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Canadian Drug Prices and Expenditures

Some statistical observations
and policy implications

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Joel Lexchin received his MD from the University of Toronto in 1977 and for the past 19 years has been an emergency physician at The University Health Network. He is currently a Professor in the School of Health Policy and Management at York University and an Associate Professor in the Department of Family and Community Medicine at the University of Toronto. He has been a consultant on pharmaceutical issues for the province of Ontario, various arms of the Canadian federal government, the World Health Organization, the government of New Zealand and the Australian National Prescribing Service. He is the author or co-author of over 70 peer-reviewed articles on topics such as physician prescribing behaviour, pharmaceutical patent issues, the drug approval process and prescription drug promotion.

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Introduction

Spending on prescription drugs is the most rapidly increasing component of health care. Currently according to information from the Canadian Institute for Health Information we spent \$18.5 billion on prescription medications in 2004 and \$20.6 billion in 2005. For comparison purposes spending on doctors in 2005 was just over \$18 billion.

Debates about drug prices, spending on drugs, the effects of price controls and similar matters tend to confuse people as numbers are thrown around out of context and issues of public policy are obscured because no one understands what is being said.

This paper attempts to shed some light on this debate by using publicly available information and interpreting it to answer important public policy questions:

- 1 Does the market work to control drug prices, i.e., is there price competition between brand-name drugs that do the same thing; is there price competition between brand-name and generic drugs?

- 2 Have government measures been able to achieve price competition?
- 3 Does it matter whether or not there is price competition?
- 4 What if anything have price controls meant in terms of the prices of individual drugs and overall spending on drugs?
- 5 Are the provinces able to offer similar drug benefits to their populations without federal help?
- 6 Do price controls help keep Canadian drug prices in line with those in other countries?
- 7 Do we have to abandon price controls in order to keep drug companies financially healthy?
- 8 Will more public spending on drugs help to control overall levels of spending?

Summary

The Patented Medicine Prices Review Board (PMPRB), a part of Health Canada, sets an upper limit on how much companies can charge for new patented medications. Current policies of the PMPRB allow companies to price new products up to the maximum price of existing drugs that are therapeutically the same. Companies take almost full advantage of that policy and do not compete on price.

Similarly, brand-name companies don't lower the prices on their drugs when generic competitors appear. By not lowering prices, companies can take advantage of PMPRB regulations that allow new patented medications to enter the Canadian market at high prices. For instance, if a new drug for arthritis comes on the market and the range of prices for existing arthritis medications is \$0.05/pill to \$1.50/pill, then the new drug could be priced at \$1.50/pill, regardless of how effective it is.

Forcing companies to lower introductory prices of new patented medications will require changes to the PMPRB's policies.

Measures taken to date by provincial and federal governments to control the prices of individual drugs or overall drug expenditures have

not had any long-lasting effects on the financial stability of the pharmaceutical industry. Profits in the pharmaceutical industry are running at roughly double those in all manufacturing industries. The economics of pharmaceutical manufacturing seems to mean stable, or increasing profits, for the companies.

Drug expenditures in Canada are currently rising about 8–10% faster than the rate of inflation, despite PMPRB controls on the price of individual patented medications and provincial controls on overall drug expenditures. More aggressive measures will be necessary to control drug spending.

There are currently significant differences in per capita public spending on pharmaceuticals in the different provinces, due to differences in their economic resources. If the provinces are going to be able to offer similar pharmaceutical benefits to their residents, it will require some type of federal equalization payments.

Contrary to assertions by the pharmaceutical industry and its allies, the drop in Canadian drug prices relative to those in other OECD countries since 1987 has nothing to do with changes in the standard of living in Canada relative to those oth-

er countries. Price and spending controls at the federal and provincial levels have been successful in lowering the prices of individual drugs in Canada compared to prices in other countries. These price controls should not be abandoned, although they are not in themselves sufficient to contain overall drug spending.

There is some evidence to support the contention that increasing the amount of spend-

ing on medications that comes from the public purse will help to control overall drug expenditures. However, just increasing public spending, while necessary, may not be sufficient. In addition to a national Pharmacare plan, whereby the government (federal, provincial or both) covers the bulk of the cost of prescription drugs, other measures should be considered in order to contain drug spending.

