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Provincial Healthcare Index 2013

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Key findings

- This study provides a framework for measuring the provision of healthcare in comparison to healthcare expenditures, across provinces, in Canada.
- The provision of healthcare in each province is captured using 46 indicators, aggregated into four broad components: [1] availability of resources; [2] use of resources; [3] access to resources and [4] clinical performance of medical goods and services.
- When compared to other provinces, Quebec receives the best value for money from its public healthcare system, followed by Ontario and New Brunswick.
- Conversely, Newfoundland & Labrador receives the least value for money from its public healthcare system, followed by Prince Edward Island and Saskatchewan.
- The Provincial Healthcare Index 2013 reveals how provinces have struck different balances between health expenditures and health system performance, enabling policymakers and taxpayers to discern whether they receive good value for their health care dollars.

Contents

Executive summary

The Fraser Institute's *Provincial Healthcare Index 2013* uses publically available data for the year 2010 (or the most recent year available) to measure the provision of healthcare in comparison to healthcare expenditures across provinces in Canada. The value for money that provinces receive can be thought of as consisting of two, equally important parts: [1] provision of healthcare (the value) and [2] expenditure on healthcare (the cost). The provision of healthcare is captured using 46 indicators, aggregated into four broad components: [1] availability of resources; [2] use of resources; [3] access to resources; [4] clinical performance of medical goods and services in each province.

1 Availability of resources

The availability of adequate medical resources is perhaps one of the most basic requirements for a proper functioning healthcare system. This study uses 12 indicators to measure relative availability of resources in three categories: human resources, technology resources, and drug resources. Overall, the data indicate that the province of Quebec has the largest number of medical resources per capita, followed by New Brunswick and Newfoundland and Labrador. The lowest number of medical resources, relative to that found in other provinces, is available in Manitoba, followed by Saskatchewan and Prince Edward Island.

2 Use of resources

While measurement of the availability of medical resources is valuable, it does not provide us with information about their use. It is, thus, important to include as well a measure of the volume of healthcare services provided. This study uses 17 indicators to measure the volume of healthcare services provided in two categories: medical services (provided by

family medicine physicians, medical specialists, and surgical specialists) and technology (or diagnostic imaging) services. Unfortunately, a measure of the use of pharmaceutical products and services was not included as data are not available.

Overall, the data indicate that Ontario performs the largest number of services per capita among the types included in this analysis, followed by the provinces of New Brunswick and Alberta. The least number of services are provided by Prince Edward Island, British Columbia, and Saskatchewan.

3 Access to resources

While both the level of medical resources and their use can provide insight into accessibility, it is also useful to measure accessibility directly by examining timeliness of care and access to new medicines. This study uses five indicators to measure access in three categories: the wait time for medical services, the wait time for diagnostic services, and the delay in approval of pharmaceutical products.

Overall, the data indicate that Ontario provides the timeliest access to medical services, followed by Quebec and Alberta. The least timely access to services is found in Prince Edward Island, followed by Newfoundland & Labrador and British Columbia.

4 Clinical performance

When assessing indicators of the availability of, access to, and use of medical resources, it is of critical importance to include as well some measure of the quality of healthcare services provided. Instead of using the health outcomes of the population (such as life expectancy), this study includes includes twelve indicators of the quality of clinical performance, measured in three categories: effectiveness (mortality), effectiveness (readmission), and patient safety.

Overall, the data indicate that Alberta has the highest quality of clinical performance, followed by Manitoba and Quebec. Saskatchewan performs most poorly, followed by British Columbia and Newfoundland & Labrador.

Results for Quebec in this component should, however, be interpreted with caution, as indicators of effectiveness (mortality) and patient safety are unavailable for the province and scores for these indicators are estimated using a simple mean-substitution technique that allows us to include useful information on the performance of other provinces without altering Quebec's ranks for provision of healthcare and value for money.

Expenditure on healthcare—the cost

When attempting to measure the performance of healthcare systems, it is essential to compare the results with the costs of maintaining such systems. A simple, but accurate, way to do so is to examine each provincial government's expenditure per capita on health care.

The data indicate that the province of Quebec spends the least on healthcare per capita, followed by British Columbia and Ontario. On the other hand, Newfoundland & Labrador spends the most on healthcare per capita, followed by Alberta and Saskatchewan.

Value for money

While Rovere and Skinner argue that "it is incorrect to define higher national levels of spending on health as negative without considering the benefits" (2012a: 15), the opposite also holds true: it is incorrect to define a health system as having higher levels of benefits without considering the costs. This study, therefore, also constructs an overall measure of value for money by comparing the per-capita cost of provincial healthcare systems to the per-capita availability of, use of, access to, and clinical performance of medical goods and services in each province. In the final calculation, the four components measuring the provision of health care are weighted equally.

The data indicate (table 1) that, when compared to other provinces, residents of Quebec receive the best value (provision of healthcare) for money (expenditure on healthcare) from their public healthcare system, followed by residents of Ontario and New Brunswick. Conversely, those living in Newfoundland & Labrador receive the least value for money from their public healthcare system, followed by residents of Prince Edward Island and Saskatchewan.

The different ways in which provinces can achieve similar levels of value for money (while operating vastly different healthcare systems) is highlighted by comparing, for example, Alberta's performance in this study with British Columbia's: while Alberta's healthcare system is characterized by high value and high cost relative to other provinces, British Columbia's rates as low value and low cost.

While this study does not assess government policies governing healthcare within individual provinces, the framework produced allows citizens and policymakers to determine how well their province is performing relative to other provinces in Canada.

Table 1: Scores for components, overall value, cost, and Value for money

	Components				Overall Value	Cost	Value for Money
	Availablilty of resources	Use of resources	Access to resources	Clinical Performance			
British Columbia	1.75	3.95	3.71	3.53	2.50	8.52	4.12
Alberta	3.06	7.88	7.75	10.00	7.71	2.15	3.35
Saskatchewan	0.55	5.22	5.42	0.00	1.92	4.61	1.17
Manitoba	0.00	7.53	5.13	9.33	5.49	4.83	3.66
Ontario	3.46	10.00	10.00	7.11	8.32	7.75	7.43
Quebec	10.00	7.36	8.95	9.33	10.00	10.00	10.00
New Brunswick	6.81	9.10	5.94	7.21	7.83	5.86	5.87
Nova Scotia	5.96	5.89	4.40	6.46	5.73	6.22	4.73
Prince Edward Island	1.13	0.00	0.00	4.23	0.00	5.47	0.48
Newfoundland & Labrador	6.68	5.70	3.41	3.92	4.74	0.00	0.00

Introduction

The Fraser Institute's *Provincial Healthcare Index* attempts to measure the provision of healthcare in comparison to healthcare expenditures across provinces in Canada. Measuring and reporting the performance of healthcare systems is vital for ensuring accountability and transparency and is valuable for identifying areas for improvement. Moreover, comparing the performance of healthcare systems among jurisdictions provides an opportunity for policymakers and the general public to determine how well their respective healthcare system is performing relative to their counterparts.

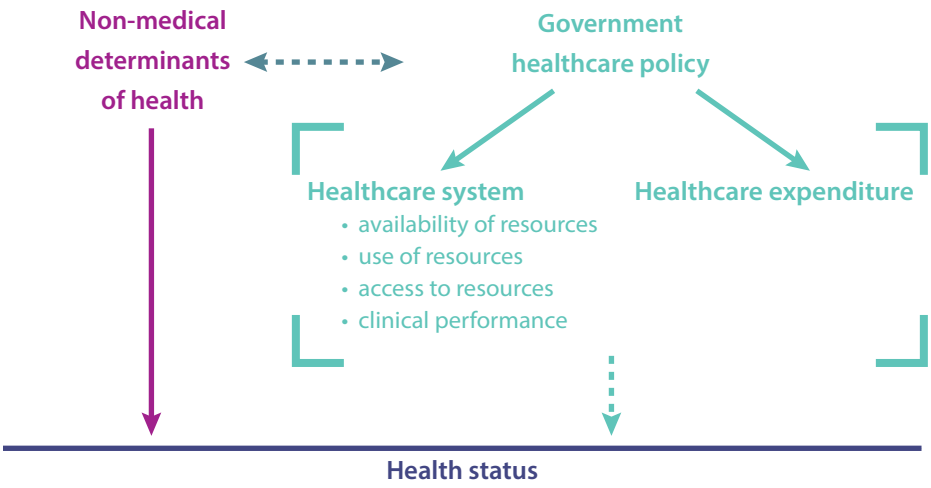
This study does not assess government policies governing healthcare within individual provinces. Instead, it simply provides a framework for measuring the value for money from provincial healthcare systems. An assessment of the relationship between value for money and specific provincial healthcare policies is left for future research.

What is measured?

When measuring the quality of healthcare 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 2011a; ix). When answering the first question, it is important to note that the health status of a population is determined by a number of factors, some of which (like timely access and quality medical care) may fall under the purview of a healthcare system, while others (like smoking rates, environmental quality, and lifestyle choices) *may* not.

Figure 1 presents an illustration of the framework we use in our study. It is an adaptation of an OECD (2011) analysis together with other studies reviewed in preparing this report. The *Provincial Healthcare Index* is focused on the answer to the second question—how healthy is the Canadian health system?—from a provincial perspective. Specifically, it measures value for money by comparing the per-capita cost of provincial healthcare systems to the per-capita availability of, use of, access to, and clinical performance of, medical goods and services in each province (the relationship in the bracketed portion of figure 1).

Figure 1: Framework used in the Provincial Healthcare Index 2013



Why is it measured?

Kelly and Hurst (2006: 10) define a healthcare system as "a set of activities and actors whose principal goal is to improve health through the provision of public and personal medical services". Several studies that measure the performance of healthcare systems were reviewed in preparing this report to identify five components (four value components, and one cost component) for measurement. The reasons each component was included are explained below.

1.1 Availability of resources

The availability of adequate medical resources is perhaps one of the most basic requirements for a properly functioning healthcare 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 healthcare expenditures. For instance, Rovere and Skinner (2012a), and Esmail and Walker (2008) focus on such indicators when examining the performance of a country's healthcare system. The CIHI (2011a)[1] and the OECD (2011) also include such indicators in their frameworks.

The World Health Organisation (WHO) notes that "the provision of healthcare involves putting together a considerable number of resource inputs to deliver an extraordinary array of different service outputs" (WHO, 2000: 74, 75) and suggests that human resources, physical capital, and consumables such as medicine are the three primary inputs of a health system. Further, "human resources … are the most important of the health system's inputs [and it] is usually the biggest single item in the recurrent budget for health" (WHO, 2000: 77).[2] Importantly, apart from physicians, who, according to the WHO,

1 The CIHI, however, stresses that "these measures provide useful contextual information, but are not direct measures of health status or the quality of health care" (2011a; xv).

2 Anand and Bärnighausen found that "the density of human resources for health is important in accounting for the variation in rates of maternal mortality, infant mortality, and under-five mortality across countries" (2004: 1).

play the primary role in the healthcare system, it is also useful to measure the number of other health personnel such as nurses that are involved in the direct provision of care.

The WHO also notes that services would not be delivered effectively "without physical capital—hospitals and equipment—and consumables such as medicines, which play an important role in raising the productivity of human resources" (WHO, 2000: 77). Research also suggests that medical technology plays a significant role for improving the efficiency of medical services, ultimately benefiting patients while reducing healthcare expenditures over time (Or et al., 2005). For example, medical technologies such as new diagnostic equipment and innovative surgical and laboratory procedures improve the efficiency of hospitals and increase the comfort and safety of patients (Esmail and Wrona, 2009). They are, therefore, an integral element of a highly efficient medical system.

Similarly, research shows that drugs are also considered one of the most important forms of medical technology used to treat patients (Skinner and Rovere, 2011). Not only are drugs used to treat illnesses that could not previously be treated, but they also represent a substitution for older less efficient and less effective methods of treatment. Furthermore, studies indicate that there is a strong statistical relationship between increased use of medication and positive health outcomes (Cremieux et al., 2005; Frech and Miller, 1999; Kleinke, 2001) and other studies have shown that increased use of new medicines can lead to net cost savings for a healthcare system as it reduces other healthcare costs such as those for hospitalization (Lichtenberg and Virabhak, 2002).

When analyzing medical resources in general, however, 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 healthcare systems are not "directional" and do not necessarily reflect the performance of health systems (CIHI, 2011b). Similarly, Kelly and Hurst (2006) contend that, while structural indicators (medical resources) are often necessary for the 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.

Importantly, this study makes no assertions about the technical relationship between medical resources and health outcomes or about the ideal level at which such resources should be available. Instead, it simply measures and compares the level of medical resources available in relation to financial resources expended in comparable jurisdictions. Given equal performance in all other dimensions of healthcare provision, the relative level at which medical resources are available may be a justification for higher (or lower) expenditure on healthcare.

Based on a review of the literature discussed above, the following indicators on the availability of resources are included in this report:

Human resources

- Family Medicine physicians per 1,000 population
- Medical Specialists per 1,000 population
- Surgical Specialists per 1,000 population
- Registered Nurses (direct care) per 1,000 population
- Licensed Practical Nurses (direct care) per 1,000 population.

Technology resources

- Nuclear Medicine Cameras per 1,000 population
- CT (computed tomography) scanners per 1,000 population
- MRI (magnetic resonance imaging) scanners per 1,000 population
- PET (positron emission tomography) scanners per 1,000 population
- PET/CT (positron emission tomography—computed tomography) scanners per 1,000 population
- SPECT/CT (single-photon emission computed tomography) per 1,000 population.

Drug resources

- Number of drugs approved for public reimbursement, as a percentage of new drug submissions (NDS-class drugs) approved by Health Canada and given a Notice of Compliance (NOC), by province, 2004–2010.

Sources

CIHI, 2011c: Table 2.0: Physicians, by Specialty and Jurisdiction; CIHI, 2011d: Table D; CIHI, 2011e: Table 1; Rovere and Skinner, 2012b: Table 2A (calculations by author).

1.2 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 healthcare demands. A similar observation is made by Figueras et al., who note that "the number of units provides no information about the efficiency with which they are operated (utilization rates)" (2004: 136). The WHO as well 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; which is why it is important to also include

the volume of services or use of resources. In other words, "the volume of care and services produced measures the quantity of health-related goods and services produced by the healthcare system" (Champagne et al., 2005, quoted, in translation, by Tchouaket et al., 2012: 6).

Both the CIHI (2011a), and the OECD (2011) include such indicators within their frameworks. However, the CIHI points out that "the utilization of healthcare 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" (2011b: 17).[3] On the other hand, the idea that the provision of services (as measured by rates of use) is a purchased benefit is highlighted by Rovere and Skinner's analysis (2012a), which focuses on several indicators of the use of healthcare.

Given that there have also been several recent academic examinations of the overuse of medical services (e.g., Korenstein et al., 2012; Chamot et al., 2009), this study does not make any assertions about the optimal level for the use of medical services or attempt to relate any level of use to health outcomes. Thus, as with the indictors on the availability of resources, the indictors of use of resources in this analysis are simply used to compare the relative value for money that each province achieves. Given equal performance in all other dimensions of healthcare provision, the relative level of use of medical services may be a justification for higher (or lower) expenditure of healthcare.

The following indicators of the use of resources are included:

Use of medical services

Since "weighting" is not used in this study, in order to maintain comparability across indicators, only the most relevant, major, services are included.

- Family Medicine Physician Services
  - *Family Medicine* Consultations per 1,000 population
  - *Family Medicine* Major Assessments per 1,000 population
  - *Family Medicine* Other Assessments per 1,000 population
  - *Family Medicine* Major Surgery per 1,000 population
  - *Family Medicine* Diagnostic/Therapeutic Services per 1,000 population.

- Medical Specialist Services
  - *Medical Specialists* Consultations per 1,000 population
  - *Medical Specialists* Major Assessments per 1,000 population
  - *Medical Specialists* Other Assessments per 1,000 population
  - *Medical Specialists* Major Surgery per 1,000 population
  - *Medical Specialists* Diagnostic/Therapeutic Services per 1,000 population.

3 However, this would also imply that a healthier population should therefore spend less on healthcare services too (assuming other things, especially income, are equal).

- Surgical Specialists Services
  - *Surgical Specialists* Consultations per 1,000 population
  - *Surgical Specialists* Major Assessments per 1,000 population
  - *Surgical Specialists* Other Assessments per 1,000 population
  - *Surgical Specialists* Major Surgery per 1,000 population
  - *Surgical Specialists* Diagnostic/Therapeutic Services per 1,000 population.

Use of technology

- MRI (magnetic resonance imaging) examinations per 1,000 population
- CT (computed tomography) examinations per 1,000 population.

(Use of pharmaceutical resources was not included because of a lack of data.)

Sources

CIHI, 2011f: Tables B.1.1, B.1.2, B.1.10; CIHI, 2009: Tables B.1.1, B.1.2, B.1.10 (PEI only); CIHI, 2011e: Table 3.

