



Seniors and Drug Prices in Canada and the United States

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Executive summary

Previous research comparing drug prices in Canada and the United States confirmed that Canadian prices for brand-name drugs are lower than American prices but that generic drug prices are much higher in Canada. The earlier studies looked at drug prices across the entire consumer market. This study looks only at those drugs that are most important to consumers 65 years of age and over and finds that seniors also pay higher prices for generic drugs and lower prices for brand-name drugs in Canada than they do in the United States. In fact, the data show that Canadian seniors pay 64% more on average than Americans for generic versions of drugs that are among the most recommended by physicians for patients 65 years and older. Meanwhile, the prices for brand-name drugs most recommended for seniors are 36% lower on average in Canada than in the United States.

Because average Canadian incomes are lower than US incomes, it is not surprising that Canadian seniors pay less for branded drugs than Americans. However, higher generic drug prices are very surprising and indicate that Canadian seniors are paying too much for generic drugs. The lack of a competitive market for pharmaceuticals in Canada is the cause of inflated prices for generic drugs north of the border. As documented and explained in previous research, Canadian government policies have given special advantages to generic companies that have allowed them to establish individual product monopolies on retail pharmacy shelves through exclusive distribution agreements. This study confirms that the inflation of prices for generic drugs discovered by previous research applies just as much to seniors as it does to the rest of the consumer population in Canada.

Findings

Canadian seniors and generic drugs

- ◆ Canadian prices for the 22 generic active ingredients among the 100 most recommended drug products for seniors that were generically available in both Canada and the United States averaged 64% higher than those in the United States.
- ◆ Twelve of the 22 were more expensive (by 149% on average) in Canada; 10 of the 22 were less expensive (by 37% on average) in Canada.
- ◆ Of the 100 drug products most recommended for seniors by their physicians, 95 had generic versions available in Canada.

Canadian seniors and brand-name drugs

- ◆ Canadian prices for the 56 brand-name drugs among the 100 most recommended drug products for seniors that were available in both Canada and the United States averaged 36% lower than those in the United States.
- ◆ Fifty-one of the 56 were less expensive in Canada (by 43% on average); 5 of the 56 were more expensive in Canada (by 33% on average).

Introduction

It is important to study the relative prices that Canadian and American seniors pay for drugs because, while those 65 years of age and older make up a relatively small percentage of the population in North America (13%: [Statistics Canada, 2004](#); 12%: [US Bureau of the Census, 2004](#)), they exercise significant influence as a consumer group on pharmaceutical policy both within and between Canada and the United States. For instance, both countries have publicly funded programs (Medicare in the US, provincial Pharmacare programs in Canada) that subsidize drug purchases for seniors as separate population groups, while such entitlements are not granted on the basis of age to other groups. Additionally, the issue of the cross-border Internet resale trade in pharmaceuticals is largely driven by consumer demand from American seniors and heavily promoted by seniors' advocacy groups in the United States. [\[Skinner, 2004a\]](#) Particular studies of the drug prices that seniors pay are also necessary because the population 65 years of age and older experiences higher rates of illness relative to younger populations [\[Brimacombe, 2001; Robson, 2001; Skinner, 2002; CIHI, 2004\]](#) and therefore arguably requires greater consumption of medications leading to higher personal drug expenditures.

Common to all of these policy issues are needs-based justifications for government intervention in markets on behalf of seniors. Therefore, it is important to establish the facts about the drug costs actually faced by seniors in both countries when buying medicines before recommending policy options that deal with their political demands. This study empirically measures differences between prices in Canada and the United States in order to set out the facts for future research on the economic and political dimensions of pharmaceutical policies that address the demands of seniors as a particular consumer group. The broader policy implications of the needs-based arguments offered by seniors' advocates for government intervention in pharmaceutical markets will not be examined here.

This study compares the relative retail prices for the drugs most commonly used by Canadian and American seniors and looks separately at brand-name and generic products. The drugs that are most important to seniors were defined as the 100 drugs most recommended for patients 65 years of age and older by Canadian physicians. [\[IMS Health, 2004\]](#) It is assumed that the state of medical practice is similar in the United States and Canada and that recommendations and prescribing patterns of physicians are transferable between the two markets. Therefore, it is further assumed that the 100 most recommended drugs for seniors in Canada would nearly match any similar list for American seniors.

Unfortunately, drug-price data for the 100 most recommended drugs for seniors in Canada were not comprehensively available across all 100 drugs in the list. However,

drug-price data were available from previous research into the 100 *top-selling* brand-name and generic drugs, defined by sales volumes over the entire market. [Skinner, 2005] In order to draw inferences about the relative drug prices faced by seniors as a separate consumer group, the list of the 100 most recommended drugs for seniors was compared to available pricing data under the list of the 100 *top-selling* brand-name and generic drugs. Every drug that appeared in both datasets was included in this study.

Brand-name and generic drugs are looked at separately in this study because they are subject to different market dynamics. For instance, brand-name drugs are subject to price controls in Canada while generic drugs are exempt from similar direct government interventions. Furthermore, the enormous cost of developing innovative brand-name drugs is a significant determinant of their higher prices relative to generic products, which merely copy the original drug and avoid the research and development costs faced by its inventor. [DiMasi, 2003] Finally, previous research has shown that brand-name and generic drugs have different price differentials in Canada and the United States when compared with equivalent products. [Skinner, 2004b; 2005] This has implications for low-income consumers, who may rely on generic versions of drugs more heavily than on relatively more expensive brand-name products.

Canadian and US prices for seniors' drugs

The data available to this study showed that 58 of the 100 top-selling brand-name drug products in 2003 were listed among the 100 drugs most recommended by Canadian physicians for seniors. [Table 1, Table 2, & Table 3] Of these 58 brand-name drug products, 56 had identifiable equivalents in the United States to which they could be compared.

Canadian prices for the 56 brand-name drugs among the 100 most recommended drug products for seniors that were available in both Canada and the United States averaged 36% lower than in the United States; 51 of the 56 drugs were less expensive in Canada. The difference for this group was -43% of US prices on average. Five of the 56 drugs were more expensive in Canada, the difference averaging +33% of US prices. [Table 4]

Of the 100 top-selling generic drug products in 2003, 23 separate active ingredients were listed among the 100 drugs most recommended by Canadian physicians for seniors. Of these 23 generic active ingredients, 22 were available in both Canada and the United States as generic products. [Table 5, Table 6, & Table 7]

Canadian prices for the 22 generic active ingredients among the 100 most recommended drug products for seniors that were available as generic products in both Canada and the United States averaged 64% higher than American prices. Twelve of the 22 were more expensive in Canada; the difference for this group was +149% of US prices, on average. Ten of the 22 were less expensive in Canada; the difference for this group was -37% of US prices on average. [Table 8]

An explanation of the methodology for making prices in Canada and the United States comparable follows later in this paper.

