

# Ranked Performance of Canada's Health System on the International Stage: A Scoping Review

## Classement du rendement du système de santé canadien sur la scène internationale : un examen de la portée



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### Abstract

*Introduction:* Since the release of the World Health Report in 2000, health system performance ranking studies have garnered significant health policy attention. However, this literature has produced variable results. The objective of this study was to synthesize the research and analyze the ranked performance of Canada's health system on the international stage.

*Method:* We conducted a scoping review exploring Canada's place in ranked health system performance among its peer Organisation for Economic Co-operation and Development countries. Arksey and O'Malley's five-stage scoping review framework was adopted, yielding 48 academic and grey literature articles. A literature extraction tool was developed to gather information on themes that emerged from the literature.

*Synthesis:* Although various methodologies were used to rank health system performance internationally, results generally suggested that Canada has been a middle-of-the-pack performer in overall health system performance for the last 15 years. Canada's overall rankings were 7/191, 11/24, 10/11, 10/17, "Promising" and "B" grade across different studies. According to past literature, Canada performed well in areas of efficiency, productivity, attaining health system goals, years of life lived with disability and stroke mortality. By contrast, Canada performed poorly in areas related to disability-adjusted life expectancy, potential years of life lost, obesity in adults and children, diabetes, female lung cancer and infant mortality.

*Conclusion:* As countries introduce health system reforms aimed at improving the health of populations, international comparisons are useful to inform cross-country learning in health and social policy. While ranking systems do have shortcomings, they can serve to shine a spotlight on Canada's health system strengths and weaknesses to better inform the health policy agenda.

## Résumé

*Introduction :* Depuis le dépôt du Rapport sur la santé dans le monde, en 2000, les études sur la classification du rendement des systèmes de santé ont attiré l'attention politique. Cependant, cette littérature a produit des résultats variables. L'objectif de la présente étude est de synthétiser la recherche et d'analyser la classification du rendement du système de santé canadien par rapport à la scène internationale.

*Méthode :* Nous avons mené un examen de la portée qui explore la place du Canada dans la classification du rendement des systèmes de santé parmi les pays de l'OCDE. Le cadre d'examen en 5 étapes d'Arksey et O'Malley a été utilisé, ce qui a permis de dégager 48 articles scientifiques et de la littérature grise. Un outil d'extraction de la littérature a été développé pour obtenir de l'information sur les thèmes qui ont émergé de la littérature.

*Synthèse :* Bien que plusieurs méthodologies aient été employées pour classer le rendement international des systèmes de santé, les résultats suggèrent en général que le Canada se situe en milieu de peloton pour ce qui est du rendement général en santé, et ce, pour les 15 dernières années. Les classifications générales du Canada étaient 7/191, 11/24, 10/11, 10/17, « prometteur » et cote « B » selon les diverses études. La littérature antérieure indique que le rendement du Canada était bon dans les secteurs de l'efficacité, de la productivité, de l'atteinte des objectifs du système de santé, des années de vie avec un handicap et de la mortalité due à un AVC. À l'opposé, le rendement du Canada est faible dans les secteurs liés à l'espérance de vie ajustée en fonction de l'incapacité, aux années potentielles de vie perdues, à l'obésité chez les adultes et les enfants, au diabète, au cancer du poumon chez les femmes et à la mortalité infantile.

*Conclusion* : Alors que les pays mettent en branle des réformes des systèmes de santé qui visent l'amélioration de la santé des populations, les comparaisons internationales sont utiles pour renseigner l'apprentissage entre pays sur la santé et sur les politiques sociales. Bien que la classification des systèmes présente certaines lacunes, elle peut servir à mettre en lumière les forces et faiblesses du système de santé canadien afin de mieux informer les politiques de santé.