1.3 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 is the timeliness of care, as measured by waiting lists. While this dimension of accessibility is often included with indicators measuring the "responsiveness", "patient-centeredness", or "client-orientation" of a system, it is undoubtedly an important aspect of healthcare performance and delivery.

For instance, 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 for the first notion has been studied extensively by 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 whom experienced worry, stress, anxiety, pain, and difficulties with activities of daily living (Statistics Canada 2006: 10, 11).

The CIHI (2011a) and the OECD (2011) include various measures of access in their reports, while the Commonwealth Fund (Davis et al., 2010, 2011), the Fraser Institute (Barua et al., 2011; Rovere and Skinner, 2012a), and the Health Consumer Powerhouse (Björnberg, 2012) have measured access

to healthcare by focusing primarily on wait times. Similarly, in addition to measuring wait times for medical services (such as surgical procedures), a number of studies have also measured wait times for access to new medicines (Rovere and Skinner, 2012b; Rawson, 2012; Tufts Center for the Study of Drug Development, 2012). As pharmaceuticals are considered an important medical technology and are included above as a "resource" indicator, wait times and, therefore, access to drugs is included in this analysis.

It should, however, also be noted that "in addition to responsiveness … waiting lists also demonstrate efficiency dimensions [and as one would expect] higher levels of medical resources (physicians, hospital beds) as well as a fee-for-service payment structure, were negatively correlated with waiting lists, confirming that higher expenditures can reduce these lists" (Figueras et al., 2004: 99). Within Canada, however, it seems as though increases in overall spending levels do not necessarily result in reduced wait times (see, e.g., Zelder, 2000; Esmail, 2003; Barua and Esmail, 2010).

As mentioned above, 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. Instead, it simply analyzes this indicator from an economic perspective in relation to financial resources expended. Given equal performance in all other dimensions of healthcare provision, the relative level of accessibility of medical goods and services may be a justification for higher (or lower) expenditure on healthcare.

The Provincial Healthcare Index thus includes the following indicators of access to resources:

Wait time for medical services

- Wait time (GP to Consult) for 12 common specialties providing medically necessary elective procedures or diagnostic services
- Wait time (Consult to Treatment) for 12 common specialties providing medically necessary elective procedures or diagnostic services.

Wait time for technology

- Wait time for MRI (magnetic resonance imaging) examination
- Wait time for CT (computed tomography) examination.

Wait time for pharmaceutical products

- Delays in approval of drugs for inclusion in the provincial formulary.

Sources

Barua et al., 2010: Table 3, Table 4, Chart 7; Rovere and Skinner, 2012: Figure 4.

1.4 Clinical performance

When assessing indicators of availability of, access to, and use of resources, it is of critical importance to include as well some measure of the quality of clinical performance. In developing frameworks for measuring the efficiency of healthcare systems, a distinction is often made between two measures of health-system objectives (CIHI, 2012a):

1. intermediate outputs ("health system activities")
2. population level outcomes (health status achievement).

As can be seen in figure 1 (p. 9), 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 et al., 2006; Rovere and Skinner, 2012a; Skinner, 2009). In fact, much research seems to indicate that the health outcome for a population is 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 et al., 2004: 83, citing Bunker et al., 1995; McKeown, 1976; Or, 1997)

Based on these assertions, the analysis in this publication does not use health outcomes (such as life expectancy) in order to measure the value for money from a healthcare system; instead it includes measures of the quality of clinical performance.

In a literature review on clinical indicators, the University of New South Wales' Centre for Clinical Governance Research in Health (2009: 5) notes that such indicators are "simply a measure of the clinical management and/or outcome of care [identifying] the rate of occurrence of an event" and that while they "… do not provide definitive answers … they are designed to indicate potential problems that might need addressing" (CCGRH, 2009: 5, citing Australian Council on Healthcare Standards, 2009). Indeed, they can thus be used to "compare variations in how the same services are provided in different areas or against national benchmarks" (CCGRH, 2009: 5, citing National Health Service Scotland, 2007).

The *Provincial Healthcare Index 2013* focuses on indicators from the CIHI's report on its Canadian Hospital Reporting Project [CHRP], which aggregates hospital level data for provinces, risk adjusting them for the characteristics of patients such as age, sex, and pre-admission comorbid[4] diagnoses (CIHI, 2012b). The CIHI groups clinical indicators into four categories: [1] effectiveness (quality and outcomes); [2] patient safety; [3] appropriateness; and [4] accessibility. The CIHI's indicators representing appropriateness were excluded from this study because of their possibly subjective nature and indicators of accessibility are already included in the section, Access to resources. Thus, only indicators from categories [1] effectiveness and [2] patient safety were extracted for use in this report.[5] For our purposes, of grouping, indicators in category [1] effectiveness are separated based on whether the indicator reported mortality rates (following surgery) or readmission rates (following surgery).

There is an abundance of literature that supports the inclusion of such indicators. Figueras et al. propose that "a related picture of how [health] systems perform can be drawn from data concerning their comparative clinical performance" (2004: 127). Such indicators could also fit in the "safety" dimension proposed by the Institute of Medicine (2001) and Kelly and Hurst (2006), as well as the "healthcare quality" component used by the OECD's Health Care Quality Indicators [HCQI] project,[6] the CIHI's CHRP (2012c), and the Fraser Institute's *Hospital Report Cards* (e.g., Barua and Esmail, 2011) are other examples of studies that analyze such indicators. Indeed, the indexes of both the Health Consumer Powerhouse (Björnberg, 2012) and the Frontier Centre (Eisen, 2011) also include measures of patient outcomes in their measurement of the "consumer friendliness" of healthcare systems.

It is critical to understand that the *Provincial Healthcare Index 2013*, unlike a medical efficiency index, makes no attempt to assess any relationships between medical inputs and health outcomes or outputs. Instead, as mentioned previously, this analysis uses health expenditure to represent inputs and the various facets of availability, access, use, and clinical performance as outputs. Clinical performance, therefore, is one of the four characteristics of a healthcare system toward which healthcare expenditure may be directed. Given equal performance in all other dimensions of healthcare provision, the relative clinical performance of medical services provided may be a justification for higher (or lower) healthcare expenditures.

4 "A comorbidity is a condition that coexists [with the condition for which the patient was admitted] at the time of admission or develops subsequently …" (CIHI, 2012, September: 6).

5 Some indicators were excluded in order to avoid the possibility of overlap. For example, indicators for readmission rates after hip and knee replacements were excluded as similar measures may already be included in the surgical readmission rate indicator.

6 See <http://www.oecd.org/health/healthpoliciesanddata/healthcarequalityindicators.htm> for more information.

The Provincial Healthcare Index thus examines the following indicators of the quality of clinical performance:[7]

Effectiveness (Mortality)[8]

- 30-day in-hospital mortality following acute myocardial infarction
- 30-day in-hospital mortality following stroke
- 5-day in-hospital mortality following major surgery.

Effectiveness (Readmission)

- 30-day medical readmission
- 30-day obstetric readmission
- 30-day pediatric readmission
- 30-day surgical readmission.

Patient Safety[8]

- In-hospital hip fracture in elderly (65+) patients
- Nursing-sensitive adverse events for medical patients
- Nursing-sensitive adverse events for surgical patients
- Obstetric trauma—vaginal delivery with instrument
- Obstetric trauma—vaginal delivery without instrument

Sources

CIHI, 2012d: Provincial Territorial Summary.

Limitations of data from Quebec

Because of "substantial differences between the way in which Quebec data is collected and current CHRP indicator definitions" (CIHI, 2012b: 1), effectiveness (mortality) and patient safety indicators are unavailable for Quebec. While the simplest way to address this issue would be to exclude these indicators altogether, this would result in the loss of valuable information about the quality of clinical performance in the other nine provinces. Further, such a method may actually introduce a bias and several studies have examined the consequences of excluding observations with missing data (Mehta et al., 2007; Rubin et al., 2007).

Instead, we follow the example of the report, *County Health Rankings*, and use the more traditional "mean-substitution" technique (University of Wisconsin Population Health Institute, 2012c) whereby an observation with missing data is given the average value derived from all other observations. In the case of more complex analyses, it has been demonstrated that this

7 Data is for 2009/10.

8 Data on effectiveness (mortality) and patient safety are unavailable for Quebec. See section, Limitations of data from Quebec, below, for details.

technique may have severe drawbacks depending on the reason for the missing data (e.g., Baraldi et al., 2009). However, a 2011 sensitivity analysis of *County Health Rankings 2010*, which are similar in purpose to the *Provincial Healthcare Index*, demonstrated that this method generates robust rankings, with minimal drawbacks (Park et al., 2011).

In order to make sure that including indicators with mean-substituted values for Quebec is, if not superior, then at least not inferior to excluding them altogether, we perform the following two tests:

1 excluding effectiveness (mortality) and patient safety sub-components

- Quebec's rank for clinical performance improves from 3rd to 1st
- Quebec's rank for provision of healthcare remains unchanged at 1st
- Quebec's rank for value for money remains unchanged at 1st;

2 excluding the clinical performance component altogether

- Quebec's rank for provision of healthcare remains unchanged at 1st
- Quebec's rank for value for money remains unchanged at 1st.

Thus, after examining the results of the two tests, it is inferred that using the mean-substitution technique allows useful information on the performance of other provinces to be included without altering Quebec's ranks for provision of healthcare or value for money.

2 Costs

When attempting to measure the performance of healthcare systems, it is essential to consider as well the costs of maintaining such systems. Several recent academic studies have discussed measures of the costs of healthcare systems from varying perspectives. For example, Tchouaket et al., (2012) include cost as a financial resource, akin to human and technological resources, and also use it as a benchmark against which services produced and health achieved are measured (in their relative performance analysis). Similarly, the WHO (2000) measures overall performance by "how well a country achieves all five goals of the health system simultaneously, relative to the maximum it could be expected to achieve given its level of resources [total health expenditure per capita] and non-health system determinants [educational attainment]" (Tandon et al., 2000: 3). On the other hand, the WHO (2000) also includes measures of equitable financing when attempting to measure desirable goals, a concept that is fundamental to the CIHI's health indicator framework (CIHI, 2011a). In addition, a number of studies focus on cost by measuring the sustainability of government healthcare spending (Rovere and Skinner, 2011; TD Economics, 2010).

Esmail and Walker (2008) and Rovere and Skinner (2012a), however, take a slightly different approach and examine the level of healthcare resources and services that are available compared to the level of healthcare spending in various OECD countries: they compare the value for money that is purchased from a country's health insurance system. It is critical to understand that while, as Rovere and Skinner argue, "it is incorrect to define higher national levels of spending on health as negative without considering the benefits" (2012a: 15), the opposite also holds true: it is incorrect to define a health system as having higher levels of benefits without considering the costs.

Thus, in order to provide an economic context for the health-system characteristics measured in this report, we include an indicator representing healthcare costs. To standardize individual healthcare costs across the provinces and to measure exclusively the value for money from provincial healthcare systems, health spending per capita by provincial governments is used.

Sources

CIHI, 2012e: Series D4—Provincial/Territorial Government Health Expenditure by Use of Funds, by Province/Territory.

How is it measured?

The Provincial Healthcare Index uses publicly available data for the year 2010 (or the most recent year available), from the CIHI and the Fraser Institute. "Value for money" consists of two, equally important, parts:

1 *Provision of healthcare (the value)*

Provision of healthcare is captured using 46 indicators, aggregated into four broad, equally important, components: [1] availability of resources; [2] use of resources; [3] access to resources; [4] clinical performance of medical goods and services in each province.

2 *Expenditure on healthcare (the cost)*

Expenditure on healthcare is captured by per-capita provincial healthcare expenditures (see Costs on p. 20).

While this study recognizes the lack of a consensus about the ideal[1] levels of the availability of, use of, access to, and clinical performance of medical goods and services, it is assumed that higher[2] (or better) levels are preferred for any given amount of money spent by the provincial government on them. Further, while there is no explicit weighting[3] of indicators, sub-components and components, implicit weighting occurs due to grouping techniques. This process can be seen in figure 2.

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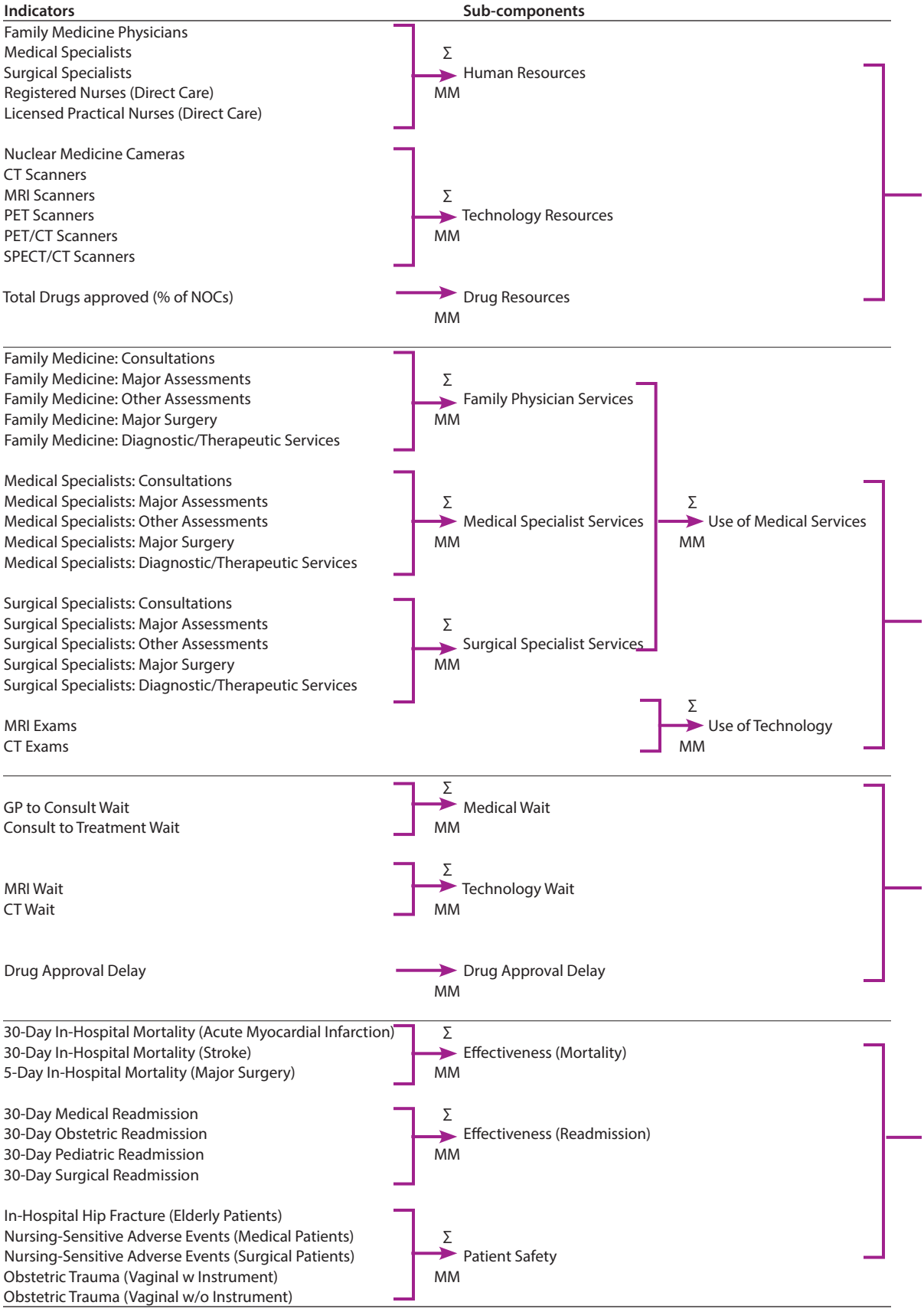
1 It is commonly accepted that it is important to adjust for age when comparing health data for provinces with different age profiles. However, in the present analysis, such adjustments would apply to both the value and the cost components in opposite directions (and may cancel each other out in the aggregation process). In order to avoid potential complications, this report does not adjust data for age. The indicators included in the Clinical Performance component are the exception, as they are risk-adjusted for patient characteristics like age, gender, and pre-admission comorbid diagnoses by the CIHI.