Table 1: The top 100 prescription drugs for seniors (65 +) ranked by recommendations received from office-based physicians in Canada, 2003: generic availability noted

Rank 2003	Product	Generic version
1	Altace	Ramipril
2	Hydrochlorothiazide	Hydrochlorothiazide
3	Norvasc	Amlodipine
4	Lipitor	Atorvastatin
5	Coumadin	Warfarin
6	Lasix	Furosemide
7	Metformin	Metformin
8	Adalat xl	Nifedipine
9	Metoprolol	Metoprolol
10	Vioxx	Rofecoxib
11	Synthroid	Levothyroxine
12	Celebrex	Celecoxib
13	Atenolol	Atenolol
14	Zocor	Simvastatin
15	Tylenol w/cod #3	Acetaminophen/ codeine
16	Diabeta	Glyburide
17	Vasotec	Enalapril
18	Prednisone	Prednisone
19	Glucophage	Metformin
20	Cipro	Ciprofloxacin
21	Glyburide	Glyburide
22	Fosamax	Alendronate
23	Nitroglycerin	
24	Monopril	Fosinopril
25	Pantoloc y	Pantoprazole
26	Accupril	Quinapril
27	Tenormin	Atenolol
28	Advair	Salmeterol/ fluticasone
29	Digoxin	Digoxin
30	Influenza vir vac	
31	Nitro-dur	Nitroglycerine
32	Losec	Omeprazole
33	Atrovent	Ipratropium
34	Cardizem cd	Diltiazem
35	Ativan	Lorazepam

Table 1 (continued): The top 100 prescription drugs for seniors (65+) ranked by recommendations received from office-based physicians in Canada, 2003: generic availability noted

Rank 2003	Product	Generic version
36	Lozide	Indapamide
37	Avapro	Irbesartan
38	Diovan	Valsartan
39	Combivent	Salbutamol/ ipratropium
40	Avandia	Rosiglitazone
41	Cozaar	Losartan
42	Tiazac	Diltiazem
43	Aricept	Donepezil
44	Atacand	Candesartan
45	Paxil	Paroxetine
46	Plavix	Clopidogrel
47	Celexa	Citalopram
48	Biaxin bid	Clarithromycin
49	Zithromax	Azithromycin
50	Ramipril	
51	Actonel	Risedronate
52	Flomax	Tamsulosin
53	Eltroxin	Levothyroxine
54	Lanoxin	Digoxin
55	Pravachol	Pravastatin
56	Lopresor	Metoprolol
57	Didrocal	Etidronic acid/ calcium
58	Ventolin	Salbutamol
59	Depo-medrol	Methylprednisolone
60	Methotrexate	Methotrexate
61	Prevacid	Lansoprazole
62	Amoxil	Amoxicillin
63	Mobicox	Meloxicam
64	Warfarin	Coumadin
65	Flovent hfa	Fluticasone
66	Ventolin hfa	Salbutamol
67	Keflex	Cefalexin
68	Levaquin	Levofloxacin
69	Pariet	Raberprazole sodium
70	Symbicort	Budesonide/ formoterol

Table 1 (continued): The top 100 prescription drugs for seniors (65+) ranked by recommendations received from office-based physicians in Canada, 2003: generic availability noted

Rank 2003	Product	Generic version
71	Micardis	Telmisartan
72	Hydrodiuril	Hydrochlorothiazide
73	Hytrin	Terazosin
74	Coversyl	Perindopril
75	Fluviral	Vaccine
76	Risperdal	Risperidone
77	Monacor	Bisoprolol
78	Furosemide	Furosemide
79	Avelox	Moxifloxacin
80	Flovent	Fluticasone
81	Nexium	Esomeprazole
82	Avalide	Irbesartan/ hydrochlorothiazide
83	Nitrogen liq	
84	Spiriva	Tiotropium bromide
85	Diovan hct	Valsartan/ hydrochlorothiazide
86	Arthrotec	Diclofenac/ misoprostol
87	Bextra	Valdecoxib
88	Allopurinol	Allopurinol
89	Zantac	Ranitidine
90	Effexor xr	Venlafaxine
91	Moduret	Amiloride/ hydrochlorothiazide
92	Premarin	Conjugated estrogen
93	Zestril	Lisinopril
94	Dilaudid	Hydromorphone
95	Zestoretic	Lisinopril/ hydrochlorothiazide
96	Aldactone	Spirolactone
97	Viagra	Sildenafil
98	Restoril	Temazepam
99	Inhibace	Cilazapril
100	Acebutolol	

Source: [IMS Health, 2004: Special request of data from the Canadian Disease and Therapeutic Index; Health Canada, Therapeutic Products Directorate, 2004.](#)

Note: generic active ingredient listed where available.

**Table 2: Top-selling 100 brand-name prescription drug products in Canada, 2003:
ranked by the number of prescriptions dispensed**

