

The effect of US pharmaceutical drug importation on the Canadian pharmaceutical supply

Marv Shepherd, PhD



M. Shepherd

Drug importation has been debated in the US many times in the past decade, especially with the many US legislative proposals of legalizing patient importation of pharmaceuticals from Canada. The question that has not been addressed in these debates is whether Canada's pharmaceutical supply can meet US demands without being threatened.

Dans les dernières années, l'importation de médicaments a fait l'objet de nombreux débats aux États-Unis, en particulier en regard des nombreuses propositions législatives déposées par les États-Unis concernant la légalisation de l'importation de produits pharmaceutiques du Canada par les patients américains. La question qui n'a pas encore été abordée au cours de ces débats est de savoir si les réserves en matière de produits pharmaceutiques du Canada pourront satisfaire à la demande des États-Unis sans les compromettre.

Abstract

Background and objectives: For over a decade, many US politicians have advocated that the US allow personal and commercial drug importation. Currently, the only entities that can legally import a pharmaceutical in the US are pharmaceutical manufacturers. Our objective was to compare the number of prescriptions dispensed in Canada with the US and estimate the effect US drug importation from Canada will have on the Canadian drug supply.

Methods: A model was created to measure the potential effect on the Canadian drug supply. The model uses the number of US prescriptions being sourced from Canada and the number of prescriptions dispensed in Canada in 2007 as the baseline. The number of days to exhaust the 2007 Canadian drug supply was calculated.

Results: The model found that if 10% of the US

prescriptions were filled from Canadian sources (manufacturer, wholesale or retail), Canada's 2007 drug supply would be exhausted in 224 days. If the demand from the US reached 20%, the 2007 supply would be exhausted in 155 days. The model was redone focusing on brand name drugs, with generic drugs removed. It was found that with a US demand of 10% and 20%, the 2007 Canadian supply for brand name drugs would be exhausted in 268 and 201 days, respectively.

Conclusion: US drug importation is a threat to Canada's drug supply. Even if the US demand were 10%, Canada would need to dramatically increase manufacturing, triple drug importation, or most likely control or halt pharmaceutical shipments to the US. *Can Pharm J* 2010; 143:226-233.

Introduction

Interest in prescription drug importation

The US public and elected officials remain interested in obtaining prescription drugs from pharmacies outside the US.¹ President Obama's support of this continues, as indicated by his recent budget submitted to Congress that included \$5 million for the Food and Drug Administration (FDA) to develop policies for Americans to import drugs.²⁻⁴ In January 2010, another drug importation bill

(McCain-Dorgan) was introduced in the Senate, but due to the intense debate in US Congress on health care reform this bill was a political threat and failed to get the 60 votes needed to pass (51-48 vote).^{5,6}

Despite the fact that the number of US residents purchasing drugs from Canada has declined since 2006, the purchase of prescription drugs from other countries continues.⁷ No research exists that documents the extent of drug importation, but

there have been reports from governmental and private agencies, along with a plethora of newspaper and magazine articles, indicating that drug importation continues.^{8,9} Some of these publications have focused on the dangers of drug importation and some have provided a consumer's guide for identifying suspect and fraudulent Internet sites, while still others have offered helpful tips to consumers on how to buy prescription drugs using the Internet.¹⁰⁻¹²

The price factor

The main reasons for the US public's interest in prescription drug importation are lower prices and avoidance of regulatory control. In most instances, prescription drugs are cheaper coming from other countries. The difference in price between the US and other countries ranges from 20% to >100%, depending on the country and the product. In Canada, brand name drugs are on average 57% less than US brand name products and range from 40% to 80% less.¹³ Generic drugs, however, are 115% higher in Canada.¹³ Price is truly the driving force for the US public demand for Canadian drugs. However, the rising value of the Canadian dollar compared to the US dollar has decreased the demand for Canadian pharmaceuticals.

No prescription required

Although not true in Canada and the US, many Internet pharmacies do not require a physician visit or a prescription for pharmaceutical products even for many narcotic analgesics and psychotropic drugs.^{14,15} Some Internet sites require the purchaser to complete a health questionnaire before the drug is shipped. With no prescription needed, consumers can avoid paying physician fees.

Current US prescription drug importation

The US pharmaceutical distribution system is referred to as a "closed distribution system"; that is, the only entities that can import pharmaceuticals legally are drug manufacturers. As a result, the monitoring and information on the extent of personal drug importation by US residents is practically nonexistent. US Customs and Border Protection (CBP) officials only periodically monitor the extent of drug importation. CBP and the FDA do not have the resources or the people necessary to monitor thousands of drug packages arriving daily at the various US international mail facilities.