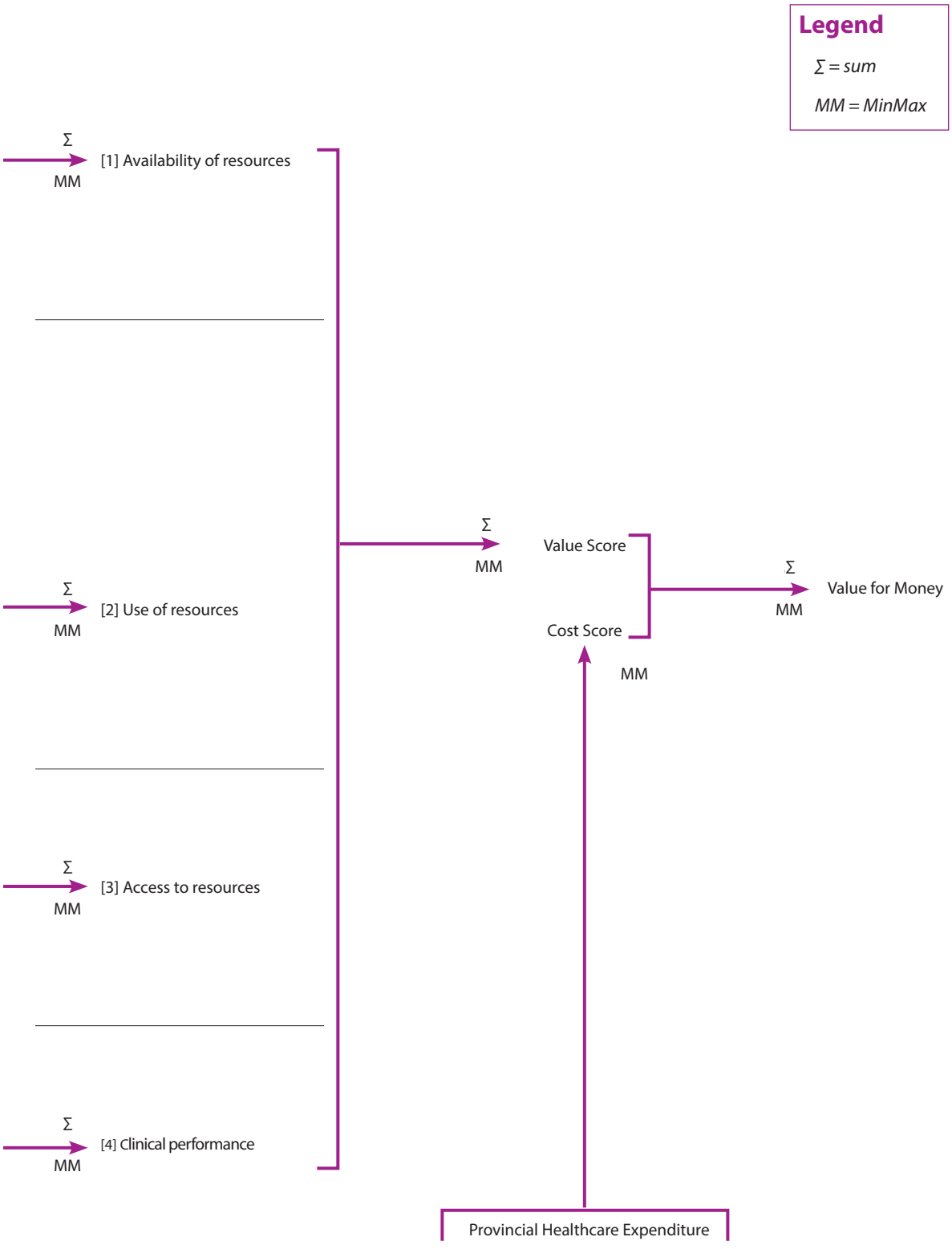
2 Lower levels are preferable for indicators included in the Access and Clinical Performance components.

3 The aggregation process used, therefore, does not take into account any specific assumptions about the relative effectiveness of specific resources or patterns of use.

Figure 2: Indicators, sub-components, and components of the Provincial Healthcare Index



Components


Legend
Σ = sum
MM = MinMax
Σ
MM
[1] Availability of resources
Σ
MM
[2] Use of resources
Σ
MM
[3] Access to resources
Σ
MM
[4] Clinical performance
Σ
MM
Value Score
Cost Score
MM
Σ
MM
Value for Money
Provincial Healthcare Expenditure

Scoring

A MinMax[4] method is used to attribute relative scores from 0 to 10, using the following formula for cases where higher values are preferable:

$$\frac{\text{(Provincial Value} - \text{Min (Range of Provincial Values))}}{\text{(Max (Range of Provincial Values)} - \text{Min (Range of Provincial Values))}} \times 10 \quad [1]$$

Where lower values are preferable (such as wait times), the formula is adjusted as follows:

$$\frac{\text{(Max (Range of Provincial Values)} - \text{Provincial Value)}}{\text{(Max (Range of Provincial Values)} - \text{Min (Range of Provincial Values))}} \times 10 \quad [2]$$

Indicators Each indicator (e.g., surgical specialists per capita) is given a standard score of 0 to 10 using the above MinMax calculation.

Sub-components Scores for each indicator (e.g., surgical specialists per capita) within a sub-component (e.g., human resources) are aggregated by summing the MinMax scores for each indicator, and then again using a MinMax method on these summed scores to give provinces a score from 0 to 10 for each sub-component.

Components The scores of sub-components are then aggregated using the same method used to calculate sub-components, but this time using sub-component scores rather than indicators. This gives provinces a score from 0 to 10 for each component (e.g., resource availability).

Overall Provision of Healthcare (Value) The scores for the four "value" components (availability of resources, use of resources, access to resources, and clinical performance) are aggregated, and a MinMax method is used to give each province a score from 0 to 10 for overall value.

Overall Expenditure on Healthcare (Cost) A similar procedure is used to derive the score for overall cost, with lower per-capita provincial health care expenditures receiving a higher score.

4 MinMax equations are commonly used to generate standardized scores in composite indexes like that published in the Fraser Institute's *Economic Freedom of the World* (Gwartney et al., 2012) and the United Nations Development Programme's *Human Development Index* (2011).

Overall Value for Money Finally, the overall value score and overall cost score are added together, and a MinMax calculation is used to give provinces an overall Value for Money score from 0 to 10.

Example Determining Alberta's overall Value for Money score and rank[5]

Step 1.1 Indicators

Alberta had 4,065 physicians practising family medicine registered in 2010 (CIHI, 2011c). In order to make a meaningful comparison across provinces, we divide this number by Alberta's population in 2010 (Statistics Canada, 2012) and estimate that it thus had about 1.09 family-medicine physicians available per thousand people. Next, we use the MinMax formula to find out where Alberta stands with this figure relative to the provinces with the best and worst result for this indicator (British Columbia: 1.19 per thousand people; Prince Edward Island: 0.89 per thousand people):

$$\frac{(1.09 - 0.89)}{(1.19 - 0.89)} \times 10 = 6.78 \quad [3]$$

Thus, on a scale of 0 (worst) to 10 (best), Alberta receives a score of 6.78 for the indicator representing the availability of family medicine physicians per thousand people.

Step 1.2 Sub-components

Using similar methods, Alberta receives scores of 8.73 for the availability of medical specialists per thousand people, 1.57 for availability of surgical specialists per thousand people, 3.0 for availability of registered nurses (direct care) per thousand people, and 0.53 for availability of licensed practical nurses (direct care) per thousand people. When the scores of these indicators are added together, Alberta receives a total score of 20.62 for the Human Resources sub-component. Next, we again use the MinMax formula to find out where Alberta stands with this figure relative to the provinces with the best and worst result for this subcomponent (Newfoundland & Labrador: 46.39; Saskatchewan: 10.69):

$$\frac{(20.62 - 10.69)}{(46.39 - 10.69)} \times 10 = 2.78 \quad [4]$$

Thus, on a scale of 0 (worst) to 10 (best), Alberta receives a score of 2.78 for the subcomponent representing the availability of human resources.

5 Numbers given in equations 3, 4, 5 and 6 are rounded for this example.

Step 1.3 Components

Using similar methods, Alberta receives a score of 5.84 for the sub-component representing the availability of technology resources, and 1.31 for the sub-component representing the availability of drug resources. When the scores of these subcomponents are added together, Alberta receives a total score of 9.93 for the component, availability of resources. Next, we use the MinMax formula to find out where Alberta stands with this figure relative to the provinces with the best and worst result for this component (Quebec: 25.91; Manitoba: 2.90):

$$\frac{(9.93 - 2.90)}{(25.91 - 2.90)} \times 10 = 3.06 \quad [5]$$

Thus, on a scale of 0 (worst) to 10 (best), Alberta receives a score of 3.06 for the component representing the availability of resources.

Step 1.4 Overall provision of healthcare (value)

Using similar methods, Alberta receives scores of 7.88 for the component representing use of resources, 7.75 for the component representing access to resources, and 10.00 for the component representing clinical performance. When the scores of these components are added together, Alberta has a total score of 28.69 for overall provision of healthcare (value). Next, we again use the MinMax formula to find out where Alberta stands with this figure relative to the provinces with the best and worst score for overall value (Quebec: 35.64; Prince Edward Island: 5.36):

$$\frac{(28.69 - 5.36)}{(35.64 - 5.36)} \times 10 = 7.71 \quad [6]$$

Thus, on a scale of 0 (worst) to 10 (best), Alberta receives a score of 7.71 for overall provision of healthcare (value).

Step 2 Overall expenditure on healthcare (cost)

In 2010, Alberta's provincial government spent approximately $16,570,256,738 (CIHI, 2012e) on its healthcare system. In order to make a meaningful comparison across provinces, we divide this number by Alberta's population in 2010 (Statistics Canada, 2012), and estimate that it thus spent approximately $4,453.29 per person. Next, we use the MinMax formula to find out where Alberta stands with this figure relative to the provinces that spend the most and least on their health care systems (Newfoundland & Labrador: $4,767.77 per capita; Quebec:$3,306.82 per capita). Assuming that a lower level of spending (for a given level of healthcare provision) is preferable, we use the formula:

$$\frac{(4{,}767.77 - 4{,}453.29)}{(4{,}767.77 - 3{,}306.82)} \times 10 = 2.15 \quad [7]$$

Thus, on a scale of 0 (worst) to 10 (best), Alberta receives a score of 2.15 for overall expenditure on healthcare (cost).

Step 3 Overall value for money

Alberta's overall value score (7.71), and overall cost score (2.15) are added together to get a total overall value for money score of 9.86. Finally, a MinMax calculation is performed to find out where Alberta stands with this figure relative to the provinces that perform best and worst (Quebec: 20.00: Newfoundland & Labrador: 4.74):

$$\frac{(9.86 - 4.74)}{(20.00 - 4.74)} \times 10 = 3.35 \quad [8]$$

Thus, on a scale of 0 (worst) to 10 (best), Alberta receives a score of 3.35 for overall value for money, ranking it in 7th place among the 10 provinces.

Results by component

Overall score Value for money

The Fraser Institute's *Provincial Healthcare Index 2013* finds that, when compared to the populations in other provinces, Quebecers (score of 10.00) receive the best value (Provision of Healthcare) for money (Expenditure on Healthcare) from their public healthcare system, followed by residents of Ontario (7.43) and New Brunswick (5.87). Residents of Newfoundland & Labrador receive the least value for money (0.00) from its public healthcare system, followed by citizens of Prince Edward Island (0.48) and Saskatchewan (1.17).

Table 1 Scores for components, overall value, cost, and Value for money

	Components				Overall Value	Cost	Value for Money
	Availablilty of resources	Use of resources	Access to resources	Clinical Performance			
British Columbia	1.75	3.95	3.71	3.53	2.50	8.52	4.12
Alberta	3.06	7.88	7.75	10.00	7.71	2.15	3.35
Saskatchewan	0.55	5.22	5.42	0.00	1.92	4.61	1.17
Manitoba	0.00	7.53	5.13	9.33	5.49	4.83	3.66
Ontario	3.46	10.00	10.00	7.11	8.32	7.75	7.43
Quebec	10.00	7.36	8.95	9.33	10.00	10.00	10.00
New Brunswick	6.81	9.10	5.94	7.21	7.83	5.86	5.87
Nova Scotia	5.96	5.89	4.40	6.46	5.73	6.22	4.73
Prince Edward Island	1.13	0.00	0.00	4.23	0.00	5.47	0.48
Newfoundland & Labrador	6.68	5.70	3.41	3.92	4.74	0.00	0.00

Example Formula for Alberta

$$\text{Overall Value}_{AB} = \frac{((\text{Resource Scr} + \text{Use Scr} + \text{Access Scr} + \text{Clinical Scr})_{AB} - (\text{Resource Scr} + \text{Use Scr} + \text{Access Scr} + \text{Clinical Scr})_{\text{Lowest}})}{((\text{Resource Scr} + \text{Use Scr} + \text{Access Scr} + \text{Clinical Scr})_{\text{Highest}} - (\text{Resource Scr} + \text{Use Scr} + \text{Access Scr} + \text{Clinical Scr})_{\text{Lowest}})}$$

$$\text{Value for Money}_{AB} = \frac{((\text{Value Scr} + \text{Cost Scr})_{AB} - (\text{Value Scr} + \text{Cost Scr})_{\text{Lowest}})}{((\text{Value Scr} + \text{Cost Scr})_{\text{Highest}} - (\text{Value Scr} + \text{Cost Scr})_{\text{Lowest}})}$$

Overall score Value—provision of healthcare

Even when examined separately (i.e., without considering cost), Quebec (score of 10.00), Ontario (8.32), and New Brunswick (7.83) are still the top-ranked provinces for their provision of healthcare when compared to other provinces. Prince Edward Island (0.00) provides the least health care (value) in comparison to other provinces, followed by Saskatchewan (1.92) and British Columbia (2.50).

Component 1 Availability of resources

On a per-capita basis, Newfoundland & Labrador has the largest number of human resources, while Quebec has the largest number of technology resources and Saskatchewan has the least in both categories. Quebec also approved the largest number of drugs for public reimbursement (as a percentage of the NOCs between 2004 and 2010) while Manitoba approved the least. Overall, the province of Quebec (score of 10.00) has the largest number of medical resources (human resources, technology resources, and available drugs), followed by New Brunswick (6.81) and Newfoundland & Labrador (6.68). The least number of medical resources, relative to that found in other provinces, are available in Manitoba, followed by Saskatchewan (0.55) and Prince Edward Island (1.13).

Table 2 Scores for overall Availability of resources and its sub-components

	Human resources	Technology resources	Drug resources	Overall availability
British Columbia	2.62	2.76	1.55	1.75
Alberta	2.78	5.84	1.31	3.06
Saskatchewan	0.00	0.00	4.17	0.55
Manitoba	1.21	1.69	0.00	0.00
Ontario	0.99	6.54	3.33	3.46
Quebec	5.91	10.00	10.00	10.00
New Brunswick	6.81	6.64	5.12	6.81
Nova Scotia	7.89	5.52	3.21	5.96
Prince Edward Island	2.11	1.96	1.43	1.13
Newfoundland & Labrador	10.00	4.83	3.45	6.68

Example Formula for Alberta

$$\text{Availability of Resources}_{AB} = \frac{((\text{Human R Scr} + \text{Technology R Scr} + \text{Drug R Scr})_{AB} - (\text{Human R Scr} + \text{Technology R Scr} + \text{Drug R Scr})_{\text{Lowest}})}{((\text{Human R Scr} + \text{Technology R Scr} + \text{Drug R Scr})_{\text{Highest}} - (\text{Human R Scr} + \text{Technology R Scr} + \text{Drug R Scr})_{\text{Lowest}})}$$

Component 2 Use of Resources

On a per-capita basis, Ontario's physicians provide the largest number of medical services while Prince Edward Island's provide the least. On the other hand, the province of New Brunswick performs the largest number of medical technology scans, while British Columbia performs the least. Overall, Ontario (score of 10.00) performs the largest number of services among the types included in this analysis, followed by the provinces of New Brunswick (9.10) and Alberta (7.88). The least number of services are provided by Prince Edward Island (0.00), British Columbia (3.95), and Saskatchewan (5.22).

Table 3 Scores for overall Use of resources and its sub-components

	Use of medical resources	Use of technology resources	Overall use
British Columbia	6.67	0.00	3.95
Alberta	7.94	4.89	7.88
Saskatchewan	4.48	4.18	5.22
Manitoba	6.89	5.39	7.53
Ontario	10.00	6.16	10.00
Quebec	6.68	5.34	7.36
New Brunswick	4.74	10.00	9.10
Nova Scotia	3.40	6.32	5.89
Prince Edward Island	0.00	0.47	0.00
Newfoundland & Labrador	6.78	2.62	5.70

Example *Formula for Alberta*

$$\text{Use of Resources}_{AB} = \frac{((\text{Medical Use Scr} + \text{Technology Use Scr})_{AB} - (\text{Medical Use Scr} + \text{Technology Use Scr})_{\text{Lowest}})}{((\text{Medical Us Scr} + \text{Technology Use Scr})_{\text{Highest}} - (\text{Medical Use Scr} + \text{Technology Use Scr})_{\text{Lowest}})}$$

Component 3 Access to resources

Patients face the shortest wait times for access to medically necessary elective services in Ontario while they face the longest wait times in Prince Edward Island. Similarly, diagnostic imagining technology is also most easily accessible in Ontario while patients face the longest wait for such services in British Columbia. Finally, Saskatchewan approves new drugs for public reimbursement within the shortest time-frame while Manitoba takes the longest. Overall, Ontario (score of 10.00) provides the timeliest access to medical services, followed by Quebec (8.95) and Alberta (7.75). The least timely access to services is experienced in Prince Edward Island (0.00), followed by Newfoundland & Labrador (3.41), and British Columbia (3.71).

