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The DRG Domino-effect: From Hospital Remuneration to Healthcare Reform

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This paper examines how the problem of wait times in Canada can potentially be tackled through targeted and transparent funding that dynamically responds to the true demand and complexity for medically necessary services. Based on the findings, it is recommended that the federal government encourage the adoption of activity-based funding [ABF] for hospitals by,

1. Clarifying the compatibility of ABF/DRG-like funding and the Canada Health Act [CHA],
2. Tasking the Canadian Institute of Health Information [CIHI] with determining a nationally efficient price for healthcare services
3. Allocating a one-time fund for provincial efforts to improve electronic medical records [EMRs] and establish national standards for intra and inter-provincial patient referrals
4. Changing the Canada Health Transfer [CHT] formula so that federal funds are allocated to provinces based on the number and complexity of services rendered

INTRODUCTION

Wait times for medically necessary care have become a permanent, and devastating, feature of Canada's healthcare system. In 2022, patients faced a median wait of 27.4 weeks for medically necessary (elective) treatment - almost three times longer than in 1993 (9.3-weeks). (Moir & Barua, 2022a). Although COVID-19 exacerbated wait times, in 2019, patients still faced a median wait of 20.9 weeks (Barua & Moir, 2019).

Simply put, there is a fundamental imbalance between the demand and supply of medical services in Canada. In the absence of a pricing mechanism, this manifests in rationed care for patients through waiting lists.

Reconciling this imbalance necessitates solutions that either temper demand, increase supply and/or better align incentives.

Proven solutions based on international evidence from more successful universal healthcare systems point towards the use of private sector as either a partner (Barua & Esmail, 2015) or a pressure-valve on the supply side (Labrie, 2023), along with the use of patient cost-sharing mechanisms to potentially reduce the use of ambulatory care (and thereby waiting lists) on the demand-side (Barua & Moir, 2022).

Unfortunately, each of these common-sense reforms face considerable hurdles due to the federal Canada Health Act (particularly Sections 12 and 18-21) and associated provincial legislation (Barua et al., 2019; Esmail & Barua, 2018).

Less discussed are the potentially far-reaching ramifications of overhauling the way hospitals are funded and, by extension, the formula used to determine federal transfer to provinces. Doing so could address the supply-side of the equation, while introducing price signals and incentives to ensure better translation of healthcare dollars into treatment (thereby potentially improving efficiency). Importantly, the CHA does not explicitly restrict provincial decisions about how medically necessary hospital services can be remunerated. (Esmail & Barua, 2018).

However, governments in Canada have typically focused on tackling the supply via budgeted spending increases. This approach has only succeeded in inflating the cost of our healthcare system without translating into reduced wait times. For example, since 1993 provincial governments collectively increased healthcare spending per capita by 68% (adjusted for inflation) (CIHI, 2022).[1] During same period wait times went up by 195%. Clearly, additional spending did not translate into improved access to care.

