

# Fraser Forum

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A Fraser Institute review of public policy in Canada

## *Prognosis:* Fewer Canadian Physicians

### ALSO IN THIS ISSUE:

Renewable fuels regulations

21<sup>st</sup>-century Canadian inequality

North American missile defence



# Fraser Forum

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## From the editor

**M**any Canadians take pride in the country's health care system. The notion of "free" health care has become woven into the fabric of our society, and for some, it has become part of our very national identity; unfortunately, this can make conversations about the system's flaws difficult and unnecessarily combative. Such conversations do need to occur, however. In this issue of *Fraser Forum* we address some of the concerns surrounding Canada's health care system and offer suggestions to its improvement.

In our featured story, "Canada's Physician Supply" (pg. 12), Nadeem Esmail identifies that there are too few physicians currently practicing in Canada to meet the health care needs of our citizens. This shortage will only worsen in coming years, which Canadians should find alarming. Not only is the current supply of physicians in Canada insufficient to meet our demands for physician care, but,

according to Esmail, it also "falls well short...of what is being delivered in other developed nations that also maintain universal approaches to health care." This is a problem that we cannot ignore and must address.

Additionally, other aspects of our health care system that need to be re-evaluated are considered in two more articles about the hidden costs (often more than monetary) that we pay for public queues (pg. 22), and the real numbers of Canadians who feel that they need to leave the country in order to receive proper (and/or timely) medical care (pg. 19). Canadians can continue take pride in our universal access to health care, but we should do so while recognizing that we do not have a perfect system. We need to make changes so that the quality of care that Canadians receive, and the time they must wait to receive that care, are both significantly improved.

This issue of *Fraser Forum* also includes an article addressing Canada's missile defence policy (pg. 5), suggestions for a continental crude oil and natural gas strategy (pg. 30), and a discussion of the Liberal position on corporate taxes (pg. 28). Most importantly, avid readers of *Forum* will notice a new feature in this particular issue. Joel Wood's article on the *Renewable Fuels Regulations* commences our new Regulations section, in which each issue of *Forum* will discuss proposed regulations of one kind or another. I hope you will enjoy its regular appearance.

CARI A. FERGUSON (fraserforum@fraserinstitute.org)



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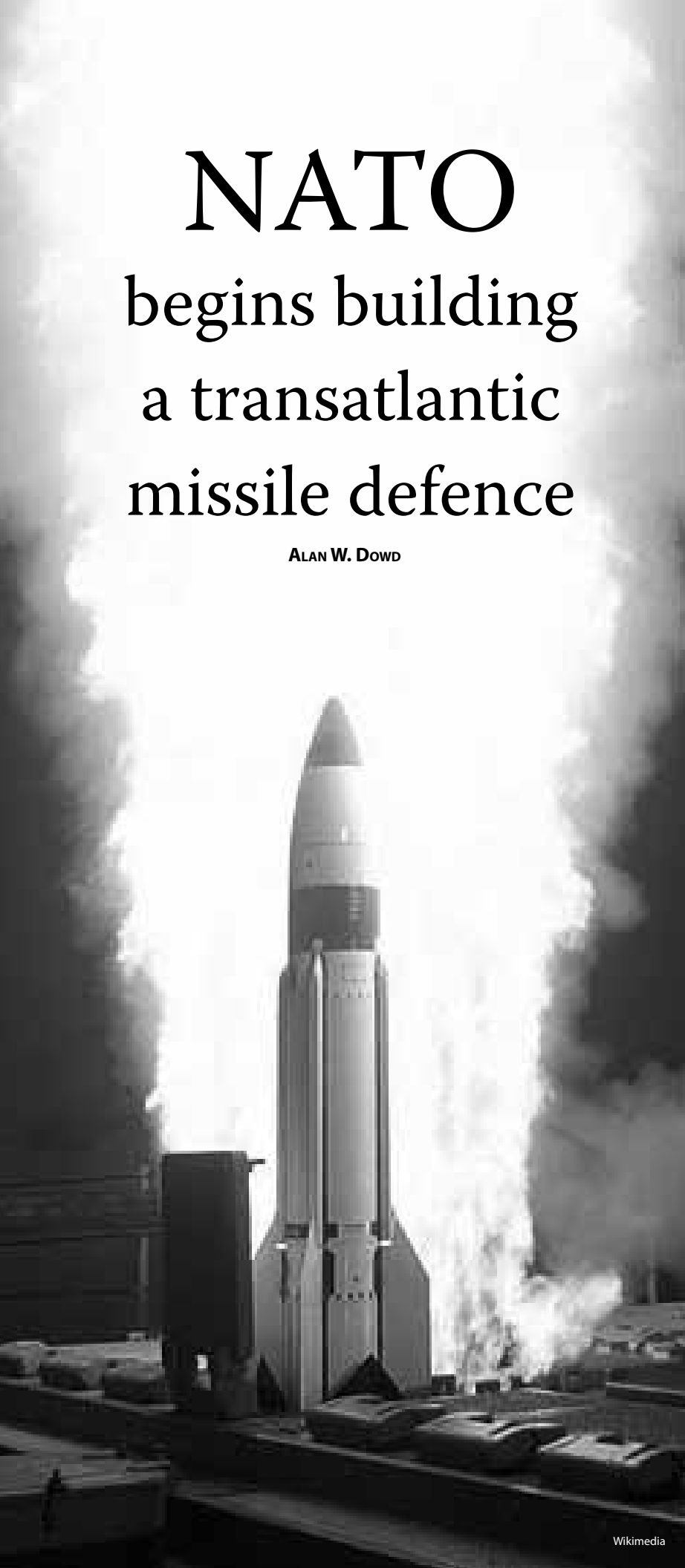
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# NATO begins building a transatlantic missile defence

ALAN W. DOWD



Once derided by its critics as “Star Wars,” missile defence has gone mainstream, as advances in technology and proliferation of long-range missiles have made missile defence not just a theoretical possibility, but an essential piece of the West’s security puzzle.

As evidence, consider NATO’s new Strategic Concept—the first reworking of the alliance’s mission statement since 1999. Adopted during the Lisbon Summit in November 2010, the Strategic Concept declares the proliferation of ballistic missiles “a real and growing threat to the Euro-Atlantic area” and commits the Allies to “develop the capability to defend our populations and territories against ballistic missile attack as a core element of our collective defence” (NATO, 2010b).

What does this new missile-defence mission mean for Canada, the United States, and NATO’s other 26 members?

## Nightmares

Before answering that question, it is important to get a sense of the growing missile threat facing NATO. Three decades ago, there were nine countries that possessed ballistic missiles. Today, there are 32 (Arms Control Association, 2007). Several of them are unfriendly or unstable. Iran, North Korea, and Syria fall into the former category, Egypt and Pakistan into the latter.

NATO’s European members are most concerned about Iran, and for good reason. Iran is developing nuclear weapons and acquiring delivery systems for those weapons. For example, the trove of diplomatic cables illicitly shared with the anti-secrecy website WikiLeaks reveals that US intelligence agencies have tracked the delivery of 19 intermediate range missiles from North Korea to Iran. The missiles give Iran the ability to strike as far away as Berlin (Cavas, 2010).

Moreover, the US Missile Defense Agency reports that Iran has tested and deployed a 2,000-km range ballistic missile of its own, bringing targets in Southern Europe within range. “With the successful launch of the Safir Space Launch

Vehicle on February 2nd, 2009, Iran demonstrated technologies that are directly applicable to the development of ICBMs” (US Missile Defense Agency, 2010). An ICBM would bring North America within Iran’s reach.

In other words, Iran is not just Europe’s nightmare.



These mushrooming threats led NATO in 2002 to begin studying the feasibility of a regional missile-defence system to protect the Allies in Europe. By 2006, NATO concluded that a European missile defence was a viable option (NATO, 2010a). In 2008, NATO declared that “missile proliferation poses an increasing threat to Allies’ forces, territory and populations,” endorsed US plans to deploy missile defences in Eastern Europe as a “substantial contribution to the protection of Allies from long-range ballistic missiles,” and outlined plans for a “NATO-wide missile defence architecture” (NATO, 2008). In 2009, NATO declared it was “deeply concerned about the Iranian nuclear and ballistic missile programmes,” and finally, in 2010, alliance leaders called missile defence “a core element of our collective defence” (NATO, 2010b).

NATO has achieved “an initial capability to protect Alliance forces against missile threats” (NATO,

2010a). The next step is protecting NATO’s population centres from missile attack. “We cannot afford to have even one of our cities hit,” says NATO Secretary General Anders Fogh Rasmussen. “Nor can we afford to be held hostage by the threat of an attack” (Rasmussen, 2010b). Whether knowingly or otherwise, Rasmussen is echoing the sentiment of Adam Smith, who, recognizing that “a wealthy nation is...the most likely to be attacked,” noted that “the first duty of the sovereign” is “protecting the society from the violence and invasion of other independent societies” (Smith, 1776/1991: 689; 698). At its core, this is what missile defence is: protection against coercion, violence, and attack.

“Missile defence won’t be cheap, but neither will it break the bank,” Rasmussen explains (Rasmussen, 2010a). The missile defence system designed to protect NATO’s deployed forces, which is now being installed, will cost an estimated \$1.04 billion. He notes that for less than \$239 million in additional investment over 10 years, “this program could be expanded to enable NATO to defend European populations and territory” (Rasmussen, 2010a).

Today, NATO is doing just that by networking its various missile-defence systems in Europe, while standing up what the Obama administration calls the “European Phased Adaptive Approach,” or EPAA. EPAA includes a mix of sea- and land-based defences. Starting this year, NATO will begin sending Aegis warships armed with anti-missile interceptors to the Mediterranean and basing portable missile sensors in Southern and Eastern Europe. By 2015, NATO plans to deploy land-based interceptor missiles, along with more sophisticated sea-based interceptors, all building toward an array of anti-missile assets stretching from Turkey to Romania to Poland by 2020 (Champion, 2010).

According to President Obama, EPAA will initially “protect large parts of Southern Europe from short- and medium-range ballistic missile threats.” Then, as more effective, longer-range interceptors come on line in Romania and Poland, EPAA will be ready to defend against intermediate-range ballistic missiles and ICBMs (Obama, 2010).

## A hole in the roof

The natural next step would be to link NATO’s European missile defences with the missile defences the United States has already deployed to defend North America. After all, the Allies envision a “NATO-wide” architecture. Toward that end, Obama has noted that EPAA will “augment” defence of the United States “against future threats of ICBMs launched from Iran” (Obama, 2010). Similarly, Rasmussen envisions “a security roof from Vancouver to Vladivostok” (Irish, 2010).

It is interesting that Rasmussen would choose those two points on the globe to promote missile defence, since Russia is openly critical of NATO’s missile-defence plans, and Canada is wary of Washington’s unwavering commitment to missile defences—a commitment that has been embraced by three successive administrations and now by NATO.

According to the new Strategic Concept, “NATO poses no threat to Russia” (NATO 2010). The feeling is not exactly mutual, however. If Russia’s cyber-attacks on NATO member Estonia, mugging of NATO aspirant Georgia, massive war games against a Polish “aggressor,” and deployment of short-range nuclear warheads to facilities bordering NATO’s Baltic and Eastern European members didn’t get the message across, then its 2010 military doctrine should. Among “the main external military dangers” identified by the Russian government in the document are





Aegis cruiser testing missile defence.

“the creation and deployment of strategic missile defence systems” and plans “to move the military infrastructure of NATO member countries closer to the borders of the Russian Federation” (The Military Doctrine of the Russian Federation, 2010).

Reacting to pronouncements like these, US Defense Secretary Robert Gates has said, “The Russians know that...our missile defences do not have the capability to defend against the Russian Federation’s large, advanced arsenal” (2010). But old habits—and decades of distrust—die hard.

NATO openly discussed its missile-defence plans with Russia in hopes of limiting such misunderstanding, but Moscow has been resistant. Although Russian President Dmitry Medvedev has expressed an interest in some sort of joint missile-defence system, hopes for a breakthrough at Lisbon foundered over Moscow’s insistence that a) none of NATO’s anti-missile sensors be pointed at Russia, and b) NATO trust Russia to “destroy missiles headed for NATO territory,” as the *Wall Street Journal* has reported (Fidler, 2010). To its credit, though, NATO is not ready to outsource the defence of allied territory to Russia.