Table 4 Scores for overall Access to resources and its sub-components

	Medical wait	Technology wait	Drug approval wait	Overall access
British Columbia	8.36	0.00	6.91	3.71
Alberta	7.28	6.67	9.28	7.75
Saskatchewan	5.66	2.96	10.00	5.42
Manitoba	8.80	9.26	0.00	5.13
Ontario	10.00	10.00	7.65	10.00
Quebec	8.36	7.78	9.44	8.95
New Brunswick	3.78	7.78	8.11	5.94
Nova Scotia	5.18	1.67	9.79	4.40
Prince Edward Island	0.00	5.93	2.03	0.00
Newfoundland & Labrador	5.00	0.37	9.31	3.41

Example Formula for Alberta

$$\text{Access to resources}_{AB} = \frac{((\text{Medical Wait Scr} + \text{Technology Wait Scr} + \text{Drug Wait Scr})_{AB} - (\text{Medical Wait Scr} + \text{Technology Wait Scr} + \text{Drug Wait Scr})_{\text{Lowest}})}{((\text{Medical Wait Scr} + \text{Technology Wait Scr} + \text{Drug Wait Scr})_{\text{Highest}} - (\text{Medical Wait Scr} + \text{Technology Wait Scr} + \text{Drug Wait Scr})_{\text{Lowest}})}$$

Component 4 Clinical performance

Alberta has the lowest mortality rates following surgery while Prince Edward Island has the highest. Quebec has the lowest readmission rates following surgery while Saskatchewan has the highest. Prince Edward Island performs best on patient-safety indicators while British Columbia performs worst. Overall, Alberta (score of 10.00) has the highest clinical performance, followed by Manitoba (9.33) and Quebec (9.33) (but see section, Limitations of data from Quebec, p. 19). Saskatchewan performs worst, followed by British Columbia (3.53), and Newfoundland & Labrador (3.92).

Table 5 Scores for overall Clinical performance and its sub-components

	Effectiveness (Mortality)	Effectiveness (Readmission)	Patient Safety	Overall clinical performance
British Columbia	7.49	4.15	0.00	3.53
Alberta	10.00	8.20	2.57	10.00
Saskatchewan	1.57	0.00	5.11	0.00
Manitoba	7.69	4.90	7.24	9.33
Ontario	3.93	7.80	4.95	7.11
Quebec	5.33*	10.00	4.49*	9.33
New Brunswick	5.90	4.68	6.25	7.21
Nova Scotia	8.26	6.60	0.91	6.46
Prince Edward Island	0.00	2.64	10.00	4.23
Newfoundland & Labrador	3.09	5.73	3.39	3.92

* Imputed value

Example Formula for Alberta

$$\text{Clinical performance}_{AB} = \frac{((\text{Mortality Scr} + \text{Readmission Scr} + \text{Patient Safety Scr})_{AB} - (\text{Mortality Scr} + \text{Readmission Scr} + \text{Patient Safety Scr})_{\text{Lowest}})}{((\text{Mortality Scr} + \text{Readmission Scr} + \text{Patient Safety Scr})_{\text{Highest}} - (\text{Mortality Scr} + \text{Readmission Scr} + \text{Patient Safety Scr})_{\text{Lowest}})}$$

Overall score Cost—expenditure on healthcare

In terms of cost, the province of Quebec (score of 10.00) spends the least on health care per capita, followed by British Columbia (8.52), and Ontario (7.75) (table 1, p. 30). Newfoundland & Labrador (0.00) spends the most on health care per capita, followed by Alberta (2.15), and Saskatchewan (4.61).

Discussion

These results clearly demonstrate several disparate approaches to achieving value for money. For example, Quebec and Ontario both have healthcare systems that are relatively high value and low cost and thus provide good value for money when compared to other provinces. On the other hand, Newfoundland & Labrador has a healthcare system that is relatively average value and high cost, providing poor value for money. Prince Edward Island also receives poor value for money as its healthcare system is characterized by low value and average cost.

The different ways in which provinces can achieve similar levels of value for money while operating vastly different healthcare systems is highlighted by comparing, for example, Alberta's performance in this study with British Columbia's: while Alberta's healthcare system is characterized by high value and high cost relative to other provinces, British Columbia's rates as low value and low cost.

Sample Matrix Characteristics of healthcare systems in Canadian provinces

	High value	Average value	Low value
High cost	Alberta	Newfoundland & Labrador	
Average cost	New Brunswick	Manitoba Nova Scotia	Saskatchewan Prince Edward Island
Low cost	Ontario Quebec		British Columbia

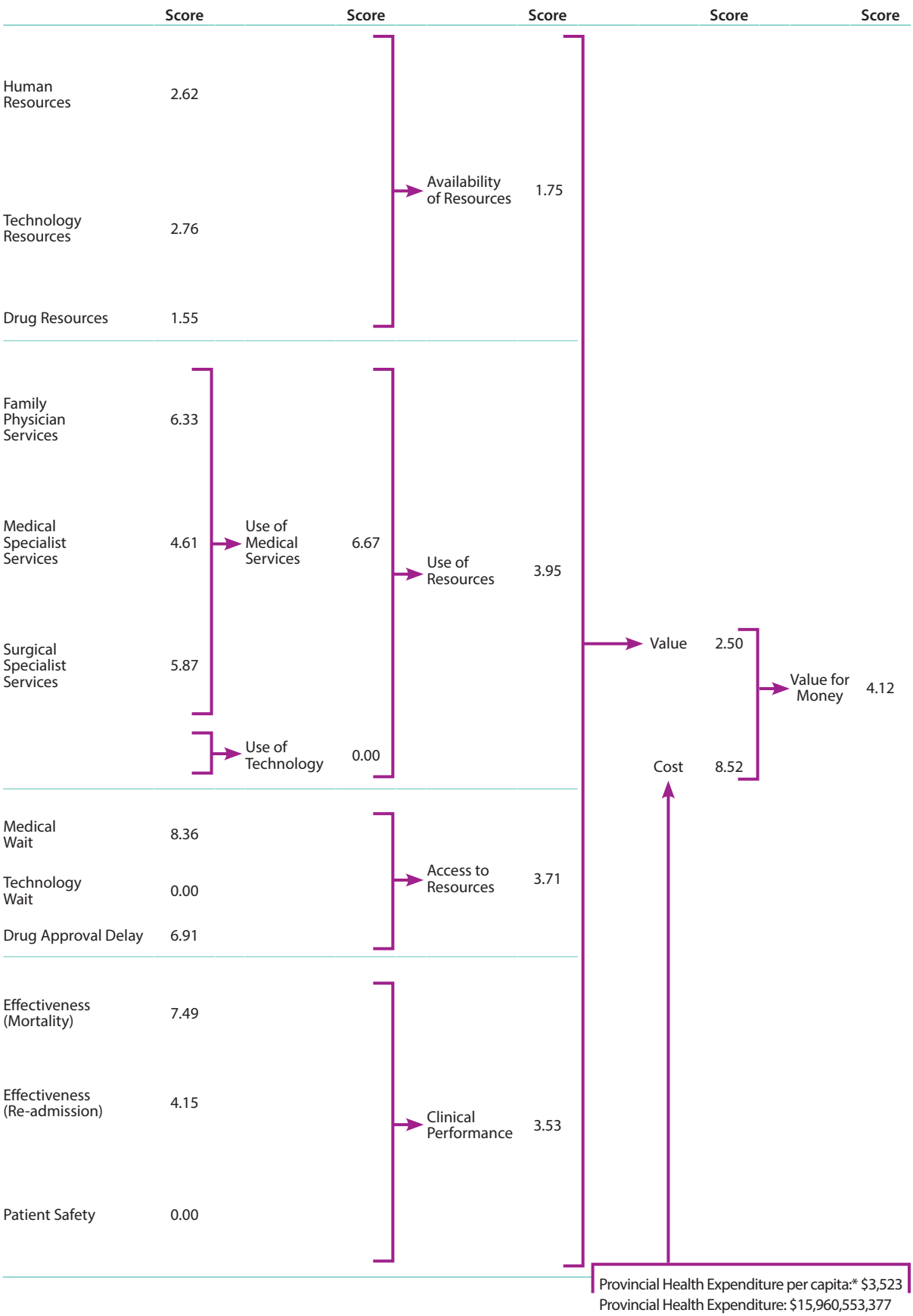
Results by province

The following tables show data for individual indicators, along with aggregate standardized scores for each province.

British Columbia

	Data	Data (p.t.p.)	Score
Family Medicine Physicians	5,380	1.19	10.00
Medical Specialists	3,169	0.70	5.60
Surgical Specialists	1,154	0.25	4.44
Registered Nurses (Direct Care)	25,072	5.53	0.00
Licensed Practical Nurses (Direct Care)	7,942	1.75	0.00
Nuclear Medicine Cameras	52	0.0115	2.85
CT Scanners	67	0.0148	1.50
MRI Scanners	41	0.0090	7.15
PET Scanners	0	0.0000	0.00
PET/CT Scanners	2	0.0004	2.68
SPECT/CT Scanners	15	0.0033	3.48
Total Drugs approved (% of NOCs)	17.97%		
Family Medicine: Consultations	142,084	31.36	2.29
Family Medicine: Major Assessments	8,750,058	1931.15	10.00
Family Medicine: Other Assessments	9,702,215	2141.30	0.00
Family Medicine: Major Surgery	13,967	3.08	0.63
Family Medicine: Diagnostic/Therapeutic Services	1,382,671	305.16	2.57
Medical Specialists: Consultations	1,025,394	226.31	8.02
Medical Specialists: Major Assessments	69,246	15.28	0.00
Medical Specialists: Other Assessments	959,227	211.70	6.06
Medical Specialists: Major Surgery	16,642	3.67	0.61
Medical Specialists: Diagnostic/Therapeutic Services	1,837,067	405.44	3.90
Surgical Specialists: Consultations	1,226,664	270.73	10.00
Surgical Specialists: Major Assessments	105,183	23.21	0.18
Surgical Specialists: Other Assessments	738,758	163.05	1.14
Surgical Specialists: Major Surgery	363,728	80.28	4.84
Surgical Specialists: Diagnostic/Therapeutic Services	1,496,633	330.31	4.29
MRI exams	133,954	29.56	0.45
CT exams	506,683	111.83	1.34
	(weeks)*		
GP to Consult Wait	8.18		9.19
Consult to Treatment Wait	10.60		7.27
CT Wait	5.00		5.00
MRI Wait	16.00		0.00
Drug Approval Delay	61.43		
	(rates)*		
30-Day In-Hospital Mortality (Acute Myocardial Infarction) (rate per 100)	7.35		5.45
30-Day In-Hospital Mortality (Stroke) (rate per 100)	15.26		7.48
5-Day In-Hospital Mortality (Major Surgery) (rate per 1,000)	9.01		8.82
30-Day Medical Readmission (rate per 100)	13.96		3.00
30-Day Obstetric Readmission (rate per 100)	2.52		4.48
30-Day Pediatric Readmission (rate per 100)	6.24		7.43
30-Day Surgical Readmission (rate per 100)	7.04		3.31
In-Hospital Hip Fracture (Elderly Patients) (rate per 1,000)	1.15		5.45
Nursing-Sensitive Adverse Events (Medical Patients) (rate per 1,000)	30.38		0.00
Nursing-Sensitive Adverse Events (Surgical Patients) (rate per 1,000)	39.63		3.00
Obstetric Trauma (Vaginal Delivery w/ Instrument) (rate per 100)	2.98		4.24
Obstetric Trauma (Vaginal Delivery w/o Instrument) (rate per 100)	0.67		5.82

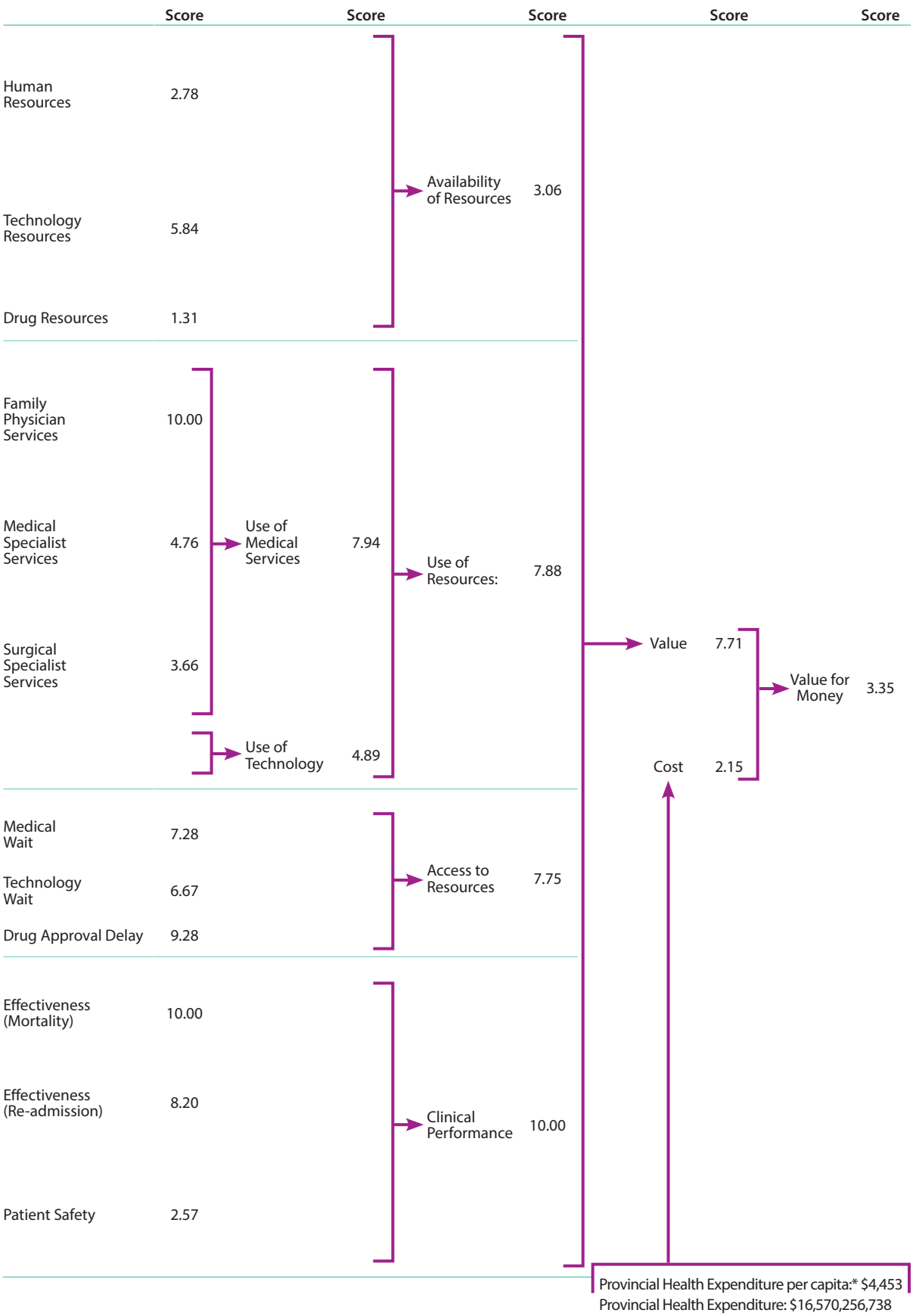
* For these indicators and components, lower values are given higher scores; p.t.p. = per 1,000 population.


