Operational Benchmarking and Cost Containment: Does quality suffer?

David Zygun MD MSc FRCPC

Critical Care Canada Forum
November 2, 2016
9.1. Health expenditure per capita, 2013 (or nearest year)

Note: Expenditure excludes investments, unless otherwise stated.
1. Includes investments.
2. Data refers to 2012.
9.3. Health expenditure as a share of GDP, 2013 (or nearest year)

Note: Excluding investments unless otherwise stated.
3. Data refers to 2012.
2. Including investments.

9.4. Health expenditure as a share of GDP, selected G7 countries, 2005-13

9.5. Health expenditure as a share of GDP, selected European countries, 2005-13
9.9. Health expenditure as share of total government expenditure, 2013 (or nearest year)

<table>
<thead>
<tr>
<th>Country</th>
<th>% total government expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Zealand</td>
<td>22</td>
</tr>
<tr>
<td>Switzerland</td>
<td>22</td>
</tr>
<tr>
<td>Netherlands</td>
<td>21</td>
</tr>
<tr>
<td>United States</td>
<td>20</td>
</tr>
<tr>
<td>Japan</td>
<td>16</td>
</tr>
<tr>
<td>Germany</td>
<td>16</td>
</tr>
<tr>
<td>Canada</td>
<td>17</td>
</tr>
<tr>
<td>Sweden</td>
<td>17</td>
</tr>
<tr>
<td>Norway</td>
<td>17</td>
</tr>
<tr>
<td>Australia</td>
<td>16</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>15</td>
</tr>
<tr>
<td>Iceland</td>
<td>15</td>
</tr>
<tr>
<td>Denmark</td>
<td>15</td>
</tr>
<tr>
<td>Austria</td>
<td>15</td>
</tr>
<tr>
<td>France</td>
<td>15</td>
</tr>
<tr>
<td>OECD34</td>
<td>15</td>
</tr>
<tr>
<td>Belgium</td>
<td>15</td>
</tr>
<tr>
<td>Chile</td>
<td>14</td>
</tr>
<tr>
<td>Spain</td>
<td>14</td>
</tr>
<tr>
<td>Czech Rep.</td>
<td>14</td>
</tr>
<tr>
<td>Slovak Rep.</td>
<td>14</td>
</tr>
<tr>
<td>Italy</td>
<td>13</td>
</tr>
<tr>
<td>Ireland</td>
<td>13</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>12</td>
</tr>
<tr>
<td>Korea</td>
<td>12</td>
</tr>
<tr>
<td>Portugal</td>
<td>12</td>
</tr>
<tr>
<td>Estonia</td>
<td>12</td>
</tr>
<tr>
<td>Mexico</td>
<td>11</td>
</tr>
<tr>
<td>Finland</td>
<td>11</td>
</tr>
<tr>
<td>Israel</td>
<td>11</td>
</tr>
<tr>
<td>Poland</td>
<td>11</td>
</tr>
<tr>
<td>Turkey</td>
<td>10</td>
</tr>
<tr>
<td>Slovenia</td>
<td>10</td>
</tr>
<tr>
<td>Greece</td>
<td>10</td>
</tr>
<tr>
<td>Hungary</td>
<td>10</td>
</tr>
</tbody>
</table>


Information on data for Israel: http://oe.cd/israel-disclaimer
Life Expectancy and GDP per capita

The Preston Millennium Curve

Source: Deaton 2004
Canadian health care is high price yet low quality

BY LORNE GUNTER, EDMONTON SUN

FIRST POSTED: SATURDAY, OCTOBER 29, 2016 06:21 PM EDT | UPDATED: SUNDAY, OCTOBER 30, 2016 12:34 PM EDT

Canadian governments spend a lot on health care, which of course means Canadian taxpayers spend a lot.

One out of every four dollars spent by governments in Canada goes to maintaining our “free” health care system. It is far and away the provinces’ largest expense.
Comparing the performance of different countries’ health-care systems provides an opportunity for policymakers and the general public to determine how well Canada’s health-care system is performing relative to its international peers. Overall, the data examined suggest that, although Canada’s is among the most expensive universal-access health-care systems in the OECD, its performance is modest to poor.
Figure 3a: Physicians per thousand population, age-adjusted, 2012 or most recent

Austria
Norway
Iceland
Israel
Switzerland
Portugal
Slovak Republic
Sweden
Spain
Czech Republic
Australia
Estonia
Georgia
Italy
OECD Average
Netherlands
France
Estonia
Ireland
Luxembourg
New Zealand
Finland
Canada
United Kingdom
United States
Korea
China
Japan

Per thousand population

Sources: OECD, 2015a; calculations by authors.

