



A Performance Measurement Framework for the Canadian Health System

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Health System Performance



Canadian Institute
for Health Information

Institut canadien
d'information sur la santé

The page features decorative wavy lines in grey and teal that flow across the top and sides, framing the central content area.

Our Vision

Better data. Better decisions.
Healthier Canadians.

Our Mandate

To lead the development and maintenance of comprehensive and integrated health information that enables sound policy and effective health system management that improve health and health care.

Our Values

Respect, Integrity, Collaboration,
Excellence, Innovation

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Executive Summary

This paper presents the new framework proposed by the Canadian Institute for Health Information (CIHI) to measure health system performance from a pan-Canadian perspective. This framework is the foundation for CIHI's enhanced program of work on health system performance measurement and reporting. This work endeavours to support Canadian jurisdictions in their efforts to improve health system performance.

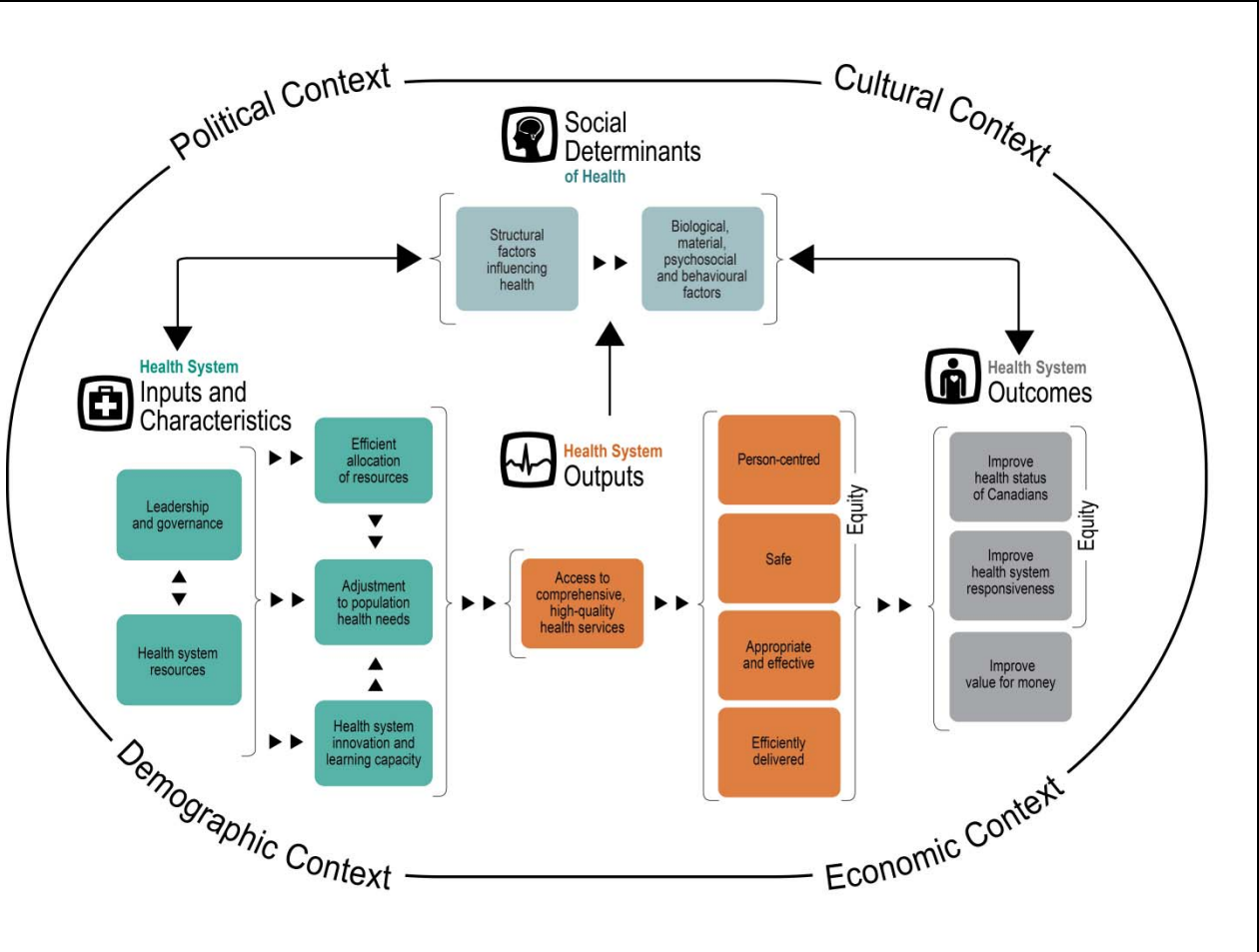
The framework presented in this paper aims to meet the health system performance information needs of the general public, policy-makers and health system managers in a way that is parsimonious and focused on the performance improvement priorities of jurisdictions. This framework builds on the previous CIHI–Statistics Canada Health Indicators Framework (published in 1999) and meets the following criteria: it takes into consideration the evolving performance information needs of its various users; it is grounded in the current state of scientific knowledge; and it is actionable, because it offers an analytical and interpretative framework that can be used to manage and improve health system performance.

The proposed health system performance measurement framework is composed of four interrelated quadrants: Health System Outcomes, Social Determinants of Health, Health System Outputs and Health System Inputs and Characteristics. Each quadrant is composed of different performance dimensions linked through expected causal relationships. These four quadrants sit within a demographic, political, economic and cultural context. The contextual environment influences the relationships among the dimensions of each quadrant and also the way they interact with each other.

The four quadrants of the framework are linked together in an expected causal chain, symbolized by the arrows connecting the quadrants and illustrating the nature of the expected relationships among the quadrants, with a focus on the end goal of better outcomes produced by a high-performing health system. While most performance frameworks are static, this framework views performance as a dynamic process where it is important to analyze the expected relationships among its different components, a view particularly useful for performance improvement.

As shown in this paper, the framework proposed by CIHI aligns largely with the health system performance improvement strategies and goals of Canadian provinces and territories.

Figure 1: CIHI's New Health System Performance Measurement Framework



Key Concepts and Definitions

Health system outcomes (framework quadrant 1) correspond to the intrinsic goals of the health system. These outcomes are the improvement of the level and distribution of health in the population, the health system's responsiveness to the needs and demands of Canadians and value for money to ensure health system sustainability.

Health status of individuals and the population covers three components: health conditions, health function and well-being.

Health conditions reflect the health problems and alterations of an individual that may lead to distress, interference with daily activities or contact with health services. They may be a disease (acute or chronic), disorder, injury or trauma, or they may reflect other health-related states such as pregnancy, aging, stress, a congenital anomaly or a genetic predisposition that can lead to death.

Health function corresponds to the general health status and functions of the population and is associated with the consequences of diseases, disorders, injuries and other health conditions. Health functions include body functions/structures (impairments), activities (activity limitations), participation (restrictions in participation) and life expectancy.