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## Introduction

Since the release of the World Health Report *Health Systems: Improving Performance* in June 2000 (WHO 2000), international studies focused on health system performance ranking have been gaining momentum. Despite challenges associated with ranking systems (Forde et al. 2013; Papanicolas et al. 2013; Smith 2002), a general enthusiasm among academic and non-academic audiences for international ranked comparisons has evolved. Studies that compare countries on the international stage provide a general and simplified picture of the overall performance of complex health systems (Hewitt and Wolfson 2013). Although what is measured may not reflect the desired end-state of a healthcare system, ranked performance sets up a contest among countries with enhanced potential to attract the media, and thus the public and the policy makers. Writing about the attention that the World Health Report garnered, Navarro (2001) compared the report to the European soccer championship, which was being held around the same time as the release of the World Health Report: "for a short period it seemed the HCS (Health Care System) league was going to be as important as the European soccer games," (p. 21). Because rankings present a simple picture of health system performance, this information tends to have broad uptake by appealing to the media and the public at large. Comparisons made between peer countries have the potential to influence health and social policy with a goal to learn lessons from the "best" performers around the world (Murray and Frenk 2010).

Among comparative studies of ranked health system performance, Canada's performance results have been variable, with some suggestion that Canada has declined in the rankings over time. The Canadian ranking for life expectancy at birth, for instance, dropped from second to seventh place in relation to 19 comparator countries between 1990 and 2010, and from fourth to tenth place for years of life lost (Murray et al. 2013). At the same time, studies have suggested that Canada has performed well, at least in certain areas. For example, according to Murray et al. (2013), Canada was shown to perform well in years of life lived with disability and stroke mortality. These variable results have left many with a confusing picture of Canada's overall health system performance on the international stage. To address these disparate and somewhat contradictory findings, the objective of this scoping review was twofold: (1) to synthesize the existing literature on health system performance and rankings, and (2) to examine and summarize Canada's ranked health system performance to provide a clear picture of Canada's performance that can offer insights for policy makers and the public at large.

## Methodology

We adopted the five-stage scoping review framework developed by Arksey and O'Malley (2005): identifying the research question; identifying the relevant studies; defining inclusion and exclusion; charting the data; and collating, summarizing and reporting the results. Arksey and O'Malley (2005) define a scoping review as "a technique to 'map' relevant literature in the field of interest ... [which] tends to address broader topics where many different study designs might be applicable ... [and] is less likely to seek to address very specific research questions nor, consequently, to assess the quality of included studies." (Arksey and O'Malley 2005: p. 20)

Two reviewers (M.N. and T.S.) initiated the review with the question "What do we know about Canada's health system performance in the international context?" Initially, all MeSH (Medical Sub Headings) and keywords related to health system performance (Box 1) were identified and a search was conducted using various sources. The first reviewer (M.N.) searched online databases Medline, Scopus, CINAHL and Embase. The second reviewer (T.S.) searched Google scholar and websites of the World Health Organization (WHO), the Organisation for Economic Co-operation and Development (OECD), the Canadian Institute for Health Information (CIHI), the Conference Board of Canada and the Commonwealth Fund for grey literature.

### BOX 1. Search terms

- Health system performance OR
- Health system ranking OR
- Healthcare performance OR
- Healthcare ranking OR
- Performance measurement OR
- AND
- Developed countries OR
- Canada

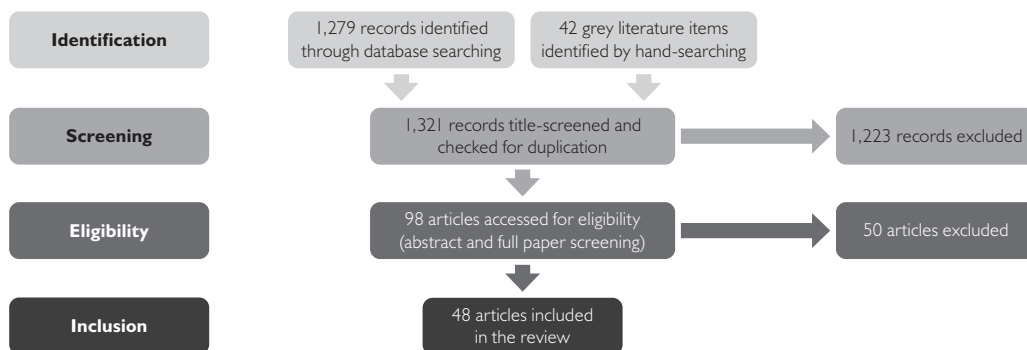
Our search terms and sources were broad enough to capture all types of study designs. The search process was iterative. As familiarity with the literature increased, the search terms and sources were redefined to allow more precise searches to be undertaken. The initial literature review increased familiarity with the concept and helped us systematically develop the inclusion and exclusion criteria (Table 1). Although definitions of "performance" were variable within the literature, we defined health system performance as "the capacity of a system to produce the highest attainable or most desirable outcome for indicators, while indicators measured one or many aspects of the health system" (Tchouaket et al. 2012). The two reviewers independently selected articles that ranked health systems based on their performance or that generally discussed ranking health system performance. Papers that did not rank health systems or studies that narrowly focused on subcomponents of health system performance such as efficiency, productivity, effectiveness, quality, accessibility, utilization and equity were excluded from the study. Our exclusion criteria were applied systematically to the best of our knowledge and the included papers represented the span of studies a scoping review usually captures.

