Pharmaceutical Disposal Programs for the Public: A Canadian Perspective

Summary: The presence of pharmaceuticals in the environment has become an environmental issue. Although human excretion has been identified as the main factor contributing to the environmental loading of pharmaceuticals, improper disposal practices can also contribute to this problem. In Canada, survey results showed that consumers tend to dispose a large part of their unused and expired pharmaceuticals in regular waste and down the drain. Therefore, a change in the behaviour of consumers regarding their disposal practices could help reduce the environmental exposure to these chemicals. In this context, this paper identifies and assesses pharmaceutical disposal programs offered to the public. Programs identified aim at increasing proper disposal of pharmaceuticals and/or reducing pharmaceutical waste. The main findings are: (1) Canada does not have a nation-wide pharmaceutical disposal program but a variety of programs are established at provincial, municipal, and community levels; (2) across the Canadian province-wide programs, Alberta seems to divert the most quantity, in absolute terms, of pharmaceutical waste from household wastes and sewer systems but Saskatchewan demonstrates a better performance per capita; and finally (3) outside of Canada, nation-wide pharmaceutical disposal programs exist in some countries.

Acknowledgments: I will like to thank Claire Hughes for her extensive review and comments.
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**Acronyms**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACP</td>
<td>Alberta College of Pharmacists</td>
</tr>
<tr>
<td>CCME</td>
<td>Canadian Council of Ministers of the Environment</td>
</tr>
<tr>
<td>CGPA</td>
<td>Canadian Generic Pharmaceutical Association</td>
</tr>
<tr>
<td>DUR</td>
<td>Drug Utilisation review</td>
</tr>
<tr>
<td>EFPIA</td>
<td>European Federation of Pharmaceutical Industries and Associations</td>
</tr>
<tr>
<td>EMA</td>
<td>Environmental Management Act</td>
</tr>
<tr>
<td>EPR</td>
<td>Extended Producer Responsibility</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>F&amp;DA</td>
<td>Food and Drugs Act</td>
</tr>
<tr>
<td>HHM</td>
<td>Hazardous Household Material</td>
</tr>
<tr>
<td>HHW</td>
<td>Household Hazardous Waste</td>
</tr>
<tr>
<td>IFO</td>
<td>Industry Funding Organization</td>
</tr>
<tr>
<td>IWMC</td>
<td>Island Waste Management Corporation</td>
</tr>
<tr>
<td>LIF</td>
<td>Swedish Association of the Pharmaceutical Industry</td>
</tr>
<tr>
<td>MHSW</td>
<td>Municipal Hazardous or Special Waste</td>
</tr>
<tr>
<td>MMSB</td>
<td>Multi-Materials Stewardship Board</td>
</tr>
<tr>
<td>NAPRA</td>
<td>National Association of Pharmacy Regulatory Authorities</td>
</tr>
<tr>
<td>PANS</td>
<td>Pharmacy Association of Nova Scotia</td>
</tr>
<tr>
<td>PAS</td>
<td>Pharmacists` Association of Saskatchewan</td>
</tr>
<tr>
<td>PBT</td>
<td>Persistence, Bioaccumulation and Toxicity</td>
</tr>
<tr>
<td>PCPSA</td>
<td>Post-Consumer Pharmaceutical Stewardship Association</td>
</tr>
<tr>
<td>PEC</td>
<td>Predicted Environmental Concentration</td>
</tr>
<tr>
<td>PEI</td>
<td>Prince Edward Island</td>
</tr>
<tr>
<td>PNEC</td>
<td>Predicted No Effect Concentration</td>
</tr>
<tr>
<td>PRA</td>
<td>Pharmacy Regulatory Authority</td>
</tr>
<tr>
<td>RCBC</td>
<td>Recycling Council of British Columbia</td>
</tr>
<tr>
<td>RUM</td>
<td>Return Unwanted Medicines</td>
</tr>
<tr>
<td>RxA</td>
<td>Alberta Pharmacists’ Association</td>
</tr>
<tr>
<td>Rx&amp;D</td>
<td>Researched-Based Pharmaceutical Companies</td>
</tr>
<tr>
<td>SCP</td>
<td>Saskatchewan College of Pharmacists</td>
</tr>
<tr>
<td>SIGRE</td>
<td>Spain Integrated Waste Management System</td>
</tr>
<tr>
<td>STP</td>
<td>Sewage Treatment Plant</td>
</tr>
<tr>
<td>WDA</td>
<td>Waste Diversion Act, 2002</td>
</tr>
<tr>
<td>WDO</td>
<td>Waste Diversion Ontario</td>
</tr>
<tr>
<td>3Rs</td>
<td>Reduce, reuse, and recycle</td>
</tr>
</tbody>
</table>
The information provided in this paper does not claim to reflect all existing programs in Canada. Instead, this paper presents information gathered through intensive web searches, correspondence with stakeholders, and review of scientific journals.

Key Findings

- There is no nation-wide program in Canada for the disposal of household pharmaceutical waste;
- Most Canadian provinces have established or are developing province-wide programs;
- None of the Canadian territories have a territory-wide program;
- Several municipalities and communities offer various pharmaceutical disposal programs;
- In general:
  - Programs are initiated by provincial governments, the pharmaceutical industry, and/or pharmaceutical associations;
  - The objectives of the programs are to increase safe disposal of pharmaceuticals and to reduce pharmaceutical waste;
  - Consumers can return unused and expired pharmaceuticals to community pharmacies or to collection depots;
  - Only pharmaceuticals returned by the public are accepted;
  - Participation is voluntary;
  - British Columbia has the only regulatory program requiring funding from the pharmaceutical industry but similar regulations are in development for Ontario and Manitoba;
  - Elsewhere funding is provided by the pharmaceutical industry and/or the governments on a voluntary basis;
  - Pharmaceutical waste is generally incinerated;
  - Programs are advertised with brochures, posters, and websites; and
  - There is monitoring of the volume of total pharmaceuticals collected, pharmacy participation rates, and costs of programs;
- Alberta’s province-wide program seems the most successful with respect to the volume of pharmaceuticals collected;
- Outside of Canada, nation-wide programs have been established; and
- Further data would be necessary to compare and better assess the success of the programs. Useful information would include:
  - Rate of participation of the public;
  - Amount of pharmaceuticals collected relative to those sold and unused; and
  - Types of pharmaceuticals collected.
### Summary of Canadian Pharmaceutical Disposal Programs

<table>
<thead>
<tr>
<th>Province/Territory</th>
<th>Mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Alberta</strong></td>
<td></td>
</tr>
<tr>
<td>Province-wide - ENVIRx Program</td>
<td></td>
</tr>
<tr>
<td>• Start: 1988</td>
<td>Collection: Community pharmacies</td>
</tr>
<tr>
<td>• Regulatory: No</td>
<td>Administration: RxA</td>
</tr>
<tr>
<td></td>
<td>Funding: Industry and provincial government</td>
</tr>
</tbody>
</table>

**British Columbia**

- Province-wide - Medications Return Program
  - Start: 1996
  - Regulatory: Yes
  - Collection: Community pharmacies
  - Administration: PCPSA
  - Funding: Industry

**Manitoba**

- Province-wide - HHW Program
  - Start: 1990
  - Regulatory: No
  - Collection: Community pharmacies and collection depots
  - Administration: Province of Manitoba
  - Funding: Provincial government

- Province-wide - HHM Stewardship Program
  - Start: In development
  - Regulatory: Yes (in development)
  - Will require industry involvement

**New Brunswick**

- Regional - HHW Regional Solid Waste Commissions Programs
  - Start: end 1990s
  - Regulatory: Yes
  - Collection: HHW depots
  - Administration: Regional Solid Waste Commissions
  - Funding: Users

**Newfoundland and Labrador**

- Province-wide - HHW Program
  - Start: 1998
  - Regulatory: No
  - Collection: HHW depots
  - Administration: MMSB
  - Funding: Provincial and municipal governments

**Northwest Territories**

- No program

**Nova Scotia**

- Province-wide - Medication Disposal Program
  - Start: mid 1990s
  - Regulatory: No
  - Collection: Community pharmacies
  - Administration: PANS
  - Funding: Industry

**Nunavut**

- Community - Pharmacy Program
  - Start: N.A.
  - Regulatory: No
  - Collection: Community pharmacies
  - Administration: The Baffin Regional Hospital Pharmacy and Regional Centres
  - Funding: N.A.

**Ontario**

- Municipal - Collection Programs
  - Start: Various
  - Regulatory: No
  - Collection: Community pharmacies and collection depots
  - Administration: Various
  - Funding: Various

- Province-wide - MHSW Diversion Program
  - Start: In development
  - Regulatory: Yes (in development)
  - WDO will develop the program
  - Administration: Not confirmed
<table>
<thead>
<tr>
<th>Province</th>
<th>Program Description</th>
<th>Start Year</th>
<th>Regulatory Requirement</th>
<th>Collection Location</th>
<th>Administration</th>
<th>Funding Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prince Edward Island</td>
<td>Province-wide - Take It Back</td>
<td>2004</td>
<td>No</td>
<td>Community pharmacies</td>
<td>IWMC</td>
<td>IWMC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Administration: IWMC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quebec</td>
<td>Municipal – Collection of HHW</td>
<td>Various</td>
<td>No</td>
<td>Collection depots</td>
<td>Municipalities</td>
<td>Municipalities</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Administration: Municipalities</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Funding: Municipalities</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Community - Pharmacy Collection</td>
<td>Various</td>
<td>Yes</td>
<td>Community pharmacies</td>
<td>Community pharmacies</td>
<td>Community pharmacies</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Administration: Community pharmacies</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Funding: Community pharmacies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saskatchewan</td>
<td>Province-wide - Pharmaceutical Waste Disposal Program</td>
<td>1997</td>
<td>No</td>
<td>Community pharmacies</td>
<td>PAS</td>
<td>Community pharmacies</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Administration: PAS</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Funding: Community pharmacies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yukon</td>
<td>Community – Pharmacy and HHW Programs</td>
<td>Various</td>
<td>No</td>
<td>Community pharmacies and collection depots</td>
<td>Whitehorse General Hospital</td>
<td>N.A.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Administration: Incinerator operated by Whitehorse General Hospital</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Funding: N.A.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Provinces and territories are presented in alphabetic order. N.A. means the information was unavailable/not found.
**Introduction**

Potential environmental and indirect human health impacts of pharmaceutical substances in the environment are an emerging concern. This is a consequence of recent findings of traces of several pharmaceuticals in the environment; primarily in water bodies (surface water, coastal water, groundwater, and drinking water) as well as in soils (for Canadian evidence see Boehringer, 2004, Metcalfe, 2006, Servos and al., 2007 among others). Although human excretion has been identified as the primary route of entry for pharmaceuticals into the environment, disposal practices and manufacturing discharges also contribute to this problem to a lesser extent.\(^1\) Pharmaceuticals can pass through sewage treatment plants (STPs) and be released to the environment because STPs are, in general, not designed to remove such chemicals. Furthermore, pharmaceuticals ending up in landfills can leak into surrounding groundwater. The environmental and indirect human health impacts of pharmaceuticals in the environment represent a large and growing area of research at the moment.

In this context, as surveys show that Canadian consumers tend to dispose a large part of their unused and expired pharmaceuticals in garbage, toilets, and sinks (COMPAS, 2002, Statistics Canada, 2008 and Annex 1); and as the Canadian use of pharmaceuticals continuously increases (as shown in Figure 1 with prescriptions), it seems important that Canada controls the management of the disposal of pharmaceuticals.\(^2\) Having such management tools would mitigate potentially hazardous environmental conditions. In addition, human health would be directly protected from risk of accidental poisonings, abuse, recreational use, etc. resulting from keeping unused, unwanted and expired pharmaceuticals at homes.\(^3\)

Disposal programs, which collect the public’s unwanted and expired pharmaceuticals and dispose of them safely, are estimated to be able to reduce the levels of pharmaceuticals entering the environment through STP effluents by 10% to 15% (Metcalfe, 2008). Although this may represent a relatively small contribution to the total

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\(^1\) Ruhoy and Daughton (2008) list unique aspects of disposal of unused and unwanted drugs into sewage systems (in contrast with contributions from human consumption and excretion) that could prove environmentally significant.

\(^2\) Lately, only residents of France and the United States have spent more per capita on pharmaceuticals than Canadians. Annex 2 illustrates national and international trends for pharmaceutical expenditure.

\(^3\) According to statistics from the United States, accidental poisonings from pharmaceuticals are up 395% since 1990; most deaths of children through accidental poisoning are due to the use of pharmaceuticals belonging to someone else; in addition it has been seen that teens and young adults prefer pharmaceutical prescriptions, second after alcohol and marijuana/cannabis, to get high (City of Kirkland, 2009 and Centre for Addiction and Mental Health, 2008).
environmental loading of pharmaceuticals, such risk management options remain important. Therefore, the objective of this paper is to describe and assess Canadian stewardship programs for the safe disposal of household pharmaceuticals.\(^4\) To achieve this goal, each Canadian jurisdiction level (national, provincial/territorial, and municipal/community) has been reviewed. In addition, in this paper, Canadian programs have been compared with international programs. All information in this paper has been gathered via Internet searches, personal communications, and scientific journal reviews. All useful references, contact information and websites are cited throughout the text.\(^5\)

**Figure 1: Prescriptions Dispensed in Canada, 1995-2005**

This paper shows that there is no nation-wide disposal program for household pharmaceuticals in Canada. However, there are a number of existing programs across Canada. The main programs are province-wide but many smaller ones are also offered by municipalities and communities. Currently, British Columbia has the only province-wide program having a regulatory framework requiring participation and funding from the

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\(^4\) Stewardship, or the responsible management of the environment and its natural resources, requires governments, industry, medical professionals and consumers to assume a greater responsibility for ensuring that the products manufactured, used, reused or disposed of have a minimum impact on the environment (Canadian Council of Ministers of the Environment (CCME), 2007). In the context of this paper, safe disposal of pharmaceuticals refers to methods other than via regular garbage, toilets, or sinks (i.e. licensed incinerators and landfills). Safe disposal should minimize potential impacts to the environment and human health. However, this paper is not intended to pose any judgement on safe disposal methods.

\(^5\) This paper has been sent to administrators of each program for review. The names of reviewers who have provided comments on the paper are indicated in the appropriate sections.
industry (Extended Producer Responsibility (EPR)). However, similar regulated programs are currently being developed in Ontario and Manitoba. Although all the programs aim to increase proper disposal practices of pharmaceuticals, they differ on many aspects such as funding, regulatory frameworks, administration, monitoring, collection practices, advertising, performance, etc. The Alberta province-wide program appears to currently collect the highest quantity, in absolute terms, of pharmaceutical waste and Saskatchewan demonstrates the best performance per capita. However, further data would be necessary to appropriately assess each program’s success. Outside of Canada, other countries have also established disposal programs for pharmaceutical waste. In contrast to Canada, most international programs are in general nation-wide.

For future research, it would be interesting to learn more about the quantity and the category of pharmaceuticals collected by disposal programs or disposed of in garbage, toilets or sinks compared to those purchased by the public. This would help to determine the degree to which improper disposal may contribute to the environmental exposure to pharmaceuticals. Furthermore, it is necessary to investigate the policies and guidelines for community pharmacies, as well as health care facilities and manufacturers in terms of pharmaceutical disposal practices. For instance, pilot studies could be undertaken to determine the amount and the types of pharmaceuticals disposed of by these establishments and the methods they use to do so. Also, a more comprehensive analysis of well performing international programs should be undertaken. Finally, it would be important to assess the overall environmental consequences (pros and cons) of safe disposal practices.

In the remainder of this document, Section 1 provides the paper terminology with respect to pharmaceutical waste; Section 2 describes the main Canadian pharmaceutical disposal programs; Section 3 compares Canadian programs and their international counterparts with respect to quantity of pharmaceutical waste collected; Section 4 provides recommendations for further study and consultation; and Section 5 summarizes all conclusions.

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6 EPR is an environmental policy approach in which a producer’s responsibility for a product is extended to the post-consumer stage of a product’s life cycle (CCME, 2007).
1 Terminology

Based on the definitions of the Food and Drugs Act (F&DA), this paper focuses on disposal programs for human pharmaceuticals which include prescription and non-prescription drugs (see Annex 3 for F&DA’s definitions). Nevertheless, the analysis presented here is not limited to statutory definitions. Instead, it cites the programs wording as it is. For instance, some programs may use other terms to refer to pharmaceuticals (e.g. drugs, medications, medicines, health products, etc.). In addition to pharmaceuticals, some programs may accept products that are not defined as a pharmaceutical under the F&DA (e.g. natural health products, sharps, etc.). For these reasons, the term pharmaceutical is used interchangeably with other terms throughout the paper. However, any programs that do not target pharmaceuticals are not analyzed in this paper. Finally, the term pharmaceutical waste refers to all unused and expired pharmaceuticals requiring disposal. Some programs may only collect and dispose of pharmaceutical substances while others also collect and dispose of pharmaceutical packaging (including packaging in contact with pharmaceuticals, external packaging, etc.).

2 Canadian Pharmaceutical Disposal Programs

There is no nation-wide disposal program for the public in Canada. However, there is an organization, the Post-Consumer Pharmaceutical Stewardship Association (PCPSA), which supports provinces/territories with stewardship programs. The PCPSA responds to government and environmental issues related to the efficient collection and safe disposal of unused medications returned by the public. It is a non-profit organization which was federally incorporated in 1999 with the support and cooperation of Canada’s Researched-Based Pharmaceutical Companies (Rx&D), the Canadian Generic Pharmaceutical Association (CGPA) and the NDMAC-Advancing Canadian self-care. However, the PCPSA’s role applies only to provinces/territories which have regulations requiring industry stewardship programs (PCPSA, 2007).