Rank	Name of Product	Active ingredient(s)	Estimated number of dispensed prescriptions
1	Lipitor	Atorvastatin	8,548,624
2	Synthroid	Levothyroxine	7,935,461
3	Altace	Ramipril	6,411,104
4	Tylenol W/ Cod #3	Acetaminophen/ Codeine/ Caffeine	4,569,380
5	Norvasc	Amlodipine	4,355,057
6	Losec	Omeprazole	4,302,519
7	Effexor Xr	Venlafaxine	3,723,402
8	Paxil	Paroxetine	3,494,708
9	Vioxx	Rofecoxib	3,366,202
10	Premarin	Estrogenic Sub Conjugated	3,344,110
11	Celexa	Citalopram	3,048,233
12	Celebrex	Celecoxib	2,961,856
13	Pantoloc	Pantoprazole	2,858,771
14	Ativan	Lorazepam	2,482,273
15	Adalat XI	Nifedipine	2,477,039
16	Flovent Hfa	Fluticasone	2,247,377
17	Tri-cyclen	Ethinylestradiol/ Norgestimate	2,237,859
18	Vasotec	Enalapril	2,236,200
19	Alesse	Ethinylestradiol/ Levonorgestrel	2,211,041
20	Fosamax	Alendronate	2,052,759
21	Eltroxin	Levothyroxine	1,979,366
22	Risperdal	Risperidone	1,930,438
23	Lanoxin	Digoxin	1,840,968
24	Zocor	Simvastatin	1,778,128
25	Cipro	Ciprofloxacin	1,597,533
26	Prevacid	Lansoprazole	1,572,293
27	Zithromax	Azithromycin	1,552,844
28	Zyprexa	Olanzapine	1,551,972
29	Marvelon	Ethinylestradiol/ Desogestrel	1,476,025
30	Plavix	Clopidogrel	1,445,184
31	Coumadin	Warfarin	1,368,056
32	Triphasil	Ethinylestradiol/ Levonorgestrel	1,359,234
33	Nitro-dur	Nitroglycerin	1,356,708
34	Biaxin Bid	Clarithromycin	1,338,130
35	Nasonex	Mometasone	1,267,908

**Table 2 (continued): Top-selling 100 brand-name prescription drug products in Canada, 2003:
ranked by the number of prescriptions dispensed**

Rank	Name of Product	Active ingredient(s)	Estimated number of dispensed prescriptions
36	Nexium	Esomeprazole	1,221,562
37	Flonase	Fluticasone	1,215,547
38	Seroquel	Quetiapine	1,171,489
39	Viagra	Sildenafil	1,167,666
40	Monopril	Fosinopril	1,144,060
41	Avapro	Irbesartan	1,122,606
42	Didrocal	Etidronic Acid/ Calcium	1,102,139
43	Cozaar	Losartan	1,092,374
44	Xalatan	Latanoprost	1,084,970
45	Mobicox	Meloxicam	1,041,710
46	Advair	Fluticasone/ Salmeterol	1,037,013
47	Accupril	Quinapril	1,009,817
48	Combivent	Salbutamol/ Ipratropium	998,506
49	Flomax	Tamsulosin	994,695
50	Actonel	Risedronate	981,322
51	Diovan	Valsartan	967,620
52	Atacand	Candesartan	940,919
53	Wellbutrin	Bupropion	925,557
54	Dilantin Sodium	Phenytoin	924,910
55	Tiazac	Diltiazem	919,293
56	Cortate	Hydrocortisone	884,382
57	Pariet	Rabeprazole Sodium	800,256
58	Lipidil Supra	Fenofibrate	773,367
59	Monacor	Bisoprolol	766,297
60	Arthrotec	Diclofenac/ Misoprostol	762,780
61	Avandia	Rosiglitazone	755,519
62	Atrovent	Ipratropium	755,138
63	Diane-35	Cyproterone/ Ethinylestradiol	740,593
64	Fucidin	Fusidic Acid	729,570
65	Cefzil	Cefprozil	668,931
66	Celestoderm-v	Betamethasone	660,105
67	Elocom	Mometasone	656,552
68	Humulin N	Insulin	644,590
69	Oxycontin	Oxycodone	641,212
70	Prometrium	Progesterone	640,947

**Table 2 (continued): Top-selling 100 brand-name prescription drug products in Canada, 2003:
ranked by the number of prescriptions dispensed**

Rank	Name of Product	Active ingredient(s)	Estimated number of dispensed prescriptions
71	Depo-provera	Medroxyprogesterone	625,886
72	Tylenol W/cod #2	Acetaminophen/ Codeine/caffeine	618,132
73	Coversyl	Perindopril	612,515
74	Singulair	Montelukast	598,965
75	Imdur	Isosorbide-5-mononitrate	581,459
76	Estrace	Estradiol	576,287
77	Avalide	Irbesartan/ Hydrochlorothiazide	566,606
78	Aricept	Donepezil	552,838
79	Imovane	Zopiclone	546,391
80	Zithromax Pediatri	Azithromycin	534,981
81	Pulmicort	Budesonide	520,484
82	Remeron	Mirtazapine	517,190
83	Micardis	Telmisartan	500,330
84	Triquilar	Ethinylestradiol/ Levonorgestrel	491,942
85	Lamisil	Terbinafine	478,037
86	Diovan Hct	Valsartan/ Hydrochlorothiazide	469,679
87	Imitrex	Sumatriptan	465,433
88	Inhibace	Cilazapril	448,920
89	Novolin Ge Nph	Insulin	440,329
90	Cyclen	Ethinylestradiol/ Norgestimate	440,070
91	Macrobid	Nitrofurantoin	421,726
92	Levaquin	Levofloxacin	421,695
93	Zovirax	Acyclovir	417,643
94	Crestor	Rosuvastatin	416,660
95	Topamax	Topiramate	416,406
96	Cosopt	Timolol/ Dorzolamide	413,363
97	Lopresor Sr	Metoprolol	409,799
98	Serc	Betahistine	405,085
99	Biaxin Pediatric	Clarithromycin	404,326
100	Zestoretic	Lisinopril/ Hydrochlorothiazide	398,907

Source: [IMS Health, 2004: Special request of data from the Compuscript Database.](#)

Table 3: Top-selling 100 brand-name prescription drugs matching the top 100 prescription drugs recommended by office-based physicians for seniors in Canada, 2003