**TABLE 1.** Inclusion and exclusion criteria for the papers

Inclusion criteria	Exclusion criteria
Ranked health system performance	Specifically focused on quality, efficiency, equity or accessibility, without linking them to performance
Generally about ranking health system performance	Not in English
Published in English between 2000 and 2015	Published before 2000 and after 2015
Focused on international health system performance rather than provincial	Compared only Canadian provinces and territories

The initial search yielded more than 1,000 sources. We performed a three-part selection process. Initially, the titles were reviewed independently by two reviewers (M.N., T.S.) to verify that each paper met the established inclusion and exclusion criteria. Then, the two independent reviewers screened the abstracts and full papers to include sources. The reviewers exchanged their list of sources to ensure shared understanding of the inclusion/exclusion criteria. Finally, a third reviewer (K.H.) examined the selections of the first two reviewers. Any uncertainty was followed up with discussion amongst the three reviewers to reach a consensus. The inclusion and exclusion criteria resulted in 48 retained sources (Figure 1). The literature was imported into the software program Ref Manager.

**FIGURE 1.** Flow chart



The two reviewers applied a qualitative approach using open coding and inductive reasoning to identify themes in the literature and to develop categories for further coding and sorting. The third reviewer observed the coding to ensure inter-reviewer reliability. The reviewers subsequently agreed on major themes and developed a literature extraction tool to obtain key information from the academic and grey literature. The data were extracted and were inputted directly into the literature extraction tool on an Excel spreadsheet. The extracted data were a mixture of general information about the studies, specific information relating to health system performance methodology and Canada’s health system performance. Empirical studies that included Canada were distinguished and charted in a separate table to provide in-depth information on Canada’s ranked performance. We synthesized

the extracted data and produced a preliminary findings report which was shared with the team and with an external expert panel for further comments. The research team members brought to the table a range of expertise in national and international health policy analysis, population health and health system performance. For the external panel, this project drew together national and international scholars in the fields of epidemiology, biostatistics, public health, international health policy, and clinical medicine. Comments from the team members and the external advisors were integrated, and a final summary of the synthesized findings was produced.

## **Synthesis**

The 48 sources in this review included academic and grey literature, empirical and conceptual papers, commentaries and editorials. Appendix 1 (available at: <http://www.longwoods.com/content/25191>) provides basic information on the 48 sources. Grey literature mainly came from the WHO, the Commonwealth Fund, the Conference Board of Canada, the OECD and the CIHI – organizations that maintain and report on national and international health-related databases. The time period of the performance data ranged from 1960 to 2010. Of the 48 sources included, the reviewers distinguished 12 empirical studies that explicitly ranked Canada on the international stage, and those 12 studies were charted separately in Table 2 and Appendix 2 (available at: <http://www.longwoods.com/content/25191>) for in-depth synthesis of Canada's ranked performance. On average, a three- to five-year interval existed between the time data were collected and the time a study was published using the same data.

The set of comparator countries varied across studies. For example, the original WHO World Health Report (2000) included 190 countries while other studies elected to assess a more narrowed set of OECD countries or "peer countries" (Table 2). Given that the comparator countries had noteworthy influence on rankings, some have argued that ranking performance among peer countries was a more plausible and appropriate pursuit compared to the indiscriminate inclusion of all countries in the original list. However, regardless of countries selected, in most studies peer countries were selected implicitly without establishing any clearly defined criteria. When criteria were explicitly specified, they most often included factors such as GDP per capita, population size, language, culture and history. One paper developed a model based on health outcome indicators and country characteristics to identify clusters of peer countries (Bauer and Ameringer 2010).

