Performance Measurement in Integrated Health Systems

Submitted as partial requirement for CCHSE Fellowship

By
Maura Davies, B.Sc., B.Ed., MHSA, CHE

Draft #1 March 11, 2002

Abstract

A variety of approaches to measuring system performance have been proposed as frameworks or are being used by health systems in Canada and other countries. This paper addresses the research question: "how are integrated health systems in Canada measuring system performance and using this information to improve performance?" The research includes reviews of six models for measuring health system performance, and approaches used by the World Health Organization, United Kingdom, New Zealand, and some examples from the United States. More detailed analysis is provided of performance measurement in four Canadian integrated health systems: Simon Fraser Health District, Capital Health (Edmonton), Saskatoon District Health, and Capital Health (Halifax). The paper concludes with a proposed performance framework based on eight principles and recommendations for further research.

Table of Contents

Figures and Tables

Executive Summary

Do they make a difference? This is the critical question that integrated health systems across Canada need to answer, for themselves, their funding agents, and the public they serve. A variety of approaches to measuring system performance have been proposed as frameworks. Internationally, countries such as the United Kingdom and New Zealand have developed comprehensive approaches to measuring performance of their health systems at the national and health district level. There is no standardized approach in Canada, and provinces and health districts have adopted performance measurement models that vary considerably in comprehensiveness and focus.

This paper addresses the research question: "how are integrated health systems in Canada measuring system performance and using this information to improve performance?" The research that has been conducted by this author includes reviews of six models for measuring health system performance: balanced scorecards, the Canadian Institute for Health Information (CIHI) population health indicators, the Canadian Council of Health Services Accreditation Achieving Improved Measurement (AIM) model, the CIHI/MacLean's Magazine public report card, the Saskatchewan Health Services Utilization and Research Commission model, and the framework proposed by the national Performance Indicators Reporting Committee. International approaches are also examined including: World Health Organization, United Kingdom, New Zealand, and some examples from the United States.

More detailed analysis is provided of performance measurement in four Canadian integrated health systems: Simon Fraser Health District, Capital Health (Edmonton),

Saskatoon District Health, and Capital Health (Halifax). The approaches used by these four organizations are compared to the principles proposed by Leggat, Narine, Lemieux-Charles, Barnsley, Baker, Sicottete, Champagne, and Bilodeau. (1998).

The paper concludes with a proposed performance framework based on the following principles:

1) establish measurable health goals;
2) apply the performance framework to all levels of the health system;
3) measure health status;
4) include non-medical determinants of health;
5) include measures of system operations;
6) focus on sub-populations, including those at higher risk;
7) ensure expert analysis of data;
8) ensure data availability and quality;
9) provide reports that are comprehensible and meaningful to targeted audiences.

Specific measures are suggested in the following categories: health status, non-medical determinants of health, operational measures, and community and health system characteristics.

This research project is intended to contribute to understanding of performance measurement in integrated heath systems. Moreover, it is intended to assist others in their efforts to develop effective ways of not only measuring system performance, but also using this knowledge to improve system performance. Areas for future research are identified.

1 Introduction

Across Canada, health services are being restructured in efforts to deliver more efficient and effective health care. Restructuring takes many forms, including:

1) Horizontal integration through hospital mergers;
2) Regionalization of acute care and a limited range of other health services;
3) More extensive vertical integration, involving a broader range of services and a focus on population health.

In Ontario, the focus is still largely on hospital closures, role changes, mergers, and strategic alliances arising from the Hospital Services Restructuring Commission. In other provinces, where hospital mergers and downsizing have already occurred, the focus is now directed toward establishment of integrated health systems that are more responsive to the health needs and cultures of communities. The range of services in these integrated systems varies considerably and appears to evolve over time. This type of restructuring is usually based on the assumptions that: 1) shared governance and management of a broad range of heath services will eliminate gaps in service and improve coordination, access, and consumer satisfaction; 2) system integration will reduce or at least help control the cost of care; and 3) health outcomes will significantly improve by focusing on the broader determinants of health and not just health care services.

Skeptics view these changes as simply the latest fad in health care. They question whether there is credible evidence to show that integrated health systems are any more

efficient or effective than traditional systems dominated by hospital-based acute care. Many of these new health systems, and the governments that fund them, are attempting to establish financial and quality indicators to track results and demonstrate improvements arising from system integration.

Leatt, Pink and Guerriere (2000) point out that there has been little evaluation of regionalization and a paucity of literature relating to performance of integrated health systems. The work by Shortell, Gillies, Anderson, Erickson and Mitchell (2000) is frequently cited as the most significant evaluation of integrated health systems. Shortell and Kaluzny (2000) describe the difficulty of assessing effective performance, quoting perspectives from Haberstroh and Kanter. "First, performance reporting is omnipresent and necessarily so. Second, almost every instance of performance reporting has something wrong with it." (Haberstroh, 1965, p. 182) Kanter pinpoints the greatest challenge. "The most interesting questions in this are not technical, they are conceptual: not how to measure effectiveness of productivity, but what to measure." (Kanter, 1981, p. 321)

The trends in performance measurement in Canada are based, somewhat, on the experiences of other countries that have dramatically restructured health services and established mechanisms to measure, monitor and report system performance. In the United States, managed care organizations use performance tracking as a marketing tool to gain competitive advantage. Many American health systems participate in benchmarking initiatives that measure quality of care and compare results among peer providers. These initiatives include the Maryland Quality Indicator Project and the

Cleveland Health Quality Choice. The National Committee for Quality Assurance has developed a widely used outcome measurement system (known as HEDIS) for managed care organizations. (National Association for Healthcare Quality, 1998) Although there are lessons to be learned from efficiencies, innovations and approaches to performance measurement arising from U.S. systems, the differences in culture and health funding need to be considered when applying these lessons to Canada.

