

# INTERNATIONAL REPORT

## Outcomes-Based Drug Coverage in British Columbia

A unique approach to public drug coverage that uses academic advisers and saves money.

by **Steven Morgan, Ken Bassett, and Barbara Mintzes**

**ABSTRACT:** For the past decade the provincial drug plan in British Columbia has based the allocation of public subsidy on scientific standards of evidence. Coverage policies under B.C. PharmaCare are marked by the restriction of public subsidy until manufacturers provide valid evidence of a comparative health outcome advantage versus therapeutic alternatives. Implementing and maintaining such outcomes-based coverage policies has required a system of evidentiary review and support. Since 1994 the Therapeutics Initiative at the University of British Columbia has provided provincial decisionmakers with such support. We describe lessons from the B.C. experience for jurisdictions interested in basing coverage on evidence of proven comparative advantage for patients' health.

**P**RESCRIPTION DRUGS constitute one of the largest and fastest-growing cost components of modern health care systems. Many approaches to managing drug expenditures focus on price control through regulation or negotiation and cost shifting through deductibles or copayments. Although these strategies can provide policymakers with immediately apparent savings, they are seldom guided by the core determinant of health care value: proven health outcomes. Yet drug spending is an investment made with the intent to improve patients' health. The simple economics of maximizing health benefits from drug spending requires, at a minimum, the avoidance of ineffective products and the use of lowest-cost options

when health outcomes are equivalent. Drug coverage policy that focuses on paying for proven health outcomes can encourage these steps.

In light of persistent cost pressures and new limits on price controls enshrined in the Medicare Prescription Drug, Improvement, and Modernization Act of 2003, U.S. interest in evidence-based approaches to drug coverage is increasing.<sup>1</sup> Several states have begun to jointly invest in producing systematic drug-to-drug evidence reviews, and there are increasing calls for the public financing of trials to establish the comparative health impact of drugs in practical settings.<sup>2</sup> Along with mechanisms to increase the availability and accessibility of clinical data, policy-making frameworks must

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be developed to consistently act on such evidence.

In this paper we describe how decision-makers in British Columbia have been allocating public drug subsidy based on scientific evidence of comparative health benefit. This outcomes-based approach to drug coverage helps to control spending while avoiding the financial inequities and adverse health impacts often associated with indiscriminate cost shifting. However, because they selectively reduce spending on certain products, outcomes-based policies are consistently challenged by manufacturers. Implementing and maintaining outcomes-based drug coverage in British Columbia has therefore required timely and defensible reviews of evidence and ongoing expert advice. A group of academics at the University of British Columbia has provided such evidentiary support for the past ten years.

Using three case studies, we illustrate the outcomes-based decision-making framework used in British Columbia, its impact on drug costs, and the relationship between policymakers and academic advisers that helps sustain it. The B.C. experience illustrates the potential value of having a drug program work closely with academic experts to develop, implement, and maintain coverage policy based on consistently applied standards of scientific evidence.

### **Policy Origins**

Outcomes-based coverage was introduced in British Columbia during the early 1990s, when rapid cost growth threatened the tax-financed provincial drug benefit program, PharmaCare. At the time, PharmaCare provided a variety of targeted drug benefit plans—including one for all B.C. seniors—and its costs were growing 17 percent per year (compared with only 7 percent growth in provincial gross domestic product, or GDP).<sup>3</sup> Other provincial drug plans felt similar cost pressures; most responded with new copayments and deductibles.<sup>4</sup> PharmaCare instead began to pursue outcomes-based coverage policies.

Key PharmaCare decisionmakers were

aware of Stephen Soumerai's U.S. research, which warned against indiscriminate charges that could impede access to necessary medicines.<sup>5</sup> In light of evidence that most of PharmaCare's cost growth was attributable to increased use of newer, higher-price drugs, decisionmakers saw evidence-based coverage as an appropriate way to control the public drug plan's costs while maintaining access to medicines of proven benefit.<sup>6</sup>

