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Comparing Performance of Universal Health Care Countries, 2020

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by Bacchus Barua and Mackenzie Moir

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Executive Summary

Comparing the performance of different countries' health-care systems provides an opportunity for policy makers 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.

This study uses a "value for money approach" to compare the cost and performance of 28 universal health-care systems in high-income countries. The level of health-care expenditure is measured using two indicators, while the performance of each country's health-care system is measured using 43 indicators, representing the four broad categories:

[1] availability of resources

[2] use of resources

[3] access to resources

[4] quality and clinical performance.

This year's report includes one new resource indicator (long-term care bed availability) and two new patient safety indicators: post-operative wound dehiscence; and post-operative sepsis after abdominal surgery. Five measures of the overall health status of the population are also included. However, these indicators can be influenced to a large degree by non-medical determinants of health that lie outside the purview of a country's health-care system and policies.

Expenditure on health care

Canada spends more on health care than the majority of high-income OECD countries with universal health-care systems. After adjustment for "age", the percentage of the population over 65, it ranks second highest for expenditure on health care as a percentage of GDP and seventh highest for health-care expenditure per capita.

Availability of resources

The availability of medical resources is perhaps one of the most basic requirements for a properly functioning health-care system. Data suggests that Canada has substantially fewer human and capital medical resources than many peer jurisdictions that spend comparable amounts of money on health care. After

adjustment for age, it has significantly fewer physicians, acute-care beds, and psychiatric beds per capita compared to the average of OECD countries included in the study. It ranks slightly above the average for nurses and ranked seventh for the number of long-term care beds (per 1,000 over the age of 65). While Canada has the second most Gamma cameras (per million population, age-adjusted), it has fewer other medical technologies than the average high-income OECD country with universal health care for which comparable inventory data are available.

Use of resources

Medical resources are of little use if their services are not being consumed by those with health-care demands. Data suggests that Canada's performance is mixed in terms of use of resources, performing at higher rates than the average OECD country on just under half the indicators examined (for example, consultations with a doctor and knee replacement), and average to lower rates on the rest. Canada reports the least degree of hospital activity (as measured by rates for curative-care discharges) in the group of countries studied.

Access to resources

While both the level of medical resources available and their use can provide insight into accessibility, it is also beneficial to measure accessibility more directly by examining measures of timeliness of care and cost-related barriers to access. Canada ranked last (or next to last) on four of the five indicators of timeliness of care; and ranked seventh (out of ten) on the indicator measuring the percentage of patients who reported that cost was a barrier to access.

Quality and clinical performance

When assessing indicators of availability of, access to, and use of resources, it is of critical importance to include some measure of quality and clinical performance in the areas of primary care, acute care, mental health care, cancer care, and patient safety. While Canada does well on seven indicators of clinical performance and quality (such as rates of survival for breast, colon, and rectal cancers, and post-operative complication rates), its performance on the seven others examined in this study are either no different from the average or in some cases—particularly obstetric traumas and diabetes-related amputations—worse.

The data examined in this report suggest that there is an imbalance between the value Canadians receive and the relatively high amount of money they spend on their health-care system. Although Canada ranks among the most expensive universal-access health-care systems in the OECD, its performance for availability and access to resources is generally below that of the average OECD country, while its performance for use of resources and quality and clinical performance is mixed.

Introduction

Measuring and reporting the performance of health-care systems is vital for ensuring accountability and transparency, and is valuable for identifying areas for improvement. Comparing the performance of different countries' health-care systems provides an opportunity for policy makers and the general public to determine how well Canada's health-care system is performing relative to its international counterparts.

This is the fifth edition of *Comparing Performance of Universal Health Care Countries*. The original report was the work of Barua, Timmermans, Nason, and Esmail (2016), who followed the examples of Esmail and Walker (2008), Rovere and Skinner (2012), and Barua (2013) to examine the performance of health-care systems using a "value for money" approach. That is, the performances of various health-care systems are assessed using indicators measuring:

1. the expenditure on health care (the cost); and
2. the provision of health care (the value).

The cost of health care is measured using two indicators, while the provision of health care is measured using 43 indicators, representing four broad categories:

1. availability of resources;
2. use of resources;
3. access to resources;
4. clinical performance and quality.

Five indicators measuring the overall health status of the population are also included. The intention is to provide Canadians with a better understanding of how much they spend on health care in comparison to other countries with universal health-care systems, and assess whether the availability, use, access, and quality of their system is of commensurate value.

The first section of this paper provides an overview of the methodology used and then explains what is being measured and how. The second section presents data reflecting how much Canada spends on health care in comparison with other countries. The third section presents data reflecting the performance of Canada's health-care system (compared to other countries) as measured by the availability of resources, use of resources, access to resources, and clinical performance and quality. The fourth section examines indicators reflecting the overall health status of the populations in the countries examined. A conclusion follows.

1. Method

What is measured, and why?

The objective of this report is to provide an overview of the amount different countries spend on their respective health-care systems, and to concurrently measure (using several indicators) the value they receive for that expenditure. When measuring the quality of health care in Canada, the Canadian Institute of Health Information (CIHI) identifies two distinct questions: "How healthy are Canadians?"; and "How healthy is the Canadian health system?" (CIHI, 2011b: ix).

The answer to the first question—How healthy are Canadians?—can be informed through the examination of indicators of health status. While such indicators are included in section four of this paper, the information they provide must be interpreted with caution when assessing the performance of the health-care system. This is because the health status of a population is determined by a number of factors, some of which (like timely access to quality medical care) may fall under the purview of a health-care system, while others (like smoking rates, environmental quality, genetic factors, and lifestyle choices) may not.

In this study, we are more concerned with the second question—"How healthy is the Canadian health system?"—as measured by indicators reflecting the availability of resources, use of resources, access to resources, and clinical performance and quality. [1] The interaction between these various components can be seen in figure 1. This study focuses primarily on area 2 of the figure, includes indicators reflecting area 3 for reference (as it is partly affected by area 2), but excludes area 1. While indicators measuring the cost and performance of the health-care system as a result of government policy are included in this paper, government health-care policy itself is neither examined nor assessed. [2]

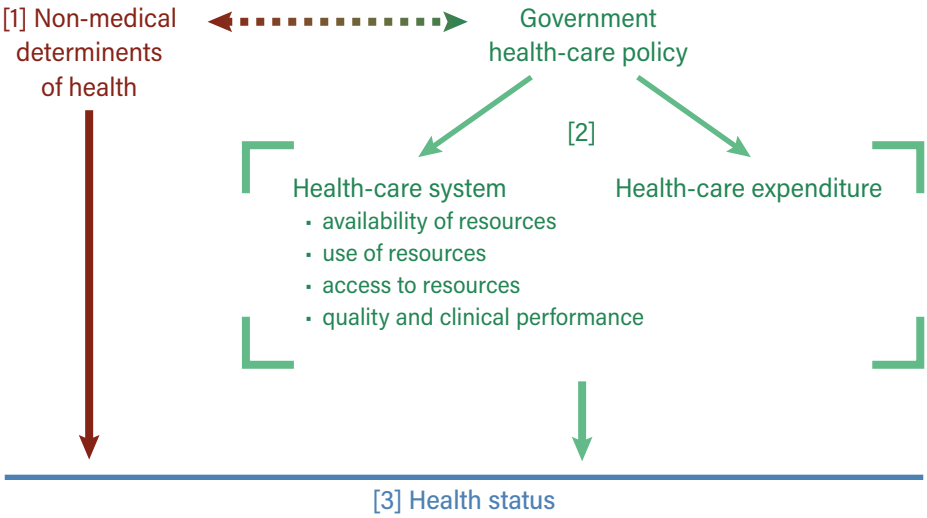
What indicators are included?

The level of health-care expenditure is measured using two indicators, while the performance of each country's health-care system is measured using 43 indicators, representing the four broad categories of: [1] availability of resources;

[1] For a broader explanation of the framework of analysis used in this report, see Barua, 2013.

[2] For example, unlike Esmail and Walker (2008) this report does not present data on how each country's universal health-insurance system is structured, whether they employ user-fees and co-payments, how hospitals and doctors are paid, and so on.

Figure 1: Framework for analysis of health care



Adapted from OECD, 2015; Barua, 2013.

[2] use of resources; [3] access to resources; and [4] clinical performance and quality. In addition, five indicators measuring health status are also included; however, as mentioned above, the authors recognize that these may be affected by factors outside the purview of, and the amount of money spent on, the health-care system in question.

All the indicators used in this report are either publicly available, or derived from publicly available data from the Organisation for Economic Co-operation and Development (OECD), the Commonwealth Fund, and the World Health Organization (WHO). The choice of indicators included are primarily based on those presented in Esmail and Walker (2008) and Rovere and Skinner (2012), and are categorized using the framework presented in Barua (2013).

In addition, since the publication of the above reports, several new indicators have become available from the OECD, Commonwealth Fund, and WHO. Barua and colleagues examined these indicators and included those that either provide new information, or add more nuanced detail, within the previously identified area of concern (Barua, Timmermans, Nason, and Esmail, 2016). [3]

[3] Four indicators used in the first two editions of this report (Barua, Timmermans, Nason, and Esmail, 2016; Barua, Hasan, and Timmermans, 2017) are no longer available from the OECD: 1. the number of digital subtraction angiography units; 2. the number of lithotripters; 3. the number of kidney transplants performed; and 4. the five-year relative survival for colorectal cancer. This last indicator was replaced by two indicators: the five-year net survival for colon cancer and the five-year net survival for rectal cancer, both of which are included in the current edition of the report. Another difference is that all indicators of cancer survival are now reported, by the OECD, as net survival rather than relative survival.

This edition of the report has added three new indicators: [1] Long-Term Care Beds (per thousand population, aged 65 and older); [2] rates of Post-Operative Wound Dehiscence; and [3] rates of Post-Operative Sepsis after Abdominal Surgery (per hundred thousand hospital discharges, 15 years and over). The previous indicator measuring hospital discharges has been replaced by curative-care discharges in order to improve comparability, while the indicator measuring Mortality Amenable to Health Care (calculated by previous authors) is now replaced by the OECD's new indicator measuring Treatable Mortality.

A complete list of the indicators used in this report, organized according to the categories mentioned above, is presented in table 1. While the selection of indicators included in this report is not comprehensive, they are meant to provide readers with a broad overview of the performance of each country's health-care system.

What is the time-frame?

Data from the OECD are for 2018, or the most recent year available. Data from the WHO for Healthy Life Expectancy (HALE) are for 2016. Data from the Commonwealth Fund are for 2016. While newer data are available for certain countries, the authors have chosen to use the year that provides the most complete and comparable data for this edition of the report.

Which countries are included?

The countries [4] included for comparison in this study were chosen based on the following three criteria:

1. must be a member of the OECD;
2. must have universal (or near-universal) coverage for core-medical services;
3. must be classified as a "high-income" country by the World Bank. [5]

Of 36 OECD members in 2018 considered for inclusion, the OECD (2019) concludes that seven countries—Chile, Estonia, Hungary, Mexico, Poland, the Slovak Republic, and the United States—do not have universal (or

[4] It is of note that there may be significant variation within each country examined. This is particularly true in Canada where the provision of health-care services is a provincial responsibility and there may be meaningful differences with regards to policy, spending, and the delivery of care.

[5] "High-income" countries are those that have a gross national income (GNI) per capita of US$12,375 or more in 2018.

Table 1: Indicators used in *Comparing Performance of Universal Health Care Countries, 2020*

Category	Indicator	Source
Spending	Total expenditure on health (% gross domestic product)	OECD 2020
	Total expenditure on health (per capita US PPP)	OECD 2020
Availability of resources	Physicians (per thousand population)	OECD 2020
	Nurses (per thousand population)	OECD 2020
	Curative (acute) care beds (per thousand population)	OECD 2020
	Psychiatric care beds (per thousand population)	OECD 2020
	Long-term care beds (Hospital + Residential long-term care beds) (per thousand pop, 65 years +)	OECD 2020
	Magnetic Resonance Imaging (MRI) units (per million population)	OECD 2020
	Computed Tomography (CT) scanners (per million population)	OECD 2020
	Positron Emission Tomography (PET) scanners (per million population)	OECD 2020
	Gamma cameras (per million population)	OECD 2020
	Mammographs (per million population)	OECD 2020
Use of resources	Doctor consultations (per hundred population)	OECD 2020
	Curative-care discharges (per hundred thousand population)	OECD 2020
	Magnetic Resonance Imaging (MRI) examinations (per thousand population)	OECD 2020
	Computed Tomography (CT) examinations (per thousand population)	OECD 2020
	Cataract surgery (per hundred thousand population)	OECD 2020
	Transluminal coronary angiolasty (per hundred thousand population)	OECD 2020
	Coronary artery bypass graft (CABG) (per hundred thousand population)	OECD 2020
	Stem cell transplantation (per hundred thousand population)	OECD 2020
	Appendectomy (per hundred thousand population)	OECD 2020
	Cholecystectomy (per hundred thousand population)	OECD 2020
	Repair of inguinal hernia (per hundred thousand population)	OECD 2020
	Hip replacement (per hundred thousand population)	OECD 2020
	Knee replacement (per hundred thousand population)	OECD 2020
Access to resources	Able to get same day appointment when sick (%)	Commonwealth Fund, 2017
	Very/somewhat easy getting care after hours (%)	Commonwealth Fund, 2017
	Waited 2 months or more for specialist appointment (%)	Commonwealth Fund, 2017
	Waited 4 months or more for elective surgery (%)	Commonwealth Fund, 2017
	Experienced barrier to access because of cost in past year (%)	Commonwealth Fund, 2017
	Waiting time of more than four weeks for getting an appointment with a specialist (%)	OECD, 2020
Quality and clinical performance	Breast cancer five-year net survival (%)	OECD 2020
	Cervical cancer five-year net survival (%)	OECD 2020
	Colon cancer five-year net survival (%)	OECD 2020
	Rectal cancer five-year net survival (%)	OECD 2020
	Admission-based AMI 30-day in-hospital mortality (per hundred patients)	OECD 2020
	Admission based hemorrhagic stroke 30-day in hospital mortality (per hundred patients)	OECD 2020
	Admission-based Ischemic stroke 30-day in-hospital mortality (per hundred patients)	OECD 2020
	Hip-fracture surgery initiated within 48 hours of admission to the hospital (per 100 patients)	OECD 2020
	Diabetes lower extremity amputation (per hundred thousand population)	OECD 2020
	Obstetric trauma vaginal delivery with instrument (per hundred vaginal deliveries)	OECD 2020
	Obstetric trauma vaginal delivery without instrument (per hundred vaginal deliveries)	OECD 2020
	In-patient suicide among patients diagnosed with a mental disorder (per hundred patients)	OECD 2020
	Post-operative wound dehiscence (per hundred thousand hospital discharges)	OECD 2020
	Post-operative sepsis after abdominal surgery (per hundred thousand hospital discharges)	OECD 2020
Health status	Life expectancy at birth (years)	OECD 2020
	Infant mortality rate (per thousand live births)	OECD 2020
	Perinatal mortality (per thousand total births)	OECD 2020
	Healthy life expectancy (HALE) at birth (years)	WHO 2020
	Treatable mortality	OECD 2020

Note: For precise definitions, see OECD, 2020; Commonwealth Fund, 2017; and WHO, 2020.

near-universal) coverage for core medical services. Of the 29 countries remaining for consideration, Turkey does not meet the criteria of being classified in the high-income group (in 2018) according to the World Bank (2020). The remaining 28 countries that meet the three criteria above can be seen in table 2 (p. 9).

Are the indicators adjusted for comparability?

The populations of the 28 countries included for comparison in this report vary significantly in their age profiles. For example, while seniors represented only 11.7% of Israel's population in 2018, they represented 28.1% of the population in Japan in the same year (OECD, 2020). This is important because it is well established that older populations require higher levels of health-care spending as a result of consuming more health-care resources and services (Esmail and Walker, 2008). [6] For example, in 2016 seniors over 65 years of age represented 17% of the Canadian population but consumed 45% of all health-care expenditures (CIHI, 2018).