Across Canadian provinces/territories, there are either formal provincial-wide programs or various municipal, community or pharmacy programs. Programs in place generally address the stewardship of unused and expired household pharmaceuticals;

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7 For example, programs that specifically collect sharps (and do not collect pharmaceuticals) are not analyzed in this paper. Disposal programs for sharps will be documented in a separate paper.
8 However, this information is not always available.
consumers return their items to community pharmacies or dispose of them in household hazardous waste (HHW) depots; household participation is voluntary, and the returned pharmaceuticals are incinerated or buried in licensed landfills. Programs differ on aspects such as funding, regulatory framework, administration, monitoring, collection practices, advertising, performance, etc.

The Pharmacy Regulatory Authority (PRA) for each province has the authority to prepare their own guidelines for the disposal of pharmaceuticals returned by consumers (NAPRA, 2007). Accordingly, some provincial guidelines for operating pharmacies state that community pharmacies should accept pharmaceuticals returned from patients for proper disposal. However, when pharmacies have to bear the cost of the disposal programs (which includes, in general, a pick-up fee and a cost per volume of pharmaceutical disposed) it is possible that pharmacies may refuse to take-back unused and expired pharmaceuticals, particularly if they have not dispensed them (Elston, 2004).

This paper assumes that the pharmaceuticals returned to pharmacies are sent to approved/licensed waste disposal facilities. However, this assumption has not been verified in the context of this paper. Furthermore, this paper has not studied what pharmacies are doing with their expired or unsold products and unwanted accumulated inventories. Although some of these items may be returned to distributors, following pharmaceutical company policies, remaining waste needs to be disposed of at the pharmacy’s own expense.

The following reviews and focuses on the structure of Canadian provinces/territories existing pharmaceutical waste disposal programs. Programs identified aim at increasing proper disposal of pharmaceuticals and/or reducing pharmaceutical waste. Owing to their large numbers, municipal/community/pharmacy programs are described in less detail. Programs that can indirectly achieve the above objectives or reduce the potential environmental and indirect human health impacts of pharmaceuticals in the environment are presented in Annex 4. The degree of detail for each program may vary across provinces and territories as the information available was not uniform for all programs. Canadian provinces/territories are presented in alphabetic order. The map in Annex 5 illustrates the Canadian territory.
2.1 Alberta

Alberta has a formal province-wide program for the disposal of household pharmaceutical waste. The ENVIRx program allows consumers to return pharmaceuticals to the majority of the province’s community pharmacies for safe disposal. It is administrated by the Alberta Pharmacists’ Association (RxA) and mainly funded by the industry and via small grants from the provincial government. The program is not regulated.

2.1.1 ENVIRx Program

Summary of Initiative: The RxA ENVIRx program has existed since 1988. Over the years, the program has evolved from being provincial government-sponsored, to pharmaceutical industry/provincial government/pharmacy-sponsored. Presently, the program is mainly funded by the industry and it is administered by the RxA.

Objective: The main objectives of the program are the diversion of pharmaceuticals from landfills and sewers for safe collection and disposal, as well as promoting proper and complete use of pharmaceuticals to reduce waste.

Scope: Only expired and unused medications returned from the public are accepted. In addition, narcotics, controlled substances, and substances that have received prior approval for destruction by Health Canada are also accepted.9

Responsibilities:

- Consumers: Through the program, consumers return items to participating pharmacies.
- Community Pharmacies: Community pharmacists accept unused and expired pharmaceuticals from consumers and store the returned items for pickup. They also promote the program.
- Pharmacists’ Association: The program is administered by Alberta pharmacists through the RxA. RxA coordinates and manages the program by collecting the voluntary contributions, developing and distributing information, and coordinating the transport and disposal of the collected items.10

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9 Outdated samples from medical clinics and other health care facilities are not accepted.
10 The program falls outside of the mandate of the Alberta College of Pharmacists (ACP), the licensing authority. Note that every province in Canada has both a licensing authority and a pharmaceutical association. Links for Canadian Pharmacy Licensing Authorities are found at: http://www.napra.org/pages/Licensing_Registration/Authorities.aspx.
- **Waste Collector:** Currently, G-M Pearson is contracted to collect and safely dispose of the waste from pharmacies.

**Nature of Participation:** Participation is voluntary for consumers, community pharmacies, and the pharmaceutical industry.

**Funding Mechanisms:**
- **Producers:** Voluntary contributions from the producers. Pharmaceutical companies are represented by Rx&D, NDMAC-Advancing Canadian Self-care, and CGPA.
- **Government:** The Alberta government (Alberta Environment) provides a small grant for the program funding.
- **Consumers:** Taxpayers experience some costs due to government grants for the program.

**Monitoring:** Annual volume of pharmaceuticals collected is reported.

**Advertising:** The program provides pharmacies with brochures for the public, a pharmacist information guide and warning labels for pharmacy waste containers.

**Waste Disposal Method:** All items collected through the program are disposed through incineration at the Wainwright Regional Waste to Energy Facility in Wainwright, Alberta. G-M Pearson collects the waste from community pharmacies on an on-call basis throughout the province.

**Regulatory Framework:** The program is not regulated.

**Statistics:**
- **Percentage of Pharmacies Participating:** The majority of the approximate 900 community pharmacies across Alberta participate voluntarily to the program.
- **Volume of Pharmaceuticals Collected:** The volume of pharmaceuticals collected increased from 1988 to 2001, dropped from 2001 to 2005 and increased again from 2005 to 2007.\(^{11}\) From 1988 to 2000, the program collected and disposed of a total of 319.08 tonnes. In 2000, the program collected and disposed of 34 tonnes of unused and expired pharmaceuticals, 48 tonnes in 2001, and 37 tonnes in 2005. In 2006 and 2007, 43 and 46 tonnes of waste were collected respectively.
- **Type of Prescription Returned:** On the top of the list of prescriptions returned under the program are antibiotics followed by painkillers and medications for heart conditions.

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\(^{11}\) The drop in the total weight amount of pharmaceuticals returned from 2001 to 2005 could be attributed to the development of the RxA Waste Acceptance Protocol prohibiting the disposal of sharps into the pails and encouraging pharmacists to remove packaging of pharmaceuticals before placing in pails. From 1988 to 2000, the program also collected and disposed of a total of 27 tonnes of needles and syringes per year.
Provincial Program Assessment:

− **Pros:**
  - The volume of pharmaceuticals collected increased from 1988 to 2007.
  - The pharmaceutical industry is voluntarily financing the program.
  - The program is free for the public and the community pharmacies.
  - The majority of community pharmacies participate.

− **Cons:**
  - The volume of pharmaceuticals collected decreased from 2001 to 2005 (although this may be due to the development of the RxA Waste Acceptance Protocol as indicated earlier).
  - There is little information about the program on the RxA website and no information is provided on the Alberta Ministry of the Environment website (the above information is from the Environment Canada and the PCPSA websites).
  - There is no information about the government grant on the Alberta Ministry of the Environment website.

**Source of Information for Alberta**

− **Useful Websites:**
  - Environment Canada
    • Largest source of information for the program (last updated in 2007).
  - National Association of Pharmacy Regulatory Authorities
    [http://www.napra.ca/docs/0/97/194/184.asp](http://www.napra.ca/docs/0/97/194/184.asp)
    • Information for advertising process.
  - PCPSA
    • Good source of information for the program.
  - RxA
    [http://www.albertapharmacy.ca/funding/envirx.aspx](http://www.albertapharmacy.ca/funding/envirx.aspx)
    (Not responding as of February 4, 2008. The site for the ENVIRx program is being redesigned as of March 13, 2008).
    • Description and rules of the program.

− **References:**
    • Information about the program.
    Online: [http://www.mentalhealth.com/mag1/p5m-dr04.html](http://www.mentalhealth.com/mag1/p5m-dr04.html) (Downloaded on January 22, 2007).
• Top prescription returned.

- **Personal Communications:**
  
  Margaret Wing, Director of Professional Services, RxA, margaret.wing@rxa.ca
  
  Personal Communications:
  
  • Provided information and reviewed this section.
  
  Rose Dehod, RxA, rose.dehod@rxa.ca
  
  • Provided information and reviewed this section.

### 2.2 British Columbia

British Columbia has a formal province-wide program for the disposal of household pharmaceutical waste. The Medications Return program allows consumers to return pharmaceuticals to the majority of the province’s community pharmacies for safe disposal. The program is administered by the PCPSA and funded by the industry. It is regulated by the provincial government. The province also has a toll-free line offering the public information about the disposal of pharmaceuticals. In addition, 21 municipalities of British Columbia have recently banned pharmaceuticals from residential garbage.

#### 2.2.1 Medications Return Program

**Summary of Initiative:** The Medications Return program began in 1996 as the British Columbia EnviRX. In the 1990s, the provincial government expanded the scope of the Post-Consumer Residual Stewardship Program Regulation (now the Recycling Regulation BC Reg. 449/04) to include pharmaceutical products. The Recycling Regulation, passed in October 2004, requires all brand-owners of pharmaceutical products sold in British Columbia to take responsibility for the safe management of their products.12

**Objective:** The program objectives are to divert expired and unused pharmaceuticals from landfills and sewers as well as to ensure safe and effective collection and disposal.

**Scope:** The program is for household prescriptions and self-care health products. Any drugs as defined in the F&DA, including prescriptions and non-prescription drugs and ingested natural health products as defined in the Natural Health Products Regulation, excluding disinfectants, sanitizers with disinfectant claims, veterinary products, topical or skin care products, and foods. Accepted items are limited to household quantities.13

**Responsibilities:**

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12 Brand owners are producers, importers, or private label companies that hold the right to pharmaceuticals.

13 Sharps, needles and syringes are not included in this program. Accepted products under this program do not meet the criteria for toxicity as defined under the Transportation of Dangerous Goods Regulations.
- **Consumers**: Consumers can return, at no charge to them, their unused and expired pharmaceuticals to participating community pharmacies.

- **Community Pharmacies**: Community pharmacists accept unused and expired pharmaceuticals from consumers and store the returned items for pickup. They also promote the program. The program also allows pharmacies located in hospitals where services are offered to out-patients to collect and store pharmaceutical wastes.\(^\text{14}\)

- **Government**: The provincial government is responsible for enforcing and monitoring compliance with the program.

- **Brand-owners**: Brand-owners are required to develop and distribute consumer educational material to retailers regarding the safe use and storage of the products, as well as the safe storage and handling of any residuals and containers. The brand-owners are also required to provide information pertaining to the location of collection facilities for their products to consumers. In addition, brand-owners are responsible for the collection and management of unused and expired pharmaceuticals from consumers through a convenient network of collection sites.

- **Administrator**: The program is administered by the PCPSA.

**Nature of Participation**: Participation is voluntary for consumers and community pharmacies but funding of the program is required for brand-owners by legislation.

**Funding Mechanisms**:

- **Brand-owners**: The program is funded by the participating pharmaceutical brand-owners through the PCPSA. The costs of operating the program are shared between the brand-owners of brand name, generic, and self-care health products. The costs are determined by PCPSA based on the amount of prescriptions dispensed in British Columbia during the previous year and/or at a per dollar rate on the sale of self-care health products in the province. The *Recycling Regulation* requires brand-owners to provide reasonable and free consumer access to return/collection facilities but is silent on how brand-owners cover the program costs. The pharmaceutical and self-care health industries have chosen to internalise the costs of the program and do not charge program/eco fees to the public at the point of sale.

\(^{14}\) Pharmaceuticals provided to patients in a hospital setting are not part of household waste as defined under the program.
**Monitoring:** Containers returned from a pharmacy are tracked by weight, pickup date, and location. An annual report is submitted to the British Columbia Ministry of the Environment. The report must contain:\[15\]:

1) a description of educational materials, communications and educational strategies used to promote the program;
2) the total amount of products and containers collected;
3) the location of its collection facilities; and
4) environmental impacts throughout the product's life cycle according to the pollution prevention hierarchy including a comparison of the approved plan's performance for the year with the performance requirements and targets in the Regulation and approved plan.

**Advertising:** The program provides pharmacies with posters and brochures for the public, a pharmacist information guide and warning labels for pharmacy waste containers. There are also advertisements through websites, an annual recycling calendars, special events, and newspapers.

**Waste Disposal Method:** All containers (20 litres) returned from a pharmacy are stored in a secure location until a shipment (between 8,000 to 12,000 kilograms) is accumulated for safe destruction through a licensed incineration facility. In 2007, all residual pharmaceuticals collected through the program were incinerated by Phase Separation Solutions Inc. in Wolseley, Saskatchewan; and in 2006 by Beiseker Envirotech Inc. (formerly Cristallo Engineering Technologies Inc.) located in Beiseker, Alberta.

**Regulatory Framework:** The Medications Return program is regulated under the Environmental Management Act (EMA), specifically the Recycling Regulation. The Waste Management Act and the EMA were combined on July 8, 2004. The EMA creates a single statute governing environmental protection and management in British Columbia. The Act incorporates provisions allowing for the development of innovative and modern regulatory regimes. One such regime is the Recycling Regulation, enacted on October 7, 2004, which repealed the Post-Consumer Residual Stewardship Program Regulation and incorporated key pharmaceutical product category provisions into a schedule of the Recycling Regulation. The pharmaceutical product category is defined under the Residual Product Categories in Schedule 2 of the Recycling Regulation.

**Statistics:**

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\[15\] Annual reports are required by regulation and available to the public on the British Columbia Ministry of Environment's web site. Only confidential or proprietary information is excluded from public reports but submitted to the British Columbia Ministry of the Environment if required by legislation.
- **Percentage of Pharmacies Participating:** As of 2007, 96 per cent (985) of licensed community pharmacies in British Columbia participated in the return program; an increase from 2006 when 92 per cent participated and from 2005 when just over 80 per cent participated.\(^{16}\)

- **Volume of Pharmaceuticals Collected:** During the 2007 period, 23,384 kg of residual pharmaceuticals or 2,129 of containers (20 litres) were picked up from pharmacies (Table 1). This represented an increase of 17 per cent in residual pharmaceuticals and a 21 per cent increase from containers received in 2006.\(^{17}\)

- **Costs:** The costs of the program during the 2005, 2006 and 2007 reporting periods, including management, communications, collection and disposal were $225,000, $257,000 and $294,185 respectively.\(^{18}\)

<table>
<thead>
<tr>
<th>Region</th>
<th>Weight (kg)</th>
<th>Containers of 20 litres (number)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coastal B.C.</td>
<td>480</td>
<td>858</td>
</tr>
<tr>
<td>Fraser Valley</td>
<td>2,130</td>
<td>1925</td>
</tr>
<tr>
<td>Greater Vancouver</td>
<td>8,117</td>
<td>10911</td>
</tr>
<tr>
<td>Kootenays</td>
<td>593</td>
<td>712</td>
</tr>
<tr>
<td>Northern B.C.</td>
<td>1,135</td>
<td>969</td>
</tr>
<tr>
<td>Okanagan</td>
<td>2,108</td>
<td>2241</td>
</tr>
<tr>
<td>Vancouver Island</td>
<td>5,432</td>
<td>5768</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19,995</strong></td>
<td><strong>23,384</strong></td>
</tr>
</tbody>
</table>

Source: PCPSA, 2006 and PCPSA, 2008

**Provincial Program Assessment:**

- **Pros:**
  - In August 2006, the PCPSA undertook a public consultation on the program with their members, participating community pharmacies, and other stakeholders. Surveys were mailed to licensed pharmacists and brand-owners for their opinion in order to improve the program.\(^{19}\)
  - The Regulation requires all brand-owners of pharmaceutical products to participate in the program.

\(^{16}\) The remaining locations are mostly pharmacies in a hospital setting, offering their own disposal service to their patients, or a return program is offered through their retail chain stores.

\(^{17}\) The increase was attributed to the promotion of the program by regional districts.

\(^{18}\) The increase in budget is based on increase of products returned and increase of costs for collecting, disposal, administration and promotion.

\(^{19}\) Outcomes of the consultation and the survey are not public.
• The “no charge to return residual product” policy ensures that consumers are not discouraged from participating.
• Trends show an increase in the volume of pharmaceuticals collected each year.
• Good monitoring processes are in place, including annual reports since 1998 on the British Columbia Ministry of the Environment’s website.
• High percentage of participation from pharmacies.
  – Cons:
  • Costs of the program increased from 2005 to 2007.
  • 20 per cent of British Columbian consumers use the program and 31 per cent are aware that pharmacies accept pharmaceuticals for safe disposal.  

2.2.2 Recycling Council of British Columbia (RCBC) Hotline

The RCBC phone line provides toll-free information regarding the disposal of expired and unused pharmaceuticals to all British Columbia residents. It directs the public to the community pharmacies accepting pharmaceutical returns under the Medications Return program. There are approximately 100 calls per year to the hotline.

2.2.3 Materials Banned from Residential Garbage

As of January 1st 2008, pharmaceuticals are in the list of banned materials from residential garbage of Metro Vancouver (21 municipalities and one electoral area). Residents are invited to return their pharmaceutical waste to pharmacies having take-back programs for safe disposal. Those who fail to comply with the new rules will be notified with a tag on the discarded garbage or asked to pay a fine. New inspectors will be monitoring the success of the program and will be enforcing the new banned and restricted materials rules. Banned products include: prescription drugs, non prescription medicines like Aspirin, herbal products, mineral supplements, vitamin supplements and throat lozenges.

Source of Information for British Columbia

– Useful Websites:

  British Columbia Ministry of the Environment
  
  • Monitoring data and information about the program including annual reports since 1998.