IMS Health reported that prescription drug sales through Canadian Internet sites were \$211 million in 2006.¹⁶ In 2004, the estimated Canadian prescription drug sales to US residents ranged

from \$800 million to \$1 billion, falling to less than \$400 million in 2005.¹⁷ The decline in Internet prescription drug sales has affected Canadian operations, with both a reduction in the number of Canadian Internet pharmacies and the number of their employees.¹⁸ The number of Internet pharmacies located in Manitoba fell from 70 to 32 between 2004 and 2006, and in August 2007 it was reported that Canadian Internet pharmacy sites had decreased from "about 50 to 25 with about half remaining in Manitoba."¹⁹

Proposed types of legal drug importation

Drug importation is a very complex issue and thus it is difficult to predict what type the US would adopt. However, it is likely that importation would fall within 2 broad categories: personal drug importation and commercial drug importation.

Personal drug importation

Based on the Dorgan bill,⁵ personal drug importation occurs when a US resident purchases prescription drug products from a designated or approved pharmacy located in Canada. The US resident could either travel to the country to purchase the product, or could purchase the drug product via mail or an Internet pharmacy website. Today, personal drug importation is illegal in the US. However, the FDA has exercised enforcement discretion to allow individuals to import drugs as long as the product does not represent an unreasonable risk, is for personal use only and comes in no more than a 90-day supply. Other variances include: the drug product must be for a serious condition and the product not available in the US, or the patient started the therapy in another country and is returning.

Commercial drug importation

Commercial drug importation would allow commercial entities such as US wholesalers, distributors, retail pharmacies or other commercial pharmacy entities to purchase drug products directly from authorized non-US pharmaceutical sources.

Knowledge into practice

- The US continues to have an interest in importing pharmaceuticals from Canada and the driving force behind the demand is US drug prices.
- The legalization of commercial and personal drug importation opens a host of drug importation methods.
- Prescription drug use on a per capita basis is similar between Canada and the US.
- Due to the population differences between Canada and the US, it would only take a small demand from the US to have a dramatic effect on Canada's drug supply.
- Pharmacists should lobby the Canadian government to monitor the country's imports and exports of drugs more closely.

Financial disclosure:

This research study was supported by a grant from the Pharmaceutical Research Manufacturers of America, Washington, DC.

La connaissance en pratique

- Les États-Unis continuent de s'intéresser à l'importation de produits pharmaceutiques du Canada, et la raison qui les motive est le prix des médicaments aux États-Unis.
- La légalisation de l'importation de médicaments commerciaux et à usage personnel ouvre la voie à toutes sortes de méthodes d'importation de médicaments.
- La consommation de médicaments sur ordonnance par habitant est similaire au Canada et aux États-Unis.
- En raison des différences de population entre le Canada et les États-Unis, il ne suffirait que d'une très faible demande de la part des États-Unis pour qu'il y ait une incidence draconienne sur les réserves de médicaments du Canada.
- Les pharmaciens se doivent de faire pression auprès du gouvernement canadien pour qu'il surveille plus étroitement les importations et les exportations de médicaments du pays.

These authorized drug exporters would sell drug products to licensed or authorized US importers. Both exporters and importers would probably be registered with the US Department of Health and Human Services, and presumably with the FDA. The onus of assuring drug quality, including storage and handling, would be the responsibility of both the authorized exporter and importer.

One element lacking in the discussion about US drug importation is the effect drug importation will have on countries providing the pharmaceuticals. If the exporters can sell drugs to US customers at a higher margin than their domestic market,

then adverse effects such as drug shortages are foreseeable for the supplier country. This research assesses the possible demand and effect US drug importation will have on the Canadian pharmaceutical supply.

Methods

Data sources, commodity/industry codes

The following is a list of databases used in conducting this research. The study uses the North American Industry Classification System (NAICS) codes and the Harmonized Schedule (HS) product codes for classifying the drug imports, exports and manufactured products.

North American Industry Classification System

The NAICS is a consistent system for economic analysis across the 3 North American Free Trade Agreement partners: Canada, Mexico and the US. NAICS is built on a production-oriented or supply-based conceptual framework in that establishments are grouped into industries according to similarity in the processes used to produce goods or services.²⁰ The primary NAICS code used for the pharmaceutical industry in this study was code 3254.