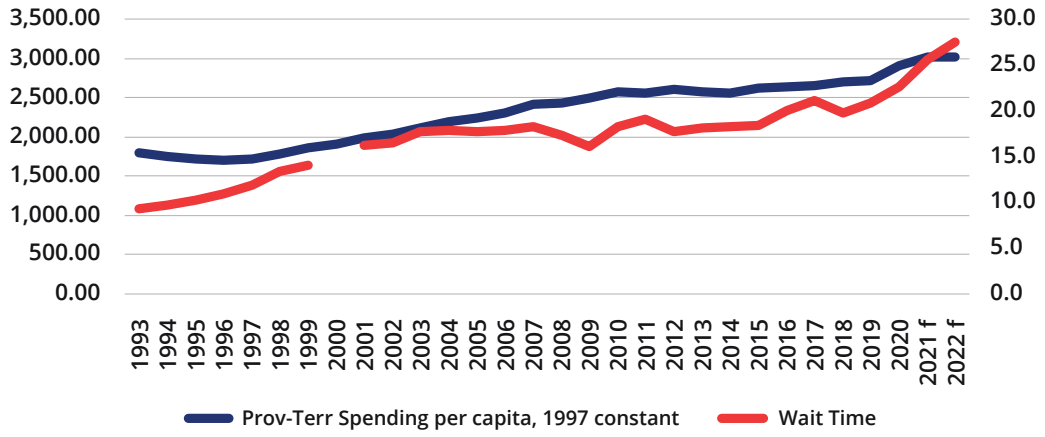

Figure 1: Spending vs Wait Times, 1993-2022

Source: Table B.4.8 CIHI (2022); Moir & Barua, 2022; calculations by author.
Note: There is a difference how annual wait times data were published between 2000-2002.
As a result data for 2000-01 and 2001-2002 were aligned with spending data for 2001 and 2002 respectively.

[1] Provincial government spending on hospitals also represents a smaller portion in 2022 (33.6 percent) compared to 1993 (45.4 percent), again demonstrating a potential disconnect between healthcare spending increases and the amount directed towards hospital services.

Indeed, Canada now ranks as the most expensive universal healthcare systems in the world (as a percentage of GDP) and 8th highest (out of 30) for spending per capita on an age-adjusted basis. However, Canada ranks dead last in terms of timely access to specialist consultations, elective treatment, and treatment in emergency rooms among the 10 universal healthcare countries for which data were available. (Moir & Barua, 2022b)

Clearly, it is not a question of how much money is spent – but how it is spent.

HOW HOSPITALS ARE CURRENTLY FUNDED: GLOBAL BUDGETS

One explanation for why efforts to expand supply through increased spending have failed is because most hospitals in Canada are primarily funded by an opaque and outdated method of remuneration– global budgets (CIHI, 2010; Sutherland, 2011).

Under this system, the "funding total and its allocation across hospitals is set at the beginning of the fiscal year. The funding levels and allocations may be adjusted over time—using sociodemographic, political and economic factors to determine future payments—but mainly follow historic patterns" (CIHI, 2010, p. 3).

While simple to administer, and providing governments with a direct method of controlling the total amount of healthcare expenses in any given year, there are a number of problems with this method of funding:

1. It is disconnected from the actual demand for patient services;
2. There is a lack of transparency regarding the "price" of a procedure;
3. Hospitals are not financially incentivized to treat patients who effectively eat into their allocated budget;
4. There is little incentive to improve efficiency, discharge low-cost patients, or improve services as doing so is not financially rewarded;
5. It cannot dynamically respond to changing demand for services (specifically increase to clear a waiting list in the current context, for example).

Indeed, the 2002 Kirby Report (Kirby & LeBreton, 2002, p. 31) noted "…that after years of global budgets in a number of provinces, no one knows how much anything costs any more and that, as a result, it is difficult to know even approximately what the public is getting for its spending on hospitals."

An additional layer of opacity that disconnects funding from activity can be attributed to how the federal government provides healthcare funding to provinces via the CHT. Because CHT payments to provinces are currently determined on a per-capita basis, the amount of federal healthcare transfers provinces receive are also not directly related to the number and complexity of cases performed. This contributes to the lack of transparency with regards to how the transferred money is ultimately spent on services.

Unsurprisingly, the 2004-2014 Health Accords, which allocated 5.5 billion to targeted wait time reductions through the CHT, was evaluated to not have "lead to the major changes that were expected" (Barua, 2014).

This disconnect between funding and activity helps explain why Canada ranks amongst the highest spenders on healthcare, while recording the least amount of general hospital-activity (Moir & Barua, 2022a).

Simply put, healthcare funding – from the federal government to provinces, and from provinces to hospitals – is not appropriately linked to activity.

HOW HOSPITALS SHOULD BE FUNDED: ACTIVITY-BASED FUNDING

What

A potential solution towards reconciling the imbalance outlined above is the adoption of ABF for both hospitals and federal healthcare transfers to provinces.