For this reason, in addition to presenting unadjusted figures, this study also presents indicators measuring health-care expenditures, availability of resources, and use of resources adjusted according to the age-profile of the country. [7] While such adjustment may not affect the overall conclusion [8] about the performance of a country's health-care system compared to expenditure, it does provide a more nuanced view when examining indicators individually. For this reason, both unadjusted and age-adjusted rankings are presented in this paper. Taking the example of health care spending, the age-adjustment process used in this paper is based on the following two factors.

[6] The Canadian Institute of Health Information (CIHI) suggests that "[o]lder seniors consume more health care dollars largely as a consequence of two factors: the cost of health care in the last few months of life, and the minority of the population with chronic illnesses that tend to require more intensive medical attention with age". They also note that "[t]here is some evidence that proximity to death rather than aging is the key factor in terms of health expenditure" (CIHI, 2011a: 16–17).

[7] It is unclear whether indicators of timely access to care need to be adjusted for age, and the methodology for making such an adjustment has not been explored by the authors. Indicators of clinical performance and quality are already adjusted for age by the OECD. The indicators of health status (such as life expectancy) used in this report generally do not require (further) age-adjustment. The methodology for calculating Treatable Mortality incorporates an age-adjustment process for their standardized rates.

[8] As Barua (2013) notes, in the process of calculating an overall value-for-money score, age-adjustment would apply to both the value and cost components in opposite directions and may cancel each other out in the process.

1. *An estimate of how health expenditures have historically changed as a result of changes in the proportion of the population over 65*

   It is possible to calculate the change in average per-capita government health-care expenditures when the age structure changes, while keeping the age-specific expenditure constant (see, e.g., Barua, Palacios, and Emes, 2016; Morgan and Cunningham, 2011; Pinsonnault, 2011). While five-year age bands are most commonly used, we can adapt this method so that only two age bands are used (0–65, and 65+) to estimate the elasticity of real, total health-care expenditures per capita solely due to changes in the proportion of the population over 65. Using Canadian [9] population and per-capita health-care expenditure data from 1980 to 2000 (Grenon, 2001), and keeping the age-specific expenditure data constant, [10] we estimate that for every 1% (or percentage point, since the share of population over 65 is a percentage itself) increase in proportion of population over 65, health-care expenditure increased by 3.1%.

2. *The degree to which the proportion of a country's population over 65 deviates from the OECD average*

   If β represents the proportion of the population over 65, and HCE_{pc} is health care expenditure per capita in a particular country, then:

   $$HCE_{pc}\ age\text{-}adjusted = HCE_{pc}\ (1 + 0.03098)^{(\beta oecd - \beta)}$$

   One way to think of this estimation is, if β_{oecd} had exactly one-percentage point more seniors as a share of the population than Canada, the adjusted expenditure for Canada should be equal to Canada's projected health-care expenditure per capita when its population over 65 increases by one percentage point. Following Esmail and Walker (2008), we assume that it is logical to apply the same proportional increase (due to ageing) derived from our spending estimate to indicators measuring the number of resources and their use. [11]

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[9] Detailed age-specific historical data on health-care spending for every OECD country were not available so we assume that the effect of ageing on health-care spending in Canada reflects how ageing would affect health-care spending in high-income OECD countries more generally.

[10] 1990 is used as a base year. A sensitivity analysis using 1980 and 2000 as base years did not yield significantly different results.

[11] Esmail and Walker note that, "[l]ike health expenditures, where the elderly consume far more resources than other proportions of the population, medical professionals [and resources, more generally] are likely to be needed at a higher rate as the population ages" (2008: 53). In the absence of precise estimates, we assume that increased use of medical resources rise roughly proportionally to increased use of all health-care services (as reflected by increased health-care spending).

2. How much does Canada spend on health care compared to other countries?

When attempting to measure the performance of health-care systems, it is essential to consider the costs of maintaining such systems. It is not meaningful to either "define higher national levels of spending on health as negative without considering the benefits" (Rovere and Skinner, 2012: 15) or, conversely, to define a health system with higher levels of benefits as positive without considering the costs. There are two measures that can help inform us about the relative differences between the amount of money spent by different countries on health care. The first is health-care expenditure as a percentage of gross domestic product (GDP). As Esmail and Walker note, this indicator "controls for the level of income in a given country and shows what share of total production is committed to health care expenditures". Such a measure also helps avoid potentially "flawed comparisons with low spending in less developed OECD countries ... while also not overvaluing high expenditures in relatively rich countries" (2008: 17) .

A second measure is health-care expenditure per capita, adjusted for comparison using purchasing power parity data (PPP). While there are some important theoretical concerns about the reliability of international comparisons using data reliant on PPP, there are also several benefits to using this indicator. Apart from being more straightforward from a conceptual standpoint, how countries rank on this indicator is less susceptible to short-term fluctuations in GDP.

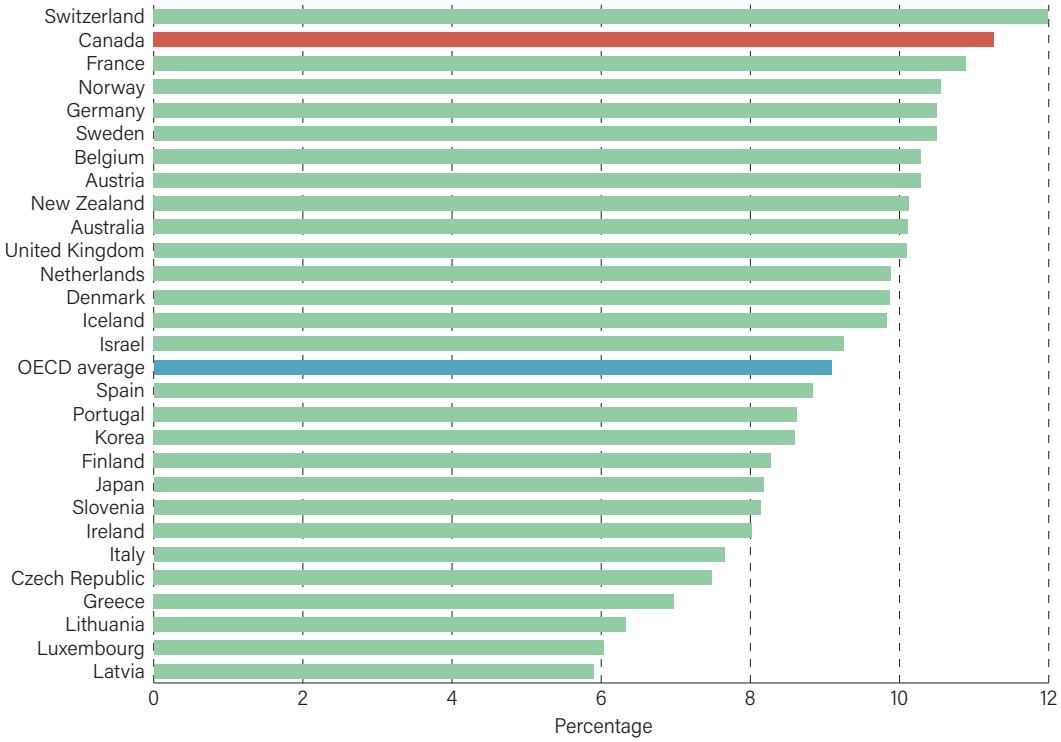
Out of 28 countries, Canada ranked 6th highest for health-care expenditure as a percentage of GDP and the 8th highest for health-care expenditure per capita (table A1, p. 42). After adjustment for age, Canada ranks second highest for health-care expenditure as a percentage of GDP and 7th highest for health-care expenditure per capita (table 2; figures 2a, 2b). Clearly, these indicators suggest that Canada spends more on health care than the majority of high-income OECD countries with universal health-care systems.

Table 2: Spending on health care, age-adjusted, 2018

	Spending as percentage of GDP		Spending per capita	
	Percentage	Rank	US$ PPP	Rank
Australia	10.1	10	5,409.1	8
Austria	10.3	8	5,523.3	6
Belgium	10.3	7	5,089.3	12
Canada	**11.3**	**2**	**5,520.0**	**7**
Czech Republic	7.5	24	3,104.7	22
Denmark	9.9	13	5,168.5	11
Finland	8.3	19	3,966.0	17
France	10.9	3	4,970.4	14
Germany	10.5	5	5,698.6	4
Greece	7.0	25	2,049.5	27
Iceland	9.8	14	5,087.6	13
Ireland	8.0	22	5,688.5	5
Israel	9.3	15	3,478.5	19
Italy	7.7	23	3,076.1	23
Japan	8.2	20	3,361.7	21
Korea	8.6	18	3,508.2	18
Latvia	5.9	28	1,763.2	28
Lithuania	6.3	26	2,300.1	26
Luxembourg	6.0	27	5,949.6	3
Netherlands	9.9	12	5,388.5	9
New Zealand	10.1	9	4,425.3	15
Norway	10.6	4	6,599.7	2
Portugal	8.6	17	2,827.3	25
Slovenia	8.1	21	2,981.9	24
Spain	8.8	16	3,368.7	20
Sweden	10.5	6	5,240.1	10
Switzerland	12.0	1	7,349.1	1
United Kingdom	10.1	11	4,330.7	16
OECD average	**9.1**		**4,400.9**	

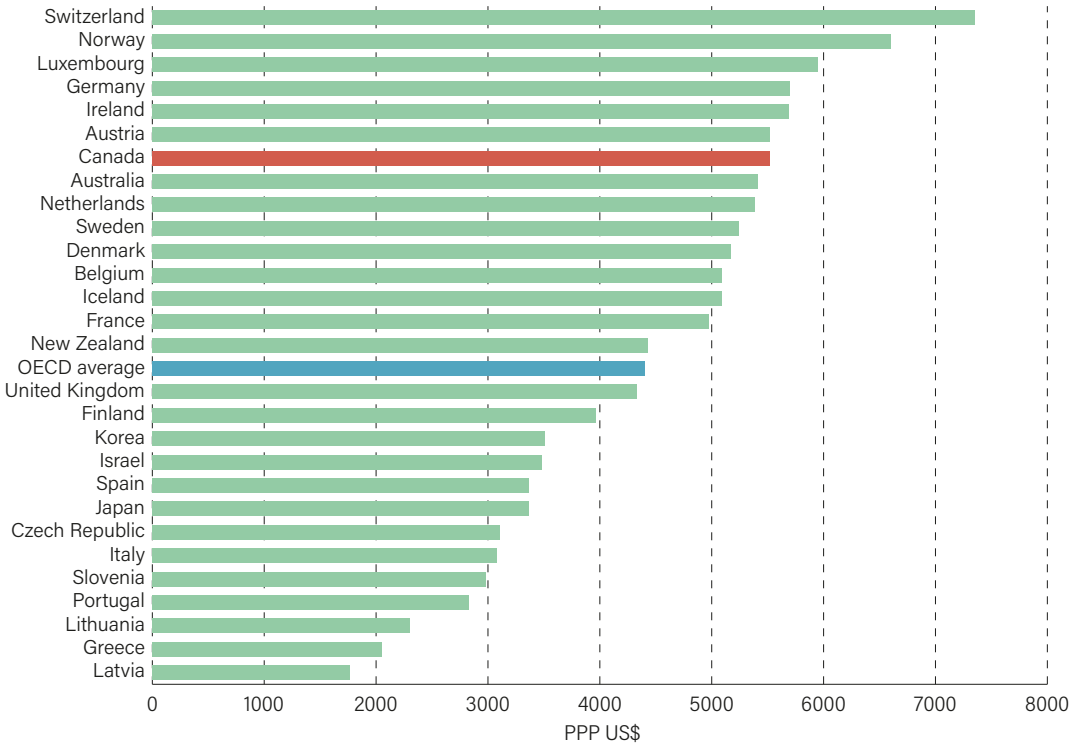
Note: Because the table shows rounded values, countries may have different ranks even if they appear to have same values.
Sources: OECD, 2020; calculations by authors.

Figure 2a: Health-care spending as a percentage of GDP, age-adjusted, 2018



Sources: OECD, 2020; calculations by authors.

Figure 2b: Health-care spending per capita (PPP US$), age-adjusted, 2018



Sources: OECD, 2020; calculations by authors.

3. How well does Canada's health-care system perform?

In light of Canada's relatively high spending on health care, the following section examines the performance of Canada's health-care system using 43 indicators, representing the four broad categories of: 1. availability of resources; 2. use of resources; 3. access to resources; 4. clinical performance and quality.

1. Availability of resources

The availability of adequate medical resources is perhaps one of the most basic requirements for a properly functioning health-care system. Due to its integral nature, along with the availability of comparable data, indicators of medical resources available are frequently examined by researchers, especially in the context of health-care expenditures (e.g., Esmail and Walker, 2008; Rovere and Skinner, 2012). The World Health Organisation (WHO) notes that "[t]he provision of health care involves putting together a considerable number of resource inputs to deliver an extraordinary array of different service outputs" (WHO, 2000: 75) and suggests that human resources, physical capital, and consumables such as medicine are the three primary inputs of a health system.

Of these, this study includes indictors of human and capital resources (table 3), and of technology resources (table 4). [12] Research has shown that drugs are also considered one of the most important forms of medical technology used to treat patients. [13] However, indicators of the availability, novelty, and consumption of pharmaceuticals are not included in this paper because comprehensive and comparable data are not available.

[12] When analyzing medical resources in general, research also indicates that "more is not always better". For instance, Watson and McGrail (2009) found no association between avoidable mortality and the overall supply of physicians. The CIHI notes that what it calls the "structural dimensions" that characterize health-care systems are not "directional" and do not necessarily reflect the performance of health systems (CIHI, 2011c). Similarly, Kelly and Hurst (2006) contend that, while structural indicators (medical resources) are often necessary for delivering high-quality medical care, they are not always sufficient on their own: simply having an abundance of medical resources does not necessarily mean that they are being used efficiently or appropriately at all times. Therefore, this study makes no assertions about the optimal level at which such resources should be available.

[13] See, for example, Skinner and Rovere, 2011: 22–23; Cremieux et al., 2005; Frech and Miller, 1999; Kleinke, 2001; and Lichtenberg and Virabhak, 2002.

Table 3: Availability of human and capital resources per thousand population, age-adjusted, 2018

	Physicians		Nurses		Acute beds		Psychiatric beds		Long-term care beds	
	per '000	Rank	per '000	Rank	per '000	Rank	per '000	Rank	per '000*	Rank
Australia	4.1	10	13.0	7	—	—	0.5	20	51.2	13
Austria	5.2	2	6.9	22	5.3	4	0.6	16	49.9	14
Belgium	3.1	21	11.2	10	5.0	6	1.3	3	69.6	3
Canada	**2.8**	**26**	**10.4**	**14**	**2.1**	**25**	**0.4**	**24**	**56.9**	**7**
Czech Republic	4.0	12	7.9	19	4.0	9	0.9	9	46.2	16
Denmark	4.1	9	9.9	16	2.3	23	0.5	19	38.8	20
Finland	2.9	24	13.1	6	2.6	21	0.5	17	59.2	6
France	3.1	23	10.4	13	2.9	16	0.8	12	52.3	12
Germany	3.9	14	12.1	8	5.5	3	1.2	4	54.4	9
Greece	5.5	1	3.0	28	3.3	12	0.7	13	4.2	25
Iceland	4.5	5	16.9	3	2.7	18	0.4	21	56.7	8
Ireland	3.8	15	14.9	4	3.2	13	0.4	23	47.8	15
Israel	4.0	11	6.2	24	2.7	19	0.5	18	20.7	22
Italy	3.5	18	5.1	26	2.3	24	0.1	28	19.2	23
Japan	1.9	28	8.8	17	5.8	2	1.9	1	33.6	21
Korea	2.7	27	8.2	18	8.1	1	1.4	2	60.9	5
Latvia	3.1	20	4.1	27	3.1	14	1.2	5	16.6	24
Lithuania	4.4	6	7.5	21	5.1	5	0.9	7	40.4	19
Luxembourg	3.4	19	13.4	5	4.2	7	0.8	11	81.9	1
Netherlands	3.6	17	11.0	11	2.7	20	0.9	10	74.7	2
New Zealand	3.7	16	11.4	9	2.9	17	0.3	27	53.1	11
Norway	5.1	3	18.6	1	3.3	11	1.1	6	44.8	18
Portugal	4.7	4	6.3	23	3.0	15	0.6	15	—	—
Slovenia	3.1	22	9.9	15	4.0	8	0.6	14	53.8	10
Spain	3.9	13	5.8	25	2.5	22	0.4	26	46.0	17
Sweden	4.1	8	10.5	12	1.9	26	0.4	22	—	—
Switzerland	4.4	7	17.8	2	3.6	10	0.9	8	65.2	4
United Kingdom	2.9	25	7.9	20	—	—	0.4	25	—	—
OECD Average	**3.8**		**10.1**		**3.6**		**0.7**		**47.9**	

Notes: Because the table shows rounded values, countries may have different ranks even if they appear to have same values. * The OECD reports long-term care beds per 1,000 population over the age of 65 in the relevant country. For this reason, the authors do not adjust this indicator for age using the method described on page 7.

