



# Improving Health System Efficiency in Canada

## Description of Methods



Canadian Institute  
for Health Information

Institut canadien  
d'information sur la santé

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For permission or information, please contact CIHI:

Canadian Institute for Health Information  
495 Richmond Road, Suite 600  
Ottawa, Ontario K2A 4H6

Phone: 613-241-7860

Fax: 613-241-8120

[www.cihi.ca](http://www.cihi.ca)

[copyright@cihi.ca](mailto:copyright@cihi.ca)

ISBN 978-1-77109-462-7 (PDF)

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How to cite this document:

Canadian Institute for Health Information. *Improving Health System Efficiency in Canada: Description of Methods*. Ottawa, ON: CIHI; 2016.

Cette publication est aussi disponible en français sous le titre *Améliorer l'efficacité du système de santé au Canada : description des méthodes*.

ISBN 978-1-77109-463-4 (PDF)

# Table of contents

Introduction .....	4
Governance .....	4
The case study approach .....	5
Data collection .....	7
Interview methods .....	7
Interview coding .....	8
Validation focus groups .....	8
Data analysis .....	9
Literature search and review .....	10
Appendix A: Key informant interview guide .....	11
Appendix B: Empirical literature consulted in the literature review .....	14
References .....	19

# Introduction

This document describes the methods used to undertake the study [\*Improving Health System Efficiency in Canada: Perspectives of Decision-Makers\*](#).

The Canadian Institute for Health Information (CIHI) has led a multi-phased initiative examining health system efficiency in Canada. This initiative provides insight into variations in efficiency across Canada and draws attention to key data and information gaps.

Phase 1: [\*Developing a Model for Measuring the Efficiency of the Health System in Canada\*](#) (2012) — CIHI conducted a policy scan, key informant interviews and a policy dialogue to develop a conceptual model for measuring health system efficiency. Data sources and relevant variables were identified to measure health system efficiency in Canada.<sup>1</sup>

Phase 2: [\*Measuring the Level and Determinants of Health System Efficiency in Canada\*](#) (2014) — CIHI applied the conceptual model from Phase 1 to spending and health outcome data, primarily from CIHI and Statistics Canada. Efficiency was operationalized as the effectiveness with which health systems use their resources to reduce premature deaths from treatable causes. Results suggested that health regions vary in their ability to improve efficiency; the regression model of efficiency scores at the regional level explained almost half of that variation.<sup>2</sup>

Phase 3: [\*Improving Health System Efficiency in Canada: Perspectives of Decision-Makers\*](#) (2016) — Using a descriptive multiple case study approach,<sup>3</sup> this phase expanded on CIHI's previous work to describe the contextual factors and mechanisms that influence health system efficiency in Canada. Specifically, this phase identified barriers and facilitators to improving efficiency at regional and provincial levels.

## Governance

CIHI formed an Expert Advisory Committee that included representatives from the ministries of health in Nova Scotia and British Columbia, a methodology expert in multiple case study methods and content experts in health system efficiency to help optimize the relevance, rigour and uptake of the findings of this report. The core CIHI team and the Expert Advisory Committee communicated frequently throughout the project's life cycle through teleconferences and email exchanges. The committee played a key role in validating the case selection, facilitating recruitment for the project by providing names of potential key informants and reviewing study findings to ensure accuracy and relevance for the target audience.

# The case study approach

The case study approach allows for an in-depth examination of the experiences in a particular context that may be applicable in other settings. In Phase 2: [Measuring the Level and Determinants of Health System Efficiency in Canada](#), CIHI found significant variations in health system efficiency across the country, with higher scores on average in B.C. than in the rest of Canada, and lower scores on average in Atlantic Canada. To better understand this variation, this study focused on 2 cases each in B.C. and Nova Scotia — 1 with relatively higher performance and 1 with relatively lower performance according to CIHI's study. For B.C., we selected Interior Health (higher efficiency than the average for Canada) and Northern Health (average efficiency). For Nova Scotia, we combined South Shore District Health Authority with South West Nova District Health Authority (higher-than-average efficiency) and Pictou County Health Authority with Guysborough Antigonish Strait Health Authority (lower-than-average efficiency).