Well-being reflects the level of physical, mental and social well-being of individuals and of populations as it relates to material conditions, quality of life and sustainability of well-being over time.¹

Health system responsiveness corresponds to the capacity of the health system to respond to the needs and expectations of the population.² It also includes the element of trust in the health system, corresponding to the population's confidence in the health system³—that the system will be there for them and will respond to their needs.

Equity (in health status and system responsiveness) is an overarching health system outcome that encompasses the equitable distribution of health status and system responsiveness across socio-economic groups—the equity of the health system. This implies that “everyone should have a fair opportunity to attain their full health potential and, more pragmatically, that no one should be disadvantaged from achieving this potential, if it can be avoided.”⁴

Value for money is related to the system outcomes of health status, system responsiveness and equity of the health system. It is a measure of the level of achievement of these three goals compared with the resources used.²

Social determinants of health (framework quadrant 2) are represented in two levels:⁵ the structural and intermediary (biological, material, psychosocial and behavioural) factors that influence the health of a population and inequalities in health.

Structural factors influencing health are those that shape individuals' and families' socio-economic position, such as income and social status, education and literacy, and gender and ethnicity. Taken together, the structural factors can expose individuals to and make them more vulnerable to unhealthy conditions.

Biological, material, psychosocial and behavioural factors are collectively referred to as "intermediary determinants of health." Biological factors include genes, aging processes and sex-linked biology. Material circumstances include characteristics of neighbourhoods, housing, working conditions and the physical environment. Psychosocial circumstances include stress, an individual's sense of control and social support networks. Behavioural factors include such things as smoking, physical exercise, diet and nutrition. There are interrelationships among these intermediary factors, as there are between intermediary and structural factors influencing health.

Health system outputs (framework quadrant 3) are the services delivered that result from activities undertaken by the organizations and individuals that are a part of the health system. The dimensions within the Health System Outputs quadrant describe the characteristics that contribute to the quality of the services. These characteristics apply to all services delivered by the health system, including public health and health promotion and disease prevention services delivered to populations, as well as services delivered to individuals, for example, hospital, physician, mental health or long-term care health services.

Access to comprehensive, high-quality health services corresponds to the range of health services available, including public health, health promotion and disease prevention services, and the ability to meet the needs of the population or an individual without time delay, financial, organizational or geographical obstacles standing in the way of seeking or obtaining health services. The attributes of "high-quality" health services are defined by the other dimensions in this quadrant and encompass the definition of quality developed by the Institute of Medicine.

Person-centred health services are respectful of and responsive to the preferences, needs and values of individuals and ensure that their preferences guide all clinical decisions. This also refers to the integration of and connections across health system structures, functions, sectors and professionals that put the individual receiving services and his or her informal caregivers at the centre of delivery and that support continuity of care.

Safe health services are those that avoid injuries to individuals from the care that is intended to help them.

Appropriate and effective health services are provided based on scientific knowledge about who could benefit from the service, reducing the incidence, duration, intensity and consequences of health problems. Services are appropriate and effective when they are provided to all who could benefit and when person-centred decisions are made to refrain from providing services to those not likely to benefit.

Efficiently delivered health services avoid waste, including waste of equipment, supplies, ideas and energy. This corresponds to the technical efficiency of the health system and refers to maximizing outputs (services) for a given level and mix of inputs (resources), or minimizing the inputs used to deliver a given level and mix of outputs.

Equity (in health system outputs) refers to the capacity of the health system to deliver comprehensive, high-quality outputs (services) to individuals and populations in an equitable way, without the imposition of financial or other barriers to receiving care that is person-centred, safe, appropriate and effective, and efficiently delivered.

Health system inputs and characteristics (framework quadrant 4) refer to the relatively stable characteristics of the health system, including the governance and leadership capacities in the system, the resources available for use, the distribution and allocation of those resources, the capacity to adjust and adapt to meet population health needs, and the innovation and learning capacities of the system.

Leadership and governance involve ensuring that strategic policy frameworks exist and are combined with effective oversight, coalition-building, the provision of appropriate regulations and incentives, attention to system design and accountability.⁶

Health system resources are the financial, human, physical, technical and informational (including evidence and high-quality data) resources that are available to the health system.

Innovation represents the implementation of an internally generated or borrowed idea—whether pertaining to a product, device, system, process, policy, program or service—that was new to the organization at the time of adoption.⁷

Learning capacity in the health system refers to the extent to which the system is “skilled at creating, acquiring, and transferring knowledge, and at modifying its behavior to reflect knowledge and insights.”⁸

Efficient allocation of resources measures how resources are combined to produce health services to meet the population-based demands and needs of a society.⁹

Adjustment to population health needs refers to the capacity of the health system to continually adapt itself to meet the health needs of the population through innovation and learning and also by adjusting the allocation of resources.

1.0 Why Having a Health System Performance Measurement Framework Matters

In 1999, the Canadian Institute for Health Information (CIHI) and Statistics Canada developed a conceptual framework for their joint Health Indicators initiative, using a series of consultations with health system stakeholders. The framework is well-accepted nationally and is internationally recognized: in 2010, it was endorsed as an international technical standard by the International Standardization Organization.

The Health Indicators Framework is a classification framework for health system performance and population health indicators; it was not designed to explain the expected relationships between various dimensions of health system performance. In contrast, other performance measurement frameworks, such as balanced scorecards or strategy maps,^{10–12} aim to align performance measurement with specific objectives pursued by organizations and/or systems.

While the CIHI–Statistics Canada Health Indicators Framework—recognized internationally as one of the most robust health system performance measurement frameworks—is a strong starting point, adjustments are needed to develop it into a dynamic and actionable framework that can be used to support health system performance improvement. In addition, the CIHI–Statistics Canada Health Indicators Framework does not reflect scientific developments in understanding performance measurement and improvement that have occurred since 1999, nor the more recent emphasis put by governments on value for money, patient safety or patient-centredness.

This paper proposes a unifying health system performance measurement framework that is designed to support the performance improvement priorities of Canadian jurisdictions by reflecting the expected causal relationships among dimensions of health system performance.

To meet the health system performance information needs of health system managers and policy-makers, as well as those of the general public, a sound health system performance measurement framework should take into consideration the evolving performance information needs of its various users; be grounded in the current state of scientific knowledge; and offer an analytical and interpretative framework, which has been theoretically justified, that can be used to manage and improve health system performance.

The desirable characteristics of a sound health system performance measurement framework oriented toward performance improvement are the following:

- **Comprehensiveness:** The framework should incorporate a wide range of performance dimensions that are clearly positioned within the boundaries of health systems.
- **Integrated:** The framework should include various models and different theoretical and disciplinary perspectives on performance.
- **Theoretically justified:** The choice of performance dimensions should be built on robust theoretical foundations.

