

APPENDIX:
ASSESSING CANADA'S DRUG SHORTAGE PROBLEM

Table A1: Fifty Most Often Repeated “Oral” Drug Product Shortages (35 ingredients), Canada, 2013–16

Drug Name	Dosage	Therapeutic Class	# of Shortages
Telmisartan	80 mg	CVS	17
Atenolol	50 mg	CVS	14
Sulfasalazine	500 mg	GI	12
Atenolol	100 mg	CVS	11
Methylphenidate Hydrochloride	20 mg	CNS	10
Amoxicillin Trihydrate	400 mg	Anti-infective	8
Cephalexin	500 mg	Anti-infective	8
Diltiazem Hydrochloride	180 mg	CVS	8
Metoprolol Tartrate	100 mg	CVS	8
Amlodipine Besylate	5 mg	CVS	7
Losartan Potassium	100 mg	CVS	7
Naproxen	500 mg	MSK	7
Acetaminophen	300 mg	CNS	6
Amoxicillin Trihydrate	250 mg	Anti-infective	6
Candesartan Cilexetil	16 mg	CVS	6
Clobazam	10 mg	CNS	6
Codeine Phosphate	10 mg	CNS	6
Diltiazem Hydrochloride	300 mg	CVS	6
Fluconazole	150 mg	Anti-infective	6
Fosinopril Sodium	10 mg	CVS	6
Irbesartan	300 mg	CVS	6
Metformin Hydrochloride	850 mg	Metabolic	6
Methylphenidate Hydrochloride	10 mg	CNS	6
Pregabalin	25 mg	CNS	6
Tamoxifen Citrate	20 mg	Anti-neoplastic	6
Valsartan	320 mg	CVS	6
Amoxicillin Trihydrate	200 mg	Anti-infective	5
Atenolol	25 mg	CVS	5

Table A1: continued

Drug Name	Dosage	Therapeutic Class	# of Shortages
Azithromycin	250 mg	Anti-infective	5
Candesartan Cilexetil	32 mg	CVS	5
Cefprozil	250 mg	Anti-infective	5
Ciprofloxacin Hydrochloride	750 mg	Anti-infective	5
Clindamycin Hydrochloride	300 mg	Anti-infective	5
Diltiazem Hydrochloride	120 mg	CVS	5
Diltiazem Hydrochloride	240 mg	CVS	5
Fluconazole	50 mg	Anti-infective	5
Hydrochlorothiazide	12.5 mg	CVS	5
Hydrochlorothiazide	25 mg	CVS	5
Losartan Potassium	50 mg	CVS	5
Metformin Hydrochloride	500 mg	Metabolic	5
Metoprolol Tartrate	200 mg	CVS	5
Naratriptan Hydrochloride	2.5 mg	CNS	5
Nitrofurantoin	50 mg	Anti-infective	5
Oxycodone Hydrochloride	5 mg	CNS	5
Ranitidine Hydrochloride	150 mg	GI	5
Spirolactone	100 mg	CVS	5
Tramadol Hydrochloride	300 mg	CNS	5
Trazodone Hydrochloride	50 mg	CNS	5
Valsartan	160 mg	CVS	5
Venlafaxine Hydrochloride	150 mg	CNS	5

Note: Period covered is April 1, 2013–March 31, 2016.

Source: www.drugshortages.ca, launched in 2012.

Table A2: Most Often Repeated “Injectables” Drug Product Shortages (40 ingredients), Canada, 2013–16