Name of product	Match drugs recommended for seniors?	Name of product	Match drugs recommended for seniors?	Name of product	Match drugs recommended for seniors?
Lipitor	✓	Nasonex		Oxycontin	
Synthroid	✓	Nexium	✓	Prometrium	
Eltroxin	✓	Flonase		Depo-provera	
Altace	✓	Seroquel		Tylenol W/cod #2	
Tylenol W/cod #3	✓	Viagra	✓	Coversyl	✓
Norvasc	✓	Monopril	✓	Singular	
Losec	✓	Avapro	✓	Imdur	
Effexor Xr	✓	Didrocal	✓	Estrace	
Paxil	✓	Cozaar	✓	Avalide	✓
Vioxx	✓	Xalatan		Aricept	✓
Premarin	✓	Mobicox	✓	Imovane	
Celexa	✓	Advair	✓	Zithromax	
Celebrex	✓	Accupril	✓	Pediatri	
Pantoloc	✓	Combivent	✓	Pulmicort	
Ativan	✓	Flomax	✓	Remeron	
Adalat XI	✓	Actonel	✓	Micardis	✓
Flovent Hfa	✓	Diovan	✓	Triquilar	
Tri-cyclen		Atacand	✓	Lamisil	
Vasotec	✓	Wellbutrin		Diovan Hct	✓
Alesse		Dilantin Sodium		Imitrex	
Fosamax	✓	Tiazac	✓	Inhibace	
Risperdal	✓	Cortate		Novolin Ge Nph	
Lanoxin	✓	Pariet	✓	Cyclen	
Zocor	✓	Lipidil Supra		Macrobid	
Cipro	✓	Monacor	✓	Levaquin	✓
Prevacid	✓	Arthrotec	✓	Zovirax	
Zithromax	✓	Avandia	✓	Crestor	
Zyprexa		Atrovent	✓	Topamax	
Marvelon		Diane-35		Cosopt	
Plavix	✓	Fucidin		Lopresor Sr	✓
Coumadin	✓	Cefzil		Serc	
Triphasil		Celestoderm-v		Biaxin Pediatric	
Nitro-dur	✓	Elocom		Zestoretic	✓
Biaxin Bid	✓	Humulin N		TOTAL	56

Sources: IMS Health, 2004: Special request of data from the *Compuscript* Database and the Canadian Disease and Therapeutic Index.

Table 4: Canadian to US retail price differences for the top selling 56 brand name prescription drugs in Canada, 2003; available in both markets; matching the 100 most recommended prescription drugs for seniors by Canadian physicians, 2003: stated as a percentage of the US price

Brand Drug Product	CAD to US RP @ US\$ PPP	Brand Drug Product	CAD to US RP @ US\$ PPP
Lipitor	-27.57%	Viagra	28.21%
Synthroid	-55.72%	Monopril	-31.90%
Altace	-36.59%	Avapro	-28.86%
Tylenol W/cod #3	-62.38%	Didrocal	-93.90%
Norvasc	-1.59%	Cozaar	-27.56%
Losec	-43.06%	Mobicox	-66.24%
Effexor Xr	-28.56%	Advair	6.04%
Paxil	-32.71%	Accupril	-20.70%
Vioxx	-47.33%	Combivent	-62.10%
Premarin	-70.75%	Flomax	-40.89%
Celexa	-39.82%	Actonel	21.70%
Celebrex	-56.95%	Diovan	-28.33%
Pantoloc	-38.60%	Atacand	-22.46%
Ativan	-81.96%	Tiazac	-15.91%
Adalat XI	-28.31%	Pariet	-63.27%
Flovent Hfa	-72.07%	Monocor	-61.55%
Vasotec	-21.41%	Arthrotec	-57.50%
Fosamax	-38.89%	Avandia	-31.14%
Risperdal	-61.89%	Atrovent	18.85%
Lanoxin	92.20%	Coversyl	-38.73%
Zocor	-40.87%	Avalide	-45.59%
Cipro	-46.28%	Aricept	-2.00%
Prevacid	-49.07%	Micardis	-33.59%
Zithromax	-19.47%	Diovan Hct	-32.40%
Plavix	-34.38%	Levaquin	-42.43%
Coumadin	-45.77%	Lopresor Sr	-75.76%
Nitro-dur	-77.44%	Zestoretic	-17.91%
Biaxin Bid	-47.11%	Average Price Difference	-36%
Nexium	-44.79%		

Source: IMS Health, 2004: Special request of data from the *Compuscript Database* and the *Canadian Disease and Therapeutic Index*.

**Table 5: Top 100 generic prescription drug products in Canada, 2003:
ranked by number of prescriptions dispensed**

Rank	Manufacturer	Active ingredient(s)	Estimated number of dispensed prescriptions
1	Apotex	Furosemide	3,355,457
2	Ratiopharm	Salbutamol	3,261,456
3	Apotex	Hydrochlorothiazide	3,021,329
4	Apotex	Lorazepam	2,448,783
5	Apotex	Amitriptyline	2,396,882
6	Novopharm	Hydrochlorothiazide	2,289,147
7	Apotex	Amoxicillin	2,151,947
8	Apotex	Oxazepam	1,964,162
9	Novopharm	Amoxicillin	1,891,898
10	Genpharm	Metformin	1,630,440
11	Apotex	Prednisone	1,544,769
12	Ratiopharm	Oxycodone/ Acetaminophen	1,369,411
13	Apotex	Metoprolol	1,153,268
14	Apotex	Allopurinol	1,124,954
15	Apotex	Ranitidine	1,113,166
16	Apotex	Lisinopril	1,106,160
17	Apotex	Naproxen	1,072,054
18	Novopharm	Metoprolol	1,069,522
19	Novopharm	Metformin	1,063,115
20	Apotex	Simvastatin	1,042,448
21	Genpharm	Glyburide	1,028,836
22	Apotex	Salbutamol	1,000,089
23	Pharmascience	Clonazepam	968,526
24	Taro	Warfarin	956,000
25	Apotex	Diazepam	943,841
26	Apotex	Warfarin	943,398
27	Apotex	Atenolol	929,227
28	Apotex	Pravastatin	926,209
29	Apotex	Triamterene/ Hydrochlorothiazide	921,848
30	Novopharm	Lorazepam	901,330
31	Apotex	Sertraline	863,412
32	Ratiopharm	Atenolol	857,530
33	Apotex	Penicillin V	835,657
34	Genpharm	Ranitidine	821,414
35	Apotex	Glyburide	815,568

**Table 5 (continued): Top 100 generic prescription drug products in Canada, 2003:
ranked by number of prescriptions dispensed**