20 Results of 500 telephone interviews conducted by Redfern Research in the spring of 2007.
21 The RCBC is a multi-sectoral non-profit organization promoting the principles of zero waste through information services, the exchange of ideas and research.
National Association of Pharmacy Regulatory Authorities
http://www.napra.ca/docs/0/97/194/184.asp
• Information on advertising process.

References:

• Information about the new Metro Vancouver ban on pharmaceutical waste (enforcement and fine).

• Statistics about the RCBC hotline.

• Information about the materials banned from residential garbage in Metro Vancouver.

• Information on accepted items.

• Medication collection data for 2007.

• Information on financial contribution from the industry.

• Monitoring data for the 2006 period.

• Results of 500 telephone interviews (rate of participation, awareness of the program, etc.) conducted in the spring of 2007 for the British Columbia Medication Return Program.

Personal Communications:

Ginette Vanasse, Executive Director, PCPSA, ginette.vanasse@medicationsreturn.ca
• Provided information and reviewed the paper.
2.3 Manitoba

Manitoba has a formal province-wide program for the disposal of household pharmaceutical waste. The Manitoba HHW program allows consumers to return pharmaceuticals to community pharmacies, directly to Miller Environmental Corporation, or to periodic collection depots for safe disposal. The program is administered and funded by the government of Manitoba. It is not regulated. In addition, Green Manitoba, an agency of the government of Manitoba, is working on developing a formal province-wide regulated stewardship program for the disposal of household hazardous materials (HHM). The HHM Stewardship program will require companies that produce or distribute designated products in Manitoba to be responsible for developing a program to collect and manage their waste products.

2.3.1 HHW Program

**Summary of Initiative:** The HHW program started in 1990 with a pilot project (a HHW depot in Winnipeg) run by Manitoba Hazardous Waste Management Corporation. As of today, the program allows pharmacies to send medications returned by the public to Miller Environmental Corporation for disposal at no charge. The general public can also take their medications directly to Miller Environmental Corporation for disposal at no charge. Finally, the Manitoba government contracts with Miller Environmental Corporation to collect and dispose of HHW during collection events occurring periodically at rural and in Winnipeg depots.

**Scope:** Accepts all expired, unwanted or unused prescription and non-prescription medications, vitamin preparations, other natural health products, needles and other medical sharps. Only the items returned by the public are accepted at no charge.22

**Funding Mechanism:**
- **Government:** The service of the program is paid for by the province of Manitoba.

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22 For instance, pharmacies wanting to appropriately discard unwanted accumulated inventory will be charged for the service.
2.3.2 HHM Stewardship Program

**Summary of Initiative:** Manitoba has had province-wide regulated product stewardship programs in operation for automotive tires and household recyclables since 1995 and for oil products since 1997. The new HHM Stewardship program will target a large portion of the household hazardous products, including pharmaceuticals. Green Manitoba has been established to lead and coordinate the development of programs for these products. It is working with the PCPSA, Manitoba Pharmaceutical Association, and the Manitoba Society of Pharmacists to implement the new program for pharmaceuticals.

**Objective:** In its preliminary stages, the objective of the program is to establish a regulation which will prohibit the sale of designated products, unless the firms selling (producers or distributors) the products in Manitoba establish suitable collection and management programs. The program’s aim will be to divert HHW away from household waste collection systems.

**Scope:** Pharmaceuticals including, but not limited to, prescription and non-prescription medications as well as medical sharps such as needles, and lancets are designated as HHW. Accepted HHW items will be from the public only.

**Responsibilities:**
- **Producers & Distributors:** The stewards, the firms selling (producers or distributors) household hazardous products in Manitoba, will have to establish suitable collection and management programs for designated products.
- **Government:** Green Manitoba has been established by the province of Manitoba as the agency to lead and coordinate the development of the HHW program.

**Nature of Participation:** Participation will be voluntary for households however a regulation will be developed to require firms, producing or distributing designated products in Manitoba, to be responsible for developing a program to collect and manage their waste products.

**Funding Mechanisms:**
- **Producers & Consumers:** Philosophy for the program is that the costs of managing designated waste materials are transferred from the municipal tax base to the producers and users of the products (the principle of EPR).

**Regulatory Framework:** Manitoba’s *Waste Reduction and Prevention Act* provides the legislative framework for introducing extended producer responsibilities. The *Household Hazardous Material Regulation* was released for public consultation October 10, 2007. The comment period closed November 13, 2007. Phase I of the program which includes
pharmaceuticals will be initiated on the date the Regulation is registered (approved). It is anticipated that the Regulation will be registered and in effect soon.

**Provincial Program Assessment:**

- **Pros:**
  - A regulation providing a level playing field for stewards will require producers and distributors to establish good disposal practices.

- **Cons:**
  - No statistics were found for the HHW program.
  - The HHM program is not in operation yet
  - The HHM program has been under discussion since 2002.

**Source of Information for Manitoba**

- **Useful Websites:**
  - Manitoba Government
    - Information on the new stewardship program and regulation released on October 10, 2007.
  - Manitoba Conservation
    - Information about the history of the HHW program.
  - The Miller Group
    - Information about Miller Environmental Corporation activities.

- **References:**
    - Background information and issues under consideration by the Province of Manitoba for the management of HHW.
    (Downloaded on September 26, 2007).
    - Information about the Conservation Manitoba program (now the HHW program).
    (Downloaded on September 26, 2007).
    - Information about the actual program and the future regulation.
• A presentation on the Regulation from the Manitoba Conservation (dated of 2002).

- **Personal Communications:**
  Jim Ferguson, Green Manitoba, Jim.Ferguson@gov.mb.ca
• Provided information and reviewed this section.

2.4 New Brunswick

New Brunswick does not have a formal province-wide program for the disposal of household pharmaceutical waste. However, the majority of the province’s regional Solid Waste Commissions offer HHW programs which allow the public to dispose of pharmaceuticals in a safe manner. The programs are managed by the Commissions and funded through the user pay approach with regular tipping fees. Solid waste programs are supported by regulations. In addition to HHW programs, the majority of pharmacies in the province offer and finance voluntary pharmaceutical take-back programs, allowing consumers to return their pharmaceuticals.

2.4.1 HHW Regional Solid Waste Commissions Programs

**Summary of Initiative:** There are 13 Solid Waste Commissions in the Province. The regional Commissions have the responsibility for all aspects of solid waste management in their respective areas. Each of the Commissions is charged with the responsibility of developing and implementing a regional solid waste program. Programs have existed since the late 1990s. The majority of the Commissions offer HHW programs on a frequent basis to its residents. HHW programs are managed and promoted entirely by the Commissions.23

**Objective:** The program allows the public an opportunity to dispose of HHW including pharmaceuticals in a manner that would minimize potential impacts to health and the environment.

**Scope:** Pharmaceuticals from the public are one of many items accepted under the programs. Collection events are for domestic residents only.

**Government:** The provincial government supports these HHW programs and recognizes the importance of their continued operation.

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23 All Solid Waste Commissions include representatives from each municipality, unincorporated area, and Indian band within its region.
Commission: Commissions are responsible for managing solid waste and addressing the needs of its communities. HHW programs have become an important part of many of their programs.

Nature of Participation: Participation of the public is voluntary.

Funding mechanisms: Funding is achieved mainly through the user pay approach with regular landfill tipping fees.

Regulatory Framework: The establishment of a regional Solid Waste Commission for a region of the province is regulated by the Regional Solid Waste Commissions Regulation under the Clean Environment Act, N.B. Reg. 96-11. The Regulation may charge the Commissions with the responsibility of developing and implementing regional solid waste programs.

Provincial Program Assessment:
– Pros:
  • The majority of the public have an option to direct materials away from their landfills and into an approved HHW program for proper disposal.
– Cons:
  • HHW programs are not always the most convenient method for the public to easily participate because of their frequency and location.

Source of Information for New Brunswick
– Useful Websites:
    • History of Regional Waste Commissions.
– References:
  • The Clean Environment Act.
  • Commissions’ contact information.
– Personal Communications:
  Mark Boldon, Manager of Bioscience and Resource Management Section, New Brunswick Department of the Environment, [Mark.Boldon@gnb.ca](mailto:Mark.Boldon@gnb.ca)
  • Provided information and reviewed this section.
2.5 Newfoundland and Labrador

Newfoundland and Labrador have a formal province-wide program for the disposal of household pharmaceutical waste. The HHW program allows residents of participating municipalities to dispose of pharmaceuticals during HHW days. The program is administered by the Multi-Materials Stewardship Board (MMSB) and funded by participating municipalities. The program is not regulated. In addition, some cities host their own HHW events.\(^{24}\)

2.5.1 HHW Program

**Summary of Initiative:** The MMSB HHW program has existed since 1998 in Newfoundland and Labrador. Unwanted pharmaceuticals can be disposed of during MMSB-sponsored HHW days. About fifteen events are scheduled every year.

**Objective:** The program provides safe hazardous waste collection (including pharmaceuticals) for participating municipalities; raises awareness among the general public about HHW issues; and helps establish progressive waste management partnerships with participating communities. In addition to providing the public with safe disposal services for HHW, the program also raises awareness about the appropriate disposal of HHW.

**Scope:** The collection events for pharmaceuticals are for the public only.\(^{25}\)

**Responsibilities:**
- **Government:** The program is a provincial government initiative, as MMSB is a provincial Crown agency that reports to the Minister of Environment and Conservation. MMSB supports modern waste management programs in the province in order to ensure a clean and healthy environment throughout Newfoundland and Labrador with a particular focus on waste reduction; recycling; and public education.
- **Waste Collector:** MMSB has contracted Island Waste Management Incorporated to collect, sort, and transport hazardous wastes for treatment and disposal.

**Nature of Participation:** Participation is voluntary for households and municipalities.

**Funding Mechanisms:**
- **Municipalities & Government:** The funding partners for the HHW program are the MMSB and participating municipalities.\(^{26}\)

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\(^{24}\) For instance, St. John’s metro area hosts its own HHW events independently of the Newfoundland wide program.

\(^{25}\) Commercial establishments dealing with issues related to disposal of pharmaceuticals, biomedical waste, sharps, and other related material must seek out the services of a qualified contractor independent of a HHW collection events.
Advertising: Schedule of events and the participating municipalities are posted on the MMSB website. In addition, there is advertising via newspapers and radio announcements in advance of HHW collection events. Information about the program and the list of accepted materials are on the MMSB website. As part of the HHW program, MMSB has produced municipal and residential HHW guides to assist communities in developing their own programs and provide the public with information about the safe usage and disposal of HHW.

Regulatory Framework: The program is not regulated.

Statistics:
- **Number of Municipalities Participating:** From May to October 2002, the program provided safe collection and disposal of hazardous wastes for 14 municipalities. From June to October of 2004, 11 municipalities participated in the collection and in 2006, 13 municipalities participated.
- **Number of Households Participating:** From May to October 2002, more than 2,300 households participated in the collection program and 2,800 from June to October 2004.27
- **Number of Events Held:** From October 1998 to November 2002, MMSB held 47 events, 18 from May to October 2002, and 16 from June to October 2004.
- **Volume of HHW Collected:** From October 1998 to November 2002, 221,466 litres of HHW were collected, 60,000 litres from May to October 2002, and 72,000 litres in 2006.

Provincial Program Assessment:
- **Pros:**
  - The program has gained success in terms of volume of HHW collection and participation of households and municipalities.
- **Cons:**
  - HHW programs are not always the most convenient method for the public to easily participate because of their frequency and location.
  - Fewer events are held each year.

26 Until 2003, the program also received funding from the Newfoundland and Labrador Waste Management Trust Fund and Environment Canada’s EcoAction Community Funding Program. Note that since 1995, Environment Canada’s EcoAction Community Funding Program has provided financial support to community groups for projects that have measurable, positive impacts on the environment. 
27 Statistics for 2006 were not available for the number of households participating and the number of events held.
• There is not much information about the program on the MMSB website. In fact, most of the information about the program was found through press release archives of the Newfoundland and Labrador Environment and Conservation website.

• Quantity of waste collection is only provided for total HHW and not for pharmaceuticals alone.

Source of Information for Newfoundland and Labrador

- Useful Websites:
  
  Environment Canada
  http://www.ec.gc.ca/ecoaction/what_is_e.html
  • Information about Environment Canada’s EcoAction Community Funding Program.

  Government of Newfoundland Labrador - Environment and Conservation
  http://www.releases.gov.nl.ca/releases/2006/env/0516n03.htm
  • Background information about the program (updated in 2006).

  Government of Newfoundland Labrador - Canada
  http://www.releases.gov.nl.ca/releases/2006/env/0516n03.htm
  • Background information about funding from 1998 to 2003 (dated of 2002).

  Government of Newfoundland Labrador - Canada
  http://www.releases.gov.nl.ca/releases/2003/env/0325n03.htm
  • Background information about funding from 2003 (dated of 2003).

  MMSB
  http://www.mmsb.nl.ca/programs-hhw.htm
  • Information about the program and accepted materials.

- Personal communications:
  
  David Penney, Marketing and Education Officer, MMSB, dpenney@mmsb.nl.ca
  • Provided information for this section.

2.6 Northwest Territories

The Northwest Territories do not have any programs for the disposal of household pharmaceutical waste.

Source of Information for Northwest Territories

- Personal Communications:
  
  Jeanette Hall, Department of Health and Social Services, Health Professional Licensing, Government of Northwest Territories, jeanette_hall@gov.nt.ca
  • Provided information for this section.
2.7 Nova Scotia

Nova Scotia has a formal province-wide program for the disposal of household pharmaceutical waste. The Medication Disposal program allows consumers to return pharmaceuticals to provincial community pharmacies for safe disposal. It is administrated by the Pharmacy Association of Nova Scotia (PANS) and paid by the industry. The program is not regulated.

2.7.1 Medication Disposal Program

Summary of Initiative: In the mid 90's, PANS set up the Dead Drug program, now called the Nova Scotia Medication Disposal program, with the assistance of McKesson Canada.

Objective: The program encourages the public to bring expired and unused pharmaceuticals back to their community pharmacies

Scope: Pharmaceuticals returned from the public are the only items accepted.\(^{28}\)

Responsibilities:
- Consumers: Consumers can return their pharmaceuticals to their community pharmacies.
- Community Pharmacies: The pharmacies are asked to deposit returned pharmaceuticals in a cardboard box lined with a plastic bag.
- Pharmacy Associations: The program is administered by PANS. PANS has licensed transporters to pick up the returned pharmaceuticals and move them to a facility for destruction (the same facility that the Province uses to dispose of hospital biomedical waste).
- Government: The Nova Scotia provincial government departments of Environment and Health are represented on the Board of PANS.
- Waste Collector: The McKesson driver brings the pharmaceuticals back to the warehouse where they are stockpiled for a period of time before being incinerated.

Nature of Participation: Participation is voluntary for consumers and community pharmacies.

Funding Mechanisms:
- Manufacturers: The destruction and transport are paid for by the manufacturers who sell pharmaceuticals in Nova Scotia.

Wastes Disposal Method: The pharmaceuticals are incinerated.

\(^{28}\) The province also has a specific program for the safe disposal of syringes, needles, and lancets named the Safe Sharps Bring-Back Program.
Regulatory Framework: The program is not regulated.

Statistics:

- **Percentage of the Pharmacies Participating:** All pharmacies in the province participate in the program (according to the PANS).

- **Volume of Pharmaceuticals Collected:** The average of pharmaceuticals collected by month has increased from 1,816 kg in 2005 to 2,138 kg in 2006 and was 2,192 kg in February 2007 (Table 2).

- **Costs:** The average cost of the program per month has increased from $6,028 in 2005 to $6,139 in 2006 but was down to $5,783 in February 2007 in comparison to $7,150 in February 2006) (Table 2).

<table>
<thead>
<tr>
<th>Table 2: Nova Scotia Medication Disposal Collection, 2005-2007</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Date</strong></td>
</tr>
<tr>
<td>July 2005</td>
</tr>
<tr>
<td>September 2005</td>
</tr>
<tr>
<td>October 2005</td>
</tr>
<tr>
<td>December 2005</td>
</tr>
<tr>
<td><em>Monthly average for 2005</em></td>
</tr>
<tr>
<td>February 2006</td>
</tr>
<tr>
<td>April 2006</td>
</tr>
<tr>
<td>August 2006</td>
</tr>
<tr>
<td>October 2006</td>
</tr>
<tr>
<td>December 2006</td>
</tr>
<tr>
<td><em>Monthly average for 2006</em></td>
</tr>
<tr>
<td>February 2007</td>
</tr>
</tbody>
</table>

Source: PANS, 2007

Provincial Program Assessment:

- **Pros:**
  - The volume of pharmaceutical collected has increased since 2005.
  - The cost of the program is assumed by the pharmaceutical industry.
  - All community pharmacies participate in the program (according to the PANS).

- **Cons:**
  - There is no information about the program on PANS website or on the web except on PCPSA website.
  - Information about the program including the statistics was only obtained through personal communication with PANS and Nova Scotia Environment and Labour.
Source of Information for Nova Scotia

- **Useful Websites:**
  
  PCPSA
  
  - Only website giving information about the program.

- **Personal Communications:**
  
  Bob M. Kenney, Solid Waste-Resource Analyst, Nova Scotia Department of the Environment and Labour, [kenneybm@gov.ns.ca](mailto:kenneybm@gov.ns.ca)
  - Provided information and reviewed this section.

  Patrick King, Executive Director, PANS. [Patrick.king@ns.sympatico.ca](mailto:Patrick.king@ns.sympatico.ca)
  - Provided information and reviewed this section.

2.8 Nunavut

Nunavut does not have a formal territory-wide program for the disposal of household pharmaceutical waste. However, consumers can return pharmaceuticals to community pharmacies and health centers. The pharmaceutical waste collected from those establishments is then sent back to the Baffin Regional Hospital Pharmacy or a Regional Center for recording purposes and incineration.