Experience with integrated health systems and performance measurement frameworks in New Zealand, Britain and other countries with publicly funded health systems may be more relevant for Canada. For example, New Zealand has established health strategies directed at determinants of health and various stages in the life cycle Progress towards achievement of these strategies and key performance indicators are monitored and widely reported. (Government of New Zealand, 2000) In 1999, the National Health Service in the United Kingdom introduced a new Performance Assessment Framework (PAF), consisting of forty-one indicators to measure performance from the perspectives of health improvement, access, effectiveness, efficiency, experience of clients, and health outcomes. (National Health Service, 1999)

Since responsibility for health care in Canada is largely decentralized to the provinces and territories, it is not surprising to find considerable variation in timing and approaches to system integration and the ways in which system performance is measured. These variations often make inter-provincial comparisons difficult, even among organizations of similar size and complexity. Recently, tension has existed between the

federal government and provincial governments regarding additional federal funding that is dependent upon a common approach to performance measurement.

There have been some efforts to coordinate development of health system performance measurement across provincial boundaries. The Canadian Institute for Health Information (CIHI) has been mandated to collect, analyze and report data that measure the quality of health care using selected indicators. In 2000, CIHI published the first annual report, Health Care in Canada. Statistics Canada has issued its most recent health indicators report. (2001) Both of these reports identified significant variation among provinces and territories and among health districts. Under the auspices of CIHI, a national consensus document was developed regarding indicators to measure population health. (Canadian Institute for Health Information, 1999) The Canadian Council for Health Services Accreditation (CCHSA) has revised accreditation standards using a new Achieving Improved Measurement (AIM) model, intended to improve performance measurement. A national set of indicators has recently been developed for the Federal/Provincial/Territorial Advisory Network on Mental Health. (McEwan and Goldner, 2001)

These initiatives reflect an enormous interest and considerable effort in developing performance measures. Yet, many integrated health systems across the country are struggling with this issue. System integration is demanding, stressful, and time-consuming. Inevitably, many operational issues urgently need to be addressed. It is not surprising, therefore, that many new health systems have given insufficient attention

to designing and implementing meaningful performance measurement, including establishment of baseline measures against which future performance can be measured.

Several integrated health systems in Canada have demonstrated leadership in both system integration and performance measurement. The Capital Health District in Edmonton, Alberta was one of the first integrated health systems in Canada. The positive findings reported by MacLean's Magazine related to improved health in Edmonton are now reflected in Capital Health's marketing campaign to recruit health professionals. Edmonton has been a leader in development and reporting of system performance measures. Leadership has also been demonstrated by other heath districts such as South Fraser, British Columbia and Saskatoon, Saskatchewan. The Capital District Health Authority (Capital Health) in Nova Scotia established a performance measurement framework as one of its first steps in developing a new integrated health system.

The purpose of this research project is to examine the approaches adopted by these four health systems to measure and improve system performance and to recommend a preferred approach. It is anticipated that this research will be of assistance to health systems in Canada in their establishment or refinement of performance measurement systems. Recommendations for performance measures for integrated health systems will contribute to the dialogue regarding what we hope to achieve by developing more integrated health systems. The recommendations should assist organizations and governments interested in establishing common measures that enable meaningful comparisons among integrated health systems and contribute to performance improvement.

2 Clarification of Terms and Management Principles

2.1 Integrated Health Systems

The concept of integrated health systems has arisen primarily from seminal work done by Stephen Shortell and his colleagues. In the mid 1990s, Shortell proposed a vision of an ideal health system which was very different than the fragmented, uncoordinated, acute-care focused systems that existed in the United States, Canada and elsewhere. The concept of what became known as an "integrated heath system" captured the imagination and enthusiasm of governments, health administrators, health providers and others who cared about how health systems were organized and functioned. In 2000, Shortell released a second edition of Remaking Health Care in America, placing greater emphasis on the linkages between health systems and their communities. (Shortell, Gillies, Anderson, Erickson, and Mitchell)

According to Shortell et al. the ideal health care system has the following characteristics:

- **Focuses on meeting the health needs of individuals and populations.** This is a different way of thinking about health care, which has largely focused on delivery of services and the impact on the health of individuals rather than groups of people.
- **Matches its resources, competencies, and capabilities to meet individual and population needs and objectives.** This implies flexibility to reallocate resources among various services, programs and sites, in order to optimize effect.
- **Involves patients in all aspects of their care.** Patients are not treated as passive recipients of care, but as the primary decision-makers regarding their care.

- **Coordinates and integrates care across the continuum**. An integrated health system involves more than horizontal integration of hospitals. It involves a system of care that includes health promotion and disease prevention activities, emergency (first responder) services, community-based primary care, hospital-based acute care, home care, long term care, rehabilitation, palliative care etc. The way in which these services are governed, organized, funded, and managed can vary enormously, provided they function as part of a single, integrated health system.
- **Develops a total and ongoing relationship with patients**. This implies two-way communication and accountability for results not present in traditional health care delivery systems.
- **Aims to provide a totally satisfying experience that embraces service quality as well as technical quality**. This implies that we identify and strive to meet customer expectations. It requires that we develop the ability to measure not only customer satisfaction but also other aspects of quality, including health outcomes.
- **Guarantees that treatments known scientifically to be effective are given to patients who benefit from them, that treatments known to be harmful or of no use are not given, and that knowledge about uncertain treatments continues to grow to reduce uncertainty.** This concept of evidence-based practice and a focus on patient safety has received even more attention since the release of the Institute of Medicine Report, To Err is Human: Building A Safer Health System. (1999)
- **Has information systems to link patient, providers, and payers across the continuum of care.** The absence of adequate information systems, connecting

community-based and facility based providers, has proven to be a major impediment for many organizations to transform into more integrated health systems.