Rank	Manufacturer	Active ingredient(s)	Estimated number of dispensed prescriptions
36	Ratiopharm	Medroxyprogesterone	805,098
37	Novopharm	Furosemide	795,709
38	Novopharm	Glyburide	783,708
39	Icn	Estrogenic Subconjugated	762,080
40	Novopharm	Cephalexin	742,734
41	Apotex	Clonazepam	740,627
42	Apotex	Folic Acid	736,169
43	Novopharm	Atenolol	712,525
44	Genpharm	Zopiclone	710,123
45	Genpharm	Simvastatin	687,774
46	Novopharm	Ranitidine	670,192
47	Novopharm	Spirolactone	651,010
48	Apotex	Metformin	639,745
49	Apotex	Trimethoprim/ Sulfamethoxazole	634,928
50	Genpharm	Amoxicillin	623,548
51	Ratiopharm	Acetaminophen/ Codeine	615,112
52	Linson	Pravastatin	614,039
53	Pharmascience	Gabapentin	611,580
54	Pharmascience	Clonazepam	602,000
55	Pharmascience	Metformin	599,634
56	Apotex	Diltiazem	597,784
57	Apotex	Temazepam	584,916
58	Apotex	Divalproex	563,285
59	Pharmascience	Metoprolol	540,334
60	Pharmascience	Atenolol	536,472
61	Novopharm	Divalproex	528,275
62	Apotex	Cephalexin	520,608
63	Pharmascience	Methylphenidate	512,263
64	Ratiopharm	Metformin	511,527
65	Ratiopharm	Diltiazem	500,518
66	Apotex	Fluconazole	486,515
67	Apotex	Ibuprofen	466,346
68	Novopharm	Quinine	457,543
69	Apotex	Flurazepam	449,894
70	Apotex	Metronidazole	415,193

**Table 5 (continued): Top 100 generic prescription drug products in Canada, 2003:
ranked by number of prescriptions dispensed**

Rank	Manufacturer	Active ingredient(s)	Estimated number of dispensed prescriptions
71	Apotex	Hydroxyzine	406,428
72	Genpharm	Alprazolam	406,303
73	Apotex	Propranolol	406,246
74	Pharmascience	Indapamide	401,789
75	Genpharm	Indapamide	399,503
76	Apotex	Alprazolam	392,567
77	Prodoc	Oxazepam	392,352
78	Apotex	Trazodone	391,471
79	Pharmascience	Lithium	385,908
80	Ratiopharm	Acetaminophen/ Codeine/ Caffeine	379,383
81	Apotex	Zopiclone	379,118
82	Novartis	Temazepam	378,973
83	Apotex	Domperidone	378,282
84	Novartis	Carbamazepine	356,320
85	Genpharm	Atenolol	356,171
86	Taro	Betamethasone	356,150
87	Ratiopharm	Betamethasone	356,145
88	Genpharm	Clonazepam	353,835
89	Novopharm	Penicillin V	348,287
90	Novopharm	Triamterene/ Hydrochlorothiazide	347,877
91	Ratiopharm	Codeine	336,017
92	Pharmascience	Procyclidine	334,739
93	Apotex	Tetracycline	330,663
94	Apotex	Metoprolol	329,499
95	Genpharm	Verapamil	315,646
96	Genpharm	Metoprolol	311,846
97	Novopharm	Cyclobenzaprine	309,173
98	Novopharm	Naproxen	307,231
99	Apotex	Carbamazepine	303,566
100	Apotex	Fluoxetine	302,329

Source: [IMS Health, 2004: Special request of data from the Compuscript Database.](#)

Table 6: Separate generic active ingredients within the top selling 100 generic prescription drug products dispensed in Canada, 2003

Rank	Active ingredient (s)	Available generically in Canada only
1	Furosemide	
2	Salbutamol	✓
3	Hydrochlorothiazide	
4	Lorazepam	
5	Amitriptyline	
6	Amoxicillin	
7	Oxazepam	
8	Metformin	
9	Prednisone	
10	Oxycodone/ Acetaminophen	
11	Metoprolol	
12	Allopurinol	
13	Ranitidine	
14	Lisinopril	
15	Naproxen	
16	Simvastatin	✓
17	Glyburide	
18	Clonazepam	
19	Warfarin	
20	Diazepam	
21	Atenolol	
22	Pravastatin	✓
23	Triamterene/ Hydrochlorothiazide	
24	Sertraline	✓
25	Penicillin V	✓
26	Medroxyprogesterone	
27	Estrogenic Sub Conjugated	✓
28	Cephalexin	
29	Folic Acid	✓
30	Zopiclone	✓
31	Spironolactone	
32	Trimethoprim/ Sulfamethoxazole	
33	Acetaminophen/ Codeine	
34	Gabapentin	✓
35	Diltiazem	

Table 6 (continued): Separate generic active ingredients within the top selling 100 generic prescription drug products dispensed in Canada, 2003

Rank	Active ingredient (s)	Available generically in Canada only
36	Temazepam	
37	Divalproex	✓
38	Methylphenidate	✓
39	Fluconazole	✓
40	Ibuprofen	
41	Quinine	
42	Flurazepam	
43	Metronidazole	
44	Hydroxyzine	
45	Alprazolam	
46	Propranolol	
47	Indapamide	
48	Trazodone	
49	Lithium	
50	Acetaminophen/ Codeine/ Caffeine	✓
51	Domperidone	✓
52	Carbamazepine	
53	Betamethasone	
54	Codeine	✓
55	Procyclidine	✓
56	Tetracycline	
57	Verapamil	
58	Cyclobenzaprine	
59	Fluoxetine	

Source: IMS Health, 2004: Special request of data from the *Compuscript* Database.

Table 7: Separate generic active ingredients among the top-selling 100 generic prescription drugs matching the top 100 prescription drugs recommended by office-based physicians for seniors in 2003

Rank	Active Ingredient(s)	Match drugs recommended for seniors
1	Furosemide	✓
2	Salbutamol/ Serevent Diskus	✓
3	Hydrochlorothiazide	✓
4	Lorazepam	✓
5	Amitriptyline	
6	Amoxicillin	✓
7	Oxazepam	
8	Metformin	✓
9	Prednisone	✓
10	Oxycodone/ Acetaminophen	
11	Metoprolol	✓
12	Allopurinol	✓
13	Ranitidine	✓
14	Lisinopril	✓
15	Naproxen	
16	Simvastatin	✓
17	Glyburide	✓
18	Clonazepam	
19	Warfarin	✓
20	Diazepam	
21	Atenolol	✓
22	Pravastatin	✓
23	Triamterene/ Hydrochlorothiazide	
24	Sertraline	
25	Penicillin V	
26	Medroxyprogesterone	
27	Estrogenic Sub Conjugated	✓
28	Cephalexin	✓
29	Folic Acid	
30	Zopiclone	
31	Spironolactone	✓
32	Trimethoprim/ Sulfamethoxazole	
33	Acetaminophen/ Codeine	✓
34	Gabapentin	
35	Diltiazem	✓

Table 7 (continued): Separate generic active ingredients among the top-selling 100 generic prescription drugs matching the top 100 prescription drugs recommended by office-based physicians for seniors in 2003

Rank	Active Ingredient(s)	Match drugs recommended for seniors
36	Temazepam	✓
37	Divalproex	
38	Methylphenidate	
39	Fluconazole	
40	Ibuprofen	
41	Quinine	
42	Flurazepam	
43	Metronidazole	
44	Hydroxyzine	
45	Alprazolam	
46	Propranolol	
47	Indapamide	✓
48	Trazodone	
49	Lithium	
50	Acetaminophen/ Codeine/ Caffeine	
51	Domperidone	
52	Carbamazepine	
53	Betamethasone	
54	Codeine	
55	Procyclidine	
56	Tetracycline	
57	Verapamil	
58	Cyclobenzaprine	
59	Fluoxetine	
	TOTAL	

Source: IMS Health, 2004: Special request of data from the *Compuscript* Database and the Canadian Disease and Therapeutic Index.