Sources: OECD, 2020; calculations by authors.

Human and capital resources

Human resources are perhaps "the most important of the health system's inputs [and] usually the biggest single item in the recurrent budget for health" (WHO, 2000: 77). Importantly, apart from physicians, who, according to the WHO (2000), play the primary role in the health-care system, it is also useful to measure the number of other health personnel such as nurses who are involved in the direct provision of care. At the same time, services cannot be effectively delivered without physical capital such as hospitals, [14] beds, and equipment. For this reason, it is useful to examine the number of physicians, nurses, curative (acute) care beds, psychiatric beds per thousand population, and long-term care beds (per thousand over the age of 65).

Measuring the availability of long-term care resources like beds will be important for those who will "at some point require LTC services that cannot be delivered a home" (OECD, 2019: 236). This edition of the report contains a new indicator measuring the relative availability of long-term care beds. Adapted from *Health at a Glance 2019* (OECD, 2019), this measure combines two sets of data: 1. hospital long-term care beds per 1,000 over the age of 65; and 2. residential long-term care beds per 1,000 over the age of 65. As these data measure the availability of beds for those over the age of 65 in the relevant country, the authors did not apply the age-adjustment method outlined on page 7.

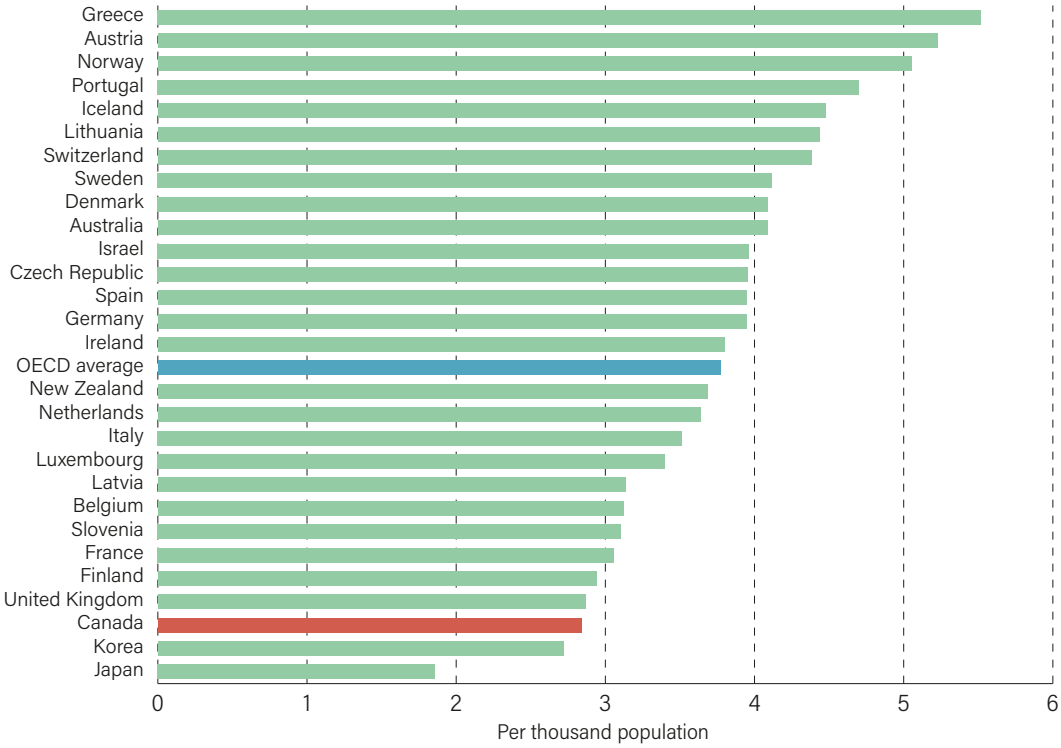
Out of 28 countries, Canada ranks 26th for physicians, 17th for nurses, 25th for curative (acute) care beds (out of 26), and 22nd for psychiatric care beds per thousand population (table A2, p. 43) and 9th for long-term care beds (out of 25). As can be seen in table 3, after adjustment for age, Canada ranks 26th for physicians (figure 3a), 14th for nurses (figure 3b), 25th for curative (acute) care beds (out of 26) (figure 3c), 24th for psychiatric care beds per thousand population, ranked 7th (out of 25) for long-term care beds per thousand population (65 and over). Except for above average availability of long-term care, and middling nursing density, Canada clearly has many fewer human and capital medical resources per capita when compared to other high-income OECD countries with universal health care.

Technology and diagnostic imaging resources

Research suggests that medical technology plays a significant role for improving the efficiency of medical services, ultimately benefiting patients while reducing health-care expenditures over time (Or, Wang, and Jamison, 2005). For example, medical technologies such as new diagnostic equipment and

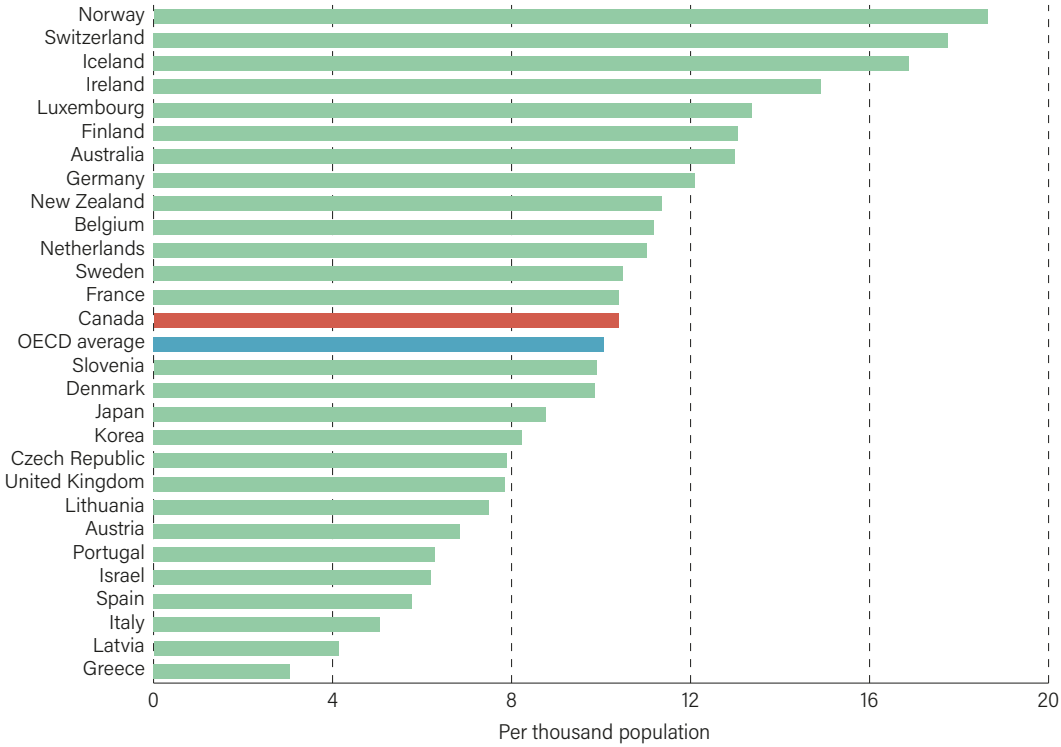
[14] While data on the number of hospitals in the countries examined in this report are available, they are not included due to large variability in size and specialty. The number of beds in some ways serves as a proxy for the amount of physical capital that would be represented by a measure of the number of hospitals in a country.

Figure 3a: Physicians per '000 population, age-adjusted, 2018 or most recent



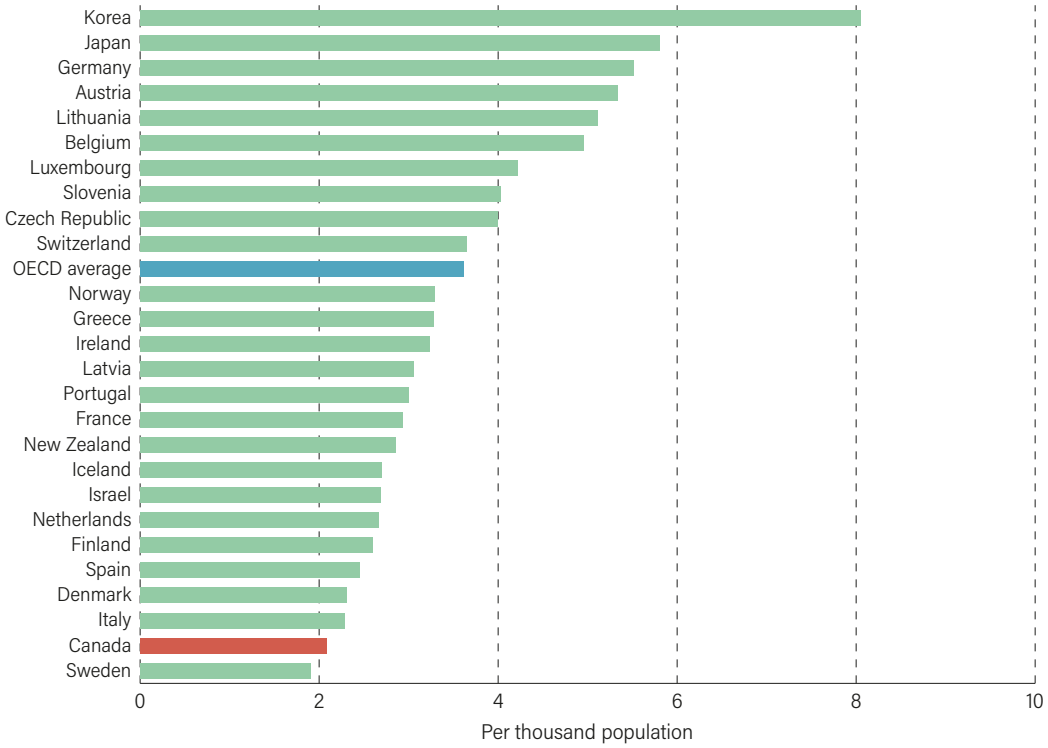
Sources: OECD, 2020; calculations by authors.

Figure 3b: Nurses per '000 population, age-adjusted, 2018 or most recent



Sources: OECD, 2020; calculations by authors.

Figure 3c: Acute-care beds per '000 population, age-adjusted, 2018 or most recent



Sources: OECD, 2020; calculations by authors.

innovative surgical and laboratory procedures improve the efficiency of hospitals and increase the comfort and safety of patients (Esmail and Wrona, 2008). For this reason, it is useful to examine the number of Magnetic Resonance Imaging (MRI) units, Computed Tomography (CT) scanners, Positron Emission Tomography (PET) scanners, Gamma cameras, and Mammographs per million population.

Per million population, Canada ranks 23rd (out of 26) for MRI units, 24th (out of 27) for CT scanners, 18th (out of 23) for PET scanners, 2nd (out of 21) for Gamma cameras, and 12th (out of 20) for Mammographs (table A3, p. 44). After adjustment for age, Canada ranks 22nd (out of 26) for MRI units (figure 4a), 21st (out of 27) for CT scanners (figure 4b), 18th (out of 23) for PET scanners, 2nd (out of 21) for Gamma cameras, and 14th (out of 20) for Mammographs (table 4). While Canada has the second most Gamma cameras (per million population) on an age-adjusted basis, it has fewer other medical technologies than the average high-income OECD country with universal health care for which comparable inventory data is available.

Table 4: Availability of technological and diagnostic imaging resources per million pop., age-adjusted, 2018

	MRI Units		CT Scanners		PET Scanners		Gamma Cameras		Mammographs	
	Per million	Rank	Per million	Rank	Per million	Rank	Per million	Rank	Per million	Rank
Australia	15.4	13	73.3	2	4.2	4	20.5	1	25.9	7
Austria	23.5	8	28.8	11	2.7	9	10.5	8	21.4	11
Belgium	11.6	21	23.8	13	2.6	10	—	—	36.5	3
Canada	**10.5**	**22**	**16.0**	**21**	**1.5**	**18**	**16.9**	**2**	**18.8**	**14**
Czech Republic	10.1	23	15.8	22	1.6	17	11.7	6	11.0	20
Denmark	—	—	38.8	6	7.8	1	14.8	3	16.0	15
Finland	25.1	6	15.1	24	2.5	11	7.0	13	25.9	6
France	14.2	14	17.0	20	2.2	12	6.7	16	—	—
Germany	31.8	3	32.2	9	—	—	—	—	—	—
Greece	26.5	4	36.7	7	1.1	21	12.1	5	59.7	2
Iceland	22.8	9	55.5	3	3.3	7	9.8	9	19.6	12
Ireland	18.6	10	23.6	14	2.1	13	5.5	18	19.5	13
Israel	6.4	26	11.8	26	1.7	16	11.4	7	—	—
Italy	25.4	5	31.0	10	3.1	8	6.8	14	29.9	4
Japan	41.2	1	83.2	1	3.4	6	8.6	10	25.6	8
Korea	34.2	2	43.8	4	4.3	3	6.7	15	70.0	1
Latvia	12.8	18	36.5	8	1.0	22	3.4	20	25.1	9
Lithuania	12.0	19	23.4	15	0.7	23	2.8	21	15.2	18
Luxembourg	13.1	16	18.8	17	1.9	14	13.1	4	13.1	19
Netherlands	12.9	17	14.1	25	4.7	2	8.1	11	—	—
New Zealand	16.4	12	17.3	19	1.1	20	4.1	19	22.0	10
Norway	—	—	—	—	—	—	—	—	—	—
Portugal	8.3	24	24.1	12	—	—	—	—	—	—
Slovenia	11.8	20	15.5	23	1.4	19	8.0	12	15.5	17
Spain	16.9	11	18.8	16	1.8	15	6.5	17	16.0	16
Sweden	13.6	15	18.0	18	—	—	—	—	—	—
Switzerland	24.5	7	40.1	5	3.8	5	—	—	28.8	5
United Kingdom	7.3	25	9.6	27	—	—	—	—	—	—
OECD Average	**18.0**		**29.0**		**2.6**		**9.3**		**25.8**	

Sources: OECD, 2020; calculations by authors.