Efforts were made to ensure that the population characteristics of the selected regions within each province did not differ substantially along several dimensions (e.g., demographic, socio-economic and population health characteristics). See tables 1a and 1b.

**Table 1a** Contextual factors for provinces and regions

Contextual factors	N.S.	Higher-than-average efficiency: South Shore/South West Nova, N.S.	Lower-than-average efficiency: Pictou County/Guysborough Antigonish Strait, N.S.	B.C.	Higher-than-average efficiency: Interior Health, B.C.	Average efficiency: Northern Health, B.C.
Seniors (65 and older) (2014)	17.7%	22.7%	20.8%	17.0%	21.7%	12.9%
Unemployment (2014)	9.0%	11.2%	12.7%	6.1%	6.6%	6.0%
Rural area population (2011)	44.7%	78.8%	64.3%	13.8%	32.1%	38.3%
Aboriginal population (2011)	2.7%	5.2%	2.5%	5.4%	7.6%	18.6%
Low-income population (2011)	12.9%	12.2%	10.0%	16.9%	12.0%	11.7%

## Sources

Canadian Institute for Health Information. [Your Health System](#). Accessed April 12, 2016.

Statistics Canada. [Table 109-5334: Unemployment rate, Canada, provinces, health regions \(2014 boundaries\) and peer groups, annual \(percent\)](#). CANSIM (database). Accessed April 12, 2016.

Statistics Canada. [Health Profile, December 2013](#). Accessed April 12, 2016.

BC Stats. [Custom population estimates](#). Accessed April 12, 2016.

**Table 1b** Health system factors for provinces and regions

Health system factors	N.S.	Higher-than-average efficiency: South Shore/South West Nova, N.S.	Lower-than-average efficiency: Pictou County/Guysborough Antigonish Strait, N.S.	B.C.	Higher-than-average efficiency: Interior Health, B.C.	Average efficiency: Northern Health, B.C.
<b>Smoking (2014)</b>	22.1%	22.4%	20.0%	14.3%	19.9%	22.6%
<b>Obesity (2014)</b>	27.8%	34.5%	30.5%	16.0%	17.8%	25.6%
<b>Physical activity during leisure time (2014)</b>	52.4%	47.7%	54.1%	61.7%	67.1%	60.7%
<b>30-day medical readmission (2013–2014)</b>	12.8%	12.5%	13.6%	14.3%	14.3%	13.5%
<b>30-day surgical readmission (2013–2014)</b>	6.5%	6.1%	6.7%	7.5%	7.9%	7.4%
<b>Patient days in alternate level of care (2013–2014)</b>	17.9%	24.5%	22.9%	11.9%	14.7%	21.3%
<b>Avoidable deaths from treatable causes, per 100,000 (2009 to 2011)</b>	68.8	63.8	62.9	51.8	53.5	68.6

**Sources**

Canadian Institute for Health Information. [Your Health System](#). Accessed April 12, 2016.

Statistics Canada. [Table 105-0501: Health indicator profiles, annual estimates, by age group and sex, Canada, provinces, territories, health regions \(2013 boundaries\) and peer groups, occasional](#). CANSIM (database). Accessed April 12, 2016.

Statistics Canada. [Table 102-4311: Premature and potentially avoidable mortality, three-year average, Canada, provinces, territories, health regions and peer groups, occasional](#). CANSIM (database). Accessed April 12, 2016.

Discharge Abstract Database, 2013–2014, Canadian Institute for Health Information.

# Data collection

## Interview methods

Semi-structured interviews were conducted with 42 senior decision-makers from the ministries of health and health regions in B.C. and Nova Scotia between October 2014 and May 2015. Potential participants were presently or recently employed as decision-makers, directors or clinical/executive leads.