Source of Information for Nunavut

- **Personal Communications:**
  
  Brooke Fulmer, Territorial Director of Pharmacy, [BFulmer@gov.nu.ca](mailto:BFulmer@gov.nu.ca)
  - Provided information and reviewed this section.

  Peter Workman, Environmental Health Consultant, Department of Health and Social Services, [PWorkman@gov.nu.ca](mailto:PWorkman@gov.nu.ca)
  - Provided information for this section.

2.9 Ontario

Ontario does not have a formal province-wide program for the disposal of household pharmaceutical waste. However, a province-wide industry funded diversion program for Municipal Hazardous or Special Waste (MHSW) is in development in Ontario. This program will be implemented in multiple phases and will focus on the reduce, reuse, and recycle (3Rs) approach that is intended to divert MHSW from disposal. Disposal of MHSW will only be considered where diversion options are not available or technically feasible. Waste Diversion Ontario (WDO) has been requested to develop the program and Stewardship Ontario was identified as the Industry Funding Organization (IFO) for the program’s Phase I products. IFO has not been confirmed for the program’s Phase II
products (which include pharmaceuticals). The program will be supported by regulation. On a smaller scale, across the province, many municipalities have collection programs through which the public can dispose of pharmaceuticals. Those include HHW collection depots and community pharmacy take-back programs.\textsuperscript{29} In addition, a pilot program exists in Northern Ontario.

\textbf{2.9.1 MHSW Diversion Program}

\textbf{Summary of Initiative:} In December 2006, the Minister of the Environment requested WDO to develop an industry funded diversion program for MHSW under the \textit{Waste Diversion Act, 2002} (WDA). Stewardship Ontario was identified as the IFO for the program’s Phase I products. The IFO has not been confirmed for the program’s Phase II products. Phase I was submitted to the Ontario Ministry of the Environment on May, 2007 and approved on February 22, 2008. Commencement of Phase I is planned for July 1, 2008. The submission dates for the remaining phases should be provided after approval of Phase I. Pharmaceuticals are included in Phase II.

\textbf{Objective:} The objectives are to promote the 3Rs approaches intended to divert MHSW from disposal. Phase I will encourage initiatives to reduce the quantities of residual MHSW available for collection and increase the quantities of material that are diverted from disposal through reuse activities or recycling processes. Disposal of MHSW will only be considered where diversion options are not available or technically feasible.

\textbf{Scope:} MHSW from homes and some small businesses including pharmaceuticals will be accepted.

\textbf{Responsibilities:}

- \textbf{Government:} The provincial government is ultimately responsible for monitoring and enforcing the program and compliance with Acts and Regulations.

- \textbf{WDO:} Required by the government to develop the MHSW stewardship program and monitor its effectiveness and efficiency. WDO is a non-crown corporation created under the WDA on June 27, 2002.

- \textbf{IFO:} Responsible for submitting annual reports to WDO.

\textbf{Nature of participation:} Participation will be voluntary for households and funding will be required by regulation for the pharmaceutical industry.

\textsuperscript{29} For instance, the City of Ottawa Take it Back Program allows consumers to bring back pharmaceuticals to participating community pharmacies in the city. The program which is paid for by the pharmacies collects approximately 3.95 tonnes of expired pharmaceuticals yearly. The City of Kingston operates a HHW facility where the public can periodically drop off items, including pharmaceuticals, at no charge. In some cities, such as Toronto, pharmaceuticals may not be accepted to HHW depots.
Funding Mechanisms:
- **Stewardship Ontario**: Stewardship Ontario will act as the IFO for the program’s Phase I and will collect fees from its members in order to pay for the program. The board of directors will include representatives from the industry that will be affected by the program.\(^{30}\)
- **Municipalities**: The WDA is silent on funding for MHSW. WDO was directed by the Minister of the Environment to utilize MHSW stewards’ fees only for post-collection costs. Therefore municipalities will retain financial responsibility for costs associated with municipal MHSW collection. Stewardship Ontario will assume financial responsibility, and likely physical responsibility over time (as existing contracts expire), for post-collection of MHSW.
- **Other Party with Commercial Connection**: The WDA stipulates that a steward can be any party that has a commercial connection with the designated waste or the product from which the designated waste is derived and is potentially responsible for paying the IFO for the implementation of the program. However, the Minister’s Program Request Letter stipulated that stewards of MHSW are brand owners and first importers.\(^{31}\)

**Regulatory Framework**: MHSW, including pharmaceuticals, was designated as waste through the *MHSW Regulation* under the WDA in December 2006. Also, a new regulation will be required to address Stewardship Ontario’s new governance structure that would result if the Minister of the Environment approves the MHSW program.
- **Ontario Regulation 542/06 under the WDA defines MHSW as**:  
  - corrosive, flammable or toxic products by reference to *Consumer Chemicals & Containers Regulations, 2001*;

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\(^{30}\) The founding members of Stewardship Ontario, represented on the board of directors are: the Food and Consumer Products Manufacturers of Canada (FCPMC), the Canadian Council of Grocery Distributors (CCGD), Refreshments Canada, the Retail Council of Canada (RCC), the Canadian Paint and Coatings Association (CPCA), the Canadian Consumer Specialty Products Association (CCSPA), the Liquor Control Board of Ontario (LCBO) and the Canadian Newspaper Association (CNA).

\(^{31}\) The WDA provides for Industry Stewardship Plans (ISP), if a steward decides to implement its own stewardship program. In such cases, the steward must submit its plan to WDO for approval. The ISP is forwarded to the Minister of the Environment for consideration only if WDO does not approve the steward’s plan. Approximately 80% of existing municipal costs for managing Phase 1 MHSW will shift to industry stewards. Industry is likely to recover these costs from their consumers, as consumers are their only source of income. Approximately 20% of existing municipal costs for managing Phase 1 MHSW will remain with municipalities as collection costs. These municipal collection costs will continue to be covered by property taxpayers. However, property taxpayers will not “have to bear a large portion of the costs through municipal taxes” as the proportion of MHSW costs remaining on municipal property taxpayers for Phase 1 MHSW will decline by 80%.
• flammable, corrosive or toxicity hazards by reference to CSA Standard Z752-03; or
• corrosive, ignitable, leachate toxic, reactive waste by reference to Regulation 347.

− The Regulation defines Municipal Special Waste as:
  • batteries;
  • pressurized & aerosol containers;
  • portable fire extinguishers;
  • fertilizers, fungicides, herbicides, insecticides, pesticides;
  • paints & coatings;
  • oil bottles & filters;
  • fluorescent light bulbs or tub;
  • pharmaceuticals, sharps, syringes;
  • switches, thermostats, thermometers, barometers & measuring devices;
  • containing mercury; and
  • antifreeze & solvents.

− Phase 1 of the program shall include:
  • paints and coatings, and containers in which they are contained;
  • solvent, and containers in which they are contained;
  • oil filters, after they have been used for their intended purpose;
  • containers that have a capacity of 30 litres or less and that were manufactured and used for the purpose of containing lubricating oil;
  • single use dry cell batteries;
  • antifreeze, and containers in which they are contained;
  • pressurized containers such as propane tanks and cylinders; and
  • fertilizers, fungicides, herbicides, insecticides, or pesticides and containers in which they are contained.

− Phase 2 of the Program shall include:
  • all items listed in Phase 1 of the program, along with:
    • batteries (other than single use dry cell);
    • aerosol containers such as hair spray containers;
    • portable fire extinguishers;
    • fluorescent light bulbs and tubes;
• pharmaceuticals;
• sharps including syringes;
• switches that contain mercury; and
• thermostats, thermometers, barometers or other measuring devices, if the
  thermostats, thermometers, barometers or other measuring devices
  contain mercury.

− Future phases of the Program:
  • will be determined as per future program request letters.

Provincial Program Assessment:
− Pros:
  • The development of the program is supported by legislation.
  • WDO will be required to monitor the program effectiveness and efficiency.
  • The industry will bear most of the costs.
  • WDO has good updated information on its website about the program
development.
− Cons:
  • The program is still in development.

2.9.2 Pilot Program for Lake Superior Basin Communities
Since 2007, Environment Canada has financed a northern Ontario non-profit
organization to conduct outreach activities promoting the proper disposal of
pharmaceutical products to residents of the Lake Superior basin. This work helps
Environment Canada fulfill its commitments under Annex 2 of the 2007 Canada-Ontario
Agreement Respecting the Great Lakes Ecosystem.\(^{32}\) It also helps Environment Canada
being aligned with the goal and spirit of the Bi-national Program to Protect and Restore
Lake Superior.\(^{33}\)

\(^{32}\) The Canada-Ontario Agreement Respecting the Great Lakes Ecosystem serves as a mechanism for
Canada to meet its obligations under the Great Lakes Water Quality Agreement. This agreement expresses
the commitment of Canada and the United States to restore and maintain the chemical, physical and
biological integrity of the Great Lakes Basin Ecosystem and includes a number of objectives and guidelines
to achieve these goals (Environment Canada, 2008). One of Annex 2’s goals on the management of harmful
pollutants states that: “Canada and Ontario will carry out education and outreach to the Great Lakes
communities, especially vulnerable populations, to reduce their exposure and their contribution to
environmental releases and develop additional programs for the safe collection and disposal of consumer
products containing substances of concern, such as pharmaceuticals” (Environment Canada, 2007).

\(^{33}\) The Bi-national Program to Restore and Protect the Lake Superior Basin is a partnership of federal, state,
provincial, Tribal and First Nation governments working together with citizens to ensure the protection of the lake
and its watershed. The program’s primary role is to develop and implement a Lake Wide Management which is
focused on the entire ecosystem of Lake Superior, its air, land, water, plus human and wildlife (United States
Environmental Protection Agency, 2008).
Through this pilot project, pharmacists from Thunder Bay to Wawa were first surveyed to determine whether they promoted pharmaceutical take-back programs, to gauge their interest and concerns in participating in such initiatives, to jointly develop materials and a communication strategy supporting existing take-back programs, and to document their current disposal practices. Pharmacists interested in participating in the outreach campaign and in collecting unused and expired medicine, returned by the public, agreed to put up posters, hand out flyers, and demonstrated that they disposed of returned products in accordance with the Ontario Ministry of the Environment Regulation 347 “General – Waste Management,” at their own cost.\(^{34}\) Pharmacies in non-Aboriginal communities outside of Thunder Bay were less interested in participating, citing increased disposal costs as the main reason.

In 2007, “Take Your Medicine... Back to Your Pharmacy” posters and flyers, in both official languages, were developed and distributed to Thunder Bay pharmacies for display at their counters and distribution with client prescriptions. Posters and flyers were also distributed to the Thunder Bay District Health Unit Network, and to the Fort William First Nation through the Anishnabek of the Gitchi Gami, a local Aboriginal not-for-profit organization. The pharmaceutical take-back campaign was launched with the assistance of a local pharmacy, and accompanying media release, public service announcement, and news coverage (print, radio and television interviews).

Thunder Bay pharmacies participating in the voluntary take-back project were contacted at the end of the project, in early 2008. While rates of pharmaceutical product returns were not quantified, most seem to agree that there was a slight increase in the amount of pharmaceuticals returned and that an increased number of inquiries about safe disposal of medicines were made. Two pharmacies stated that it appeared that people were more aware of safe disposal of pharmaceuticals.

In 2009, based on recommendations that emerged from the 2007 pilot project, the posters and flyers were translated in Ojibway (the language of the aboriginal

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\(^{34}\) Regulation 347 requires that any generators of hazardous waste (certain pharmaceuticals listed in Schedules 2A or 2B of Regulation 347) register those wastes with the Ministry (Hurst, pers. comm. 2009). While regulated, the management of these wastes is not clearly articulated in any one Ministry standard or guideline. For instance, Regulation 347 does not stipulate which types of treatment technologies are to be used for the disposal of hazardous waste. Pharmacies that operate public waste programs are not required to register these wastes with the Ministry, provided they have a signed agreement with an approved biomedical waste management company. These companies have an exemption in their Certificate of Approval that permits the pharmacy to dispose of public waste without having to manifest or register these wastes with the Ministry.
communities of the Lake Superior basin), with a slightly modified message: “Take Your Medicine….Back to Your Pharmacy or Nursing Station.” These posters and flyers were distributed in March and April of 2009 to 11 Aboriginal communities by the local Health Canada Environmental Health Officers. Additional French/English posters were distributed to medical and dental clinics, hospitals, senior’s centres, retirement homes, and the Thunder Bay District Health Unit network. Thunder Bay residents were encouraged to properly dispose of their unused or expired pharmaceuticals through six presentations to community organizations and a series of ten public information sessions and displays. Two pharmaceutical collection events and public info sessions were also held at centres for the elderly aged 55 or above.

The role of Environment Canada is not to monitor and/or enforce the take-back program, but rather to promote the voluntary adoption of pollution prevention best practices. Additional deliverables that support this project but which are not funded by Environment Canada include the development of a local newspaper insert in the form of a “pharmaceutical bag” encouraging people to take-back their pharmaceuticals to their pharmacy; making 1,000 copies of these bags available during presentations, at display booths, and at other venues; local television shows and Shaw cable interview; and a media release and public service announcement. It is hoped that a method will be devised to collect data on the amount of old medications returned. Pending results of the 2009 activities of the project (a report to assess the success of the project should be finalized by the end of 2009), interests and available resources, additional local and regional outreach including a focus on additional sectors might form the basis for future projects.

Source of Information for Ontario

- **Useful Websites:**

  Stewardship Ontario
  http://www.stewardshipontario.ca/
  - Good information about the program and legislations.

  Waste Diversion Ontario
  http://www.wdo.ca/
  - Good updated information about the program development.

- **References:**

  City of Kingston. 2007. Household Hazardous Waste. Online:
  http://www.cityofkingston.ca/residents/waste/hazardous/material.asp (Downloaded on October 9, 2007).
  - Information about the HHW collection.
• Estimates of the quantities of medication collected.

• Information about the HHW collection.

Ministry of the Environment. n.d. The Program Request Letter & Addendum also Listed MHSW to be Included in Phase 2 of the Program. Online: http://www.stewardshipontario.ca/mhsw/index.html (Downloaded on March 20, 2008).
• List of Phase I and Phase II items.

• Recent information about the program.

− Personal Communications:
  Glenda Gies, Executive Director, WDO, glendagies@wdo.ca
  • Provided information and reviewed the section about the MHSW diversion program.

  Debra Hurst, Senior Environmental Policy Advisor, Hazardous Waste Policy Section, Ontario Ministry of the Environment, debra.hurst@ontario.ca
  • Provided information about Regulation 347.

  Martin Nantel, Northern Ontario Program Coordinator, Environment Canada, Martin.Nantel@ec.gc.ca
  • Provided information and reviewed the section about the pilot program for Northern Ontario.

2.10 Prince Edward Island

Prince Edward Island (PEI) has a formal province-wide program for the disposal of household pharmaceutical waste. The Take It Back program allows consumers to return pharmaceuticals to community pharmacies or directly to any Waste Watch Drop-Off Centers (WWDC) for safe disposal. It is administrated and paid by the Island Waste Management Corporation (IWMC). The program is not regulated.

2.10.1 Take It Back Program

Summary of Initiative: The Take It Back program was established in 2004 by the Province of PEI, in partnership with the PEI Pharmaceutical Association and IWMC.
**Objective:** The program allows Islanders to take unwanted prescription and over-the-counter pharmaceuticals to their community pharmacy or to any WWDC (6 location across PEI) at any time for environmentally safe disposal.

**Scope:** Accepted items are pharmaceuticals from the public only.

**Responsibilities:**
- **Community Pharmacies:** The community pharmacies collect and deliver the unwanted pharmaceuticals to one of the WWDC.
- **IWMC:** IWMC, the provincial Crown Corporation, arranges for the pharmaceuticals WWDC to have pharmaceuticals disposed at licensed hazardous waste disposal facilities off-Island. IWMC administers and provides solid waste management services throughout Prince Edward Island.

**Nature of Participation:** Participation is voluntary for households and community pharmacies.

**Funding Mechanisms:**
- **IWMC:** IWMC pays for the safe disposal of the pharmaceuticals at licensed hazardous waste disposal facilities off-Island. Currently, Atlantic Industrial Services, under contract with IWMC, collect, transport and dispose of the HHW (including pharmaceuticals from the program).

**Regulatory Framework:** The program is not regulated.

**Statistics:**
- **Volume of Pharmaceuticals Collected:** More than 1,300 kilograms of old pharmaceuticals were collected in 2004 during a cleanup campaign.

**Provincial Program Assessment:**
- **Cons:**
  - Data on participation of pharmacies are not provided.
  - There are no data for the volume of pharmaceuticals collected in 2005 and 2006.

**Source of Information for Prince Edward Island**
- **Useful Websites:**
  - IWMC
    [http://www.iwmc.pe.ca/takeback.htm](http://www.iwmc.pe.ca/takeback.htm)
    - Information about the program such as pamphlet, drop-off centers, and collection schedule.
  - IWMC
    [http://www.iwmc.pe.ca/sites.htm](http://www.iwmc.pe.ca/sites.htm)
    - Information about WWDC
Prince Edward Island Environment, Energy and Forestry
- News Release of 2004 providing information about the program.

- **Personal Communications:**
  
  Glenda MacKinnon-Peters, Hazardous Materials Specialist, Pollution Prevention, Environment, Energy & Forestry, gcmackinnon-peters@gov.pe.ca
  
  - Provided information and reviewed this section.

