycled. We turn off all unnecessary electronic equipment when not in use, especially when the pharmacy is closed.

Finally, our administration is a champion in their support of our efforts, and in their quest for a more paperless invoicing/payroll/budget/annual evaluation/communication system. These are all in their infancy, but we all strive for less paper every day.

—Joan Bobyn B.S.P., Ph.D., Pharmacist/Manager, Greystone Co-op Pharmacy, Saskatoon, Sask.

(including lozenges) are covered by the regulation, as well as natural health products (NHPs) as these latter are defined in the *Food and Drugs Act*’s Natural Health Products Regulations, and include homeopathic or traditional medicines.^(15,18)

Of note, the B.C. Recycling Regulation excludes sharps and syringes, disinfectants (e.g., contact lens disinfectants), topical/skin care products (e.g., antidandruff shampoos, antiperspirants, sunburn products), mouthwashes and fluoridated toothpastes.^(15,17,19) As well, the regulation excludes unused/expired drugs from farms and institutions (e.g., hospitals or medical practitioner’s offices). A list setting out types of products accepted at participating pharmacies is available online (www.medicationsreturn.ca/rmg_item_rules.pdf).⁽¹⁹⁾

Is the program working?

According to the 2008 annual report on the Medications Return Program, collection in B.C. increased from 23.3 tonnes in 2007 to 35.7 tonnes in 2008.⁽¹⁵⁾ Pharmacy participation increased nearly two per cent to 95% of all registered community pharmacies, with more than 942 community pharmacies participating. Initiatives by the B.C. Pharmacy Association and the Capital Regional District to promote the program, as well as improved web links for pharmacists and consumers, and increased media coverage, helped boost consumer awareness. As well, in January 2008, Metro Vancouver enacted a by-law that bans consumers from disposing of their unused medications in curbside garbage/recycling bins.^(20,21)

The B.C. program appears flexible and focused on the ultimate goal—safe diversion of post-consumer medications. It has also provided take-back containers at certain sites with special needs (e.g., a remote community hospital, retirement/care facilities and one clinic).⁽¹⁵⁾

Ontario

In Ontario, pharmaceutical waste will be regulated as of July 1, 2010, as part of the second phase of the province’s Municipal Hazardous or Special Waste

(MHSW) program (the first phase included paints, solvents and certain batteries; the second phase will also include batteries, fluorescent light bulbs/tubes, thermometers and thermostats).⁽²²⁾ The program includes pharmaceuticals (e.g., prescription and nonprescription drugs, NHPs and sharps, including syringes) from the residential sector (i.e., consumers) and will be funded by stewards (i.e., brand owners and first importers)—not pharmacies.⁽²³⁾

Stewardship Ontario’s final consolidated MHSW Program Plan notes that an estimated 90% of Ontario pharmacies (i.e., 2,863 pharmacies) already accept unused medications and sharps.^(23,24) This might be a surprise to many, as pharmacy-based disposal programs are not well-advertised or promoted. Currently, pharmacies fully fund these services, which they perform on a voluntary basis.⁽²⁴⁾

The Ontario MHSW Regulation does not define “pharmaceuticals,”⁽²⁵⁾ but the MHSW Draft Program Plan defines the term to include human and veterinary drugs, prescription drugs, biologics, radiopharmaceuticals, controlled substances, controlled and restricted drugs, narcotics, orally ingested nonprescription drugs and NHPs, and nonprescription topical antibiotic and antifungal creams. Exclusions include non-orally ingested nonprescription and natural health product items (e.g., certain topical creams); nonprescription or natural health products that are drops, lozenges or chewing gum; and products in food format (e.g., probiotics sold as food).^(23,24) Note that this definition differs somewhat from the one used in B.C.

How much pharmaceutical waste is produced by Ontarians?

Approximately 659 tonnes of pharmaceuticals are available each year for collection in Ontario, based on the number of prescription and nonprescription medications in the marketplace in 2007 in Ontario (6,589 tonnes) and the estimation that 10% of pharmaceuticals are not consumed.⁽²⁴⁾ In 2007, approximately 42 tonnes of pharmaceuticals were collected by municipalities and in 2008, approximately 250 tonnes were



collected through pharmacies.⁽²³⁾ The collection target for Year 1 of the MHSW program is 312 tonnes of prescription, nonprescription and NHPs (254 tonnes via return to retail, [i.e., to pharmacies] and the remainder through toxic taxis, depots and events). The target for Year 5 is 601 tonnes.⁽²³⁾

In 2007, approximately 184 tonnes of sharps and syringes reached the Ontario market.⁽²⁴⁾ As these items are not consumed (in contrast to medications), the program assumes 100% will be available for collection and targets 230 tonnes for Year 1 and 362 tonnes for Year 5.⁽²⁴⁾ Details of how the Ontario program will work will be forthcoming, once vendors are chosen to execute the plan.