On April 1, 2015, in the midst of our recruitment and interview process, the 9 regional health authorities in Nova Scotia underwent a reorganization into the Nova Scotia Health Authority, with no change to the IWK Health Centre.<sup>4</sup> This reorganization presented a challenge for our recruitment and interview process, as the 2 health regions we had identified as cases in Nova Scotia ceased to exist and governance was combined under the Nova Scotia Health Authority. Several potential key informants also changed roles or left the Nova Scotia Health Authority during this time. Therefore, our recruitment and interviews in Nova Scotia had greater provincial than regional representation. During our interviews, we were careful to clarify whether key informants were reflecting on their previous positions and health system organizations or the current health system structure.

An interview guide (see Appendix A) was developed based on a review and update of the literature collected in the previous 2 phases of the health system efficiency study and in consultation with the Expert Advisory Committee. The guide was piloted with 4 volunteers from senior levels of government in Ontario. The final interview guide asked key informants to reflect on health system efficiency in their region or province, including their perspectives on barriers and facilitators to improving health system efficiency. We used a modified Dillman's tailored method for recruitment.<sup>5</sup> Of the 46 potential key informants in B.C. who were contacted at least once, 23 were interviewed, for a recruitment rate of 50%. In Nova Scotia, 19 of 33 potential key informants contacted were interviewed, for a recruitment rate of 58%. Interview recruitment stopped once we reached saturation in content. Interviews took approximately 45 minutes to complete. We sought verbal consent from key informants for participation and audio recording before beginning the interview.

Interviewers (n = 3) wrote detailed reflexive notes after each interview. These reflexive notes highlighted overall themes and ideas discussed, as well as general impressions from the interview.

## Interview coding

Interviews were digitally recorded, transcribed verbatim, verified for accuracy and imported into NVivo 10.0 for thematic analysis. The interviews were inductively and deductively coded using the constant comparative method.<sup>6</sup> The coding frame was developed by the research team following an iterative process and revised to include emergent themes.

An initial set of interview transcripts was reviewed by the research team, and emergent themes were collated to develop the coding framework. As more interviews were coded, the coding framework was refined. A sample of interview transcripts was then coded by every member of the coding team to establish inter-rater reliability and to validate the application of the coding scheme.<sup>7</sup> A kappa score of 0.7 on a theme was considered an acceptable level of agreement. If any theme had a kappa of less than 0.7, the team reviewed theme definitions and application of the coding framework to ensure consistency of coding. Once a finalized framework was established and agreement on themes was greater than 0.7, the remaining interviews were coded independently by members of the research team.

## Validation focus groups

Following the preliminary analysis of the individual interview data, we invited key informants to a web-based focus group for each province. The purpose of these focus groups was to validate emergent themes from the interviews, to confirm participants' meaning and perspective, and to mitigate erroneous interpretation. Of the key informants we invited — 23 from B.C. and 19 from Nova Scotia — 5 attended from each province. In general, 4 is an acceptable minimum number of focus group participants.<sup>8,9</sup>



# Data analysis

The first phase of the analysis was descriptive, whereby the main themes related to health system efficiency presented by key informants from both provinces were documented. These themes represent broad categories under which the actions and challenges presented by key informants were organized and compared. The emerging themes are the following:

- Governance, leadership and accountability
- Information and data
- Partnerships and collaboration
- Coordination and integration of care
- Funding and capital investments
- Access and appropriateness of care
- Organizational culture
- Legislation, politics and policy
- Human resources
- Population health
- Ability to change/innovation
- Rural environment

Interview data was further analyzed and categorized as actions or mechanisms for improving efficiency (“doing well”), the challenges that key informants expressed in terms of improving health system efficiency (“needs improvement”) and general comments (“general”).