Speaking of allied territory, it is important to note that Canada is part of the NATO alliance. In fact, Canada was a founding member of the NATO alliance. Yet Canada remains somewhat on the sidelines when it comes to NATO’s newest mission, missile defence. As former Canadian diplomat Paul Chapin observes, Canada is the only member of the alliance “without any plan to defend ourselves against a threat we all agree is real” (Chapin, 2010b). Indeed, Prime Minister Harper’s statement after the Lisbon Summit pointedly made no mention of missile defence, which is one of the centerpieces of the new Strategic Concept (Harper, 2010).

A government report, updated in June 2010, serves only to highlight Canada’s unease with the entire subject of missile defence. Although the report notes that “the threat to Canada and Canadian interests could increase,” it adds that “the ballistic missile threat to Canada is not currently considered to be high” (Department of National Defence, 2010). The report concludes with a noncommittal statement: “No final decision has been made on Canada’s involvement in the missile defence of North America” (Department of National Defence).

In short, while Europe has awakened to the missile threat, Canada’s approach remains passive, focused on “engaging diplomatically with potential ballistic missile proliferators; promoting multilateral arms control mechanisms; and examining the employment of defensive capabilities” (Department of National Defence).

## Blame it on NATO

To be sure, there are elements within the Canadian military community that quietly support missile defence, but the political reality is that it remains a controversial, even unpopular, initiative among the Canadian public (Barry, 2010). The result is a kind of official agnosticism on missile defence, which is reflected in the aforementioned report. This is not new. University of Calgary Professor Donald Barry, writing in the *Journal of Military and Strategic Studies*, notes that Canadian governments dating back to the 1960s have been unenthusiastic about US missile defence plans (Barry, 2010).

One is left to wonder if opposition to missile defence is a function of a lack of confidence in the system

or of the false sense that staying on the sidelines will somehow keep Canada out of harm's way.

If it is the former, it pays to recall that nothing made by man is perfect. Missile defences, like any other weapons system, will sometimes fail. But they will also sometimes succeed. What future president or prime minister would prefer a zero percent chance of deflecting an inbound missile—something guaranteed by not deploying missile defences—over 50-50 odds, or even a 20% chance?

If it is the latter, the reality is that Canada already is a target, partly because of what Canada stands for and partly because Canada's enemies already view Canada as conjoined to the United States. From NATO to NAFTA, from Afghanistan to the Arctic, from commerce to culture, Canada and the United States are as connected as any two countries on earth.

Yet, as Chapin observes, Canada "seems able to support missile defence for others, just not for itself" (2010a:19). It is time for that to change. Perhaps NATO's enthusiastic embrace of missile defence at Lisbon can serve as political cover for Ottawa. Instead of sitting on the sidelines, Canadian policymakers can tell their ambivalent constituencies, "NATO made us do it."

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# *Inequality*



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## Twenty-first-century Canada is not eighteenth-century France

MARK MILKE

**I**n one of his many books on the history of civilization, historian Will Durant described the gross unfairness that existed among rights and tax burdens in pre-revolutionary France. By the late 1700s, although serfdom had largely disappeared, most French peasants

were still subject to feudal dues for use of the local lord's grist mills, ovens, wine presses, and fishponds. This was not a user-pay system—at least not an accurate charging—as the local lord maintained a monopoly over such equipment. Additionally problematic, as Durant writes, was that such a lord could also “hunt his game even into

the peasant's crops,” (Durant, 1967: 928) an obvious problem for peasants when such crops were damaged.

Despite these remaining feudal obligations, Durant cites the French socialist, Jean Jaures, who argued that, beyond feudal dues, if no other abuses had existed in eighteenth-century France, the remnants of

# *For a millennium open trade and economic incentives have improved living standards*

serfdom would have gradually withered to nothing, and no revolution would have ever taken place (Durant, 1967: 929). Instead, however, other demands from church and state existed and made dues-paying—about 10% of a peasant's produce or income—light by comparison. They included, among other imports, the ecclesiastical tithe that took another 8-10% of peasant income. According to Durant in *Rousseau and Revolution*: “Add the taxes paid to the state, the market and sales taxes, and the fees paid to the parish priest for baptism, marriage, and burial, and the peasant was left about half the fruit of his toil” (Durant, 1967: 928-929).

Noting eighteenth-century France is worthwhile in the context of discussing inequality in the early twenty-first century in Canada, as it helps to have context from ages past. In pre-1789 France, as Durant also points out, “the peasant had to pay for the state, the Church and the aristocracy”, and the land tax (which also was applied to personal property) “fell almost entirely upon him” (Durant 1967, 936). While this was occurring, the nobles, clergy, magistrates, head administrators, and university officials were exempt from that same tax, which thus became the burden of the peasants (Durant, 1967: 936.)

But eighteenth-century France is not modern-day Canada. According to an analysis from colleagues at the Fraser Institute, in 2010, the top 30% of families in Canada paid 66.6% of all taxes while earning 59.3% of all income and the bottom 30% of all income earners pay 4.8% of all taxes while earning 9.3% of all income (Palacios and Veldhuis, 2010: 9-10).

That reality does not mean taxation or government spending cannot be reformed to be either more effective or lighter, but it does mean that attention should be paid less to modern income inequality, and more to smarter redistribution and wealth creation. In particular, it is the latter focus which has lifted up entire countries from the wretched state that almost all existed in previously.

This is why a recent headline claiming that inequality in Canada is a problem (McQuaig and Brooks, 2010) has much in common with Mark Twain's quip about the news of his (non-) death: such news is greatly exaggerated. In reality, inequality has not increased in Canada. Economist and University of Nipissing professor Chris Sarlo, for example, has examined poverty and inequality with precision, and his conclusion is at odds with such headlines.

In 2009, Sarlo looked at two of the best measurements for

inequality: adult equivalent incomes (which account for households of different sizes) and average equivalent consumption (which factors in government income or under-reported income). Sarlo found inequality has barely budged in 35 years. Instead, only child poverty has risen of late, and he sensibly recommends it is that which must be targeted for remedies, not the mythical rising inequality (Sarlo, 2009).

Those who assert that an obvious fact—some earn more money than others—is then a cause of higher rates of sickness or crime (Wilkinson and Pickett, 2009; McQuaig and Brooks, 2010), make a classic correlation-causation mistake. According to such logic, even if prices stayed the same and the richest Canadians saw their income and wealth triple while the rest of us saw our incomes and wealth only double, social problems and pathologies would increase. This is a flawed association. It simplifies complex reasons for poverty, crime, and sickness—important matters that ought to be addressed soberly.

Here is another bit of context to put all this in perspective, and to provide a longer-term look at how countries have prospered. One thousand years ago, one-third of all babies died before their first birthday



while those who made it past that marker could expect to live only 24 years with hunger and disease as their constant companion. Today, the average person lives to age 66 (the world-wide average), and does so in vastly improved health (Maddison 2001, 17).

Such progress—uneven, as it still is dependent on one’s locale—came even as the world’s population rose 22-fold. That is because per capita income increased 13-fold and the world economy grew nearly 300-fold during the past millennium (Maddison, 2001: 17). In other words, growth in real income outpaced even explosive population growth. That had tremendous, positive consequences. For example, extra wealth made it possible to pay people to spend their life in a lab to study how to advance medical technology. That was, and is, of no small benefit to improving and lengthening our lives.

These facts are courtesy of a 2001 book by the late Angus Maddison, a Dutch scholar on economic growth and development who published a detailed survey for the OECD of how societies prosper, after looking at wealth creation dating back to 1000AD. Professor Maddison’s findings, updated annually at the University of Groningen ([www.ggdc.net](http://www.ggdc.net)), help us understand which societies prospered historically and why.

Maddison finds that much of the world economy’s advancement took place after 1820, though it did not do so exclusively. The Dutch, for example, prospered early in part because they “created a modern nation state which protected property rights of merchants and entrepreneurs, promoted secular education and promoted religious tolerance” (Maddison, 2001:20). Similarly, Britain had faster growth in per capita income in the seventeenth century when compared with other European countries, credited to an improvement in banking, fiscal institutions and in agriculture among other factors (Maddison, 2001: 21).

Scholars such as Maddison, who study human progress, find time and again that open trade, entrepreneurship, secure property rights, toleration, moderate taxation, and limited and predictable government go a long way to helping everyone in a society prosper in a variety of ways. Such ingredients also provide the revenues necessary for governments to carry out essential functions. In the pursuit of better living standards for all, such policies have worked for a millennium, but especially during the past two centuries as they were applied ever more widely.

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# Canada's physician supply

NADEEM ESMAIL



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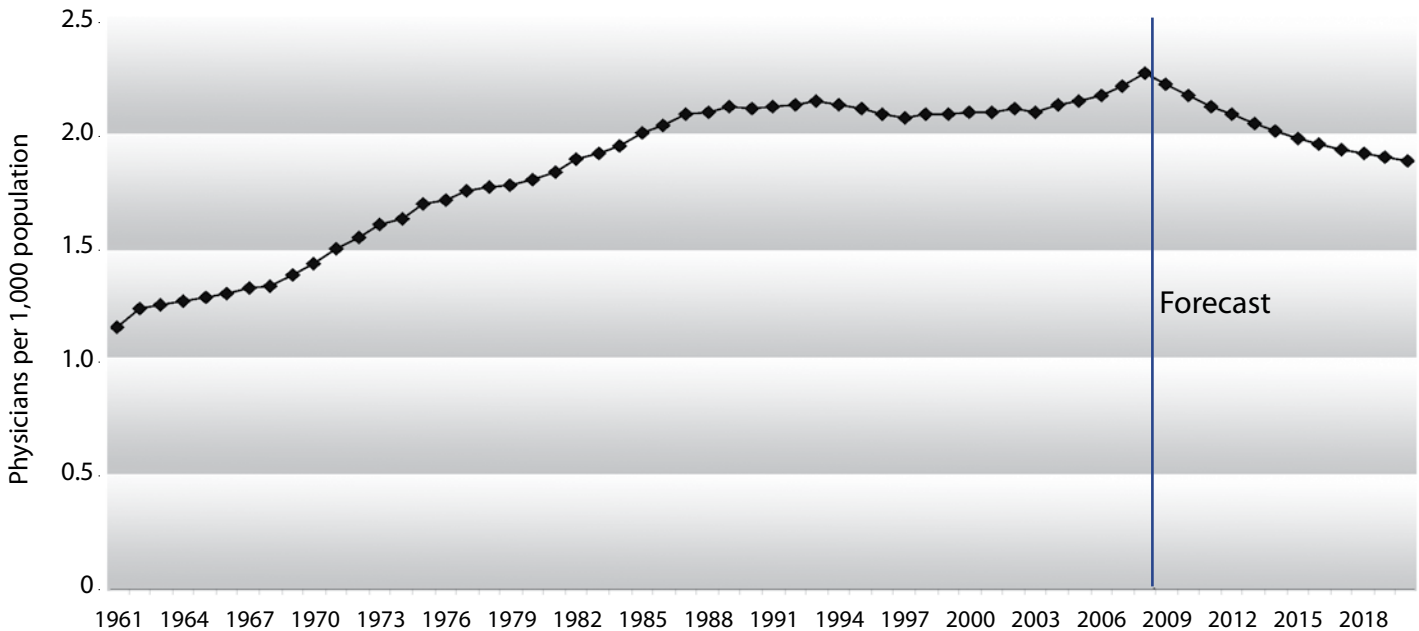
**D**iscussions regarding health care in Canada regularly return to the supply of medical practitioners in this country. Canadians' focus on physician supply has been driven by the publication of numerous reports and commentaries on this issue produced by research organizations, professional associations, government committees, and others. Importantly, most of these discussions and papers have generally arrived at the same conclusion: there are too few physicians practicing in Canada today.

That conclusion is supported by the available evidence on Canadians' unmet health care needs. For example, in 2007, almost 1.7 million Canadians (6%) aged 12 or older reported being unable to find a regular physician (Statistics Canada, 2008). More recent Statistics

Canada data show that 6.6% of Canadians aged 12 or older reported being without a regular doctor and unable to find one (Statistics Canada, 2010a; calculation by author). Similarly, a research poll completed in 2007 found that 14% of Canadians (approximately 5 million) were without a family doctor, more than 41% of whom (approximately 2 million) were unsuccessful in trying to find one (CFPC, 2007).

Further, after accounting for the fact that most other developed nations have a greater proportion of seniors (aged 65 and older) (OECD, 2010)<sup>1</sup>, and thus a greater demand for health care services, Canada's physician-to-population ratio in 2006 ranked 26<sup>th</sup> among the 28 developed nations that maintain universal access health insurance programs for which data were available (Esmail,

**Figure 1: Canadian physician-to-population ratio, 1961 to 2020**



Sources: AFMC (2010); McArthur (1999a); OECD (2010); Statistics Canada (2010b); and Ryten et al. (1998); calculations by author.