■ **Health Canada's role.** Prior to 1993 PharmaCare had accepted for coverage virtually any drug approved for sale by Health Canada. Similar to the U.S. Food and Drug Administration (FDA), Health Canada typically licenses products according to evidence of safety and efficacy from placebo-controlled trials of short duration.<sup>7</sup> This process is not designed to establish the long-term or relative effectiveness of therapeutic alternatives. Without such evidence on comparative health impact, policymakers could not know whether ever-increasing drug costs were justified. PharmaCare sought a process for evaluating available scientific evidence and turned to the academic community for decision support. As a former director of PharmaCare explained, "Evidence-based policy is a complex task and is sufficiently 'charged' both politically and economically that policymakers require confident expert advisers."<sup>8</sup>

■ **The Therapeutics Initiative.** The resulting Therapeutics Initiative (TI) was established in 1994 with a renewable five-year grant from the Ministry of Health. The TI is a university-based group of family physicians, specialists, academic researchers, clinical pharmacologists, pharmacists, and epidemiologists. Its mandate includes the evaluation of all drugs for which manufacturers seek public coverage. Other activities of the TI include the provision of newsletters and continuing education about rational drug therapy to physicians and pharmacists. The TI is also routinely called upon to offer decisionmakers advice about clinical evidence related to often hotly contested coverage decisions.<sup>9</sup>

## Outcomes-Based Policies

The following chronological case studies illustrate three major outcomes-based B.C. policy decisions: the genesis of the decision-making framework; application of outcomes-based coverage to existing therapeutic classes of drugs; and outcomes-based coverage of new, heavily promoted medicines.

■ **Nitroglycerin: the genesis.** The potential value of basing coverage on comparative clinical evidence became apparent with the 1994 publication of a review of nitrate drugs used to treat stable angina.<sup>10</sup> PharmaCare was spending approximately \$3.8 million annually on a slow-release nitroglycerin product that cost ten times as much per usual dose as funded alternatives. The review of evidence, conducted by TI members, found that existing evidence did not distinguish slow-release nitroglycerine from less costly nitrates in terms of efficacy, effectiveness, compliance, or side effects. Predictably, manufacturers challenged this conclusion.

The review—and later, policies that would be based upon it—withstood these challenges because the standards applied were grounded in the emerging literature on evidence-based medicine and, as such, were widely accepted and scientifically defensible.<sup>11</sup> However, dealing with challenges from stakeholders engaged decisionmakers in an ongoing dialogue with the TI about the uses of evidence in policy. A decisionmaker involved at the time noted that educating the drug benefit plan about the hierarchy of evidence is “a lesson that cannot be overstated.”<sup>12</sup> It became clear that evidence-based policy would require solid standards of evidence.

The TI established the importance of only considering evidence if it came from published clinical trials involving (1) the strongest possible study design (blinded, randomized controlled trials); (2) an appropriate spectrum of participants and practice settings; (3) com-

parators with similar properties or clinical endpoints, or both; and (4) the measurement of clinically valid outcomes such as morbidity and mortality. The final point, while most controversial, proved most important. From the assessment of nitrate drugs onward, B.C. PharmaCare accepted a hierarchy of health outcomes that placed greater weight on evidence of mortality and morbidity reduction than on evidence of intermediate or “surrogate” effects (for example, changes in cholesterol level, bone density, or blood pressure). It is in this sense that PharmaCare would strive for truly outcomes-based coverage decisions.

Through dialogue with the TI, decisionmakers established the essence of their program of outcomes-based coverage: PharmaCare would not pay for a more costly product in the absence of scientifically valid evidence of a comparative advantage to patients’ health. Putting this into operation in the context of established drug categories, such as nitrates, required PharmaCare to introduce its most ambitious outcomes-based policy: the Reference Drug Program.

■ **Reference Drug Program: application.** In 1995 PharmaCare subjected nitrate drugs, histamine-2 blockers, and nonsteroidal anti-inflammatory drugs (NSAIDs) to reference-based subsidy. For each drug class considered, the TI was asked to determine whether scientifically valid evidence indicated the superiority of any drug in terms of morbidity or mortality. In the absence of such evidence, PharmaCare based its public subsidy on low-cost options within the class. The reference-based subsidies factored in generous allowances for variation in dosing levels. Moreover, patients with clinical requirements for specific products received full subsidy through a special authority process, and any patient could “top up” reference-based subsidy to the cost of his or her preferred product.