The second phase of the analysis was to interpret the key actions and challenges for health system efficiency according to the emerging themes. Interview extracts from each province for each of the emerging themes were reviewed again by at least 2 members of the research team to identify key actions and challenges for each theme. Actions and challenges were further distilled based on consensus among multiple team members and on the following criteria: importance (mentioned by several key informants) and actionability (key informants considered an action to be successful or potentially successful). Cross-cutting actions and challenges that touched on more than one of the preliminary themes were noted.

These actions and challenges were organized into 5 dimensions that reflected the perspective of key informants: performance monitoring for accountability and decision-making, system-level integration in governance and care delivery, partnerships outside the health sector to improve population health, physician engagement and remuneration, and flexible funding.

# Literature search and review

A literature search and review was undertaken after the data was analyzed to validate the study findings and to understand the contribution of the study to the broader literature.

A search protocol was applied to 2 databases of peer-reviewed publications (EconLit and Medline) and was limited to publications produced between 2000 and 2015. The keyword search included variations on the following terms: health system and efficiency, value for money, waste and productivity. The search protocol was also applied to web-based grey literature sources and specific sources identified through hand-searching. Snowball techniques were also applied to identify references from the sources already obtained. The search focused primarily on specific examples of efficiency improvement achieved in Canadian jurisdictions or in other countries in the Organisation for Economic Co-operation and Development (OECD) and their sub-national systems. The search also targeted high-profile reports that featured conceptual approaches and frameworks for efficiency improvement.

The search yielded 60 empirical studies (of which 38 were from, or featured systems in, the United States) and an additional 40 sources that were reports, reviews or commentaries on the topic of health system efficiency. Please see Appendix B for the list of citations featuring empirical studies included in the literature review.

# Appendix A: Key informant interview guide

Thank you for agreeing to participate in Phase 3 of our health system efficiency study. As a reminder, this study will explore how contextual factors and mechanisms influence regional variation in efficiency. We selected 2 provinces, Nova Scotia and British Columbia, for in-depth analysis, as well as 2 regions in each of the provinces. We hope that this work will identify enablers of efficient care delivery as well as challenges that could be addressed to improve the sustainability of Canada's health systems.

This telephone interview will be approximately 45 minutes. We are audiotaping the interview so we can analyze the information at a later date. Please note that we will keep all of your responses to the interview questions confidential. Quotations from your interview may be used in write-ups and/or presentations; however, the quotations will be anonymized and will not contain any information that allows you to be personally identified. We'd like to remind you that there are no right or wrong answers. Your perspective is important and we ask that you try to be specific in your responses, with examples if possible. If you do not understand a question, please feel free to ask for clarification.

Do you have any questions? Do you agree to proceed with the interview?

## **Introduction (5 minutes)**

1. Please describe your current position and role in the health system.

## **Care across the continuum (10–15 minutes)**

In the context of our current work, health system efficiency, in simple terms, refers to how effectively inputs (resources) are converted into outputs (achieved objectives). For example, inputs may include the major components of health spending — hospitals, physician services, pharmaceuticals, residential care facilities and community care — measured in dollars. Efficiency in CIHI's previous work was measured against the objective of Canadians having access to timely and effective health care when they are sick or need care. This broad objective was measured using reduced potential years of life lost due to treatable causes of death (such as hypertensive diseases).

2. How do you interpret CIHI's measure of health system efficiency as it relates to your [region/province]?
3. What has your [region/province] done to improve efficiency?

The next set of questions refers to your thoughts on efficiency for specific sectors.

4. What policies, delivery designs or practices, if any, have been implemented in your [region/ministry] that may directly or indirectly impact health system efficiency?
5. What are some of the components of overall health system organization that may directly or indirectly impact health system efficiency?
6. In thinking about these various sector inputs or resources that impact health system efficiency, such as hospitals, residential care, primary care, home care and public health, what is your [region/province] doing particularly well to address health system efficiency? Not doing so well?