- **Actionable:** The framework should be designed to be amenable to action and show the expected causal relationships between its performance dimensions.
- **Strategically aligned:** The framework should reflect health system improvement priorities of jurisdictions while keeping within its theoretical foundations.

2.0 Description of CIHI's Health System Performance Measurement Framework

The framework presented in this paper builds on the CIHI–Statistics Canada Health Indicators Framework. However, its purpose is not to classify performance information but rather to measure the performance of the health system against intermediate and ultimate goals and to support Canadian jurisdictions in their efforts to improve health system performance. The proposed framework does this by providing a structure that enables health system managers and policy-makers to assess health system performance and to compare their results with those of their peers, as well as to learn from each other and from the best available evidence.

Within the framework, *outputs* (the delivery of health services to individuals or to populations) produced by the health system are considered *intermediate* objectives and correspond to the capacity of the health system to provide access to timely, continuous and effective health services. Health system *outcomes* refer to the actual and perceived *ultimate* goals of the health system for individuals and for the general population.

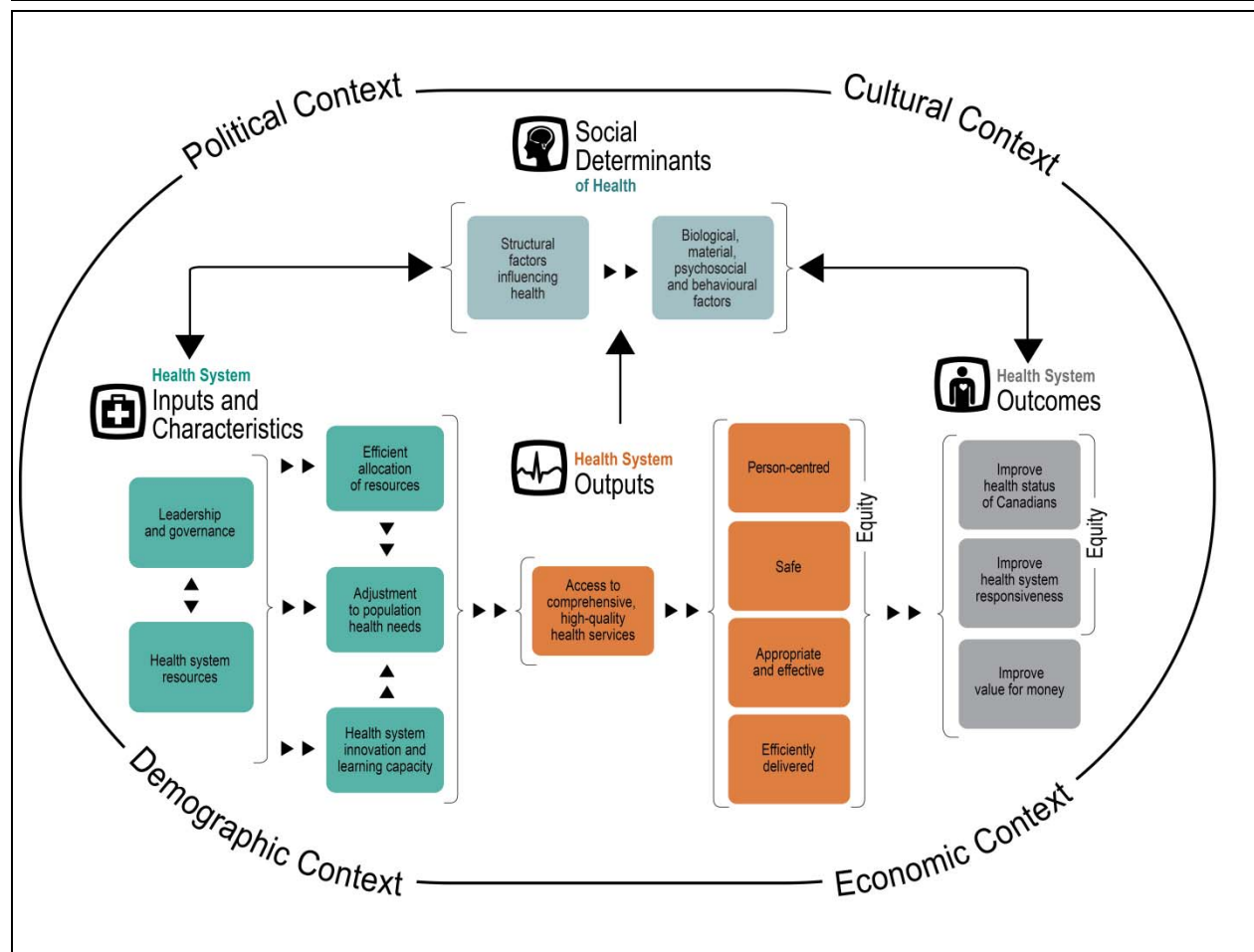
This framework aims to be actionable by showing the theoretical relationships between its various components and the achievements of the goals pursued by the health system, all within a given context.

Health systems are defined as “all activities whose primary purpose is to promote, restore, and maintain health”¹³ and therefore include both health care services provided to individuals and groups as well as public health services and policies. Health care services include preventive, diagnostic, therapeutic, rehabilitative and palliative care services targeted to individuals or specific population groups, whereas public health activities consist of health surveillance and protection, health promotion and disease prevention activities that focus on health determinants that apply to the entire population.

Similar to the Health Indicators Framework, the proposed health system performance measurement framework (Figure 1) is composed of four interrelated quadrants: Health System Outcomes, Social Determinants of Health, Health System Outputs and Health System Inputs and Characteristics (Appendix B highlights the relationship between the two frameworks). Each of the four quadrants is composed of different performance dimensions linked through expected relationships. The four quadrants sit within a demographic, political, economic and cultural context. The contextual environment influences the relationships among the dimensions of each quadrant and also the way they interact with each other. An assessment of how well the health system achieves its intermediate and ultimate goals cannot be done without considering all performance dimensions and contextual elements included in this framework.

The quadrants and performance dimensions of the framework are described below, starting with the outcomes or ultimate goals of the health system and working back through the quadrants that support the achievement of those outcomes.

Figure 1: CIHI's New Health System Performance Measurement Framework



2.1 Health System Outcomes

This quadrant reflects the high-level outcomes that are the ultimate goals of the health system, corresponding to the expectations of Canadians and of health system stakeholders. Three different goals can be considered ultimate goals and are largely consistent with other international frameworks: the health status of Canadians, the responsiveness of the health system and value for money. The dimension of equity spans the first two of these goals and other dimensions of the framework, as shown in Figure 1.