Major themes were categorized around health system performance methodologies and Canada's ranked health system performance. It is worth noting that even the health system performance methodologies identified in this review were generally related to Canadian context due to the bias for Canada in the inclusion and exclusion criteria. If there were other methodologies that did not include Canada in their ranking, they were excluded from this review.

## Ranked Performance of Canada's Health System on the International Stage: A Scoping Review

**TABLE 2.** A summary of methodologies for ranked performance and Canada's ranking

Author (year)	Title	No.	HSP methodology	HSP measurement indicators	Canada's overall/ranked performance
WHO (2000)	<i>The World Health Report 2000 – Health Systems: Improving Performance</i>	191	A composite of indicators as a measure of HSP: focused on objectives of the HS	Health status: DALE Responsiveness: Survey Fairness: Survey	<ul style="list-style-type: none"> <li>• Overall goal attainment: 7/191</li> <li>• Overall performance: 30/191</li> </ul>
Anderson and Hussey (2001)	<i>Comparing Health System Performance in OECD Countries</i>	26	Individual indicators as a measure of HSP on key subject areas	Individual indicators: (1) Immunization rate, smoking and alcohol consumption (2) Physicians and hospitals (3) MRI per million, coronary bypass and dialysis per 100,000 (4) DALE and PYLL (5) WHR Responsiveness (6) Health spending per capita and percentage of GDP	Compared to OECD median, Canada has: <ul style="list-style-type: none"> <li>• a lower immunization rate</li> <li>• higher smoking and lower alcohol consumption</li> <li>• higher physician visit per capita</li> <li>• lower MRI and higher coronary bypass and dialysis</li> <li>• higher DALE and LE</li> <li>• lower PYLL</li> <li>• higher spending</li> </ul>
Nolte et al. (2006)	<i>Diabetes as a Tracer Condition in International Benchmarking of Health Systems</i>	29	Disease as a tracer condition to assess HSP	Diabetes incidence and mortality	Diabetes mortality to incidence ratio: 6/29
The Conference Board of Canada (2006)	<i>Healthy Provinces, Healthy Canadians: A Provincial Benchmarking Report</i>	24	A composite of indicators as a measure of HSP: benchmarking all indicators together	Health status: 11 indicators Healthcare outcomes: 7 indicators Healthcare utilization: 1 indicator	Overall ranking: 11/24
Gay et al. (2011)	<i>Mortality Amenable to Healthcare in 31 OECD Countries: Estimates and Methodological Issues</i>	31	Mortality amenable to healthcare intervention	Amenable mortality	<ul style="list-style-type: none"> <li>• Nolte and McKee: 11/31 (male = 9; female = 12)</li> <li>• Tobias and Yeh: 15/31 (male = 11; female = 16)</li> </ul>
Tchouaket et al. (2012)	<i>HSP of 27 OECD Countries</i>	27	A composite of indicators as a measure of HSP: Donabedian's structure-process-outcome and effectiveness, efficiency and productivity	Health status: 27 indicators Resources: 21 indicators Health services: 20 indicators	<ul style="list-style-type: none"> <li>• Absolute performance (below average, average or above average): average</li> <li>• Relative performance (below average, average or above average): above average</li> <li>• Integrated overall performance (limited, weakly polarized, promising or satisfactory): promising</li> </ul>
Verguet and Jamison (2013)	<i>Performance in Rate of Decline of Adult Mortality in the OECD, 1970–2010</i>	22	Individual indicator as a measure of HSP: adult mortality	Female adult mortality	Ranking based on FAM: <ul style="list-style-type: none"> <li>• 1971–1980 = 15/22</li> <li>• 1981–1990 = 7/22</li> <li>• 1991–2000 = 15/22</li> <li>• 2001–2010 = 15/22</li> </ul> Ranking based rate of decline: <ul style="list-style-type: none"> <li>• from 1971–1980 to 1981–1990 = 6/22</li> <li>• from 1981–1990 to 1991–2000 = 17/22</li> <li>• from 1991–2000 to 2001–2010 = 13/22</li> </ul>