Harmonized schedule

The HS is an international classification system for import and export products that is standardized

between countries at a 4- to 6-digit level. Commodity classifications in the US are provided in 2 publications, one for exports and one for imports:

- Schedule B — Export statistics are initially collected and compiled in terms of approximately 8000 commodity classifications in a publication of the US Census Bureau that is based on the HS.²¹
- Harmonized tariff schedule — Import statistics are initially collected and compiled in terms of about 14,000 commodity classifications. The codes are administered by the US International Trade Commission (USITC). This system is based on the HS.²²

Due to the proprietary nature of the import and export information, HS codes represent categorizations of products. The 4-digit HS code most frequently used in this report is HS 3004. The code is defined as: medicaments consisting of mixed or unmixed products for therapeutic or prophylactic uses, put up in measured doses (including those in transdermal administration systems) or in forms or packaging for retail sales.²³

This designation was used because it reflects drug products for consumer use, rather than using the overall pharmaceuticals and medicines product code that includes bulk pharmaceuticals. The Canadian Annual Survey of Manufacturers (ASM) has a category for Canada's Pharmaceutical and Medicine Manufacturing firms (NAICS 3254).²⁴ This source was used to obtain the dollar value of Canadian manufactured pharmaceuticals.

In addition, Canadian pharmaceutical manufacturing statistics were obtained from Canada's Business and Consumer site.²⁵ The primary sources for US data were the Foreign Trade Division of the US Census Bureau²⁶ and the United States International Trade Commission.²⁷

Number of prescriptions dispensed

The primary unit of analysis is the number of prescriptions dispensed by community pharmacies. It was assumed that physician prescribing behaviours are similar for Canada and the US. In 2006, the number of prescriptions dispensed per person in Canada was 13, whereas in the US it was 12.3.²⁸ No documentation could be found that compares drug quantities per prescription (number of capsules or tablets per prescription) between Canada and the US.

Results

Comparison of top 10 drug products

To determine if drugs dispensed in Canada are comparable to the US, the top 10 drugs dispensed for 2007 were compared (Table 1). The top 2 drugs

For information on current drug shortages in Canada, see p. 164 of the July/August issue of CPJ (Vol. 143, No. 4).

TABLE 1 Top 10 prescription drugs dispensed in Canada and the US, 2007

Canada ²⁹			United States ³⁰		
Rank	Drug name (generic name)	Total prescriptions	Rank	Drug name	Total prescriptions
1	Lipitor (atorvastatin)	13,630,000	1	Hydrocodone/acetaminophen	119,000,000
2	Synthroid (levothyroxine)	10,389,000	2	Lisinopril	70,500,000
3	Norvasc (amlodipine)	6,804,000	3	Lipitor (atorvastatin)	65,100,000
4	Pantoloc (pantoprazole)	5,054,000	4	Levothyroxine	55,300,000
5	Crestor (rosuvastatin)	4,587,000	5	Amoxicillin	53,200,000
6	Altace (ramipril)	4,188,000	6	Hydrochlorothiazide	47,800,000
7	ratio-Salbutamol HFA (salbutamol)	4,178,000	7	Simvastatin	47,700,000
8	Novo-Venlafaxine (venlafaxine)	3,932,000	8	Azithromycin	46,300,000
9	Apo-Furosemide (furosemide)	3,676,000	9	Atenolol	44,200,000
10	Pariet (rabeprazole)	3,558,000	10	Furosemide	43,800,000

for Canada were atorvastatin and levothyroxine. Atorvastatin and levothyroxine had rankings of third and fourth in the US. Both countries had 2 cholesterol-lowering agents in the top 10. Canada listed atorvastatin and rosuvastatin, whereas the US listed atorvastatin and simvastatin. Both countries had an angiotensin-converting enzyme inhibitor in the top 10 (Canada — ramipril, US — lisinopril). Canada listed 2 proton pump inhibitors, whereas none were listed for the US. Canada's top 10 included 1 diuretic (furosemide), whereas the US included 2 diuretics (furosemide and hydrochlorothiazide). Canada had 1 antidepressant, venlafaxine, while the US had none. The US had 2 antibiotics in the top 10 (amoxicillin and azithromycin); Canada had none.

With the exception of antibiotics, therapeutic categories represented were similar. The major difference between Canada and the US is that 9 of the top 10 drugs for the US were generic drug products, whereas Canada only had 3. This is important because multi-source generic products are excluded from the pending US importation legislation. It is Canadian brand name drugs that are vulnerable to US demand.