Introducing new drugs

Background

The vast majority of the drugs that are brought to market in any given year are no better than existing products. Classical economic theory would decree that in these circumstances companies would compete on price since quality is no different.

Question

When brand-name companies introduce new patented prescription drugs, do they compete on price with already existing medications used to treat the same condition?

Data used

Annual reports from the Patented Medicine Prices Review Board (PMPRB) were used to identify new patented drugs. Prices of these new drugs were compared to prices of existing drugs that were therapeutically equivalent to the new drugs. Prices came from listings in provincial formularies.

Analysis

Introductory price as a percent of average price of existing brand-name drugs that were therapeutically the same is shown in Chart 1.

Mean introductory price as a percent of price of existing drugs: 95.9%

Introductory price as a percent of most expensive existing brand-name drug that was therapeutically the same is shown in Chart 2.

Mean introductory price as a percent of most expensive drug: 91.5%

Conclusion

Brand-name companies rarely compete on price with other brand-name companies.

Policy implications

The Patented Medicine Prices Review Board (PMPRB), a part of Health Canada, sets an upper limit on how much companies can charge for new patented medications. Current policies of the PMPRB allow companies to price new products up to the maximum price of existing drugs that are therapeutically the same. Companies take almost full advantage of that policy and do not compete on price. Forcing compa-

nies to lower introductory prices of new patented medications will require changes to the PMPRB's policies.

Reference/data sources

Lexchin J., Do manufacturers of brand-name drugs engage in price competition? An analysis of introductory prices. CMAJ 2006;174:1120-1.

CHART 1 Introductory price as a percent of average price of existing brand-name drugs that were therapeutically the same

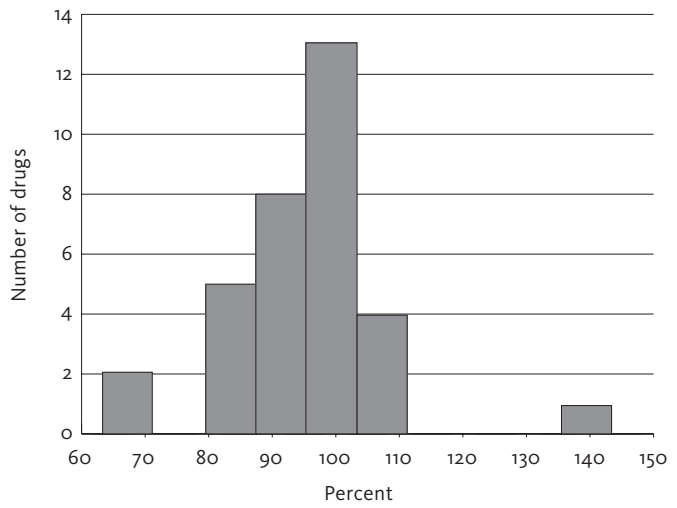
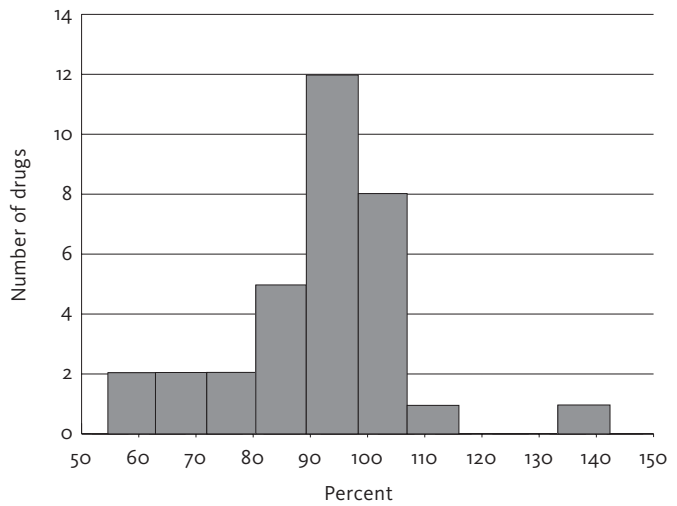


CHART 2 Introductory price as a percent of most expensive existing brand-name drug that was therapeutically the same



Brand-name drugs vs. generics

Background

Brand-name drugs are protected by patents for about 12–13 years against competition. When patents expire, generic companies are free to bring their own lower-cost versions of these drugs onto the market. If the brand-name companies wanted to protect their market share they should lower their prices in order to engage in price competition with the generic products.