Drug Name	Dosage	Therapeutic Class	# of Shortages
Ondansetron Hydrochloride Dihydrate	2 mg	CNS	10
Dextrose	500 mg	Solutions	9
Sodium Chloride	9 mg	Solutions	9
Cefazolin Sodium	10 g	Anti-infective	8
Levofloxacin	5 mg	Anti-infective	8
Methotrexate Sodium	25 mg	Anti-neoplastic	8
Ranitidine Hydrochloride	25 mg	GI	8
Cefazolin Sodium	1 g	Anti-infective	7
Midazolam	5 mg	CNS	7
Diazepam	5 mg	CNS	6
Furosemide	10 mg	CVS	6
Scopolamine Hydrobromide	0.4 mg	CNS	6
Aminophylline	25 mg	Respiratory	5
Ceftriaxone Sodium	1 g	Anti-infective	5
Ceftriaxone Sodium	10 g	Anti-infective	5
Dextrose	200 mg	Solutions	5
Heparin Sodium	10000 units	Antithrombotic	5
Midazolam	1 mg	CNS	5
Oxytocin	10 U	Hormones	5
Scopolamine Hydrobromide	0.6 mg	CNS	5
Sodium Chloride	234 mg	Solutions	5
Atropine Sulfate	0.1 mg	CNS	4
Dextrose	50 mg	Solutions	4
Dobutamine Hydrochloride	12.5 mg	CVS	4
Epinephrine	1 mg	CVS	4
Epirubicin Hydrochloride	2 mg	Antineoplastic	4
Haloperidol Decanoate	100 mg	CNS	4
Imipenem	500 mg	Anti-infective	4

Table A2: continued

Drug Name	Dosage	Therapeutic Class	# of Shortages
Labetalol Hydrochloride	5 mg	CVS	4
Magnesium Sulfate	500 mg	Solutions	4
Piperacillin Sodium	4 g	Anti-infective	4
Sumatriptan Succinate	12 mg	CNS	4
Tobramycin Sulfate	40 mg	Anti-infective	4
Vancomycin Hydrochloride	500 mg	Anti-infective	4
Zinc Sulfate	1 mg	Solutions	4
Ceftriaxone Sodium	2 g	Anti-infective	3
Deferoxamine Mesylate	500 mg	Other	3
Epinephrine	0.15 mg	CVS	3
Fentanyl Citrate	50 mcg	Anesthetic	3
Flumazenil	0.1 mg	Other	3
Hydromorphone Hydrochloride	10 mg	CNS	3
Ketamine Hydrochloride	10 mg	Anesthetic	3
Ketorolac Tromethamine	30 mg	MSK	3
Methylene Blue	10 mg	Other	3
Methylprednisolone	40 mg	Hormones	3
Piperacillin Sodium	2 g	Anti-infective	3
Ranitidine Hydrochloride	15 mg	GI	3
Ropivacaine Hydrochloride	10 mg	Anesthetic	3
Sodium Bicarbonate	84 mg	Solutions	3
Vancomycin Hydrochloride	1000 mg	Anti-infective	3

* There are 19 other drugs with 3 shortages.

Note: Period covered is April 1, 2013–March 31, 2016.

Source: www.drugshortages.ca, launched in 2012.

Table A3: Oral Drug/Dosage Formats and Repeated Shortages by Therapeutic Class, Canada, 2013–16

Therapeutic Class	Year (# of Repeated Shortages)				Total	Drug/Dosage Formats
	2013*	2014	2015	2016**		
Gastrointestinal	1	2	14	5	22	3
Cardiovascular	1	85	58	9	153	20
Metabolic	0	3	9	0	12	2
Hormone	0	4	2	5	11	2
Anti-infective	0	11	30	8	49	8
Hormone Antagonist	0	1	4	1	6	1
CNS	1	18	38	19	76	13
Other	0	4	3	0	7	1

* April 1–December 31. ** January 1–March 31
Source: www.drugshortages.ca, launched in 2012.

Table A4: Injectable Drug/Dosage Formats and Repeated Shortages by Therapeutic Class, Canada, 2013–16

Therapeutic Class	Year (# of Repeated Shortages)				Total	Drug/Dosage Formats
	2013*	2014	2015	2016**		
Gastrointestinal	4	10	20	2	36	6
Electrolytes	2	12	26	3	43	8
Cardiovascular	2	5	19	0	26	6
Hormones	0	0	8	0	8	2
Anti-infective	3	20	31	6	60	12
Chemotherapy	1	2	7	2	12	2
CNS	6	11	17	5	39	9
Other	3	4	6	1	14	5

* April 1–December 31. ** January 1–March 31
Source: www.drugshortages.ca, launched in 2012.