Prescriptions dispensed per year

Table 2 presents the total number of prescriptions dispensed per year from 1998 through 2007 for Canada and the US. In examining these results, it can be seen that in 2007, Canada dispensed almost 449 million prescriptions, whereas the US dis-

pensed 3.5 billion, an amount more than 8 times larger ($3.515/0.448780 = 8.5$). If one excludes US mail order prescriptions, the US market is 7.9 times larger than the Canadian market. When considering population size difference, these results were expected; the US population ($301,621,157$)³¹ is 9.1 times larger than Canada's ($32,976,000$).³²

Model for all drugs

A model was developed to estimate the number of days before the 2007 Canadian drug supply would be exhausted, controlling for the percentage of US prescriptions filled in Canada. An additional 10% (representing normal on-hand inventory quantities) was added to the 448,780,000 prescriptions dispensed in Canada to represent the estimated annual supply: $493,658,000 = (10\% \times 448,780,000) + 448,780,000$.

The mathematical model to estimate the number of days to exhaust the drug supply is as follows:

$$\frac{493,658,000 \text{ Rxs}}{\left\{ \begin{array}{l} \text{Number of} \\ \text{US Rxs} \\ \text{dispensed daily} \\ (9,775,342 \text{ Rxs}) \end{array} \right\} \times \left\{ \begin{array}{l} \text{Proportion} \\ \text{of US Rxs} \\ \text{purchased} \\ \text{from Canada} \end{array} \right\} + \left\{ \begin{array}{l} \text{Number} \\ \text{of Canadian} \\ \text{Rxs dispensed} \\ \text{daily} \end{array} \right\}} = \text{Days' supply}$$

US drug importation effect on Canadian drug supply
A total of 1,229,534 million prescriptions per day ($448,780,000/365$) were dispensed in Canada versus 9,775,342 prescriptions in the US (3.568 billion/ 365 days) by community pharmacies in

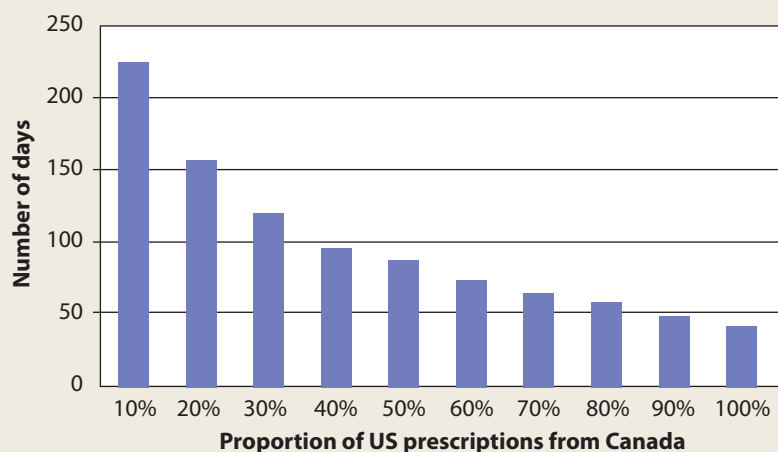
TABLE 2 Trend in number of prescriptions dispensed per year, US and Canada, 1998-2007

Year	Canada	United States ³⁵	
	Prescriptions dispensed from community pharmacies	Prescriptions dispensed from community pharmacies* and mail service pharmacies	Prescriptions dispensed from community pharmacies (excludes mail service)
1998	254,187,000 ³³	2,481,000,000	2,358,000,000
1999	271,613,000 ³³	2,707,000,000	2,573,000,000
2000	290,659,000 ³³	2,865,000,000	2,719,000,000
2001	312,572,000 ³³	3,009,000,000	2,848,000,000
2002	334,966,000 ³³	3,301,300,000	3,131,000,000
2003	361,442,000 ³³	3,361,100,000	3,177,000,000
2004	381,590,000 ³³	3,434,900,000	3,228,000,000
2005	396,866,000 ³⁴	3,545,100,000	3,322,000,000
2006	422,594,000 ³⁴	3,706,700,000	3,474,000,000
2007	448,780,000 ²⁹	3,810,400,000 ³⁶	3,568,000,000

* Community pharmacies include independent pharmacies, traditional chain drugstores, supermarket pharmacies and mass merchandiser pharmacies.