Question

When generic drugs become available, do brand-name companies lower their prices and attempt to compete on price with generic medications?

Data used

Prices of brand name drugs were tracked before generics appeared, at the point when generic competition started and subsequent to the initiation of competition. Prices came from various editions of the Ontario Drug Benefit Formulary.

Analysis

Effect of number of generic competitors on price of brand-name product at the time of introduction of generic competition is shown in Chart 3.

Effect of time since generic competition began and number of generic competitors on price of brand-name products is shown in Chart 4.

Conclusion

Brand-name companies do not compete with generic companies on the basis of price, regardless of how many generic competitors there are or how long after generics have been introduced. Although this analysis ends at 1999, there is no more recent evidence to contradict the findings and there have not been any policy changes that would suggest that the situation has changed.

Policy implications

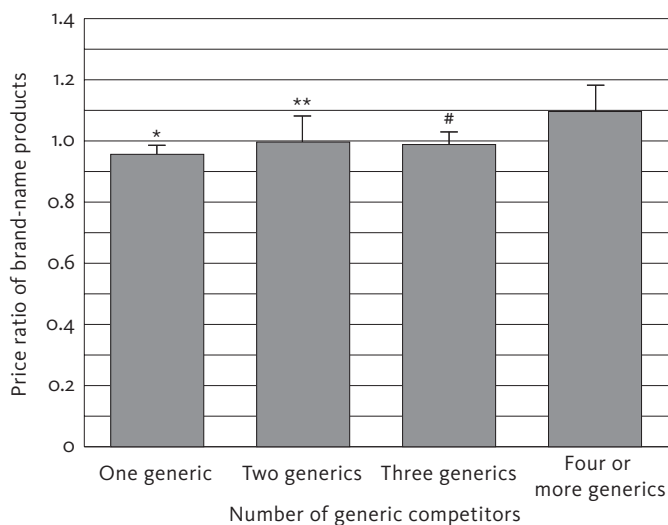
The PMPRB allows companies to set prices for new patented drugs up to the highest amount charged for other medicines that are therapeutically equivalent. Since brand-name companies don't lower the prices on their drugs, then new patented medications can enter the Canadian market at high prices. For instance, if a new drug for arthritis comes on the market and the range of prices for existing arthritis medications is \$0.05/pill to \$1.50/pill, then the new

drug could be priced at \$1.50/pill regardless of how effective it is.

Reference/data sources

Lexchin J., *The effect of generic competition on the price of brand-name drugs*. Health Policy 2004;68:47–54.

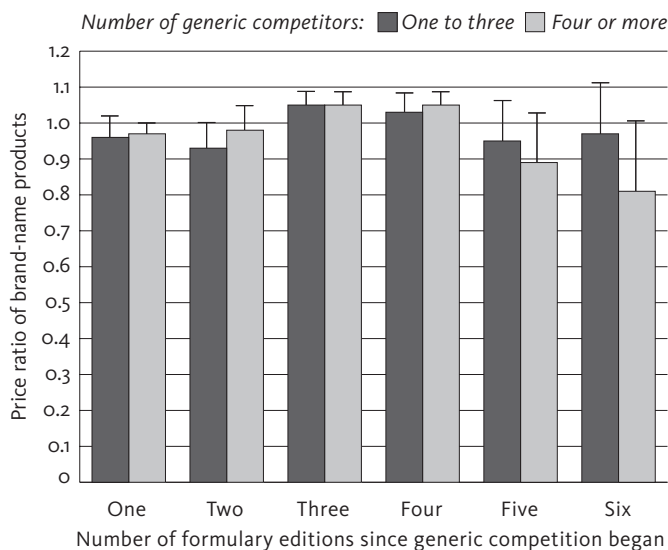
CHART 3 Effect of number of generic competitors on price of brand-name product at the time of introduction of generic competition



Price ratio of brand-name products is calculated as: price in edition of formulary when generic competition starts/price in edition of formulary preceding introduction of generic competition.