- **Provides information on costs, quality, outcomes, and patient satisfaction to multiple stakeholders.** This provides direction as to the type of performance measures that should be used to evaluate the performance of integrated health systems.
- **Uses financial incentives and organizational structure to align governance, management, physicians, and other caregivers in support of achieving shared objectives.** The pessimistic assessment expressed by Shortell et al. regarding of the potential for creation of integrated health systems in the United States arises, in large part, from existing financial incentives for physicians and organizational structures that perpetuate silos of care providers. According to Shortell et al. this is fundamentally a matter of alignment. "As a nation, we are not even close to driving this nail straight despite the best of intentions on the part of many groups. In the short term, we are not optimistic that much progress will be made. There are too many negative forces." (p.286) There may be more potential for success in the Canadian system. The movement toward alternative funding arrangements for physicians and creation of health districts in most provinces reflect the importance of structural changes in enabling integration. Even with these changes, the exclusion of responsibility for some essential components (for example, Pharmacare programs and primary care physicians) from most health districts will limit the degree of integration that can occur.

- **Is able to participate as an effective partner in the community-wide health care management system.** This concept is the most significant change in the second edition of Shortell's book. The authors propose a broader system that links medical care and health care delivery efforts to a broad array of community health-building assets, including educational, family, religious, housing, employment, environmental, legal, and the business sectors. This intersectoral approach will "help leverage the medical and health care delivery sectors' efforts to restore and maintain health, with all parties working toward enhancing the community's stock of health. The goal is to 'push to the left': to push the chronically ill in the community to becoming 'sporadically well' and, where possible, the 'chronically well' and to push the sporadically ill to becoming chronically well." (p.263)
- **Is able to improve continuously the care that it provides.** Shortell et al. emphasize the importance of a strong system culture and the benefit of building a common culture through the implementation of Continuous Quality Improvement (CQI) as the operating principle of the organization. (p.44) They argue that the techniques of CQI "tend to promote systems thinking by focusing on the linkages of processes and activities across functions and units" (p.46) CQI projects also promote integration by requiring individuals in different units or functional areas to work together on activities that are linked to the system's strategic priorities. (p. 46)
- **Is able to learn and renew itself to continue to improve.** This statement recognizes that integration takes time, and will occur incrementally through a process of evolution rather than revolution.

Although much has been written regarding integrated health systems, the work of Shortell et al. continues to be considered the most thoughtful and complete explanation of integrated health systems and the implications for how systems are organized, managed and evaluated. For the purposes of this paper, Shortell's criteria for an integrated health system will be used as the reference point for both defining integrated health systems and examining the management principles that are associated with this approach to health care.

2.2 Performance Measurement

As Shortell et al. (2000) point out, there has been relatively little systematic study on the performance of integrated health systems. In their review of American hospitals, Snail and Robinson (1998) concluded that reorganization has produced mixed results, although compared to totally independent hospitals, system hospitals have lower average costs and marginal costs. Zelman (1996) has suggested that more highly integrated systems are more likely to have the resources to invest in information systems and related infrastructure to support quality improvement. Several studies have concluded that services for people with mental illness are more effective in integrated systems. (Rosenheck, 1998; Lehman, 1994; Beiser, Shore, Peters, and Tatum, 1985)

Building on the work of Gillies, Shortell, Anderson, Mitchell and Morgan (1993), Shortell et al. (2000) conclude that the ability of integrated health systems to add value may depend more on three core competencies:

- Functional integration of key support functions (especially human resources, information technology, and continuous improvement processes);

- Physician integration, including physician leadership and active participation by physicians in system planning, management and governance;
- Clinical integration, including coordination of clinical services across sites and establishment of care management systems across the continuum enabling tracking of health improvement outcomes.

There is no agreement on how to measure the performance of integrated health systems, although a variety of approaches have been suggested and are being used. There is widespread agreement on the importance of evaluating health system performance in a thoughtful and comprehensive way. Flood , Shortell and Scott (1994) and Luttman, Siren and Laffel (1994) suggest that development and use of a performance measurement framework helps providers to evaluate and improve performance, identify unmet needs, achieve greater accountability and mobilize resources for improvement. In their review of approaches to performance measurement in health care, Leggat, Narine, Lemieux-Charles, Barnsley, Baker, Sicotte, Champagne, and Bilodeau (1998) identified additional purposes of performance measurement:

- Clarify and communicate organizational goals and priorities;
- Set productivity targets;
- Serve as the basis for development of performance standards, practice guidelines and clinical pathways;
- Monitor and assess performance of management staff;
- Facilitate cooperation among institutions and interest groups with competing interests.

Despite these lofty goals, measurement of performance of integrated health systems poses some particular challenges. These include the following concerns:

- Improvements in heath outcomes occur over a long period of time;
- Many health outcomes are difficult to measure;
- The content and quality of data contained in a performance measurement framework are often suspect. It is often not clearly demonstrated that variations in performance are a true reflection of performance differences; (Leggatt et al, 1998, Page and Cramer, 2001)
- There is considerable potential for misinterpretation and manipulation of data. Smith (1994) refers to three phenomena: tunnel vision, myopia, convergence, and gaming. Tunnel vision involves focusing on areas for which there are readily available performance measures, to the exclusion of other important areas of performance. Myopia refers to focusing solely on short-term results. Convergence involves a tendency for behaviour to gravitate towards the mean, or for data to be falsified to avoid identification of outliers that would then be subject to scrutiny. Gaming occurs when there is an altering of behaviour to achieve strategic advantage. This may include filtering of bad results and avoidance of reporting exceptional results that might form the basis of future expectations.