2008). These facts, when combined with evidence that increased spending on physicians has been related to reduced wait times for treatment in Canada (Esmail, 2003; Barua and Esmail, 2010), clearly suggest that the supply of physician services in Canada is not meeting demand. This article seeks to add to the current understanding of Canada's physician shortage and how Canada's physician supply may evolve in the coming years.

## The evolution of Canada's physician supply

In the early 1970s, Canadians enjoyed one of the highest physician-to-population ratios in the developed world (Esmail and Walker, 2008).<sup>2</sup> Such generous relative access to doctors was, in light of recent evidence from studies showing the health benefits of greater access to doctors, unquestionably beneficial for Canadians. Unfortunately, in the early- to mid-1980s, some government officials voiced concern about the growing number of physicians, and recommended that governments reduce the number of medical school admissions and training positions available (Tyrrell and Dauphinee, 1999). While their calls for reform were not met with a specific policy on physician supply, medical school admissions did fall slightly in the years that followed (Tyrrell and Dauphinee, 1999; Ryten et al., 1998).

In the early 1990s, however, specific policies on physician supply were introduced following the publication

of what has come to be known as the Barer-Stoddart report. In 1991, researchers Morris L. Barer and Greg L. Stoddart published a discussion paper for the Federal/Provincial/Territorial Conference of Deputy Ministers of Health. Their report recommended, among other things, reducing medical school enrollment by 10%, reducing the number of provincially funded post-graduate training positions by 10% to meet the needs of students graduating with M.D.s in Canada, and reducing Canada's reliance on foreign-trained doctors over time (Barer and Stoddart, 1991). Governments responded in 1992 by accepting all three of these recommendations, with the goal of maintaining or reducing the physician-to-population ratio in Canada (Tyrrell and Dauphinee, 1999).

Figure 1 reveals the effect of these decisions: a physician-to-population ratio that increased steadily from the early 1960s to the late 1980s, peaking in 1993 at 2.15 physicians per 1,000 people. Until the mid-2000s, Canada's physician supply grew just fast enough to maintain a ratio of between 2.07 and 2.15 physicians per 1,000 people with some slight growth to a peak of 2.27 occurring between 2005 and 2008.<sup>3</sup> (The projections included in this figure will be discussed later in this article.) In other words, Canada's policies restricted the growth rate of the physician-to-population ratio in order to remain at a level that is now below what other nations provide through their universal access health programs, and below the current demand for physician services in Canada.

Vitality, potential health benefits associated with having a higher physician-to-population ratio, including

longer lives and lower rates of mortality (see, for example: Or, 2001, and Starfield et al., 2005), were lost as a consequence of these restrictions.

While it is clear that the current physician supply is insufficient, the numbers to the left of the projections marker in figure 1 tell us nothing of the future. According to recent statistics published by the Association of Faculties of Medicine of Canada, provincial governments have been increasing the number of medical school admissions markedly in recent years (figure 2). In order to better understand how Canada's physician supply will evolve over the coming years, it is important to consider the impact these changes in school admissions will have on the number of physicians entering the workforce over the next 7 to 10 years. It is also important to consider what will happen to the physician supply over that time in order to more fully understand the impact of government controls on physician training.

## Graduation rates and physician supply to 2020

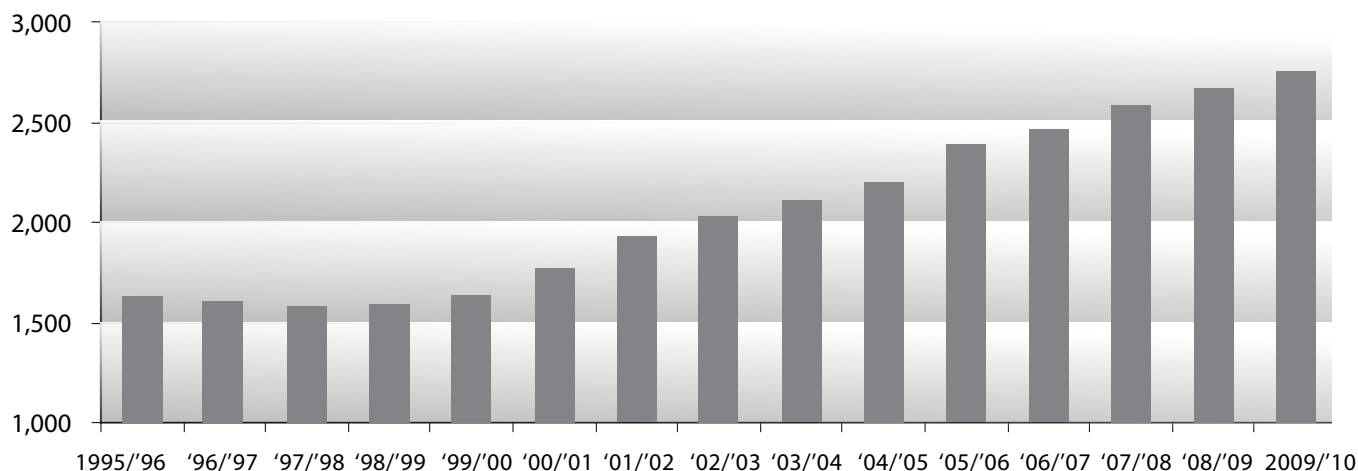
Extrapolating from Canada's medical school graduation rates, it is possible to estimate the number of new doctors who will be entering the workforce in the coming years. To estimate the future supply of doctors accurately,

however, it is important to take into account the number of physicians currently working in Canada who will die, retire, or leave for employment in other nations, as these physicians must be replaced in order to maintain a constant supply of physicians over time. An article by Ryten et al. published in the *Canadian Medical Association Journal* sheds some light on both issues.

In early 1996, the authors followed up with 1,722 medical school graduates who received their degree in 1989 (leaving them sufficient time to complete post-graduate medical training). They found that only 1,300 of the graduates were actively practicing in Canada 7 years after graduation. A further 216 were still training to practice in Canada, while 13 students remained in Canada, but were not in active practice. Meanwhile, 193 had left the country (figure 3). In total, only 88% of those who graduated in 1989 were practicing, or training to practice, as Canadian physicians in 1996.

Ryten et al. also found that the number of Canadian-trained physicians entering the workforce was insufficient even to maintain the current supply of doctors at that time. In the mid-1990s, the authors estimated that approximately 650 to 750 new physicians would be needed each year in order to keep up with historical rates of population growth (the physician supply must grow with the population in order to maintain a constant ratio). The authors also determined that a further 900 to

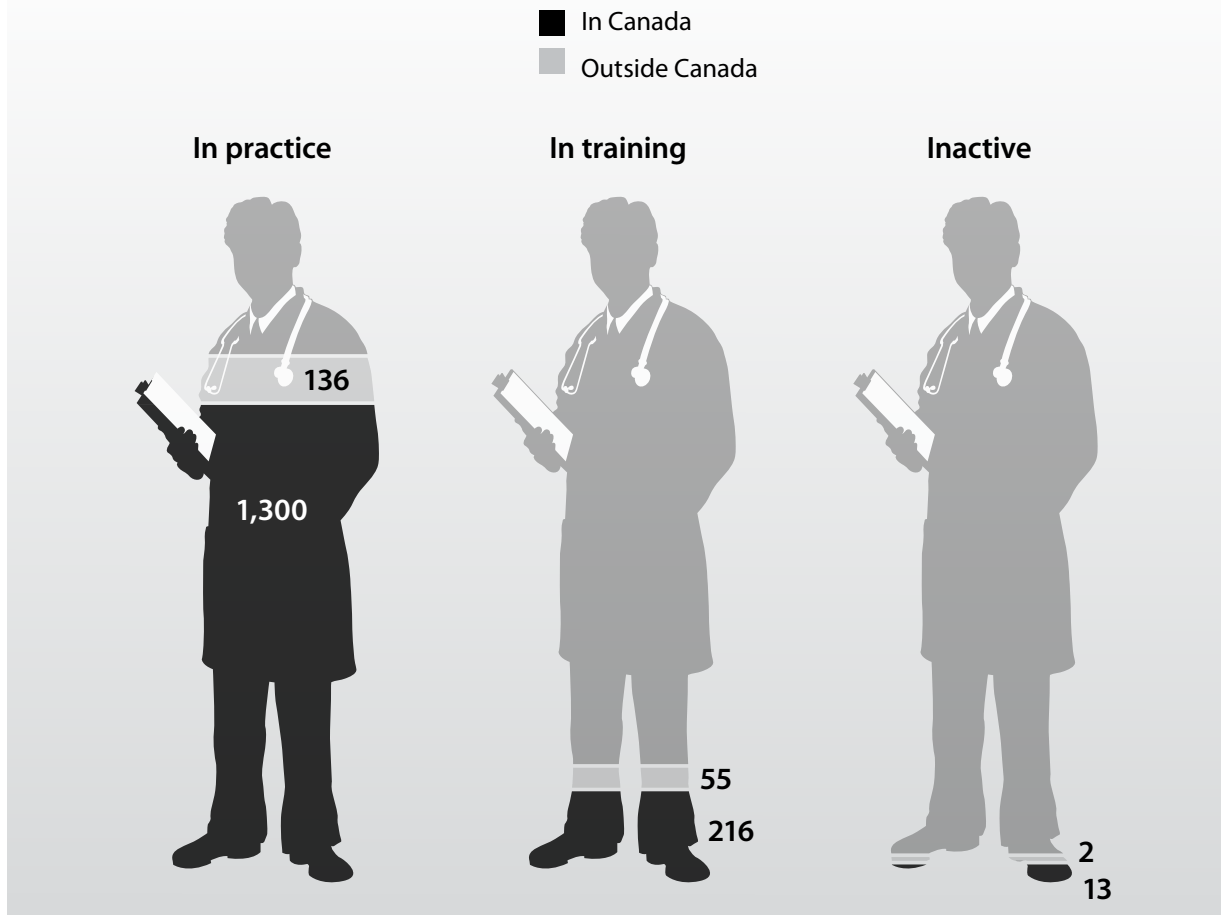
**Figure 2: First-year enrollment in Canadian faculties of medicine, 1995/96 to 2009/10**



Source: AFMC (2010).



**Figure 3: Location and professional activity of Canadian medical school graduates from 1989, as of 1995-1996**



Source: Ryten et al. (1998).

1,100 physicians would be needed to replace those who either retired or died, and that roughly 300 to 350 new physicians would need to be added in order to replace those physicians who left the country. In other words, maintaining the physician-to-population ratio in the mid 1990s would require adding 1,900 to 2,200 new physicians to the workforce every year (between 3.1% and 3.6% of the 1996 physician population)—a substantially greater number than the 1,516 new Canadian-trained additions who were either in practice or still training to practice in Canada from the class of 1989.

By applying the proportions determined by Ryten et al., as has been done previously by McArthur (1999a),<sup>4</sup> to the number of students who enrolled in medical schools in Canada and the number of students who were awarded M.D.s from 2000 onwards, it is possible to estimate the number of new Canadian-trained physicians who will be entering the workforce up to 2020.<sup>5</sup> As figure 4 illustrates, if 88% of medical school graduates are part of Canada's

physician supply 7 years after graduation, and if 97% of those admitted to medical school graduate (as was the case for the class of 1989), then current enrollment and graduation rates suggest that 2,336 Canadian-trained students will be added to the physician supply in 2020.

Figure 4 also shows the estimated number of new physicians required to maintain the physician-to-population ratio. This number exceeds the estimated number of Canadian trained physicians entering the workforce every year through 2018. For 2019 and 2020, the number of Canadian trained physicians estimated to be entering the workforce exceeds slightly the estimated number of physicians required to maintain the physician-to-population ratio. This number of physicians required assumes that the number needed to replace those lost to death, retirement, or emigration, and to keep up with population growth is a constant 3.2% of the current physician population over time (which is equal to the addition of 2,000 new physicians in 1996, the low-middle point in the

Ryten et al. estimates above).<sup>6</sup> It also assumes that only Canadian-trained doctors will be added to the physician supply between 2008 and 2020.<sup>7</sup>

This replacement rate is a conservative estimate: at present approximately 38% of Canada’s physicians are aged 55 or older (CMA, 2010), which suggests that the number of physicians needed to replace those who retire or die (900 to 1,100 doctors in the mid-1990s) will rise significantly in the coming years. In addition, this estimate does not take into account the effects of demographic changes in the physician workforce, the consequence of which may be that, in the future, more physicians will be required to deliver the same volume of services being provided today (Esmail, 2007). Furthermore, this is only the number of new physicians required to *maintain* the stock of physicians, which is clearly insufficient to meet current demand and will likely fall well short of demand in the future given that Canada’s health needs can be expected to increase as our population ages.