Analysis of variance: * $p < 0.0001$ compared to 4 or more generics; ** $p < 0.0103$ compared to 4 or more generics; # $p < 0.0056$ compared to 4 or more generics. Bars represent 95% confidence intervals.

CHART 4 Effect of time since generic competition began and number of generic competitors on price of brand-name products



Price ratio of brand-name products is calculated as: price in successive editions of formulary after generic competition started/price in edition of formulary preceding introduction of generic competition.

Two factor analysis of variance. Neither factor had a significant effect; interaction factor not significant. Bars represent 95% confidence intervals.

Drug prices and profits

Background

The Patented Medicine Prices Review Board limits the price for individual patented drugs. Provinces have a variety of measures to limit the amount that they spend on their public drug plans. Examples of the provincial initiatives are reference-based pricing in British Columbia, tendering for drugs in Saskatchewan, and agreements with companies about expenditures in Ontario.

Question

Have the various provincial and federal measures that are aimed at controlling the prices of individual drugs and the overall expenditures on pharmaceuticals affected profits in the pharmaceutical industry?

Data used

Statistics Canada data was used to compare rates of return as a percent of shareholders' equity for the pharmaceutical industry to that for all manufacturing industries.

TABLE 1 **Percent rate of return on shareholders' equity, large firms (sales > \$75 million) 1996–2003**

Year	Pharmaceutical industry (median)	All manufacturing (median)
2003	20.1	10.8
2002	20.8	11.3
2001	16.7	10.0
2000	11.4	13.1
1999	5.4	14.6
1998	4.1	13.3
1997	18.5	14.0
1996	23.5	12.2

Analysis

Rate of Return on Shareholders' Equity, Large Firms (Sales > \$75 million) 1996–2003 (Percent) is shown in Table 1.

Conclusion

Although profit levels in the pharmaceutical industry dropped substantially in the late 1990s, they have recovered and are now almost twice those for all manufacturing industries.

Policy implications

Measures taken to date by provincial and federal governments have not had any long-lasting effects on the financial stability of the pharmaceutical industry. The economics of pharmaceutical manufacturing seems to mean stable or increasing profits for the companies.

Reference/data sources

Statistics Canada, Financial Performance Indicators for Canadian Business, Vol. 1, 1996–1999 (Catalogue 61-224-XCB)

Statistics Canada, Financial Performance Indicators for Canadian Business, Vol. 1, 2000–2002 (Catalogue 61-224-XCB)

Statistics Canada. Financial Performance Indicators for Canadian Business, Vol. 1, 2001–2003 (Catalogue 61-224-XCB)

Drug prices keep rising

Background

The Patented Medicine Prices Review Board limits the price for individual patented drugs. Provinces have a variety of measures to limit the amount that they spend on their public drug plans. Examples of the provincial initiatives are reference-based pricing in British Columbia, tendering for drugs in Saskatchewan, and agreements with companies about expenditures in Ontario.

Question

Have federal and provincial controls on the prices of individual drugs and provincial controls on overall expenditures been successful in containing the rise in expenditures on prescription drugs?

Data used

Total outpatient drug expenditures were adjusted for inflation (base year 1992) and yearly percent changes were calculated.

Analysis

Year-to-year percent change in outpatient drug expenditures, adjusted for inflation is shown in Chart 5.

Conclusion

Except for two years, overall drug expenditure since 1985 has been rising significantly faster than the overall rate of inflation.