TABLE 2. Continued

Author (year)	Title	No.	HSP methodology	HSP measurement indicators	Canada's overall/ranked performance
Veillard et al. (2013), CIHI (2011, 2013)	<i>Methods to Stimulate National and Sub-National Benchmarking through International Health System Performance Comparisons: A Canadian Approach</i>	34	Individual indicators as measures of HSP: directional measures for four dimensions of HSP: (1) Health status, (2) Non-medical determinant, (3) Access and (4) Quality of care	Health status: 15 indicators Non-medical determinant: 6 indicators Access: 3 indicators Quality of care: 15 indicators	Compared to OECD average, Canada performs well on some indicators and needs improvement on others
Murray et al. (2013)	<i>UK Health Performance: Findings of the Global Burden of Disease Study 2010</i>	19	Individual indicator as a measure of HSP: benchmarking individual indicators	Mortalities and causes of death, YLL, YLD, DALY, HALE (259 diseases and injuries and 67 risk factors)	<ul style="list-style-type: none"> <li>• Age-standardized YLLs: 1990 = 4/19; 2010 = 10/19</li> <li>• LEB: 1990 = 2/19; 2010 = 7/19</li> <li>• Health-adjusted LEB: 1990 = 2/19; 2010 = 5/19</li> </ul>
Gerring et al. (2013)	<i>Assessing Health System Performance: A Model-Based Approach</i>	190	Composite index: economy–education, epidemiology, geography, culture and residual is modelled as public health index in which residual is considered as HSP	Health outcome: 9 indicators Culture and history: 2 indicators Education: 2 indicators Epidemiology: 3 indicators Geography: 11 indicators Economy: 3 indicators Miscellaneous: 8 indicators	Canada's overall ranking: 97/190
Davis et al. (2014)	<i>Mirror, Mirror on the Wall</i>	11	Composite: ranking based in individual indicators and averaging the ranks	Quality: 44 indicators Access: 12 indicators Efficiency: 11 indicators Equity: 10 indicators Healthy lives: 3 indicators	Canada's overall ranking: 10/11
The Conference Board of Canada (2015)	<i>International Ranking: Canada Benchmarked Against 15 Countries</i>	17	Composite: normalizing and averaging indicators	11 indicators: LEB; self-reported health status; premature mortality (PYLL); infant mortality; mortality from cancer; circulatory disease, respiratory disease, diabetes, musculoskeletal system, mental disorders and medical misadventures	Canada's overall grade: "B" Canada's overall ranking: 10/17

CIHI = Canadian Institute for Health Information; DALE = disability-adjusted LE; DALY = disability-adjusted life year; FAM = female adult mortality; GDP = gross domestic product; HALE = health-adjusted LE; HS = health system; HSP = HS performance; LE = life expectancy; LEB = LE at birth; MRI = magnetic resonance imaging; No. = number of countries compared; OECD = Organisation for Economic Co-operation and Development; PYLL = potential YLL; WHO = World Health Organization; WHR = World Health Report; YLD = years lived with disability; YLL = years of life lost.

## Health system performance methodology

Of the 48 sources included in this review, 12 used some method of ranking and included Canada among the countries ranked (Table 2). Each of the studies applied different frameworks, indicators and analytical methods. The four main groups of indicators included population health outcome indicators, disease-specific indicators, healthcare system indicators and indicators focused on the non-medical determinants of health. Population health outcome indicators (i.e., life expectancies, years of life lost and mortalities) were found in nearly all studies (Anderson and Hussey 2001; Davis et al. 2014; Gerring et al. 2013; Heijink et al. 2013; Murray et al. 2013; Nolte et al. 2006; Reibling 2013; Tchouaket et al. 2012;



The Conference Board of Canada 2006, 2015; Veillard et al. 2013; Verguet and Jamison 2013; WHO 2000). Some studies went beyond outcome indicators and included causes of death, disease incidence rates and mortality rates for specific diseases (Arah et al. 2005; Murray et al. 2013; Nolte et al. 2006; The Conference Board of Canada 2015). Healthcare system indicators typically comprised the number of physicians and hospitals, the volume of services and utilization rates. Indicators of health spending were also used to assess efficiency, fair financing and equity of access within the health system (Davis et al. 2014; Heijink et al. 2013; Reibling 2013; Tchouaket et al. 2012). Non-medical determinant indicators were generally related to smoking, alcohol and diet (Anderson and Hussey 2001; Hussey et al. 2004; The Conference Board of Canada 2006).