- The first and defining goal of the health system is to improve the health status of the population,² where “health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.”¹⁴ As such, this dimension is subdivided into three elements: health conditions, human functioning and well-being. *Health conditions* reflect health problems and alterations of health status such as diseases, disorders and

injuries. These conditions can be measured in the population by incidence rates or condition-specific mortality rates. *Human functioning* refers to the more general health status and functioning capacity of the population associated with the consequences of diseases and disorders; it can be measured by potential years of life lost or healthy life expectancy. Finally, *well-being* reflects the level of physical, mental and social well-being of individuals and of populations as it relates to material conditions, quality of life and sustainability of well-being over time.¹

- The health system must provide services and improve population health in a way that meets the needs and expectations of the people it serves,¹⁵ in accordance with the values of society. This is a second ultimate health system goal that the World Health Organization (WHO) calls health system responsiveness.² Trust corresponds to the population's confidence in the health system;³ it results from the quality of interactions between patients and providers and the congruence between the health system and societal values.¹⁶ Some authors argue that the organization and practices of the health system should be driven by dominant shared values.^{16, 17}
- The health system outcomes discussed above can be considered in terms of level of attainment for the overall population as well as from a perspective of equitable distribution of health status and system responsiveness across socio-economic groups—the equity of the health system. This implies that “everyone should have a fair opportunity to attain their full health potential and, more pragmatically, that no one should be disadvantaged from achieving this potential, if it can be avoided.”⁴
- Value for money is the third ultimate goal and is related to the three described above since it measures the level of achievement of these goals compared with the resources used.² Therefore, value as defined here is concerned with the ability of the health system to balance the allocation of resources to obtain the best outcomes (health status, health system responsiveness and equity) for the resources used.¹⁸

2.2 Social Determinants of Health

*A New Perspective on the Health of Canadians*¹⁹ proposed an initial framework that considered for the first time the determinants of health and drew attention to the need to act on them to improve the health status of the population. This statement emphasized the importance of public health policies to improve the health status of the population.²⁰ Recent work by Wilkinson and Marmot for the 2008 WHO report on social determinants of health⁶ outlines the “remarkable sensitivity of health to the social environment.” While the health care system can prolong survival and cure people of diseases, the improvement of population health depends largely on public health policies and on broader governmental action. Indeed, public policy in general can “play [a role] in shaping the social environment in ways conducive to better health.”²¹ Numerous environmental and social determinants of health have been described in the literature, including poverty, working conditions, social support, unemployment, social position, transport policy, socio-economic status and physical environment.^{19–24}

In this framework, we draw on the work by Solar and Irwin for the Commission on Social Determinants of Health set up by the WHO.⁵ There are social, cultural, political and economic factors that are understood to give rise to a set of unequal socio-economic positions. These are

reflected in the contextual component of this framework and include processes such as governance, macroeconomic policy, social and public policies, cultural and societal values and epidemiological conditions.ⁱ

The social determinants of health are shown in the framework at two levels:⁵ structural and intermediary factors. Structural factors influencing health are those that shape individuals' and families' socio-economic position, such as income and social status, education and literacy, and gender and ethnicity.^{ii, 25} Structural factors influence health over the life course, as advantages and disadvantages accumulate over time.^{26, 27} For example, a mother's life circumstances, partly through their influence on maternal behaviours, will have an impact on fetal growth and development, which may, in turn, have longer-term influences on health in childhood and adulthood.²⁸ Parental income and education also affect child health, as well as the child's longer-term educational and health outcomes. Moreover, the deleterious effects on health of living in persistent poverty accumulate over the life course.²⁹

Taken together, these structural factors can expose individuals to and make them more vulnerable to unhealthy conditions. These conditions include material and psychosocial circumstances and behavioural and biological factors, which are collectively referred to as "intermediary determinants of health."⁵ *Biological factors* include genetic endowment, aging processes and sex-related biology. These factors can have a profound influence on health, often in complex interactions with the environment. *Material circumstances* include the characteristics of neighbourhoods, homes, workplaces and the physical environment.^{6, 30} These environments can be health promoting or they can present health risks. The *psychosocial circumstances* that may contribute to health or illness include stress, an individual's sense of control and a person's social support networks.^{21, 25, 31} In addition, there are numerous *behavioural factors* that can affect health. These include smoking, physical exercise, and diet and nutrition.^{iii, 21, 25, 31, 32} While individuals' behaviours are influenced by their early life experiences and the environments in which they live, it is also important to acknowledge individuals' responsibility over health and healthy behaviours and, by doing so, to empower them in their responses to these experiences and environments. Together, all of these intermediary factors can affect an individual's health, and they are important for our understanding of what shapes the health of the population as well as inequalities in health.²⁰

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- i. For example, social policies that help individuals who are unemployed or poorly housed maintain an adequate standard of life, combined with taxation policies that redistribute income from richer to poorer individuals, contribute to a less unequal distribution of socio-economic status in a society.
 - ii. It is important to note that considerations of ethnicity (and race) have a particular complexity in societies, such as Canada's, that have colonial settler histories. From the determinants of health perspective, Aboriginal peoples in Canada—First Nations, Inuit and Métis—have specific histories and relationships with settler society that means they cannot simply be grouped together, nor grouped with other non-indigenous ethnic groups. These histories are shaped by the legacy of colonialism, which includes the destruction of culture, language and identity; the dispersal of families and family supports; and the experiences of the residential school system, all of which have a bearing on the determinants of health.⁸⁶
 - iii. Solar and Irwin characterize health systems as an intermediary determinant of health that can "directly address differences in exposure and vulnerability not only by improving equitable access to care, but also in the promotion of intersectoral action to improve health status."⁵ The intent of Solar and Irwin's model, however, is to depict the social determinants of population health. It is not a model of health system performance. In the health system performance framework, therefore, the relationships between the health system and the determinants of health are depicted differently.

As noted above, broad governmental and intersectoral action is needed to address the social determinants of health. The health system has an important role to play. On the one hand, the health system directly organizes activities to address the intermediary determinants of health through its traditional public health functions. These include ensuring air, food and water safety and providing disease prevention and health promotion activities. The health system can also take a leadership role in coordinating activities across the different sectors of government (intersectoral action) and in developing healthy public policies.^{33, 34} Additionally, it has been argued that a more efficient health system could allow resources to be reallocated to other sectors,³⁵ which could influence the structural factors influencing health (such as by increasing minimum wages or investing in early childhood education).

2.3 Health System Outputs

The Health System Outputs quadrant groups dimensions that relate to characteristics of the health services (or outputs) produced by the health system, including both the health care system and public health and health promotion services.³⁶ This quadrant can be broken down into two different components. The first component represents the capacity of the system to deliver high-quality services, including health promotion and disease prevention, to individuals and to the population in an equitable way. The second component reflects the quality attributes of health services delivered: services must be person-centred (individuals and patients see services as being organized around them and integrated, including public health services), safe, appropriate and effective, and efficiently delivered. According to the scientific literature, the accessibility of comprehensive, publicly funded and high-quality health services influences several of the characteristics of health services, especially experiences of individuals,^{37, 38} safety^{39, 40} and effectiveness of care^{41, 42} (see Example 1 following).