Table A5: Reported Oral Drug Discontinuations by Therapeutic Class, Canada, 2013–16

Therapeutic Class	Year				Total (per Class)
	2013*	2014	2015	2016**	
Antidepressants	3	12	10	1	26
Opioids	-	9	-	4	13
Beta-Blocking Agents	1	6	4	-	11
ACE Inhibitors, Plain	-	-	9	1	10
Antiepileptics	3	-	7	-	10
ACE Inhibitors, Combinations	-	8	-	-	8
Lipid Modifying agents, Plain	-	1	6	1	8
Anti-Dementia drugs	-	1	5	-	6
Antipsychotics	2	-	-	4	6
Blood glucose lowering drugs (excl insulin)	-	-	6	-	6
Drugs for Peptic Ulcer and GERD	-	4	2	-	6
Anti-inflammatory and anti-rheumatic drugs	-	3	1	1	5
Corticosteroids for systemic use, plain	1	2	-	2	5
Quinolone anti-bacterials	-	1	4	-	5
Selective Calcium Channel blockers, with direct cardiac effects	-	5	-	-	5
Urologicals	-	2	3	-	5
Estrogens	-	4	-	-	4
Macrolides, lincosamides, Streptogramins	3	-	1	-	4
Selective Calcium Channel blockers, with mainly vascular effects	4	-	-	-	4
Angiotensin II Antagonists, Plain	-	3	-	-	3
Anxiolytics	-	3	-	-	3
Beta-Lactam Antibacterials, Penicillins	-	2	1	-	3
Hypnotics and sedatives	-	1	2	-	3
Antigout preparations	-	2	-	-	2
Antihistamines for systemic use	-	2	-	-	2
Cough suppressants and expectorants, combinations	1	1	-	-	2
Cough suppressants, excl. combinations with expectorants	-	1	1	-	2
Direct acting Antivirals	-	2	-	-	2

Table A5: continued

Therapeutic Class	Year				Total (per Class)
	2013*	2014	2015	2016**	
Anti-tuberculosis drugs	-	1	1	-	2
Muscle relaxants, centrally acting	-	2	-	-	2
Other Antihypertensives	-	-	2	-	2
Posterior Pituitary lobe hormones	-	-	1	1	2
Sulfonamides and Trimethoprim	-	-	2	-	2
All other therapeutic products	-	-	1	-	1
Antiadrenergic agents, centrally acting	-	-	1	-	1
Antiarrhythmics, Class I and II	-	1	-	-	1
Antifungals for systemic use	1	-	-	-	1
Antiglaucoma preparations	-	1	-	-	1
Antimetabolites	-	-	1	-	1
Antimigraine preparations	-	-	1	-	1
Antithrombotic agents	-	-	1	-	1
Antiemetics and Antinauseants	-	1	-	-	1
Drugs for Addictive disorders	-	1	-	-	1
Drugs for functional gastrointestinal disorders	-	1	-	-	1
Gonadotropins and other ovulation stimulants	-	-	1	-	1
Hormonal contraceptives for systemic use	-	-	1	-	1
Hormone antagonists and related agents	-	1	-	-	1
Iron preparations	-	1	-	-	1
Low-ceiling diuretics, excl. thiazides	-	-	-	1	1
Other Beta-lactam antibacterials	-	-	1	-	1
Other sex hormones and modulators of the genital system	-	-	1	-	1
Other systemic drugs for obstructive airway diseases	-	-	-	1	1
Tetracyclines	-	-	1	-	1
Total (per year)	19	85	78	18	200

* April 1–December 31. ** January 1–March 31

Source: www.drugshortages.ca, launched in 2012.

Table A6: Reported Injectable Drug Discontinuations by Therapeutic Class, Canada, 2013–16