Figure 4a: MRI units per million population, age-adjusted, 2018 or most recent

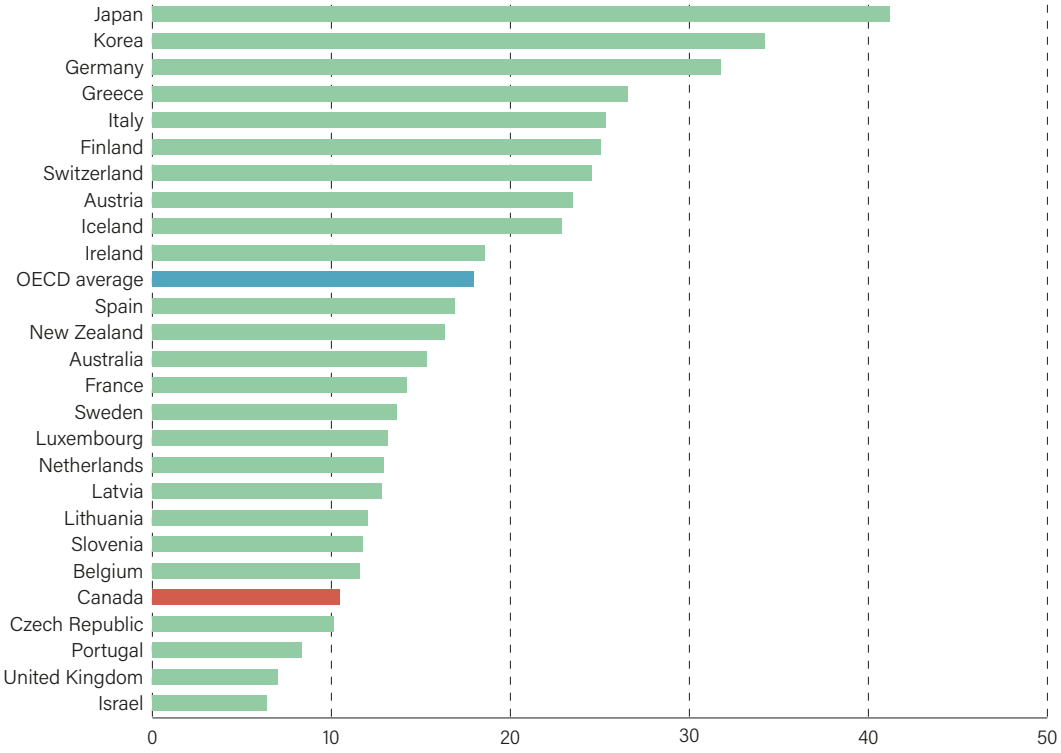
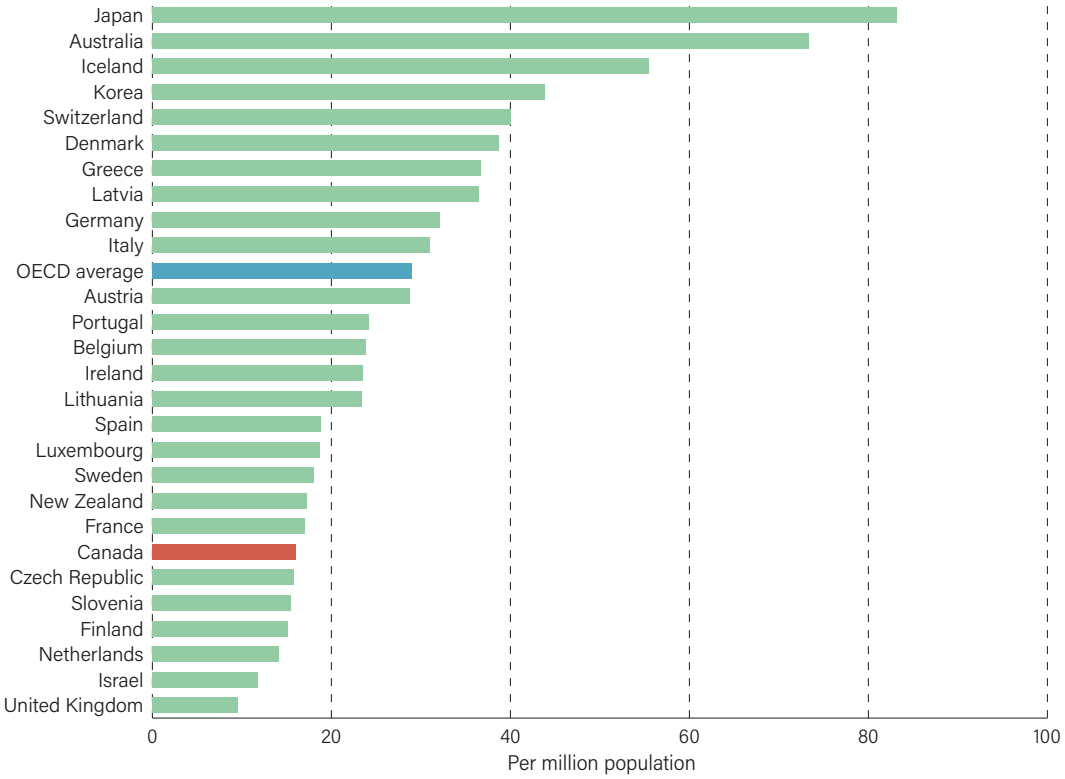


Figure 4b: CT scanners per million population, age-adjusted, 2018 or most recent



Sources: OECD, 2020; calculations by authors.

2. Use of resources

While measurement of the availability of medical resources is valuable, it does not provide us with information about their use. Importantly, medical resources are of little use if their services are not being consumed by those with health-care demands. A similar observation is made by Figueras, Saltman, Busse, and Dubois who note that "the number of units provides no information about the efficiency with which they are operated (utilization rates)" (2004: 122). The WHO similarly points out that "major equipment purchases are an easy way for the health system to waste resources, when they are underused, yield little health gain, and use up staff time and recurrent budget" (2000: xvii). Thus, simply having an abundance of medical resources does not necessarily mean that they are being used; for this reason, it is important to also include the volume of services or use of resources. In other words, "[t]he volume of care and services produced measures the quantity of health-related goods and services produced by the health-care system" (Champagne et al., 2005, quoted, in translation, by Tchouaket, Lamarche1, Goulet, and Contandriopoulos, 2012: 109).

In order to get a better idea of the quantity of health-related goods [15] and services provided by different countries, we examine indictors measuring the number of doctors' consultations per capita, curative-care discharge rates per hundred thousand population, [16] MRI examinations per thousand population, and CT scans per thousand population. In addition, Canada's ranking based on the number of nine specific procedures performed relative to other countries is also discussed (for data see tables A5 and A6, pp. 46–49). [17]

[15] Data measuring the consumption of antibiotics were available but were not included in this study due to variability among countries in policies concerning use of antibiotics.

[16] Previous versions of this report included an indicator measuring hospital discharge rates. The OECD (2017: 174) defines hospital discharge rates as "... the number of patients who leave a hospital after staying at least one night" including "... deaths in hospital following inpatient care". The OECD (2017) notes a number of methodological differences between countries for this indicator. For example, some same-day separations are included in Chile, Japan, Norway, and the United States while healthy babies born in hospitals (which can account for about 3% to 10% of all discharges) are excluded in several countries like Australia, Austria, Canada, Chile, Estonia, Finland, Greece, Ireland, Luxembourg, Mexico, and Norway. Further, data for Canada only included "curative-care discharges" defined as "health care contacts during which the principal intent is to relieve symptoms of illness or injury, to reduce the severity of an illness or injury, or to protect against exacerbation and/or complication of an illness or injury that could threaten life or normal function". In order to ensure better comparability, curative-care discharges are now reported for all countries (including Canada).

[17] Of course, as the CIHI points out that "the utilization of health-care services should be related to the need for services" and that "other things being equal, a healthier population would have less need for services than an unhealthier one" (2011a: 17). However, this

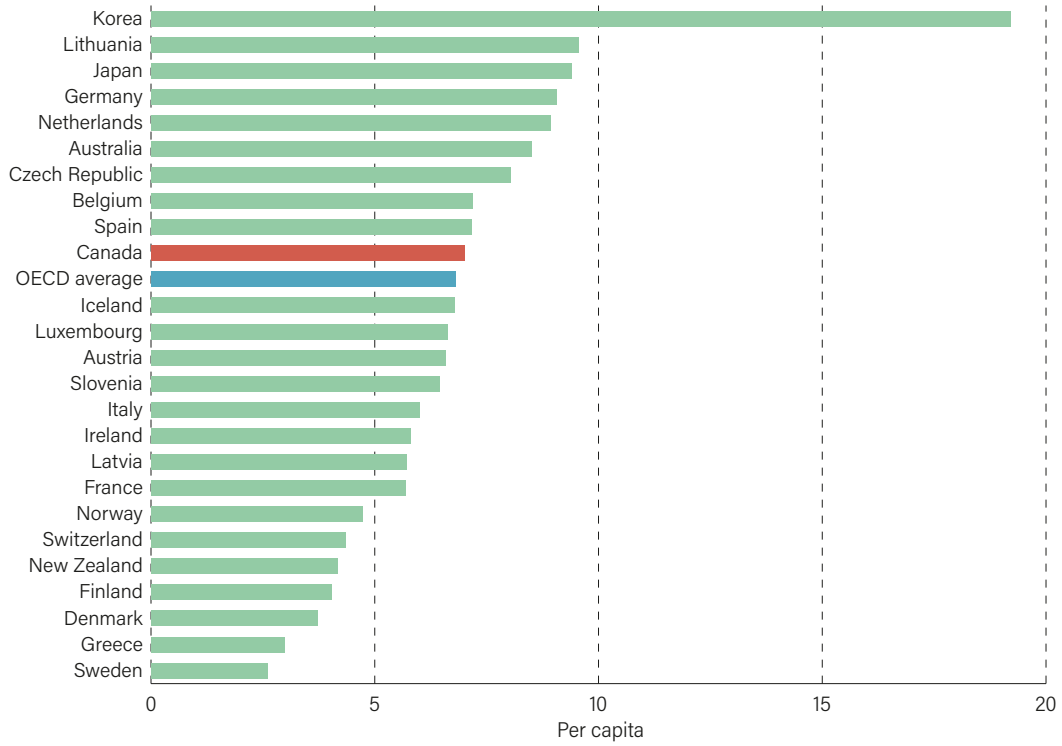
Canada ranks 11th (out of 25) for doctor consultations per capita, 27th (out of 27) for curative-care discharge rates per 100,000 population, 19th (out of 25) for MRI exams per thousand population, and 12th (out of 25) for CT scans per thousand population (table A4, pp. 45). After adjustment for age, Canada ranks 10th (out of 25) for doctor consultations per capita (figure 5a), 27th (out of 27) for curative-care discharge rates per 100,000 population (figure 5b), 20th (out of 25) for MRI examinations per thousand population, and 13th (out of 25) for CT scans per thousand population (table 5).

Canada ranks slightly higher than the average high-income OECD country with universal health care for the rate of doctor consultations on an age-adjusted basis, and above average for CT scans. Canada ranks below average for MRI examinations on an age-adjusted basis, and ranks as the country with the lowest curative-care discharge rates (per hundred thousand population). The OECD notes that "[h]ospital activities are affected by a number of factors, including the capacity of hospitals to treat patients, the ability of the primary care sector to prevent avoidable hospital admissions, and the availability of post-acute care settings to provide rehabilitative and long-term care services" (2015: 106). It is useful to reiterate that they are examined in this publication simply as an indicator of the use or provision of health-care services in the context of health-care spending.

Examining rates for specific procedures we determined that, after adjusting for age, Canada ranks 9th (out of 27) for cataract surgeries, 18th (out of 25) for transluminal coronary angioplasties, 2nd (out of 25) for coronary artery bypass grafts, 15th (out of 23) for stem cell transplantation, 18th (out of 26) for appendectomies, 8th (out of 26) for cholecystectomies, 14th (out of 26) for repair of inguinal hernias, 19th (out of 26) for hip replacements, and 6th (out of 24) for knee replacements (table 6). Data for adjusted and unadjusted rates for specific procedures for each country can be seen in table A5 (p. 46–47) and table A6 (pp. 48–49). Canada's performance is mixed, performing well, or at higher rates than the average OECD country, on about half the indicators examined, and at average to lower rates on the rest.

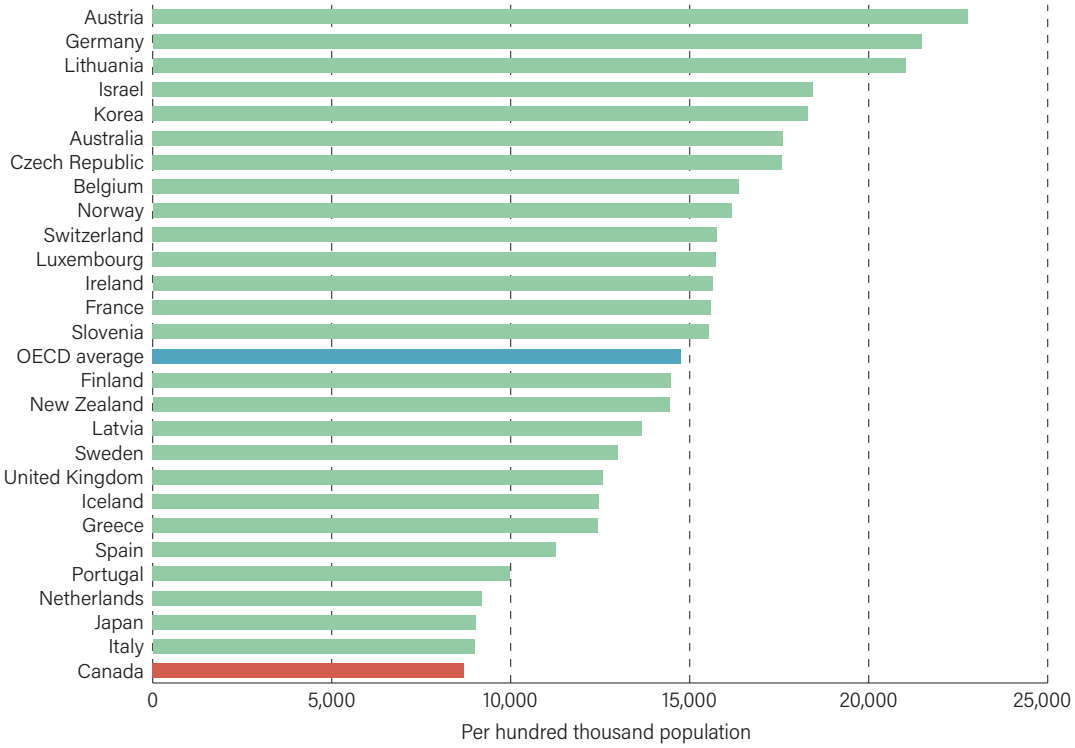
would also imply that a healthier population should therefore spend less on health-care services too (assuming other things, especially income, are equal). On the other hand, the provision of services (as measured by rates of use) can also be viewed as a purchased benefit, or simply an indication of the amount in services that a health-care system provides. Given that there have also been several recent academic examinations of the overuse of medical services (e.g., Korenstein, Falk, Howell, Bishop, and Keyhani, 2012; Chamot, Charvet, and Perneger, 2009), this study makes no assertions about the optimal level for the use of medical services.

Figure 5a: Consultations with doctor per capita, age-adjusted, 2018 or most recent



Sources: OECD, 2020; calculations by authors.

Figure 5b: Curative-care discharge rates per '000,000 pop., age-adjusted, 2018 or most recent



Sources: OECD, 2020; calculations by authors.

Table 5: Use of resources, age-adjusted, 2018

	Doctor consultations		Curative-care discharge rates		MRI exams		CT exams	
	Per capita	Rank	Per 100,000	Rank	Per 1,000	Rank	Per 1,000	Rank
Australia	8.5	6	17599.0	6	52.4	21	146.7	14
Austria	6.6	13	22777.8	1	141.0	1	183.1	8
Belgium	7.2	8	16378.1	8	95.1	5	201.4	4
Canada	**7.0**	**10**	**8696.5**	**27**	**53.0**	**20**	**160.3**	**13**
Czech Republic	8.0	7	17583.9	7	53.6	19	108.6	19
Denmark	3.7	23	—	—	87.0	8	180.2	10
Finland	4.0	22	14484.2	15	45.3	23	52.6	24
France	5.7	18	15596.1	13	115.3	4	188.7	6
Germany	9.1	4	21475.9	2	136.6	2	140.3	15
Greece	3.0	24	12438.9	21	75.4	11	193.5	5
Iceland	6.8	11	12458.7	20	118.3	3	261.6	1
Ireland	5.8	16	15632.3	12	—	—	—	—
Israel	—	—	18435.9	4	57.4	16	180.5	9
Italy	6.0	15	8987.3	26	65.1	14	82.6	22
Japan	9.4	3	9031.4	25	83.8	9	172.3	11
Korea	19.2	1	18304.3	5	55.7	17	259.4	2
Latvia	5.7	17	13667.0	17	61.4	15	171.7	12
Lithuania	9.5	2	21027.0	3	55.5	18	110.1	18
Luxembourg	6.6	12	15730.8	11	94.7	6	249.2	3
Netherlands	8.9	5	9196.9	24	51.7	22	94.0	21
New Zealand	4.2	21	14438.3	16	4.8	25	31.6	25
Norway	4.7	19	16162.2	9	—	—	—	—
Portugal	—	—	9984.4	23	44.0	24	187.0	7
Slovenia	6.4	14	15546.3	14	68.0	12	74.2	23
Spain	7.2	9	11258.3	22	90.8	7	116.7	16
Sweden	2.6	25	12999.2	18	—	—	—	—
Switzerland	4.3	20	15769.2	10	78.5	10	115.0	17
United Kingdom	—	—	12572.8	19	67.5	13	102.2	20
OECD Average	**6.8**		**14749.4**		**74.1**		**150.5**	

Source: OECD, 2020; calculations by authors.