- Access to comprehensive, high-quality health services refers to the capacity of the health system to offer the range of services that meets the needs of individual patients and of the population⁴³ in a timely fashion without financial, organizational or geographical barriers to seeking or obtaining those services.⁴⁴ It reflects the degree of fit between the characteristics of the health services resources provided and the needs of the population.^{17, 44, 45} The comprehensiveness of publicly funded services available is an important aspect of this dimension. For example, services such as dental care and prescription drugs may be accessible to individuals who have private health insurance coverage, but if such services are not publicly funded in some way, there may be financial barriers to access for others.
- Person-centred services are integrated services that support patient experiences of continuity, reflecting “how patients experience care over time as coherent and linked; as a result of good information flow, good interpersonal skills, and good coordination of care.”⁴⁶ Integrated health services encompass the organizational and clinical arrangements that enhance connectivity and collaboration between health care providers across organizations, functions and sectors.^{47, 48} Additionally, the degree to which health services and health providers conform to and are responsive to individuals’ wants, needs and preferences⁴⁹ is reflected in the experience of individuals and patients in seeking, obtaining and receiving services. It corresponds to the interpersonal quality of care and to services where privacy, confidentiality, informed choice, honesty and empathy are the central elements that characterize the relationship between a patient and a provider of health services.³⁷

- Safe health services are those that avoid injuring patients with the care that is intended to help them.⁵⁰ While appropriateness of care is identified as a separate dimension, appropriate services are clearly linked to safe services, as delivering inappropriate services may expose individuals to unnecessary risks without the potential benefits.
- Appropriateness and effectiveness of health services represent the main components of technical quality of care⁵¹ and are based on the application of current scientific knowledge and clinical norms to achieve the most favourable balance of risks and benefits.⁵¹ Appropriateness reflects the extent to which health services provided to individuals are based on scientific knowledge about the benefits and risks of the services. Effectiveness of health services refers to the health outcomes attributable to the services delivered—reducing the incidence, duration, intensity and consequences of health problems. This also encompasses the appropriateness and effectiveness of population health interventions, such as those related to lifestyle, disease prevention and screening.
- Efficiently delivered health services represent the “maximum level of output that can be produced for a given amount of input under the prevailing technological process.”⁵² They result from optimizing the processes of care and the production of services in the health system.⁴⁵ Efficiency would be improved, for example, by delivering elective surgical procedures as day surgery, by shortening lengths of acute care stays by improving discharge planning and coordination, or by removing waste in the way services are delivered.

It is important to note that the outputs of the health system—the health services discussed in this quadrant—include all outputs that relate to the provision of health services, including acute, community, primary, continuing, rehabilitation, promotion and protection, and public health services. The quality attributes of being person-centred, safe, appropriate and effective, and efficiently delivered apply equally to all of these services, and they are all services that contribute to the achievement of the health system outcomes described in the fourth quadrant.

Example 1

The Influence of Health System Accessibility on Quality and Health Outcomes

In the Institute of Medicine’s 2001 report *Crossing the Quality Chasm*,⁵⁰ reducing delay for health care was one of the six aims for improving the quality and effectiveness of the health care system. Delays in access can occur at different points in the patient’s interaction with the health system. Thus the notion of accessibility encompasses all types of delay during the contact between a patient and a provider, such as delay for a medical appointment,⁵³ the waiting time in an emergency room⁵⁴ and delays for surgery after admission.^{55, 56} There is a strong association between these types of delay and health outcomes such as survival rate⁵⁵ and mortality rate.^{53, 54, 56}

2.4 Health System Inputs and Characteristics

The last quadrant is composed of dimensions that frame the health system and are considered prerequisites of health system performance. They correspond to “the relatively stable characteristics of [the health system providers of services], of the tools and resources they have at their disposal and of the physical and organizational setting in which they work”

(adapted from Donabedian, 1980⁵¹). Thus they represent factors that potentially explain performance² and can therefore be seen as levers of health system performance improvement. This quadrant is composed of five interrelated dimensions: leadership and governance; resources available for the health system to use; efficient allocation of those resources to health system activities and initiatives; health system innovation and learning capacity; and the capacity to adjust and adapt to better meet changing population health needs.

- Health system leadership and governance involve ensuring that strategic policy frameworks exist and are combined with effective oversight, coalition-building, the provision of appropriate regulations and incentives, attention to system design and accountability.⁶ In this framework, leadership and governance also refer to the capacity of the health system to lead and to coordinate strategies across sectors that can contribute significantly to the health of individuals and populations.
- Health system resources refer to the level of financial, human, physical (facilities), technical and informational (including the availability of high-quality data) resources available. These resources are mobilized and used by the health system to produce the goods and services required for the system to achieve its ends. Evidence is a key informational resource, and its availability and relevance is the cornerstone of performance improvement at all levels of the health system, as it informs and supports many types of decisions.⁵⁷
- Efficient allocation of resources measures how the resources available to the health system are allocated to the production of the various health services that reflect the population-based demands and needs within a society and enable the health system to achieve better outcomes.⁹
- Innovation refers to the implementation of internally generated or borrowed ideas—whether pertaining to a product, device, system, process, policy, program or service—that was new to the organization at the time of adoption.⁷ A learning system is one that is “skilled at creating, acquiring, and transferring knowledge, and at modifying its behavior to reflect knowledge and insights.”⁸ The learning capacity of the health system is not only a prerequisite for its ability to innovate and adapt to its environment,⁵⁸ it is also a pillar for quality and performance improvement.
- Adjusting to population health needs refers to the capacity of the health system to adapt and adjust to best meet the changing health needs of the population. This involves knowledge of the epidemiological profile of the population to understand health needs (including disease, disability, injuries and other health problems) so the allocation of resources can be adjusted to meet those needs.⁵⁹ It reflects the capacity of the health system to adapt to a changing environment of population needs.

The dimensions of this health system performance measurement framework, as illustrated and described above, are consistent with well-recognized international performance frameworks such as the Institute for Healthcare Improvement’s Triple Aim framework (see Appendix B). The Health System Outputs quadrant corresponds to the performance dimensions developed by the Organisation for Economic Co-operation and Development (OECD) in the Quality Indicators Project⁶⁰ and to dimensions from The Commonwealth Fund’s framework.⁶¹ Moreover, dimensions in the Health System Outcomes quadrant align with the performance assessment frameworks developed by the WHO,² the OECD⁶² and the Institute for Healthcare Improvement.⁶³ Finally, including the two remaining quadrants (Social Determinants of Health and Health System Inputs and Characteristics) provides a more integrated perspective and context to explain and analyze health system performance.

3.0 Ensuring That CIHI's Health System Performance Measurement Framework Aligns With Jurisdictional Priorities

The proposed framework provides a comprehensive and integrated structure for health system performance measurement. Its dynamic mapping of the expected relationships among the quadrants of the framework helps to explain performance and its determinants, as well as potential consequences of system changes and improvement efforts. In addition, we mapped the published strategic plans, priorities and objectives of Canadian jurisdictions to the performance dimensions of the framework and found a high degree of correspondence. As such, provinces and territories can use the performance measurement framework to map and understand relationships among the different dimensions and how these relationships support the achievement of their own health system objectives and performance improvement strategies.