**“Opposition to the Reference Drug Program included legal challenges, negative media campaigns, and threats to cease drug industry funding of research in British Columbia.”**

Angiotensin-converting enzyme (ACE) inhibitors and calcium-channel blockers were added to the Reference Drug Program in 1997.

The application of outcomes-based coverage through the Reference Drug Program assigned the burden of proof to manufacturers. Those wishing to have their drug subsidized at a higher rate than therapeutic alternatives would have to show that their product had a scientifically established health outcome advantage. Maintaining this policy required that the TI provide prompt reviews of and advice about manufacturers' ongoing submissions of evidence. Most data submitted by manufacturers came from small, short-term trials that established no differences in health outcomes. Manufacturers, however, claimed that higher costs were justified by "convenience" advantages, such as less frequent dosing. Given that trials had not established that such factors produce superior outcomes, claims of convenience were not persuasive in the context of the outcomes-based policy.

Opposition to the Reference Drug Program included legal challenges, negative media campaigns, and threats to cease drug industry funding of research in British Columbia. Knowing that rigorous external assessment was appropriate to policy based on scientific evidence, PharmaCare provided data access to academic groups that sought to evaluate the Reference Drug Program. Teams from Harvard, the University of Washington, and McMaster University evaluated the policy and found that it was successful at containing costs, ensuring ongoing access, and avoiding deleterious health and health system consequences.<sup>13</sup> PharmaCare savings from the Reference Drug Program are conservatively estimated at \$12 million annually (5 percent of affected plan costs).<sup>14</sup> Similar savings would be generated by applying the same standards of evidence to new "blockbuster" product classes that compete with older, less costly ones.

■ **COX-2 inhibitors: outcomes-based coverage.** B.C. decisionmakers have found that "managing market entry" through outcomes-based coverage of new drug classes is as important as the reference pricing of existing

products.<sup>15</sup> This is especially true in cases of intensely marketed new products for which there is little or no evidence upon which to base coverage decisions. Cyclooxygenase-2 (COX-2) inhibitors are a key example. First marketed in 1999 for the treatment of osteoarthritis and rheumatoid arthritis, COX-2 inhibitors cost much more than older NSAIDs. The premium price was rationalized by claims of reduced adverse consequences from gastrointestinal toxicity. Most drug plans—in Canada and elsewhere—provided coverage for these drugs shortly after their launch. PharmaCare did not.

In mid-1999 the TI was asked to review evidence concerning the first COX-2 inhibitor (celecoxib) for which a manufacturer sought public coverage. There were yet no published randomized controlled trials, and reports of trials submitted to Health Canada for market approval were not made public. This was the first time in the TI's experience that a drug was licensed in Canada without any publicly available scientific evidence. In the absence of such evidence, the TI concluded that celecoxib's relative efficacy and safety were unknown.<sup>16</sup> PharmaCare consequently restricted funding of COX-2 inhibitors until manufacturers published valid evidence that their products were indeed better than older NSAIDs.

Maintenance of this coverage policy, like other outcomes-based policies, required the evaluation and reevaluation of evidence submitted by manufacturers seeking coverage. Four further manufacturer-requested reviews of evidence pertaining to COX-2 inhibitors would be conducted between 1999 and 2003. None would find valid evidence of a health outcome advantage. In view of subclinical advantages (for example, fewer endoscopically determined gastroduodenal ulcers) with undetermined relevance to patients' health, PharmaCare listed COX-2 inhibitors as a "fourth-line" restricted benefit (that is, beneficiaries were required to try three other NSAIDs before COX-2 inhibitors would be publicly subsidized through a special authority process) in August 2000.