Health is influenced by many non-medical determinants that are outside the responsibilities and control of health systems. This poses the challenge of creating a performance measurement framework that is sufficiently comprehensive. It also raises

concerns about holding a health system accountable for things beyond its control. The World Health Organization (WHO) expresses an important cautionary note:

> "Although progress is feasible against many of society's health problems, some of the causes lie completely outside even a broad notion of what health systems are. Health systems cannot be held responsible for influences such as the distribution of income and wealth, any more than for the impact of the climate. But avoidable deaths and illnesses from childbirth, measles, malaria or tobacco consumption can be properly laid at their door. A fair judgement of how much health damage it should be possible to avoid requires an estimate of the best that can be expected, and of the least that can be demanded, of a system." (WHO, 2000 p.23)

There is considerable debate about who should measure performance of health systems and growing support for this evaluation to be done at arms-length from the health systems being evaluated. It is felt that this will promote more objectivity and transparency. Saskatoon has recently decided to establish a provincial Quality Council and this approach has been suggested by Romanow (2002) and other health commissions. Review of health system performance by objective third parties does not preclude performance measurement also being done by health systems themselves.

For purposes of this paper, a performance measurement framework is defined as a set of measures used over time to provide a balanced perspective on how well an organization is performing and to serve as a stimulus for quality improvement. This paper will examine theoretical models of measuring performance in integrated health systems, examples of approaches used in several countries, and examples of frameworks used in four Canadian health systems. The paper will propose a model framework based on these findings.

2.3 Population Health

Population health is a conceptual framework for thinking about health, the factors that influence health, and decisions and actions that need to be made to improve health. Our concept of health continues to evolve, from the absence of disease, to a state of physical, mental, emotional and spiritual well-being, to the more current thinking of health as "a capacity or resource for everyday living that enables us to pursue our goals, acquire skills and education, grow and satisfy personal aspiration". (Health Canada 2001) A population health approach focuses on maintaining and improving the health of an entire population, rather than focusing on individuals. It attempts to reduce inequalities in health between population groups by addressing a broad range of factors that influence health.

> "Population health refers to the health of a population as measured by health status indicators and as influenced by social, economic, and physical environments, personal health practices, individual capacity and coping skills, human biology, early childhood development, and health services. As an approach, population health focuses on the interrelated conditions and factors that influence the health of populations over the life course, identifies systematic variations in their patterns of occurrence, and applies the resulting knowledge to develop and implement policies and actions to improve the health and well-being of these populations." (Health Canada 2001, p. 2)

Health Canada (2001) has established a Population Health Template that includes eight key elements:

- Focus on the health of populations;
- Address the determinants of health and their interactions;
- Base decisions on evidence;
- Increase upstream investments;

- Apply multiple strategies;
- Collaborate across sectors and levels;
- Employ mechanisms for public involvement; and
- Demonstrate accountability for health outcomes.

Although Health Canada does not recommend a specific accountability framework, it does note that:

> "Under a population health approach, a much greater emphasis is placed on accountability for health outcomes and determining the degree of change that can actually be attributed to interventions…Outcome evaluation…examines long-term changes in both health status and the determinants of health. These include changes in knowledge, awareness and behaviour, shifts in social, economic and environmental conditions, as well as changes to public policy and health infrastructure. Outcome evaluation also seeks to measure reduction in health status inequities between population sub-groups." (Health Canada 2001, p. 31)

Health Canada (2001) recommends the following actions to help demonstrate accountability for health outcomes:

- Construct a results-based accountability framework that establishes clear accountabilities and performance measures;
- Ascertain baseline measures and set targets for health improvement;
- Institutionalize effective evaluation systems;
- Promote the use of health impact assessment tools that set forth criteria for determining the health impact of current or proposed policies and programs; and
- Publicly report results.

Most integrated health systems have identified improvement in the health status of their communities as their ultimate vision. Some performance measurement frameworks attempt to identify, track and publicly report measures of both health determinants and health status for defined populations.

2.4 Quality Improvement

The modern concept of quality improvement arises from work over the past sixty years by such quality leaders as Deming, Juran, Donabedian, and Berwick. Quality is defined in many ways, depending on the perspectives of different stakeholders. Patients may view quality in terms of how well their needs and expectations are met. Providers may consider quality in terms of clinical effectiveness. From a health system perspective, quality is concerned with efficiency and cost effectiveness. From a societal view, quality is measured in terms of value for money and benefits to the community. (Harrigan, 2000)

The concept of quality improvement (often referred to as continuous quality improvement or CQI) generally involves a focus on the following:

- Improvement in processes of health care and care delivery;
- Customer needs and expectations;
- Continuous monitoring of quality with the intent to improve;
- Leadership commitment to quality;
- Involvement of staff and education of staff in quality management;
- Long-term commitment to quality

(Harrigan, 2000)

Process improvement is often described as involving a Plan, Do, Study, Act (PDSA) cycle, which includes measuring quality before and after process changes are made. The reference to continuous monitoring implies the development, measurement, and tracking of selected quality indicators, including measures related to customer satisfaction.

3 Theoretical Models

In the absence of consensus regarding a framework for measuring the performance of integrated health systems, a variety of approaches have been proposed and/or adopted.

3.1 Balanced Scorecards

Since Kaplan and Norton (1991) proposed a balanced scorecard for measuring performance of organizations, this approach has been adopted by a variety of industries, including health care. A balanced scorecard examines performance from four perspectives:

Financial: how does the system look to funders? is sufficient income generated? is there value for the dollars spent?