3.1 A Dynamic Framework Supporting Performance Improvement Efforts of Jurisdictions

The four quadrants of the framework are linked together in an expected causal chain. These links are symbolized by the arrows connecting the different quadrants (Figure 1). While most performance frameworks are static, this framework views performance as a dynamic process, where it is important to map and analyze the expected relationships among its different components.⁶⁴ This dynamic view is particularly useful for a performance improvement approach.¹⁰ Performance itself is measured in terms of achievement of intermediate objectives and ultimate goals through the two quadrants of Health System Outputs and Health System Outcomes. The quadrants of Health System Inputs and Characteristics and Social Determinants of Health represent contextual factors that shape and explain health system performance. Correspondingly, the arrows shown in the framework illustrate the nature of the expected relationships among quadrants, with a focus on the production of better outcomes by a high-performing health system.

The first arrow, between the Health System Inputs and Characteristics and the Health System Outputs quadrants, corresponds to the capacity of the health system to adapt to its environment and respond to the health problems of the population⁶⁴ by using available resources (including scientific evidence) and improving the efficient allocation of those resources to meet changing population health needs, and through the innovation and learning capacities of the health system. These characteristics can shape the capacity of the health system to achieve its output goals and, indirectly, its outcome goals. Specifically, the availability and relevance of evidence, innovation and learning capacity and the efficient allocation of resources determines the quality of services,^{65, 66} patient safety⁶⁷ and the effectiveness of services^{65, 68} (see examples 2 and 3 below).

Example 2

The Influence of Health System Innovation on Safety of Care

The surgical checklist is a clinical process innovation that applies evidence-based practices and safety checks to the surgical setting. The use of this innovation increases patient safety and the effectiveness of care. A growing body of evidence shows that implementing checklists has led to fewer post-operative complications and unplanned re-operations, as well as decreased surgical site infection and in-hospital mortality rates.^{57–59} According to a study in eight hospitals, introducing a surgical safety checklist into operating rooms was associated with an average decrease of 36% in post-operative complication and mortality rates.⁵⁹

Example 3

The Need for Relevant Evidence to Improve Quality of Care

Relevant evidence, in the form of clinical guidelines, can have significant positive effects on the quality of care that health care professionals provide, and can therefore lead to improved health outcomes for patients.^{60, 61} The effects of evidence on quality of care are especially important in the provision of appropriate and effective care. In one study, physicians who received training about guidelines for influenza vaccinations were 21% more likely to give the appropriate influenza vaccination than those who had not received training.⁶²

A second arrow connects the Health System Outputs and Health System Outcomes quadrants and shows the contribution of health system outputs to the achievement of the health system's ultimate goals. The outputs of the health system should be aligned with its ultimate goals⁶⁴ to improve the health status of the entire population and to respond to population needs in a way that promotes equity and value for money. For example, avoidable mortality, a health status measure that reflects premature death in a population, is determined by the presence of timely and effective health care and public health interventions^{69, 70} (see Example 4 on the next page). Likewise, responsiveness and trust in the health system are influenced by the accessibility and quality of care that shape the capacity of the health system to meet the needs and expectations of the population.^{3, 15} All of these aspects can be explained by decisions in resource allocation, which should correspond to societal values.¹⁶ There are also numerous scientific studies linking appropriate, integrated, safe and evidence-based care with improvement in health system efficiency or value for money.^{71, 72} Thus the Health System Outputs quadrant represents one of the major determinants of the level of achievement of health system outcomes or ultimate goals.

Example 4**Disease Prevention Interventions Improve Population Health Status**

At the population level, avoidable mortality rates can be substantially decreased by reducing behavioural risk factors for disease—that is, through disease prevention measures. In Ontario between 1994 and 2005, around half of the decrease in mortality from coronary heart disease was due to a reduction in the prevalence of overall behavioural risk factors (the other half was due to treatment advances).⁶⁷ Data from other countries also supports this trend.

Three additional arrows illustrate the relationships between the Social Determinants of Health quadrant and the three health system quadrants. While the development and implementation of strategies and initiatives that affect the social determinants might not be seen as a responsibility of the health system, performance capacity in the Health System Inputs and Characteristics quadrant (particularly leadership and governance), in partnership with other policy sectors at both the system and community levels, may support policies and strategies to improve these conditions or to mitigate their impact on health status and equity. The structural and intermediary determinants of health in a population, in turn, will have implications for health system resource requirements and allocation of resources. The second arrow shows how effective health system outputs, particularly those related to public health, health protection, and health promotion and disease prevention, may be able to improve the behavioural determinants of health (see Example 4). The final arrow marks the influence of social determinants of health, along with the individual responses to these determinants, on the health status of Canadians and on equity in health. This arrow also illustrates that health status can have an impact on the determinants of health related to material circumstances by supporting individuals' capacities to be productive participants. Indeed, the health status of the population is highly associated with social position, life conditions and the environment.^{20, 21} Therefore, the health status of the population cannot be solely attributed to the effects of the health system but must be analyzed in the context of a broader environmental, economic and social setting.

3.2 A Framework Aligned With Performance Improvement Priorities of Canadian Jurisdictions

CIHI collected information on the health system priorities of jurisdictions to develop an earlier report on the efficiency of the Canadian health system.⁹ This work can be used to show the level of congruence between these priorities and the dimensions of this performance measurement framework.

The strategic and service delivery plans of the provinces and territories all share two common goals. The first refers to improving overall population health, including optimal health and well-being, through health promotion and disease prevention policies that act on the social determinants of health. The second objective refers to improving health system performance, focusing on the accessibility (especially of primary care services), quality, safety and effectiveness of health services. Most strategic plans also emphasize the sustainability of a publicly funded

system through ensuring value for money. Many plans support improvement in continuity and integration as well as the development of alternative models of care, mainly for the elderly and persons with chronic diseases. Sustainability, cost effectiveness and efficiency are part of the strategic objectives in many jurisdictions. Finally, health system characteristics, including human resources and the quality of work life, as well as the innovation process through the introduction of information technologies, are also important aspects of many provincial and territorial plans. In terms of goals and strategies related to equity in the system, some jurisdictions have included explicit statements about reducing health inequalities in population health status or by ensuring the equity and quality of services, while others focus on identifying and meeting the needs of vulnerable populations.

The published strategic priorities of the provinces and territories^{73–85} were mapped to the framework, illustrating how the proposed performance measurement framework accommodates the health system performance strategies and objectives of the jurisdictions. Table 1 below shows examples of how some of the priorities identified in the published strategic plans from the province of British Columbia relate to the dimensions of the health system performance measurement framework.