Figure 3b: Nurses per thousand population, age-adjusted, 2012 or most recent

Norway
Iceland
Sweden
Denmark
Belgium
Luxembourg
Netherlands
Germany
Australia
New Zealand
Switzerland
OECD Average
Canada
Netherlands
United Kingdom
Czech Republic
Austria
Austria
Slovak Republic
Estonia
Ireland
Italy
Korea
Portugal
China
Spain

Per thousand population

Sources: OECD, 2015a; calculations by authors.
Figure 3c: Acute-care beds per thousand population, age-adjusted, 2012 or most recent

Sources: OECD, 2015a; calculations by authors.
Figure 4a: Magnetic Resonance Imaging (MRI) units per million population, age-adjusted, 2012 or most recent

Figure 4b: Computed Tomography (CT) scanners per million population, age-adjusted, 2012 or most recent

Sources: OECD, 2015a; calculations by authors.
Figure 7b: Mortality amenable to health care, 2011

Age-standardized death rates (SDRs) per hundred thousand from amenable mortality

Sources: OECD, 2015a; WHO, 2015a, 2015b; calculations by authors.
Health Care Cost Containment Strategies Used In Four Other High-Income Countries Hold Lessons For The United States

### Exhibit 1

#### Total Health Care Cost Growth In Five Countries, 2000–10

<table>
<thead>
<tr>
<th>Country</th>
<th>Growth of health spending (%)</th>
<th>Per Capita Health Spending (US$)</th>
<th>Total Health Spending (% of GDP)</th>
<th>Public Share of Total Health Spending (%)</th>
<th>Out-of-Pocket Share of Total Health Spending (%)</th>
<th>Drug Spending Per Capita (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td></td>
<td>76</td>
<td>56</td>
<td>62</td>
<td>87</td>
<td>72</td>
</tr>
<tr>
<td>France</td>
<td></td>
<td>2,519</td>
<td>2,545</td>
<td>2,678</td>
<td>3,974</td>
<td>4,338</td>
</tr>
<tr>
<td>Germany</td>
<td></td>
<td>4,445</td>
<td>3,974</td>
<td>4,338</td>
<td>3,433</td>
<td>8,233</td>
</tr>
<tr>
<td>United Kingdom</td>
<td></td>
<td>1,834</td>
<td>3,433</td>
<td>3,433</td>
<td>8,233</td>
<td>4,791</td>
</tr>
<tr>
<td>United States</td>
<td></td>
<td>4,791</td>
<td>8,233</td>
<td>4,791</td>
<td>8,233</td>
<td>4,791</td>
</tr>
</tbody>
</table>

**Source:** Organization for Economic Cooperation and Development. OECD Health Data 2012 (Note 1 in text). **Notes:** The Organization for Economic Cooperation and Development reports data for the United Kingdom, not England. Percentages have been rounded. US dollars are purchasing power parity. GDP is gross domestic product. *The most recent data for UK drug spending are from 2008.*
## Exhibit 2

### Health Care Cost Containment Strategies

<table>
<thead>
<tr>
<th>Approach</th>
<th>Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Budget shifting</td>
<td>Reducing population coverage: removing entitlement to some or all statutory</td>
</tr>
<tr>
<td></td>
<td>benefits from specific groups of people</td>
</tr>
<tr>
<td></td>
<td>Reducing service coverage: excluding benefits, use of positive or negative</td>
</tr>
<tr>
<td></td>
<td>lists</td>
</tr>
<tr>
<td></td>
<td>Reducing cost coverage: introducing or increasing user charges</td>
</tr>
<tr>
<td></td>
<td>Public budget shifting: moving budgets across level of government, moving</td>
</tr>
<tr>
<td></td>
<td>from health to social services budgets, tax incentives for private health</td>
</tr>
<tr>
<td></td>
<td>insurance</td>
</tr>
<tr>
<td>Budget setting</td>
<td>Overall budget cap at government level</td>
</tr>
<tr>
<td></td>
<td>Budget caps by health care sector</td>
</tr>
<tr>
<td></td>
<td>Budgets at purchaser level</td>
</tr>
<tr>
<td></td>
<td>Individual patient budgets</td>
</tr>
<tr>
<td></td>
<td>Changes in provider payment methods: shifting to capitation or salary,</td>
</tr>
<tr>
<td></td>
<td>linking payment to performance</td>
</tr>
<tr>
<td>Direct and indirect controls of</td>
<td>Price controls: setting prices, price or reimbursement rate cuts</td>
</tr>
<tr>
<td>health care supply</td>
<td>Volume controls: infrastructure, human resources, technology</td>
</tr>
<tr>
<td></td>
<td>Health technology assessment to set priorities, influence coverage</td>
</tr>
<tr>
<td></td>
<td>decisions, or guide clinical practice</td>
</tr>
<tr>
<td></td>
<td>Practice guidelines</td>
</tr>
</tbody>
</table>