Table 6: Use of resources in Canada, by specialty, per 100,000 population, age-adjusted ranks, 2018

Procedure	Rate (per 100,000 population)	Rank	Average of selected countries
Cataract surgery	1177.4	9 (out of 27)	986.9
Transluminal coronary angioplasty	167.6	18 (out of 25)	212.8
Coronary artery bypass graft	57.2	2 (out of 25)	36.6
Stem cell transplantation	6.6	15 (out of 23)	6.9
Appendectomy	117.2	18 (out of 26)	127.9
Cholecystectomy	215.4	8 (out of 26)	185.9
Repair of inguinal hernia	183.0	14 (out of 26)	182.3
Hip replacement	173.9	19 (out of 26)	197.3
Knee replacement	210.9	6 (out of 24)	160.0

Source: OECD, 2020; calculations by authors.

3. Access to resources

While both the level of medical resources available and their use can provide insight into accessibility, it is also useful to measure accessibility directly. Various dimensions of accessibility—physical, financial, and psychological—can be measured (Kelly and Hurst, 2006). However, another important interpretation of accessibility (for which objective data is more readily available) is the timeliness of care, as measured by waiting lists.

Murray and Frenk propose that individuals value prompt attention for two reasons: "it may lead to better health outcomes" and "it can allay fears and concerns that come with waiting for diagnosis or treatment" (2000: 720). Existing empirical support [18] for the first notion has been studied extensively by Nadeem Esmail who found that "adverse consequences from prolonged waiting are increasingly being identified and quantified in medical and economics literature" (Esmail, 2009: 11). In addition, waiting for treatment can, itself, also adversely affect the lives of those on waiting lists. For example, in Canada "18% of individuals who visited a specialist indicated that waiting for the visit affected their life compared with 11% and 12% for non-emergency surgery and diagnostic tests, respectively"; many of these people experienced worry, stress, anxiety, pain, and difficulties with activities of daily living (Statistics Canada 2006: 10, 11).

The CIHI (2011b) and the OECD (2011) include various measures of access in their reports, while the Commonwealth Fund (2015), the Fraser Institute (Barua, 2015; Rovere and Skinner, 2012), [19] and the Health Consumer Powerhouse (Björnberg, 2012) have measured access to health care by focusing primarily on wait times. [20] This report includes six indicators of access to care (five measuring timeliness, and one measuring financial barriers to access): 1. the percentage of patients who were able to get an appointment on the same/next day when sick; 2. who reported that it was very or somewhat easy to get care after hours; 3. who waited more than four weeks for an appointment with a specialist; 4. who waited two months or more for an appointment with a specialist; 5. who waited four months or more for elective surgery; and 6. who found cost a barrier to access in the past year. Unlike indicators in previous

[18] For a comprehensive review of studies looking at the adverse consequences associated with increased wait times, see Day, 2013.

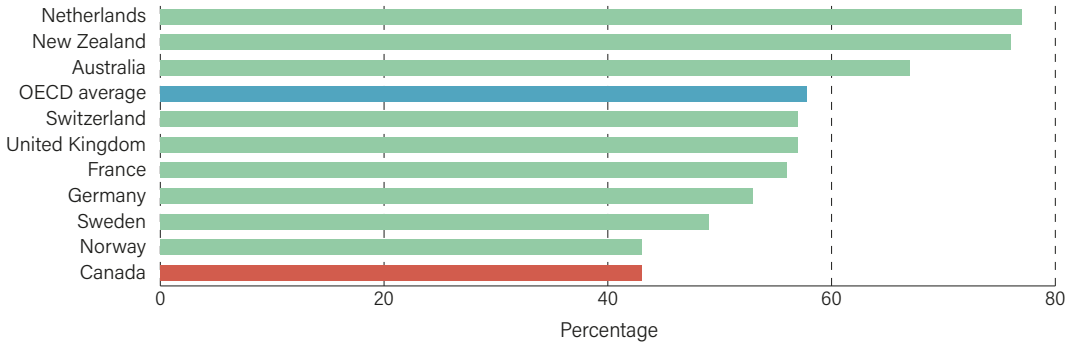
[19] Barua (2013) also includes wait times for access to new pharmaceuticals.

[20] There is an abundance of literature that focuses on the medical and technical relationship between resources, use, wait times, and outcomes (which are not examined in this report). Nevertheless, as with the other indicators discussed, this analysis does not make any assertions about the optimal level of accessibility.

sections, lower rates are preferable for many indicators in this section. However, the performances of countries on each indicator are ordered such that a rank of 1 indicates superior performance on all indicators.

As can be seen in table 7, Canada is tied for last place (out of 10) for the percentage of patients able to make a same-day appointment when sick (43%; figure 6a), and ranks 4th (out of 10) for the percentage of patients who report that it is very or somewhat easy to find care after hours (63%). Canada placed second last (with 62.8%) among the 16 countries for which data was available on the percentage of patients who reported waiting more than four weeks for an appointment with a specialist.

Figure 6a: Percentage of patients able to make a same-day appointment when sick, 2016



Sources: Commonwealth Fund, 2017.

Canada also ranked worst (10th out of 10) for the percentage of patients who reported waiting two months or more for a specialist appointment (30%; figure 6b), and worst (10th out of 10) for the percentage of patients who reported waiting four months or more for elective surgery (18%; figure 6c).

Canada placed at or near the bottom among other countries with universal-access health-care systems on four out of five indicators of timeliness of care. It performed better than average for the indicator measuring patients who reported it was very or somewhat easy to find care after hours, ranking 4th (out of 10). However, Canada also performed worse than the 10-country average on the indicator measuring the percentage of patients (16%; figure 6d) who found cost was a barrier to access, ranking 7th (out of 10). [21]

[21] Cost as a barrier to access defined as at least one of the following: did not fill/skipped prescription, did not visit doctor with medical problem, and/or did not get the recommended care.

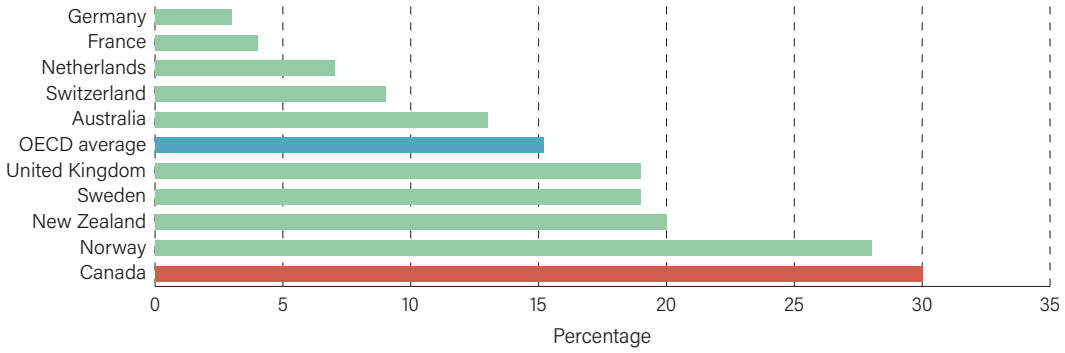
Table 7: Access to resources, 2016

	Able to make same/next day appointment when sick		Very or somewhat easy to find care after hours		Waited 4 weeks or more for appointment with a specialist		Waited 2 months or more for specialist appointment		Waited 4 months or more for elective surgery		Found cost a barrier to access in past year	
	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank
Australia	67	3	44	7	42.6[a]	7	13	5	8	5	14	6
Austria	—	—	—	—	—	—	—	—	—	—	—	—
Belgium	—	—	—	—	20.2[b]	2	—	—	—	—	—	—
Canada	**43**	**9**	**63**	**4**	**62.8[w]**	**17**	**30**	**10**	**18**	**10**	**16**	**7**
Czech Republic	—	—	—	—	—	—	—	—	—	—	—	—
Denmark	—	—	—	—	—	—	—	—	—	—	—	—
Finland	—	—	—	—	—	—	—	—	—	—	—	—
France	56	6	64	1	50.4[w]	10	4	2	2	2	17	8
Germany	53	7	64	1	28.1[b]	5	3	1	0	1	7	1
Greece	—	—	—	—	—	—	—	—	—	—	—	—
Iceland	—	—	—	—	—	—	—	—	—	—	—	—
Ireland	—	—	—	—	—	—	—	—	—	—	—	—
Israel	—	—	—	—	25.2[b]	3	—	—	—	—	—	—
Italy	—	—	—	—	55.0[w]	13	—	—	—	—	—	—
Japan	—	—	—	—	—	—	—	—	—	—	—	—
Korea	—	—	—	—	—	—	—	—	—	—	—	—
Latvia	—	—	—	—	—	—	—	—	—	—	—	—
Lithuania	—	—	—	—	—	—	—	—	—	—	—	—
Luxembourg	—	—	—	—	13.3[b]	1	—	—	—	—	—	—
Netherlands	77	1	25	10	33.0[a]	6	7	3	4	3	8	3
New Zealand	76	2	44	7	51.3[w]	11	20	8	15	8	18	9
Norway	43	9	40	9	64.2[w]	16	28	9	15	8	10	5
Portugal	—	—	—	—	45.8[a]	8	—	—	—	—	—	—
Slovenia	—	—	—	—	—	—	—	—	—	—	—	—
Spain	—	—	—	—	59.3[w]	14	—	—	—	—	—	—
Sweden	49	8	64	1	54.2[b]	12	19	6	12	6	8	3
Switzerland	57	4	58	5	27.3[a]	4	9	4	7	4	22	10
United Kingdom	57	4	49	6	46.4[b]	9	19	6	12	6	7	1
OECD Average	**58**		**52**		**45**		**15**		**9**		**13**	

Note: w = statistically worse than average; b = statistically better than average; a = not statistically different from average. Calculations by authors based on the upper and lower confidence intervals of each country in relation to the average upper and lower confidence intervals of all countries in each group.

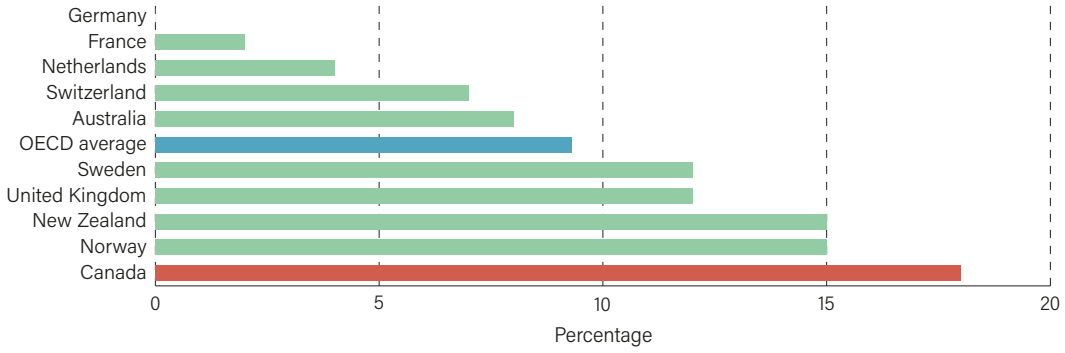
Sources: OECD, 2020; Commonwealth Fund, 2017; calculations by authors.

Figure 6b: Percentage of patients who waited 2 months or more for an appointment with specialist, 2016



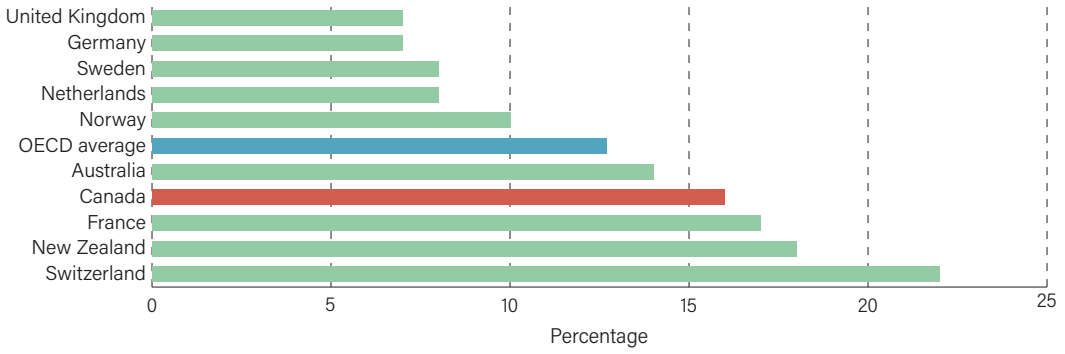
Sources: Commonwealth Fund, 2017.

Figure 6c: Percentage of patients who waited 4 months or more for elective surgery, 2016



Sources: Commonwealth Fund, 2017.

Figure 6d: Percentage of patients who found cost a barrier to access in the past year, 2016



Sources: Commonwealth Fund, 2017.

4. Clinical performance and quality

When assessing indicators of availability of, access to, and use of, resources, it is of critical importance to include as well some measure of clinical performance and quality. The OECD presents a number of indicators measuring different aspects of health-care quality in the areas of primary care, acute care, mental health care, patient safety, patient experiences, and cancer care. This report contains 14 indicators of clinical performance and quality:

- one indicator of primary care—diabetes-related amputation of a lower extremity; [22]
- four indicators of acute care—hip-fracture surgery initiated within 2 days of admission to the hospital, 30-day mortality after admission to hospital for acute myocaridal infarction (AMI), hemorrhagic stroke, and ischemic stroke;
- one indicator of mental health care—in-patient suicide among patients diagnosed with a mental disorder;
- four indicators of cancer care—five-year survival rates for breast, cervical, colon, and rectal cancers; and
- four indicators of patient safety—obstetric trauma during a vaginal delivery with an instrument and without an instrument, post-operative wound dehiscence, and sepsis (after abdominal surgery).

The indicators included in this report were chosen based on the assessment by Barua, Timmermans, Nason, and Esmail (2016) of how closely each indicator reflects direct intervention by the health-care system, whether data is available for Canada, and the novelty of information conveyed by the indicator. For example, hospital admission rates for asthma are not included since these may largely reflect genetic and environmental factors. [23] On the other hand, the age-sex standardized mortality rate (per 100 patients) within 30 days after admission to a hospital for an acute myocardial infarction is included. Not only does this account for the prevalence of the disease but it more closely "reflects

[22] Amputation of a lower extremity "is a significant complication of diabetes that is costly to individuals economically, socially and psychologically" (Buckley, Kearns, Kearney, Perry, and Bradley, 2014: 1). It is considered to be a preventable complication and, hence, reflective of the quality of care provided by a health-care system.

[23] The OECD (2015) notes that disease prevalence may explain some (though not all) of the cross-country variation in these rates.

the processes of care, such as timely transport of patients and effective medical interventions" and is "influenced by not only the quality of care provided in hospitals but also differences in hospital transfers, average length of stay and AMI severity" (OECD 2015: 138).

While the absolute rate for each indicator is presented in table 8a and table 8b, each country's relative performance is based on the upper and lower confidence intervals of that rate (calculated by the OECD) in relation to the calculated average range for the included OECD countries for nine of the 14 indicators used in this section. Further, while lower rates are preferable for certain indicators, the performances of countries on each indicator are ordered such that a rank of 1 indicates superior performance on all indicators.

Primary care

Canada ranks 19th (out of 24) for performance on the indicator measuring the rate of diabetes-related lower extremity amputation, which is statistically worse than the average range for the OECD countries included for comparison (table 8a).

Acute care

Canada ranks 6th (out of 22) for the rate of hip-fracture surgery initiated within 48 hours after admission to the hospital. Canada ranks 9th (out of 27) for performance on the indicator measuring 30-day mortality after admission to hospital for AMI (statistically better than average), 17th (out of 27) for performance on the indicator measuring 30-day mortality after admission to hospital for a hemorrhagic stroke (not statistically different from the average), and 17th (out of 27) for performance on the indicator measuring 30-day mortality after admission to hospital for an ischemic stroke (not statistically different from the average) (table 8a).

Mental health care

The OECD reports a rate of 0.07% for in-patient suicides among patients diagnosed with a mental disorder in Canada (statistically worse than average). This performance ranks Canada 14th (out of 17; statistically worse than average) (table 8a).