Table 1: Relation of Published Strategic Goals and Objectives of British Columbia to the Dimensions in the Proposed Health System Performance Measurement Framework

Goals and Objectives in 2010–2011 to 2012–2013 Service Plan		Related Performance Dimensions From Proposed Measurement Framework
Goals	Objectives	
Improved health and wellness of the population	Support individuals in their efforts to maintain and improve their health through health promotion and disease prevention	Improved health status of Canadians
		Biological, material, psychosocial and behavioural factors
		Access to services (information, advice and resources)
		Health system resources (evidence and information)
Health needs of the population are met by high-quality community-based health care and support services	Provide a system of community-based health care and support services, with a focus on attachment to a family physician and an extended health care team and links to local community services	Access to comprehensive, high-quality health services
		Person-centred services
		Social factors influencing health
		Equity
Individuals have access to high-quality acute care services when they need them	Deliver acute care services that are accessible, effective and efficient	Access to comprehensive, high-quality health services
		Safe; appropriate and effective
		Efficiently delivered
		Health system innovation and learning capacity
Improve innovation, productivity and efficiency in the delivery of health services	Optimize the way in which health human resources, information management, technology and infrastructure are used in service delivery	Health system resources
		Health system innovation and learning capacity
	Innovate and improve efficiency to ensure sustainability of the publicly funded health system	Leadership and governance
		Appropriate and effective
		Efficiently delivered
		Improved value for money

This illustration also supports the dynamic nature of the proposed framework. Strategies articulated for a single goal or objective often cover supporting (or upstream) performance dimensions. For example, the last objective of “Innovate and improve efficiency . . .” includes strategies related to

- The *leadership and governance* dimension, such as “legislative, regulatory and policy frameworks that ensure clear and consistent policy direction, allowing services to be delivered appropriately and cost-effectively”; and
- The *efficiently delivered* dimension of health services, such as “using activity and performance-based funding to provide incentives to increase access, clinical and service excellence.”

4.0 Conclusion/Next Steps

The objective of this paper is to describe a unifying pan-Canadian framework to measure health system performance in a way that will support the performance improvement strategies of jurisdictions across Canada. This framework is the foundation for the development of an integrated health system performance reporting and improvement initiative led by CIHI. In addition, through the creation of a common platform to classify, understand, analyze and support health system performance improvement, a unifying performance measurement framework can reduce the common perception of “indicator chaos” and further strengthen capacities to use performance information to manage and improve health system performance.

Appendix A: Process for Developing the Framework

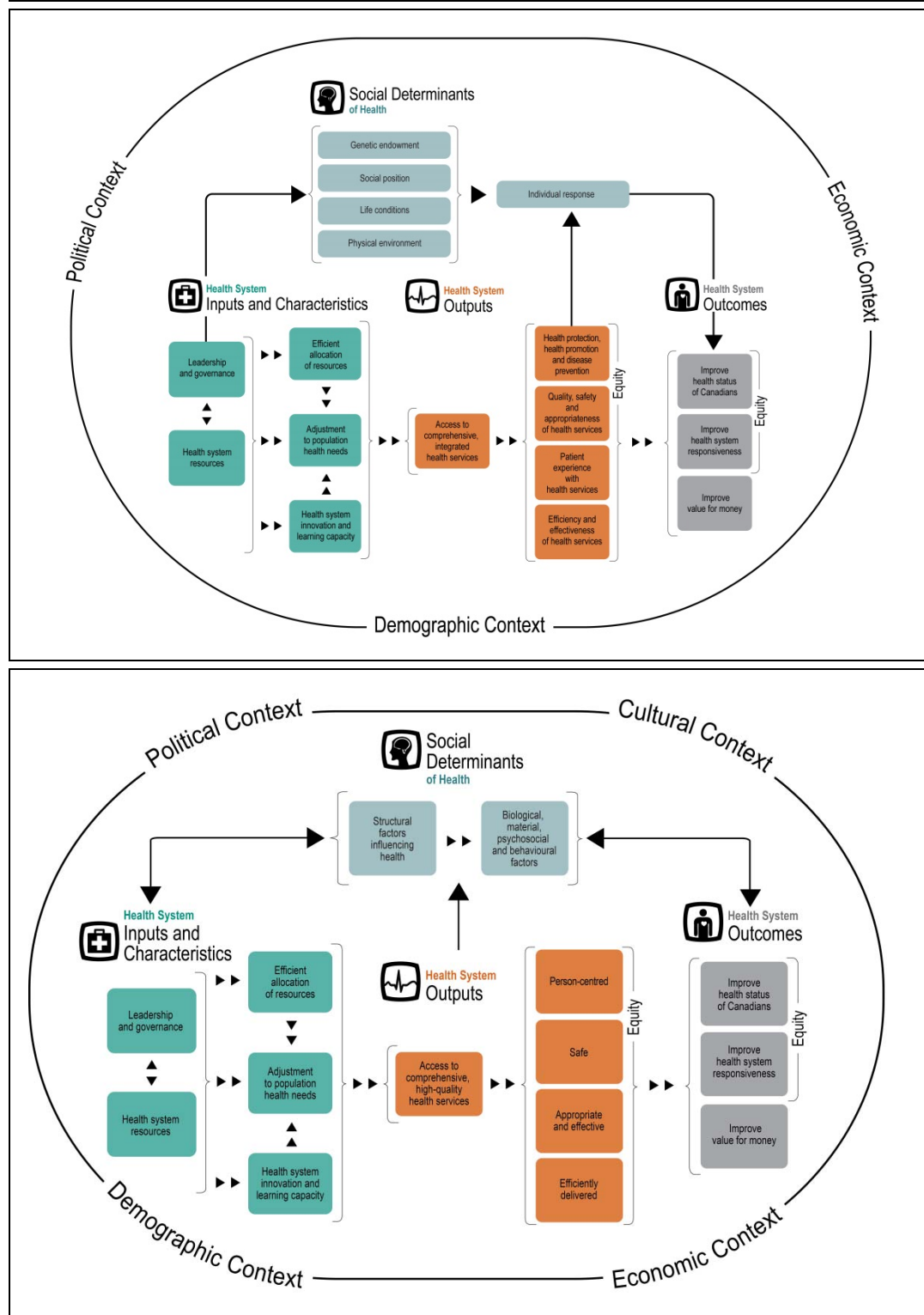
The framework described in this report was developed between June 2012 and July 2013. The steps in the development are summarized below:

1. Review existing international frameworks for health system performance reporting.
2. Review literature and evidence on organizational and health system quality improvement reporting.
3. Develop first draft of the health system performance framework, followed by internal review and discussion.
4. Share first draft with selected stakeholders, expert advisory groups and councils.
5. Revise first draft based on feedback to develop a proposed health system performance framework and related technical report.
6. Post the framework and technical report on CIHI's website for general comments and feedback.
7. Revise proposed framework to develop the final version of the health system performance framework presented in this document.

Summary of Changes

The figure on the next page shows the proposed health system performance framework (step 5 above) and the final version (step 7 above).