Therapeutic Class	Year				Total (per Class)
	2013*	2014	2015	2016**	
I.V. solutions	7	2	2	-	11
Antimetabolites	1	-	3	-	4
Beta-Lactam Antibacterials, Penicillins	-	3	1	-	4
Cardiac stimulants, excl. cardiac glycosides	1	-	-	3	4
Antipsychotics	-	1	1	1	3
Antithrombotic agents	-	-	3	-	3
Antiemetics and Antinauseants	-	-	3	-	3
Drugs affecting bone structure and mineralization	-	-	3	-	3
I.V. solution additives	-	-	3	-	3
Antimycotics for systemic use	-	1	1	-	2
Other Beta-Lactam Antibacterials	-	2	-	-	2
Quinolone Antibacterials	-	1	1	-	2
Vitamins A & D, incl. combinations	-	-	2	-	2
Anti-parathyroid agents	-	1	-	-	1
Antiarrhythmics, Class I and III	1	-	-	-	1
Anxiolytics	-	-	-	1	1
Bacterial Vaccines	-	-	1	-	1
Beta-blocking agents	-	-	1	-	1
Belladonna and Derivatives	1	-	-	-	1
Cardiac glycosides	-	1	-	-	1
Drugs for Constipation	-	-	1	-	1
Drugs for Peptic Ulcer and GERD	-	-	1	-	1
Iron preparations	1	-	-	-	1
Macrolides, Lincosamides, and Streptogramins	-	-	1	-	1
Magnetic resonance imaging contrast media	-	-	-	1	1
Muscle relaxants, peripherally acting	-	-	1	-	1
Opioids	-	-	1	-	1
Other cardiac preparations	-	1	-	-	1
Other diagnostic agents	-	1	-	-	1

Table A6: continued

Therapeutic Class	Year				Total (per Class)
	2013*	2014	2015	2016**	
Other therapeutic radiopharmaceuticals	-	1	-	-	1
Skeleton	-	1	-	-	1
Vasodilators used in cardiac diseases	-	1	-	-	1
Viral vaccines	-	1	-	-	1
Total (per year)	12	18	30	6	66

* April 1–December 31. ** January 1–March 31

Source: www.drugshortages.ca, launched in 2012.

Table A7: Reported Discontinuations for Oral Drugs by Company, Canada, April 1, 2013–March 31, 2016

Company	Year				Total
	2013*	2014	2015	2016**	
Teva Canada Limited+	-	18	43	17	78
Valeant Canada LP/Valeant Canada S.E.C.+	-	41	-	-	41
Pfizer Canada Inc.++	11	2	16	-	29
Apotex Inc.+	4	18	3	-	25
Sanofi Canada++	3	1	3	-	7
GlaxoSmithKline Inc.++	1	3	1	-	5
Janssen Inc.++	-	2	3	-	5
Novartis Pharmaceuticals Canada Inc.++	-	-	4	-	4
Alkermes, Inc.++	-	-	1	1	2
Boehringer Ingelheim (Canada) Ltd.++	-	-	2	-	2
Ferring Inc.++	-	-	1	-	1
Omega Laboratories Ltd.+	-	-	1	-	1
Total (per year)	19	85	78	18	200

* April 1–December 31. ** January 1–March 31. + Generic company. ++ Innovator company.

Source: www.drugshortages.ca, launched in 2012.

Table A8: Reported Discontinuations per year for Injectable Drugs by Company, Canada, 2013–16

Company	Year				Total
	2013*	2014	2015	2016**	
Hospira Healthcare Corporation+	3	1	3	3	10
Sandoz Canada Inc.+	4	1	4	-	9
Baxter Corporation++	5	2	-	-	7
Pfizer Canada Inc.++	-	3	3	-	6
Teva Canada Limited+	-	1	5	-	6
Omega Laboratories Ltd.+	-	2	2	-	4
AbbVie Corporation++	-	-	3	-	3
Bristol-Myers Squibb Canada++	-	2	-	1	3
Eli Lilly Canada Inc.++	-	-	2	-	2
Novartis Pharmaceuticals Canada Inc.++	-	-	2	-	2
Valeo Pharma Inc.+	-	1	1	-	2
ACTAVIS GROUP PTC EHF+	-	-	-	1	1
Ferring Inc.++	-	1	-	-	1
Fresenius Kabi+	-	-	1	-	1
GlaxoSmithKline Inc.++	-	1	-	-	1
Janssen Inc.++	-	1	-	-	1
LEO Pharma Inc.++	-	-	1	-	1
Lantheus MI Canada, Inc.+	-	-	-	1	1
Lupin Pharma Canada Limited+	-	-	1	-	1
MALLINCKRODT CANADA ULC++	-	1	-	-	1
Sanofi Canada++	-	-	1	-	1
Sanofi Pasteur Limited++	-	-	1	-	1
Valeant Canada LP/Valeant Canada S.E.C.+	-	1	-	-	1
Total (per year)	12	18	30	6	66

* April 1–December 31. ** January 1–March 31. + Generic company. ++ Innovator company.

Source: www.drugshortages.ca, launched in 2012.