Cancer care

Canada ranks 5th (out of 26) on the indicator measuring the rate of 5-year survival after treatment for breast cancer (statistically better than average), 11th (out of 26) for the rate of 5-year survival after treatment for cervical cancer (not statistically different from the average), 8th (out of 26) for the rate of 5-year survival after treatment for colon cancer (statistically better than average), and 6th (out of 26) for the rate of 5-year survival after treatment for rectal cancer (statistically better than average) (table 8b).

Patient safety

Canada ranks 19th (out of 19) for its performance on the indicator measuring obstetric trauma during a vaginal delivery with an instrument, and 19th (out of 19) for its performance on the indicator measuring obstetric trauma during a vaginal delivery without an instrument (table 8b). Canada ranks 7th (out of 19) for post-operative wound dehiscence rates and 2nd (out of 18) for post-operative sepsis after abdominal surgery. [24]

While Canada does well on seven indicators of clinical performance and quality, its performance on the other seven is either average or poor.

[24] Because these measures of safety are reported only as crude rates, readers should interpret these metrics with caution when comparing them to those reported by other countries.

Table 8a: Clinical performance and quality, 2017 or latest: primary care, acute care, mental health care

	Diabetes lower extremity amputation		Hip-fracture surgery initiated within 48 hours after admission to the hospital		Admission-based AMI 30-day in-hospital mortality	
	Age-sex standardized rate per 100,000; 15 years and older	Rank	Crude rate per 100 patients; 65 years and older	Rank	Age-sex standardized rate per 100 patients; 45 years and older	Rank
Australia	3.9[b]	9	—	—	3.8[b]	5
Austria	13.2[w]	23	88.7	10	6.2[a]	15
Belgium	3.4[b]	7	87.0	13	6.8[a]	18
Canada	**7.1[w]**	**19**	**92.4**	**6**	**4.8[b]**	**9**
Czech Republic	—	—	80.5	16	6.2[a]	15
Denmark	7.8[w]	20	96.9	1	3.2[b]	2
Finland	3.6[b]	8	86.8	14	8[w]	21
France	4.3[b]	12	—	—	5.6[a]	14
Germany	8.2[w]	21	91.4	7	8.5[w]	22
Greece	—	—	—	—	—	—
Iceland	0.9[b]	1	94.9	4	2.3[b]	1
Ireland	3.1[b]	5	84.0	15	5.4[a]	11
Israel	16.8[w]	24	88.6	11	5.5[a]	13
Italy	1.6[b]	2	53.2	19	5.4[b]	11
Japan	—	—	—	—	9.7[w]	26
Korea	2.1[b]	3	—	—	9.6[w]	25
Latvia	6[a]	16	40.6	22	13.4[w]	27
Lithuania	6.5[a]	18	70.8	17	8.6[w]	24
Luxembourg	5.7[a]	13	—	—	8.5[a]	22
Netherlands	4.1[b]	11	96.0	2	3.5[b]	3
New Zealand	5.9[a]	14	88.5	12	4.7[b]	8
Norway	5.9[a]	14	96.0	2	3.5[b]	3
Portugal	10.4[w]	22	43.5	21	7.3[w]	20
Slovenia	—	—	69.5	18	4.1[b]	7
Spain	6.4[a]	17	51.9	20	6.5[a]	17
Sweden	3.9[b]	9	92.8	5	3.9[b]	6
Switzerland	3.1[b]	5	90.8	8	5.1[b]	10
United Kingdom	3[b]	4	90.7	9	7[w]	19
OECD Average	5.7		**80.7**		6.2	

Note: w = statistically worse than average; b = statistically better than average; a = not statistically different from average. Calculations by authors based on the upper and lower confidence intervals of each country in relation to the average upper and lower confidence intervals of all countries in each group.

Table 8a, continued

	Admission-based hemorrhagic stroke 30-day in-hospital mortality		Admission-based ischemic stroke 30-day in-hospital mortality		In-patient suicide among patients diagnosed with a mental disorder	
	Age-sex standardized rate per 100 patients; 45 years and older	Rank	Age-sex standardized rate per 100 patients; 45 years and older	Rank	Age-sex standardized rate per 100 patients; 15 years and older	Rank
Australia	19.4[b]	9	6[b]	10	—	—
Austria	17.7[b]	7	6.2[b]	12	—	—
Belgium	27[w]	23	8.3[a]	20	0.08[w]	16
Canada	**23.9**[a]	**17**	**7.9**[a]	**17**	**0.07**[w]	**14**
Czech Republic	25.8[w]	22	9.4[w]	23	0[b]	1
Denmark	23.7[a]	16	4.2[b]	5	0.08[a]	16
Finland	22.2[a]	12	8[a]	18	0.06[a]	11
France	22.4[a]	14	7.1[a]	14	—	—
Germany	22.2[a]	12	6[b]	10	—	—
Greece	—	—	—	—	—	—
Iceland	9.3[b]	1	3.8[b]	4	0.06[a]	11
Ireland	25.6[a]	21	8[a]	18	—	—
Israel	21.3[a]	11	5.9[b]	9	0.06[a]	11
Italy	19.8[b]	10	6.3[b]	13	—	—
Japan	11.9[b]	2	3[b]	1	—	—
Korea	16.9[b]	6	3.2[b]	2	—	—
Latvia	39.2[w]	27	20.4[w]	27	0[b]	1
Lithuania	29.8[w]	26	15.6[w]	26	0.01[a]	4
Luxembourg	17.8[a]	8	7.5[a]	15	—	—
Netherlands	24.6[a]	18	5.3[b]	6	0.01[a]	4
New Zealand	23.6[a]	15	7.7[a]	16	0.03[a]	9
Norway	15[b]	4	3.7[b]	3	0.04[a]	10
Portugal	24.6[a]	18	10.1[w]	24	0.01[a]	4
Slovenia	24.9[a]	20	12.2[w]	25	0.07[a]	14
Spain	28.7[w]	25	9[w]	22	0.02[a]	8
Sweden	14.4[b]	3	5.7[b]	8	—	—
Switzerland	15.4[b]	5	5.4[b]	7	0.01[a]	4
United Kingdom	28.2[w]	24	8.8[w]	21	0[b]	1
OECD Average	22.0		7.6		0.04	

Source: OECD, 2020; calculations by authors.

Table 8b: Clinical performance and quality: cancer care and patient safety

	Breast cancer		Cervical cancer		Colon cancer		Rectal cancer	
	Five-year net survival, 2010–2014, female, 15 years old and over, age-standardized survival, %	Rank	Five-year net survival, 2010–2014, female, 15 years old and over, age-standardized survival, %	Rank	Five-year net survival, 2010–2014, 15 years old and over, age-standardized survival, %	Rank	Five-year net survival, 2010–2014, 15 years old and over, age-standardized survival, %	Rank
Australia	89.5[b]	1	66.4[a]	14	70.7[b]	3	71[b]	2
Austria	84.8[a]	21	63.9[a]	21	63.7[a]	15	64.2[a]	14
Belgium	86.4[a]	14	65.4[a]	17	67.9[b]	5	66.6[b]	7
Canada	**88.6[b]**	**5**	**67.3[a]**	**11**	**67[b]**	**8**	**67.1[b]**	**6**
Czech Republic	81.4[w]	24	61[w]	24	56.1[w]	25	52.3[w]	25
Denmark	86.1[a]	16	69.5[a]	6	61.6[a]	20	64.8[a]	10
Finland	88.5[b]	6	67.4[a]	9	64.9[a]	9	64.4[a]	13
France	86.7[a]	11	65[a]	19	63.7[a]	15	60.9[a]	20
Germany	86[a]	17	65.2[a]	18	64.8[a]	12	62.3[a]	17
Greece	—	—	—	—	—	—	—	—
Iceland	89.1[a]	3	80.1[b]	1	68.2[a]	4	63[a]	15
Ireland	82[w]	23	63.6[a]	23	60.5[w]	22	61.7[a]	18
Israel	88[b]	7	66.6[a]	13	71.7[b]	2	67.8[b]	4
Italy	86[a]	17	66.8[a]	12	64.2[a]	13	61.3[a]	19
Japan	89.4[b]	2	71.4[b]	4	67.8[b]	6	64.8[a]	10
Korea	86.6[a]	12	77.3[b]	2	71.8[b]	1	71.1[b]	1
Latvia	76.9[w]	25	53.9[w]	26	48.8[w]	26	49.5[w]	26
Lithuania	73.5[w]	26	59.2[w]	25	56.9[w]	24	52.7[w]	24
Luxembourg	—	—	—	—	—	—	—	—
Netherlands	86.6[a]	12	67.5[a]	8	63.1[a]	18	65.3[a]	9
New Zealand	87.6[a]	8	67.4[a]	9	64[a]	14	66[a]	8
Norway	87.2[a]	10	73.2[b]	3	64.9[a]	9	68.3[b]	3
Portugal	87.6[a]	8	66.2[a]	15	60.9[w]	21	59.6[a]	22
Slovenia	83.5[a]	22	65.5[a]	16	61.9[a]	19	60.3[a]	21
Spain	85.3[a]	20	64.6[a]	20	63.3[a]	17	59.5[a]	23
Sweden	88.8[b]	4	68.3[a]	7	64.9[a]	9	64.7[a]	12
Switzerland	86.2[a]	15	71.4[a]	4	67.3[b]	7	67.3[b]	5
United Kingdom	85.6[a]	19	63.8[a]	22	60[w]	23	62.5[a]	16
OECD Average	85.7		66.8		63.9		63.0	

Note: w = statistically worse than average; b = statistically better than average; a = not statistically different from average. Calculations by authors based on the upper and lower confidence intervals of each country in relation to the average upper and lower confidence intervals of all countries in each group.

Table 8b, continued

	Obstetric trauma, vaginal delivery with instrument, 2017		Obstetric trauma, vaginal delivery without instrument, 2017		Post-operative wound dehiscence, 2017		Post-operative sepsis after abdominal surgery, 2017	
	Crude rate per 100 vaginal deliveries; female; 15 years and older	Rank	Crude rate per 100 vaginal deliveries; female; 15 years and older	Rank	Crude rate per 100,000 hospital discharges, 15 years and over	Rank	Crude rate per 100,000 hospital discharges, 15 years and over	
Australia	6.8	14	2.5	15	80.9	5	3,610.6	16
Austria	—	—	—	—	—	—	—	—
Belgium	3.4	7	0.7	4	205.2	10	1,716.5	7
Canada	**16.4**	**19**	**3.1**	**19**	**124**	**7**	**1,042.6**	**2**
Czech Republic	—	—	—	—	—	—	—	—
Denmark	11	17	3	18	63.2	2	1,123.5	3
Finland	3.7	8	1	8	668.6	17	3,234.9	13
France	—	—	—	—	—	—	—	—
Germany	6.6	13	1.4	10	603.1	15	1,862.2	8
Greece	—	—	—	—	—	—	—	—
Iceland	—	—	—	—	—	—	—	—
Ireland	3.7	8	1.5	11	204	9	4,585.1	18
Israel	1.9	2	0.5	3	106.4	6	3,523.4	14
Italy	1.9	2	0.9	6	10.9	1	1,608.4	6
Japan	—	—	—	—	—	—	—	—
Korea	—	—	—	—	—	—	530.1	1
Latvia	4.5	10	0.3	1	—	—	—	—
Lithuania	—	—	—	—	—	—	—	—
Luxembourg	—	—	—	—	—	—	—	—
Netherlands	2.9	6	2.4	14	414.3	14	3,532.6	15
New Zealand	8.5	16	2.5	15	—	—	—	—
Norway	2.8	5	1.2	9	175.8	8	2,418.0	12
Portugal	2.3	4	0.4	2	646.1	16	1,358.2	4
Slovenia	1.7	1	0.7	4	291.6	11	2,351.4	10
Spain	4.9	11	0.9	6	350.1	12	1,918.7	9
Sweden	11.1	18	2.3	13	350.1	12	1,428.7	5
Switzerland	7.4	15	2.1	12	67	3	2,371.3	11
United Kingdom	6.2	12	2.5	15	72.8	4	4,304.2	17
OECD Average	5.7		1.6		260.8		2,362.2	

Sources: OECD, 2020; calculations by authors.

4 Health status and outcomes

As can be seen in figure 1 (p. 3), the literature suggests that achieving a certain health status—the health outcome for a population—, though of great interest and importance, is a product of both medical and non-medical determinants of health and is thus not necessarily a good measure of the performance of a health system (Arah, Westert, Hurst, and Klazinga, 2006; Rovere and Skinner, 2012; Skinner, 2009). In fact, much research seems to indicate that the health outcomes for a population are not correlated to spending on medical care or the type of health-insurance system (Centre for International Statistics, 1998). Indeed, "factors such as clean water, proper sanitation, and good nutrition, along with additional environmental, economic, and lifestyle dimensions, are considerably more important in determining the outcomes a country experiences ... The actual contribution of medical and clinical services is usually considered to be in the range of 10 up to 25 per cent of observed outcome" (Figueras, Saltman, Busse, and Dubois, 2004: 83, citing Bunker, Frazier, and Mosteller, 1995; McKeown, 1976; Or, 1997).

However, such indicators (for example, life expectancy, mortality rates) are nevertheless widely used to provide a related view of how well a health-care system may be performing its objectives. Further, while it is clear that life expectancy is not completely determined by access to high-quality health care, it is also true that longer life spans would not be as likely without these services (Esmail and Walker, 2008). Therefore, in order to provide a more complete (if only related) picture of how well each country's health-care system performs, we include five indicators of health status and outcomes: 1. life expectancy (LE) at birth; 2. healthy-age life expectancy (HALE); 3. infant mortality; 4. perinatal mortality; and 5. treatable mortality. Four of these indicators were previously used by Esmail and Walker (2008).

Measures of longevity

Perhaps the most commonly used measure of health status is life expectancy at birth, that is, the average number of years a person can be expected to live assuming age-specific mortality levels remain constant (OECD, 2015). Canada ranks 14th (out of 28) for its performance on the indicator measuring life expectancy at birth (calculated by the OECD) (table 9). The WHO calculates a related measure called healthy life expectancy (HALE) that reflects how long individuals in a country will live in a good state of health (or not in a poor state of health). Canada ranks 5th (out of 28) for its performance on this indicator.

Table 9: Health Status— life expectancy at birth, healthy life expectancy, infant and perinatal mortality, and treatable mortality

	Life expectancy at birth (LE), 2018		Healthy life expectancy (HALE), 2016		Infant mortality rate, 2018		Perinatal mortality rate, 2018		Treatable mortality rate, 2017	
	Years	Rank	Years	Rank	Deaths per 1,000 live births	Rank	Deaths per 1,000 total births	Rank	* SDRs per 100,000	Rank
Australia	82.8	7	73.0	7	3.1	14	7.6	26	47.0	4
Austria	81.8	17	72.4	14	2.7	8	4.8	14	57.0	15
Belgium	81.7	20	71.6	23	3.8	23	6	23	54.0	13
Canada	**82**	**14**	**73.2**	**5**	**4.7**	**28**	**5.8**	**22**	**56.0**	**14**
Czech Republic	79.1	26	69.3	26	2.6	7	3.4	5	95.0	26
Denmark	81	24	71.8	21	3.7	22	4.1	8	59.0	18
Finland	81.8	17	71.7	22	2.1	5	3.4	5	57.0	15
France	82.8	7	73.4	4	3.8	23	10.6	28	48.0	6
Germany	81	24	71.6	23	3.2	15	5.6	21	64.0	20
Greece	81.9	15	72.0	18	3.5	20	5.5	19	75.0	25
Iceland	82.9	5	73.0	7	1.7	1	2.1	1	44.0	2
Ireland	82.3	13	72.1	16	2.9	12	5.2	17	65.0	22
Israel	82.9	5	72.9	11	3.0	13	5.1	16	59.0	18
Italy	83.4	4	73.2	5	2.8	10	4.1	8	52.0	12
Japan	84.2	1	74.8	1	1.9	3	2.2	2	48.0	6
Korea	82.7	10	73.0	7	2.8	10	2.8	3	45.0	3
Latvia	74.9	28	66.2	27	3.2	15	4.3	11	157.0	28
Lithuania	75.8	27	66.1	28	3.4	19	5.4	18	141.0	27
Luxembourg	82.4	12	72.6	13	4.3	27	8.9	27	51.0	9
Netherlands	81.9	15	72.1	16	3.5	20	4.9	15	49.0	8
New Zealand	81.8	17	72.8	12	4.2	26	5.5	19	64.0	20
Norway	82.8	7	73.0	7	2.3	6	3.8	7	47.0	4
Portugal	81.4	22	72.0	18	3.3	17	4.2	10	66.0	23
Slovenia	81.5	21	70.5	25	1.7	1	2.8	3	57.0	15
Spain	83.5	3	73.8	2	2.7	8	4.4	12	51.0	9
Sweden	82.6	11	72.4	14	2.0	4	4.7	13	51.0	9
Switzerland	83.8	2	73.5	3	3.3	17	6.6	25	40.0	1
United Kingdom	81.3	23	71.9	20	3.9	25	6.2	24	69.0	24
OECD Average	**81.7**		**72.0**		**3.1**		**5.0**		**63.1**	

Note: * SDR = Age-standardized death rates.