Other provinces⁽²⁶⁻²⁹⁾

Alberta: EnviRx is a voluntary Alberta program started in 1988 by the Alberta Pharmacists' Association. Consumers return expired and unused medications to the approximate 850 participating

pharmacies for disposal. The program is funded by industry groups and government grants. There has not been a consistent increase in the weight of pharmaceuticals collected: 2001 (48 tonnes), 2005 (37 tonnes), 2007 (46 tonnes). The decrease in weight collected between 2001 and 2005 may have been due in part to development of a waste acceptance protocol that prohibited inclusion of sharps and encouraged pharmacists to take pharmaceuticals out of packaging before discarding.

Saskatchewan: Since 1997, Saskatchewan's Pharmaceutical Waste Disposal Program has collected drugs and sharps. The program is administered by the Pharmacists' Association of Saskatchewan and pharmacies pay for waste pickup. An estimated 90% of the province's 350 pharmacies participate in the program; in 2007, more than 16 tonnes of pharmaceutical waste was collected (including sharps, packaging).

Nova Scotia: The Medication Disposal Program began in the mid-1990s and is administered by the Pharmacy Association of Nova Scotia. Drugs are collected by pharmacies, while manufacturers pay for transport and destruction. The province also has a Safe-Sharps program. The average weight of pharmaceuticals collected each month increased from 1.8 tonnes (2005) to 2.2 tonnes (2007).

Prince Edward Island: The Take it Back! Program for medications in P.E.I. and the Don't Get Stuck program for sharps involve collection by pharmacies; the province pays for disposal.

Green *Manitoba* is working on developing a formal provincially regulated stewardship program that will include pharmaceuticals. While there is no formal province-wide program in *Québec*, Recyc-Québec advises consumers to return medications to pharmacies or to an eco-centre or permanent depot. *New Brunswick* has no province-wide program, but most pharmacies accept medication returns, and pay for disposal. *Newfoundland and Labrador* plans to establish a framework for a waste pharmaceuticals/sharps diversion program.

Some special issues

Safety and confidentiality

To maximize the amount of medication collected in each disposal bin, pharmacy staff members often remove the medications from their containers (e.g., Rx vials) before placing medications in the disposal bin. The safety of this practice has been questioned—mixing solids and liquids could lead to off-gassing, as well as spills.⁽³⁰⁾ In addition, staff members could be exposed to pharmaceutical “dust” during the disposal process. Drug diversion may also be an issue.

Furthermore, confidential information printed on vials and other containers (e.g., patient name, medication name) could be at risk if empty containers are simply discarded in regular garbage. It is generally recommended that medications returned by the consumer be



At our store, we do the following on a daily basis:

- *Offer (and advertise) safe, free medication and sharps disposal
- *Use 100% biodegradable bags
- *Always ask customers if they really need a bag
- *At customer request (and where the law allows) we may reuse medication vials
- *We recycle everything that is recyclable (we have separate bins for different stuff)

—Michael Ibrahim, B.Sc.Pharm., CGP, CDE, Pharmacist, Owner Pharmasave Michael's Pharmacy, Bayfield, Ont.

placed in the disposal container as is, vials and bottles included, and then incinerated.⁽³⁰⁾ However, for greater certainty, some pharmacists ask patients to transfer their own medications into plastic bags; this minimizes staff handling of the drugs and the consumer deals with disposal of vials (and personal information on labels).⁽³¹⁾ When disposing of full bottles (e.g., liquids or ointments), personal information may be blacked out with marker. Pharmacists should be satisfied that the medication disposal process they adopt does not risk exposing confidential information.

It is recognized that disposing of full bottles and jars in disposal bins takes up a lot more space and may significantly increase costs to pharmacies in the many jurisdictions where stores must pay for disposal of medications. It is hoped that, ultimately, brand owners (e.g., manufacturers) will pay at least part of these costs in areas where disposal programs are voluntary.

Definition of pharmaceuticals

As discussed above, post-consumer pharmaceutical waste remains largely unregulated in Canada. Ideally, pharmaceutical waste disposal should be regulated in a consistent manner across the country. However, as provinces (not the federal government) regulate such disposal, this is unlikely to be the case, at least in the near future.