2.11 Quebec

Quebec does not have a formal province-wide program for the disposal of household pharmaceutical waste. However, some Quebec municipalities have put in place different collection modes for HHW including pharmaceuticals. Those include collection days, mobile depots, and permanent depots. In addition, community pharmacies are required through regulations under the *Pharmacy Act* to collect pharmaceuticals returned by consumers for safe disposal. The province’s municipalities and community pharmacies are in charge of managing the cost of these programs. Finally, the provincial *Québec Residual Materials Management Policy, 1998-2008* incorporates the EPR approach which makes possible the development of regulations for the management of dangerous residual materials such as pharmaceuticals.

2.11.1 Municipal Collection of HHW

**Summary of Initiative:** RECYC-QUÉBEC advises Quebec’s residents that pharmaceuticals waste should not be disposed of in toilets, sinks or garbage. It promotes the collection and safe disposal of HHW including pharmaceuticals. Some municipalities and most community pharmacies are collecting pharmaceutical residuals via collection days and collection depots.

**Funding Mechanisms:**

- **Municipalities and community pharmacies:** Manage associated costs.

**Regulatory Framework:** The province’s *Québec Residual Materials Management Policy 1998-2008* incorporates the EPR approach. As a result, regulations for the management of dangerous materials are being developed. As of now, there are regulations for waste oil, oil containers and filters and residual paints and containers. Other residual materials should be regulated in the future as the government announced its intention to adopt an umbrella regulation supporting EPR. Although this structure opens the door for the

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35 The RECYC-QUÉBEC was created in 1990 by the Quebec Government. Its mandate and mission are detailed in the *Loi sur la Société québécoise de récupération et de recyclage* (L.R.Q., c. S-22.01).
designation of pharmaceuticals, these products are, at the moment, not on the priority list of the Quebec Ministère du Développement durable, de l'Environnement et des Parcs.

2.11.2 Community Pharmacy Collection

Summary of Initiative: Pharmacies are required through regulations to collect pharmaceuticals returned by consumers for safe disposal.

Funding Mechanisms: Community pharmacies manage associated costs.

Regulatory Framework: Under the Pharmacy Act, R.S.Q. c. P-10, the Code of ethics of pharmacists, R.Q. c. P-10, r.5 and the Regulation respecting the keeping of pharmacies, R.Q. c. P-10, r.20.1 require pharmacists/pharmacies to accept pharmaceuticals returned by consumers for safe disposal. However, the Regulations are silent on mode of destruction.

− **Code of Ethics of Pharmacists - Article 3.01.07**: A pharmacist must, where so requested by a patient, participate in the safe collection of expired or unused medicines for the purpose of destroying them.

− **Regulation Respecting the Keeping of Pharmacies - Article 9**: Medications that have expired or have been returned to the pharmacist for their safe disposal shall be stored separately from other medications or substances used in the preparation of medications.

Source of Information for Quebec

− **Useful Websites:**
  
  Canadian Legal Information Institute
  [http://www.canlii.org/qc/legis/loi/p-10/index.html](http://www.canlii.org/qc/legis/loi/p-10/index.html)
  
  • The Pharmacy Act, R.S.Q. c. P-10 and associated regulations.

  RECYC-QUÉBEC
  
  • Advice for the disposal of pharmaceuticals.

− **References:**

  
  • Information about HHW collection including pharmaceuticals and the objectives of the Québec Residual Materials Management Policy, 1998-2008.

− **Personal Communications:**

  Anne-Marie Doucet, Agente de développement industriel, RECYC-QUÉBEC, a-m.doucet@Recyc-Quebec.gouv.qc.ca
  
  • Provided information and reviewed this section.
2.12 Saskatchewan

Saskatchewan has a province-wide program for the disposal of household pharmaceutical waste. The Pharmaceutical Waste Disposal program allows consumers to return pharmaceuticals to the majority of the province’s community pharmacies for safe disposal. It is managed by the Pharmacists’ Association of Saskatchewan (PAS). Under this program, pharmacies have to pay for the pick up of the pharmaceutical waste. The program is not regulated.

2.12.1 Pharmaceutical Waste Disposal Program

**Summary of Initiative:** The Saskatchewan Pharmaceutical Waste Disposal program has existed since 1997. It was initiated by the Saskatchewan College of Pharmacists (SCP). Today the program is managed by the PAS.36

**Objective:** The program allows households to bring back their pharmaceuticals to participating community pharmacies for safe disposal.

**Scope:** Accepted items are household pharmaceutical waste only.37

**Responsibilities:**
- **Consumers:** Consumers can bring their pharmaceutical waste to participating community pharmacies. They have to verify if their pharmacy participates in the program.
- **Pharmacists; Association:** The program is managed by the PAS which contracts the services of a company for the collection and disposal of pharmaceutical wastes.
- **Pharmacies:** Pharmacies involved choose the disposal company for services to have their waste shipped for incineration depending upon price and availability along service routes.
- **Waste Collection Companies:** The waste collection companies pick up the pharmaceutical wastes at pharmacies and ship it to a government approved incineration facility. The three main disposal companies are BioMed Recovery and Disposal, Stericycle, and Sanitec. BioMed initially started the program and other

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36 The program is no longer formal but continues. There have been some discussions with the Ministry of the Environment about making the program more formal with an appropriate compensation model, but that process is not a high priority for the PAS at this time.

37 Sharps are also accepted.
companies have since come to Saskatchewan to provide similar services. BioMed (licensed by Saskatchewan Environment and Resource Management) also supplies pharmacies with containers for the collection of the wastes.³⁸

- **Government:** The Saskatchewan government is not involved in the program.

**Nature of Participation:** The program participation is voluntary for consumers, community pharmacies, and the pharmaceutical industry.

**Funding Mechanisms:**
- **Pharmacies:** Pharmacies have to pay for the pick up of the pharmaceutical wastes.

**Monitoring:** BioMed has a tracking system verifying incineration. However, it does not maintain an inventory of each individual pharmaceutical being disposed.

**Advertising:** The program includes posters reminding consumers to return all expired or unwanted pharmaceuticals. In addition, PAS provides pharmacies with drug cleanup promotional materials, including posters, brochures and other suitable consumer information.

**Waste Disposal Method:** Pharmaceuticals are incinerated. BioMed uses hydroclaving and incineration medical waste processing systems.³⁹

**Regulatory Framework:** The program is not regulated.

**Statistics:**
- **Percentage of the Pharmacies Participating:** The PAS does not keep track of the number of pharmacies involved in the program. However, it estimates that close to 90 per cent of the 350 pharmacies in the province participate.
- **Volume of Pharmaceuticals Collected:** In 2007, 16,351 kg of pharmaceutical waste was collected from pharmacies including pills, sharps and packaging.

**Provincial Program Assessment:**
- **Pros:**
  - Many pharmacies participate in the program (as estimated by the PAS and SCP).
- **Cons:**
  - There is no tracking for the number of pharmacies involved.

³⁸ The boxes and plastic liners, approved for use by Saskatchewan Environment, are approximately 12"x 16" x 30" high. Pick-up costs are $25.50 per box if there are five or more boxes per location. There is an additional service charge of $10.00 per pick-up of fewer than five boxes. Disposal boxes can hold up to 25 pounds (10 to 12 kilograms). Boxes weighing over 25 pounds may also be subject to additional disposal costs which can be up to $.80/pound. The approved boxes are designed to carry a maximum load of 15 kg.

³⁹ Hydroclaving is a method of indirect high pressure steam sterilisation.
• Volume of pharmaceutical waste collected was only found for 2007 via personal communication.
• Pharmacists have to pay to participate in the program which may discourage them.
• Information on the program is very hard to find as there is no information about the program on the PAS and the SCP websites. Information about the program comes mainly from the National Association of Pharmacy Regulatory Authorities (NAPRA).

Source of Information for Saskatchewan

- **Useful Websites:**
  Biomed Recovery & Disposal Ltd.
  • Information on waste containers, prices, and disposal method.
- **References:**
  NAPRA. 2003. Saskatchewan College of Pharmacists – Pharmaceutical Waste Disposal program. Online:
  (Downloaded on January 24, 2007).
  • The largest piece of information about the program.
- **Personal Communications:**
  Biomed Recovery & Disposal Ltd., 1-866-288-3298
  • Provided information for this section.
  Brett Filson, Executive Director, PAS, [brett.filson@skpharmacists.ca](mailto:brett.filson@skpharmacists.ca)
  • Provided information and reviewed this section.
  Lori Postnikoff, Field Officer, Saskatchewan College of Pharmacists, [lori.postnikoff@saskpharm.ca](mailto:lori.postnikoff@saskpharm.ca)
  • Provided information and reviewed this section.

2.13 Yukon Territory

The Yukon does not have a formal territorial-wide program for the disposal of household pharmaceutical waste. However, most community pharmacies in the Yukon have informal take-back programs through which they accept pharmaceutical waste from their customers. Via those programs, pharmaceuticals are shipped to the incinerator operated by the Whitehorse General Hospital and are incinerated. In addition, Yukon offers various HHW collection days periodically in communities.

Source of Information for Yukon Territory
3 Comparison of Pharmaceutical Disposal Programs

3.1 Canadian Comparison

To facilitate the comparison between the programs, this section refers only to existing Canadian province-wide programs (as there is no territory-wide program).

3.1.1 Generalities

In general, most programs are initiated by provincial governments, and/or the pharmaceutical industry, and/or pharmacy associations. The objectives are to increase proper disposal and/or reduce waste. Community pharmacies or HHW depots collect pharmaceuticals from the public only. Participation is voluntary. British Columbia has the only regulatory program requiring funding from the industry, but similar regulations are in development for Ontario and Manitoba. Elsewhere, funding is provided by the pharmaceutical industry and/or governments on a voluntary basis. Disposal is generally accomplished through incineration. The programs are advertised with brochures, posters, and on websites. The volume of pharmaceuticals collected, participation of pharmacies, and costs for the program are the only data monitored.

3.1.2 Performance Comparison

To compare the performances of each program, Table 3 has been created. The table includes available statistics for each operational provincial program (volume of pharmaceuticals collected, pharmacy participation rates, and cost of the programs) based on the most recent annual statistics. Since the information available for each program varies across provinces, Table 3 has some cells with unavailable information. Furthermore, it is important to note that the volume of pharmaceuticals may have been
weighted differently across programs (i.e. including or not packages). Consequently, the comparison exercise performed here is only indicative of relative performance.

In this context, Alberta and British Columbia show the most success in terms of total volumes of pharmaceutical waste collected and participation of pharmacies. However, when we look at volume collected per capita, Alberta (0.01 kg) and Saskatchewan (0.02 kg) demonstrates a better performance than British Columbia (0.005 kg). Finally, the costs associated to the Nova Scotia program are relatively lower than in British Columbia, estimated at $0.006 per pill for British Columbia compared to $0.001 per pill for Nova Scotia (see the footnote of Table 3 for details on these estimates).
### Table 3: Canadian Pharmaceutical Disposal Programs

<table>
<thead>
<tr>
<th>Program</th>
<th>Pharmaceutical Waste Collected</th>
<th>Pharmacy Participation</th>
<th>Program Costs</th>
<th>Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alberta ENVIRx</td>
<td>37 tonnes 0.01 kg/capita (Pop = 3.3 million)</td>
<td>100% (Pharma = 900)</td>
<td>N.A.</td>
<td>Industry and provincial government</td>
</tr>
<tr>
<td>British Columbia Medications Return</td>
<td>23 tonnes 0.005 kg/capita (Pop = 4.3 million)</td>
<td>96% (Pharma = 985)</td>
<td>$294,185 $0.006/pill (Pills = 32.7 million)</td>
<td>Industry</td>
</tr>
<tr>
<td>Manitoba HHW</td>
<td>N.A.</td>
<td>N.A.</td>
<td>N.A.</td>
<td>Provincial government</td>
</tr>
<tr>
<td>New Brunswick HHW Regional Solid Waste Commissions</td>
<td>N.A.</td>
<td>N.A.</td>
<td>N.A.</td>
<td>Users</td>
</tr>
<tr>
<td>Newfoundland and Labrador HHW</td>
<td>72,000 litres of hazardous waste (may include pharmaceuticals)</td>
<td>N.A. (in terms of number of municipalities and households)</td>
<td>N.A.</td>
<td>Provincial and municipal governments</td>
</tr>
<tr>
<td>Nova Scotia Medication Disposal</td>
<td>10.6 tonnes 0.01 kg/capita (Pop = 0.93 million)</td>
<td>100% (Pharma = 259)</td>
<td>$30,695 $0.001/pill (Pills = 19.2 million)</td>
<td>Industry</td>
</tr>
<tr>
<td>Prince Edward Island Take It Back</td>
<td>1.3 tonnes 0.01 kg/capita (Pop = 0.14 million)</td>
<td>N.A.% (Pharma = 40)</td>
<td>N.A.</td>
<td>IWMC</td>
</tr>
<tr>
<td>Saskatchewan Pharmaceutical Waste Disposal</td>
<td>16.4 tonnes 0.02 kg/capita (Pop = 0.99 million)</td>
<td>90% (Pharma = 350)</td>
<td>N.A.</td>
<td>Community pharmacies</td>
</tr>
</tbody>
</table>

Notes: Population (Pop) statistics are from Statistics Canada (2006). The numbers of pharmacies (Pharma) are from provincial programs or NAPRA (2002). The cost per pill is measured with the total number of pills (pills) calculated using the average weight of a single pill (estimated at 0.55g or 0.00055 kg by Gualtero, 2005). ¹About 13 municipalities and 2,300 households participate to the Newfoundland and Labrador HHW collection per year. Volume statistics are not necessarily perfectly comparable as they may or may not include packaging, sharps, etc. Data are based on the most recently available statistics for a year. 1 tonne (or metric ton) = 1,000 kilograms. N.A. means no data are available.

Further data would be necessary to better compare and assess each program performance. To increase the validity of the assessment it would be useful to have inputs on the percentage of consumers using and aware of the existence of the programs, the volume of pharmaceuticals collected versus sold and consumed/unused, the types of pharmaceuticals collected, the number of brochures distributed, the amount of media coverage for the programs, etc. For some of these inputs, it may be hard to gather precise information. For instance, there is no public data on the volume of...
pharmaceutical sales as neither manufacturers nor pharmacists publicly release such information. In addition, consumers do not participate in disposal programs if they take all of their pharmaceuticals or if they are never prescribed any pharmaceuticals or never take non-prescriptions. According to a survey of Statistics Canada, about 25% of all households in Canada had leftover or expired pharmaceuticals in 2005 (Statistics Canada, 2008). This survey shows that households in Quebec and Prince Edward Island are the most careful with disposal of leftover and expired pharmaceuticals (see Annex 1 for further details on this survey).

3.1.3 Elements of Success

The relative success of British Columbia is perhaps a result of the efforts directed to improve the performance of its Medication Return program. For instance, in 2006 the PCPSA performed a consultation with stakeholders, surveying the public and the pharmacies in order to assess shortfalls in the program and aspects that needed improvement. Furthermore, because the industry selling pharmaceuticals in British Columbia has to participate and bear all the costs of the program, there is no disincentive for the pharmacies and the public to participate (in terms of cost). Furthermore, the program offers good advertising, providing posters, brochures, a pharmacist information manual, and advertisement through websites and newspapers. Constant monitoring of the program (volume of pharmaceuticals collected, cost, and participation of pharmacies) allows frequent assessments of the program. Finally, the program gains from its longevity. Similar characteristics make the Alberta ENVIRx program successful. The obvious difference with this program is the fact that participation and funding from the industry is voluntary. Nevertheless, up to now the industry has responded positively and has financed the program. Both the Alberta and British Columbia programs are free of charge for the public and the community pharmacies. Less evidence is available for the PEI Take It Back program as it is a fairly new initiative, which was started in 2004 and for which little data is available. For instance, the volume of pharmaceuticals collected by PEI’s program is only available for

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40 IMS Health Incorporated sales such statistics.
41 In addition, only 50 per cent of people take their pharmaceuticals as prescribed according to the Ontario Pharmacist Association (Medical News, 2007). According to the results of a survey about the British Columbia Medication Return Program, 84 per cent of households in British Columbia have pharmaceuticals in their home and 28 per cent have some unwanted items (expired, leftover, etc.). In addition, only 20 per cent of people return their pharmaceuticals to pharmacies and only 31 per cent are aware of the British Columbia Medications Return Program (Redfern Research, 2007). In 2002, a survey from NDMAC showed that in the 12 previous months, 65% of the survey respondents used a prescription drug and 85% of respondents used a self-care health product (White, pers. comm., 2008).
the year 2004 and there is no data on pharmacy participation. Therefore, it is difficult to assess the PEI program performance across years.

3.2 International Comparison

In terms of the volume of pharmaceuticals collected per capita, operational Canadian and international programs seem similar (see Table 4 for statistics on international programs). However, the French and Swedish programs show the highest diversion rate with 0.2 kg and 0.1 kg of pharmaceutical waste collected per capita per year, respectively, followed by Portugal and Spain with 0.05 kg per capita each. Although, Canadian programs collect about 0.01 kg of pharmaceutical waste per capita per year (Table 3), the volume data may not be perfectly comparable as they may or may not include variables such as packaging, sharps, etc. Moreover, owing to the lack of data, we can only compare the success of the programs based on volume collected and not on other factors such as awareness of programs, public participation, etc. Therefore, one may conclude that the comparison only shows that Canadian pharmaceutical compliance to their prescriptions is higher than internationally.

Programs presented in Table 4 may not represent a complete list of existing international programs. Instead, it reports programs that have been found to be in operation as of February 2008 and for which recent statistics (e.g. volume of pharmaceuticals collected) are available. All programs presented in Table 4 are nationwide.

In Australia, the Return Unwanted Medicines (RUM) Project is mainly financed by the federal government. While the pharmaceutical industry is aware and supportive of the RUM Project, the main objective and challenge of RUM is to increase consumer awareness.