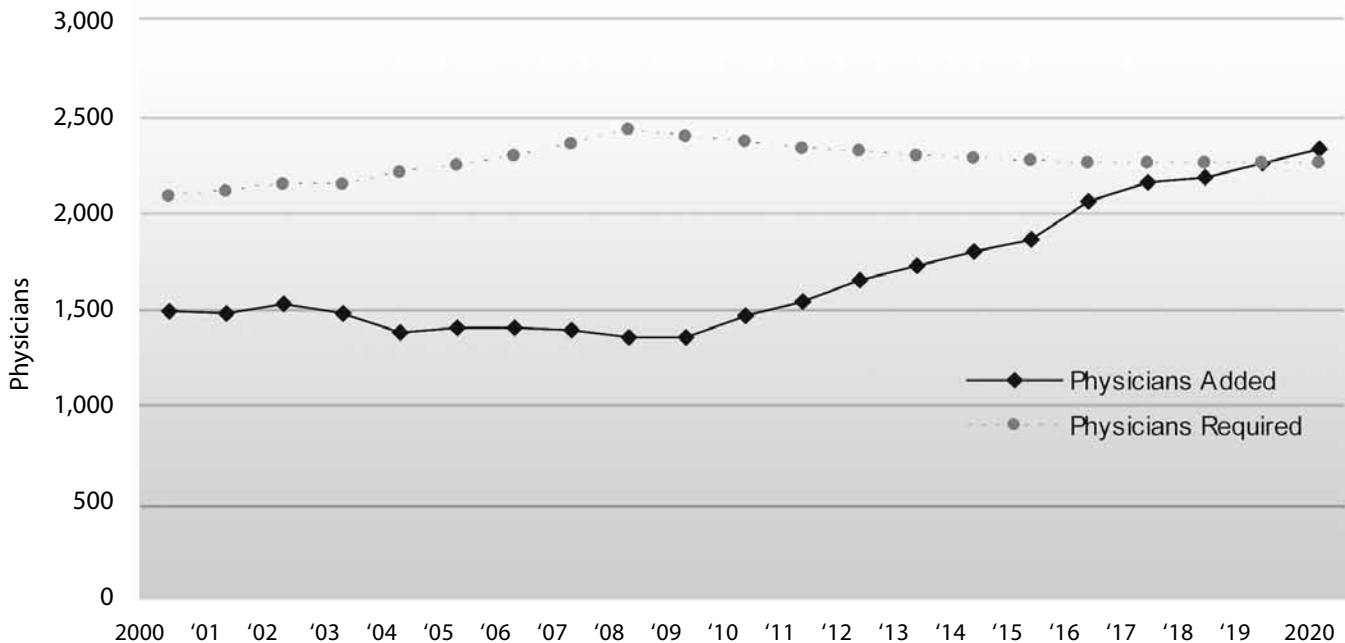
Making one additional assumption—that the Canadian population will increase at the medium growth rate forecast by Statistics Canada (Statistics Canada, 2010b)<sup>8</sup>—allows us to estimate how the physician-to-population ratio will evolve in Canada in the coming years (figure 1). Clearly, without a significant addition of foreign-trained

doctors, the Canadian physician-to-population ratio will decline between now and 2020,<sup>9</sup> just as it would have through the 1990s and 2000s if foreign physicians had not made up for the shortfall caused by insufficient medical school admissions.

## Conclusion

The current physician supply in Canada is insufficient to meet the demand for physician care under the present structure of Medicare,<sup>10</sup> and falls well short (in terms of the supply of physicians relative to population) of what is being delivered in other developed nations that also maintain universal approaches to health care insurance. Without a significant intake of foreign physicians, the physician-to-population ratio will fall in the coming years because there are not enough new doctors being trained in Canada. It would seem that a government-imposed limitation on the number of physicians being trained in Canada is a policy choice that is not serving the best interests of Canadians, be they patients in need of a physician, or capable students who wish to become doctors, but who are unable to access medical training in this country.

**Figure 4: New Canadian-graduated doctors in practice compared to the number of new doctors required to maintain physician-to-population ratio, 2000 to 2020**



Sources: AFMC (2010); McArthur (1999a); OECD (2010); and Ryten et al. (1998); calculations by author.

# *The physician-to-population ratio will fall in the coming years*



Fotolia

## Notes

1 In 2008, 13.6 percent of Canadians were aged 65 and older, ranking Canada 20th among 28 developed nations that maintain a universal access health insurance program (list of nations from Esmail and Walker, 2008). The three oldest nations (Japan, Italy, and Germany) all had over 20% of their population aged 65 and older. The average for these 28 nations was 15.3% (OECD, 2010).

2 In 1970, Canada had an age-adjusted ratio of 1.8 doctors per 1,000 population, the second highest ratio among 20 developed nations for which data were then available (Esmail and Walker, 2008).

3 The differences between historic physician supply data presented here and those presented in Esmail (2008) result from a change in the data series used to measure physician supply. In Esmail (2008), the data series employed was “Practicing Physicians” from OECD (2008). In OECD (2010) Canadian data is not available for the “Practicing Physicians” series, but is instead available for the “Professionally Active Physicians” series. The calculations in this article employ data from this latter series. It should be noted that “Practicing Physicians” is defined as “practicing physicians who provide services

directly to patients”, while “Professionally Active Physicians” is defined as “practicing physicians and other physicians for whom their medical education is a prerequisite for the execution of the job” (OECD, 2010).

4 Esmail (2006) and Esmail (2008) also employ this projection methodology.

5 This estimate uses graduation rates for students awarded M.D.s between 2002 and 2010 (who, between 2009 and 2017 will be at the same point in their careers as the students studied by Ryten et al.), and enrollment rates for students entering medical school between 2007/2008 and 2009/2010 who will, in general, be at the same point in their medical careers between 2018 and 2020 as the students studied by Ryten et al. were in 1996 after graduating in 1989. All graduation and enrollment rates are from AFMC (2010).

6 This replacement value is smaller than the 3.5% estimate of physicians leaving practice in Canada annually (not counting the number of physicians required to account for population growth) used by Tyrrell and Dauphinee (1999) to estimate changes in the physician supply.

7 This second assumption may seem questionable since significant numbers of foreign-trained physicians have been added to the Canadian workforce in order to maintain the existing

physician-to-population ratio. However, the precise number of foreign-trained doctors who will be added in the future is difficult to estimate. This assumption does not, however, affect the conclusions of this examination. Since the main purpose of this article is to consider the effect controls have on the supply of Canadian-trained doctors, this simplifying assumption serves to clarify the effect these training restrictions have on the future supply.

8 This analysis uses the M1 medium population growth forecast from Statistics Canada (2010b).

9 This decline in the ratio is seen in Figure 4 as the decline in the number of physicians required to maintain the physician-to-population ratio between 2008 and 2020.

10 Shortages can only occur when prices are not permitted to adjust. Prices will naturally rise in any functioning market where goods or services are in short supply relative to demand, thus encouraging new supply and reducing demand simultaneously. The outcome is equilibrium of supply and demand (no shortage or excess). In the Canadian health care marketplace, such adjustment is impossible because of restrictions on both the prices and supply of medical services. The optimal solution to Canada's shortage is obviously to remove restrictions on training, practice, and pricing, and to introduce user charges. This would increase the supply of services while simultaneously encouraging more informed use of medical practitioners' time (thus reducing the demand for treatment overall and improving the allocation of physician manpower and effort). Such a change in policy would bring Canada more in line with some of the world's top-performing universal access health care programs (Esmail and Walker, 2008). Unfortunately for Canadians, the introduction of user fees and extra billing are not permitted under the current federal legislation guiding Medicare. The analysis here takes the current legislation as given and discusses only the supply of physicians.

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# Leaving Canada for medical care



NADEEM ESMAIL

**T**here are a growing number of companies providing Canadians with easier access to medically necessary treatments outside the country. Of course, leaving Canada for medically necessary treatment is nothing new; Canadians have been doing so for many years, either in response to the unavailability of certain

treatments in Canada, in response to concerns about quality in Canada, or in response to long wait times for medically necessary treatment.

How many Canadians receive treatment outside Canada each year, though? While data on this topic are difficult to come by, it is possible to estimate the number

**Table 1: Estimated number of patients receiving treatment outside Canada, 2010**

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	CAN
Plastic surgery	31	37	0	0	55	18	2	7	2	—	153
Gynecology	341	119	52	0	1,358	113	0	7	11	0	2,001
Ophthalmology	795	838	20	40	902	1,131	44	50	0	22	3,842
Otolaryngology	108	202	13	44	721	329	6	35	0	0	1,458
General surgery	676	191	188	209	2,431	1,160	46	15	0	0	4,914
Neurosurgery	47	88	0	0	96	156	—	0	—	—	387
Orthopedic surgery	526	354	0	96	711	208	7	54	6	17	1,979
Cardiovascular surgery	29	13	63	0	423	399	27	0	—	0	953
Urology	363	614	—	30	4,479	270	31	170	—	0	5,957
Internal medicine	495	531	152	164	1,585	990	8	127	7	0	4,058
Radiation oncology	11	33	—	—	40	26	7	—	0	—	116
Medical oncology	12	24	—	—	1,146	81	—	7	0	0	1,271
Residual*	2,131	2,404	456	349	9,245	2,524	106	381	17	91	17,705
<b>Total</b>	<b>5,565</b>	<b>5,447</b>	<b>943</b>	<b>933</b>	<b>23,192</b>	<b>7,406</b>	<b>282</b>	<b>851</b>	<b>44</b>	<b>130</b>	<b>44,794</b>

\*The residual count was produced using the average provincial percent of patients receiving treatment outside Canada and the residual count of procedures produced in *Waiting Your Turn*.

Source: Barua, Rovere, and Skinner 2010; calculations by author.

using the results of the Fraser Institute's *Waiting Your Turn* survey, and the counts of procedures completed each year in Canada, which are provided by the Canadian Institute for Health Information (CIHI).<sup>1</sup> While the computations below are approximate, they are the most accurate estimates currently available.

## Methodology

Each year, the Fraser Institute's *Waiting Your Turn* survey asks physicians across Canada—in 12 major medical specialties—the question, “Approximately what percentage of your patients *received* non-emergency medical treatment in the past 12 months outside Canada?” (emphasis in original). The answers are averaged for each of the specialties studied in *Waiting Your Turn* for each province, producing a table that reports the average percentage of patients receiving treatment outside Canada (Barua et al., 2010: table 11). In 2010, 1.0% of all patients in Canada

were estimated to have received non-emergency medical treatment outside Canada, the same as in 2009.

Combining these percentages<sup>2</sup> with the number of procedures performed in each province and in each medical specialty gives an estimate of the number of Canadians who actually received treatment outside the country. Two data-related issues must be noted before discussing the estimate. First, the number of procedures performed in Canada is not readily available from the Canadian Institute for Health Information (CIHI). Notably, Alberta and Quebec do not provide complete discharge abstract data (DAD) to the CIHI, which is the source for the procedures counts data used in *Waiting Your Turn*. The authors of *Waiting Your Turn* address this concern by making a pro-rated estimate of procedures using older hospitalization data. These estimated procedure counts fill in for the actual number of procedures in Alberta and Quebec.