Figure 2: CIHI's Health System Performance Framework—Version Proposed in May 2013 (Top) and Final Version (Bottom)



Two of the four quadrants developed in the proposed version remain unchanged:

1. Health System Outcomes; and
2. Health System Inputs and Characteristics.

The other two quadrants—Health System Outputs and Social Determinants of Health—were modified to address comments and suggestions made by stakeholders during the consultation process.

While the concepts and dimensions of performance in the quadrant **Health System Outputs** are essentially the same, they were reorganized and clarified to better align with the concept of quality developed by the Institute of Medicine, which has also been adopted and adapted by many provincial health (quality) councils. The reorganization of concepts into new dimensions is outlined in the table below:

Table 2: List of Changes to the Health System Outputs Quadrant

Health System Outputs: Concept From Proposed Version	Changes Made in Final Version
Access to comprehensive, integrated health services	Concept remains to address the fundamental role of providing equitable and timely access to comprehensive services. However, the concept of <i>integrated</i> services was removed from this dimension and is addressed through reference to <i>person-centred</i> health services that are organized to support continuity of care.
Health protection, health promotion and disease prevention	While presented as a separate dimension in the proposed version, these services are a key constituent of the <i>comprehensive</i> health services included in the Health System Outputs quadrant. Health protection, health promotion and disease prevention services should have the same quality characteristics of being person-centred, safe, appropriate and effective, and efficiently delivered as other health services.
Quality, safety and appropriateness of health services	The concept of <i>quality</i> was moved to the dimension of access: the health system should provide access to comprehensive and high-quality services. <i>Quality</i> , then, is defined by the other dimensions of the Health System Outputs quadrant: services that are person-centred, safe, appropriate and effective, and efficiently delivered. While <i>appropriateness</i> is related to safety, in that delivering services that patients would not benefit from may expose them to unnecessary risk, it is a key component of what makes health services <i>effective</i> ; thus it has been included in a separate dimension with effectiveness.
Patient experience with health services	The definition of this dimension—care that is respectful of and responsive to individual patient preferences, needs and values—was based on the Institute of Medicine’s definition of patient-centred care. This dimension has been labelled <i>person-centred</i> and also encompasses care that is integrated and organized across structures, functions and providers to support the integration of and the experience of continuity of care.
Efficiency and effectiveness of health services	The two concepts included in this dimension were split into separate dimensions. <i>Effective</i> services are those that can provide a benefit to individuals in terms of reducing the incidence, duration, intensity and consequences of health problems. <i>Efficiently delivered</i> services minimize the use of resources—supplies, equipment, time, energy—in delivering services; this is related to the concept of technical efficiency.

The quadrant **Social Determinants of Health** was reorganized to draw on the work of Solar and Irwin for the WHO Commission on Social Determinants of Health.⁵ Based on this work, the social determinants are shown in two levels: structural and intermediary factors. *Structural factors influencing health* consist of the factors that define individuals' and families' socio-economic positions, such as income and social status, education and literacy, and gender and ethnicity. These structural factors expose individuals to and can make them more vulnerable to unhealthy conditions, collectively referred to as the *intermediary factors* of health. The intermediary determinants include

- Biological factors, such as genes, aging processes and sex-linked biology;
- Material circumstances, such as characteristics of neighbourhoods, housing, working conditions and the physical environment;
- Psychosocial circumstances, such as stress, an individual's sense of control and social support networks; and
- Behavioural factors, such as smoking, physical exercise, diet and nutrition.

In this framework, the social determinants of health interact with the social, cultural, political and economic contexts that can give rise to unequal socio-economic positions. The social determinants of health also have relationships with the other three quadrants. They have an impact on health system inputs and characteristics, particularly on the need for and allocation of resources within the health system. In turn, there may be opportunities for health policies, leadership and governance working across public policy sectors to have an impact on both the structural and intermediary factors. The effectiveness of health system outputs, particularly public health and health promotion and disease prevention services, can also have an impact the intermediary factors. Finally, the social determinants of health have a profound impact on, and in turn are affected by, the outcomes of the health system—the overall level of health status and distribution of health in the population—and on the capacity of the system to respond to the needs and expectations of the population, on the equity of the health system and, by extension, on what the health system can achieve in relation to the resources used (value for money).

Appendix B: Relationship Between the CIHI–Statistics Canada Health Indicators Framework and the Proposed Health System Performance Framework

CIHI–Statistics Canada Health Indicators Framework	CIHI Health System Performance Framework
Health Status	Ultimate Goals
Well-being	Health status of Canadians
Human function	Health system responsiveness
Health conditions	Value for money
Deaths	
Non-Medical Determinants of Health	Social Determinants of Health
Health behaviours	Behavioural factors
Personal resources	Material and psychosocial factors
Living and working conditions	Structural factors influencing health
Environmental factors	Material factors
Health System Performance	Health System Outputs
Effectiveness	Appropriate and effective
Appropriateness	
Competence	
Efficiency	Efficiently delivered
Accessibility	Access to comprehensive, high-quality health services
Safety	Safe
Acceptability	Person-centred
Continuity	
Community and Health System Characteristics	Health System Inputs and Characteristics <i>Plus</i> Context
Community	Demographic, political, economic contexts
Health System	Leadership and governance
Resources	Health system resources
	Efficient allocation of resources
	Adjustment to population needs
	Health system innovation and learning capacity

Notes

The arrows symbolize the mapping of dimensions from the CIHI–Statistics Canada Health Indicators Framework to the CIHI Health System Performance Framework.

■ Represent new dimensions in the CIHI Health System Performance Framework.

■ Represent dimensions that were expanded or modified in the CIHI Health System Performance Framework.

Appendix C: Comparison of the Proposed CIHI Health System Performance Framework and International Performance Measurement Frameworks

	Commonwealth Fund ⁶¹	WHO ²	OECD ⁶²	OECD ⁶⁰	IHI ⁶³	CIHI
Accessibility	•		•			•
Comprehensiveness						
Continuity of Care						•
Integration						
Appropriateness of Care	•					•
Effectiveness	•			•		
Safety	•			•		•
Competence or Capability	•					•
Patient Experience	•	•*	•*	•	•	•
Productivity or Technical Efficiency						•
Expenditure or Cost		•	•		•	•
Responsiveness/Trust in the Health System		•*	•*	•		•
Efficiency	•		•			•
Healthy Lives or Health Status Improvement	•	•	•		•	•
Equity	•	•	•			•
Efficient Allocation of Resources						•
Innovation and Capacity to Improve	•					•

Notes

* The concept of responsiveness can be articulated at two levels simultaneously: the responsiveness of the health system overall; and the responsiveness of the care and services provided to patients (also called patient experience). In our framework, we make a distinction between these two approaches.

WHO: World Health Organization.

OECD: Organisation for Economic Co-operation and Development.

IHI: Institute for Healthcare Improvement.

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