2007. Dividing the total number of Canadian prescriptions dispensed in 2007 plus the 10% by the daily number of prescriptions filled in the US, the results show that if the supply of drugs in Canada did not change and US residents were to have all their prescriptions filled in Canada, the Canadian annual drug supply would be exhausted in 50.50 days (493,658,000 / 9,775,345). However, this number does *not* include the Canadian need, which is 1,229,534 prescriptions per day. If the US and Canadian daily needs are combined, the 2007 Canadian drug supply would be exhausted in approximately 45 days: $493,658,000 / (1,230,000 + 9,775,342) = 44.86$ days. Of course, this is unre-

FIGURE 1 Projected number of days to exhaust the 2007 Canadian drug supply, controlling for proportion of US prescriptions sourced from Canada



alistic. Not all US prescriptions would be sourced from Canada. However, it does dramatically show the difference in market sizes between Canada and the US.

Figure 1 presents the results of the model controlling for the proportion of US prescriptions sourced from Canada. If 10% of US prescriptions were sourced from Canada, the 2007 Canadian drug supply would be exhausted in 224 days. The Canadian drug supply would be shortened by 141 days. If 20% of US prescriptions were supplied by Canada, the drug supply would last approximately 155 days. Obviously, this model does not take into account additional drug supplies from either Canadian manufacturers or by Canada importing additional supplies. However, it does show that the Canadian drug supply would have to more than *double* (365 days/154 days = 2.35) to meet a 20% demand from the US.

Model for brand name drugs only

As stated earlier, the US legislative proposals have focused on brand name drugs, not generic drug products. The reason behind this is that Canadian brand name drug products are on average 51% less expensive compared to the US and the price for Canadian generic drugs is on average 115% greater than in the US.¹³ Furthermore, in 2007, generic drug use in the US was 67.3%,³⁶ whereas in Canada it was 48%.²⁹ A model similar to the one presented above was constructed for brand name drugs.

In 2007, IMS Health reported that 67.3% of the US prescriptions were filled with a generic drug. Thus, the estimated total number of brand name prescriptions dispensed in 2007 in the US was 1.1667 billion. The number of brand name prescriptions dispensed daily in the US was 3.1965 million (1.1667 billion/365 days).

IMS Health Canada reported that 48% of these prescriptions were filled with a generic drug. Thus, a total of 233,365,600 prescriptions were filled with a brand name product. The number of brand name prescriptions dispensed per day was 639,935 (233,365,600/365). An additional 10% was added to the supply since not all drugs were dispensed in 2007. The result is a supply of 256.7 million brand name prescriptions. Figure 2 presents the results of the model to estimate the number of days to exhaust the 2007 Canadian brand name drug supply controlling for US demand.

If 20% of US brand name drugs came from Canada, the 2007 Canadian brand name drug supply would be exhausted in 201 days. To meet this US demand, Canada would need to nearly double its supply of brand name products.

Discussion

The study supports that the risks are high for the Canadian health care system if the US were to aggressively import drugs from Canada. To meet the demand, Canada would need to dramatically increase drug manufacturing output and/or increase its own drug imports. Otherwise shortages might occur; the threat to the Canadian health care system is real. The most likely scenario is that Canadian officials would put a halt to exporting drugs to the US, if this presented a threat to Canadians.

In 2008, Canadian-imported pharmaceuticals classified as “put up in measured doses or packed for retail use” (HS 3004) were valued at C\$8.31 billion.³⁷ These products came from more than 70 different countries, with the US being the largest supplier (\$1.998 billion, 24%). Figure 3 depicts a 200% growth in Canada’s drug importation since 1998 and a decline in proportion of drugs from the US. The reality is that the US will not be importing many additional Canadian-made drugs. The vast majority will most likely be manufactured outside of Canada.

Based on the latest manufacturing statistics (2007), Canadian manufacturing shipments for pharmaceuticals (NAICS Code 3254) were C\$8.284 billion.³⁸ However, Canada exported C\$6.505 billion (78.52%) of these drugs.³⁸ This leaves C\$1.779 billion for the domestic market. Canada imported C\$12.334 billion of pharmaceuticals in 2007. Out of these drug imports, Canada exported C\$296,692. Thus, it appears that Canadian drug manufacturing output would need to increase dramatically to meet the importation demand from the US.