Second, there is a temporal mismatch between the timing of the Fraser Institute's *Waiting Your Turn* survey and the CIHI's annual DAD release. Specifically,

procedure counts data used for *Waiting Your Turn* are typically one year behind (e.g., the 2010 edition of *Waiting Your Turn* used procedure counts from 2008/2009). While the calculation below uses the temporally mismatched procedures counts to provide up-to-date information, previous calculations adjusting for the temporal mismatch show that it does not appear to materially affect the trend witnessed in the overall count of Canadians. However, it does, as expected, affect the actual counts of Canadians (Esmail, 2007).<sup>3</sup>

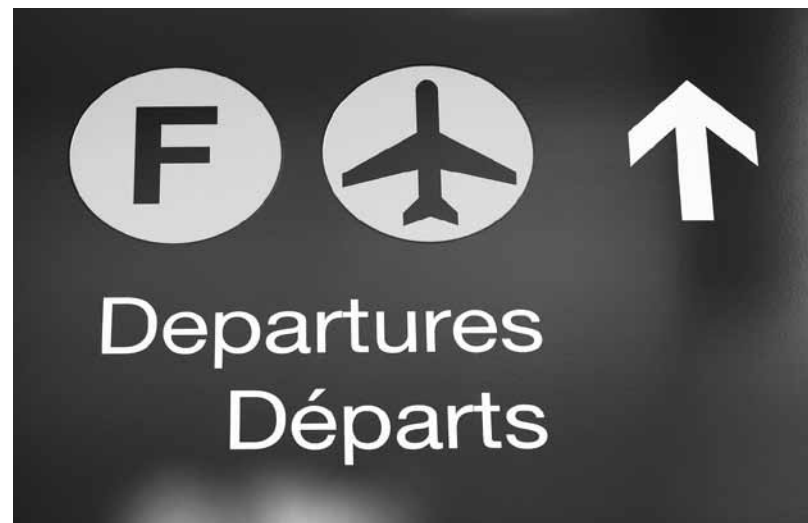
The counts of the number of patients receiving treatment outside Canada each year that are produced by this methodology are likely to underestimate the actual number of patients being treated outside Canada. This is the result of a few factors. First, and most importantly, these numbers are based on specialist responses, which means that patients who leave Canada without consulting a specialist<sup>4</sup> are not likely to be included in the count shown in table 1. Second, the counts are based on the number of procedures estimated to have been performed in Canada, which is less than the total number of patients consulted and less than the total number of Canadians who would have required treatment, including those who left Canada to seek it.

## An estimated count of patients leaving Canada

The products of the percentage of patients receiving non-emergency treatment outside of Canada and the number of patients treated in Canada as estimated in *Waiting Your Turn* are shown in table 1.

A significant number of Canadians—an estimated 44,794 in total—received treatment outside Canada in 2010. This is a notable increase from the 41,006 Canadians estimated to have received treatment outside Canada in 2009. Increases in the estimated number of patients going outside Canada for treatment were seen in British Columbia (5,327 to 5,565), Alberta (5,354 to 5,447), Saskatchewan (707 to 943), Manitoba (678 to 933), Ontario (20,510 to 23,192), Quebec (6,917 to 7,406), Nova Scotia (601 to 851), and Prince Edward Island (15 to 44). Conversely, New Brunswick (497 to 282) and Newfoundland and Labrador (400 to 130) saw decreases in the estimated number of patients who received treatment outside Canada.

The national increase in the estimated number of patients treated outside Canada occurred at the same time as a national increase in the median wait time for medically necessary treatment. Specifically, the national median wait time for treatment after consultation with a specialist was 8.0 weeks in 2009 and 9.3 weeks in 2010.



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## Conclusion

In 2010, an estimated 44,794 Canadians received non-emergency medical treatment outside Canada. This estimate likely underestimates the actual number of patients who received treatment outside the country that year.

## Notes

- 1 This includes estimates for some provinces that do not provide comparable data to the CIHI.
- 2 Readers should note that exact values, not the rounded values which appear in table 11 in Barua et al., 2010, are used for this calculation.
- 3 Specifically, the Canadian counts with the temporal mismatch for 2004, 2005, and 2006 were 49,392, 44,022, and 39,282, respectively. Accounting for the mismatch, the counts for 2004 and 2005 were 47,011 and 45,776, respectively. See Esmail, 2007.
- 4 In 2010, the national median wait time between referral by a general practitioner and consultation with a specialist was 8.9 weeks. See Barua et al., 2010.

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# The private cost of public queues



**NADEEM ESMAIL**

**I**n December 2010, the Fraser Institute released its twentieth annual measurement of waiting times for medically necessary treatments in Canada (Barua et al., 2010). This most recent measurement shows that the national median waiting time from specialist appointment to treatment increased from 8.0 weeks in 2009 to 9.3 weeks in 2010.

But the measurement of waiting times, or the examination of the absolute delay Canadians must endure in order to receive medically necessary care, is only one way of looking at the burden of waiting for health care. We can also calculate the privately borne cost of waiting: the value of the time that is lost while waiting for treatment.<sup>1</sup>

## The privately borne cost of waiting for care

One way of estimating the privately borne cost of waiting for care in Canada was originally developed by Steven Gliberman and Lorna Hoye (1990).<sup>2</sup> They calculated the cost of waiting by estimating the amount of time that

could not be used productively by a patient while waiting for treatment.

Gliberman and Hoye's methodology is relatively simple. First, multiply the number of patients waiting for treatment by the wait times for those treatments in order to derive an estimate of the total number of weeks all patients will spend waiting for care. Then multiply this value by a measure of the proportion of time spent waiting for treatment that is rendered unproductive by the physical and emotional impact of an untreated medical condition. The monetary value of this lost productive time can then be estimated.

In 2010, an estimated 825,827 Canadians were waiting for care after an appointment with a specialist (table 1). These Canadians waited, on average, 9.3 weeks for treatment, though those wait times varied significantly when broken down by province and medical specialty (figure 1). Multiplying the number of Canadians waiting in each of the 12 medical specialties in each of the 10 provinces by the weighted median wait time for that medical specialty in that province gives a rough estimate of the total amount of time that Canadians waited for treatment in



**Table 1: Estimated number of procedures for which patients were waiting after appointment with specialist, by specialty, 2010**

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	CAN
<b>Plastic surgery</b>	5,591	1,093	1,554	1,331	3,458	2,554	576	1,211	29	416	17,813
<b>Gynecology</b>	4,069	3,736	1,353	952	7,818	4,543	404	934	127	676	24,613
<b>Ophthalmology</b>	16,602	14,950	3,166	1,587	28,261	75,185	1,374	5,954	271	1,124	148,475
<b>Otolaryngology</b>	5,490	2,849	4,981	1,232	8,529	3,386	709	895	45	566	28,682
<b>General surgery</b>	10,410	9,608	4,534	2,986	17,836	28,554	1,087	3,253	165	3,373	81,805
<b>Neurosurgery</b>	1,319	512	406	45	2,246	2,483	--	128	--	--	7,139
<b>Orthopedic surgery</b>	14,517	10,745	8,888	3,682	28,240	12,327	2,161	5,700	2,526	1,545	90,331
<b>Cardiovascular surgery</b>	211	106	70	25	457	34	101	29	--	1	1,035
<b>Urology</b>	4,420	2,070	--	388	15,379	13,116	1,555	4,559	--	2,068	43,555
<b>Internal medicine</b>	5,016	8,982	4,065	1,581	14,423	25,562	339	2,039	8	3,489	65,503
<b>Radiation oncology</b>	73	69	--	--	139	168	51	--	4	3	507
<b>Medical oncology</b>	89	90	--	--	643	391	--	136	4	38	1,391
<b>Residual</b>	42,328	40,707	22,141	10,051	85,390	76,960	5,528	18,517	2,149	11,209	314,978
<b>Total waiting</b>	110,135	95,518	51,158	23,858	212,818	245,264	13,886	43,356	5,327	24,507	825,827

Note: Totals may not match sums of numbers for individual specialties/provinces due to rounding.

Source: Barua et al., 2010.

2010: about 10.24 million weeks. This estimate is much greater than the estimated 6.92 million weeks for 2009 due to an increase in both wait times and in the number of Canadians waiting for care (Barua et al., 2010; Esmail, 2009a).

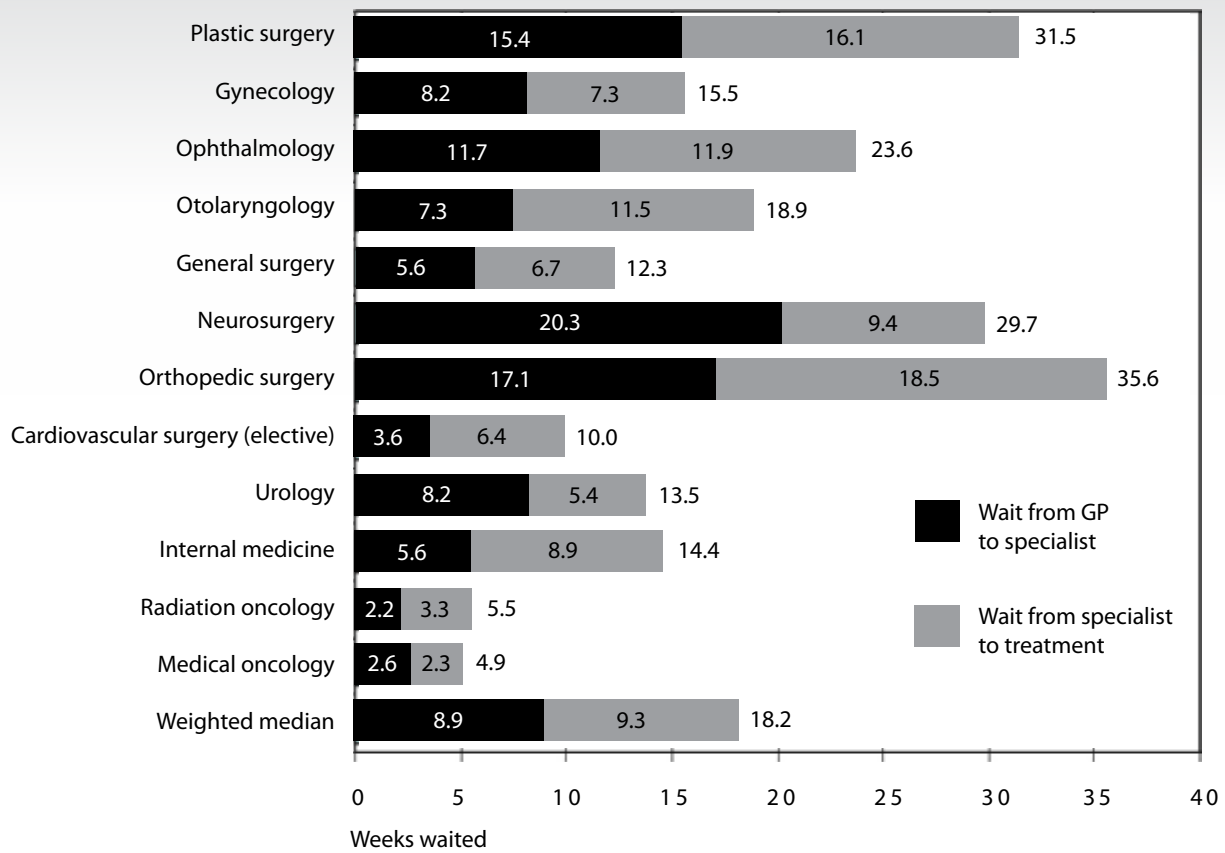
Globerman and Hoye's original estimate for the cost of waiting, which came from responses to a survey of physicians, used specialty-specific measures of the proportion of patients who were "experiencing significant difficulty in carrying on their work or daily duties as a result of their medical conditions" (1990: 26). The proportions they estimated ranged from 14% of patients in gynecology to 88% in cardiovascular surgery, and averaged 41% overall (Globerman with Hoye, 1990; Esmail, 2009a).

However, the estimates of lost productivity measured by Globerman and Hoye cannot necessarily be applied today because of advances in medicine and the medical system's ability to deal with pain and discomfort with pharmaceuticals. These advances may allow many Canadians who are suffering significant difficulties to function at a higher level today than they would have in 1990,

or even to maintain their normal activity levels. For this reason, this author's estimation of the cost of waiting in 2010 uses a Statistics Canada finding that 11.0% of people were adversely affected by their wait for non-emergency surgery in 2005 (Statistics Canada, 2006). This percentage is below even the lowest specialty-specific measure estimated by Globerman and Hoye (1990).<sup>3</sup>

An assumption that 11.0% of people waiting for treatment in 2010 experienced significant difficulties in their daily lives as a result of their medical condition, and thus lost productivity while waiting for treatment, results in an estimate that nearly 1.13 million weeks were "lost" while patients waited for treatment. However, because this estimate is based on the assumption that all individuals face the same wait time for treatment in each specialty/province combination, it is mathematically equivalent to assuming that 11.0% of the productivity of all Canadians waiting for care was lost to a combination of mental anguish and the pain and suffering that accompany any wait for treatment. Multiplying this lost time by an estimate of the average weekly wage of Canadians in 2010 (given in table 2), which provides an estimate

**Figure 1: Median wait by speciality in 2010**  
**Weeks waited from referral by GP to treatment**



Source: Barua et al., 2010.