Score
Score
Score
Score
Score
Human Resources
2.62
Technology Resources
2.76
Drug Resources
1.55
Availability of Resources
1.75
Family Physician Services
6.33
Medical Specialist Services
4.61
Surgical Specialist Services
5.87
Use of Medical Services
Use of Technology
0.00
6.67
Use of Resources
3.95
Medical Wait
8.36
Technology Wait
0.00
Drug Approval Delay
6.91
Access to Resources
3.71
Effectiveness (Mortality)
7.49
Effectiveness (Re-admission)
4.15
Patient Safety
0.00
Clinical Performance
3.53
Value
2.50
Cost
8.52
Value for Money
4.12
Provincial Health Expenditure per capita:* $3,523
Provincial Health Expenditure: $15,960,553,377

Alberta

	Data	Data (p.t.p.)	Score
Family Medicine Physicians	4,065	1.09	6.78
Medical Specialists	2,976	0.80	8.73
Surgical Specialists	839	0.23	1.57
Registered Nurses (Direct Care)	26,010	6.99	3.00
Licensed Practical Nurses (Direct Care)	7,132	1.92	0.53
Nuclear Medicine Cameras	64	0.0172	6.53
CT Scanners	48	0.0129	0.00
MRI Scanners	36	0.0097	8.20
PET Scanners	1	0.0003	5.31
PET/CT Scanners	3	0.0008	4.90
SPECT/CT Scanners	14	0.0038	4.27
Total Drugs approved (% of NOCs)	17.32%		
Family Medicine: Consultations	503,735	135.38	10.00
Family Medicine: Major Assessments	1,461,568	392.80	1.80
Family Medicine: Other Assessments	12,103,518	3252.85	5.79
Family Medicine: Major Surgery	28,295	7.60	1.73
Family Medicine: Diagnostic/Therapeutic Services	892,312	239.81	1.76
Medical Specialists: Consultations	841,334	226.11	8.01
Medical Specialists: Major Assessments	199,847	53.71	0.82
Medical Specialists: Other Assessments	556,905	149.67	3.75
Medical Specialists: Major Surgery	35,787	9.62	3.82
Medical Specialists: Diagnostic/Therapeutic Services	1,200,674	322.68	2.69
Surgical Specialists: Consultations	679,206	182.54	3.12
Surgical Specialists: Major Assessments	271,687	73.02	2.19
Surgical Specialists: Other Assessments	717,962	192.95	2.14
Surgical Specialists: Major Surgery	333,976	89.76	6.07
Surgical Specialists: Diagnostic/Therapeutic Services	672,148	180.64	0.75
MRI exams	202,704	54.48	9.75
CT exams	367,450	98.75	0.00
	(weeks)*		
GP to Consult Wait	9.86		8.25
Consult to Treatment Wait	12.21		6.27
CT Wait	4.00		10.00
MRI Wait	11.50		5.00
Drug Approval Delay	48.71		
	(rates)*		
30-Day In-Hospital Mortality (Acute Myocardial Infarction) (rate per 100)	6.57		9.19
30-Day In-Hospital Mortality (Stroke) (rate per 100)	13.09		10.00
5-Day In-Hospital Mortality (Major Surgery) (rate per 1,000)	9.14		8.47
30-Day Medical Readmission (rate per 100)	13.13		6.82
30-Day Obstetric Readmission (rate per 100)	1.90		8.51
30-Day Pediatric Readmission (rate per 100)	5.99		9.65
30-Day Surgical Readmission (rate per 100)	6.42		7.05
In-Hospital Hip Fracture (Elderly Patients) (rate per 1,000)	1.15		5.45
Nursing-Sensitive Adverse Events (Medical Patients) (rate per 1,000)	26.93		2.14
Nursing-Sensitive Adverse Events (Surgical Patients) (rate per 1,000)	28.11		7.54
Obstetric Trauma (Vaginal Delivery w/ Instrument) (rate per 100)	3.16		3.89
Obstetric Trauma (Vaginal Delivery w/o Instrument) (rate per 100)	0.82		3.58

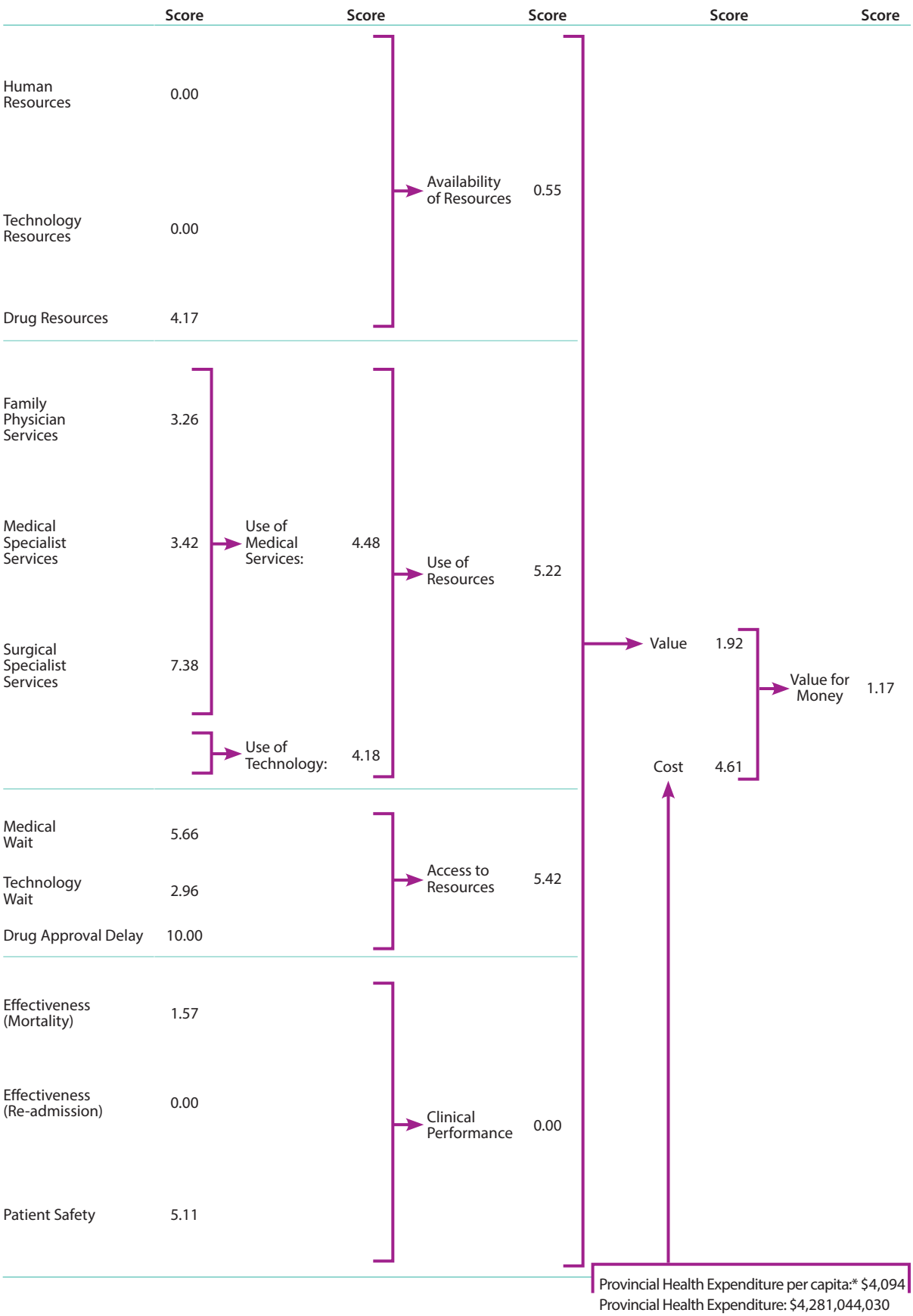
* For these indicators and components, lower values are given higher scores; p.t.p. = per 1,000 population.


Score
Score
Score
Score
Score
Human Resources
2.78
Technology Resources
5.84
Drug Resources
1.31
Availability of Resources
3.06
Family Physician Services
10.00
Medical Specialist Services
4.76
Surgical Specialist Services
3.66
Use of Medical Services
7.94
Use of Technology
4.89
Use of Resources:
7.88
Medical Wait
7.28
Technology Wait
6.67
Drug Approval Delay
9.28
Access to Resources
7.75
Effectiveness (Mortality)
10.00
Effectiveness (Re-admission)
8.20
Patient Safety
2.57
Clinical Performance
10.00
Value
7.71
Cost
2.15
Value for Money
3.35
Provincial Health Expenditure per capita:* $4,453
Provincial Health Expenditure: $16,570,256,738

Saskatchewan

	Data	Data (p.t.p.)	Score
Family Medicine Physicians	997	0.95	2.07
Medical Specialists	561	0.54	0.52
Surgical Specialists	219	0.21	0.00
Registered Nurses (Direct Care)	8,553	8.18	5.45
Licensed Practical Nurses (Direct Care)	2,690	2.57	2.66
Nuclear Medicine Cameras	13	0.0124	3.47
CT Scanners	15	0.0143	1.15
MRI Scanners	5	0.0048	0.00
PET Scanners	0	0.0000	0.00
PET/CT Scanners	0	0.0000	0.00
SPECT/CT Scanners	3	0.0029	2.70
Total Drugs approved (% of NOCs)	25.16%		
Family Medicine: Consultations	21,126	20.20	1.47
Family Medicine: Major Assessments	238,804	228.39	0.92
Family Medicine: Other Assessments	3,340,845	3195.15	5.49
Family Medicine: Major Surgery	5,349	5.12	1.12
Family Medicine: Diagnostic/Therapeutic Services	258,245	246.98	1.85
Medical Specialists: Consultations	178,958	171.15	5.12
Medical Specialists: Major Assessments	28,403	27.16	0.25
Medical Specialists: Other Assessments	136,834	130.87	3.06
Medical Specialists: Major Surgery	4,746	4.54	1.08
Medical Specialists: Diagnostic/Therapeutic Services	496,879	475.21	4.92
Surgical Specialists: Consultations	237,248	226.90	6.58
Surgical Specialists: Major Assessments	45,493	43.51	1.00
Surgical Specialists: Other Assessments	272,509	260.62	4.39
Surgical Specialists: Major Surgery	99,800	95.45	6.81
Surgical Specialists: Diagnostic/Therapeutic Services	416,036	397.89	5.88
MRI exams	37,853	36.20	2.93
CT exams	161,061	154.04	5.66
	(weeks)*		
GP to Consult Wait	6.72		10.00
Consult to Treatment Wait	19.74		1.63
CT Wait	5.00		5.00
MRI Wait	12.00		4.44
Drug Approval Delay	44.86		
	(rates)*		
30-Day In-Hospital Mortality (Acute Myocardial Infarction) (rate per 100)	8.49		0.00
30-Day In-Hospital Mortality (Stroke) (rate per 100)	15.82		6.83
5-Day In-Hospital Mortality (Major Surgery) (rate per 1,000)	12.00		0.95
30-Day Medical Readmission (rate per 100)	14.61		0.00
30-Day Obstetric Readmission (rate per 100)	2.60		3.96
30-Day Pediatric Readmission (rate per 100)	7.07		0.09
30-Day Surgical Readmission (rate per 100)	7.59		0.00
In-Hospital Hip Fracture (Elderly Patients) (rate per 1,000)	0.70		10.00
Nursing-Sensitive Adverse Events (Medical Patients) (rate per 1,000)	19.39		6.82
Nursing-Sensitive Adverse Events (Surgical Patients) (rate per 1,000)	23.77		9.25
Obstetric Trauma (Vaginal Delivery w/ Instrument) (rate per 100)	5.17		0.00
Obstetric Trauma (Vaginal Delivery w/o Instrument) (rate per 100)	1.02		0.60

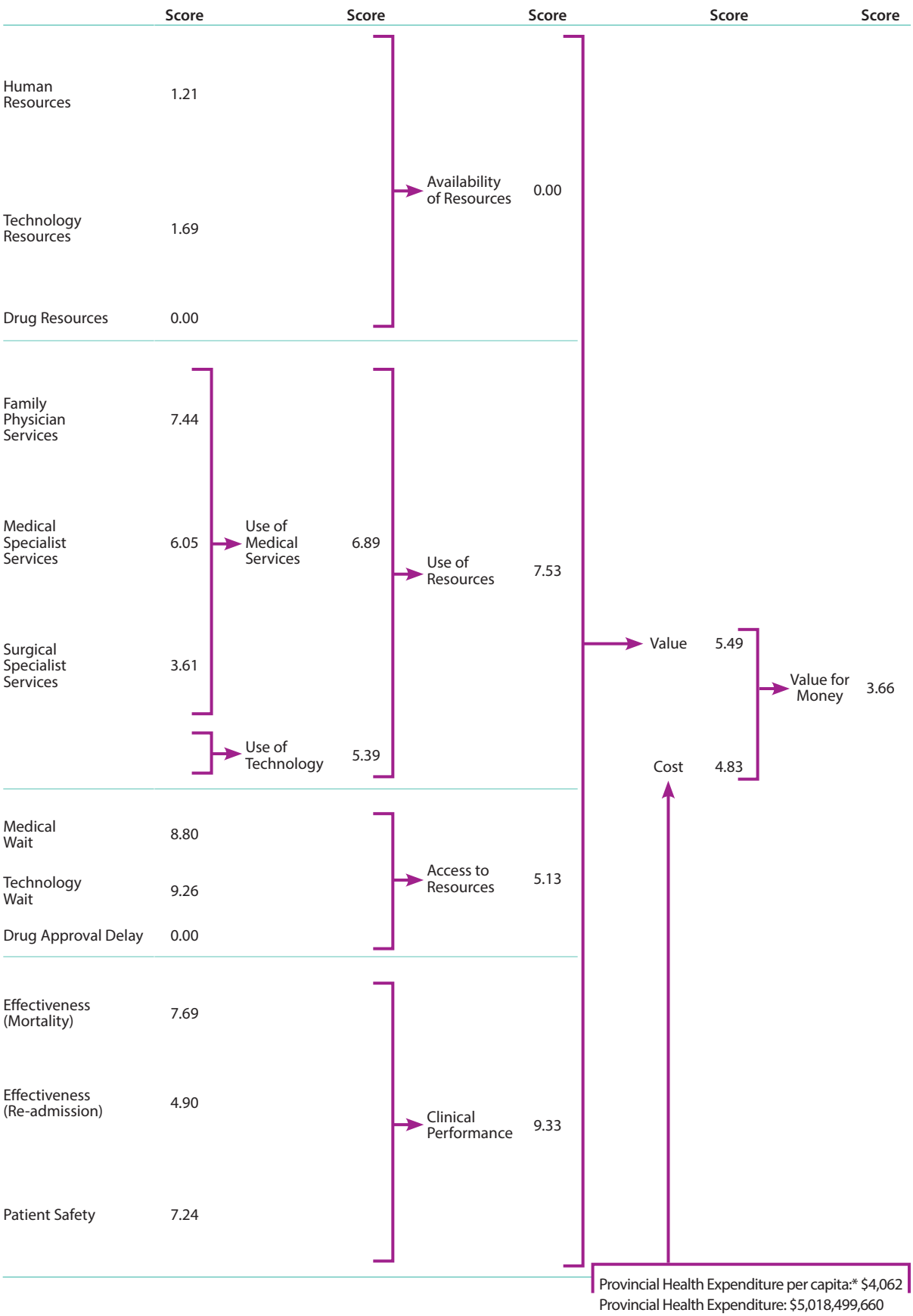
* For these indicators and components, lower values are given higher scores; p.t.p. = per 1,000 population.