Many US commercial entities will capitalize on the opportunity to import pharmaceuticals. These include not only US wholesalers and large chain pharmacy operations, but health insurers and pharmacy benefit management (PBM) firms with mail service pharmacies. PBMs will probably expand their pharmacy networks and may add Canadian community pharmacies, especially in Canadian border cities. Mail service pharmacies may expand and open up operations in Canada, or buy/merge with Canadian-based mail service pharmacies. In addition, US chain store pharmacy operations may move their product sourcing units and warehouse sites to Canada. Undoubtedly, Canada’s drug distribution infrastructure system (warehousing, transportation, product relabelling/packaging, protocol for recalls, etc.) would need to expand to handle the anticipated demand and volume

FIGURE 2 Projected number of days to exhaust the 2007 Canadian brand name drug supply, controlling for proportion of US brand name prescriptions purchased in Canada

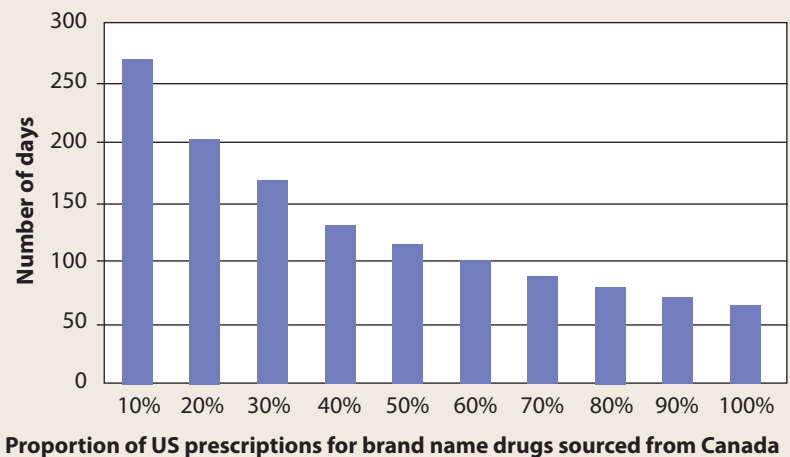
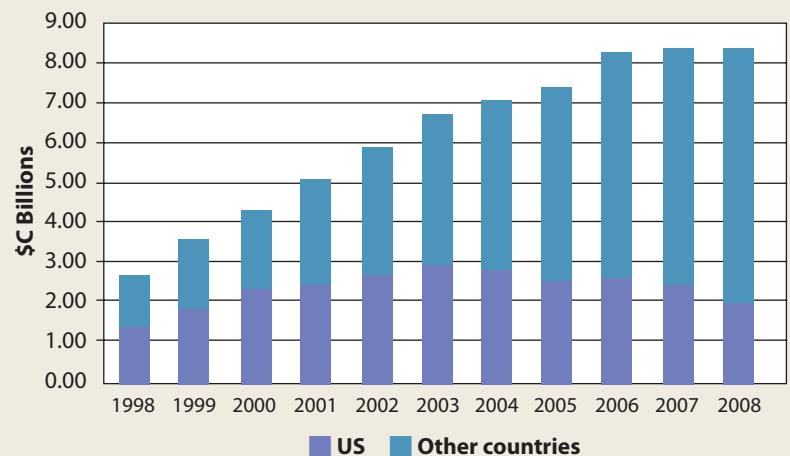


FIGURE 3 Trend in Canadian drug imports from the US and other countries for drugs in measured dosage forms or packaged for retail use (HS3004) 1998–2008³⁷



If Canadian drug suppliers receive higher product margins in US markets (commercial and personal markets) than in Canada, pressures on the Canadian drug supply will be higher and shortages may occur.

Canada’s need for additional pharmaceuticals would probably stimulate drug suppliers/providers from across the world. Some providers might be of high quality, while others might be questionable. The risk of obtaining a substandard or counterfeit drug product would be higher for both Canadian and US residents.

Canadian interest in limiting or banning prescription drugs sales to US residents is not new. In 2004 and 2005, Canadians were talking about banning the sales of drugs to US residents.³⁹⁻⁴¹ Even the Canadian health minister at that time, Ujjal

Dosanjh, stated that “Canada cannot be the drug-store for the United States of America.”⁴²

Conclusion

US drug importation from Canada is a threat to the Canadian health care system. It would increase the risks for drug shortages and it could be product-specific. If 20% of the US prescription drug demand were sourced from Canada, the brand name drug supply (using 2007 data) would be exhausted in just over 6 months. Canada needs to monitor the situation very closely. Canada would need to dramatically increase drug production, import more pharmaceuticals, or cut back or stop the exporting of pharmaceuticals to the US, especially if shortages became a threat to Canadians. ■

Marv Shepherd is Director of the Center for Pharmacoeconomic Studies in the College of Pharmacy at the University of Texas at Austin. Contact: marvshepherd@mail.utexas.edu.