**Table 2: Average of average hourly and weekly wages\*, by province, January to December 2010**

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	CAN
Nominal average hourly wage	\$22.81	\$25.02	\$22.41	\$20.54	\$23.23	\$21.14	\$19.02	\$19.87	\$18.67	\$20.69	\$22.53
Nominal average weekly wage	\$824.39	\$945.89	\$834.87	\$745.09	\$848.68	\$745.71	\$718.72	\$732.17	\$686.02	\$792.10	\$820.90

\*The wages reported here are earned wages or salaries including tips, commissions, and bonuses before taxes and other deductions.

Source: Statistics Canada's CANSIM database; calculations by author.

**Table 3: Calculated cost of waiting for medically necessary health services from specialist appointment to treatment, by province and specialty, 2010 (\$ thousands)**

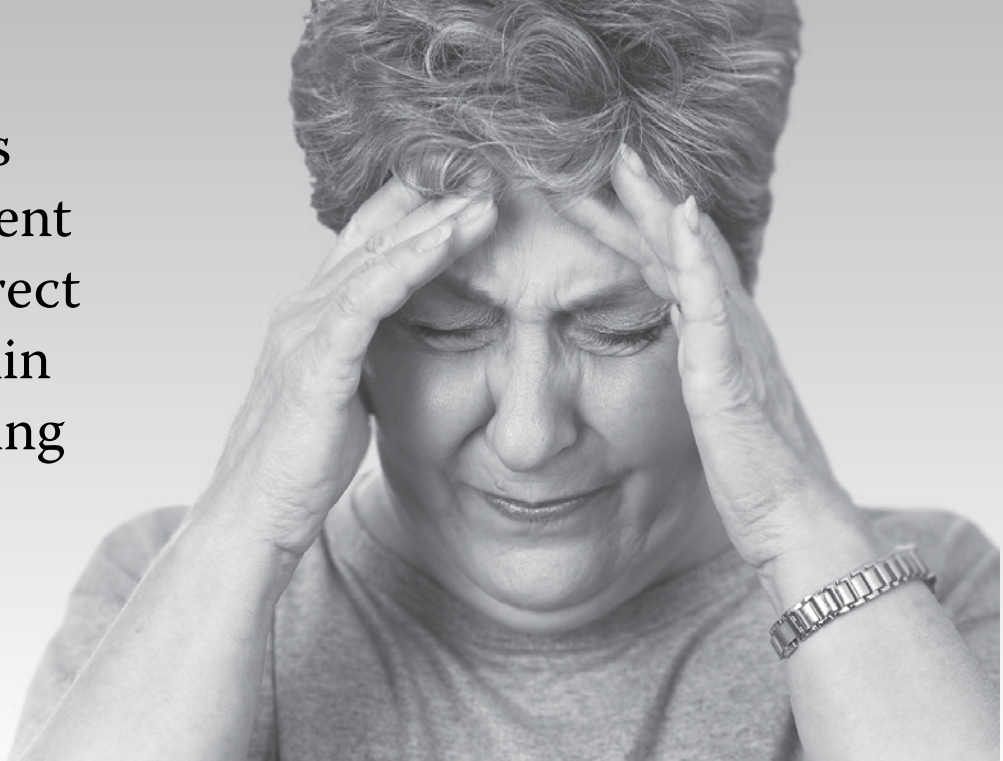
	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	CAN
Plastic surgery	\$17,031	\$1,312	\$5,540	\$3,392	\$2,419	\$2,437	\$769	\$4,353	\$16	\$1,106	\$38,374
Gynecology	\$3,369	\$3,863	\$1,390	\$548	\$4,392	\$2,483	\$172	\$615	\$59	\$473	\$17,364
Ophthalmology	\$21,082	\$35,642	\$3,051	\$782	\$21,498	\$76,734	\$886	\$10,095	\$244	\$976	\$170,990
Otolaryngology	\$9,354	\$4,016	\$22,706	\$1,458	\$6,470	\$1,785	\$424	\$964	\$16	\$551	\$47,744
General surgery	\$6,820	\$8,801	\$4,656	\$1,822	\$6,416	\$19,489	\$532	\$2,195	\$38	\$3,837	\$54,606
Neurosurgery	\$1,380	\$322	\$454	\$9	\$1,529	\$2,604	\$-	\$159	\$-	\$-	\$6,456
Orthopedic surgery	\$26,840	\$25,243	\$42,203	\$5,404	\$35,929	\$14,321	\$2,807	\$17,758	\$19,456	\$3,116	\$193,077
Cardiovascular surgery	\$24	\$12	\$25	\$2	\$43	\$0	\$48	\$2	\$-	\$0	\$155
Urology	\$1,956	\$661	\$-	\$106	\$6,280	\$6,245	\$1,066	\$5,935	\$-	\$2,681	\$24,929
Internal medicine	\$2,685	\$13,562	\$5,203	\$811	\$6,946	\$24,772	\$203	\$1,646	\$2	\$6,007	\$61,836
Radiation oncology	\$29	\$40	\$-	\$-	\$28	\$53	\$16	\$-	\$1	\$1	\$168
Medical oncology	\$15	\$19	\$-	\$-	\$135	\$64	\$-	\$110	\$1	\$7	\$350
Residual*	\$40,671	\$51,700	\$40,137	\$7,315	\$49,172	\$62,534	\$3,934	\$23,061	\$3,628	\$14,071	\$296,221
<b>Total cost</b>	<b>\$131,255</b>	<b>\$145,192</b>	<b>\$125,365</b>	<b>\$21,648</b>	<b>\$141,257</b>	<b>\$213,521</b>	<b>\$10,857</b>	<b>\$66,892</b>	<b>\$23,460</b>	<b>\$32,824</b>	<b>\$912,270</b>

Note: Totals may not match sums of numbers for individual specialties/provinces due to rounding

\*The "residual" count is a count of the number of non-emergency procedures for which people are waiting in Canada that are not included in the Fraser Institute's survey. The wait time used for calculating the residual cost is each province's weighted median wait time for all specialties included in *Waiting Your Turn*.

Sources: Barua et al., 2010; Statistics Canada's CANSIM database; Statistics Canada, 2006; calculations by author.

# Long waits for treatment impose direct costs in pain and suffering



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of the value of the lost time to each individual,<sup>4</sup> gives an estimate of the cost of the productive time that was lost while individuals waited for medically necessary treatment in 2010 (table 3).

The estimated cost of waiting for care in Canada for patients who were in the queue in 2010, according to calculations based on the methodology produced by Gliberman and Hoye (1990), was roughly \$912 million—an average of about \$1,105 for each of the estimated 825,827 Canadians waiting for treatment in 2010. Alternatively, that cost works out to roughly \$10,043 for each individual among the 11.0% of patients in the queue who were suffering considerable hardships while waiting for care.<sup>5</sup>

Of course, this number is a conservative estimate of the private cost of waiting for care in Canada. This estimate assumes that only those hours during the average work week should be counted as lost. It places no intrinsic value on the time individuals spend waiting in a reduced capacity outside of the working week. Valuing all hours of the week, including evenings and weekends but excluding eight hours of sleep per night, at the average hourly wage (given in table 2) would increase the estimated cost of waiting to more than \$2.79 billion, or about \$3,384 per person.

This estimate only counts costs that are borne by the individual waiting for treatment. The costs of care provided by family members (in terms of time spent caring for the individual waiting for treatment) and their lost productivity due to difficulty or mental anguish are not valued in this estimate.<sup>6</sup> Moreover, non-monetary medical costs, such as increased risk of mortality or adverse events that result directly from long delays for treatment, are not included in this estimate (Esmail, 2009a).

In 2009, the estimated private cost of waiting for treatment using the 11.0% estimate, adjusted for inflation,<sup>7</sup> was slightly less than \$611 million in total—about \$880 per patient. If the cost of the hours lost outside of the work week were included, this estimate would increase to about \$1.87 billion or about \$2,695 per individual after adjusting for inflation. From 2009 to 2010, therefore, the cost of waiting increased by roughly \$225 per Canadian in the queue if only working hours are valued, or by roughly \$689 if all non-sleeping hours are valued. In summary, both the wait time for treatment after seeing a specialist in 2010, and the privately borne cost of enduring that wait time have deteriorated markedly relative to their levels in 2009.

## Conclusion

The rationing of health care in Canada through queues for medically necessary health services imposes direct costs on those waiting for care. The ability of individuals who are waiting to enjoy leisure time and earn an income to support their families is diminished by physical and psychological pain and suffering. In addition, friends and family may be asked to help those waiting for treatment, or may suffer similar reductions in their productive lives because of their own psychological pain.

In 2010, the estimated 825,827 Canadians who were waiting for treatment endured an estimated private cost of at least \$912 million, if not substantially more, in lost productivity and leisure time. That cost was, on a per-patient basis, notably greater than the cost in 2009.

## Notes

1 The measurement below measures only the cost of the wait time from specialist to treatment and does not capture the cost of the wait time from general practitioner referral to seeing a specialist. Thus, this estimate of the privately borne cost of waiting is an underestimate of the true privately borne cost of waiting.

2 Globerman and Hoye employed this methodology in 1990 to develop an estimate of the cost of waiting for medically necessary treatment in the first measurement of waiting times in Canada published by the Fraser Institute. Follow-up examinations of the privately borne cost of queuing in 2004, 2005, 2006, 2007, 2008, and 2009 published by the Fraser Institute also employ this methodology.

3 Statistics Canada's findings are based on the percentage of survey respondents who reported that "waiting for none-emergency surgery affected their life." Globerman and Hoye's estimate measures the number of patients who "experienced significant difficulty carrying on their work or daily duties as a result of their medical condition." Notably, in a 2003 survey of Canadians, only 13% of those who reported being affected by their wait in the Statistics Canada study reported a loss of income, while 14% experienced loss of work. At the same time, 60% experienced worry, anxiety, and stress, 51% experienced pain, and 31% experienced problems with activities of daily living (Sanmartin et al., 2004). In the most recent Statistics Canada survey, 49% of those who were affected by their wait for care experienced worry, anxiety, and stress, 51% experienced pain, and 36% experienced problems with activities of daily living (Statistics Canada, 2006). The methodology employed here for the estimate of the private cost of waiting attempts to measure much more than just lost work or lost income. Rather, it estimates lost productivity in total, including lost on-the-job productivity, lost enjoyment of life, inability to play sports, etc. In other words, the private cost of waiting for care estimated here values the amount of time Canadians spend waiting for care during which these individuals are unable to participate fully in their lives. Also, this estimate does not necessarily assume that 11.0% of individuals are losing all of their productivity while 89.0% are completely unaffected. Rather, the estimates are constructed in such a way that the lost productivity can be 100% for 11.0% of patients, or 11.0% for 100% of patients, or any combination thereof.

4 Though extending this value of time to all individuals may seem questionable, given that some children and retired seniors will be included in the number of patients in the queue, one need only understand that the lost leisure or ability to concentrate suffered by these individuals must have some value. Since most seniors are enjoying increasing opportunities to seek at least part-time employment in the service sector, their labour/leisure trade-off will be such that the last unit of leisure

enjoyed by a senior citizen is equal in value to the last unit of work that is undertaken. Seniors who do not choose to work are clearly placing a higher value on their leisure time than the labour market will offer for their labour. For children, the value of their leisure (which can potentially be viewed as time for personal growth) or productivity at school (which can be viewed as an investment for the future) is assumed to be, for simplicity, not significantly different from that of a working adult. Furthermore, as there are likely to be few children waiting for treatment, any variation from adult reservation wages is not likely to have a marked affect on the average calculation.

5 Globerman and Hoye estimated the cost of queuing for medically necessary care to be about \$2,900 per patient in 1989. In 2010 dollars, this works out to approximately \$4,517.

6 A 2003 Statistics Canada survey found that 20.2% of individuals whose wait times affected their lives reported increased dependence on family or friends (Sanmartin et al., 2004).

7 The estimate from Esmail (2009b) was revised and is now based on average wage data for all 12 months of 2009 (the originally published figures were based on an average of average wage data for the first eight months of 2009 as data for September to December was not available at the time of publication).

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# Ignatieff's Liberals just don't get it

CHARLES LAMMAM, NIELS VELDHUIS,  
AND MILAGROS PALACIOS

Last month, federal opposition parties joined forces to demand that the Conservative government reverse its corporate tax rate reductions. “[This] will send a very clear message that this government ought to change course,” warned Liberal leader Michael Ignatieff (Fitzpatrick 2011). But if increasing corporate tax rates is good policy, why have governments of all ideological stripes across Canada done the opposite by slashing them?