### **Population health (10 minutes)**

The preceding questions focused on some of the inputs or resources that influence health system efficiency. Our previous work at CIHI has also demonstrated that population health characteristics, such as the prevalence of smoking, obesity, physical inactivity and chronic conditions, contribute to health system efficiency.

7. In thinking about health system efficiency, how does your health [region/ministry] address population health characteristics?
8. Can you provide specific examples of policies, delivery designs and/or practices in your [region/ministry] that aim to provide access to timely and effective health care for marginalized populations?

### **Wrap-up (10 minutes)**

9. Overall, from your perspective, what are the biggest facilitators to improving health system efficiency in your [region/ministry]?
10. Overall, from your perspective, what are the biggest barriers to improving health system efficiency in your [region/ministry]?
11. Are there any documents relating to efforts in your [region/province] to improve or monitor health system efficiency that you are willing to share with us?
12. Do you have any final thoughts or anything else you would like to share that we have not yet discussed that might be important?

We have finished with the main part of the interview. Now, we have a few logistical questions to ask.

13. Would you be interested in participating in a follow-up meeting/focus group to discuss preliminary results?

14. Are there any other individuals that you might suggest for us to interview (e.g., provincial/regional system planners, managers, clinicians)?
15. Would you be interested in receiving the product when published? Are there other people within the organization that may be interested in receiving the product?
16. What types of companion products related to this topic are of interest (reports, webinars, policy dialogues, etc.)?
17. Is there anything else we should keep in mind throughout the study?

Thank you for participating in the interview. We greatly appreciate your time and your input on health system efficiency. If you have any further thoughts regarding the interview or any relevant documents you'd like to share, please do not hesitate to contact me.

# Appendix B: Empirical literature consulted in the literature review

Alderwick H, Robertson R, Appleby J, Dunn P, Maguire D. [Better Value in the NHS: The Role of Changes in Clinical Practice](#). 2015.

Baker GR, Denis JL. [A Comparative Study of Three Transformative Healthcare Systems: Lessons for Canada](#). 2011.

Baker GR, MacIntosh-Murray A, Porcellato C, Dionne L, Stelmakovich K, Born K. [Chapter 2: Birmingham East and North Primary Care Trust and Heart of England Foundation Trust](#). In: *High Performing Healthcare Systems: Delivering Quality by Design*. 2008.

Baker GR, MacIntosh-Murray A, Porcellato C, Dionne L, Stelmakovich K, Born K. [Chapter 3: Veterans Affairs New England Healthcare System \(Veterans Integrated Service Network 1\)](#). In: *High Performing Healthcare Systems: Delivering Quality by Design*. 2008.

Baker GR, MacIntosh-Murray A, Porcellato C, Dionne L, Stelmakovich K, Born K. [Chapter 4: Jönköping County Council](#). In: *High Performing Healthcare Systems: Delivering Quality by Design*. 2008.

Baker GR, MacIntosh-Murray A, Porcellato C, Dionne L, Stelmakovich K, Born K. [Chapter 5: Intermountain Healthcare](#). In: *High Performing Healthcare Systems: Delivering Quality by Design*. 2008.

Baker GR, MacIntosh-Murray A, Porcellato C, Dionne L, Stelmakovich K, Born K. [Chapter 6: Henry Ford Health System](#). In: *High Performing Healthcare Systems: Delivering Quality by Design*. 2008.

Baker GR, MacIntosh-Murray A, Porcellato C, Dionne L, Stelmakovich K, Born K. [Chapter 7: Calgary Health Region](#). In: *High Performing Healthcare Systems: Delivering Quality by Design*. 2008.

Baker GR, MacIntosh-Murray A, Porcellato C, Dionne L, Stelmakovich K, Born K. [Chapter 8: Trillium Health Centre](#). In: *High Performing Healthcare Systems: Delivering Quality by Design*. 2008.

