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# Evaluating reference-based pricing: initial findings and prospects

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## Abstract

REFERENCE-BASED PRICING IS A CONTROVERSIAL POLICY MECHANISM used to control pharmaceutical expenditures. After its implementation in some European countries, the British Columbia government introduced a version of reference-based pricing in October 1995. The authors reviewed previous studies of reference-based pricing in other countries and conducted a preliminary assessment of the impacts of the BC system by analysing secondary utilization and cost data. After the introduction of reference-based pricing in other jurisdictions within the Organisation for Economic Cooperation and Development, there was a temporary reduction in the rate of growth of total pharmaceutical expenditures, followed by a return to previous growth trends in subsequent years. Similarly, initial data from BC showed dramatic declines in annual expenditures for drugs within referenced categories (from \$42.0 million the year before reference-based pricing was introduced to \$23.7 million the year after). Although early evidence suggests that reference-based pricing in BC is indeed reducing drug expenditures, much more research is needed to make a final determination of its success. A more comprehensive and longitudinal evaluation of reference-based pricing is needed and should take into account a wide range of non-cost impacts, the most important of which are the effects on health outcomes.

Reference-based pricing is a term describing any system that establishes a common reimbursement level for a group of comparable or interchangeable drugs. The basic premise of reference-based pricing is that governments can reduce drug costs without affecting quality of care by encouraging the use of less expensive but equally efficacious drugs while maintaining the freedom of manufacturers to set prices and of physicians and patients to choose the products they prefer.<sup>1,2</sup>

A comprehensive framework for evaluating such a program would include an assessment of the impact of reference-based pricing on health outcomes, quality of care, utilization patterns, drug pricing, equity, access, health system costs, and industry's capacity for innovation.<sup>3</sup>

Several concerns about reference-based pricing have been raised, including the perception that it encroaches on a physician's autonomy to tailor treatment to individual patients, the potential for differential access to care based on ability to pay, the introduction of a financial component into the physician-patient relationship, the lack of remuneration to physicians for submission of special authority requests (requests for full coverage for more expensive drugs in special circumstances), a lack of openness in the implementation of reference-based pricing and the disincentive it may pose to improving existing drugs and developing new ones.<sup>4</sup>

Very little research has been undertaken to address these issues in any jurisdiction, nor has the infrastructure been established to do so. However, data *are* available relating to the primary purpose of reference-based pricing, cost reduction, and these data defined our analysis here.

Since 1989, several nations in the Organisation for Economic Cooperation and Development have experimented with reference-based pricing. Although existing research is not sufficiently comprehensive to allow a complete understanding of the full effects of reference-based pricing, it is clear that such systems have not succeeded in substantially slowing the growth of total pharmaceutical expenditures over the long term.<sup>3,5,6</sup> One reason is that price reductions, the focus of reference-



based pricing, can be outweighed by attendant increases in volume or changes in prescribing mix that favour newer (and hence non-referenced), more expensive products. In addition, reference-based pricing is most applicable to a limited segment of the overall pharmaceutical market: those therapeutic categories that contain a number of competing products, especially generic equivalents, and that thus allow for choices to be based on considerations of cost and effectiveness.<sup>2,5</sup>

In October 1995 the British Columbia government introduced a reference-based pricing system for histamine-2 receptor (H<sub>2</sub>) antagonists, nitrates and NSAIDs. In 1996 the policy was extended to angiotensin-converting-enzyme (ACE) inhibitors. BC covers all prescription drug costs for elderly patients, although there is a dispensing deductible of \$200. Other patients can obtain similar coverage but must pay a monthly premium.

Among the features that differentiate the BC program from others are the desire to base decisions on research evidence, the creation of an independent body of experts to

assess this evidence and a de facto educational component for both physicians and patients consisting of information sheets, presentations and other aids. In addition, there is an option for special authority approval, which provides full coverage for a more expensive drug if the prescribing physician can justify its use.<sup>7,8</sup>

## Data sources

The following data were obtained from BC Pharmacare: total number of prescriptions, quantity (number of pills in different strength formulations) and costs within the reference categories for several years before and for 1 year after the introduction of reference-based pricing.

## Results

After the introduction of reference-based pricing in BC, there was an immediate and pronounced shift toward the prescribing of the reference products in all 3 therapeutic

**Table 1: Numbers of prescriptions for H<sub>2</sub> antagonists and omeprazole before and after implementation of reference-based pricing in British Columbia, in October 1995**

	October 1994 to September 1995		October 1995 to September 1996		Change in no. of prescriptions, %
	No. of prescriptions	Market share, %	No. of prescriptions	Market share, %	
<b>H<sub>2</sub> antagonists</b>					
Cimetidine*	38 675	10.5	197 419	56.8	+410.4
Famotidine	26 281	7.2	9 047	2.6	-65.6
Nizatidine	9 589	2.6	2 879	0.8	-69.8
Ranitidine	162 068	44.2	64 970	18.7	-59.9
Subtotal	236 613	64.5	274 333	78.9	+15.9
<b>Omeprazole</b>	129 996	35.4	73 255	21.1	-43.6
<b>Total</b>	366 609	100.0	347 588	100.0	-5.2

Source: BC Pharmacare data.