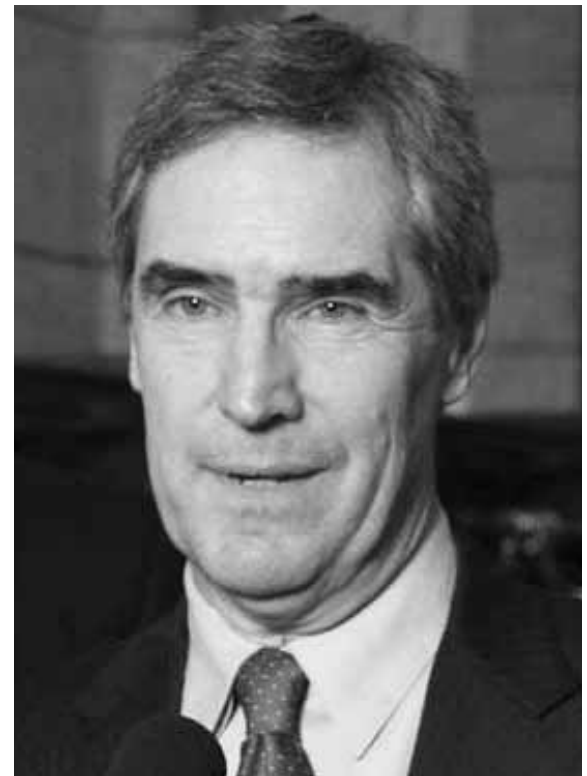
It is because they understand the economics. Business tax reductions yield significant benefits to all Canadians by way of making the economic landscape more attractive for investment. Jurisdictions that lower business taxes increase the after-tax rate of return on investment. Increased returns, then, provide the incentives for investment and leave firms with more money to reinvest.

When businesses invest in machinery, equipment, and technology, workers have more capital with which to work, and can produce more and higher-valued output for each hour they work. In other words, workers become more productive. Because increased productivity leads to higher wages, workers, in the end, benefit greatly from corporate tax reductions.

The Liberal government of Jean Chrétien and Paul Martin got it: “Business income tax rates have a significant impact on the level of business investment, employment, productivity, wages, and incomes” (Department of Finance, Canada, 2000: 222).

Gordon Campbell's BC Liberals got it: “In order to make British Columbia truly competitive...the general corporate income tax rate will be reduced” (Department of Finance, BC, 2001: 65-66).

Ralph Klein's Progressive Conservatives got it: “The first priority is to reduce corporate income tax rates. Lower tax rates benefit all businesses and sectors of the Alberta economy, and ultimately Albertans through a growing economy and better job opportunities” (Department of Finance, Alberta, 2001: 119).



Lorne Calvert's NDP government in Saskatchewan got it: “Saskatchewan will begin a phased reduction of the general corporate income tax rate from 17% to 12%... The significance of this reform should have an immediate impact on investor and business attitudes towards Saskatchewan. Statutory tax rates are the most transparent means of demonstrating the investment “friendliness” of a jurisdiction” (Department of Finance, Saskatchewan, 2006: 14-16).

Gary Doer's NDP government in Manitoba got it: “Since 1999, the government has worked hard to provide business with a competitive environment. We have cut the general corporate income tax by almost 30%” (Selinger, 2009: 10).

Shawn Graham's New Brunswick Liberals got it: “Reducing the tax on corporate income will enhance New Brunswick's business tax competitiveness, and assist in encouraging new investment and job creation in New Brunswick, which are vital to economic growth” (Department of Finance, New Brunswick, 2008: 19).

Even Dalton McGuinty's Liberals finally got it when he announced reductions in Ontario's 2009 budget: “We also propose to strengthen our businesses by reducing Ontario's corporate income tax rate [which] would increase business investment, create new jobs, raise incomes” (Duncan, 2009: 11).

Over the past decade, Liberal, NDP, Conservative, and Progressive Conservative governments both federally and provincially have all reduced corporate tax rates to improve our economy. They did so because the evidence on the economic impact of lower corporate taxes is well documented.

Consider a recent Department of Finance Canada study that analyzed the corporate tax cuts implemented

between 2000 and 2004 by Mr. Ignatieff's predecessors, former Liberal Prime Minister Jean Chrétien and then Finance Minister Paul Martin (Parsons, 2008); the study found that each 10% reduction in the after-tax cost of capital increased the amount of capital by 7%.

In *The Effect of Corporate Taxes on Investment and Entrepreneurship*, former World Bank Chief Economist Simeon Djankov and his co-authors analyzed data from 85 countries and found that higher corporate taxes reduced both investment and entrepreneurial activity (Djankov et al., 2008). Specifically, a 10 percentage point increase in corporate tax rates reduced a country's total investment to Gross Domestic Product (GDP) ratio by about two percentage points, reduced the number of businesses by 1.9 firms per 100 people, and discouraged the rate of new business registration by 1.4 percentage points.

A recent OECD study, *Do Tax Structures Affect Aggregate Economic Growth?*, explored the direct relationship between various taxes and economic growth for 21 developed countries over the period 1971 to 2004 (Arnold, 2008). While personal income, consumption, and property taxes all had negative effects on per person income growth, corporate income taxes had the most damaging effect.

Yet Michael Ignatieff believes that corporate tax cuts are "giveaways" that "fatten profits" for the "richest and most powerful corporations." In fact, he wants to increase corporate taxes to finance spending increases on social programs such as his proposed \$1 billion a year "Family Care Plan" (Liberal Party of Canada, 2010).

In theory, his reasoning seems simple: if you need money, then increase taxes. In reality, the Liberals and other opposition parties have the economics backward. If we want more revenue to spend on programs, then we need businesses to invest, expand, and create more jobs.


To encourage them to do so, Canada needs a more positive investment climate—one that is more conducive to business activity. Prudent fiscal policy, flexible labour markets, lower and more efficient regulation, low taxes, freer trade, and many other investment-friendly policies are needed. Admittedly, a lower corporate income tax rate is not a magic bullet, but it is an important component of a positive economic environment.

The reality of the global economic landscape is that countries are competing with one another for investment, so any advantage is critical. Unfortunately, according to the OECD, Canada's combined federal and provincial corporate income tax rate (29.5%) was 10<sup>th</sup> highest among 31 OECD countries in 2010 (OECD, 2010).

If Mr. Ignatieff has his way, Canada will only become less competitive. While he thinks the Conservatives "ought to change course," it is his Liberals and other opposition parties that need to reverse their misguided positions on corporate taxes.

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# Towards a continental crude oil and natural gas strategy

GERRY ANGEVINE

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In 2008, the Fraser Institute published a *Vision for a Continental Energy Strategy* (Klein and Tobin, 2008). In 2010, the Institute released two studies of North America's crude oil and natural gas supply potential and requirements. These two studies flagged roadblocks that stand in the way of achieving petroleum development in a manner consistent with the goals and objectives of a continental energy strategy (Angevine, 2010a; 2010b). This paper summarizes both the obstacles to market development of the continent's petroleum resources that those studies

identified and the policy recommendations that were put forward.

## A continental energy strategy

The envisioned strategy is to have North American energy policies at the national, provincial, and state levels aligned, as far as possible, in support of efficient and rapid development of the continent's energy resources in light of market conditions, science-based environmental concerns, and competition from oil and gas imports and petroleum

investment opportunities abroad.<sup>1</sup> The primary objective is to ensure that Canadians, Americans, and Mexicans can realize the maximum possible economic and social benefits from development of the continent's energy resources through free and open markets, including energy trade with the rest of the world. Accelerated development of North America's energy resources, spurred by market opportunities both at home and abroad would trigger employment and income growth and contribute to an improved quality of life.<sup>2</sup> Increased availability of petroleum supplies from the continent's indigenous



sources would also increase the range of oil and gas supply options that are available to consumers. Further, increased development and production of the continent's energy resources would bolster the security of oil and gas supplies (Klein and Tobin, 2008).

Because market forces will determine the most efficient allocation of North America's energy resources, our continental energy strategy focuses on ensuring that government policies and regulations pertaining to energy resource investment, development, consumption, and trade are stable, fair, and appropriate. Governments must avoid intervening in energy investment decisions. Such decisions are best left to entrepreneurs who have an in-depth knowledge of the technologies involved and are prepared to take calculated, educated risks (Klein and Tobin, 2008).

## **Barriers to development of the continent's oil and gas resources**

Unfortunately, a number of regulatory and taxation barriers are discouraging investment in the North American petroleum sector and making it difficult for projects here to compete with development opportunities in other parts of the world. These include:

### **1. Uncompetitive royalty regimes**

The tax structures facing the oil and gas industry in North America, including royalties and production taxes, need to be competitive with those elsewhere. In some provinces and states, oil and gas production is taxed to an extent that makes them less desirable locations for investment for petroleum industry

investment than elsewhere in North America and overseas.<sup>3</sup>

### **2. Royalty regimes that fail to recognize the higher costs of unconventional supplies**

Royalty and production tax regimes that fail to take into account the higher costs of petroleum development and production from unconventional and offshore resources relative to conventional, onshore sources of supply are yet another barrier to investment. Where this is the case, exploration for, and development of, production facilities involving higher cost oil and gas supply sources is likely to be constrained.<sup>4</sup>

### **3. Uncertainty regarding the course of environmental policy**

The cost of complying with policies aimed at reducing CO<sub>2</sub> and other greenhouse gas emissions which some believe are contributing to global warming is of particular concern to existing and potential oil sands producers and investors, as well as heavy oil producers in Western Canada, California, and elsewhere.<sup>5</sup> Without clear policies, potential investors will be unable to determine the cost of compliance with the anticipated regulatory changes. As a result, some projects are likely either to be put on hold or dropped.

### **4. Moratoria on offshore exploration and development**

Moratoria on offshore exploration as, for example, in the Queen Charlotte Basin off of British Columbia's mainland, are another obstacle to investment in petroleum exploration and development. Exploration, development, and production have

been underway for some time off of Canada's east coast. A scientific task force review initiated by the Government of British Columbia in 2002 concluded that, with appropriate safeguards and assessments of project proposals, the moratoria on hydrocarbon exploration and development off British Columbia's shores could be lifted. However, the freeze on activity continues (British Columbia Ministry of Energy Mines and Petroleum Resources, 2002).<sup>6</sup>

### **5. Delays in oil and gas pipeline regulatory approval processes**

In December 2010, when the National Energy Board issued its decision about the Mackenzie Gas Project, more than six years had elapsed since the consortium led by Imperial Oil Resources Ventures Ltd. applied for permission to construct the project. Although this is an exceptional case, it serves to illustrate how lengthy and costly the regulatory approval process can be. Delays in the construction of a pipeline which prevents incremental oil or natural gas supplies from reaching their market can impact consumers by increasing the local cost of natural gas or oil products. Moreover, delays in construction, which increase the capital cost of a pipeline because of wage and price inflation during the delay period, can result in higher transportation costs since pipeline tariffs are based on the cost of service including depreciation and interest.

The National Energy Board has self-imposed "standards" regarding time schedules to follow when releasing decisions following the completion of public hearings. However, these are arbitrary and serve only as guidelines. To ensure a more rapid response to pipeline construction applications in Canada, the *National Energy Board Act* needs to be revamped to focus

government involvement in the construction permitting process on the non-commercial aspects of proposed projects, such as safety, environmental impacts, and other matters of public importance (Angevine, 2010a).

## 6. Land claims and access compensation disputes

Uncertainty over land claims or demands by aboriginal groups for compensation can have serious consequences for the development of energy projects because an unsettled dispute can result in a project being deferred indefinitely.

## 7. Political constraints on upstream investment

Laws and regulations that forbid foreign investors from sharing in the risks and rewards from the discovery, development, and production of oil and gas will result in slower production growth than would occur otherwise. This is the case in Mexico, which nationalized the petroleum industry in 1938, causing foreign-owned oil companies to leave the country. In 2008, the Mexican government introduced a number of reforms designed to increase petroleum exploration (Mueller, Thomas, et al., 2008), but they fall far short of introducing a truly free market since ownership of any hydrocarbons that are discovered through exploration is reserved for the state.

## Towards a continental crude oil and natural gas strategy

The potential exists to grow the capacity to produce petroleum



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Offshore drilling may face continued moratoria until environmental issues have been resolved.

from indigenous sources and improve domestic oil and natural gas supply and demand balances (and thereby lower import requirements) in North America (Angevine, 2010a and 2010b). However, in order for citizens to reap the benefits from accelerated development of the continent's petroleum resources, energy policies in Canada, the United States, and Mexico need to be reformed. Essentially, the policy structure needs to become more market-oriented to ensure that North America does not impose unnecessary barriers to

timely investment in petroleum production and transportation facilities compared with other industries, and with oil and gas industry investment opportunities overseas.