Consumer: how do customers view the organization? are customer needs identified and met?

Quality processes and outcomes: at what must the organization excel?

Learning and growth: can the organization continue to improve and add value?

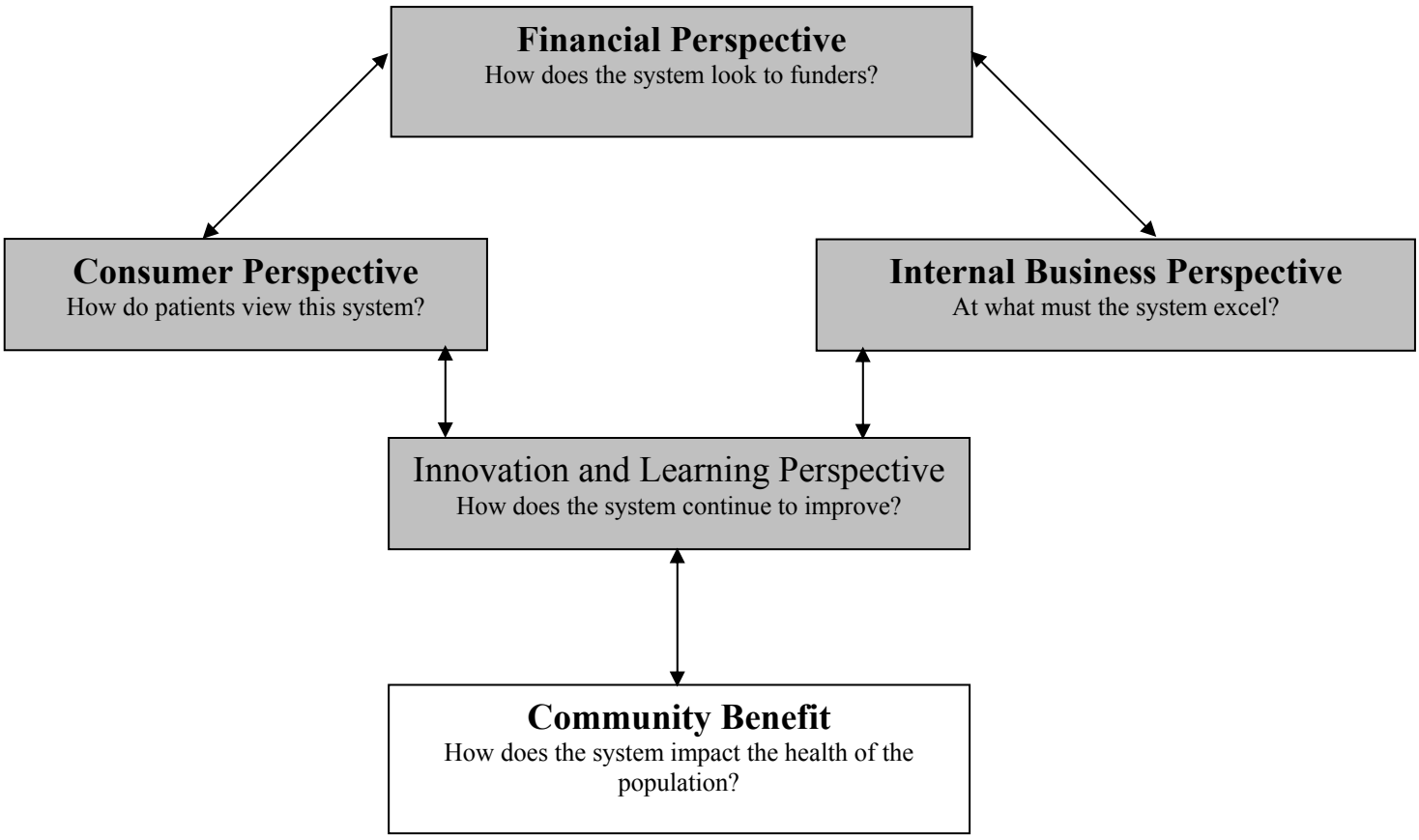
A balanced scorecard is intended to be a comprehensive performance framework and reporting tool. It translates the strategic directions and goals of an organization into a coherent set of performance measures. The organization's performance is viewed in terms of achievement of goals, which are measured from a variety of perspectives. The balanced scorecard identifies the results ("push/pull effect") when changes are made to improve one aspect of performance. A balanced scorecard promotes alignment of strategy throughout all levels of the organization and provides feedback on achievement of corporate strategy. Achievement of goals may be expressed in a variety of ways, and is not limited to indicators expressed as rates (with numerator, denominator, and comparator).

The term "balanced scorecard" is sometimes used more generally to refer to a set of indicators. For example, the evaluation framework for hospitals in Ontario is referred to as a balanced scorecard. (Ontario Hospital Association, 1999) It examines indicators related to clinical outcomes and utilization, financial performance, patient satisfaction, and system integration and change. This is a modification of the original balanced scorecard concept as developed by Kaplan and Norton, which is distinguished by its link between strategy and performance.

Leatt et al. (2000) have proposed a modification of Kaplan and Norton's model as a framework for monitoring the performance of an integrated health system. Using this framework, performance would be examined from five perspectives:

1. **Financial:** how does the system look to funders?
2. **Customer:** how do patients view the system?
3. **Internal business:** at what must the system excel?
4. **Innovation and learning:** how does the system continue to improve?
5. **Community benefit:** how does the system impact the health of the population?

Figure 1 Framework for Monitoring the Performance of a Health System (Leatt et al., 2000)



The approach of Leatt et al. introduces the concept of health of the population as something for which integrated health systems would be held at least partially responsible.