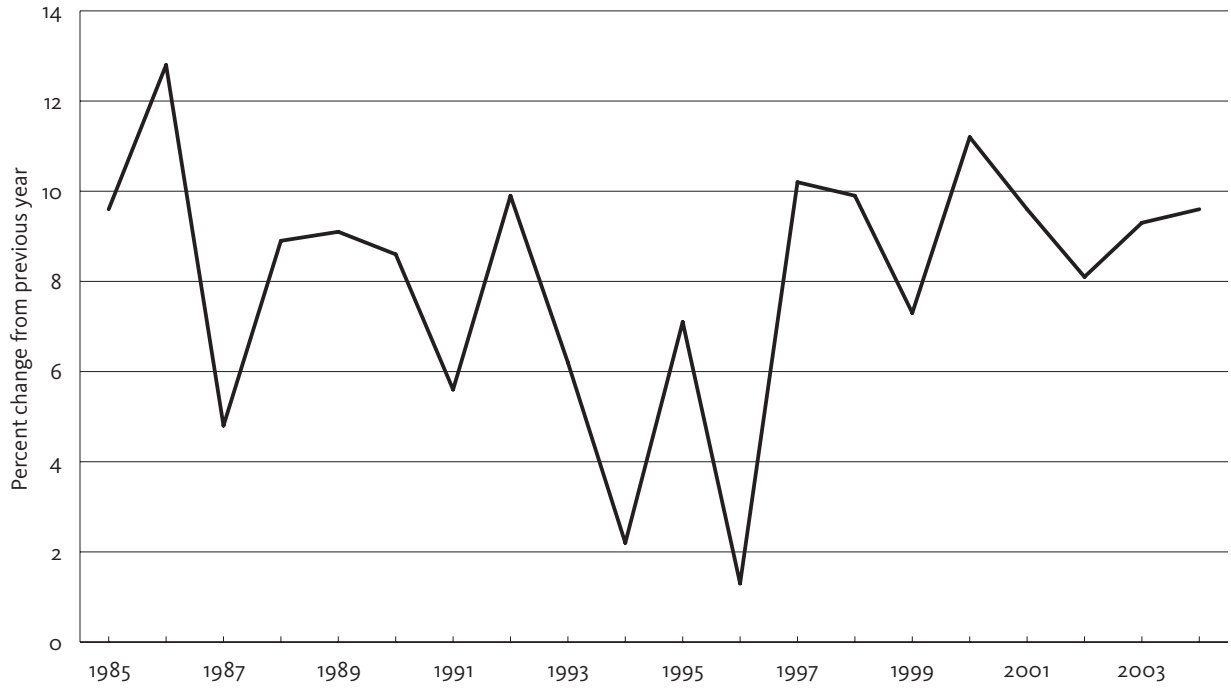
Policy implications

Federal and provincial controls have not been successful at controlling overall drug expenditures. More aggressive measures will be necessary to control drug spending.

Reference/data sources

Canadian Institute for Health Information. Drug expenditure in Canada 1985–2004. Available at http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=AR_8o_E

CHART 5 Year-to-year percent change in outpatient drug expenditures, adjusted for inflation



Provincial drug benefits differ

Background

Medicare only covers the cost of drugs used in hospitals, not drugs prescribed in the community. Therefore there is no national standard for drug coverage in Canada and, as a result, over the years the provinces have developed their own programs paid for out of provincial revenues. However, there are significant differences among provinces in their tax bases, and therefore in the quantity and quality of services that they can offer their populations.

Question

Are the different provinces financially able to offer comparable drug benefits to their population?

Data used

Per capita gross domestic product (GDP) for each province was compared to per capita public spending on prescription drugs.

Analysis

Per capita provincial GDP and per capita public spending on drugs is shown in Chart 6.

Correlation coefficient .688 ($p = .04$)

Conclusion

There is no statistically significant correlation between provincial GDP and public spending on drugs when all 10 provinces are considered. Alberta appears to be an outlier, and removing data for this province from the analysis yields a relatively strong correlation between provincial GDP and public spending.