Under an ABF system, hospitals are funded according to the number and complexity of services they deliver. A national efficient price [NEP] is determined based on the average cost of hospital procedures. The classification of complexity is standardized through the use of Diagnosis-Related Groups (DRGs) which are used to provide relative weights to the NEP.

The result is: if more patients walk-in through the door, hospitals are provided with necessary money to treat them, and unutilized funds are diverted elsewhere to hospitals with larger and more complex case-loads. Further, hospitals may keep the difference between the payment and actual cost incurred, thereby providing an economic incentive to improve efficiency (Sutherland, 2011) .

DRGs (in combination with an NEP) can also be used to calculate federal healthcare transfers to provinces according to activity. Doing so would directly link transfers to medical demand, improve transparency, and take the politics out of the transfer system.

Why

A recent study found that a minority of five (of 28) high-income universal healthcare systems (including Canada) almost exclusively rely on global budgets to fund public and private hospitals (Esmail, 2021b, 2021a). None of these five countries are considered leaders in providing timely access to universal healthcare.

By contrast, DRG-like/per-patient funding is used to fund public hospitals in the remaining 23 high-income universal healthcare countries - including top-performers like Switzerland, the Netherlands, Germany, and Australia.

As can be seen in Table 1, the three universal healthcare countries with the shortest wait times for elective surgery in 2020 all primarily rely on ABF for funding hospitals. By contrast, the three worst performers (including Canada) rely to a greater degree on global budgets.

COUNTRY	WAITED < 4 MONTHS FOR ELECTIVE SURGERY 2020	ABF % OF HOSPITAL BUDGETS APPX. 2012 OR EARLIER	PUBLIC HOSPITAL FUNDING MAIN SOURCE, 2016 OR EARLIER	PRIVATE NOT FOR PROFIT FUNDING MAIN SOURCE, 2016 OR EARLIER	PRIVATE FOR PROFIT FUNDING MAIN SOURCE, 2016 OR EARLIER
Germany	0.99	80%	ABF/DRG-like	ABF/DRG-like	ABF/DRG-like
Switzerland	0.94		ABF/DRG-like	ABF/DRG-like	ABF/DRG-like
France	0.90	80%	ABF/DRG-like	ABF/DRG-like	ABF/DRG-like
Netherlands	0.87	84%	ABF/DRG-like	ABF/DRG-like	-
New Zealand	0.76		Global Budget/DRG-Pricing	-	-
Australia	0.72		ABF/DRG-like	Procedure/Service	Procedure/Service
United Kingdom	0.72	70%	ABF/DRG-like	Procedure/Service	Fee for Service
Sweden	0.71	55%	Global Budget	Global Budget	ABF/DRG-like
Norway	0.71	40%	Global Budget	Global Budget	ABF/DRG-like
Canada	0.62	9%	Global Budget	Global Budget	Global Budget

Table 1

Source: Schneider et al. (2021); Labrie (2012); OECD (2016)

Note: In New Zealand, hospitals use a DRG pricing system within a fixed overall budget (Siciliani et al., 2015)

Some countries (such as Australia, France, the Netherlands, and the United Kingdom) use DRG-like payments for public hospitals but "locate this within an overall global budget" (OECD, 2013, p. 19) – this is most pronounced in Australia and the UK. The two top-ranking countries – Germany and Switzerland – generally do not employ these budgeting constraints (OECD, 2013, p. 18).

Despite this basic grouping (Table 1) between wait times and hospital renumeration, there are several important policy differences between the countries examined in the above table and the results should not be considered definitive (details explored below).

How

The federal government also has a role to play via the CHA and CHT.

First, because of the significant degree of ambiguity with regards to the term "reasonable access", the Federal government must clarify its position regarding the compatibility of ABF and the Canada Health Act [CHA], specifically with regards to section 12. This would clarify to the provinces that funding hospitals according to activity does not contravene the spirit of the CHA, allowing them to experiment.