Bentley TKG, Effros RM, Palar K, Keeler EB. [Waste in the U.S. health care system: a conceptual framework](#). *The Milbank Quarterly*. 2008.

Bielaszka-Du Vernay C. [Vermont's blueprint for medical homes, community health teams, and better health at lower cost](#). *Health Affairs*. 2011.

The British Society of Gastroenterology, Bolton NHS Foundation Trust. [Alcohol Care Teams: Reducing Acute Hospital Admissions and Improving Quality of Care](#). 2011.

Charlesworth A. [Health care budgeting in the United Kingdom](#). In: Organisation for Economic Co-operation and Development. *Fiscal Sustainability of Health Systems: Bridging Health and Finance Perspectives*. 2015.

Cheng SM, Thompson LJ. [Cancer Care Ontario and integrated cancer programs: portrait of a performance management system and lessons learned](#). *Journal of Health Organization and Management*. 2006.

Duarte NT, Goodson JR, Arnold EW. [Performance management excellence among the Malcolm Baldrige National Quality Award Winners in Health Care](#). *The Health Care Manager*. 2013.

Duvalko KM, Sherar M, Sawka C. [Creating a system for performance improvement in cancer care: Cancer Care Ontario's clinical governance framework](#). *Cancer Control*. 2009.

East Midlands Ambulance Service NHS Trust. [Crisis Response Falls Team: Reducing Admissions and Repeat Falls](#). 2014.

Edwards JN, Silow-Carroll S, Lashbrook A. [Achieving Efficiency: Lessons From Four Top-Performing Hospitals](#). July 2011.

Fawcett KJ Jr, Brummel S, Byrnes JJ. [Restructuring primary care for performance improvement](#). *The Journal of Medical Practice Management*. 2009.

Ferris TG, Weil E, Meyer GS, Neagle M, Heffernan JL, Torchiana DF. [Cost savings from managing high-risk patients](#). In: Yong PL, Saunders RS, Olsen L, eds. *The Healthcare Imperative: Lowering Costs and Improving Outcomes: Workshop Series Summary*. 2010.

Fraser Health, Providence Health Care, Provincial Health Services Authority, Vancouver Coastal Health. [Improving Efficiency Through Lower Mainland Consolidation](#). 2014.

Hollander MJ, Kadlec H, Hamdi R, Tessaro A. [Increasing value for money in the Canadian healthcare system: new findings on the contribution of primary care services](#). *Healthcare Quarterly*. 2009.

Kirch DG, Grigsby RK, Zolko WW, Moskowitz J, Hefner DS, Souba WW, Carubia JM, Baron SD. [Reinventing the academic health center](#). *Academic Medicine*. 2005.

Kirkman-Liff B. [The structure, processes, and outcomes of Banner Health's corporate-wide strategy to improve health care quality](#). *Quality Management Health Care*. 2004.

Klein S, McCarthy D. [Gundersen Lutheran Health System: Performance Improvement Through Partnership](#). 2009.

Klein S, McCarthy D, Cohen A. [Health Share of Oregon: A Community-Oriented Approach to Accountable Care for Medicaid Beneficiaries](#). 2014.

Kumar A, de Lagasnerie G, Rouilleault D, Vammalle C. [Health care budgeting in France](#). In: Organisation for Economic Co-operation and Development. *Fiscal Sustainability of Health Systems: Bridging Health and Finance Perspectives*. 2015.

Larsson S, Lawyer P, Garellick G, Lindahl B, Lundström M. [Use of 13 disease registries in 5 countries demonstrates the potential to use outcome data to improve health care's value](#). *Health Affairs*. 2012.

McCarthy D, Cohen A. [The Colorado Beacon Consortium: Strengthening the Capacity for Health Care Delivery Transformation in Rural Communities](#). 2013.

McCarthy D, Klein S. [The Triple Aim Journey: Improving Population Health and Patients' Experience of Care, While Reducing Costs](#). 2010.