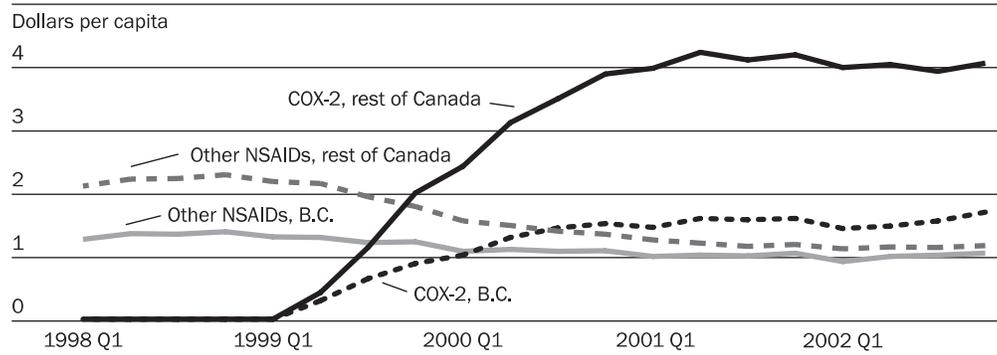
The case of COX-2 inhibitors illuminated, for both PharmaCare and the TI, the limited and selective nature of published data. Following public hearings held by the FDA, the TI learned that a published report of the CLASS (Celecoxib Long-Term Arthritis Safety Study) trial—submitted as evidence of celecoxib’s comparative therapeutic value—had been misleading.<sup>17</sup> The published report summarized two trials that were much longer than described in the published article.<sup>18</sup> On review of the full trial data, obtained from the FDA, the TI concluded that more patients taking celecoxib and rofecoxib experienced serious adverse events than those on comparators in the same class, which suggested a net safety disadvantage in overall patient health.<sup>19</sup> PharmaCare maintained the restricted benefit status for COX-2 inhibitors.

*Cost savings.* PharmaCare’s restrictions on COX-2 inhibitors has produced major savings to the public drug plan. Whereas the Ontario government spent approximately \$50 per senior on COX-2 inhibitors and other NSAIDs in 2002, B.C. PharmaCare spent less than \$7.<sup>20</sup> This difference amounts to \$23 million in annual PharmaCare savings (6 percent of the seniors’ drug plan budget). As illustrated in Exhibits 1 and 2, restrictive PharmaCare coverage

also appears to have had a spillover effect, influencing the overall rate of COX-2 prescribing in British Columbia. By 2002 per capita spending on COX-2 inhibitors was \$9.81 lower in British Columbia than in the rest of Canada. Almost all (\$8) of the difference in spending is explained by lower consumption of COX-2 inhibitors in British Columbia: 5.2 defined daily doses (DDD) per capita versus 12.9 in the rest of Canada.<sup>21</sup> To manufacturers, British Columbia’s low COX-2 inhibitor use represents a loss of approximately \$40 million in potential annual sales.

*Pressure to remove coverage restrictions.* PharmaCare has experienced predictable pressure from manufacturers and allied consumer and professional groups to remove restrictions from the coverage of COX-2 inhibitors. Yet several factors have made it possible to uphold the coverage decision. Key among these were PharmaCare’s consistent application of its decision-making framework and the frequent and thorough evaluations of evidence. No manufacturer (or patient group) could claim to be treated unfairly: The same evidentiary standards have been applied across the board in PharmaCare. And, as with the Reference Drug Program, PharmaCare has provided data to academics conducting external evaluations of

**EXHIBIT 1**  
**Total (Private And Public) Spending On COX-2 Inhibitors And Other Nonsteroidal Anti-Inflammatory Drugs (NSAIDs) Purchased Per Capita Per Quarter, In British Columbia And The Rest Of Canada, 1998–2002**

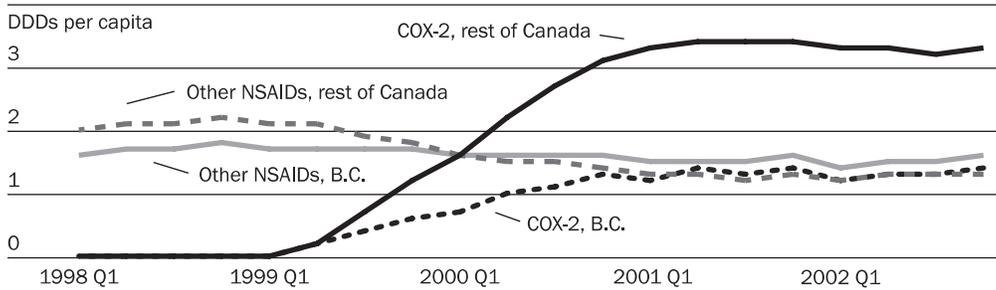


**SOURCE:** Authors’ calculations based on data from IMS Health, Canada.

**NOTES:** COX-2 is cyclooxygenase-2. Older NSAIDs include Diclofenac, Etodolac, Fenoprofen, Flurbiprofen, Ibuprofen, Indomethacin, Ketoprofen, Nabumetone, Naproxen, Oxaprozin, Phenylbutazone, Piroxicam, Sulindac, Tenoxicam, Tiaprofenic acid, and Tolmetin. Dollars are Canadian dollars.