References

1. US Food and Drug Administration. FDA says consumers continue to buy risky drugs online. Nov. 1, 2007. Available: www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/2007/ucm109018.htm (accessed March 30, 2010).
2. Reuters. Obama's budget supports drug import plan. Feb. 26, 2009. Available: www.reuters.com/article/domesticNews/idUSTRE51P53920090226 (accessed May 20, 2009).
3. Randall T. Drug imports may become legal under Obama and McCain plans. Bloomberg Press. March 4, 2009. Available: www.bloomberg.com/apps/news?pid=20601082&sid=aOZTOmhTQHQU (accessed May 20, 2009).
4. Drug importation on tap for US FDA in 2010 budget. *Scrip World Pharmaceutical News*. May 15, 2009;3445:23.
5. Senate Bill 525. A bill to amend the Federal Food, Drug, and Cosmetic Act with respect to the importation of prescription drugs, and for other purposes (Sen. Dorgan). Available: www.thomas.gov/cgi-bin/query/z?c111:S.525 (accessed July 27, 2006).
6. Levy N, Hook J. Senate rejects importation of prescription drugs. *LA Times*. Dec. 15, 2009. Available: www.latimes.com/news/nation-and-world/la-naw-senate-drugs-2009dec16,0,44463000.story (accessed Dec. 16, 2009).
7. Lopes G. Illicit online drug sales rampant. *The Washington Times*. May 17, 2007. Available: <http://washingtontimes.com> (accessed Dec. 16, 2009).
8. Monitor M. Brandjacking Big Pharma. Available: http://markmonitor.com/cta/bji-summer_2008p/thankyou.html (accessed August 29, 2008).
9. Meadows M. Use caution when buying medications online. US FDA. Available: www.fda.gov/fdac/features/2005/105_buy.html (accessed August 28, 2008).
10. Kesselheim AS, Choudhry NK. The international pharmaceutical market as a source of low cost prescription drugs for US patients. *Ann Int Med* 2008;148:614-9.
11. US Food and Drug Administration. FDA warns companies importing and marketing drugs over the Internet that fraudulently claim to prevent and treat STDs. March 6, 2008. Available: www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/2008/ucm116864.htm (accessed August 27, 2008).
12. US Food and Drug Administration. FDA alerts consumers of unsafe misrepresented drugs purchased over the Internet. Feb. 16, 2007. Available: www.fda.gov/bbs/topics/NEWS/2007/NEW01564.html (accessed Aug. 29, 2008).
13. Skinner B, Rovere M. Seniors and drug prices in Canada and the United States, 2008 edition. *Fraser Alert*. August 18, 2008. Fraser Institute. Available: www.fraserinstitute.org/research-news/display.aspx?id=13424 (accessed July 20, 2010).
14. National Center on Addiction and Substance Abuse. You've got drugs! V: Prescription drug pushers on the Internet. CASA white paper. July 9, 2008. Available: www.casacolumbia.org/absolutem/templates/PressReleases.aspx?articleid=531&zoneid=66 (accessed Nov. 12, 2008).
15. Eckholm E. Abuses are found in online sales of medication. *New York Times*. July 9, 2008. Available: www.nytimes.com/2008/07/09/health/09drugs.html?_r=2&scp=1&sq=online%20medication&st=cse&oref=slogin&oref=slogin (accessed Nov. 11, 2008).
16. Kaiser Network. Fewer US residents purchase prescription drugs from Canada, in part because of Medicare drug benefit. Available: www.kaisernetwork.org/daily_reports/rep_index.cfm?hint=3&DR_ID=48654 (accessed August 24, 2008).
17. Kaiser Network. Prescription drug sales to US residents from Canadian pharmacies have decreased by half since 2004, group says. Available: www.kaisernetwork.org/daily_reports/rep_index.cfm?hint=3&DR_ID=45179 (accessed August 28, 2008).
18. Kraus C. Kinks in Canada drug pipeline. *New York Time*. April 6, 2006. Available: www.nytimes.com/2006/04/06/business/worldbusiness/06canada.html (accessed August 28, 2008).
19. Strong loonie a poison pill for Internet pharmacies. *Winnipeg Free Press*. August 7, 2007. Available: www.winnipegfreepress.com/local/v-printfriendly/story/4018190p-4631039c.html (accessed August 8, 2008).
20. International Trade Data and Associates. Trade data basics. Available: http://trade.gov/mas/ian/referenceinfo/tg_ian_001872.asp (accessed July 29, 2010).
21. US Census Bureau. Schedule B: statistical classification of domestic and foreign commodities exported from the United States. Available: www.census.gov/foreign-trade/schedules/b/index.html (accessed March 30, 2010).
22. United States International Trade Commission. Tariff Affairs Products: Harmonized Tariff Schedule. Available: www.usitc.gov/tata/index.htm (accessed March 30, 2010).
23. United States International Trade Commission. Harmonized Tariff Schedule of the United States (2008) — Supplement 1. Chapter 30, Pharmaceutical Products, pp. 30-4. Avail-