Numerous analytical methods were applied in ranking health system performance. Simple benchmarking approaches were the most common, in which a country's performance was ranked in relation to top and bottom performers (Davis et al. 2014; Tchouaket et al. 2012; The Conference Board of Canada 2006, 2015). Some studies used more complex methods to assess the performance of countries. One study applied cluster analysis to group countries with same level of performance (Tchouaket et al. 2012), and another applied a least squares regression model to control for broader social determinants of health such as education, economy and history and culture (Gerring et al. 2013). The choice of analytical methods depended on the conceptual framework used to assess health system performance.

The methodologies applied to assess health system performance fell into one of two categories: those that used a single health indicator as a proxy for health system performance, and those that developed an index for health system performance using many indicators. When single indicators were taken as a measure for health system performance, population health outcome indicators were the most commonly used (Murray et al. 2013; Verguet and Jamison 2013). The second category of studies used a number of indicators to create a single composite index for health system performance. Composite indices were created in multiple ways. The simplest approach was to sum indicators normalized along the same scale (Davis et al. 2014). Another approach combined indicators weighted according to theoretical or conceptual frameworks (Tchouaket et al. 2012; WHO 2000).

Caution was taken when interpreting findings, as all methods of ranking had limitations. For example, the method that used summary health indicators as a proxy for health system performance was criticized on the grounds that health was a function of the whole of society rather than just the health (care) system, and that health outcomes could not be attributed only to the activities of the health system (Arah et al. 2006; Handler et al. 2001; Kaltenthaler et al. 2004; Navarro 2001; Rosen 2001). Studies that simply added up indicators by giving them equal weight were also consistently criticized (Richardson et al. 2003; Wibulpolprasert and Tangcharoensathien 2001). The use of conceptual frameworks in performance assessment was generally applauded for acknowledging the complexity of health systems, but the way each framework was operationalized was often heavily criticized (Bhargava 2001;

Blendon et al. 2001; Deber 2004; Mulligan et al. 2000; Wagstaff 2002; Wibulpolprasert and Tangcharoensathien 2001). For example, the chief editor of the 2000 WHO report, Musgrove (2010) wrote 10 years after the report was published that “61% of the numbers that went into that ranking exercise were not observed but simply imputed” (p. 1546).

### Canada’s ranked health system performance

Canada’s ranked performance varied across the studies. Table 2 and Appendix 2 summarize Canada’s ranked health system performance in the 12 empirical studies. When ranked in numbers, Canada’s performance ranged from 6/29 for diabetes mortality-to-incidence ratio (Nolte et al. 2006) to 97/190 for overall health system performance (WHO 2000). Table 3 shows Canada’s ranked numbers in various studies, with each study applying different indicators, different frameworks, different comparator countries and different analytical methods.

**TABLE 3.** Summary of Canada’s ranked performance in numbers

Year	Author	Ranked for	Canada’s ranking
2000	WHO	Overall goal attainment	7/191
2000	WHO	Overall health system performance	30/191
2006	Nolte et al.	Diabetes mortality to incidence ratio	6/29
2006	The Conference Board of Canada	Overall health system performance	11/24
2013	Verguet and Jamison	Female adult mortality	15/22
2013	Murray et al.	Age-standardized years of life lost	10/19
2013	Murray et al.	Life expectancy at birth	7/19
2013	Gerring et al.	Overall health system performance	97/190
2014	Davis et al.	Overall health system performance	10/11
2015	The Conference Board of Canada	Overall health system performance	10/17 (B grade)

WHO = World Health Organization.

When not ranked in numbers, Canada was often compared to the OECD average. In these cases, Canada tended to achieve a middling performance (Anderson and Hussey 2001; Veillard et al. 2013) in terms of absolute performance, “above average” for relative performance and “promising” for “integrated overall performance” (Tchouaket et al. 2012).