3.2 Canadian Institute for Health Information (CIHI) Population Health Framework

In May 2000, CIHI sponsored a national consensus conference that developed a framework for measuring health of populations and performance of health systems. (see Appendix 1) The framework consists of four components:

1. The overall health status of the population (well being, health conditions, human function, and deaths), how it compares to other regions and changes over time;
2. The major non-medical determinants of health (health behaviours, living and working conditions, personal resources, and environmental factors);
3. The health services received by residents (as measured by acceptability, accessibility, appropriateness, competence, continuity, effectiveness, efficiency and safety); and
4. Characteristics of the community or health system (demographics, availability of health providers, and rates of selected procedures).

The approach adopted by CIHI introduces a degree of complexity in measuring performance of integrated health systems. It reflects accountability for improving health of the population served, not only in terms of health status but also in terms of impact on "up stream" determinants of health. CIHI's model includes traditional operational

measures grouped around eight dimensions of quality. It also acknowledges the characteristics of different communities that may help explain differences among various communities and health systems.

The attraction of CIHI's approach is the ability to use nationally collected data and to compare results across Canada, using a common approach. A core list of health indicators has been proposed, with some indicators to be developed over time. A significant number of the proposed indicators are not currently available or reflect data that are collected infrequently by Statistics Canada in national surveys.

CIHI and Statistics Canada issue regular reports based on the CIHI framework. The latest report How Healthy are Canadians? (2001) includes data related to personal health practices (nutrition, alcohol, physical activity, weight, smoking); stress and well being (personal stress, work stress, depression, chronic conditions, injury, pain, activity limitation, and social support); health care (physician visits, hospital stays, consultation for emotional health, alternative care, medication use, flu and home care); and death (causes and trends).

3.3 Canadian Council of Health Services Accreditation (CCHSA)

The CIHI approach to measuring indicators of health systems incorporates the eight dimensions of quality previously identified by CCHSA. Accreditation standards were based on these dimensions of quality. In 1997, CCHSA modified its approach to accreditation and adopted the AIM accreditation program, which measures system

performance from four quality dimensions: responsiveness, system competency, client/community focus, and worklife.

Although CCHSA emphasizes that its role is not indicator development, it does promote the use of valid and reliable indicators. During 1996-1998, CCHSA collaborated with fourteen acute care organizations across Canada to test the utility of six indicators. In 1997, CCHSA conducted a national survey of its members to identify indicators they viewed as important. CCHSA then developed a list of criteria to guide selection of recommended indicators. These criteria include:

- Relationship to AIM standards and the four dimensions of quality;
- Nationally accepted definition;
- Proven validity and reliability;
- Relationship to one or more health care sectors (for example, acute care, long tem care);
- Mix of structure, process and outcomes indicators;
- Inclusion of some indicators related to population health and continuum of services; a
- Rate based.

Although CCHSA does not require or recommend specific indicators, it has developed a document that identifies examples of indicators based on work to date. CCHSA has developed guidelines for organizations in the use of indicators. These guidelines include the use of a manageable number of indicators, use of a mix of indicators, and inclusion of some indicators that are used nationally. CCHSA also

recommends considering relevance to organizational goals and the ease of accessing data. CCHSA recommends the inclusion of some indicators related to population health as developed by the CIHI consensus conference. This recommendation lends credibility to the approach developed by CIHI.

3.4 CIHI/MacLean's Magazine Reports on Health and Health System Performance

In 1999, CIHI developed a partnership with MacLean's Magazine to regularly report to the public on the health of Canadians and the performance of our health system. The approach that they adopted mirrored the hugely popular and somewhat controversial annual comparisons of Canadian universities. MacLean's Magazine issues semi-annual health reports, based primarily on CIHI data. The October 2001 MacLean's report, Living Long, and Living Well, examines life expectancy and years of disability free years. Comparisons, by gender, are provided for life expectancy and years of disability free life expectancy at birth for 54 communities. It also compares life expectancy and years of disability free life expectancy at age 65 for the same communities.

Previous reports have identified the healthiest clusters of Canadians (those who live in and around Vancouver and Toronto). The June 2000 report compared sixteen indicators in 51 health regions with populations over 100,000. These indicators related to prenatal care (low birth weights, Caesarian sections, births after Caesarian sections); community health (hip fractures, hospitalization for pneumonia and flu); services for the elderly (hip and knee replacements), efficiencies (hospitalization for conditions considered treatable on an ambulatory basis, length of stay in hospital, and admissions

for conditions considered preventable by care in offices or clinics {MNRH}); deaths by cancers, circulatory and respiratory diseases; overall life expectancy; and availability of physicians and specialists per capita. The rankings divided communities into three categories: those with medical schools, other major communities, and largely rural communities.

The MacLean's reports have drawn considerable public attention and debate. The methodology, data integrity, and interpretations have been questioned and criticized. A recent article in the Canadian Journal of Public Health (Page and Cramer, 2001) identified the following concerns:

- Differences in ordinal ranks (rank ordering) are not amenable to quantitative or mathematical interpretation using accepted statistical methods;
- Many of the 13 indices that are grouped under the six major measures are unrelated and correlations are not statistically significant;
- Many of the indices used in the main six health care measures were unrelated to the final rankings;
- The differences between the top and bottom groups were not significantly different for most indices (for example, for communities with medical schools, the top and bottom groups differed by only 4.90 points and were statistically significant ($p<0.05$ (2 –tailed)) on only 2 (15%) of the thirteen individual indices.