Source: OECD, 2020; WHO, 2020; calculations by authors

These two measures can be combined to determine the number of years lost to illness or the percentage of expected lifetime that individuals can expect to live in full health. This measure (HALE⁄LE) may allow some additional insight into the ability of the health-care system to provide care for individuals who may as a result of their illnesses soon endure a significantly negative effect on their standard of living. Canada ranks 1st (out of 28) on this measure.

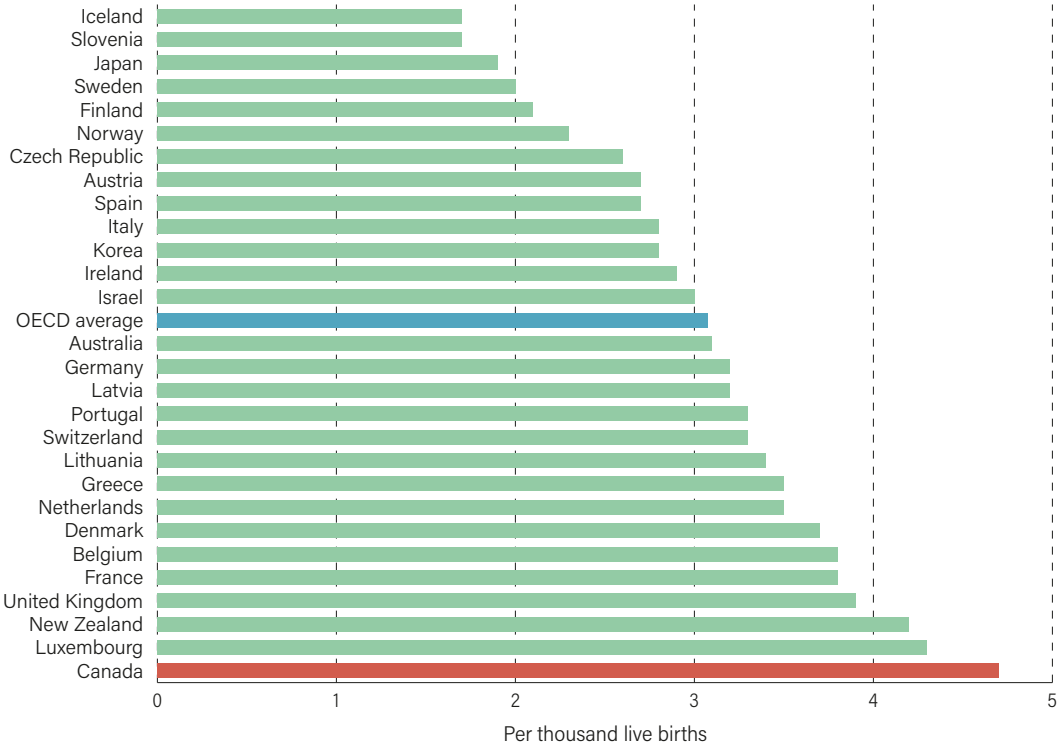
Measures of mortality

The diametric opposite of measures of the length of life and the proportion of that lifetime that can be enjoyed in full health are measures of mortality. The most basic measures of mortality commonly used to compare health status are infant and perinatal mortality rates. Though these mortality statistics can be affected by immigration from poor countries, unhealthy outlier populations, and other population demographics (Seeman, 2003), they can also serve as indicators of a well-functioning health-care system. Zeynep Or notes that these mortality statistics are a useful way to gauge the performance of a health-care system since "the performance of a health system is often judged by its capacity to prevent deaths at the youngest ages" and notes that perinatal mortality is an important indicator of "effectiveness of health care interventions during pregnancy and childbirth" (2001: 8). Canada ranks 28th (out of 28) for its performance on the indicator measuring infant mortality (figure 7a), and 22nd (out of 28 for perinatal mortality (table 9).

Adjusted measures of mortality

Unfortunately, the use of HALE, LE, and infant and perinatal mortality as measures of the effectiveness of a health system includes a number of effects that are not related to the health system. Measures such as crime rates, pollution, water quality, and public sanitation systems affect life expectancy in addition to those directly related to the health-care systems that have been compared in this report. A potentially finer way of breaking down mortality is to use the treatable-mortality measure recently adopted by the OECD. In 2018, the OECD and other partners developed a new list of treatable and preventable mortality. These lists were built on the work of Nolte and Mckee (2004, 2011); these two studies formed the basis of the measure, Mortality Amenable to Health Care, found in previous versions of this report. According to the OECD, the measure of treatable mortality focuses on "[c]auses of death that can be mainly avoided through timely and effective health care interventions, including secondary prevention such as screening, and treatment (i.e., after the onset of diseases, to reduce case-fatality)" (OECD, 2020: 1). The list of diseases included, their corresponding ICD-10 codes, their age thresholds,

Figure 7a: Infant mortality per thousand live births, 2018 or most recent



Sources: OECD, 2020; calculations by authors.

and the rationale for their inclusion are available in the OECD's documentation (OECD, 2019). The OECD draws data from the WHO Mortality Database when making this calculation, and reports these data as both "absolute numbers and as standardised death rates according to age" (OECD, 2020: 1). While the measure used in previous versions of this report (mortality amenable to health care) included codes with a variety of age ranges for specific illnesses, the list used for this measure (treatable mortality) uses a single age band of 0–74 for all included ICD-10 codes.

Table 9 presents the available data for Treatable Mortality for the categories of illness presented in table 10. Similar to our own calculations last year, Canada ranked 14th for its performance on the indicator measuring treatable mortality among the 28 countries ranked (figure 7b).

Table 10: Cause of death considered treatable by health care

Infectious diseases
Tuberculosis (50%)
Scarlet fever
Sepsis
Cellulitis
Legionnaires disease
Streptococcal and enterococci infection
Other meningitis
Meningitis due to other and unspecified causes
Cancer
Cervical cancer (50%)
Colorectal cancer
Breast cancer (female only)
Uterus cancer
Testicular cancer
Thyroid cancer
Hodgkin's disease
Lymphoid leukaemia
Benign neoplasm
Endocrine and metabolic diseases
Diabetes mellitus (50%)
Thyroid disorders
Adrenal disorders
Diseases of the nervous system
Epilepsy
Diseases of the circulatory system
Aortic aneurysm (50%)
Hypertensive diseases (50%)
Ischaemic heart diseases (50%)
Cerebrovascular diseases (50%)
Other atherosclerosis (50%)
Rheumatic and other heart disease
Venous thromboembolism*
Diseases of the respiratory system
Upper respiratory infections
Pneumonia, not elsewhere classified or organism unspecified
Acute lower respiratory infections
Asthma and bronchiectasis
Adult respiratory distress syndrome
Pulmonary oedema
Abscess of lung and mediastinum pyothorax
Other pleural disorders
Diseases of the digestive system
Gastric and duodenal ulcer
Appendicitis
Abdominal hernia
Cholelithiasis and cholecystitis
Other diseases of gallbladder or biliary tract
Acute pancreatitis
Other diseases of pancreas

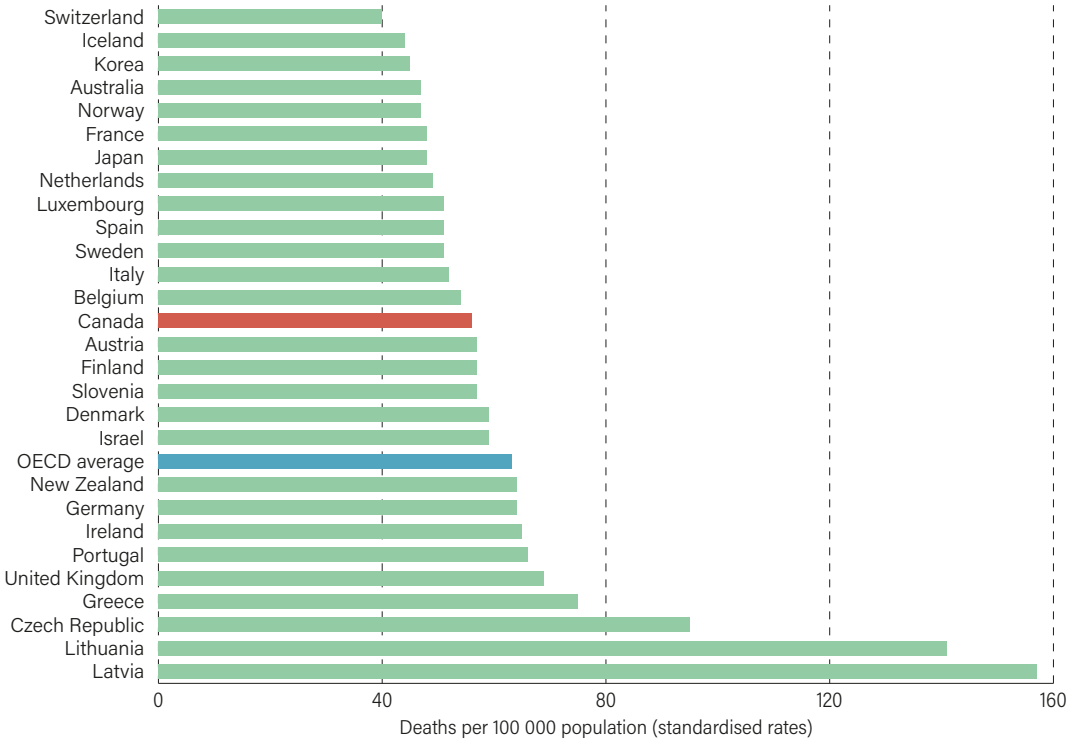
Table 10: Cause of death considered treatable by health care

Diseases of the genitourinary system
Nephritis and nephrosis
Obstructive uropathy
Renal failure
Renal colic
Disorders resulting from renal tubular dysfunction
Unspecified contracted kidney, small kidney of unknown cause
Inflammatory diseases of genitourinary system
Prostatic hyperplasia
Pregnancy, childbirth, and pernatal period
Pregnancy, childbirth and the puerperium
Certain conditions originating in the perinatal period
Congenital malformations
Congenital malformations of the circulatory system (heart defects)
Adverse effects of medical and surgical care
Drugs, medicaments and biological substances causing adverse effects in therapeutic use*
Misadventures to patients during surgical and medical care*
Medical devices associated with adverse incidents in diagnostic and therapeutic use*

Note *: Some of these conditions that are mainly acquired when people are hospitalized or in contact with health services might also be considered to be preventable, in the sense that the incidence of these health care-associated infections or health problems might be reduced through greater prevention in health care facilities.

Source: adapted from OECD, 2019.

Figure 7b: Treatable mortality, 2017



Sources: OECD, 2020.

Conclusion

Canada spends more on health care than the majority of high-income OECD countries with universal health-care systems. After adjustment for age, Canada's expenditure on health care as a percentage of GDP ranks as 2nd highest and its health-care expenditure per capita (out of 28), 7th highest. Despite this level of spending, Canada has significantly fewer physicians, acute-care beds, and psychiatric beds per thousand compared to the average OECD country though it ranks close to the average for nurses and above average for long-term care beds per thousand over the age of 65. Further, while Canada performs well on Gamma-camera density (per million population), it has fewer other medical technologies than the average high-income OECD country with universal health care for which comparable inventory data is available.

Canada's performance is mixed for use of resources, performing higher rates than the average OECD country on about half the indicators examined (for example, consultations with a doctor and knee replacement), and average to lower rates on the rest. Canada reports the least hospital activity (as measured by curative-care discharge rates) in the group of countries studied.

Canada ranked last (or next to last) on four of the five indicators of timeliness of care; and ranked seventh (out of ten) on the indicator measuring the percentage of patients who reported that cost was a barrier to access.

Finally, while Canada does well on seven indicators of clinical performance and quality (such as rates of survival for breast, colon, and rectal cancers), its performance on the seven others are either no different from the average or in some cases—particularly obstetric trauma and diabetes related amputations—worse.

Canada ranks among the most expensive universal health-care systems in the OECD. However, its performance for availability and access to resources is generally below that of the average OECD country, while its performance for use of resources and quality and clinical performance is mixed. Clearly, there is an imbalance between the value Canadians receive and the relatively high amount of money they spend on their health-care system.

Appendix—additional tables and data

Table A1: Health-care spending, 2018

	Spending as percentage of GDP		Spending per capita	
	Percentage	Rank	US$ PPP	Rank
Australia	9.3	14	4,964.5	12
Austria	10.3	8	5,538.3	4
Belgium	10.3	7	5,103.2	11
Canada	**10.8**	**6**	**5,287.4**	**8**
Czech Republic	7.6	22	3,170.7	21
Denmark	10.1	9	5,294.5	7
Finland	9.0	16	4,331.5	16
France	11.3	3	5,154.1	10
Germany	11.5	2	6,223.8	3
Greece	7.7	21	2,265.9	27
Iceland	8.5	19	4,419.9	15
Ireland	6.9	25	4,911.8	13
Israel	7.5	24	2,825.8	25
Italy	8.7	18	3,484.9	19
Japan	11.0	4	4,504.4	14
Korea	7.6	23	3,085.2	23
Latvia	6.2	27	1,856.5	28
Lithuania	6.6	26	2,385.1	26
Luxembourg	5.3	28	5,216.3	9
Netherlands	10.0	12	5,436.3	5
New Zealand	9.2	15	4,024.6	18
Norway	10.0	10	6,283.2	2
Portugal	9.4	13	3,097.3	22
Slovenia	8.3	20	3,054.6	24
Spain	9.0	17	3,429.8	20
Sweden	10.9	5	5,433.7	6
Switzerland	11.9	1	7,279.8	1
United Kingdom	10.0	11	4,289.8	17
OECD average	**9.1**		**4,369.7**	

Source: OECD, 2020; calculations by authors.

Table A2: Availability of human and capital resources per thousand population, 2017/2018

	Physicians		Nurses		Acute beds		Psychiatric beds		Long-term care beds	
	per '000	Rank	per '000	Rank	per '000	Rank	per '000	Rank	per '000*	Rank
Australia	3.75	14	11.92	7	—	—	0.42	19	—	—
Austria	5.24	2	6.87	23	5.35	4	0.58	16	9.3	11
Belgium	3.13	23	11.22	10	4.97	6	1.35	2	13.0	2
Canada	**2.72**	**26**	**9.95**	**17**	**2.00**	**25**	**0.37**	**22**	**9.8**	**9**
Czech Republic	4.04	10	8.07	18	4.08	8	0.93	8	8.9	12
Denmark	4.19	9	10.10	16	2.36	22	0.47	18	7.5	19
Finland	3.21	20	14.26	4	2.84	16	0.54	17	12.6	3
France	3.17	22	10.79	13	3.04	15	0.83	11	10.3	8
Germany	4.31	7	13.22	5	6.02	3	1.28	3	11.5	6
Greece	6.10	1	3.37	28	3.63	10	0.74	12	0.9	24
Iceland	3.89	13	14.67	3	2.34	23	0.37	22	7.9	17
Ireland	3.28	18	12.88	6	2.79	17	0.34	26	6.6	20
Israel	3.22	19	5.03	26	2.18	24	0.40	21	2.4	23
Italy	3.98	12	5.74	25	2.59	20	0.09	28	4.3	21
Japan	2.49	27	11.76	8	7.78	1	2.61	1	9.3	10
Korea	2.39	28	7.24	21	7.08	2	1.26	4	8.7	14
Latvia	3.30	17	4.35	27	3.22	13	1.22	5	3.4	22
Lithuania	4.60	5	7.78	19	5.30	5	0.98	7	8.0	16
Luxembourg	2.98	24	11.72	9	3.70	9	0.74	12	11.6	5
Netherlands	3.67	15	11.13	11	2.69	18	0.86	10	14.0	1
New Zealand	3.35	16	10.34	14	2.60	19	0.30	27	8.2	15
Norway	4.81	4	17.74	1	3.13	14	1.05	6	7.6	18
Portugal	5.15	3	6.88	22	3.29	12	0.64	15	—	—
Slovenia	3.18	21	10.14	15	4.13	7	0.66	14	10.4	7
Spain	4.02	11	5.87	24	2.50	21	0.36	25	8.8	13
Sweden	4.27	8	10.88	12	1.97	26	0.41	20	—	—
Switzerland	4.34	6	17.59	2	3.61	11	0.93	8	11.9	4
United Kingdom	2.84	25	7.78	19	—	—	0.37	22	—	—
OECD Average	**3.77**		**9.97**		**3.66**		**0.75**		**8.61**	

Note: This measure takes the raw number of long-term care beds in hospitals and residential facilities in each country, divides each figure by the country's population in 000's, and then adds them together. Figures for Germany and Japan are from 2017.
Sources: OECD, 2020; calculations by authors.