Next, the implementation of activity-based funding relies on two factors: a) a case-mix system to group procedures by type and complexity (eg. DRGs) and b) a price per case-mix group (eg. the NEP) (CIHI, 2010, p. 3). Fortunately, Canada already employs a version of the International Classification of Disease standard [ICD-10-CA] for coding inpatient activity and has its own version of case-mix grouping CMG+ (CIHI, n.d.) based on the DRG grouping system (though not currently used for ABF).

For the second factor, the federal government could task CIHI with determining a nationally efficient price [NEP] for services by building upon the CMG+ grouping system. CMG+ also produces a Resource Intensity Weight [RIW] that assigns weights to each CMG relative to a reference point based on "the average typical inpatient case" (CIHI, 2013, p. 29).

The determination of an NEP in conjunction with the use of CMG+ could also play an important additional role that would be instrumental in determining federal Canada Health Transfer [CHT] payments to provinces.

The CHT is currently provided on an equal per capita basis (Government of Canada, 2023). This is problematic because:

1. It doesn't consider demographic factors, geographic differences or disease-burdens due to genetic, environmental, or other factor;

2. Transfers are not directly connected to the delivery services;

3. Funds can be diverted to unnecessary administrative functions;

4. It results in significant political posturing and negotiations

While studies have attempted to propose reforms to the CHT formula to account for some of these individual differences (Marchildon & Mou, 2014) a more direct approach would be to allocate the CHT on the basis of healthcare activity.

Finally, the federal government could provide a one-time fund for provincial efforts to improve electronic medical records [EMRs] and centralize intra-provincial patient referrals and enable inter-provincial referrals via ABF.

EMPIRICAL EVIDENCE

Studies have consistently shown that the implementation of activity-based funding has the potential to increase volume of services, lower wait times, and generate efficiency gains. Each of these have been examined in detail by (Esmail, 2021b; Labrie, 2012; Sutherland, 2011) among others. A few notable examples are presented below.

Australia: In 1993, public hospitals in Victoria shifted away from global budgets towards case-mix funding (accounting for about 50% of hospital revenue) (Street & Duckett, 1996). Within 6 months of implementation, the number of patients treated increased by 5%, but total expenditure was reduced by 5% (Duckett, 1995). There was also a 27% decrease in the total number of patients waiting longer than clinically desirable between 1993 and 1994 (Duckett, 1995)

Germany: The DRG system was implemented across hospitals in 2005. Since then "… the average length of stay has decreased by 17%, the number of cases has increased by 18%, and the number of nursing days has remained rather stable with a 1% decrease" (Barber S.L. et al., 2019).

Netherlands: Following the "Treek norms" reforms in 2001, the Netherlands adopted ABF for hospitals and removed hospital spending (and medical specialist position) caps in 2001. The combination of reforms resulted in increased production and lower wait times. Between 2000–2003, wait times fell 20% for outpatient care and 38% for inpatient care. By 2006 wait times had fallen 50% and by "[i]n 2011, mean waiting times for almost all surgical procedures were four weeks or less."(Siciliani et al., 2015, p. 16)

Sweden: The "Stockholm Model" implemented a shift towards DRG-based funding for hospitals in the early 90's. Stockholm itself recorded an 8% increase in inpatient activity, 15% outpatient visits, and 50% increase in day surgeries about a year after reform. A 10% reduction in DRG-prices in 1992 also led to a 1% lower total cost despite the increase in activity – highlighting the importance of appropriate price setting to accompany the implementation of a DRG system. Lower wait times were observed withing 2 years of the reform. However, the increase in volume of patients eventually led to increased overall costs as "[t]he system has a built-in propensity to increase production" (Håkansson, 2000).