**Source** Adapted from Mossialos E, Le Grand J. Health care and cost containment in the European Union (Note 6 in text).
Distinguishing between savings and efficiency gains

**Efficiency gains**

- **Doing the same or more with fewer resources**
  - Addressing fragmented pooling
  - Better procurement
  - Selective cuts targeting excess capacity and inflated input costs
  - Cost-reducing substitution

- **Doing more with the same or more resources**
  - Capacity planning, HTA
  - Public health and prevention
  - Provider payment, P4P
  - Skill mix changes, eHealth
  - Moving care out of hospital

**Savings**

- **Doing less with fewer resources**
  - Large or sustained cuts
  - Non-selective cuts
  - Cuts to public health services
  - Cuts to low wages

**No savings**

- **Doing less with the same or more resources**
  - Cost-increasing substitution
  - Access barriers
  - Unmet need

**Inefficiencies**

Source: Thomson et al. (2014).

Budgeting

• Incremental Budgeting
  • Not very cost effective, predicts for next year

• Zero based budgeting
  • Decision package – set priorities for each year for services provided
  • Each year you start from ground zero, can’t assume that because it was included last year that it will be included next

• Flexible budgeting
  • Varies with labour and volume, calculates what you need based on your bottom line

• New performance budgeting
  • Based on outcomes – need to justify new expenditures based on outcomes
Case Payment Incentives

• Positive Incentives
  – Removes economic incentives to overprovide services for a single patient
  – Possibly increases quality
  – Easy to operate
  – Low administration costs
  – Hospital specialization

• Negative Incentives
  – DRG creep (gaming)
  – Cost shifting
  – Cream skimming
  – Quality skimping
  – Data fraud
  – Increases unnecessary admissions and readmissions
  – Low payment may impede innovation adoption
  – Hospital specialization
Case definitions

• Choice of DRG definitions
  • Diagnosis, procedures, complications, age, LOS, provider setting, method of admission

• Sample of providers

• Basis for tariff
  • AC, MC, normative costs, good practice costs

• Treatment of outliers
  • trimming
Yardstick Competition

• Basic model that underlies DRG pricing
  – Shleifer (Rand Journal of Economics, 1985)
• Trying to replicate the perfect competition outcome
  • $P = MC$ (or at least $P = AC$)
• Uses information across all providers to induce competitive outcome
  • assumes homogenous hospitals who maximise financial surplus
  • no cartels
  • no gaming by the hospitals
Yardstick Competition

• Assume initially hospitals not cost minimising
  – Purchaser decides to reimburse all hospitals at the average cost observed across similar hospitals
  – each hospital has an incentive to reduce costs below the average to maximise surplus
  – each hospital will then invest in effort (which is costly) reducing technology

• Observed average cost across hospitals falls
  – purchaser reimburses at new observe average
  – continues until average costs cannot fall further
  – at this point $P = (AC) = MC$
Yardstick Competition - DRGs

• Individual hospital’s costs do not enter the reimbursement formulae

• Hospital is a price taker
  – If the hospital cost > DRG then hospital loses money
  – Stops service
  – Cross subsidises
  – INVESTS in effort to reduce cost

• Cost-cutting incentives are strong
Effect on Quality?

• Competition is an instrument for organising decisions about the use of resources.

• Its primary purpose is to improve efficiency (value for money)

• Empirical evidence base... is small but expanding
Effect on Quality?

• Under regulated prices, the studies point to a positive impact of competition on quality of care (proxied by mortality rates)
  – context of USA and UK health systems only

• Under market-determined prices, an almost equal occurrence of positive, zero and negative effects of competition on quality.
  – heavy reliance in the literature on hospital mortality rates (almost the sole indicator used to measure the effects of competition on performance)
Effect on Quality?

• Kahn et al. (1990) conducted a pre–post analysis to study the effect of the PPS on mortality in a nationally representative sample of 14,012 Medicare patients from five states. They did not find an association between the introduction of PPS and increased 30- or 180-day mortality.

• Staiger and Gaumer (1992) and Cutler (1995) both found that changes in the PPS have a direct effect on quality of care, and the relationship is stronger for short-term mortality rates.