\*Reference drug for H<sub>2</sub> antagonists.

**Table 2: Costs of H<sub>2</sub> antagonists and omeprazole before and after implementation of reference-based pricing in British Columbia, in October 1995**

	October 1994 to September 1995		October 1995 to September 1996		Change in ingredient cost, %
	Ingredient cost, \$	Market share, %	Ingredient cost, \$	Market share, %	
<b>H<sub>2</sub> antagonists</b>					
Cimetidine*	499 984	2.1	2 463 623	16.6	+392.7
Famotidine	1 573 635	6.6	434 074	2.9	-72.4
Nizatidine	758 040	3.2	187 569	1.3	-75.2
Ranitidine	6 210 636	26.0	1 862 784	12.6	-70.0
Subtotal H <sub>2</sub>	9 042 295	37.9	4 948 051	33.4	-45.3
<b>Omeprazole</b>	14 840 003	62.1	9 885 649	66.6	-33.4
<b>Total</b>	23 882 298	100.0	14 833 700	100.0	-37.9

Source: BC Pharmacare data.

\*Reference drug for H<sub>2</sub> antagonists.



categories ( $H_2$  antagonists, nitrates and NSAIDs). In total, expenditures dropped from \$42.0 million in the year before the introduction of reference-based pricing to \$23.7 million the year after.

More detailed examination of the preliminary data available identified a few noteworthy patterns for the  $H_2$  antagonists and the nitrates.

- The total number of prescriptions for  $H_2$  antagonists (and omeprazole) and nitrates decreased (by 5.2% and 2.5% respectively), in contrast to previous trends recorded by BC Pharmacare.
- The numbers and market shares of both new and repeat prescriptions suggested that a substantial number of patients were switched from one drug to another after the introduction of reference-based pricing. The effects of these changes in terms of number of physician visits, quality of care and consumer satisfaction are not known.
- Few substantial changes in unit cost were observed (except in the case of transdermal nitroglycerin), which suggested that pricing levels, by and large, were maintained. However, the reactions of individual companies might have been significantly different if reference-based pricing had been implemented beyond the BC market.

Detailed findings for  $H_2$  antagonists and omeprazole are presented here as an illustration of the impacts brought about by reference-based pricing thus far. Table 1 shows that during the year before reference-based pricing was introduced, ranitidine was prescribed more than 4 times as often as cimetidine, the reference drug. However, in the year after, there were 3 times as many prescriptions for cimetidine as for ranitidine. There were also substantial decreases in prescriptions for famotidine, nizatidine and omeprazole.

In total, the number of prescriptions for  $H_2$  antagonists and omeprazole decreased by 5.2%, from 366 609 in the year before to 347 588 the year after the introduction of reference-based pricing. This represents a reversal of the 9.2% average annual growth between 1985 and 1994. Mean number of units per prescription did not change appreciably after the introduction of reference-based pricing.

With respect to ingredient cost (cost paid by BC Pharmacare excluding pharmacist fees), Table 2 shows a drop of nearly 38% in total expenditures, from \$23.9 million the year before implementation to \$14.8 million the year after, a change that reflects the impact of the switch to cimetidine. In comparison, the average annual growth in ingredient cost between 1986 and 1994 was 22.2%.

In many other countries where reference-based pricing has been implemented, manufacturers of products priced higher than the reference price had to drastically lower their prices to maintain market share. However, our analysis of the data for mean cost per unit in BC showed that, of 81 possible combinations of  $H_2$  antagonist product,

strength and form, only 12 (15%) had changes in cost per unit greater than 15%.

## Discussion

In the first year after its implementation, reference-based pricing seems to have achieved the goal of reducing drug expenditures within reference categories. However, comprehensive evaluation of the policy requires a much broader assessment.

The apparent drop in total volume of drugs prescribed warrants continued monitoring. The key question is the extent to which the policy is reducing inappropriate utilization and not acting as a barrier to appropriate care.

The paucity of data on evaluative criteria other than cost and utilization precludes a comprehensive assessment of the success of reference-based pricing programs in general and the BC initiative in particular. In addition, there is a need to verify precisely which components of the BC reference-based pricing program (the pricing policy, the educational component, the special authority option or specialist access) have had the greatest impact.

In conclusion, several research questions must be addressed before consideration can be given to the wider application of reference-based pricing.

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