Score
Score
Score
Score
Score
Human Resources
0.00
Technology Resources
0.00
Drug Resources
4.17
Availability of Resources
0.55
Family Physician Services
3.26
Medical Specialist Services
3.42
Surgical Specialist Services
7.38
Use of Medical Services:
4.48
Use of Technology:
4.18
Use of Resources
5.22
Medical Wait
5.66
Technology Wait
2.96
Drug Approval Delay
10.00
Access to Resources
5.42
Effectiveness (Mortality)
1.57
Effectiveness (Re-admission)
0.00
Patient Safety
5.11
Clinical Performance
0.00
Value
1.92
Cost
4.61
Value for Money
1.17
Provincial Health Expenditure per capita:* $4,094
Provincial Health Expenditure: $4,281,044,030

Manitoba

	Data	Data (p.t.p.)	Score
Family Medicine Physicians	1,217	0.99	3.14
Medical Specialists	826	0.67	4.64
Surgical Specialists	266	0.22	0.58
Registered Nurses (Direct Care)	10,010	8.10	5.29
Licensed Practical Nurses (Direct Care)	2,691	2.18	1.38
Nuclear Medicine Cameras	14	0.0113	2.76
CT Scanners	20	0.0162	2.61
MRI Scanners	8	0.0065	2.84
PET Scanners	0	0.0000	0.00
PET/CT Scanners	1	0.0008	4.92
SPECT/CT Scanners	2	0.0016	0.51
Total Drugs approved (% of NOCs)	13.73%		
Family Medicine: Consultations	29,233	23.66	1.72
Family Medicine: Major Assessments	635,703	514.57	2.45
Family Medicine: Other Assessments	3,008,609	2435.33	1.53
Family Medicine: Major Surgery	51,545	41.72	10.00
Family Medicine: Diagnostic/Therapeutic Services	268,688	217.49	1.48
Medical Specialists: Consultations	177,967	144.06	3.70
Medical Specialists: Major Assessments	239,597	193.94	3.79
Medical Specialists: Other Assessments	359,798	291.24	9.01
Medical Specialists: Major Surgery	5,942	4.81	1.23
Medical Specialists: Diagnostic/Therapeutic Services	667,340	540.18	5.86
Surgical Specialists: Consultations	176,006	142.47	0.00
Surgical Specialists: Major Assessments	140,910	114.06	3.85
Surgical Specialists: Other Assessments	159,059	128.75	0.00
Surgical Specialists: Major Surgery	148,409	120.13	10.00
Surgical Specialists: Diagnostic/Therapeutic Services	199,163	161.21	0.29
MRI exams	58,247	47.15	7.02
CT exams	164,763	133.37	3.55
	(weeks)*		
GP to Consult Wait	8.64		8.93
Consult to Treatment Wait	8.88		8.33
CT Wait	4.00		10.00
MRI Wait	8.00		8.89
Drug Approval Delay	98.43		
	(rates)*		
30-Day In-Hospital Mortality (Acute Myocardial Infarction) (rate per 100)	7.38		5.31
30-Day In-Hospital Mortality (Stroke) (rate per 100)	15.04		7.74
5-Day In-Hospital Mortality (Major Surgery) (rate per 1,000)	8.88		9.16
30-Day Medical Readmission (rate per 100)	13.22		6.41
30-Day Obstetric Readmission (rate per 100)	2.80		2.66
30-Day Pediatric Readmission (rate per 100)	6.48		5.31
30-Day Surgical Readmission (rate per 100)	6.53		6.39
In-Hospital Hip Fracture (Elderly Patients) (rate per 1,000)	1.11		5.86
Nursing-Sensitive Adverse Events (Medical Patients) (rate per 1,000)	25.92		2.77
Nursing-Sensitive Adverse Events (Surgical Patients) (rate per 1,000)	27.00		7.98
Obstetric Trauma (Vaginal Delivery w/ Instrument) (rate per 100)	2.07		6.00
Obstetric Trauma (Vaginal Delivery w/o Instrument) (rate per 100)	0.56		7.46

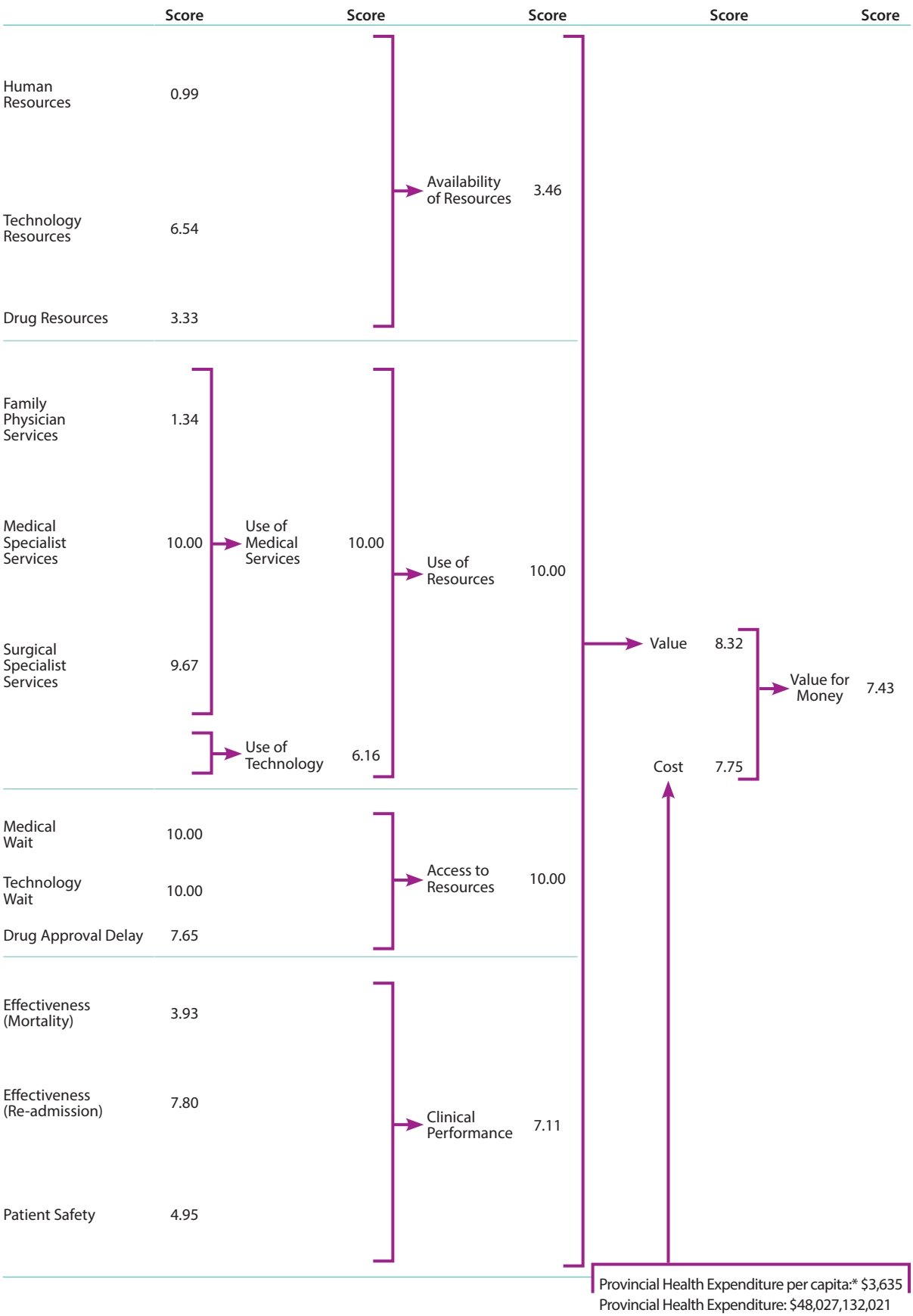
* For these indicators and components, lower values are given higher scores; p.t.p. = per 1,000 population.


Score
Score
Score
Score
Score
Human Resources
1.21
Technology Resources
1.69
Drug Resources
0.00
Availability of Resources
0.00
Family Physician Services
7.44
Medical Specialist Services
6.05
Surgical Specialist Services
3.61
Use of Medical Services
6.89
Use of Technology
5.39
Use of Resources
7.53
Medical Wait
8.80
Technology Wait
9.26
Drug Approval Delay
0.00
Access to Resources
5.13
Effectiveness (Mortality)
7.69
Effectiveness (Re-admission)
4.90
Patient Safety
7.24
Clinical Performance
9.33
Value
5.49
Cost
4.83
Value for Money
3.66
Provincial Health Expenditure per capita:* $4,062
Provincial Health Expenditure: $5,018,499,660

Ontario

	Data	Data (p.t.p.)	Score
Family Medicine Physicians	12,170	0.92	0.97
Medical Specialists	9,666	0.73	6.60
Surgical Specialists	3,197	0.24	3.20
Registered Nurses (Direct Care)	85,414	6.47	1.92
Licensed Practical Nurses (Direct Care)	29,359	2.22	1.52
Nuclear Medicine Cameras	285	0.0216	9.33
CT Scanners	175	0.0132	0.28
MRI Scanners	99	0.0075	4.54
PET Scanners	6	0.0005	8.98
PET/CT Scanners	13	0.0010	5.99
SPECT/CT Scanners	38	0.0029	2.71
Total Drugs approved (% of NOCs)	22.88%		
Family Medicine: Consultations	306,092	23.17	1.69
Family Medicine: Major Assessments	3,149,254	238.39	0.97
Family Medicine: Other Assessments	30,325,804	2295.55	0.80
Family Medicine: Major Surgery	42,655	3.23	0.66
Family Medicine: Diagnostic/Therapeutic Services	5,338,320	404.09	3.81
Medical Specialists: Consultations	3,130,994	237.00	8.59
Medical Specialists: Major Assessments	3,063,165	231.87	4.60
Medical Specialists: Other Assessments	4,146,181	313.85	9.85
Medical Specialists: Major Surgery	139,451	10.56	4.33
Medical Specialists: Diagnostic/Therapeutic Services	10,880,670	823.63	10.00
Surgical Specialists: Consultations	2,820,996	213.54	5.54
Surgical Specialists: Major Assessments	2,003,016	151.62	5.37
Surgical Specialists: Other Assessments	5,666,533	428.94	10.00
Surgical Specialists: Major Surgery	1,257,937	95.22	6.78
Surgical Specialists: Diagnostic/Therapeutic Services	3,845,322	291.08	3.36
MRI exams	728,411	55.14	10.00
CT exams	1,538,316	116.44	1.81
	(weeks)*		
GP to Consult Wait	7.80		9.40
Consult to Treatment Wait	6.17		10.00
CT Wait	4.00		10.00
MRI Wait	7.00		10.00
Drug Approval Delay	57.43		
	(rates)*		
30-Day In-Hospital Mortality (Acute Myocardial Infarction) (rate per 100)	7.93		2.68
30-Day In-Hospital Mortality (Stroke) (rate per 100)	16.12		6.48
5-Day In-Hospital Mortality (Major Surgery) (rate per 1,000)	10.77		4.18
30-Day Medical Readmission (rate per 100)	12.99		7.47
30-Day Obstetric Readmission (rate per 100)	1.67		10.00
30-Day Pediatric Readmission (rate per 100)	6.24		7.43
30-Day Surgical Readmission (rate per 100)	6.63		5.78
In-Hospital Hip Fracture (Elderly Patients) (rate per 1,000)	0.72		9.80
Nursing-Sensitive Adverse Events (Medical Patients) (rate per 1,000)	29.68		0.43
Nursing-Sensitive Adverse Events (Surgical Patients) (rate per 1,000)	37.85		3.70
Obstetric Trauma (Vaginal Delivery w/ Instrument) (rate per 100)	2.65		4.87
Obstetric Trauma (Vaginal Delivery w/o Instrument) (rate per 100)	0.55		7.61

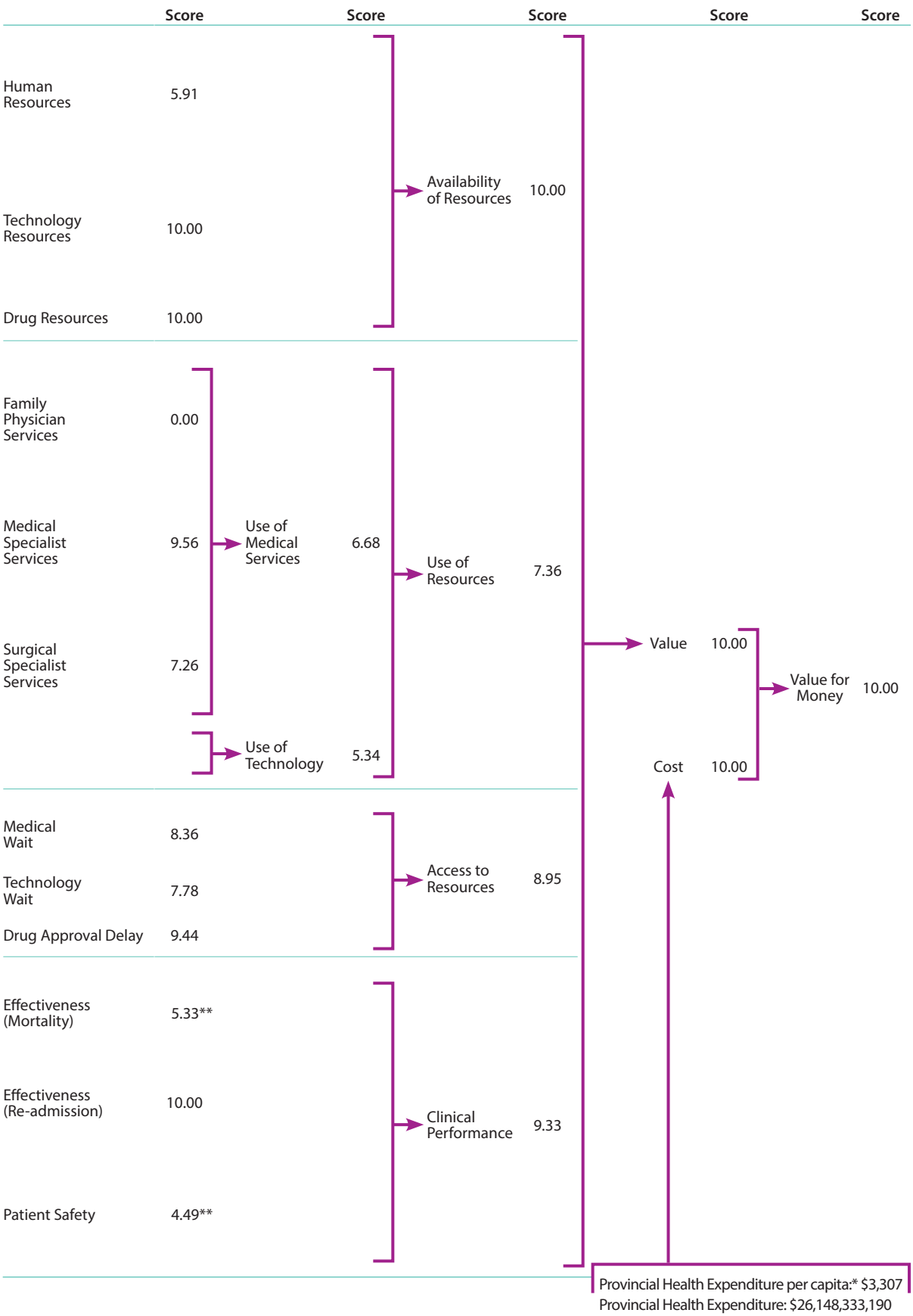
* For these indicators and components, lower values are given higher scores; p.t.p. = per 1,000 population.


Score
Score
Score
Score
Score
Human Resources
0.99
Technology Resources
6.54
Drug Resources
3.33
Availability of Resources
3.46
Family Physician Services
1.34
Medical Specialist Services
10.00
Surgical Specialist Services
9.67
Use of Medical Services
10.00
Use of Technology
6.16
Use of Resources
10.00
Medical Wait
10.00
Technology Wait
10.00
Drug Approval Delay
7.65
Access to Resources
10.00
Effectiveness (Mortality)
3.93
Effectiveness (Re-admission)
7.80
Patient Safety
4.95
Clinical Performance
7.11
Value
8.32
Cost
7.75
Value for Money
7.43
Provincial Health Expenditure per capita:* $3,635
Provincial Health Expenditure: $48,027,132,021

Quebec

	Data	Data (p.t.p.)	Score
Family Medicine Physicians	8,814	1.11	7.53
Medical Specialists	6,646	0.84	10.00
Surgical Specialists	2,332	0.29	8.40
Registered Nurses (Direct Care)	56,769	7.18	3.39
Licensed Practical Nurses (Direct Care)	19,887	2.51	2.47
Nuclear Medicine Cameras	123	0.0156	5.47
CT Scanners	132	0.0167	3.01
MRI Scanners	85	0.0107	10.00
PET Scanners	4	0.0005	10.00
PET/CT Scanners	13	0.0016	10.00
SPECT/CT Scanners	39	0.0049	6.32
Total Drugs approved (% of NOCs)	41.18%		
Family Medicine: Consultations	374,105	47.31	3.48
Family Medicine: Major Assessments	2,167,762	274.14	1.16
Family Medicine: Other Assessments	18,454,378	2333.81	1.00
Family Medicine: Major Surgery	12,232	1.55	0.26
Family Medicine: Diagnostic/Therapeutic Services	780,989	98.77	0.00
Medical Specialists: Consultations	2,086,595	263.88	10.00
Medical Specialists: Major Assessments	3,847,186	486.53	10.00
Medical Specialists: Other Assessments	2,513,160	317.82	10.00
Medical Specialists: Major Surgery	54,842	6.94	2.37
Medical Specialists: Diagnostic/Therapeutic Services	2,971,898	375.84	3.47
Surgical Specialists: Consultations	1,614,829	204.22	4.81
Surgical Specialists: Major Assessments	2,106,866	266.44	10.00
Surgical Specialists: Other Assessments	2,061,198	260.67	4.39
Surgical Specialists: Major Surgery	610,332	77.18	4.45
Surgical Specialists: Diagnostic/Therapeutic Services	1,407,078	177.94	0.69
MRI exams	337,415	42.67	5.34
CT exams	1,177,610	148.93	5.14
	(weeks)*		
GP to Consult Wait	8.94		8.76
Consult to Treatment Wait	9.91		7.69
CT Wait	4.00		10.00
MRI Wait	10.00		6.67
Drug Approval Delay	47.86		
	(rates)*		
30-Day In-Hospital Mortality (Acute Myocardial Infarction) (rate per 100)	—		4.99**
30-Day In-Hospital Mortality (Stroke) (rate per 100)	—		5.53**
5-Day In-Hospital Mortality (Major Surgery) (rate per 1,000)	—		6.12**
30-Day Medical Readmission (rate per 100)	12.44		10.00
30-Day Obstetric Readmission (rate per 100)	1.95		8.18
30-Day Pediatric Readmission (rate per 100)	5.95		10.00
30-Day Surgical Readmission (rate per 100)	5.93		10.00
In-Hospital Hip Fracture (Elderly Patients) (rate per 1,000)	—		6.94**
Nursing-Sensitive Adverse Events (Medical Patients) (rate per 1,000)	—		3.33**
Nursing-Sensitive Adverse Events (Surgical Patients) (rate per 1,000)	—		5.83**
Obstetric Trauma (Vaginal Delivery w/ Instrument) (rate per 100)	—		4.50**
Obstetric Trauma (Vaginal Delivery w/o Instrument) (rate per 100)	—		5.09**