- able: www.usitc.gov/tata/hts/bychapter/_0810.htm (accessed July 27, 2010).
24. Industry Canada. Canadian Industry Statistics (CIS). Manufacturing production: pharmaceutical and medicine manufacturing (NAICS 3254). Available: www.ic.gc.ca/cis-sic/cis-sic.nsf/IDE/cis-sic3254prde.html (accessed August 6, 2010).
25. Industry Canada. Life Sciences Gateway. Canadian Pharmaceutical Industry Profile. Available: www.ic.gc.ca/eic/site/lsg-pdsv.nsf/eng/h_hn00021.html (accessed August 5, 2010).
26. US Census Bureau. USA Trade Online. Available: www.usa-tradeonline.gov/ (accessed August 6, 2010).
27. United States International Trade Commission. Exports and Imports by NAICS Commodity. Available: http://dataweb.usitc.gov/scripts/user_set.asp.
28. Skinner B, Rovere M. Cost burden of prescription drug spending. In: *Fraser alert: market solutions to public policy problems*. The Fraser Institute. Nov. 2007. Available: www.fraserinstitute.org/commerce.web/product_files/costburden2.pdf (accessed August 2, 2008).
29. IMS Health Canada. Canadian prescription drug sales experience slowest growth in a decade with a 6.2% increase. March 26, 2008. Available: www.imshealthcanada.com/web/content/0,3148,77303623_63872702_77770096_83605640,00.html (accessed Sept. 22, 2008).
30. IMS Health. 2007 Top-line industry data. Available: www.imshealth.com/portal/site/imshealth/menuitem.a953aef4d73d1ecd88f611019418c22a/?vgnnextoid=bb967900b55a5110VgnVCM10000071812ca2RCRD&vgnnextfmt=default (accessed Sept. 22, 2008)
31. US Census Bureau. Population finder. Available: <http://factfinder.census.gov/servlet/SAFFPopulation> (accessed Sept. 9, 2008).
32. Statistics Canada. Population by sex and age group, by province and territory. Available: www40.statcan.ca/l01/cst01/demo31a.htm (accessed Sept. 9, 2008).
33. IMS Health Canada. Growth in retail prescriptions slows in 2004. Available: www.imshealthcanada.com/vgn/images/portal/cit_40000873/0/35/78325956retail_prescription_growth_slows.pdf (accessed August 12, 2008).
34. IMS Health Canada. Canadian Internet pharmacy sales to the United States down 50% in 2006. March 19, 2007. Available: www.imshealthcanada.com/web/content/0,3148,77303623_63872702_77770096_80533284,00.html (accessed July 27, 2007).
35. National Association of Chain Drug Stores and IMS Health. Available: www.nacds.org/wmspage.cfm?parm1=506 (accessed Sept. 12, 2008).
36. IMS Health. IMS Health reports US prescription sales grew 3.8 percent in 2007 to \$286.5 billion. Available: www.imshealth.com/portal/site/imshealth (accessed April 24, 2008).
37. Industry Canada. Trade data online: trade by product. Available: http://strategis.ic.gc.ca/sc_mrkti/tdst/tdo/tdo.php#tag (accessed March 30, 2010).
38. Industry Canada. Trade data online (TDO). Trade by product (HS codes). Available: www.ic.gc.ca/sc_mrkti/tdst/tdo/tdo.php#tag (accessed July 3, 2010).
39. Hollis A, Anis A. Rx for Canada: close the Internet pharmacies. CD Howe Commentary 205;Oct. 2004. Available: www.cdhowe.org/pdf/commentary_205.pdf (accessed March 30, 2010).
40. Canadian pharma wants export ban bill reinstated. *Scrip World Pharmaceutical News*. Dec. 9, 2005;3114:14.
41. Canada floats first bill to limit drug exports to US. *Scrip World Pharmaceutical News*. Dec. 7, 2005;3113:19.
42. Daily News Central. Canada may restrict bulk prescription-drug exports. June 29, 2005. Available: <http://health.dailynews-central.com/content/view/1163/0> (accessed July 27, 2010).