Overall, we identified a number of themes regarding Canada’s ranked performance. First, Canada performed well for some indicators and poorly for others. When analyzed further, it was found that Canada’s rankings were higher for most population health outcome indicators but lower for complex indices of performance. Second, there was a sex difference in Canada’s ranking in the international stage, with some indicators of female health ranking lower than indicators of male health. Finally, Canada’s ranked performance tended to decline over time. In earlier decades, Canada’s ranked performance tended to be stronger, but a fall through the ranks is observable in more recent decades.

Canada's performance was variable depending upon the indicators selected. Some of the desirable rankings included Canada being placed 7<sup>th</sup> out of 191 countries in terms of overall goal attainment (WHO 2000). Canada's male life expectancy was 6/24 in 2006, male disability adjusted life expectancy (DALE) was 5/26 in 2001 and male potential years of life lost (PYLL) was 6/26 in 2001 (Anderson and Hussey 2001). Canada was found to be a top performer in terms of stroke care for years (Murray et al. 2013; The Conference Board of Canada 2006). Tchouaket et al. (2012) clustered Canada into a group of countries with higher levels of service, higher efficiency (outcome/resource) and higher productivity (services/resources). In terms of undesirable performances, Canada ranked 14<sup>th</sup> out of 26 countries for female DALE and 12<sup>th</sup> out of 26 countries for female PYLL in 2011 (Anderson and Hussey 2001). Canada ranked second last for female lung cancer rate and third last for female mortality from lung cancer (The Conference Board of Canada 2006). In 2013, Canada ranked 15<sup>th</sup> out of 22 countries for female adult mortality (Verguet and Jamison 2013). Veillard and colleagues found Canada had higher rates of overweight and obesity in adults and children, and higher rates of diabetes in adults compared to OECD average in 2013 (Veillard et al. 2013). The Conference Board of Canada gave Canada a "C" grade for infant mortality (The Conference Board of Canada 2015). Tchouaket and colleagues (2012) grouped Canada among countries with poorer resources, average outcomes and lower effectiveness (meaning the outcome was not to the level expected of the amount of services provided).

Despite the variability within the literature, Canada often ranked higher for summary population health outcome indicators compared to composite indices. In the 2000 WHO report, Canada ranked 12/191 for health status, which dropped to 30/191 for the overall health performance index (WHO 2000). In 2010, Canada's ranking for health-adjusted life-expectancy at birth was 5/19 and for age-standard years of life lost 10/19 (Murray et al. 2013). Around the same time, Canada ranked 10/11 for a composite index developed by the Commonwealth Fund combining 80 indicators (Davis et al. 2014), 10/17 for another composite index developed by The Conference Board of Canada combining 11 indicators (The Conference Board of Canada 2015) and 97/190 for a composite index of health system performance controlling for social determinants of health (Gerring et al. 2013).

Canada's rankings also had a sex dimension. Canada's ranking for female indicators of health were generally lower compared to its ranking for male indicators of health. For example, Canada's ranking for male DALE was 5/26, while for female DALE, it was 14/26; Canada's male PYLL was 6/26, while Canada's female PYLL was 12/26 (Anderson and Hussey 2001). The Conference Board of Canada (2006) found Canada second last for female lung cancer rate, and third last for female mortality from lung cancer.

Finally, in studies that tracked Canada's performance over time, there was a general trend of decline through the rankings. Canada's ranking for age-standard years of life lost has dropped from 4/19 in the 1990s to 10/19 in 2010, and for life expectancy at birth from 2/19 in the 1990s to 7/19 in 2010 (Murray et al. 2013). The Conference Board of Canada ranked Canada's overall health system performance at 11/24 in 2004, which dropped to 10/17 in 2015 – a three-rank drop if they were put in a same scale (The Conference Board of Canada 2006, 2015).

## Discussion and conclusion

When analyzing ranking studies, Hewitt and Wolfson (2013) urged the research community to carefully consider the aspects of health or healthcare being assessed; the relationship between indicators within the health system, as well as the reliability, accuracy and comparability of indicators, and the methods of ranking and analysis. As important as it is to note that not everything measured is necessarily valuable, synthesizing what is already measured can be useful. Our findings indicated that the heterogeneity in methodologies to assess ranked health system performance has led to the development of a diverse literature focused on different aspects of health system performance, yielding variable results. Some studies used simplistic methods of selecting one indicator as a proxy for health system performance, while others applied more intricate methods to create composite indices of health system performance. Despite the heterogeneity in methodologies, a growing literature on health system performance ranking suggests that the systematic compilation of results has the potential to add value by creating an overall picture of performance which can offer insight for policy makers in Canada as well as the public at large.