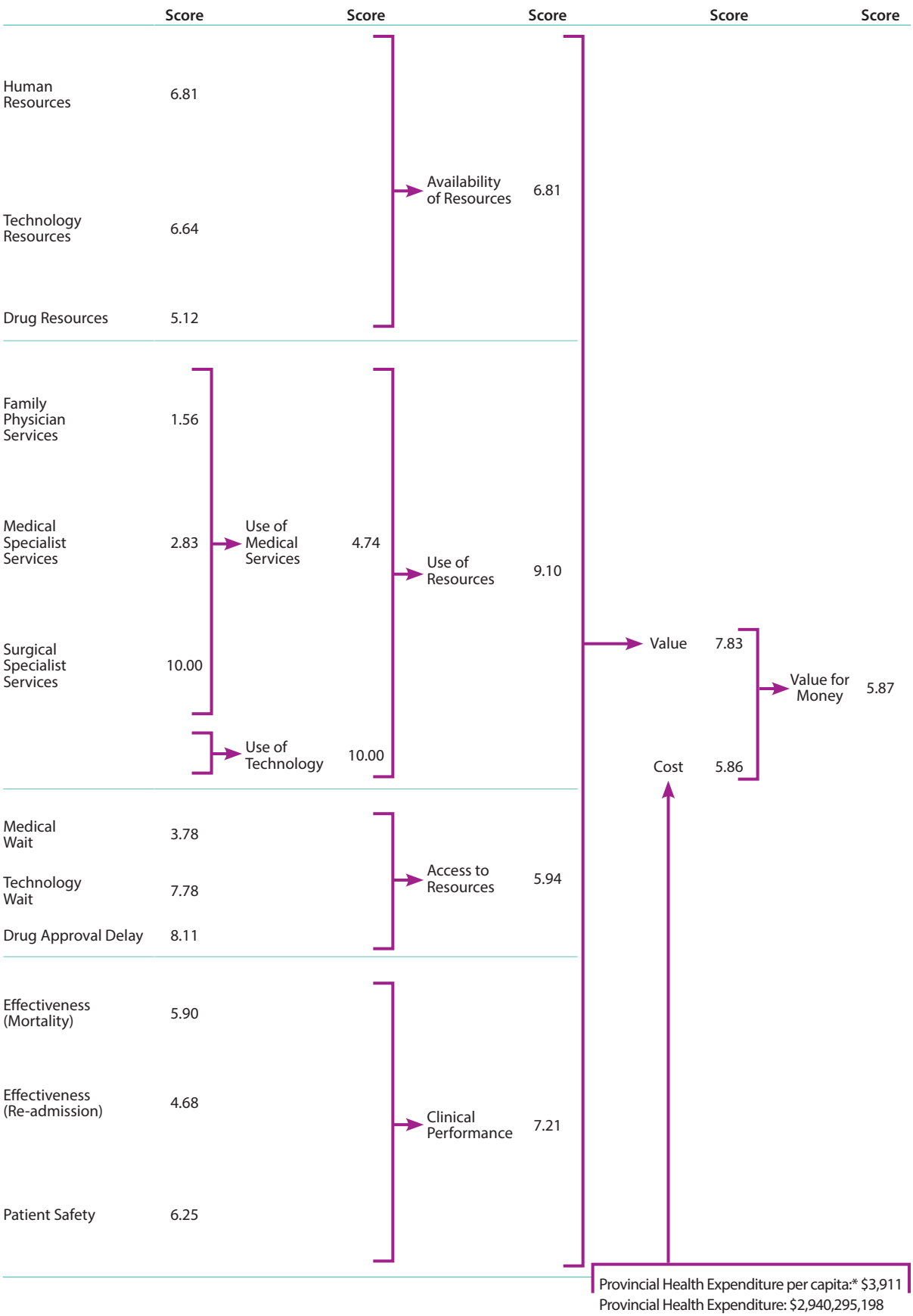
* For these indicators and components, lower values are given higher scores; ** imputed value; p.t.p. = per 1,000 population.


Score
Score
Score
Score
Score
Human Resources
5.91
Technology Resources
10.00
Drug Resources
10.00
Availability of Resources
10.00
Family Physician Services
0.00
Medical Specialist Services
9.56
Surgical Specialist Services
7.26
Use of Medical Services
6.68
Use of Technology
5.34
Use of Resources
7.36
Medical Wait
8.36
Technology Wait
7.78
Drug Approval Delay
9.44
Access to Resources
8.95
Effectiveness (Mortality)
5.33**
Effectiveness (Re-admission)
10.00
Patient Safety
4.49**
Clinical Performance
9.33
Value
10.00
Cost
10.00
Value for Money
10.00
Provincial Health Expenditure per capita:* $3,307
Provincial Health Expenditure: $26,148,333,190

New Brunswick

	Data	Data (p.t.p.)	Score
Family Medicine Physicians	819	1.09	6.68
Medical Specialists	493	0.66	4.24
Surgical Specialists	234	0.31	10.00
Registered Nurses (Direct Care)	7,248	9.64	8.46
Licensed Practical Nurses (Direct Care)	2,627	3.49	5.64
Nuclear Medicine Cameras	17	0.0226	10.00
CT Scanners	18	0.0239	8.76
MRI Scanners	6	0.0080	5.36
PET Scanners	0	0.0000	0.00
PET/CT Scanners	1	0.0013	8.09
SPECT/CT Scanners	1	0.0013	0.00
Total Drugs approved (% of NOCs)	27.78%		
Family Medicine: Consultations	19,967	26.56	1.94
Family Medicine: Major Assessments	73,635	97.94	0.22
Family Medicine: Other Assessments	2,261,120	3007.61	4.52
Family Medicine: Major Surgery	369	0.49	0.00
Family Medicine: Diagnostic/Therapeutic Services	169,901	225.99	1.59
Medical Specialists: Consultations	141,625	188.38	6.03
Medical Specialists: Major Assessments	15,330	20.39	0.11
Medical Specialists: Other Assessments	68,586	91.23	1.58
Medical Specialists: Major Surgery	3,300	4.39	1.00
Medical Specialists: Diagnostic/Therapeutic Services	291,674	387.97	3.64
Surgical Specialists: Consultations	196,903	261.91	9.31
Surgical Specialists: Major Assessments	14,063	18.71	0.00
Surgical Specialists: Other Assessments	208,427	277.24	4.95
Surgical Specialists: Major Surgery	77,041	102.48	7.72
Surgical Specialists: Diagnostic/Therapeutic Services	430,283	572.34	10.00
MRI exams	37,563	49.96	8.07
CT exams	147,633	196.37	10.00
	(weeks)*		
GP to Consult Wait	24.64		0.00
Consult to Treatment Wait	9.00		8.25
CT Wait	4.00		10.00
MRI Wait	10.00		6.67
Drug Approval Delay	55.00		
	(rates)*		
30-Day In-Hospital Mortality (Acute Myocardial Infarction) (rate per 100)	6.91		7.56
30-Day In-Hospital Mortality (Stroke) (rate per 100)	15.87		6.77
5-Day In-Hospital Mortality (Major Surgery) (rate per 1,000)	10.97		3.66
30-Day Medical Readmission (rate per 100)	12.87		8.02
30-Day Obstetric Readmission (rate per 100)	2.38		5.39
30-Day Pediatric Readmission (rate per 100)	7.08		0.00
30-Day Surgical Readmission (rate per 100)	6.49		6.63
In-Hospital Hip Fracture (Elderly Patients) (rate per 1,000)	0.81		8.89
Nursing-Sensitive Adverse Events (Medical Patients) (rate per 1,000)	21.03		5.80
Nursing-Sensitive Adverse Events (Surgical Patients) (rate per 1,000)	24.62		8.92
Obstetric Trauma (Vaginal Delivery w/ Instrument) (rate per 100)	2.65		4.87
Obstetric Trauma (Vaginal Delivery w/o Instrument) (rate per 100)	1.06		0.00

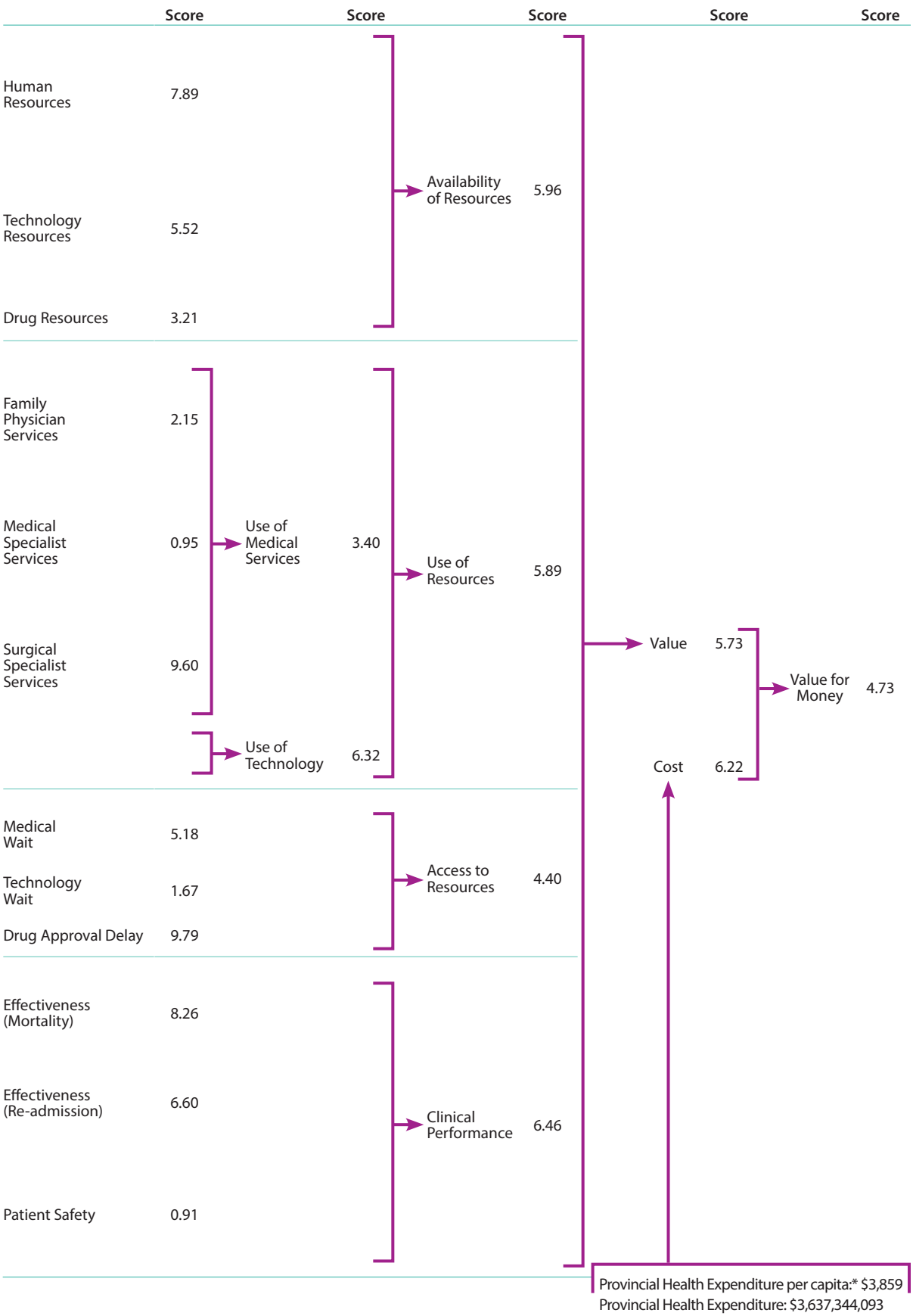
* For these indicators and components, lower values are given higher scores; p.t.p. = per 1,000 population.


Score
Score
Score
Score
Score
Human Resources
6.81
Technology Resources
6.64
Drug Resources
5.12
Availability of Resources
6.81
Family Physician Services
1.56
Medical Specialist Services
2.83
Surgical Specialist Services
10.00
Use of Medical Services
4.74
Use of Technology
10.00
Use of Resources
9.10
Medical Wait
3.78
Technology Wait
7.78
Drug Approval Delay
8.11
Access to Resources
5.94
Effectiveness (Mortality)
5.90
Effectiveness (Re-admission)
4.68
Patient Safety
6.25
Clinical Performance
7.21
Value
7.83
Cost
5.86
Value for Money
5.87
Provincial Health Expenditure per capita:* $3,911
Provincial Health Expenditure: $2,940,295,198

Nova Scotia

	Data	Data (p.t.p.)	Score
Family Medicine Physicians	1,077	1.14	8.49
Medical Specialists	768	0.81	9.20
Surgical Specialists	281	0.30	8.71
Registered Nurses (Direct Care)	8,057	8.55	6.21
Licensed Practical Nurses (Direct Care)	3,469	3.68	6.25
Nuclear Medicine Cameras	17	0.0180	7.06
CT Scanners	16	0.0170	3.23
MRI Scanners	9	0.0095	7.99
PET Scanners	0	0.0000	0.00
PET/CT Scanners	1	0.0011	6.45
SPECT/CT Scanners	3	0.0032	3.25
Total Drugs approved (% of NOCs)	22.55%		
Family Medicine: Consultations	16,571	17.58	1.27
Family Medicine: Major Assessments	62,850	66.68	0.06
Family Medicine: Other Assessments	3,260,594	3459.52	6.87
Family Medicine: Major Surgery	2,144	2.27	0.43
Family Medicine: Diagnostic/Therapeutic Services	133,155	141.28	0.53
Medical Specialists: Consultations	114,378	121.36	2.50
Medical Specialists: Major Assessments	39,110	41.50	0.56
Medical Specialists: Other Assessments	84,519	89.68	1.53
Medical Specialists: Major Surgery	4,545	4.82	1.23
Medical Specialists: Diagnostic/Therapeutic Services	130,370	138.32	0.00
Surgical Specialists: Consultations	233,711	247.97	8.23
Surgical Specialists: Major Assessments	77,071	81.77	2.55
Surgical Specialists: Other Assessments	343,518	364.48	7.85
Surgical Specialists: Major Surgery	89,260	94.71	6.71
Surgical Specialists: Diagnostic/Therapeutic Services	360,178	382.15	5.51
MRI exams	39,032	41.41	4.87
CT exams	159,277	168.99	7.20
	(weeks)*		
GP to Consult Wait	13.01		6.49
Consult to Treatment Wait	15.46		4.26
CT Wait	5.50		2.50
MRI Wait	11.50		5.00
Drug Approval Delay	46.00		
	(rates)*		
30-Day In-Hospital Mortality (Acute Myocardial Infarction) (rate per 100)	6.40		10.00
30-Day In-Hospital Mortality (Stroke) (rate per 100)	18.63		3.57
5-Day In-Hospital Mortality (Major Surgery) (rate per 1,000)	8.56		10.00
30-Day Medical Readmission (rate per 100)	12.63		9.12
30-Day Obstetric Readmission (rate per 100)	2.23		6.36
30-Day Pediatric Readmission (rate per 100)	6.86		1.95
30-Day Surgical Readmission (rate per 100)	6.07		9.16
In-Hospital Hip Fracture (Elderly Patients) (rate per 1,000)	0.83		8.69
Nursing-Sensitive Adverse Events (Medical Patients) (rate per 1,000)	28.57		1.12
Nursing-Sensitive Adverse Events (Surgical Patients) (rate per 1,000)	42.08		2.03
Obstetric Trauma (Vaginal Delivery w/ Instrument) (rate per 100)	4.21		1.86
Obstetric Trauma (Vaginal Delivery w/o Instrument) (rate per 100)	0.64		6.27