• Cutler (1998) found that Medicare cutbacks in the 1980s were financed by shifting costs to the private sector.
Effect on Quality?

- Kahn et al. (1990) conducted a pre–post analysis to study the effect of the PPS on mortality in a nationally representative sample of 14,012 Medicare patients from five states. They did not find an association between the introduction of PPS and increased 30- or 180-day mortality.

- Staiger and Gaumer (1992) and Cutler (1995) both found that changes in the PPS have a direct effect on quality of care, and the relationship is stronger for short-term mortality.

- Cutler (1998) found that Medicare cutbacks in the 1980s were financed by shifting costs to the private sector.

Table 6

Summary of the effects of the prospective payment system (PPS) on quality of care

<table>
<thead>
<tr>
<th>Area of effect</th>
<th>Principal finding</th>
<th>Secondary findings</th>
<th>Important industry differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>Little evidence of hospitalization being indiscriminately denied.</td>
<td>Greater admissions declines where PPS rates more generous. Possible PRO effects undocumented.</td>
<td>—</td>
</tr>
<tr>
<td>Mortality</td>
<td>No documented rise in mortality rates after PPS, whether measured in hospital or up to 1 year later.</td>
<td>Some evidence that deaths formerly occurring in hospital now occur elsewhere.</td>
<td>Rates for small and government-owned hospitals slightly sensitive to generosity of rates.</td>
</tr>
<tr>
<td>Readmissions</td>
<td>No significant change.</td>
<td>Possible decline in readmission rates in later PPS years.</td>
<td>Rates for rural and small urban hospitals declined by 1988. Rates for large urban hospitals increased slightly by 1988.</td>
</tr>
<tr>
<td>Transfers</td>
<td>Little change.</td>
<td>Possible increase in transfer rate in later years of PPS.</td>
<td>Some evidence that elderly veterans diverted to VA hospitals.</td>
</tr>
<tr>
<td>Emergency</td>
<td>Evidence inconclusive—possible increase, but likely not due to poor care.</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Processes of care</td>
<td>Improvement in explicit and implicit measures of process quality, due to continuing pre-PPS trend (i.e., PPS did not cause, but did not prevent, the improvement). Decrease in stability of patients at discharge.</td>
<td>Indications that discharge planning and management of post-hospital care uneven. Improvements in process and decrease in discharge stability do not vary by patient type (e.g., age, sex, race).</td>
<td>Process improvements greatest for rural, non-teaching hospitals, least for urban, teaching hospitals. Decrease in stability at discharge consistent across hospital types.</td>
</tr>
</tbody>
</table>

NOTES: PRO is peer review organization. VA is Department of Veterans Affairs.

Effect on Quality?

- Kahn et al. (1990) conducted a pre–post analysis to study the effect of the PPS on mortality in a nationally representative sample of 14,012 Medicare patients from five states. They did not find an association between the introduction of PPS and increased 30- or 180-day mortality.

- Staiger and Gaumer (1992) and Cutler (1995) both found that changes in the PPS have a direct effect on quality of care, and the relationship is stronger for short-term mortality.

- Cutler (1998) found that Medicare cutbacks in the 1980s were financed by shifting costs to the private sector.
Effect on Quality?

Table 3
Long-difference regressions with instrumental variables dependent variables: change in AMI mortality and/or complication rates

<table>
<thead>
<tr>
<th></th>
<th>Mortality rates</th>
<th>Complication + mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7-day</td>
<td>30-day</td>
</tr>
<tr>
<td>1985–1990&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Δ(PPS fiscal pressure)&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-0.0058</td>
<td>-0.0092&lt;sup&gt;*&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>(0.0050)</td>
<td>(0.0115)</td>
</tr>
<tr>
<td>Δ(Non-Medicare HMO penetration)&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.155</td>
<td>0.0263&lt;sup&gt;**&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>(0.0108)</td>
<td>(0.0115)</td>
</tr>
<tr>
<td>Δ(Medicare HMO penetration)</td>
<td>-0.0115</td>
<td>0.0006</td>
</tr>
<tr>
<td></td>
<td>(0.0158)</td>
<td>(0.0168)</td>
</tr>
<tr>
<td>1990–1994&lt;sup&gt;d&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Δ(PPS fiscal pressure)&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-0.0112&lt;sup&gt;*&lt;/sup&gt;</td>
<td>-0.0241&lt;sup&gt;**&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>(0.0069)</td>
<td>(0.0078)</td>
</tr>
<tr>
<td>Δ(Non-Medicare HMO penetration)&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.0399&lt;sup&gt;**&lt;/sup&gt;</td>
<td>0.0545&lt;sup&gt;**&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>(0.0156)</td>
<td>(0.0177)</td>
</tr>
<tr>
<td>Δ(Medicare HMO penetration)</td>
<td>0.0138</td>
<td>0.0363&lt;sup&gt;*&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>(0.0189)</td>
<td>(0.0214)</td>
</tr>
</tbody>
</table>

Standard errors in parentheses. Coefficients represent changes in mortality/complication rates in percentage points.