In Europe, the Directive 2004/27/EC, Article 127b requires that all European Union (EU) “Member States shall ensure that appropriate collection systems are in place for medicinal products that are unused or have expired.” (Europa, 2004). According to Directive 2004/27/EC, Article 54j “reference to any appropriate collection system in place shall appear on the outer packaging of medicinal products or, where there is no outer packaging, on the immediate packaging.” (Europa, 2004 and European Medicines Agency, 2004). In 2007, a survey of the European Federation of Pharmaceutical

\[42\text{ For instance, we estimated that France collected 0.09 kg/capita instead of 0.2 kg/capita of pharmaceutical waste in 2006 when packaging items are excluded from the figures (see the footnote of Table 4 for more details).} \]
Industries and Associations (EFPIA) found that out of 27 countries surveyed, 19 had take-back programs in place (Taylor and Poulmaire, 2008). However, quantitative information on the performance of these take-back programs could not be gathered for many countries and no data for specific individual counties has been published by Taylor and Polmaire (2007). Therefore, the information for the individual EU countries presented below, in Table 4, comes from other sources.

Among European countries, Sweden has a unique retail pharmacy system which is organized into one single government-owned chain known as Apoteket AB. The environmental program of Apoteket AB focuses on intensive public awareness campaigns to educate the public about the environmental consequences of flushing pharmaceuticals down the drain and throwing products in household garbage. This attention put on awareness campaigns seems advantageous as Apoteket AB reported that more than 70% of the customers with leftover drugs returned them or planned on returning them to a pharmacy. In addition, the 12% increase in the volume of pharmaceuticals collected from 2006 to 2007, 910 tonnes to 1019 tonnes, is in part attributed to a campaign carried out by Apoteket AB and other stakeholders at the end of 2006. In 2006, France’s program Cyclamed collected about 0.21 kg per capita of pharmaceutical waste, including packaging. However, in terms of pharmaceutical substances alone, the program collected 0.09 kg per capita in 2006, where packaging is estimated to represent 43% of the total volume collected. Data for 2007 are unavailable as the program is currently under reorganization. The program will continue to collect unused and expired pharmaceuticals from the public for safe disposal. However, it will terminate redistributing unused but useable pharmaceuticals to emerging countries and destitute people in France. This second role will end in part for security reasons (see Annex 6 for more details). In Portugal, pharmacies, manufacturers, distributors and importers fund the program Valormed and an eco-fee is imposed on products placed in the market. This program has recently been criticized for incinerating all pharmaceutical waste, rather than recycling packages. Since its launch, Spain Integrated Waste...
Management System (SIGRE) has carried out communication campaigns to raise awareness of environmental issues involved with the use/disposal of medicines. The growing volume of leftover medicines managed by SIGRE indicates a positive response to its communication initiatives (an e-bulletin and a website for which visits increase through years).

**Table 4: International Pharmaceutical Disposal Programs**

<table>
<thead>
<tr>
<th>Program</th>
<th>Pharmaceutical Waste Collected</th>
<th>Pharmacy Participation</th>
<th>Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>France Cyclamed</td>
<td>13,169 tonnes, 0.21 kg/capita²</td>
<td>80% - 90%, (Pharma = 22,500)</td>
<td>Industry, pharmacies and wholesales (4,872,530 euros in 2006)</td>
</tr>
<tr>
<td>Since: 1993</td>
<td>(Pop = 63 million)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australia RUM</td>
<td>377 tonnes, 0.01 kg/capita</td>
<td>100%, (Pharma = 5,000)</td>
<td>Federal government ($1 to $1.5 million/year)</td>
</tr>
<tr>
<td>Since: 1999</td>
<td>(Pop = 20 million)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portugal Valormed</td>
<td>630 tonnes, 0.05 kg/capita</td>
<td>98.5%, (Pharma = 2,786)</td>
<td>Pharmaceutical Stakeholder Groups (eco-fee applied to all packaging)</td>
</tr>
<tr>
<td>Since: 2001</td>
<td>(Pop = 10.6 million)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spain SIGRE</td>
<td>2,624 tonnes, 0.06 kg/capita²</td>
<td>100%, (Pharma = 20,406)</td>
<td>Pharmaceutical industry (eco-fee applied to all packaging)</td>
</tr>
<tr>
<td>Since: 2003</td>
<td>(Pop = 45.2 million)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweden Apoteket</td>
<td>1019 tonnes, 0.1 kg/capita</td>
<td>100%, (Pharma = 980)</td>
<td>Federal government (national pharmacy)</td>
</tr>
<tr>
<td>AB Since: 1970</td>
<td>(Pop = 9.1 million)</td>
<td></td>
<td>(1,444,441 euros in 2006)</td>
</tr>
</tbody>
</table>

Note: Pharma and Pop are for total number of pharmacies and total population in a country, respectively. Volume statistics are not necessarily perfectly comparable as they may or may not include packaging, sharps, etc. Data are based on the most recently available annual statistics. International statistics are taken from international sources (see Annex 6) and VisionQuest (2007) Report. 1 tonne (or metric ton) = 1,000 kilograms. ²France figures include packaging. Excluding packaging, the volume collected is relatively less at 5,663 tonnes or 0.09 kg/capita. Sweden figures also include some package materials. However, volume collected for pharmaceutical substances alone was not found.

The United States does not have a national program.⁴⁶ In fact, it is even illegal in some states for pharmacies to accept returned unused drugs (Daugthon, 2003). The main barrier preventing the development of take-back programs for pharmaceuticals in

⁴⁶ In the United States, the federal government has developed guidelines for the proper disposal of prescription drugs recommending the public to: take unused, unneeded or expired prescription drugs out of their original containers and throw them in the trash; mix prescription drugs with an undesirable substance like unused coffee or kitty litter, and put them in impermeable containers like empty cans or sealed bags; flush prescription drugs down the toilet, but only if the label specifically instructs doing so; and participate in community pharmaceutical "take-back" programs that allow the public to bring unused medications to a central location for proper disposal. In addition, the United States Environmental Protection Agency has developed a website to increase awareness about possible harm to the environment from chemicals found in pharmaceuticals, cosmetics, perfumes and other personal-care products (United States Environmental Protection Agency, 2007).
the United States is the Controlled Substances Act which requires the presence of a law officer to handle control substances (e.g. narcotic drugs).\footnote{The term "controlled substance" means a drug or other substance, or immediate precursor (e.g. opiates, opium derivatives, anabolic steroids, narcotic drugs, etc.). For more details, see the Act at: \url{http://www.usdoj.gov/dea/pubs/csa/812.htm}.}

Consequently, the development of disposal programs for household pharmaceuticals is only at the initial stages in the United States on a state by state basis, mainly at the community level.\footnote{61 programs across the United States have been identified by the Community Medical Foundation for Patient Safety (according to a talk given by M. C. Mireles in Maine at the 2008 International Symposium on Pharmaceuticals in the Home and Environment: Catalyst for Change, November 10-11, 2008).} In order to help community pharmacies to hold pharmaceutical collections, the Northeast Recycling Council Inc. organization has prepared a comprehensive guidance document (Rubinstein, 2008) describing the existing federal and state laws and legal strategies for collecting pharmaceuticals. In addition it explains how to hold pharmaceutical collections and includes case studies.

Examples of existing programs in the United States include the Washington State pharmaceutical pilot program, called the Secure Medicine Return: PH:ARM Pilot, which offers secure bins in pharmacies or in clinics for consumers to return their pharmaceuticals for safe disposal (by incineration). Two keys are necessary to open the bins and the keys are given to two different employees for security reasons. Funding for this pilot program terminated at the end of 2008.\footnote{No information was found about further funding. However, it seems that the objective is to have pharmaceutical manufacturers to fund an on-going program in Washington State (Unwanted Medicine Return Pilot Program, n.d.).}

Maine is also testing a pilot program to mail back unused pharmaceuticals called the Maine Safe Medicine Disposal program which is funded with a grant from the United States Environmental Protection Agency and administrated by the Maine Drug Enforcement Agency. It is currently in Phase I and targets the elderly (60+ years old). Pharmacies in 4 counties were selected to participate and distribute envelopes to consumers with a survey. Consumers are asked to put their unused/expired pharmaceuticals into the provided envelop and place it in a mail box. The Postal Service ships the envelopes to the United States Food and Drug Administration for safe disposal. The Food and Drug Administration allows representatives of the Maine mail-back program to enter its offices to review the content of the envelopes for research purposes. The program is free for the public. This program is working on moving into Phase II which should make the program permanent and available to all citizens of Maine.\footnote{The website for the program is: \url{www.safemeddisposal.com}. Note that Maine has a rural population.}
In 2003, Maine was the first state to pass legislation regarding the disposal of unused pharmaceutical wastes but it did not require funding from manufacturers. The Maine State legislation: LD 411 which is “An Act to establish a pilot program for return of unused prescription drugs by mail”, was signed in 2007 and allows for the development of a mail-back program. In October 2007, California passed the Senate Bill 966 requiring that California establish a state-wide model program by the end of 2008 for the collection and proper disposal of household pharmaceuticals (Teleosis Institute, 2007). New York State has a similar bill, which if passed will be different in the sense that it will require consumers to return their unwanted drugs to a collection program. Washington State is in the process of introducing the first producer responsibility bill for pharmaceuticals in the United States (Grasso, pers. Comm. 2007). This bill will require manufacturers to implement and pay for a pharmaceutical return program. International programs mentioned in Table 4 are further detailed in Annex 6.

4 Further Considerations

This paper identifies limitations in the current Canadian management of pharmaceutical waste. In this context, this section lists areas that require further study and consultation before any recommendations can be made on how to optimize the Canadian management of pharmaceutical waste. For instance, stakeholders involved with the issues presented in this paper may need to look further into:

- Developing a Canada-wide strategy for pharmaceutical waste disposal.
- Taking actions in regions where no evidence of pharmaceutical take-back programs was found, i.e. Northwest Territories.
- Increasing awareness campaigns to educate consumers and medical professionals about the risks associated with the disposal of pharmaceutical products in the environment and the benefits of safe disposal methods.
- Focussing on educating the young as they will in return educate their parents/friends and in the future, their own children.
- Focussing on educating pharmacist students as well as other health care students.
- Increasing the motivation among Canadians to take their unused and expired pharmaceuticals back to community pharmacies or other depots for safe disposal.

• Distributing bags that consumers can use to place their unwanted and expired pharmaceuticals to be returned to pharmacies or other disposal depots. This can help increase awareness of, and participation in, take-back programs (bags are distributed in Sweden and subsequently there is a high rate of participation by the population to this specific take-back program).

• Having programs available to all consumers (e.g., participation of neighbourhood pharmacies, senior centers, etc.).

• Implementing a mail take-back program across Canada or at least in rural areas, similar to the pilot mail-back program in Maine. Such system may help to raise the participation of the public by facilitating the return of pharmaceuticals. Having envelopes distributed for free by pharmacies and post offices could make the return of pharmaceuticals more accessible to more people.

• Finding creative ideas to remind people of the importance of safe disposal in order to induce them to participate in take-back programs (e.g. insert memo in water bills).

• Using environmental issues as an incentive to safe disposal but also include health issues (such as the danger of using pharmaceuticals for non-medicinal reasons).

• Increasing the motivation among community pharmacies to take-back public unused and expired pharmaceuticals for safe disposal.

• Exploring the possibility of having secured collection bins installed inside and/or outside public establishments across the country, to collect expired and unwanted pharmaceuticals (as well as veterinary drugs and potentially other products). At the moment, collection bins for pharmaceuticals are only found inside pharmacies. However, various regions of Canada have installed collection bins, inside and outside of public establishments and/or work offices, to collect used sharps as well as other hazardous and non-hazardous materials such as batteries. A risk to consider when implementing such collection system is the fact that drug users may try to steal drugs from bins (the use of pharmaceuticals for non-medicinal use is a growing issue).

• Increasing the promotion of pharmaceutical waste disposal programs.

• Considering labelling products/packages with disposal advice and/or reference to collection systems (e.g. in line with the EU Directive 2004/27/EC).

• Evaluating the need to have pharmaceutical packaging collected and disposed safely via disposal programs. The rational is that pharmaceutical residuals may be

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52 See Jacques (2008) for further details about the collection of used sharps across Canada. There are boxes to collect batteries in most Federal Government offices.
absorbed and therefore remain in packaging or it may be impossible to separate pharmaceuticals from their packaging (e.g. cream and lotion).

- Having pharmaceutical waste well defined so that it is clear if programs collect and dispose of packaging and which type of packaging is accepted (including packaging in contact with pharmaceuticals, external packaging, etc.).

- Analyzing the need and the possibility to have disposal programs collecting unused and expired pharmaceuticals from households and health care facilities, including hospitals, long term care facilities, offices of doctors and dentists, etc. (as well as collecting veterinarian drugs) inline with the Swedish national disposal program.

- Analyzing the possibility of developing repository programs in Canada that allow the redistribution of unused and reusable (unexpired) pharmaceuticals to low income Canadians or people in developing countries.

- Efforts should be put on programs that aim at reducing the amount of pharmaceutical waste, as much as increasing safe disposal. There is no data indicating the estimated amount of pharmaceuticals that are unused by consumers. Therefore, disposal programs with high volume of collection per capita may well indicate effectiveness of programs but may also indicate high rate of wastage of pharmaceuticals in a region. In contrast, programs with smaller rates of collection may indicate better compliance with prescriptions.

- Using cost saving objectives as an incentive to reduce the amount of pharmaceutical waste (the cost to dispose of pharmaceuticals is usually much higher than the retail value of pharmaceuticals).

- Creating a publicly accessible database with volume of Canadian pharmaceutical sales.

- Increasing the motivation among Canadians to take their full prescription in order to reduce pharmaceutical waste.

- Reducing duplication of prescriptions and size of prescriptions when possible.

- Frequent monitoring, evaluating, and reassessing the performance of existing disposal programs in order to improve them.

- Using take-back programs to gather research data on pharmaceuticals (e.g. geographic and demographic patterns of pharmaceutical accumulation, reasons for pharmaceutical accumulation, types of pharmaceuticals accumulated, etc.) Research data would help to respond to many health and economic questions, assess why
there is waste, derive implication for insurance and dispensing policies, etc. (as part of its mail-back pilot project, Maine is gathering research data).

- Considering legislative framework underlying disposal programs in line with British Columbia.
- Further analyzing international frameworks and increasing international collaboration on the issue of pharmaceuticals and the environment.
- Analyzing the need to have special disposal systems for pharmaceutical waste generated by all players including consumers, pharmacies, health centres, manufacturers, etc.
- Evaluating what role municipalities should have in managing pharmaceutical waste. For instance, should they impose a ban on the disposal of pharmaceuticals in residential garbage, sewer, etc?
- Analyzing the overall environmental impacts of disposal practices in order to determine environmentally friendly disposal methods. For instance, incineration may reduce the load of pharmaceuticals in the environment but at the same time it may also increase emissions of greenhouse gases or other pollutants.
- Evaluating the potential benefit and the possibility to implement a classification system for pharmaceuticals in Canada, similar to Swedish Environmental Classification of Pharmaceuticals (Annex 4). Such a system can allow the public and physicians to select environmentally-friendly pharmaceuticals and can result in an increase of the production of environmentally-friendly products.
- Adopting the PEI system of registry of pharmaceuticals (Annex 4) in order for the medical professionals to give better advice and prescribe the appropriate pharmaceuticals to patients.

5 Conclusion

This paper describes and assesses Canadian pharmaceutical waste disposal programs. The focus of this paper is on the use and disposal practices of consumers. It shows that Canada does not have a nation-wide model program. Instead, most provinces have or are developing their own programs. Through those programs, consumers can bring their unused and expired pharmaceuticals to community pharmacies or collection depots for safe disposal. Programs have seen increasing volumes of pharmaceutical waste collected in the past few years, which may reflect an increase of public education and participation. British Columbia has the only program
requiring brand-owner participation and funding; however, similar requirements are in development for Manitoba and Ontario. In Canada, the Alberta province-wide program is collecting the highest volume of pharmaceutical waste in absolute terms and Saskatchewan is showing the best performance per capita. Other countries, such as Sweden, France and Spain, have nation-wide programs showing good performances in terms of quantity of pharmaceutical waste collected.

In order to improve proper disposal of pharmaceuticals, it is important to increase public awareness and understanding of the risks associated with pharmaceutical products in the environment and the benefits of safe disposal methods. Also, further harmonization across programs could facilitate the management. Nevertheless, further study and consultation are needed in order to determine how to best optimize the management of pharmaceutical waste.

In this context, in future research it would be interesting to find answers to the information gaps revealed in this paper. For instance, what is the actual percentage of the population consuming pharmaceuticals? From that subgroup, how many use their full prescription and how many have to dispose of unused items? Among those who have disposed of pharmaceuticals, are they aware of safe disposal programs/options offered in their region, are they taking advantage of them, and what types of pharmaceuticals do they need to dispose of? In addition, it would be interesting to have an appreciation for the amount and types of pharmaceuticals wasted (returned to pharmacies or thrown in garbage, toilets or sinks) in comparison to the amount of pharmaceuticals consumed (excreted) by the public. This would help determine the scope of the issue of pharmaceutical waste by the public. A better knowledge of international programs would also be useful. Canada can learn from these countries. For instance, Sweden and Australia have good monitoring processes with comprehensive data. They put a lot of attention in awareness campaigns for consumers and health professionals and show interesting diversion rates of household pharmaceutical waste from garbage, toilets, and sinks (see Annex 6 for further details). Furthermore, as the programs reviewed in this paper only focus on consumers, it would be interesting to analyze disposal practices at community pharmacies, health care facilities, and manufacturers. For instance, pilot studies could be undertaken at each location in order to assess the amount and types of pharmaceuticals disposed of and the disposal methods used. Finally, it is important that safe disposal management systems exist, for all stakeholders involved in the exposure of the environment to pharmaceuticals, in order to prevent environmental contamination.
According to Statistics Canada (2008), about 25% of Canadian had leftover or expired pharmaceuticals in 2005 at home. Of these, almost 50% returned the products to a pharmacy, depot or drop-off centre; 39% placed them with their regular garbage, flushed them down the drain or buried them; and the remaining still had them at home at the time of the survey. Methods of disposal vary across provinces and territories. Almost two-thirds of households in Quebec and in Prince Edward Island returned pharmaceuticals to a pharmacy, drop-off centre or depot. In contrast, less than one-third did so in British Columbia, Manitoba, Saskatchewan, and Newfoundland and Labrador.