Some communities and health systems (notably Capital Health in Edmonton) have cited the MacLean's results in their reports to the community and in their

recruitment ads. However, the observations made by Page and Cramer point out the difficulty when making comparisons regarding the performance of different health systems and the need for academic rigor when drawing conclusions from this type of data. MacLean's Magazine and CIHI acknowledge that the methodology will continue to evolve and improve over time, as has been seen with the reports comparing universities. Perhaps most importantly, the MacLean's reports draw the public's attention to considerable variations in health status among Canadian communities, with a gradation towards poorer health as you move east. The reports point out the many determinants affecting health, including personal health practices. The reports also impose a degree of accountability by health systems regarding the results of their efforts and expenditure of public resources.

3.5 Saskatchewan Health Services Utilization and Research Commission

In August 2000, the Saskatchewan Health Services Utilization and Research Commission (HSURC) proposed a framework for system performance indicators, based on an adaptation of the work by Maxwell (1984) and Donabedian (1990). This framework contains six interdependent dimensions.

Figure 2 System Performance Framework (HSURC 2000)

Effectiveness				
Equity	**Accessibility**	**Acceptability**	**Relevance**	**Efficiency**

The framework positions effectiveness at the top because HSURC views effectiveness in maximizing physical and social functioning as the most appropriate measure of overall health system performance. Sample indicators for effectiveness include premature mortality, potential years of life lost (PYLL), and health-related quality of life. HSURC does not recommend specific indicators for all the dimensions, but does recommend the following attributes for system performance indicators:

- Goal oriented (including goals related to health promotion, preventive care, treatment, and supportive care);
- System focused (not just clinical effectiveness);
- Outcome focused (rather than just structure and process);
- Measure those things the health system can change (recognizing that many determinants of health are beyond the immediate control of health systems);
- Use benchmarking;
- Facilitate meaningful comparisons (factoring in community variations for age, gender, functional status, socio-economic status and disease severity);
- Simple (understandable by various users, limited number of indicators, active involvement by providers and managers in indicator development).

The HSURC framework emphasizes the importance of measuring the impact of health systems on health outcomes. The proposed criteria for selection of indicators echo considerations recommended by CCHSA and others.

3.6 Performance Indicators Reporting Committee (PIRC)

In 2000, the provincial and territorial Ministers of Health agreed to develop a common approach to performance measurement. They specified fourteen performance measures to be tracked across all jurisdictions and established the Performance Indicators Reporting Committee (PIRC) to develop this approach. The proposed indicators (see Appendix 2) include:

- Self reported health;
- Life expectancy and disability free life;
- Infant mortality;
- Change in life expectancy from selected conditions;
- Adequacy of health protection and promotion activities;
- Patient satisfaction;
- Waiting times for key diagnostic and treatment services;
- Access to 24/7 first contact health;
- Adequacy of public health surveillance;
- Home and community care services;
- Improved quality of life;

- Reduced burden of disease, illness and injury; and
- Hospital readmissions.

Development of these indicators is proving to be problematic. The indicators initially suggested by the ministers were vague and the ministers provided no clarity regarding what the indicators were intended to measure. The PIRC has attempted to reach consensus on the minimal dataset that meets the spirit of the ministers' directive. Variability in health information systems across Canada is also a limiting factor, which means the indicators that are eventually developed will probably reflect "the lowest common denominator" that could be achieved among such diverse jurisdictions. Many jurisdictions are unable to report waiting times. The indicators include some measures of health status but very little information related to non-medical determinants of health. Many provinces already have much more sophisticated approaches to system performance measurement and will gain little by complying with the proposed reporting requirements.

Table 1 Comparison of Theoretical Models

	Measures health outcomes	Measures system operations	Measures system goals
Leatt, Pink and Guerriere BSC	**X**	**X**	**X**
CIHI population health framework	**X**	**X**	
CCHSA AIMS dimensions of quality		**X**	
MacLean's/ CIHI regional comparisons	**X**	**X**	
HSURC	**X**	**X**	**X**
PIRC	**X**	**X**	

4. International Approaches to Performance Measurment

Canada can look to other countries regarding their approaches to measuring system performance. In a paper prepared for the conference "Measuring Up: Improving Health Systems Performance in OECD Countries", Naylor, Iron and Handa (2001) point out:

> "We cannot understand and address the ubiquitous variations in practice and performance within and across OECD countries without better assessment methods and sharing of information. Assessment of performance is the only means by which we can understand what we are doing well, where we are falling short and what kinds of solutions have been found to be effective in other jurisdictions. Indeed, the degree of variation in health service delivery within and across jurisdictions constitutes a set of both purposive and inadvertent experiments from which a great deal can be learned." (p. 3)

In a recent British Medical Journal article, Evans, Tandon, Murray, and Lauer (2001) proposed a method to measure and monitor the performance of health systems. They suggested that the main outcome measure should be efficiency, as calculated by healthy life expectancy relative to heath expenditure per capita. Evans et al. defined healthy life expectancy as life expectancy adjusted for years spent in less than full health. In addition to per capita expenditure, education (years of schooling) was identified as the other most important determinant of healthy life expectancy. Evans et al. applied their methodology to 191 countries, which were then ranked according to efficiency. Using this formula and assigning a score where 1 represents the highest level of efficiency, they calculated efficiency rankings (e.g. Oman 1, France 4, Spain 6, Japan 9, United Kingdom 24, Canada 35, Australia 39, United States 72, New Zealand 80 and Zimbabwe 191). Evans et al. concluded that increasing the resources for health care systems is

critical to improving health in poor countries, especially if annual health expenditures fall below $80 (US) per capita. They also concluded that most countries can use existing resources more efficiently. As intriguing as this methodology may be, it provides insufficient detail to serve as a framework for ongoing monitoring of system performance intended as an impetus for continuous improvement.