A specific North American oil and gas strategy should include the following:

### 1. Ensure that oil and natural gas royalties are competitive

In order to attract investment required for the development of oil

and natural gas production and pipelines, Canadian and US jurisdictions need to ensure that their royalty regimes are competitive with those of competing jurisdictions in Latin America and overseas.

## **2. Reflect the higher costs of producing oil and natural gas from unconventional and frontier sources in royalties**

The governments of Canadian and American jurisdictions must reflect differences in the cost structures between conventional oil and natural gas production, on the one hand, and production from unconventional and frontier sources of supply such as the oil sands, coal bed methane, tight sands, shale formations, the deep-water outer-continental shelf, and the northern frontier, on the other, in their royalty structures if they wish to attract greater investment in exploration and development of the more costly sources of supply. A universal, flat, net-revenue approach to the determination of royalties, similar to the reforms to personal and corporate income tax calculations proposed by Clemens et al. in a 2008 Fraser Institute study, would overcome this problem (Clemens, 2008). In lieu of such fundamental reform, jurisdictions need to review royalty regimes with regard to high cost sources of petroleum supply to ensure that they are competitive.

## **3. Reduce environmental policy uncertainty**

Uncertainty concerning the timing and specifics of environmental policy changes can significantly impact investor decisions to move

ahead with oil and natural gas development projects and energy pipeline construction. For this reason, provincial, state, and federal governments need to make the details of regulatory changes that they are in the process of implementing public without unnecessary delays.

## **4. Remove barriers to offshore development**

Moratoria on petroleum exploration and production in offshore areas should be lifted once the authorities are satisfied that the environmental risks can be mitigated. Doing so will open new areas for potential discoveries and allow additional indigenous oil and gas supplies to be tapped if the exploration is successful.

## **5. Streamline regulatory processes pertaining to pipeline construction permits**

Additional pipeline capacity will be needed to transport new oil and gas supply sources to market. Regulatory processes for obtaining construction permits need to be reviewed to ensure that unnecessary impediments are not allowed to stand in the way of project construction.

## **6. Develop more efficient and fairer procedures for resolving native land claims**

Approaches for settling native land claim and compensation issues expeditiously and in a fair and appropriate manner need to be found in order to help to prevent such claims from delaying pipeline construction and saddling eventual users with inappropriately high transportation costs. An approach which appears to be gaining commercial favour in

Canada is to provide First Nations bands through whose territories a proposed pipeline would pass with a share in the ownership of the facility so that they may benefit from ongoing operations. One example of this is the British Columbia Government's decision to grant First Nations groups \$32 million to invest in the Kitimat to Summit Lake Pipeline that the Pacific Trails Pipeline Partnership (PTP) is planning to build to supply natural gas to PTP's proposed Kitimat LNG Terminal (*Daily Commercial News*, 2009). Another, is the Aboriginal Pipeline Group's (APG) one-third interest in the proposed Mackenzie Gas Project, with one of the interested parties (TransCanada Pipelines Limited) providing financing to native groups to allow them to buy into APG. Currently, Enbridge Inc. is reportedly offering First Nations groups that would be directly impacted by the company's proposed Northern Gateway project a 10% equity position, financing, and 1% of pre-tax earnings (Enbridge, 2011 and O'Meara, 2011).

## **7. Reduce the frequency of disputes with regard to land access issues**

Where they are not already in place, fair and appropriate means must be found to prevent delays in development from occurring because of disputes over the amount of compensation to be paid to land owners for access to land—whether by petroleum operators for exploration or operations, or investors seeking to build oil or gas pipelines.

It would be beneficial if the results of recently negotiated settlements in the region were made publicly available as is the case with real estate transactions. Improvements in the quantity and quality of

available information would help to speed up the negotiating process and require fewer cases to be referred to public tribunals.

## 8. Strive to remove political constraints on foreign investment in Mexican natural gas exploration and development

Allowing foreign companies to explore for oil and gas in Mexico, to develop and operate production facilities, and to market gas there—subject to market conditions and a globally competitive royalty structure and taxation framework—would facilitate a much-needed influx of capital and expertise. This would allow Mexico to increase its oil and gas production and avoid becoming a net importer of petroleum supplies.

## Notes

1 This is not meant to imply harmonization of policy frameworks but, rather, to have each jurisdiction seek policies which the responsible officials believe are necessary to foster petroleum resource development in light of the particular circumstances.

2 This assumes that the economies are at less than full employment such that inflation does not erode real incomes.

3 This is reflected in the relatively poor scores that Alberta, California, Colorado, Newfoundland and Labrador, New Mexico, New York, and the Northwest Territories achieved relative to most other Canadian and US jurisdictions—and many other countries—in relation to fiscal terms (royalties or production taxes) in the *2010 Fraser Institute Global Petroleum Survey* (Angevine and Cervantes, 2010).

4 Alberta recently introduced special incentives that lower royalties for unconventional gas production and—in the case of deep or horizontal oil and gas wells—all situations where the cost of production can be higher than with conventional gas production (Alberta Department of Energy, 2010). The very perception that special adjustments are necessary, though, suggests that the royalty regime is flawed.

5 Oil sands and heavy oil projects involve greater carbon emissions per unit of production than conventional light/medium oil production.

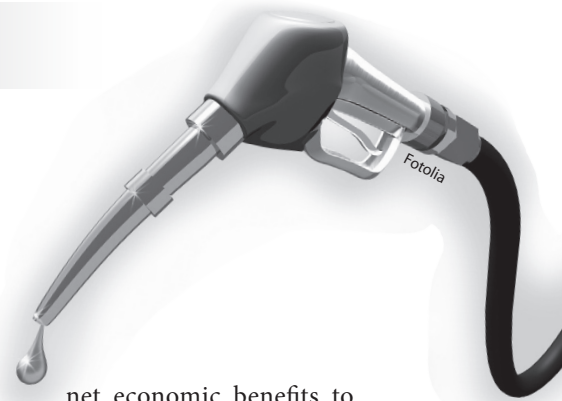
6 The failure of automatic flow shut-off controls to activate when the rig at the BP Deepwater Horizon site in the US Gulf of Mexico exploded in April 2010, causing hundreds of thousands of barrels of crude oil to leak into the Gulf with untold environmental damage, will make it more difficult to sway those who argue that risks to the environment from offshore drilling cannot be adequately controlled.

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## Canada's federal Renewable Fuels Regulations: An example of poor decision making

JOEL WOOD



On December 15<sup>th</sup>, 2010, regulations took effect that mandate the minimum amount of renewable fuel content that must be included in gasoline sold in Canada. The regulations imposed by the government will result in large costs to the petroleum industry and consumers, while providing very little verifiable benefit to society. The *Renewable Fuels Regulations* require fuel suppliers to blend an average of at least 5% renewable fuel content in gasoline (Canada, 2010). These are federal regulations, but British Columbia (*Renewable and Low Carbon Fuel Requirements Regulation*), Manitoba (*Ethanol General Regulation*), Ontario (*Ethanol in Gasoline*), and Saskatchewan (*Ethanol Fuel (General) Regulations*) already have similar regulations in force provincially. Ethanol and biodiesel are examples of the renewable fuels that will be used to make up the 5% mandates. Ethanol is a commercial alcohol, and in Canada it is produced from feedstocks such as corn and wheat (CFRA, 2010a). Biodiesel is produced from vegetable oils or animal fats (CFRA, 2010b). The motivations in support of the regulations are reductions in greenhouse gas (GHG) emissions and increased jobs in the renewable fuel sector (Canada, 2010).

Economic theory suggests that the regulations will impose costs on fuel suppliers since the regulations force them to include a higher cost input (ethanol or biodiesel) in their production process. If ethanol and biodiesel were not more expensive than gasoline, then the fuel suppliers would already be mixing them with gasoline on a large scale and regulations would not be required. According to the *Regulatory Impact Analysis Statement* accompanying the published regulations, fuel suppliers will incur total costs of \$775.3 million<sup>1</sup> to comply with the regulations between 2010 and 2034 (Canada, 2010).

Fuel suppliers will pass much of the upfront cost of complying with the regulations onto consumers and fuels such as ethanol are less efficient than gasoline. Natural Resources Canada estimates that an average consumer would use 2.2% more fuel when using gasoline containing 10% ethanol as opposed to when using just regular gasoline (Canada, 2010). Therefore, the regulations will result in consumers not only paying higher gasoline prices, but also filling their tanks more often. The costs to consumers purely attributed to the additional fuel usage are estimated to be \$1.1022 billion (Canada, 2010).

To the supposed net economic benefits to the agriculture and renewable fuels sectors, the *Regulatory Impact Analysis Statement* described them as negligible (Canada, 2010). The analysis does mention job creation in the renewable fuels sector, but does not predict any increases in gross domestic product in this sector (Canada, 2010). The report estimates that the regulations will not affect food prices and land use, and will result in a negligible increase in income (less than 1%) in the crop sector (Canada, 2010).

The federal government expects the regulations to lead to a total reduction of GHG emissions of 23.8 Mt<sup>2</sup> over 25 years, or an average annual reduction of 0.99 Mt. To put this expected reduction in context, the average annual reduction is only 0.13% of Canada's annual GHG emissions in 2008 (Environment Canada, 2010; author's calculations). The report monetizes the benefits from the expected reductions in GHG emissions due to the regulations by choosing a social cost of carbon estimate of \$25 per tonne of GHG. Using this emissions price, the report estimates benefits over a 25-year period to be \$560.8 million (Canada, 2010). The report estimates the total costs of the regulations to industry, consumers, and government to be \$1.8798 billion (Canada, 2010). The net benefits (benefits minus costs) of the regulations are both negative and large (\$-1.319 billion). The benefit cost analysis shows that the government has implemented regulations for which the benefits do not even come close to outweighing the costs.

There is a serious mistake in the methodology applied for the benefit cost analysis in the report. The method used to estimate net benefits in the report values a dollar of benefits more than a dollar of costs that occur in a given year.<sup>3</sup> However, it is standard practice in benefit cost analysis to put equal weight on benefits and costs that occur in the same year.<sup>4</sup> By not using equal weights, the analysis either overestimates the present value of benefits or underestimates the present value of costs. In either case, net benefits would be much more negative.

Further, the report undertakes a sensitivity analysis by changing the social cost of carbon emissions. The analysis finds that a \$100 per tonne of GHG (as advocated by Stern, 2007) will produce positive net benefits. However, the benefit cost analysis uses different assumptions than Stern. If the analysis is altered to be consistent with

the assumptions used by Stern, then the benefits of GHG reductions increase by approximately 17%, but the costs of the regulations increase by over 100% (author's calculations). When appropriate assumptions are made, the net benefits become even more negative, even when an unreasonably high social cost of carbon is assumed (see Nordhaus, 2007 for a critique of Stern). Despite the fact that the regulations will produce negative net benefits, the *Regulatory Impact Analysis Statement* concludes:

Despite the GHG emission reductions, the benefits in terms of employment and increased economic activity, domestic and international commitments of the Canadian government...the overall impact of the Regulations will be positive. (Canada, 2010).

The report's conclusion completely contradicts the report's analysis. Not only are the net benefits to economic activity negative, but the annual reductions of GHG emissions represent only a tiny percentage (far less than 1%) of the reductions required to meet the domestic and international commitments of the federal government.<sup>5</sup> The only credible justification for the imposition of the regulations is that they will reduce emissions. However, the government's own analysis shows that any benefits from reduced emissions are far outweighed by the costs imposed on industry and consumers, despite mistakes in the analysis that either underestimate costs or overestimate benefits.

Whatever way you look at it, the recently imposed *Renewable Fuels Regulations* cannot be justified. The regulations will impose large costs on society while offering negligible reductions in GHG emissions.

## Notes

1 All dollar amounts are given as 2007 dollars.

2 Mt = Megatonnes. 1 Mt = 1 million tonnes.

3 In technical economics language, the present value of benefits are estimated using a discount rate of 3% and the present value of costs are estimated using a discount rate of 8%. Chapter 6 of Field and Olewiler (2005) provides an introductory level treatment of benefit cost analysis and discounting.

4 This proper framework is applied by Ecoresources (2009), cited as a reference document to the *Regulatory Impact Analysis Statement*.

5 The federal government has committed to reducing GHG emissions to 80% of 2006 levels by 2020 (2020 emissions would need to be 159.6 Mt less than 2008 emissions), see Environment Canada, 2008.

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