Note: Uncontrolled disposal methods include disposal in regular garbage, disposal down the drain, sewer, toilet or sink or burial. Controlled disposal methods include taking the medication to a pharmacy, depot or drop-off centre. Data are represented as a percentage of the 24% of all households who reported having leftover or expired medications to dispose of in 2005. Totals do not add to 100%. Respondents may also have indicated they used other methods of disposal or that they still had them and/or didn’t know what to do with them.

Source: Statistics Canada, 2008

These statistics are based on the Household Environment Survey 2005 of Statistics Canada (Statistics Canada, 2007). The initial sample size consisted of 36,431 households. A 77.8% response rate yields an effective sample of 28,334 responding households to the Household Environment Survey. Provincial response rates ranged from 73.1% to 83.3%.
Annex 2: Pharmaceutical Expenditure


<table>
<thead>
<tr>
<th>Province</th>
<th>Total exp.</th>
<th>Total exp. per capita</th>
<th>Prescription exp. per capita</th>
<th>Prescription exp. as a % of total exp.</th>
<th>Public prescription exp. as a % of prescription exp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>N.L.</td>
<td>374.9</td>
<td>16.5</td>
<td>727.74</td>
<td>631.34</td>
<td>86.8</td>
</tr>
<tr>
<td>P.E.I.</td>
<td>94.8</td>
<td>16.2</td>
<td>683.59</td>
<td>559.08</td>
<td>81.8</td>
</tr>
<tr>
<td>N.S.</td>
<td>748.5</td>
<td>17.4</td>
<td>796.64</td>
<td>659.88</td>
<td>82.8</td>
</tr>
<tr>
<td>N.B.</td>
<td>572.7</td>
<td>17.2</td>
<td>760.89</td>
<td>639.87</td>
<td>84.1</td>
</tr>
<tr>
<td>Que.</td>
<td>6,170.0</td>
<td>20.3</td>
<td>807.42</td>
<td>698.96</td>
<td>86.6</td>
</tr>
<tr>
<td>Ont.</td>
<td>10,286.7</td>
<td>17.0</td>
<td>811.13</td>
<td>674.86</td>
<td>83.2</td>
</tr>
<tr>
<td>Man.</td>
<td>816.5</td>
<td>14.1</td>
<td>890.13</td>
<td>578.19</td>
<td>83.8</td>
</tr>
<tr>
<td>Sask.</td>
<td>719.7</td>
<td>15.3</td>
<td>725.90</td>
<td>607.08</td>
<td>83.6</td>
</tr>
<tr>
<td>Alb.</td>
<td>2,343.4</td>
<td>14.4</td>
<td>711.19</td>
<td>580.15</td>
<td>81.6</td>
</tr>
<tr>
<td>B.C.</td>
<td>2,970.6</td>
<td>15.4</td>
<td>890.37</td>
<td>567.39</td>
<td>82.2</td>
</tr>
<tr>
<td>Y.T.</td>
<td>20.5</td>
<td>9.9</td>
<td>859.26</td>
<td>519.11</td>
<td>78.7</td>
</tr>
<tr>
<td>N.W.T.</td>
<td>22.5</td>
<td>7.1</td>
<td>515.12</td>
<td>433.49</td>
<td>84.2</td>
</tr>
<tr>
<td>Nun.</td>
<td>14.5</td>
<td>4.7</td>
<td>479.13</td>
<td>397.47</td>
<td>83.0</td>
</tr>
<tr>
<td>Canada</td>
<td>25,155.4</td>
<td>17.0</td>
<td>772.89</td>
<td>647.99</td>
<td>83.8</td>
</tr>
</tbody>
</table>

Note: 2006 values are forecasted.

Source: Canadian Institute for Health Information, 2007
Annex 3: Definition of Pharmaceuticals

According to the Canadian F&DA, a “drug” includes any substance or mixture of substances manufactured, sold or represented for use in:

a) the diagnosis, treatment, mitigation or prevention of a disease, disorder or abnormal physical state, or its symptoms, in human beings or animals;

b) restoring, correcting or modifying organic functions in human beings or animals; and

c) disinfection in premises in which food is manufactured, prepared or kept.

Under the F&DA, the Food and Drug Regulation defines a “pharmaceutical” as a drug other than a drug listed in Schedule C or D to the Act; where Schedule C includes drugs other than radionuclides sold or represented for use in the preparation of radiopharmaceuticals; and Schedule D are biologics such as blood and vaccines.
Annex 4: Other Pharmaceutical Programs

Some programs focus on promoting the full use of a prescription or reducing the size of prescriptions where others aim at promoting the use and development of environmentally-friendly pharmaceuticals. Benefits from both of these types of programs include the reduction of pharmaceutical wastes and the reduction of the environmental and indirect human health impacts of pharmaceuticals in the environment. Examples of such programs are presented below. The list may be incomplete as many types of programs can exist across Canada and elsewhere. Note that examples presented here focus on Canadian programs. Programs are presented in alphabetic order.\(^{54}\)

A4.1: Drug Utilization Review (DUR) Programs

DUR can be implemented in health care centres (nursing, hospital, etc.) They are meant to decrease the amount of pharmaceuticals consumed by the public and to aid in the selection of the most appropriate pharmaceutical therapy.

**Canadian Evidence:** The utilisation of DUR programs led to a reduction in the quantity of pharmaceuticals consumed in an Ontario nursing home.

**References:**


- Results of a pilot study on DUR programs carried out in an Ontario nursing home.

A4.2: Education Programs

Education programs focus on informing patients about their diseases, their pharmaceuticals, and the importance of taking the complete prescription. These programs can also inform physicians and nurses on how to select the best pharmaceuticals for their patients. These programs are usually done in respect of patient quality of life, treatment compliance, and treatment costs. Their objective is to improve medication compliance.

**Canadian Evidence:** Education programs should be used because inappropriate pharmaceutical use and treatment non-compliance costs Canadians approximately $8 billion annually.

**Reference:**

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\(^{54}\) For further examples of programs, see Ruhoy and Daughton (2008).

**A4.3: Keep Track and Take it Back**

A kit with a pharmaceutical record booklet that allows individuals to maintain a complete documentation of their pharmaceuticals, including prescriptions and over the counter pharmaceuticals such as herbal medicines and vitamins is distributed to patients. The pharmaceutical record can be shared with pharmacists, physicians and other health care providers. The kit also includes a pharmaceutical disposal bag and calendar reminder stickers to encourage the public to review their pharmaceuticals regularly and return any expired or unused pharmaceuticals to the pharmacy for safe disposal.

**Canadian Evidence:** On May 2, the Keep Track and Take it Back Safe Medication Use Campaign was launched by the Brant County Health Unit, in partnership with the Ontario Pharmacists’ Association, the Brant County Pharmacists’ Association, the Brant County Medical Association, the Brant Community Healthcare System, Rx&D, and the Brant County Retired Teachers of Ontario.  

**Useful Websites:**

Medical News Today
- Information about the Keep Track and Take it Back Safe Medication Use Campaign.

**A4.4: Meds Check Medication Review**

This program allows patients to ask their pharmacist questions or discuss any concerns they may have with their pharmaceuticals. Pharmacists share the results of the review, including a comprehensive pharmaceutical list and recommended action with the patient/caregiver and, when appropriate, the patient physician and/or primary healthcare provider. The goal is to maximize patient adherence to pharmaceutical therapy.

**Canadian Evidence:** Ontario community pharmacists provide Meds Check Medication Review service voluntarily at no charge on an annual basis.

**Useful Websites:**

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55 The launch of this campaign follows *The Transparent Drug System for Patients Act* (TDSPA), passed in the Ontario Legislature in June, 2006.

56 Eligible recipients of the Ontario Drug Benefit Program have to be taking three or more chronic prescription medications. *The Transparent Drug System for Patients Act* (TDSPA), passed in Ontario Legislature in June, 2006, included a landmark decision to recognize the valuable role of pharmacists by compensating them for professional services. As of April 1, 2007, the Ministry of Health and Long-Term Care, collaboratively with the Ontario Pharmacy Council and the Ontario Pharmacists’ Association (OPA) launched Pharmacists’ Professional Services as eligible benefits under the Ontario Drug Benefit (ODB) Program. Phase one, which began April 1, 2007, compensates pharmacists for providing the Meds Check Medication Review.
A4.5: Prince Edward Island Drug Information System

This is a computerized pharmacy network that has connected pharmacists, physicians, and other authorized health care professionals with comprehensive electronic pharmaceutical profiles for all patients since July 2007. This information system should help reduce pharmaceutical duplications and non-compliance as medical professionals will be able to review patient pharmaceutical usage. The system is supported by the Pharmaceutical Information Act, which was proclaimed in the spring of 2007. It is the first of its kind in Canada but similar systems should be introduced in other provinces in the future as part of a national strategy for electronic drug information.

Useful Websites:

Prince Edward Island Government
• Announcement of the Drug Information System for Prince Edward Island.

Prince Edward Island Government
• Information about the system.

A4.6: Swedish Environmental Classification of Pharmaceuticals

The Swedish voluntary environmental drug classification system is an initiative of the Swedish Association of the Pharmaceutical Industry (LIF) together with the interested parties in the healthcare sector. Environmental hazard assessments were initiated in 2003 by the Stockholm County Council and the Swedish Pharmacy chain Apoteket AB (the Stockholm model). During 2005, a new classification was developed covering both environmental risk and hazard assessment, carried out by the LIF (the Swedish model). The goal was to develop a model which clearly showed environmental information, both to interested members of the public and healthcare professionals. The information is drawn from pharmaceutical companies and an independent organisation, the Swedish Environmental Research Institute, reviews the data, the assessments and the

57 The system was developed by the LIF, Stockholm County Council, the pharmacy monopoly chain Apoteket AB, the Swedish Association of Local Authorities and Regions, and the Swedish Medical Products Agency. The system is voluntary as Sweden can not, under EU rules, implement a mandatory environmental classification and labelling system.
58 Today, the Stockholm model takes its information about environmental hazard and risk from the Fass.se website. It grades hazard in terms of an index standing for persistence, bioaccumulation and toxicity (BPT-index). The Swedish County Council are responsible for managing and financing healthcare including reimbursement of prescription medicines.
classifications. The information and classification of the first groups of substances was published in October 2005. The assessments are to include all medications by 2010.

- Environmental risk of a pharmaceutical substance is assessed by comparing the highest level of concentration of that specific substance which is anticipated not to cause negative effects in animals and plants with the anticipated concentration in Swedish waters. The tests are standardised and conducted in laboratories. As the classification focuses on possible adverse aquatic environmental effects, the data is normally from algae, daphnia and fish. Risk is specified as:

  o Insignificant
  o Low if \( \frac{PEC}{PNEC} < 0.1 \)
  o Moderate if \( \frac{PEC}{PNEC} \) is between 0.1 and 1
  o High if \( \frac{PEC}{PNEC} > 10 \)

Where:
PEC: Predicted Environmental Concentration
PNEC: Predicted No Effect Concentration

- Environmental hazard is assessed by determining if a pharmaceutical substance is persistent or biodegradable, and whether it can bioaccumulate in aquatic organisms. Pharmaceuticals are classified regarding biodegradation and bioaccumulation according to standardised laboratory tests. The Swedish classification system uses the following phrases:

  o Regarding degradability:
    ▪ The substance is *degraded* in the environment
    ▪ The substance is *slowly degraded* in the environment
    ▪ The substance is *potentially persistent*

  o Regarding bioaccumulation:
    ▪ *No significant* bioaccumulation potential
    ▪ *Potential* to bioaccumulate in aquatic organisms

The system allows taking environmental impact into account when comparing medications that are equally safe and suitable for a purpose. There is a focus on educating the public and medical staffs on the potential impacts of pharmaceuticals and on motivating the industry to produce environmentally-friendly products. The development of the system was helped by the fact that the volume of sales is easily

---

59 Biological degradation takes place in soil or water by means of microorganisms. However, non-biological degradation is based on chemical reactions or reactions to UV rays in sunlight. Highly lipid-soluble pharmaceuticals may have the ability to bioaccumulate in the fat tissue of animals. Animals higher in the food chain are more susceptible to this. They eat animals which in turn have eaten other organisms which may have absorbed the substance.
accessible in Sweden because of the monopoly of the pharmaceutical retail sector.\footnote{This monopoly should end by January 2009 as new companies should be permitted to enter the business according to new government promises (Clark and al., 2007).}

This particularity implies that it may be harder to implement a similar classification system in countries where sales data are not publicly available.\footnote{However, the company IMS Health Incorporated provides data on volume of pharmaceutical sales for many countries.}

**Useful Websites:**

Fass.se
- www.fass.se
- Information about the Swedish model, environmental risks and hazard and details of tests for each pharmaceutical substance (in Swedish language).

www.fass.se/environment
- Information about the Swedish model (in English language).

Janusinfo
- www.janusinfo.se/environment
- Information about the Stockholm model.

**References:**

LIF. n.d. Swedish Environmental Classification of Pharmaceuticals. Online: www.lif.se/cs/default.asp?id=5588 (Downloaded on April 8, 2008).
- Information about the Swedish classification.

- Information about the evolution from the Stockholm model to the Swedish model.

**Personal Communications:**

Bo Gunnarsson, Dr. Med. Sc., Executive Office Support, Apoteket AB
- bo.gunnarsson@apoteket.se
- Provided information and reviewed this section.

David Taylor, Director of Environment & Sustainability, AstraZeneca,
- David.Taylor4@astrazeneca.com
- Provided information and reviewed this section.

Matilda Persson, Pharmacist, LIF,
- matilda.persson@lif.se
- Provided information and reviewed this section.

**A4.7: Trial Prescription Programs**

Trial prescription programs encourage the dispensing of a small portion of a prescription at first to see if the patient can tolerate them. These programs are usually implemented on expensive pharmaceuticals that are known to have a high incidence of side effects.

**Canadian Evidence:** In British Columbia, Pharmacare reimburses the pharmacy for the initial dispensing fee for the trial quantity. When the balance of the prescription is filled,
the patient is responsible for payment towards the remaining pharmaceutical cost and
the dispensing fee according to their usual plan rules.

**Useful Websites:**

British Columbia Ministry of Health
http://www.healthservices.gov.bc.ca/pharme/generalinfo/trial.html
- Information about Trial Prescription Program.
Annex 5: Map of Canada, Provinces and Territories

Annex 6: International Programs

A6.1: Australia Return Unwanted Medicines (RUM) Project

Overview:

- National voluntary pharmaceuticals take-back program.
- Enables consumers to return unused pharmaceuticals to any pharmacy across Australia.
- In place since 1999.
- No charge to the public and pharmacies.
- The Commonwealth Department of Health and Aging funds cover the costs together with limited support from the pharmaceutical industry (funding has been restricted to collection and disposal costs and has not been covering consumer awareness campaigns).
- At the initial stage the government provided $3 million for 3 years.
- The Federal Budget for July 2005 allocated over $6 million for a further four years to the project, with a funding review due in June 2009.
- Returned products are all incinerated in licensed incinerators.
- Buckets are recycled.

Statistics

- Population: 20 million.
- Participation of pharmacies: 5,000 (100%).
- Diversion rate: 0.017 kg / capita in 2006.
- Increase in collection: 2.3% from 2005 to 2006.

<table>
<thead>
<tr>
<th>Rum Collection, 2000-2006</th>
<th></th>
<th>Annual increase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total volume</td>
<td>(kg)</td>
</tr>
<tr>
<td>2000</td>
<td>235,267</td>
<td>N.A.</td>
</tr>
<tr>
<td>2001</td>
<td>256,643</td>
<td>9.1</td>
</tr>
<tr>
<td>2002</td>
<td>325,065</td>
<td>26.7</td>
</tr>
<tr>
<td>2003</td>
<td>356,625</td>
<td>9.7</td>
</tr>
<tr>
<td>2004</td>
<td>315,810</td>
<td>-11.4</td>
</tr>
<tr>
<td>2005</td>
<td>334,561</td>
<td>5.9</td>
</tr>
<tr>
<td>2006</td>
<td>342,128</td>
<td>2.3</td>
</tr>
</tbody>
</table>

Note: N.A. means no data available.
Other Information:

• In 2001, an extensive Consumer Awareness Campaign had been conducted in New South Wales. Funded by the State Department for the Environment, the campaign presented the RUM Project to health professionals and consumers across the State. Consumer studies have then demonstrated that some 60% of consumers knew of the RUM Project in that state.

• While the pharmaceutical industry is very aware and supportive of the RUM Project, the main aim of RUM remains to improve consumer awareness in all states.

• It is planned to increase consumer awareness via community pharmacy promotions (brochures for consumers), liaison with health insurers (Medicare, Medibank Private, etc.), and promotion from government Ministers.\(^\text{62}\)

• RUM monitors comprehensive amounts of data including the types of pharmaceuticals returned, the demographics of participants, reasons for return and targeted education campaigns.

• RUM diverted about 11% of all pharmaceuticals, drugs, medicines wastes generated in Australia in 2002.\(^\text{63}\)

• RUM shows that consumers are more likely to return prescriptions and solid pharmaceuticals than other medications.