Policy implications

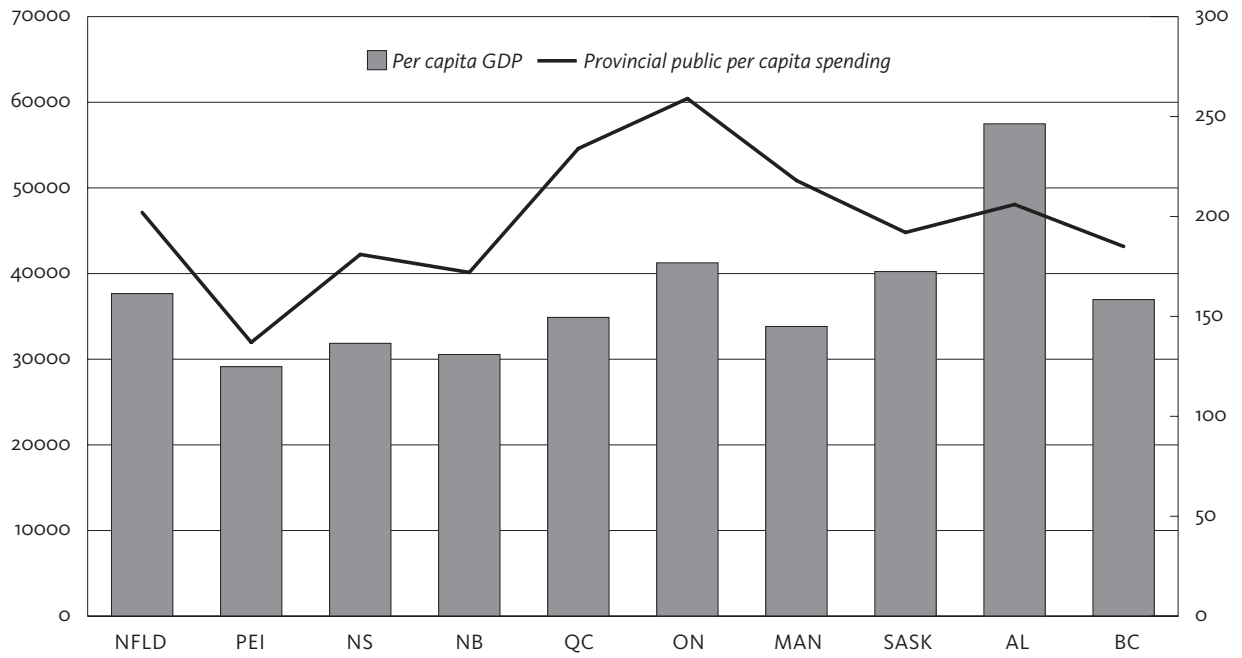
If the provinces are going to be able to offer similar pharmaceutical benefits to their residents, it will require some type of federal equalization payments.

Reference/data sources

Statistics Canada: Gross domestic product, expenditure-based, by province and territory. Available at <http://www40.statcan.ca/lo1/csto1/econ15.htm>

Canadian Institute for Health Information. Drug expenditure in Canada 1985-2004. Available at http://secure.cihi.ca/cihiweb/disPage.jsp?cw_page=AR_80_E

CHART 6 Per capita provincial GDP and per capita public spending on drugs



Drug prices and GDP

Background

The Patented Medicine Prices Review Board compares prices of patented medicines in Canada to those in seven other countries (France, Germany, Italy, Sweden, Switzerland, United Kingdom, United States). Since 1987, Canadian prices have gone from being 23% above the international average to 8% lower in 2005. The pharmaceutical industry and others supporting its position claim that this change has more to do with differences in the standard of living in Canada and these other countries than it does with price controls, i.e., there is a greater difference in the standard of living in Canada and these other countries now than there was in 1987 and therefore there is a greater difference in drug prices.

Question

Do drug prices in Canada relative to those in other OECD countries reflect different standards of living in the different countries?

Data used

Gross Domestic Product (GDP) is usually considered a proxy for standard of living in a country. Changes in GDP in Canada and six other coun-

tries (France, Germany, Italy, Sweden, Switzerland, United Kingdom) were compared to changes in the price ratio for prescription drugs.

Analysis

Changes in the ratio of GDP and prescription drug prices: are shown in Table 2.

Changes in GDP and drug price ratio 1987–1997: Correlation coefficient 0.741 ($p = .10$). No significant correlation

Changes in GDP and drug price ratio 1997–2002: Correlation coefficient 0.056 ($p = .92$). No significant correlation

Conclusion

There is no correlation between changes in GDP (standard of living) and drug price ratios for Canada versus other OECD countries. Other things besides changes in relative GDP are affecting the ratio of drug prices.