The time lag between data collection and research publication indicates that published research and analyses are not reflective of the current (the time of publication) performance of health systems. The consideration of time lag becomes more important when combined with political cycles of government and corresponding healthcare priorities and the lag effect of policies, as it often takes years before the impact of policy becomes evident on health at the population level. In today's world, the growing prevalence of timely data requires analytical tools to translate data into actionable knowledge promptly.

In terms of country rankings, it is not surprising to see Canada rank higher for some indicators and lower for others, but unpacking the themes around higher and lower rankings provides further insights. Canada's lower ranking is typically observed when a composite index is used to rank health system performance. For major population health outcome indicators, Canada tends to perform well. However, further research is required to understand the reason for Canada's declining ranking among studies that use composite indices. A decline in ranking has been observed over the last two decades, but it is important to note that this decline over time does not mean that Canada's performance has worsened (Nolte and McKee 2011). In terms of absolute numbers, for example, Canada's life expectancy improved from 77.2 in 1990 to 80.6 in 2010 (Murray et al. 2013). It is other countries that are improving at a higher pace than Canada. The slow improvement rate was found in one study in which Canada ranked 138 out of 191 countries for improvement rate between 1960 and 2010 (Gerring et al. 2013). A sex difference in Canada's ranking observed in various studies may be partially explained by poor performance of Canada's female indicators for lung cancer, evident from multiple studies included in this review.

Conclusions about Canada's middling performance must be interpreted carefully. Canada's middling performance is usually concluded as a result of Canada performing well on some indicators and poorly on others. But middle-of-the-pack performance is a relative assessment. It does not convey a sense of Canada's absolute performance. In a report by the Canadian

Institute for Health Information (CIHI 2016), this interpretation challenge is discussed in further detail. By ranking countries' performances, the absolute distance between the first and the second positions may not be the same as the absolute distance between the second and the third performing countries. Thus, a middling performance does not convey much about the absolute performance of the country but only its relative performance according to the set of comparator countries included in the analysis. It is worth noting that countries that are improving at a faster pace than Canada are aiming to be the best in the world. One of Canada's common peer countries, Australia, has been striving to match the best performers in the world, and in some cases appears to be improving at a higher rate than Canada (Ring and O'Brien 2008).

Our study had a number of limitations. We have missed some relevant sources because of the databases we included; time constraint between 2000 and 2015; exclusion of studies published in languages other than English; a specific focus on Canada and bias from our definition of performance that omits narrow aspects of performance such as equity, efficiency, effectiveness, quality, productivity, accessibility and utilization. Furthermore, it was an intentional decision on the part of the reviewers to focus on specific rather than broad. Therefore, this is not a comprehensive review of literature on health system performance, but an in-depth synthesis of literature on the ranking of health system performance. Although not comprehensive, we observed that the studies included were representative and reflected the patterns and trends in the literature. It is possible that our findings could have been influenced by particular expertise of the members of the team; however, we worked with an external expert panel to minimize that possibility. Unlike systematic reviews, scoping reviews often lack critical appraisal of the sources they include. Though we did not perform a systematic quality appraisal to include sources, we have distinguished empirical studies among the included sources.

In conclusion, ranking health systems based on the heterogeneity of frameworks, methodologies and indicators has three implications for policy. First, countries' rankings change in different studies. It should not be a cause for hasty media attention or policy decisions. Second, rankings are often reflective of certain aspects of health systems. Depending on what is being ranked, it is better that policy debates focus on specific aspects of a health system rather than the whole of the health system. Third, it is not the rank that offers the lesson, but what has been ranked and how. Ranking may be a good way to attract media and raise public awareness about aspects of the health system, but it has limited potential to offer valuable lessons for policy makers, health managers and frontline program implementers. Future research on international health system performance should move from studies that simply present rankings to studies that explore best practices within countries to facilitate cross-learning at the global level.

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