Table 8: Canadian to US price differences for the top selling 22 generic active ingredients in Canada, 2003; available in both markets; matching the 100 most recommended prescription drugs for seniors by Canadian physicians, 2003: stated as a percentage of the US price

Generic active ingredient	CAD TO US RP @ US\$ PPP
Furosemide	91%
Hydrochlorothiazide	180%
Lorazepam	-9%
Amoxicillin	-24%
Metformin	-2%
Prednisone	162%
Metoprolol	88%
Allopurinol	-20%
Ranitidine	179%
Lisinopril	439%
Simvastatin	-58%
Glyburide	-47%
Warfarin	14%
Atenolol	363%
Pravastatin	-60%
Estrogenic Subconjugated	-80%
Cephalexin	44%
Spirolactone	-50%
Acetaminophen/codeine	74%
Diltiazem	105%
Temazepam	48%
Indapamide	-19%
Average Price Difference	64%

Source: IMS Health, 2004: Special request of data from the *Compuscript* Database and the Canadian Disease and Therapeutic Index.

Analysis and conclusions

The findings of this study of the differences between Canadian and US prices over the 100 drugs most commonly recommended for seniors by Canadian physicians are consistent with the findings of previous research on drug prices over the entire market. In a preceding study of Canadian and US drug prices over the 100 top-selling brand-name and generic drugs, it was found that Canadian prices averaged 43% lower than American prices for brand-name drugs and 78% higher for generic drugs after adjusting for the purchasing power parities (PPP) of the two currencies. [Skinner, 2005] This study of the drugs most important to seniors found that after adjusting for PPP Canadian prices for brand-name products averaged 36% lower than US prices for equivalent products, while the Canadian prices for the generic drugs most important to seniors averaged 64% higher than equivalent products in the United States.

As explained in previous studies, [Skinner, 2004b; 2005] because average Canadian incomes are lower than American incomes, it is not surprising that Canadian seniors pay less for branded drugs than Americans. However, higher generic prices are not what would be expected and indicate that Canadian seniors are paying too much for generic drugs. The lack of a competitive market for pharmaceuticals in Canada is the cause of inflated prices for generic drugs north of the border. Previous research documented and explained how Canadian government policies have given special advantages to generic companies that have allowed them to establish individual product monopolies on retail pharmacy shelves through exclusive distribution agreements. [Skinner, 2004b; 2005]

This study confirms that the artificial inflation of generic drug prices discovered in previous research applies just as much to seniors as it does to the rest of the consumer population in Canada. However, if it is assumed that, because of fixed incomes and the loss of employment-based drug insurance after retirement, seniors are more likely to buy generic versions of the drugs that are most important to them, then the burden of this artificial inflation of the prices for generic drugs likely falls more heavily on them than it does on younger segments of the population.

Having access to data on the value of total spending on generic and brand-name drugs by seniors in Canada would allow a rough estimate of the losses suffered by this particular group of consumers from inflated generic pricing. Unfortunately sources of such data could not be identified by this study.

Data

Drug prices

The data in this study refer only to prescription drugs in Canada and the United States. Non-prescription or over-the-counter (OTC) drugs are excluded unless otherwise stated. Prices and volumes apply to retail pharmacy sales only and include pharmacy mark-ups and professional fees unless otherwise stated. Direct government or institutional sales are excluded.

Canadian data

The Canadian dataset used for this study comprises the following three separate lists of drug products:

- ◆ the top 100 *brand-name* drug products in Canada ranked by the number of prescriptions dispensed, representing 72.9% of the total number of brand-name prescriptions dispensed in the Canadian market;
- ◆ the top 100 *generic* drug products in Canada ranked by the number of prescriptions dispensed, representing 63.6% of the total number of generic prescriptions dispensed in the Canadian market for 2003;
- ◆ the top 100 products recommended by Canadian office-based physicians for patients aged 65 years and over in year 2003.

All Canadian data were purchased directly from IMS Health Canada. Data about brand-name and generic drug products was derived from IMS Health's *CompuScript* database. According to IMS Health, the *CompuScript* database estimates the number of prescriptions dispensed by Canadian retail pharmacies. The *CompuScript* sample is drawn from a panel of over 4,700 pharmacies, which represents approximately two thirds of all retail pharmacies in Canada. The sample, stratified by province, type of store (chain or independent), and size of store (large or small), comprises over 2,000 stores and is representative of the universe of stores in Canada. Records are collected electronically each month from participating pharmacies. After passing through various quality control checks, the sample data are projected to the universe in each province and provincial totals are summed to provide a national estimate. The data elements available include extended units. The extended unit may be pills (for oral solids), millilitres (for liquids), doses (for some inhalers), and grams (for powders). Also available is the cost of the prescription as dispensed. This includes all mark-ups and the pharmacist's professional fee. [IMS Health, 2004d]

Data for the top 100 products recommended by Canadian office-based physicians for patients aged 65 years and over in year 2003 were derived from IMS Health's Canadian Disease and Therapeutic Index. The Canadian dataset included the following elements:

- ◆ drug product name
- ◆ active ingredient(s) (i.e. common drug name)
- ◆ manufacturer
- ◆ formulation (e.g. orals, solid)
- ◆ extended unit type (e.g. tablets)
- ◆ available dosage strengths per drug product (e.g. 50 mg tablets, 100 mg tablets, 120mg/5ml liquid)
- ◆ total prescriptions dispensed per drug product
- ◆ total prescriptions dispensed per drug product by dosage strength
- ◆ total extended units dispensed per drug product
- ◆ total extended units dispensed per drug product by dosage strength
- ◆ average extended units dispensed per prescription, per drug product by dosage strength
- ◆ total cost of dispensed prescriptions per drug product including all pharmacy mark-ups and professional fees
- ◆ average prescription cost per drug product including all pharmacy mark-ups and professional fees.