Policy implications

Price controls at the federal and provincial levels have been successful in lowering the prices of individual drugs in Canada compared to prices in other countries. These price controls

TABLE 2 **Changes in the ratio of GDP and prescription drug prices**

		France	Germany	Italy	Sweden	Switzerland	United Kingdom
1987	Drug price ratio (Canada=100)	53.0	84.4	50.4	72.7	93.1	69.6
	GDP ratio (Canada=100)	120.9	155.5	87.4	137.2	220.9	88.5
1997	Drug price ratio (Canada=100)	89.4	111.2	79.5	106.4	123.4	100.8
	GDP ratio (Canada=100)	130.6	146.4	94.3	139.2	209.6	99.0
2002	Drug price ratio (Canada=100)	82.7	95.9	78.9	93.6	105.4	104.3
	GDP ratio (Canada=100)	127.0	136.5	89.2	140.7	196.3	95.4

should not be abandoned, although they are not in themselves sufficient to contain overall drug spending.

Reference/data sources

Energy Information Administration. International energy annual 2002. Table B.2c: World

per capita gross domestic product at market exchange rates, 1980–2002. Available at <http://www.eia.doe.gov/emeu/international/populationandgdp.html>

Patented Medicine Prices Review Board. Annual reports. Available at <http://www.pmprb-cepmb.gc.ca/english/view.asp?x=91>

Public spending on drugs

Background

With the exception of a few developed countries (Canada, Mexico and the United States), the majority of spending on medications in all other Organization for Economic Cooperation and Development (OECD) countries comes from the public purse. Therefore governments in these countries theoretically have the ability to control the amount that is spent on medications.

Question

Do countries with higher levels of public spending on drugs do better at controlling overall drug expenses than countries with lower levels of public spending?

Data used

The following data from the OECD were used: percent public expenditure on prescription drugs as a percent of overall expenditure, per capita overall expenditure on prescription drugs, annual growth rate in expenditures on prescription drugs.

Analysis

Percent annual growth, percent public expenditure, per capita expenditure for 17 OECD countries is shown in Table 3.

Percent public expenditure & per capita expenditure: Correlation coefficient $-.553$ ($p = .0198$). A significant correlation exists.

Percent public expenditure & annual growth rate: Correlation coefficient $-.264$ ($p = .3115$). No significant correlation.

Conclusion

Depending on how drug spending is measured, more public spending may or may not help to control overall spending. If overall spending is measured by the amount spent per person, then increasing public spending helps keep this under control. If overall spending is measured by the annual growth rate, then higher public spending doesn't seem to help.

Policy implications

A national Pharmacare plan, whereby the government (federal, provincial or both) covers the bulk of the cost of prescription drugs, may not be sufficient on its own to control overall expendi-

TABLE 3 Percent annual growth, percent public expenditure, per capita expenditure for 17 OECD countries

Country	Percent public expenditure (2002)	Percent annual growth 1992–2002	Per capita expenditure** (2002)
Ireland	84.2	7.1	259
Czech Republic	77.4	6.0	253
Germany	74.8	1.9	408
Greece	71.5	3.3	278
Sweden	69.3	6.4	329
Japan	68.3*	1.8	391
Switzerland	67.0	3.4	354
France	67	4.3	570
Hungary	62.5	3.9	298
Iceland	61.8*	4.7	375
Australia	53.8*	8.0	346
Finland	53	4.7	309
Denmark	52.5	4.0	239
Korea	52.4*	7.3	208
Italy	52.1	2.4	484
Canada	37.6	5.2	485
United States	19.5	7.2	673

* 2001 data

** U.S. dollars Purchasing Power Parity

tures. Other measures should be considered in conjunction with a Pharmacare plan.

Reference/data sources

Organization for Economic Cooperation and Development. Public funding as a percentage of pharmaceutical expenditure, 1990 and 2002.

Available at www.irdes.fr/ecosante/OECD/431010.html

Organization for Economic Cooperation and Development. OECD health data 2004. Available at <http://www.oecd.org/dataoecd/3/62/31938359.pdf>

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