**EXHIBIT 2**

**Total Defined Daily Doses (DDD) Of COX-2 Inhibitors And Other Nonsteroidal Anti-Inflammatory Drugs (NSAIDs) Purchased Per Capita Per Quarter, In British Columbia And The Rest Of Canada, 1998-2002**



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**NOTES:** COX-2 is cyclooxygenase-2. Older NSAIDs include Diclofenac, Etodolac, Fenoprofen, Flurbiprofen, Ibuprofen, Indomethacin, Ketoprofen, Nabumetone, Naproxen, Oxaprozin, Phenylbutazone, Piroxicam, Sulindac, Tenoxicam, Tiaprofenic acid, and Tolmetin.

the policy. Two groups are conducting such research, both coordinated in Ontario and funded by national granting agencies.<sup>22</sup>

**Unique Features Of The B.C. Approach**

■ **Paying for proven health outcomes.**

PharmaCare's decision-making framework has been compared with those applied in Australia and New Zealand.<sup>23</sup> Each consistently applies slightly different standards of clinical evidence to coverage decisions. What makes the B.C. approach unique is the focus on paying for proven health outcomes: the consistent restriction of public subsidy until manufacturers provide published scientific evidence of a comparative mortality or morbidity benefit. While PharmaCare's outcomes-based decision-making framework might be considered strict, evaluations of the policies described above indicate that they save PharmaCare approximately \$35 million annually (14 percent of program costs). Furthermore, with special exemptions put in place to deal with patients' idiosyncratic needs and options for patients to use their own funds to purchase products that do not meet the criteria for outcomes-based coverage, these savings have not come with the adverse effects associated with indiscriminate cost-shifting policies.

■ **Impact on the private sector.** Pharma-

Care's outcomes-based policies appear to have created a further spillover effect on prescribing in the province. Although PharmaCare's coverage policies apply only to the publicly insured, they may alter prescribing practices and therefore contribute to spending control for all residents of the province. Since PharmaCare has incorporated evidence of patient outcomes in its decision making, drug costs have risen more slowly in British Columbia than in any other Canadian province. Per capita spending on prescription drugs grew 84 percent, from \$192 in 1993 to \$353 in 2002, well below the 104 percent increase, from \$235 to \$480, in the rest of Canada.<sup>24</sup> Evidence suggests that in 2002, when B.C. residents received prescription drugs, they received those from less costly classes of therapeutic options, chose lower-cost drugs within categories, and purchased generics more often than their peers in the rest of Canada.<sup>25</sup>

■ **A role for academic advisers.** Another unique feature of British Columbia's approach is the role of academic advisers in supporting the decision-making process. Because the state of evidence can change and opposition from stakeholders is ongoing, implementing and maintaining outcomes-based drug coverage requires ongoing evidentiary support. Since funders are subject to the potential bias of being focused on cost and may not have the nec-

essary expertise, evidentiary support can be facilitated through a partnership between decisionmakers and academics. In this relationship, the role for experts goes beyond the production of technology assessments. The B.C. experience illustrates that expert advisers in this type of policy-making process are required to conduct timely reviews of submitted evidence and to “respond quickly and succinctly to civil servants’ frantic requests for information.”<sup>26</sup> While vetting evidentiary support to academics creates an inherent interdependence among agents, it offers a degree of transparency and separation of roles that cannot be achieved through “in-house” scientific review. Ideally, academic advisers would be accountable only for the timeliness and validity of their scientific support, while decisionmakers would be accountable for funding decisions made in light of that evidence. When this is achieved, outcomes-based drug coverage works to reduce costs while ensuring access to the valued output of pharmaceutical investment: scientifically proven benefit to patients’ health.

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#### NOTES

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