Table A3: Availability of technological and diagnostic imaging resources, per million population, 2018

	MRI Units		CT Scanners		PET Scanners		Gamma Cameras		Mammographs	
	Per million	Rank	Per million	Rank	Per million	Rank	Per million	Rank	Per million	Rank
Australia	14.1	15	67.3	2	3.8	4	18.8	1	23.7	9
Austria	23.5	8	28.8	11	2.7	10	10.5	8	21.5	10
Belgium	11.6	20	23.9	14	2.6	11	—.	—	36.6	3
Canada	**10.0**	**23**	**15.4**	**24**	**1.4**	**18**	**16.2**	**2**	**18.1**	**12**
Czech Republic	10.4	22	16.1	21	1.6	16	12.0	5	11.2	20
Denmark	—.	—	39.7	5	7.9	1	15.2	3	16.4	15
Finland	27.4	6	16.5	19	2.7	9	7.6	14	28.3	7
France	14.8	13	17.7	18	2.3	12	7.0	15	—.	—
Germany	34.7	2	35.1	9	—.	—	—.	—	—.	—
Greece	29.4	4	40.6	4	1.2	20	13.4	4	66.0	1
Iceland	19.9	9	48.2	3	2.8	8	8.5	10	17.0	13
Ireland	16.0	11	20.3	15	1.9	13	4.7	18	16.9	14
Israel	5.2	26	9.6	26	1.4	19	9.2	9	—.	—
Italy	28.7	5	35.1	10	3.5	7	7.7	13	33.8	5
Japan	55.2	1	111.5	1	4.6	3	11.5	7	34.3	4
Korea	30.1	3	38.6	7	3.8	5	5.9	17	61.6	2
Latvia	13.5	16	38.4	8	1.0	21	3.6	20	26.5	8
Lithuania	12.5	18	24.3	13	0.7	23	2.9	21	15.7	18
Luxembourg	11.5	21	16.5	20	1.6	15	11.5	6	11.5	19
Netherlands	13.1	17	14.2	25	4.7	2	8.2	12	—.	—
New Zealand	14.9	12	15.7	23	1.0	22	3.7	19	20.0	11
Norway	—.	—	—.	—	—.	—	—.	—	—.	—
Portugal	9.1	24	26.5	12	—.	—	—.	—	—.	—
Slovenia	12.1	19	15.9	22	1.5	17	8.2	11	15.9	17
Spain	17.2	10	19.1	16	1.8	14	6.6	16	16.2	16
Sweden	14.2	14	18.7	17	—.	—	—.	—	—.	—
Switzerland	24.3	7	39.7	5	3.8	6	—.	—	28.5	6
United Kingdom	7.2	25	9.5	27	—.	—	—.	—	—.	—
OECD Average	**18.5**		**29.7**		**2.6**		**9.2**		**26.0**	

Source: OECD 2020; calculations by authors

Table A4: Use of resources, 2018

	Doctor consultations		Curative-care discharge rates		MRI exams		CT exams	
	Per capita	Rank	Per 100,000	Rank	Per 1,000	Rank	Per 1,000	Rank
Australia	7.8	7	16,152.5	7	48.1	23	134.6	15
Austria	6.6	12	22,839.9	2	141.4	2	183.6	10
Belgium	7.2	9	16,422.8	5	95.4	6	201.9	7
Canada	**6.7**	**11**	**8,330.1**	**27**	**50.8**	**19**	**153.5**	**12**
Czech Republic	8.2	6	17,957.6	4	54.7	17	110.9	19
Denmark	3.8	22	—.	—	89.1	8	184.6	9
Finland	4.4	20	15,819.1	10	49.5	20	57.5	24
France	5.9	15	16,172.5	6	119.6	3	195.7	8
Germany	9.9	3	23,455.2	1	149.2	1	153.2	13
Greece	3.3	24	13,752.2	16	83.4	9	213.9	5
Iceland	5.9	15	10,823.6	24	102.8	5	227.3	3
Ireland	5.0	18	13,498.1	17	—.	—	—.	—
Israel	—.	—	14,976.5	13	46.6	24	146.6	14
Italy	6.8	10	10,181.7	25	73.7	12	93.6	22
Japan	12.6	2	12,101.3	21	112.3	4	230.8	1
Korea	16.9	1	16,097.3	8	49.0	21	228.1	2
Latvia	6.0	14	14,389.9	14	64.6	15	180.8	11
Lithuania	9.9	3	21,804.1	3	57.5	16	114.2	17
Luxembourg	5.8	17	13,792.0	15	83.0	10	218.5	4
Netherlands	9.0	5	9,278.4	26	52.2	18	94.8	21
New Zealand	3.8	22	13,130.9	19	4.4	25	28.7	25
Norway	4.5	19	15,387.1	12	—.	—	—.	—
Portugal	—.	—	10,937.9	23	48.2	22	204.9	6
Slovenia	6.6	12	15,925.3	9	69.7	13	76.0	23
Spain	7.3	8	11,462.6	22	92.4	7	118.8	16
Sweden	2.7	25	13,479.6	18	—.	—	—.	—
Switzerland	4.3	21	15,620.4	11	77.8	11	113.9	18
United Kingdom	—.	—	12,454.2	20	66.9	14	101.2	20
OECD Average	**6.8**		**14,675.7**		**75.3**		**150.7**	

Source: OECD 2020; calculations by authors

Table A5: Use of resources, by specialty, per 100,000 population, age-adjusted, 2018

	Cataract surgery		Transluminal coronary angioplasty		Coronary artery bypass graft		Stem cell transplantation	
	Per 100,000	Rank	Per 100,000	Rank	Per 100,000	Rank	Per 100,000	Rank
Australia	1193.6	8	201.6	13	55.0	3	8.4	5
Austria	1356.5	3	301.9	4	39.6	13	6.8	13
Belgium	1091.3	10	258.9	7	59.3	1	8.4	6
Canada	**1177.4**	**9**	**167.6**	**18**	**57.2**	**2**	**6.6**	**15**
Czech Republic	1214.7	7	210.4	12	43.8	8	6.8	14
Denmark	970.2	16	170.6	17	51.3	6	—	—
Finland	1042.0	14	170.9	16	29.1	16	5.7	19
France	1294.3	6	267.1	6	27.4	18	8.3	9
Germany	960.8	17	374.5	1	50.0	7	8.7	3
Greece	774.7	23	—.	—	—.	—	—.	—
Iceland	1044.2	13	236.5	8	27.1	19	0.0	23
Ireland	309.7	27	151.1	21	22.7	22	6.5	16
Israel	902.8	18	328.3	2	41.4	9	10.0	1
Italy	808.9	21	194.5	14	29.8	15	8.3	8
Japan	—.	—	—.	—	—.	—	3.3	22
Korea	1304.1	4	163.9	20	9.0	25	—.	—
Latvia	1572.8	1	—.	—	—.	—	—.	—
Lithuania	850.5	19	300.8	5	53.6	4	7.2	11
Luxembourg	1508.9	2	165.5	19	19.4	23	—.	—
Netherlands	1090.0	11	223.6	10	52.6	5	8.3	7
New Zealand	405.7	25	142.5	22	39.8	12	6.2	17
Norway	401.3	26	227.1	9	26.7	20	8.5	4
Portugal	1295.1	5	110.7	25	32.3	14	4.7	21
Slovenia	981.4	15	215.1	11	40.7	10	6.0	18
Spain	814.0	20	117.6	24	15.0	24	7.1	12
Sweden	1083.3	12	188.5	15	28.0	17	7.9	10
Switzerland	409.0	24	304.4	3	40.7	11	9.2	2
United Kingdom	788.8	22	126.2	23	24.0	21	5.6	20
OECD Average	**986.9**		**212.8**		**36.6**		**6.9**	

Source: OECD 2020; calculations by authors

Table A5, continued

Appendectomy		Cholecystectomy		Repair of inguinal hernia		Hip replacement		Knee replacement	
Per 100,000	Rank	Per 100,000	Rank	Per 100,000	Rank	Per 100,000	Rank	Per 100,000	Rank
182.4	2	245.4	4	199.6	10	212.7	13	230.7	3
147.4	7	212.4	9	276.6	1	297.7	2	229.3	4
141.0	9	231.9	5	218.9	6	273.9	4	206.7	7
117.2	**18**	**215.4**	**8**	**183.0**	**14**	**173.9**	**19**	**210.9**	**6**
122.1	15	190.6	12	163.8	18	195.1	14	141.7	14
120.5	16	137.9	22	176.8	16	235.7	9	176.9	9
122.3	14	146.1	19	162.5	19	251.3	6	213.7	5
103.7	20	186.4	13	226.3	5	239.7	8	175.3	10
136.9	11	219.6	7	192.1	12	284.4	3	204.0	8
74.6	25	263.5	2	212.9	7	41.9	26	—.	—
190.3	1	262.3	3	257.5	3	250.0	7	—.	—
163.4	6	117.1	26	90.4	25	142.8	21	55.0	24
124.9	12	159.7	17	234.1	4	81.5	24	84.9	22
59.9	26	163.0	15	185.2	13	163.2	20	113.8	21
—.	—	—.	—	—.	—	—.	—	—.	—
181.8	3	172.8	14	80.5	26	64.6	25	158.1	12
—.	—	—.	—	—.	—	—.	—	—.	—
164.1	5	284.0	1	182.5	15	193.5	15	120.0	20
115.8	19	192.1	11	208.4	8	230.7	11	231.3	2
94.7	22	157.5	18	167.7	17	220.3	12	169.9	11
139.4	10	141.0	21	117.9	24	186.6	17	135.1	16
141.3	8	128.9	25	123.5	23	272.7	5	137.3	15
84.0	24	142.9	20	142.3	21	82.7	23	56.8	23
117.4	17	229.1	6	205.5	9	183.2	18	129.6	18
103.5	21	162.7	16	195.7	11	119.3	22	129.8	17
122.5	13	132.8	24	145.3	20	233.4	10	125.9	19
166.0	4	202.1	10	265.8	2	310.2	1	252.6	1
88.1	23	136.9	23	125.6	22	188.9	16	149.8	13
127.9		**185.9**		**182.3**		**197.3**		**160.0**	

Table A6: Use of resources, by specialty, per 100,000 population, 2018

	Cataract surgery		Transluminal coronary angioplasty		Coronary artery bypass graft		Stem cell transplantation	
	Per 100,000	Rank	Per 100,000	Rank	Per 100,000	Rank	Per 100,000	Rank
Australia	1095.5	12	185.0	16	50.5	7	7.7	10
Austria	1360.2	3	302.7	3	39.7	11	6.8	14
Belgium	1094.3	13	259.6	7	59.5	1	8.4	5
Canada	**1127.8**	**9**	**160.5**	**18**	**54.8**	**3**	**6.3**	**15**
Czech Republic	1240.5	6	214.9	12	44.7	8	6.9	13
Denmark	993.9	16	174.8	17	52.6	6	—	—
Finland	1138.0	8	186.6	15	31.8	16	6.2	16
France	1342.1	4	277.0	5	28.4	18	8.6	4
Germany	1049.4	14	409.0	1	54.6	4	9.5	1
Greece	856.5	20	—	—	—	—	—	—
Iceland	907.2	18	205.5	13	23.5	21	0.0	23
Ireland	267.4	27	130.5	21	19.6	22	5.6	18
Israel	733.4	23	266.7	6	33.6	15	8.1	8
Italy	916.4	17	220.4	9	33.8	14	9.4	2
Japan	—	—	—	—	—	—	4.4	22
Korea	1146.9	7	144.1	20	7.9	25	—	—
Latvia	1656.0	1	—	—	—	—	—	—
Lithuania	881.9	19	311.9	2	55.6	2	7.5	11
Luxembourg	1322.9	5	145.1	19	17.0	23	—	—
Netherlands	1099.7	11	225.6	8	53.1	5	8.4	5
New Zealand	369.0	26	129.6	22	36.2	12	5.6	18
Norway	382.1	25	216.2	11	25.4	19	8.1	8
Portugal	1418.8	2	121.3	24	35.4	13	5.2	21
Slovenia	1005.3	15	220.3	10	41.7	9	6.1	17
Spain	828.8	21	119.7	25	15.3	24	7.2	12
Sweden	1123.3	10	195.5	14	29.0	17	8.2	7
Switzerland	405.1	24	301.5	4	40.3	10	9.1	3
United Kingdom	781.4	22	125.0	23	23.8	20	5.5	20
OECD Average	**983.1**		**210.0**		**36.3**		**6.9**	

Source: OECD 2020; calculations by authors

Table A6, continued

Appendectomy		Cholecystectomy		Repair of inguinal hernia		Hip replacement		Knee replacement	
Per 100,000	Rank	Per 100,000	Rank	Per 100,000	Rank	Per 100,000	Rank	Per 100,000	Rank
167.4	2	225.2	7	183.2	13	195.2	15	211.7	5
147.8	7	213.0	8	277.4	1	298.5	3	229.9	3
141.4	8	232.5	5	219.5	6	274.6	4	207.3	6
112.3	**17**	**206.3**	**9**	**175.3**	**17**	**166.6**	**20**	**202.0**	**8**
124.7	14	194.7	11	167.3	19	199.2	14	144.7	13
123.4	15	141.3	20	181.1	15	241.4	9	181.2	10
133.6	11	159.6	16	177.5	16	274.5	5	233.4	2
107.5	18	193.3	12	234.7	4	248.6	7	181.8	9
149.5	6	239.8	3	209.8	8	310.6	1	222.8	4
82.5	25	291.3	2	235.4	3	46.3	26	—	—
165.3	3	227.9	6	223.7	5	217.2	11	—	—
141.1	9	101.1	26	78.1	25	123.3	21	47.5	24
101.5	20	129.7	23	190.2	11	66.2	24	69.0	22
67.9	26	184.7	13	209.8	8	184.9	18	128.9	19
—	—	—	—	—	—	—	—	—	—
159.9	5	152.0	19	70.8	26	56.8	25	139.0	14
—	—	—	—	—	—	—	—	—	—
170.2	1	294.5	1	189.2	12	200.6	13	124.4	20
101.5	20	168.4	14	182.7	14	202.3	12	202.8	7
95.5	22	158.9	17	169.2	18	222.3	10	171.4	11
126.8	13	128.2	24	107.2	24	169.7	19	122.9	21
134.5	10	122.7	25	117.6	23	259.6	6	130.7	17
92.0	23	156.5	18	155.9	20	90.6	23	62.2	23
120.3	16	234.7	4	210.5	7	187.7	16	132.8	15
105.4	19	165.7	15	199.2	10	121.5	22	132.2	16
127.0	12	137.7	21	150.7	21	242.0	8	130.6	18
164.4	4	200.2	10	263.3	2	307.3	2	250.2	1
87.3	24	135.6	22	124.4	22	187.1	17	148.4	12
125.0		**184.4**		**180.9**		**195.9**		**158.7**	

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