Canada: Some provinces have experimented with limited introduction of ABF. British Columbia introduced a pilot program that replaced up to 20% of hospital global budgets with ABF across 23 hospitals between 2010–2013. Sutherland et al. (2016) found that "inpatient surgical activity trended slightly higher, though volume of medical cases fell and day surgery activity was unaffected". In 2012, Ontario began using a blended approach of Quality Based Procedures [QBP] for 15%, and Health Based Allocation Method [HBAM] for 40% of hospital reimbursement. Proshin et al., (2020) found "a significant decrease in acute length of stay associated with QBPs, as well as a marked shift towards patients being discharged home with/without post-operative supporting services" (the length of stay effect stabilized after 2014) while Li et al., (2020) found "mixed and generally very small effects on quality of care, access to care, and coding behaviour". More recently, approximately 25% of hospitals in Quebec are expected to be funded on the basis of activity by the end of 2023 (Shaw & Faubert, 2023).

The mixed results from these experiments so far is unsurprising given the limited implementation of ABF as well as the remaining overarching provincial budget (and generally hospital budget) which limits increases in activity and innovation.

More generally, Sutherland (2011) found strong evidence that ABF is linked "to increased volume of hospital care, such as those reported in Victoria (Australia), Norway, Italy, Sweden" as well as reductions in wait times, without significant impact on quality. Some caution is provided by a meta-analysis by Palmer et al., (2014) which found that ABF was associated with a 24% increase in admission to post-acute care following hospitalization but results for other indicators of interest were mixed[2].

Overall, although empirical evidence strongly suggests ABF can potentially increase activity, its potential to reduce wait times is strengthened by additional measures including the absence of spending caps for hospitals, increased capacity, choice and competition (Siciliani et al., 2015)

[2] Though the authors note that "overall credibility of included studies was generally low" Palmer et al., (2014)

CONSIDERATIONS AND THE PATH FORWARD

Design and implementation matters and the devil, as usual, is in the details.

There are a number of potential undesirable consequences of a poorly designed ABF policy. These include.

1. **Problem:** ABF may result in shorter hospital stays than clinically reasonable, up-coding, and providing unnecessary care.

   Solution: Routine audits and fines for infractions as would be routine in any business.

2. **Problem:** Potentially inadequate funding for rural hospitals

   Solution: ABF can be mixed with global budgeting, as is the norm in countries like Norway and Denmark.

3. **Problem:** Although implementing ABF may reduce costs per procedure, it's possible that overall costs could increase due to higher surgical volumes.

   Solution: This can be mitigated by locating ABF within an overall budget. However, this is not recommended. Countries that follow this (Australia and the UK) spend less but have longer wait times than those that don't (Germany and Switzerland). All outperform Canada.

   Insight: The increase brings true cost of providing healthcare to light and may have a domino effect opening the door to subsequent reforms.

4. **Problem:** ABF and centralized referral systems may result in more patients being treated by private clinics than provincial governments earlier intended.

   Insight: Again, this is not necessarily a problem so long as patients receive universal access to treatment and may, again, result in increased long-term collaboration.

5. **Problem:** Reduced lengths of stay can affect outcomes for rehabilitation services, long-term and home-care.

   Solution: These settings should be excluded.

Finally, the proposal to encourage the adoption of ABF for hospital remuneration does not come with the sort of politically polarized baggage that may accompany other reforms such as private alternatives and cost-sharing requirements. In fact, ABF has aspects that align with ideological positions across the spectrum. It can appeal to those in favour of increased public spending while causing skepticism among those in favour of austerity. Similarly, parties concerned with increased involvement of the private sector may be skeptical of ABF due to its potential to finance hospitals regardless of ownership which may be desirable for those in favour of wider reform down the road.

The potential promise of ABF to increase transparency, more directly link spending to measurable activity, and solve issues of provincial funding disparity, while achieving the overarching goal of tackling wait times for treatment should be something that all parties find – regardless of political stripe –not just palatable, but desirable.

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