McCarthy D, Klein S, Cohen A. [Buffalo and Western New York: Collaborating to Improve Health System Performance by Leveraging Social Capital](#). 2014.

McCarthy D, Klein S, Cohen A. [Opportunity for Regional Improvement: Three Case Studies of Local Health System Performance](#). 2014.

McCarthy D, Nuzum R, Mika S, Wrenn J, Wakefield M. [The North Dakota Experience: Achieving High-Performance Health Care Through Rural Innovation and Cooperation](#). 2008.

McKinsey & Company. [Building capabilities so that improvements to clinical operations will last: frontline capability building improves care quality while lowering hospital costs](#). Accessed March 1, 2016.

McKinsey & Company. [By creating a performance-driven culture, a health system lowered costs and raised quality of care: clinical operations transformation — from front line to back office — yields lasting results](#). Accessed March 1, 2016.

McKinsey & Company. [Improving health and reducing hospitalization for target patient groups: integrated care approach brings double-digit decreases in emergency and nursing home admissions and reduces costs by more than 20 percent](#). Accessed March 1, 2016.



McKinsey & Company. [Integrating services helps lower length of hospital stay: regional health system integrates services to reduce length of stay and improve care](#). Accessed March 1, 2016.

McKinsey & Company. [Making change happen at an academic medical center: targeted changes in core hospital processes increase efficiency and reduce cost base](#). Accessed March 1, 2016.

McKinsey & Company. [Nursing excellence program improves staff retention and quality, and reduces costs: addressing the root causes of nurse attrition and absenteeism increases staff satisfaction, improves patient outcomes and saves money](#). Accessed March 1, 2016.

McKinsey & Company. [Strengthening primary care improves outcomes, lowers costs: giving primary care practices a stronger role can help stem rising healthcare costs](#). Accessed March 1, 2016.

McWilliams JM, Chernew ME, Landon BE, Schwartz AL. [Performance differences in year 1 of Pioneer accountable care organizations](#). *The New England Journal of Medicine*. May 2015.

NHS Greenwich. [Reducing Hospital Admission Rates for People With Diabetes: A Systematic Approach to Improving Primary Care Outcomes](#). 2013.

Nottingham University Hospitals NHS Trust. [Wireless Working in Hospitals: Improving Efficiency and Safety of Out-of-Hours Care](#). 2013.

Ouwens M, Wollersheim H, Hermens R, Hulscher M, Grol R. [Integrated care programmes for chronically ill patients: a review of systematic reviews](#). *International Journal for Quality in Health Care*. 2005.

Perlin JB, Kolodner RM, Roswell RH. [The Veterans Health Administration: quality, value, accountability, and information as transforming strategies for patient-centered care](#). *The American Journal of Managed Care*. 2004.

Pittenger KR. [Using production system methods in medical practice: improving medical costs and outcomes](#). In: Yong PL, Saunders RS, Olsen L, eds. *The Healthcare Imperative: Lowering Costs and Improving Outcomes: Workshop Series Summary*. 2010.

PWC. [HealthCast: Global Best Practices in Bending the Cost Curve](#). November 2012.

QIPP Safe Care Programme, Salford Royal NHS Foundation Trust, University of Central Lancashire. [Safety Express: A National Pilot to Deliver Harm Free Care](#). 2013.

Rangachari P, Hutchison MD. [A systems approach to improving core measure outcomes in a small rural facility](#). *Journal for Health Quality*. 2011.

Schilling L, Deas D, Jedlinsky M, Aronoff D, Fershtman J, Wali MA. [Kaiser Permanente's performance improvement system, part 2: developing a value framework](#). *The Joint Commission Journal on Quality and Patient Safety*. 2010.

Silow-Carroll S, Edwards JN, Rodin D. [How Colorado, Minnesota, and Vermont Are Reforming Care Delivery and Payment to Improve Health and Lower Costs](#). 2013.