• Most commonly returned pharmaceuticals were prescribed for cardiovascular system, nervous system and alimentary tract and metabolism (Warfarin Sodium the most commonly returned).

• Top ten generic pharmaceuticals returned include: glyceryl, trinitrate, prednisolone, salbutamol, sulfate, paracetamol, warfarin sodium, frusemide, amoxysillin, aspirin, metoclopramide hydrochloride, codeine phosphate with paracetamol.

• The main reasons for returning pharmaceuticals are: safety of pharmaceuticals/medicinal use and efficacy; change in therapy/medication recommended by medical practitioners and other health professionals; consumer’s death; consumer perception regarding the need for pharmaceuticals/medication and/or effectiveness of pharmaceuticals; consumer experiences of unwanted effects; or pharmaceuticals have passed their “use by” date.

\(^{62}\) Medicare is the Australian universal health care system and Medibank Private is the Australian largest and only national private health insurer.

\(^{63}\) According to RUM collection data (325,065 kg in 2002) and the Department of the Environment and Heritage data on generation of wastes pharmaceuticals, drugs, medicines (3,033,000 kg in 2002) as defined under the Basel Convention.
Useful Websites:

RUM
- All the information about RUM.

Australian Government – Department of the Environment and Water Resources
- Volume of Australian pharmaceutical waste generation (data from the Department of the Environment and Heritage).

Personal Communications:
Simon Appel, Project Manager, RUM, rum@netconnect.com.au
- Provided information and reviewed this section.

A6.2: France Cyclamed Program

Overview:
- National program.
- Enable consumers to return pharmaceuticals to local pharmacies for safe disposal.
- In place since 1993.
- Managed by the medicines distribution chain (pharmacies, wholesalers, industry).
- Total operating costs were evaluated at 4,872,530 euros (0.4 euro/kilo) in 2006.
- The industry finances the external cost and wholesalers provide free of charge transportation from pharmacies to their facilities.
- Pharmaceutical waste is incinerated with energy recovery.

Statistics:
- Population: 63 million.
- Participation of pharmacies: 22,500 (about 80% to 90%).
- Diversion rate:
  - Pharmaceuticals and packages 0.21 kg / capita in 2006.
  - Pharmaceutical substances alone 0.09 kg / capita in 2006.
- Decrease in collection: -6.2% from 2005 to 2006.
### Cyclamed Collection, 1995-2006

<table>
<thead>
<tr>
<th>Year</th>
<th>Total volume including packaging(^1) (tonne)</th>
<th>Total volume excluding packaging(^2) (tonne)</th>
<th>Annual increase of total volume including packaging (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>6,894</td>
<td>2,688</td>
<td>N.A.</td>
</tr>
<tr>
<td>2002</td>
<td>14,073</td>
<td>5,488</td>
<td>N.A.</td>
</tr>
<tr>
<td>2003</td>
<td>14,717</td>
<td>5,739</td>
<td>4.6</td>
</tr>
<tr>
<td>2004</td>
<td>15,214</td>
<td>5,933</td>
<td>3.3</td>
</tr>
<tr>
<td>2005</td>
<td>14,113</td>
<td>5,504</td>
<td>-7.2</td>
</tr>
<tr>
<td>2006</td>
<td>13,169</td>
<td>5,663</td>
<td>-6.7</td>
</tr>
</tbody>
</table>

Note:  
\(^1\)Prior 2006, data includes pharmaceuticals with packages (including empty packages which represented about 10% of the total volume). Since 2006, empty packages are not collected anymore.  
\(^2\)Prior 2006, data are based on the estimate that pharmaceuticals represent about 39% of the total volume of pharmaceutical waste collected. Since 2006, we estimated that pharmaceuticals represent about 43% of total volume collected (as empty packages are not collected anymore). Data for 2007 are missing as the reorganization of the program was already started at that time. N.A. means no data available.

### Other Information:

- Following an investigation of the program undertaken in 2005, it was decided that Cyclamed would be reorganized. The program will continue collecting unused and expired pharmaceuticals from the public for safe disposal. However, Cyclamed will stop giving unused but usable pharmaceuticals to humanitarian associations for redistribution to destitute people of France and emerging countries (over than 80 countries). This is partly due to the fact that Cyclamed had a low rate of redistribution (less than 5% of collected pharmaceuticals were redistributed for humanitarian use). Nevertheless, it was decided that the program remains intact until December 2008 to give enough time to the associations to reorganize their practices.
- Prescriptions and non prescriptions are accepted.
- Pharmaceuticals can only be returned to pharmacies by the public.
- Incineration is done in incineration sites which comply with the European regulations and energy is recover from incineration (more than 7,000 houses were heated and lighted in 2002 with such energy).
- It is estimated that Cyclamed collects about 80% of the amount of unused pharmaceuticals from the public (for pharmaceuticals alone excluding packaging). This figure is based on the estimate that about 8% of pharmaceuticals remain unused. If the amount of unused pharmaceuticals was in fact higher, the collection rate of Cyclamed will drop accordingly. Total pharmaceuticals collected by Cyclamed in 2006 represented about 6% of the total pharmaceuticals produced each year in France (95000 tonnes).
The drop in the volume of total pharmaceuticals collected, including packaging, from 2005 to 2006 is mainly due to the change in the system. In previous year, Cyclamed collected both pharmaceutical products and packaging (even empty) while the system is now only collecting pharmaceutical waste (meaning, empty packaging are no more collected). Packaging represented about 11% of pharmaceutical waste in 2003. Packaging includes: papers and cardboards (notices, cases, etc.), glasses (bottles, etc.), plastics (blisters, tubes, etc.), aluminum (tubes, blisters, etc.).

Unused pharmaceuticals returned to pharmacies are picked up by wholesalers and placed in closed containers at their sites. When containers are full, they are transported to incineration sites for elimination.

Since 2006, pharmacies are required to take back unused pharmaceuticals from the public (legislation does regulate disposal). As this requirement is recent, it will take some time before it is completely applied. Note that no pharmacy has its own program, all use Cyclamed services on a voluntary basis.

Total operating costs are evaluated to 370 euros by 1000kg of unused pharmaceuticals (13,169kg x 370 euros = 4,872,530 euros in 2006). The direct costs including collection, transportation and incineration represent about 3,070,000 euros (63% of the total costs). Remaining costs are for communication and personnel expenses. Charges related to humanitarian donation was about 0.5% of the total costs in 2003.

TV, radio and poster campaigns are used to encourage the population to return unused and expired pharmaceuticals to pharmacies. In addition, comic books explaining the value of Cyclamed are distributed at doctors’ offices.

In average, 77% of French are returning their unwanted pharmaceuticals to pharmacies.

Useful Websites:

Cyclamed
http://www.unpf.org/cyclamed/

Cyclamed website. Provides information about the program and statistics until 2003.

References:

(Downloaded on April 4, 2008).

Investigation of Cyclamed. Details on costs, volume collected from 1995 to 2003, etc.
• Decision for the reorganization of Cyclamed.

• Indicate that the program will remain unchanged for consumers.

Personal Communications:
Claire Sibenaler, Directeur Etudes Cliniques/Environnement, Les Entreprises du Médicaments (LEEM), csibenaler@leem.org
• Provided information and reviewed this section.

A6.3: Portugal Valormed Program
Overview:
• National program.
• Enable consumers to return unused pharmaceuticals to local pharmacies for safe disposal.
• In place since 2001.
• Initiative of stakeholders within the pharmaceutical industry.
• Funding required to administer the program is provided by members of the pharmaceutical associations, including community pharmacies, pharmaceutical manufacturers, pharmaceutical distributors, and chemical and pharmaceutical importers.
• Pharmaceutical companies pay an eco-fee of 0.00504 euro for each package placed on the market.
• Pharmaceutical waste is incinerated.

Statistics:
• Population: 10.6 million.
• Participation of pharmacies: 2,786 (98.5%).
• Diversion rate: 0.054 kg / capita in 2006.
• Increase in collection: 11% from 2006 to 2007.
### Valormed Collection, 2001-2007

<table>
<thead>
<tr>
<th>Year</th>
<th>Total volume (tonne)</th>
<th>Annual increase (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>167</td>
<td>N.A.</td>
</tr>
<tr>
<td>2002</td>
<td>243</td>
<td>45.5</td>
</tr>
<tr>
<td>2003</td>
<td>336</td>
<td>38.3</td>
</tr>
<tr>
<td>2004</td>
<td>393</td>
<td>17.0</td>
</tr>
<tr>
<td>2005</td>
<td>471</td>
<td>19.8</td>
</tr>
<tr>
<td>2006</td>
<td>576</td>
<td>22.3</td>
</tr>
<tr>
<td>2007</td>
<td>638</td>
<td>10.8</td>
</tr>
</tbody>
</table>

Note: Figures include packaging. N.A. means no data available.

### Other Information:
- There is a national program for the collection and treatment of packaging waste (lato sensu) based on EU Directives. However, due to the specificities of pharmaceutical waste the Portuguese Associations of Pharmaceutical Industry, pharmacists and Distributors created a dedicated system for disposing of packaging medicines waste called Valormed.
- By Valormed system, consumers can return unused ad expired pharmaceutical to community pharmacies.
- A logistic system properly approved by Environmental Authorities makes the appropriate treatment of the material.
- 181 pharmaceutical companies (95% of the market) and 98.5% of the pharmacies participate.
- Capture approximately 300 million prescriptions per year.
- Has been criticized in the news for completely incinerating all of the pharmaceutical waste, rather than diverting some of the packaging through recycling or other means.
- Pharmacies are equipped with special collection containers where consumers can place unwanted pharmaceuticals.

### Useful Websites:
- [http://www.valormed.pt](http://www.valormed.pt)
- Valormed website (in Portuguse language).

### References:

### Personal Communications:
Marianne Poulmaire, EFPIA, marianne.poulmaire@efpia.org
- Provided information and reviewed the sections pertinent to Europe.
A6.4: Spain Integrated Waste Management System (SIGRE)

Overview:
- Collection system of waste packaging and leftover medicines.
- Citizens can return medicine wastes to pharmacies across Spain.
- Free service.
- 267 pharmaceutical companies and 20,406 pharmacies participate.
- Pharmacies are equipped with special collection containers where consumers can place unwanted pharmaceuticals.
- SIGRE is a non-profit organization.
- Funded directly by the pharmaceutical industry based on volume of sales
- In place since 2002.
- Started by the Spanish pharmaceutical industry with the collaboration of pharmacies and distributors.
- Collection is taken to a central processing facility for recycling or destruction.

Statistics:
- Population: 45.2 million.
- Participation of pharmacies: 20,406 (100%).
- Diversion rate: 0.058 kg / capita in 2007.
- Increase in collection: 16.5% from 2006 to 2007.

<table>
<thead>
<tr>
<th>SIGRE Collection, 2002-20067</th>
<th>Total volume (tonnes)</th>
<th>Annual increase (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>903</td>
<td>N.A.</td>
</tr>
<tr>
<td>2003</td>
<td>1,371</td>
<td>51.8</td>
</tr>
<tr>
<td>2004</td>
<td>1,656</td>
<td>20.8</td>
</tr>
<tr>
<td>2005</td>
<td>1,989</td>
<td>20.1</td>
</tr>
<tr>
<td>2006</td>
<td>2,300</td>
<td>15.6</td>
</tr>
<tr>
<td>2007</td>
<td>2,624</td>
<td>16.5</td>
</tr>
</tbody>
</table>

Note: volume data includes packaging. N.A. means no data available.

Other Information:
- SIGRE was born as an answer to the European Directive 94/62/CEE on the management of packages whose principles were gathered by Law 11/1997 of Packaging and Packaging Waste.
  - This law contains the mechanisms that must establish the agents who participate in the packaged product commercialization to assure the collection
and management of the packaging waste generated by their products (this norm is of application to all the sectors, including the pharmacy).

- Most pharmacies (99%) subscribed to SIGRE in response to the European Directive.
- Consumers place unwanted pharmaceuticals into identified containers.
- Items are separated into toxic pharmaceuticals, non toxic pharmaceuticals and recyclable material (i.e. paper, plastic, etc...).
- Logos are included on pharmaceutical products to inform consumers that they can return their products to pharmacy.
- Logos appear on approximately 1.3 billion containers per year.
- In 2003, 42% of the public surveyed indicated that they threw their medications into the trash where a 2007 survey found that this number dropped to 8%.
- Since its launch, with the support of Environmental and Health Departments, SIGRE has carried out communication actions to raise awareness of environmental issues involved with the use of medicines (in 2004 SIGRE came out with this slogan: Look after your Health. Look after Nature).
- The growing volume of packaging and leftover medicines managed by SIGRE indicates a positive response to the communication initiative.
- SIGRE communication channels include an e-bulletin which keeps pharmaceutical companies, government agencies and numerous other groups informed of progress and results, and a website which received over 94,948 visits in 2007 (an increase from 12,400 in 2004).

Useful Websites:

SIGRE
www.sigre.es
- SIGRE website.

References:
- Information and statistics.

- Information on funding and logo.

Personal Communications:
Miguel Vega Serrano, Director of International Relations, SIGRE, mvega@sigre.es
• Provided information and reviewed this section.

A6.5: Sweden Apoteket AB Environmental Program

Overview:
• The Swedish retail chain Apoteket AB takes back leftover drugs from the public. In addition, in some areas Apoteket has special agreements to also take care of unused pharmaceuticals from care centers, dentists, hospitals as well as veterinarian products from farmers.64
• The drugs are taken away for incineration in Sweden.
• Apoteket is owned by the state and is non-profit-orientated.65
• Funded by the government (the national pharmacy).
• The annual cost for 2006 was estimated at 1,444,441 euros (1.6 euro/kilo).

Program Statistics:
• Population: 9.1 million.
• Participation of pharmacies: 980 including 900 community pharmacies and 80 hospital pharmacies (100%).
• Diversion rate: 0.1 kg / capita in 2007.
• Increase in collection: 12% from 2006 to 2007.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total volume (tonne)</th>
<th>Annual increase (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>287</td>
<td>N.A.</td>
</tr>
<tr>
<td>2003</td>
<td>910</td>
<td>2.2</td>
</tr>
<tr>
<td>2004</td>
<td>946</td>
<td>4.0</td>
</tr>
<tr>
<td>2005</td>
<td>900</td>
<td>-4.9</td>
</tr>
<tr>
<td>2006</td>
<td>910</td>
<td>1.1</td>
</tr>
<tr>
<td>2007</td>
<td>1019</td>
<td>12.0</td>
</tr>
</tbody>
</table>

Note: Figures also include some package materials. N.A. means no data available.

Other Information:
• Sweden has incorporated the European Union Directive on Waste, which covers pharmaceuticals, into its national legislation.66

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64 This has been written into the business agreement with the state, and Apoteket has regulated it in separate agreements with the municipalities.
65 Since 1970, Apoteket is Sweden’s sole retailer for medicinal products including prescription, over-the-counter medicine, and other health products such as body care and personal hygiene products.
66 Drugs that only contain solutions of salt and nutrients may be discarded into the waste water stream. All other drugs that are classified as non-hazardous waste and that come from households and from most other bodies, such as most healthcare centres and hospitals, are collected by Apoteket. In some parts of the country other operators collect the hospital medical waste.
• Transparent plastic bags, to put leftover drugs, with information on them are always provided at the pharmacies.
• Prescription, over the counter, recreational drugs and needles are collected.
• The LIF has, together with Apoteket AB, on several occasions over the years 2001 to 2007 carried out campaigns in media, at pharmacies and at clinics to raise the general public’s awareness on how to dispose of unused drugs. In those campaigns the federation of Swedish Country Councils, the drug distribution firms, the foundation “KEEP Sweden Tidy Foundation” and the Swedish Water & Wastewater Association all participated.
• For instance, during the Apoteket AB campaign 2006 – "We need your help", folders containing information about how unused drugs can affect the environment and simple solutions to address this were distributed to the general public at pharmacies. Solutions included: 1. Do not buy more drugs than you need 2. Store your drugs in a safe way 3. Return unused drugs to a pharmacy.
• The annual increase in drug collection from 2006 to 2007 has been attributed to the campaign carried out at the end of 2006.
• Apoteket AB and LIF have, on three different occasions (2001, 2004 and 2007), conducted surveys to investigate the level of knowledge in the general public on the disposal of leftover drugs.
• According to these surveys, about 43% of consumers returned their unused drugs to pharmacies in 2007. However, most unused drugs were kept in cupboard/saved (55%) and few were disposed of in garbage (3%). A large percentage (55%) said that they will return drugs kept in cupboard/saved to pharmacies when they are ready to dispose of them. Therefore, in 2007, about 73% of customers with leftover drugs said that they intended to bring them in a pharmacy (43% + (55% x 55%) = 73.25).
• Targets have been set for 2010 so that at least 80% of customers who have surplus drugs should hand them in at a pharmacy.
• Apoteket provides a list of pharmaceuticals recommended by doctors based on efficacy, cost, and impacts on the environment (see Annex 4).
• The drugs are placed in sealed boxes and transported to specially designated incineration areas by Tamro, one of the two drug distribution firms in Sweden. The drugs are burned, under supervision, and the gas is cleaned before being released. The ash is placed at approved refuse tips.
It is estimated that the program collects about 65 to 75% of the amount of unused pharmaceuticals.

**Useful Websites:**

Apoteket  
- Information about the environmental program including statistics.

**References:**

- Information about the environmental program including statistics.

- Information about the program including results from surveys.

- Information about costs and accepted items.

- Information about the Swedish pharmacy chain Apoteket and buying medicine in Sweden.

- Information about the European countries waste management for households and health care centers’ pharmaceuticals.

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Personal Communications