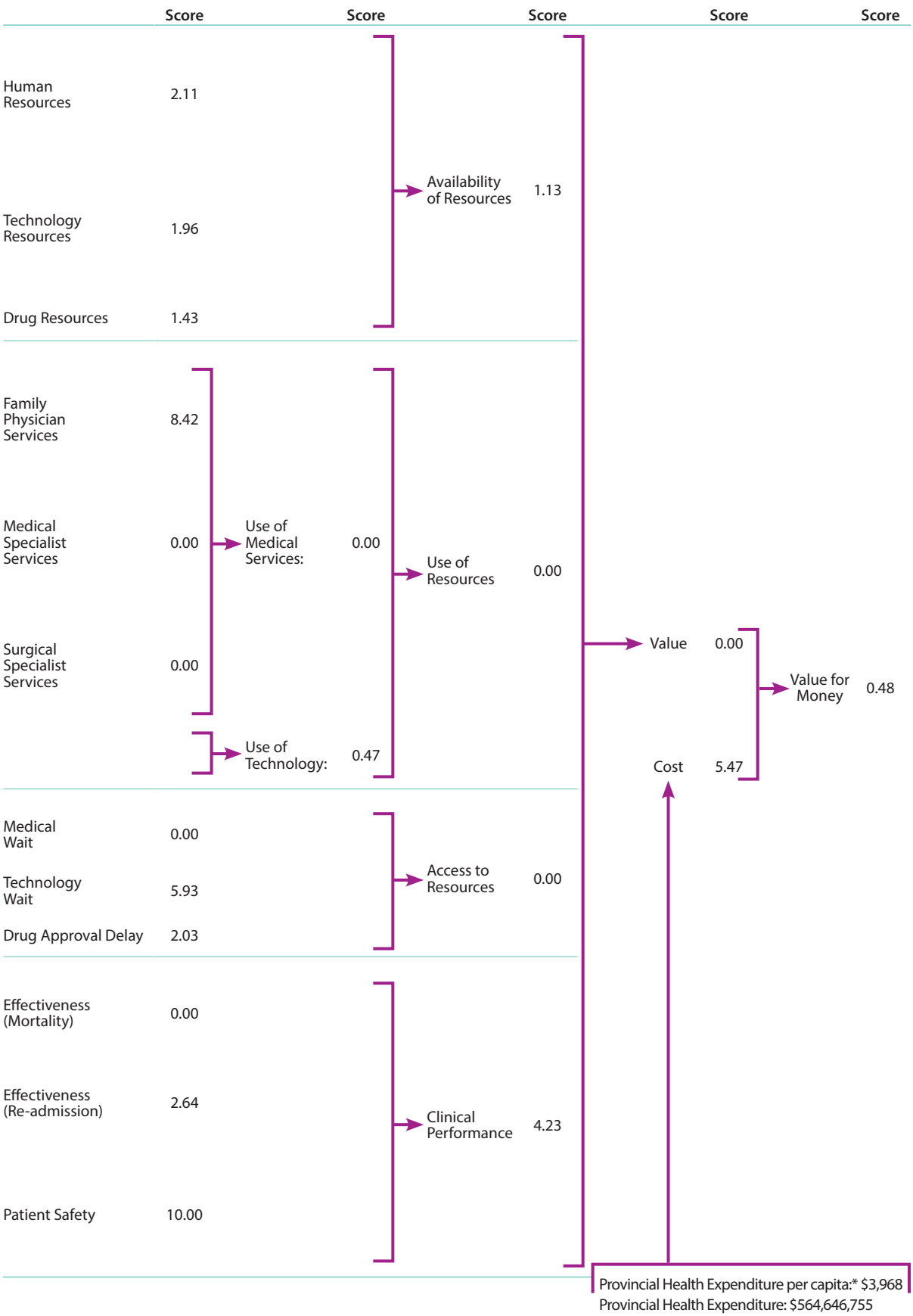
* For these indicators and components, lower values are given higher scores; p.t.p. = per 1,000 population.


Score
Score
Score
Score
Score
Human Resources
7.89
Technology Resources
5.52
Drug Resources
3.21
Availability of Resources
5.96
Family Physician Services
2.15
Medical Specialist Services
0.95
Surgical Specialist Services
9.60
Use of Medical Services
3.40
Use of Technology
6.32
Use of Resources
5.89
Medical Wait
5.18
Technology Wait
1.67
Drug Approval Delay
9.79
Access to Resources
4.40
Effectiveness (Mortality)
8.26
Effectiveness (Re-admission)
6.60
Patient Safety
0.91
Clinical Performance
6.46
Value
5.73
Cost
6.22
Value for Money
4.73
Provincial Health Expenditure per capita:* $3,859
Provincial Health Expenditure: $3,637,344,093

Prince Edward Island

	Data	Data (p.t.p.)	Score
Family Medicine Physicians	127	0.89	0.00
Medical Specialists	74	0.52	0.00
Surgical Specialists	35	0.25	3.59
Registered Nurses (Direct Care)	1,298	9.12	7.39
Licensed Practical Nurses (Direct Care)	567	3.98	7.23
Nuclear Medicine Cameras	1	0.0070	0.00
CT Scanners	2	0.0141	0.92
MRI Scanners	1	0.0070	3.76
PET Scanners	0	0.0000	0.00
PET/CT Scanners	0	0.0000	0.00
SPECT/CT Scanners	1	0.0070	10.00
Total Drugs approved (% of NOCs)	17.65%		
Family Medicine: Consultations	7,547	53.04	3.90
Family Medicine: Major Assessments	39,292	276.12	1.17
Family Medicine: Other Assessments	320,390	2251.51	0.57
Family Medicine: Major Surgery	1,843	12.95	3.02
Family Medicine: Diagnostic/Therapeutic Services	128,124	900.38	10.00
Medical Specialists: Consultations	10,499	73.78	0.00
Medical Specialists: Major Assessments	9,245	64.97	1.05
Medical Specialists: Other Assessments	6,912	48.57	0.00
Medical Specialists: Major Surgery	361	2.54	0.00
Medical Specialists: Diagnostic/Therapeutic Services	33,961	238.66	1.46
Surgical Specialists: Consultations	20,554	144.44	0.15
Surgical Specialists: Major Assessments	6,001	42.17	0.95
Surgical Specialists: Other Assessments	31,001	217.86	2.97
Surgical Specialists: Major Surgery	6,093	42.82	0.00
Surgical Specialists: Diagnostic/Therapeutic Services	21,169	148.76	0.00
MRI exams	4,459	31.34	1.11
CT exams	16,060	112.86	1.45
	(weeks)*		
GP to Consult Wait	22.00		1.48
Consult to Treatment Wait	22.37		0.00
CT Wait	5.00		5.00
MRI Wait	8.00		8.89
Drug Approval Delay	87.57		
	(rates)*		
30-Day In-Hospital Mortality (Acute Myocardial Infarction) (rate per 100)	7.82		3.21
30-Day In-Hospital Mortality (Stroke) (rate per 100)	20.95		0.87
5-Day In-Hospital Mortality (Major Surgery) (rate per 1,000)	12.36		0.00
30-Day Medical Readmission (rate per 100)	13.31		5.99
30-Day Obstetric Readmission (rate per 100)	3.21		0.00
30-Day Pediatric Readmission (rate per 100)	6.90		1.59
30-Day Surgical Readmission (rate per 100)	6.68		5.48
In-Hospital Hip Fracture (Elderly Patients) (rate per 1,000)	1.69		0.00
Nursing-Sensitive Adverse Events (Medical Patients) (rate per 1,000)	14.26		10.00
Nursing-Sensitive Adverse Events (Surgical Patients) (rate per 1,000)	21.88		10.00
Obstetric Trauma (Vaginal Delivery w/ Instrument) (rate per 100)	0.00		10.00
Obstetric Trauma (Vaginal Delivery w/o Instrument) (rate per 100)	0.76		4.48

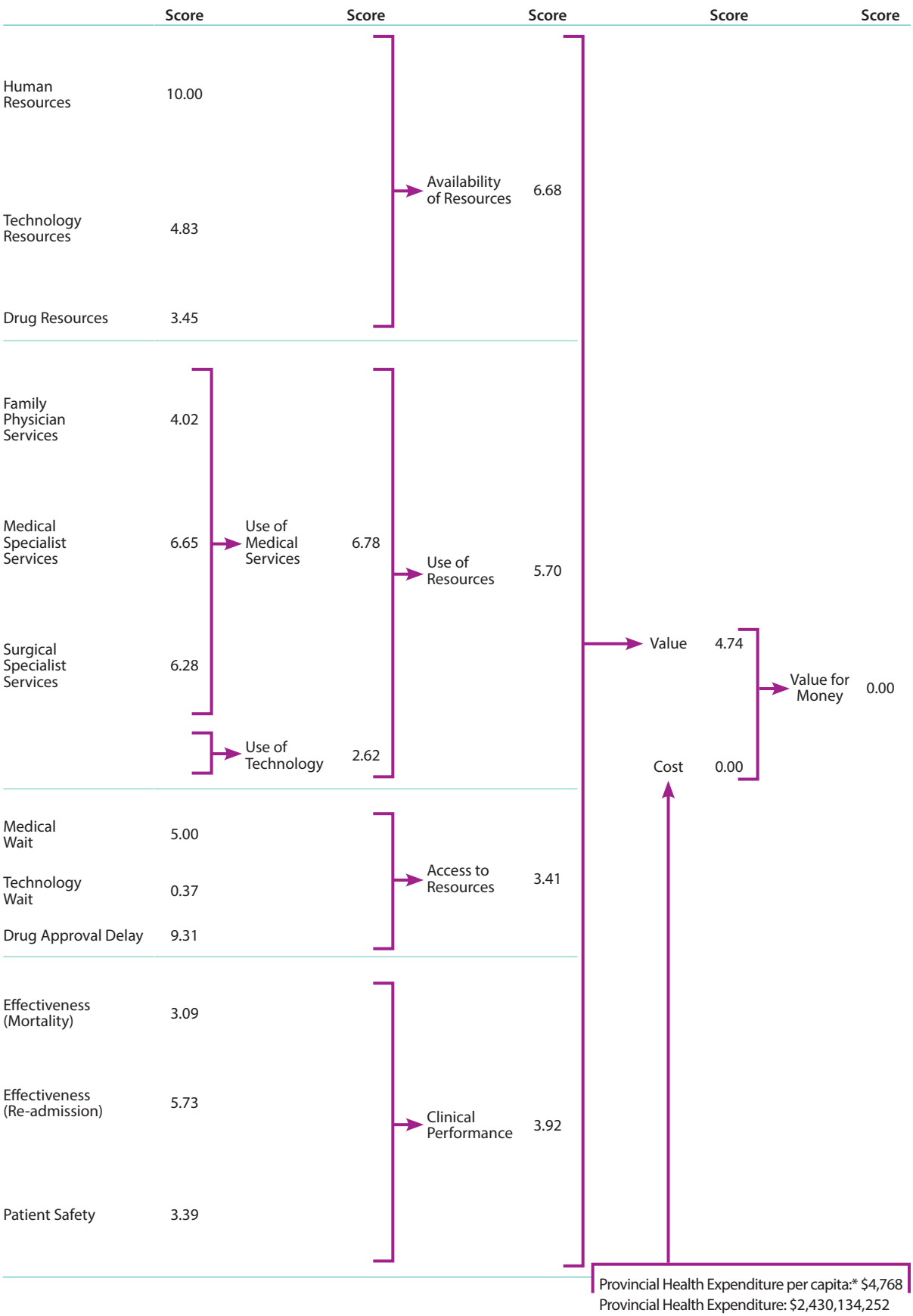
* For these indicators and components, lower values are given higher scores; p.t.p. = per 1,000 population.


Score
Score
Score
Score
Score
Human Resources
2.11
Technology Resources
1.96
Drug Resources
1.43
Availability of Resources
1.13
Family Physician Services
8.42
Medical Specialist Services
0.00
Surgical Specialist Services
0.00
Use of Medical Services:
0.00
Use of Technology:
0.47
Use of Resources
0.00
Medical Wait
0.00
Technology Wait
5.93
Drug Approval Delay
2.03
Access to Resources
0.00
Effectiveness (Mortality)
0.00
Effectiveness (Re-admission)
2.64
Patient Safety
10.00
Clinical Performance
4.23
Value
0.00
Cost
5.47
Value for Money
0.48
Provincial Health Expenditure per capita:* $3,968
Provincial Health Expenditure: $564,646,755

Newfoundland & Labrador

	Data	Data (p.t.p.)	Score
Family Medicine Physicians	604	1.19	9.92
Medical Specialists	398	0.78	8.14
Surgical Specialists	150	0.29	8.33
Registered Nurses (Direct Care)	5,296	10.39	10.00
Licensed Practical Nurses (Direct Care)	2,466	4.84	10.00
Nuclear Medicine Cameras	8	0.0157	5.56
CT Scanners	13	0.0255	10.00
MRI Scanners	3	0.0059	1.85
PET Scanners	0	0.0000	0.00
PET/CT Scanners	0	0.0000	0.00
SPECT/CT Scanners	3	0.0059	8.00
Total Drugs approved (% of NOCs)	23.20%		
Family Medicine: Consultations	191	0.37	0.00
Family Medicine: Major Assessments	28,467	55.85	0.00
Family Medicine: Other Assessments	2,069,354	4059.95	10.00
Family Medicine: Major Surgery	1,351	2.65	0.52
Family Medicine: Diagnostic/Therapeutic Services	110,937	217.65	1.48
Medical Specialists: Consultations	84,773	166.32	4.87
Medical Specialists: Major Assessments	44,420	87.15	1.53
Medical Specialists: Other Assessments	76,235	149.57	3.75
Medical Specialists: Major Surgery	10,743	21.08	10.00
Medical Specialists: Diagnostic/Therapeutic Services	264,308	518.56	5.55
Surgical Specialists: Consultations	114,699	225.03	6.44
Surgical Specialists: Major Assessments	71,756	140.78	4.93
Surgical Specialists: Other Assessments	115,511	226.63	3.26
Surgical Specialists: Major Surgery	35,836	70.31	3.56
Surgical Specialists: Diagnostic/Therapeutic Services	149,780	293.86	3.43
MRI exams	14,459	28.37	0.00
CT exams	80,461	157.86	6.05
	(weeks)*		
GP to Consult Wait	14.74		5.53
Consult to Treatment Wait	14.41		4.92
CT Wait	6.00		0.00
MRI Wait	11.00		5.56
Drug Approval Delay	48.57		
	(rates)*		
30-Day In-Hospital Mortality (Acute Myocardial Infarction) (rate per 100)	8.17		1.53
30-Day In-Hospital Mortality (Stroke) (rate per 100)	21.7		0.00
5-Day In-Hospital Mortality (Major Surgery) (rate per 1,000)	8.62		9.84
30-Day Medical Readmission (rate per 100)	13.16		6.68
30-Day Obstetric Readmission (rate per 100)	3.12		0.58
30-Day Pediatric Readmission (rate per 100)	5.97		9.82
30-Day Surgical Readmission (rate per 100)	6.51		6.51
In-Hospital Hip Fracture (Elderly Patients) (rate per 1,000)	0.87		8.28
Nursing-Sensitive Adverse Events (Medical Patients) (rate per 1,000)	28.97		0.87
Nursing-Sensitive Adverse Events (Surgical Patients) (rate per 1,000)	47.23		0.00
Obstetric Trauma (Vaginal Delivery w/ Instrument) (rate per 100)	2.71		4.76
Obstetric Trauma (Vaginal Delivery w/o Instrument) (rate per 100)	0.39		10.00

* For these indicators and components, lower values are given higher scores; p.t.p. = per 1,000 population.


Score
Score
Score
Score
Score
Human Resources
10.00
Technology Resources
4.83
Drug Resources
3.45
Availability of Resources
6.68
Family Physician Services
4.02
Medical Specialist Services
6.65
Surgical Specialist Services
6.28
Use of Medical Services
Use of Technology
2.62
6.78
Use of Resources
5.70
Medical Wait
5.00
Technology Wait
0.37
Drug Approval Delay
9.31
Access to Resources
3.41
Effectiveness (Mortality)
3.09
Effectiveness (Re-admission)
5.73
Patient Safety
3.39
Clinical Performance
3.92
Value
4.74
Cost
0.00
Value for Money
0.00
Provincial Health Expenditure per capita:* $4,768
Provincial Health Expenditure: $2,430,134,252

Conclusion

This study offers citizens and policymakers an opportunity to determine how well their province is performing relative to the rest of Canada. An overall measure of value for money is constructed by comparing the percapita cost of provincial healthcare systems to the per-capita availability of, use of, access to, and clinical performance of medical goods and services in each province.

As the results indicate, some provinces produce better value for money than others on specific healthcare indicators; however, this framework is designed to produce a measure of value for money from provincial healthcare systems aggregated across a number of key indicators outlined in the literature. While it does not assess government policies governing healthcare within individual provinces, the framework produced provides a good foundation for subsequent research assessing the relationship between value for money and specific provincial healthcare policies.

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Bacchus Barua is an Economist in the Fraser Institute's Centre for Health Policy Studies. He completed his B.A. (Honours) in Economics at the University of Delhi (Ramjas College) and received an M.A. in Economics from Simon Fraser University. Bacchus is the author of *Why We Wait: Physician Opinions on Factors Affecting Health Care Wait Times* as well as the lead author of *Hospital Report Card: British Columbia* (2011) and *Waiting Your Turn: Wait Times for Healthcare in Canada* (2010–2012).

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