Silver MP, Geis MS, Bateman KA. [Improving health care systems performance: a human factors approach](#). *American Journal of Medical Quality*. 2014.

Smith M, Saunders R, Stuckhardt L, McGinnis JM, eds. [Best Care at Lower Cost: The Path to Continuously Learning Health Care in America](#). 2013.

South Norfolk Healthcare Community Interest Company. [Peer-Reviewed Referral Management: Saving Money and Increasing Quality by Improving Referral Practice](#). 2013.

Steele G. [Strategies that work](#). In: Yong PL, Saunders RS, Olsen L, eds. *The Healthcare Imperative: Lowering Costs and Improving Outcomes: Workshop Series Summary*. 2010.

Thewiseen S, Jeurissen P, van der Vlugt G. [Health care budgeting in the Netherlands](#). In: Organisation for Economic Co-operation and Development. *Fiscal Sustainability of Health Systems: Bridging Health and Finance Perspectives*. 2015.

Van Citters AD, Larson BK, Carluzzo KL, Gbemudu JN, Kreindler SA, Wu FM, Shortell SM, Nelson EC, Fisher ES. [Four Health Care Organizations' Efforts to Improve Patient Care and Reduce Costs](#). 2012.

Wodchis WP, Williams P, Mery G. [Creating Strategic Change in Canadian Healthcare: Conference White Paper Working Drafts](#). 2014.

Wynn JD, Draffin E, Jones A, Reida L. [The Vidant Health quality transformation](#). *The Joint Commission Journal on Quality and Patient Safety*. 2014.

Yaggy SD, Michener JL, Yaggy D, Champagne MT, Silberberg M, Lyn M, Johnson F, Yarnall KS. [Just for us: an academic medical center–community partnership to maintain the health of a frail low-income senior population](#). *The Gerontologist*. 2006.

# References

1. Canadian Institute for Health Information. [\*Developing a Model for Measuring the Efficiency of the Health System in Canada\*](#). 2012.
2. Canadian Institute for Health Information. [\*Measuring the Level and Determinants of Health System Efficiency in Canada\*](#). 2014.
3. Yin R. [\*Case Study Research: Design and Methods\*](#). 2009.
4. Nova Scotia Health and Wellness Department. [\*Nova Scotia Health Authority\*](#). Updated April 1, 2015. Accessed February 2, 2016.
5. Dillman DA, Smyth JD, Christian LM. [\*Internet, Phone, Mail, and Mixed-Mode Surveys: The Tailored Design Method, 4th Edition\*](#). 2014.
6. Boeije H. [\*A purposeful approach to the constant comparative method in the analysis of qualitative interviews\*](#). *Quality & Quantity: International Journal of Methodology*. 2002.
7. Barbour RS. [\*Checklists for improving rigour in qualitative research: a case of the tail wagging the dog?\*](#). *BMJ*. 2001.
8. Krueger R, Casey M. [\*Focus Groups: A Practical Guide for Applied Research, 3rd Edition\*](#). 2000.
9. McLafferty I. [\*Focus group interviews as a data collecting strategy\*](#). *Journal of Advanced Nursing*. 2004.



## Talk to us

**CIHI Ottawa**

495 Richmond Road  
Suite 600  
Ottawa, Ont.  
K2A 4H6  
**613-241-7860**

**CIHI Toronto**

4110 Yonge Street  
Suite 300  
Toronto, Ont.  
M2P 2B7  
**416-481-2002**

**CIHI Victoria**

880 Douglas Street  
Suite 600  
Victoria, B.C.  
V8W 2B7  
**250-220-4100**

**CIHI Montréal**

1010 Sherbrooke Street West  
Suite 602  
Montréal, Que.  
H3A 2R7  
**514-842-2226**

**CIHI St. John's**

140 Water Street  
Suite 701  
St. John's, N.L.  
A1C 6H6  
**709-576-7006**