The data do not represent a random sample of the entire market for brand-name and generic drugs in Canada. However, since the *CompuSript* database represents two thirds of all pharmacies in Canada and the datasets selected for this study represent between nearly two thirds and three quarters of the universe for their respective classes of prescription drugs, it is reasonably safe to extrapolate these findings to the total market for brand-name and generic drugs in Canada.

US data

Comparing Canadian drug prices with American drug prices is complicated by the lack of published data that identifies *actual* prices paid by consumers in the United States, even though such data exists in Canada. Inquiries with IMS Health Canada indicate that there is no publicly accessible source of data on final retail consumer purchases for the entire US market like that used by IMS Health to estimate sales volumes and spending in Canada. Further, IMS Health indicated that their US operation does not maintain a similarly structured set of US data comparable to the Canadian *Compuscript* database and, in any case, estimates of the costs for the US data that were available made obtaining it unaffordable for this project.

Estimating retail prices from manufacturers' direct price or wholesale price is also difficult because detailed data on actual prices paid to manufacturers and wholesalers by retailers varies widely depending on individually negotiated rebates. Detailed price and rebate data are kept private by retailers, wholesalers, and manufacturers because they are proprietary commercial information. Moreover, the reality is that retail prices vary significantly from one geographic location to another in the United States, making it difficult to extrapolate small samples across the entire American market. [Graham, 2004] So, while IMS Health can reasonably estimate an average price for the Canadian market, it is difficult to obtain the same degree of accuracy when estimating average prices in the US.

Nonetheless, it is possible to derive a reasonable estimate of average prices indirectly by comparing the limited sample of *actual* retail prices collected for this study to:

- ◆ data identifying manufacturers' list or average wholesale prices (AWP)
- ◆ published research estimating the size of rebates offered to major third party payers, and
- ◆ the percentage of retail sales affected by third party reimbursement.

If such a comparison shows that the actual retail prices collected for the study sample are approximately similar to the prices applying to third-party payers that are known to cover the majority of the US market, then it seems reasonable to assume that the actual retail price data collected in this study can be roughly extrapolated to the entire US market and should approximately represent average US prices.

Data on retail prices

For this study, actual US data on retail drug prices, drug formulations, dosage strengths, and prescription sizes were obtained from Costco® and Walgreen's® Actual Retail Prices (RP). The resources available to this project did not permit the mass primary collection of US retail price data on a scale that would achieve a representative sample size that could be extrapolated to the entire market. Instead, the research design called for a comparison of the discounts off listed average wholesale prices (AWP) generally available to bulk payers in the market to at least one actual US retail price for each of the drugs in the Canadian sample. For ease in collecting data and to make the sample as representative as possible, this study primarily used the online pharmacy drug-price information and ordering services of Costco® and Walgreen's®, two major US retail pharmacy chains with national distribution to obtain actual US price and other drug information for comparison to the Canadian data purchased from IMS Health. According to the retailers, pharmacies located in Costco® retail outlets nationwide offer pricing consistent with those listed on the website, which reflected the full cash purchase price including pharmacy mark-ups

and professional fees. [Costco, 2004] Walgreen's® list prices also reflected the full cash purchase price. [Walgreen's, 2004]

The actual price data from Costco® and Walgreen's® was collected between July 12 and August 15, 2004 and again verified on October 15, 2004. The data elements included in the US dataset are as follows:

- ◆ drug product name
- ◆ active ingredient(s) [i.e. common drug name]
- ◆ manufacturer
- ◆ formulation [e.g. orals, solid]
- ◆ extended unit type [e.g. tablets]
- ◆ available dosage strengths per drug product [e.g. 50 mg tablets, 100 mg tablets, 120mg/5ml liquid]
- ◆ standard extended units dispensed per prescription, per drug product by dosage strength
- ◆ prescription cost per drug product including all mark-ups and professional fees.

Data verifying generalization of primary data

Data used to verify whether the primary data collected for this study could be generalized to the entire market was obtained from the 2004 Thomson™ Red Book® (RB), which is the central source of data on manufacturers' list prices for the US pharmaceutical market. Prices listed in the RB are labelled as Average Wholesale Price (AWP). The RB bases its published AWP on one of the following:

- ◆ AWP as reported by the manufacturer.
- ◆ AWP calculated based on a mark-up specified by the manufacturer (includes manufacturers, re-packagers, and private labellers). This mark-up is typically based on the Wholesale Acquisition Cost (WAC) or Direct Price (DP) as provided by the manufacturer but may be based on other pricing data provided by the manufacturer.
- ◆ When the manufacturer does not provide an AWP or mark-up formula from which AWP can be calculated, the AWP is calculated by applying a standard 20% mark-up over the manufacturer-supplied WAC. If a WAC is not provided, the standard mark-up is supplied to the DP.

According to the publishers, the data have not been subjected to any independent analysis to determine or calculate the *actual* AWP paid by providers (this includes retailers, hospitals, physicians, and others buying from the wholesaler or directly from the manufacturer for distribution to a patient) to wholesalers. The publisher also does

not independently investigate the *actual* WAC paid by wholesalers to manufacturers or DP paid by providers to manufacturers but relies on the manufacturers to report the values for these categories as described above.

For the purposes of researching US drug prices, it is especially important to note that AWP listed in the RB are not reflective either of *average* prices or of the *actual* prices paid by wholesalers or pharmacies in the United States. This is because AWP is only used as a benchmark for calculating individually negotiated discounts and rebates to large government and private sector buyers like Medicare, Medicaid, Veteran Affairs, Federal Supply Services, private insurers, health maintenance organizations (HMOs), and pharmacy benefit managers (PBMs). Therefore, AWP data does not provide a realistic picture of *actual* prices for drugs in the United States.