The lack of consistency, even in the definition of “pharmaceuticals” in B.C. and Ontario, the two provinces that are (or will shortly be) regulated, is concerning. It would be unwieldy for stewards

(usually the pharmaceutical companies) to have to deal with different products in the various provinces. As well, if one goal is to promote consumer understanding and participation, then marketing efforts would be much less expensive if the programs were standardized across the country.

In addition, from a practical perspective, will it be possible for stewardship programs to exclude products such as lozenges and certain creams and ointments, while including others? Who will check the mountains of returned medications for “contraband” products?

Narcotics and controlled drugs

Pharmacists are not required to obtain authorization from Health Canada in order to destroy previously dispensed narcotic drugs returned by consumers (e.g., those belonging to a deceased patient).^(32,33) However, as pharmacists could be challenged later as to the fate of these substances, it is recommended that they verify provincial policy with their licensing body and:

- record the name and quantity of narcotic to be destroyed,
- render the substances unusable (e.g., by grinding or adding water, then mixing with coffee grounds, kitty litter)⁽³⁴⁾ and
- have a second person (e.g., another pharmacist or the person returning the substance to the store) witness the destruction.

Certain narcotics are of special concern. For example, the residual drug in a used fentanyl patch could cause harm. The College of Pharmacists of British Columbia issued an alert in light of deaths due to

overdoses of fentanyl that had been prescribed for others; the B.C. College advises that used patches be placed in a childproof container and returned to the pharmacy for disposal.⁽³⁵⁾ Although the manufacturers' product monographs recommend flushing fentanyl patches down the toilet,⁽³⁶⁻³⁸⁾ the B.C. College alert suggests that other disposal methods be considered where possible, due to the environmental impact of drugs in the water supply. As well, the alert states that pharmacy managers must ensure that these patches are rendered unusable or inaccessible until they can be destroyed.

Physician samples

Doctors frequently receive medication samples (clinical evaluation packages) from pharmaceutical companies. It is not clear how many of these samples accumulate or expire in physicians' offices. However, the magnitude of the issue is highlighted by a 2001 medications return study in which physicians and patients brought unused or expired medications to a Vancouver hospital.⁽³⁹⁾ Twenty-five individuals contributed 47 kilograms of medications over two days. Most of these (87%) were physician samples, contributed by 12 doctors.

According to the Canadian Medical Association's Guidelines for Physicians in Interactions with Industry, physicians who accept clinical evaluation packages (i.e., samples) are responsible for proper disposal of unused samples.⁽⁴⁰⁾ This is echoed by provincial licensing bodies, such as the College of Physicians and Surgeons of Ontario.⁽⁴¹⁾ At the same time, the Code of Ethical Practices of Canada's research-based pharmaceutical companies clearly places the onus of dealing with expired samples on the companies that supply the samples.⁽⁴²⁾

The College of Physicians and Surgeons of B.C. recommends that drugs and samples in physician offices be monitored by the doctor or assistant and that these be disposed of and replaced when outdated; the group also recommends that sharps be disposed of in an appropriate manner.⁽⁴³⁾ Unfortunately, they do not indicate how this should



“Our pharmacy has been participating in the B.C. Medications Return Program for so long that it’s now just part of our normal daily routine. The containers are supplied with all the instructions for pick up and how to order new containers. We return one full med disposal container (13 x 16 inch) about every three months.

We ask consumers to bring in their pills/capsules in plastic bags—so consumers are responsible for disposing of their own containers (and their personal information on the labels). We empty the contents of the bags into the disposal containers—this minimizes our handling of medications and dirty packaging. The entire bottles/jars for liquids and ointments are placed in the bin and any personal information on the label is blacked out with a marker. For inhalers, we try to accept only the canister and ask the consumer to destroy their own personal information, or we black out any personal information if the container cannot be separated from the label.

To us, accepting expired and no-longer-needed prescription and OTC medications just seems like part of our daily practice of pharmacy now, as we have been doing it for more than 10 years.

—Elaine Cooke, R.Ph., CDE, Safeway Pharmacy #198, Maple Ridge, B.C.

be done. Although there are no formal mechanisms in place, one alternative is to ensure that pharmaceutical company representatives do not over-supply physicians with samples and regularly take back unused or outdated samples. Physicians should rotate sample inventory and consider limiting samples to the most prescribed medications.⁽⁴⁴⁾

Since pharmacy-based returns programs usually exclude physician samples, it is not clear how physicians typically dispose of expired samples. Some healthcare professionals support banning all physician samples.⁽⁴⁵⁾ Alternatives to this practice include a voucher system or arrangement whereby patients can obtain a limited supply of a medication for free from pharmacies.