<sup>a</sup> Sample size: 1673, $R^2$ and $F$-statistics from the first stage: $R^2 = 0.40, F[8, 1664] = 140.6$.

<sup>b</sup> The unit of ΔPPS fiscal pressure is divided by US$ 1000, this variable is instrumented using Δ(simulated PPS) as the IV.

<sup>c</sup> The scale of HMO penetration is between 0 and 1, with 1 representing 100% HMO penetration in the county.

<sup>d</sup> Sample size: 1727; $R^2$ and $F$-statistics from the first stage: $R^2 = 0.36, F[8, 1718] = 120.2$.

* $P < 0.10$.

** $P < 0.05$. 
Effect on Quality?

The results I obtain on the Medicare price decline between 1985 and 1990 are largely consistent with those reported by Cutler (1995) and Staiger and Gaumer (1992). All three studies find that the substantial cut in Medicare reimbursement shifted time of death closer to date of discharge. Some hospital behavior models suggest that an exogenous price decrease

\[
\Delta(\text{Non-Medicare HMO penetration})^c = 0.0399^{**} \quad 0.0545^{**} \quad 0.0398^{**} \quad 0.0228 \quad 0.0168 \quad 0.0101 \quad 0.0100 \quad -0.0175 \\
(0.0156) \quad (0.0177) \quad (0.0174) \quad (0.0179) \quad (0.0169) \quad (0.0136) \quad (0.0165) \quad (0.0154)
\]

\[
\Delta(\text{Medicare HMO penetration}) = 0.0138 \quad 0.0363^* \quad 0.0451^{**} \quad 0.0455^{**} \quad 0.0440^{**} \quad 0.0158 \quad 0.0399^{**} \quad 0.0497^{**} \\
(0.0189) \quad (0.0214) \quad (0.0211) \quad (0.0217) \quad (0.0205) \quad (0.0165) \quad (0.0200) \quad (0.0187)
\]

Standard errors in parentheses. Coefficients represent changes in mortality/complication rates in percentage points.

- Sample size: 1673, $R^2$ and $F$-statistics from the first stage: $R^2 = 0.40, F[8, 1664] = 140.6$.
- The unit of $\Delta$PPS fiscal pressure is divided by US$ 1000, this variable is instrumented using $\Delta$(simulated PPS) as the IV.
- The scale of HMO penetration is between 0 and 1, with 1 representing 100% HMO penetration in the county.
- Sample size: 1727, $R^2$ and $F$-statistics from the first stage: $R^2 = 0.36, F[8, 1718] = 120.2$.

* $P < 0.10$.
** $P < 0.05$. 
Effect on Quality?

Closures

Closure rates represent a blunt, external measure of financial health of hospitals—a measure that is politically provocative as well. Closure rates have certainly been higher since PPS was implemented. As the U.S. General Accounting Office (GAO) (1991b) found, the number of closures in the period 1987-1991 was double the number in the 4 years prior to PPS. And the closures have affected rural hospitals, and 85 percent of all closures were for hospitals with fewer than 100 beds.

Multivariate models in two recent studies enumerate factors that predict closure. Although the models they use are different in many respects, both GAO (1991b) and Adamache and Hurdle (1991) concur that higher closure rates are associated with:

- Declining volumes (days or occupancy).
- Declining population or high unemployment.
- More competition.
- Small number of beds.
- More debt (Adamache and Hurdle only).
- Less severe case mix.
- Status as an independent proprietary hospital.
Diminishing Returns to Expenditure?

Health Expenditure and Health Outcomes

- Cuba
- Czech
- China
- Japan
- UK
- USA
- Luxembourg
- Equatorial Guinea
- Namibia
- Lesotho

Healthy life expectancy at birth vs. Health expenditure per capita ($PPP)
Diminishing Returns to Expenditure?

Health Expenditure and Infant Mortality

Infant mortality rates per 10,000 population

Health care expenditure per capita $PPP

Turkey
Mexico
Hungary
Greece
UK
Belgium
Norway
Lux.
USA

UNIVERSITY OF ALBERTA
FACULTY OF MEDICINE & DENTISTRY
Department of Critical Care Medicine
Thank you

zygun@ualberta.ca