Reliable data on actual average drug prices are not readily available in the United States. Nevertheless, it is possible to estimate approximate actual average prices in the market by first accounting for the proportion of the market for prescription drug sales in the United States that is affected by third-party payer rebates and discounts off listed prices. For instance, there are data available that estimate the numbers of prescriptions that are reimbursed by third-party payers compared to those that are paid for by cash customers. According to research published by Canada's Patented Medicines Price Review Board (PMPRB), the proportion of cash customers in the US market has been steadily decreasing in recent years, from 63% of retail prescriptions in 1990 to only 25% by 1998. [PMPRB, 2003: 95] Therefore, at least 75% of retail prescriptions in the United States are reimbursed by third-party payers and are, therefore, sold at prices that are significantly lower than the RB prices.

Second, it is also possible to estimate the magnitude of the discounts achieved over the three quarters of the market for retail prescription drugs that is covered by third-party reimbursement. The size of the discount from AWP depends on the particular terms of the rebates negotiated by third-party payers and the class of drugs concerned. Research by the PMPRB indicates that because of volume discounting generic drug prices tend to be 50% to 60% below AWP, while branded drug prices are 13% to 15% below AWP. [PMPRB, 2003: 95] As mentioned above, these discounts apply to at least three quarters of the market.

The validity of the PMPRB's estimate of the size of the average discount is confirmed by comparing RB list prices with *actual* prices paid by US government agencies from the US Federal Supply Schedule (FSS). In the United States, prices for drugs purchased by federal agencies are set by the Federal Supply Schedule (FSS). FSS prices match the lowest price obtainable in the American market. According to the US General Accounting Office (GAO), average FSS prices for generic drugs are more than 50% below the RB price. Moreover, the US Department of Veteran Affairs (VA) has been able to negotiate prices even lower than FSS prices through purchase contracts for select drugs. [PMPRB, 2003: 95]

Because three quarters of the market obtains retail drug discounts that are similar in size to the FSS price, the average retail price for drugs in the United States is obviously much lower than the RB's AWP price and, especially for generic drugs, may in fact be strongly skewed toward the lower FSS price. Since the actual primary data on retail prices that were collected for this study approximates the kinds of discounts achieved by FSS and other third-party payers, it may be reasonably assumed that average prices are reflected in the retail price data presented here.

Table 9: Comparison of Canadian and US data elements used in this study

<i>Canadian data elements</i>	<i>US data elements</i>
◆ Drug product name	◆ Drug product name
◆ Active ingredient(s) (i.e. common drug name)	◆ Active ingredient(s) (i.e. common drug name)
◆ Manufacturer	◆ Manufacturer
◆ Formulation (e.g. orals, solid)	◆ Formulation (e.g. orals, solid)
◆ Extended unit type (e.g. tablets)	◆ Extended unit type (e.g. tablets)
◆ Available dosage strengths per drug product (e.g. 50 mg tablets, 100 mg tablets, 120mg/5ml liquid)	◆ Available dosage strengths per drug product (e.g. 50 mg tablets, 100 mg tablets, 120mg/5ml liquid)
◆ Total prescriptions dispensed per drug product	
◆ Total prescriptions dispensed per drug product by dosage strength	
◆ Total extended units dispensed per drug product	
◆ Total extended units dispensed per drug product by dosage strength	
◆ Average extended units dispensed per prescription, per drug product by dosage strength	◆ Standard extended units dispensed per prescription, per drug product by dosage strength
◆ Total cost of dispensed prescriptions per drug product	
◆ Average prescription cost per drug product	◆ Prescription cost per drug product

Methodology

The data sources used for this study listed dosage strengths and prescription sizes that sometimes differed in Canada and the United States for the same drug products. In order to make the data comparable between markets, all drug prices were converted to common dosage units. In almost all cases, this was measured in terms of a price per milligram of active ingredient. By converting to a price per dosage unit, prescriptions of various sizes and dosages could be made comparable for each drug product.

Canadian sales volumes per formulation and dosage for each drug product were available in the Canadian dataset. Unfortunately, the same level of detail was not available from the three sources of US price data. To improve comparability on average pricing this study assumed that US sales volumes would follow Canadian patterns and made volume-weighted adjustments to the US data so that they would match Canadian sales volumes per drug formulation and dosage.

Data sources contained many entries for generic drug products as there are multiple manufacturers in the market producing the same active ingredient. Therefore, in the Canadian dataset, all generic manufacturers producing the same active ingredient were aggregated into one entry with a weighted average price based on sales volumes for all common dosage strengths and drug formulations. In the US data set, an average of all listed RB prices for generic manufacturers producing the same active ingredient was calculated and used to calculate a representative price based on Canadian volume weights.

In order to make prices comparable across currencies, the Canadian prices were converted to US dollars at the 2003 Purchasing Power Parity (PPP) rate of 1.21 Canadian dollars to the US dollar calculated by the the Organization for Economic Cooperation and Development. [OECD, 2004] The PPP is used to reflect a currency's actual purchasing power relative to the same basket of goods in different countries. PPP is a useful measure for consumers who will only shop in their domestic markets because it should accurately reflect their transaction costs (excluding indirect costs) in their own country. By contrast, the exchange rate between the Canadian and US currencies is applicable only to a very small percentage of consumers who are willing or able to shop in both countries. Therefore, PPP conversion should be considered the more accurate currency adjustment for general comparisons. Economists also universally accept PPP conversion as the most accurate way to make average prices in different markets truly comparable.

The Canadian dataset is current through the full year 2003, representing the most recent full year of data available. By necessity, actual US retail price data were obtained through primary research and were therefore current to the summer of 2004. In order to keep US data on AWP prices comparable to actual US retail price

(RP) data, the 2004 edition of the Red Book was used. The difference in years between the Canadian and US datasets required the US data to be adjusted to remove the effect of normal price inflation that occurred between 2003 and 2004. According to the US Bureau of Labor Statistics, the 2003 annual inflation rate for pharmaceutical preparations averaged 4.5%. [US Bureau of Labour Statistics, 2004] This figure is conservative when compared to the claims made by drug-price advocacy groups like Families USA, which have reported drug-price inflation rates as high as 6.5% in 2003. [Families USA, 2004] Therefore, US prices were adjusted to remove the 4.5%t inflation that took place between 2003 and 2004 in order to make the Canadian and US prices comparable across time periods.

Due to the fact that all prices have been converted to US currency, Canadian to US price differences are stated as a percentage of the US price:

$$\text{price difference} = (\text{CAD\$} - \text{US\$}) / \text{US\$}.$$

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Recent Fraser Institute publications

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