Veterinary drugs

Huge volumes of pharmaceuticals are used in veterinary medicine, farming and aquaculture, for therapeutic purposes as well as for growth promotion.⁽⁴⁶⁾ Veterinarians are instructed on disposal of narcotics, non-controlled drugs and pharmaceuticals by their provincial Colleges. The College of Veterinarians of Ontario’s Minimum Standards for Veterinary Facilities in Ontario provides detailed sug-

gestions for disposal of expired drugs.⁽⁴⁷⁾ Veterinarians are not to leave expired narcotic or controlled drugs with pharmacists unless the products are no longer serviceable or in a useable condition.⁽⁴⁸⁾ They may incinerate the products in the presence of another healthcare professional after obtaining authorization from the Drug Control Unit of Health Canada. Regardless of the type of veterinary facility (private office or small hospital), veterinarians must keep expired drugs separate from unexpired agents and then discard them or return them to the manufacturer.

What can pharmacists do?

It makes sense for pharmacies to handle medication returns from consumers: pharmacies are convenient for the public, and pharmacy staff can provide safe, knowledgeable disposal services. As well, accepting responsibility for end-of-life management of medications is a strategic marketing opportunity for pharmacists, and reinforces the trust the public has in the profession. At the same time, it is appropriate for manufacturers to pay for disposal of medications. This would avoid situations (e.g., in areas where pharmacies

must pay for disposal services themselves) where pharmacies refuse to take back medications that were not purchased at their stores.

Below are a few suggestions for pharmacists (or pharmacy associations) to promote the development and maximize the effectiveness of pharmaceutical waste disposal programs:

• Find out what’s happening:

Start by finding out which pharmaceutical waste programs are in place in your municipality (and province). Identify gaps and areas of concern. Perhaps pharmacists in other provinces are doing something innovative? Ask about their programs. Carefully select the company your pharmacy uses to dispose of pharmaceutical waste; examine the advantages/disadvantages of each company.

• **Work with regulators** (e.g., ministries of health and environment; municipalities), as well as other healthcare professionals. The goal could be to develop a comprehensive medication disposal program that is readily understood by all. For example, -To maximize participation by consumers, encourage by-laws that prohibit pharmaceuticals in curbside garbage (as is the case in Vancouver).

-Look for all sources of unwanted medications, such as nursing homes, schools, and offices (e.g., physician, dentist, veterinarian) and lobby for a program that includes these sources.⁽⁴⁹⁾

-Advocate for Canada to follow the lead of countries such as Sweden,⁽⁵⁰⁾ where drugs are classified according to their environmental impact (risk). Ultimately, pharmacists and prescribers should be able to select the least persistent and least bioaccumulative alternative.

• Lobby the manufacturers

-Encourage green manufacturing. -Ask for research to determine whether expiry dates on pharmaceuticals can be extended, to help minimize waste. Although retained potency depends upon the nature of the drug and storage con-



ditions, recently published information shows that many drugs retain 90% of their potency for at least five years after their labelled expiry dates.⁽⁵¹⁾ The American Society of Health-System Pharmacists supports the maximal extension of expiration dates of pharmaceutical products as a means of reducing healthcare costs.⁽⁵²⁾

-Ask manufacturers and wholesalers to use less packaging for products coming to your store. Be persistent and specify which packaging seems excessive and why.

- **Review your store's purchasing practices**

-Control inventory: keep stock to a minimum to avoid product expiry.

-Insist on the longest expiry dates for pharmaceuticals.

-Where possible, select products that have minimal packaging.

- **Encourage optimal prescribing by physicians**

-For example, the use of trial quantities for the initial prescription.

- **Talk to your clients**

-Find out why they have old and unwanted medications in their homes. Is too much drug being supplied? Do treatments change frequently? Do drugs quickly become outdated? Do they hoard?


-Help them reduce consumption of non-essential medications (and warn them about excess packaging).

-Finally, tell consumers that they can return their medications to your pharmacy. Although a significant number of pharmacies state that they provide this service, in many areas it remains a well-kept secret.

Medication disposal success stories

The green initiatives that accompany this article (see sidebars) highlight some medication disposal and environmental initiatives undertaken by Canadian pharmacies. We hope that these stories will encourage others to follow suit.

Conclusion

Proper disposal of medications is part of the pharmacist's professional mandate, and pharmacists should be proud to do their part to protect the environment! This is an exciting time to be involved in pharmaceutical waste disposal, with many provincial programs in the development phase. Pharmacists have unique opportunities to work with regulators, other health-care professionals and pharmaceutical companies to achieve the common goal of protecting the environment by ensuring that comprehensive, clear programs are put into place and that consumers are made aware of these programs. 

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