4.1 World Health Organization (WHO)

In the World Health Report (WHO, 2000), a more elaborate approach to measuring health system performance is detailed. WHO uses measures related to three health system objectives: good health, responsiveness, and fair financial contribution. For this purpose, health is measured as disability-adjusted life expectancy (DALE). Responsiveness is measured by how well the system meets a population's expectations of how it should be treated by providers of prevention, care, or non-personal services. This performance measure includes seven elements: respect, confidentiality, autonomy, prompt attention, amenities, access to social support networks, and choice of provider. Fair financing measures whether the risk each household faces due to the costs of the heath system are distributed according to ability to pay rather than to the risk of illness, and whether financial protection is ensured for everyone. These measures are weighted to produce a single overall performance measure of health system attainment. (see Appendix 3) Actual performance is then assessed relative to what might have been achieved with the resources available in the country. The latter measure is deemed by WHO to be the most critical measure of health system performance. WHO

acknowledges that difficulty in obtaining accurate data causes a high level of uncertainty in the results, although general trends (as opposed to individual rankings) are reasonably credible. The findings are fascinating.

The WHO approach is an effort to measure health system performance at a high level, incorporating measures of health outcomes, consumer expectations, fairness, and value for money. Of necessity, it includes macro measures that are available throughout the world. The results confirm that richer countries tend to have better results than poorer countries. However, some poorer countries such as Pakistan perform much better than other poor countries (including most African countries). The results for Africa illustrate the enormous toll that AIDS/HIV is taking in those countries. WHO uses these findings to provide analysis and recommendations regarding the ways in which health services are organized and financed.

The challenge posed by the WHO approach is for health systems to examine not only their results, but to evaluate these results relative to what could have been achieved if the same resources were invested and used differently. International comparisons provide direction to examine aspects of apparent excellent performance (for example, among the Scandanavian countries) to see what lessons can be learned and applied in different settings.

4.2 United Kingdom

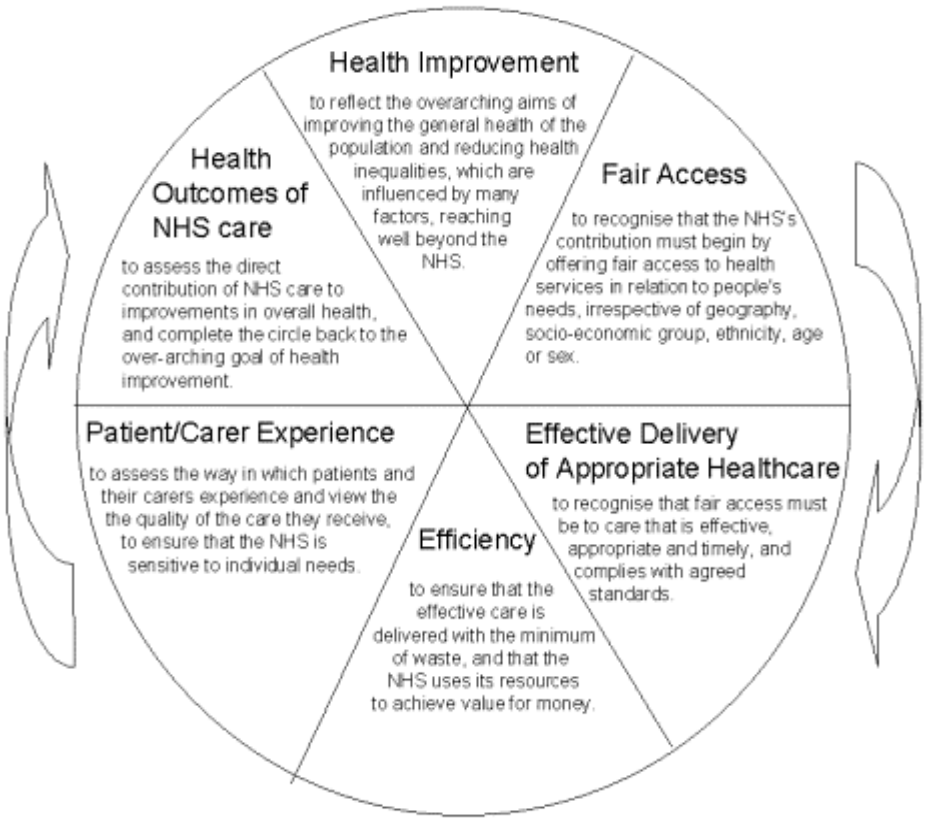
Although it is interesting to examine ways to measure performance of countries relative to one another, more value may be gained by examining approaches to

measurement of system performance adopted by selected countries that have health systems somewhat similar to Canada's, have focused on performance measurement, and have information available in English.

The approach adopted by Britain's National Health Service (NHS) provides useful lessons. A plan entitled A First Class Service: Quality in the New NHS (National Health Service, 1998) provided for increased funding (particularly for hospitals and health human resources), and massive reform of the NHS in response to public dissatisfaction. The plan described the existing NHS as a 1940s system operating in a 21st century world. (p. 2) The plan envisioned a health service designed around the patient, with strong emphasis on preventive care, self-care, primary care, hospital care, and intermediate care. Proposed reform involved a three-part approach to improving quality: new national standards (setting standards), dependable local delivery systems (delivering standards), and performance assessment (monitoring standards).

The NHS Performance Assessment Framework (PAF) was released in July 1999. It is based on a balanced scorecard approach involving six inter-dependent areas of performance: health improvement, fair access, effective delivery of appropriate health care, efficiency, patient/carer experience, and health outcomes of NSH care. (see Appendix 4)

Figure 3 NHS Performance Assessment Framework (NHS, 1999)



Indicators have been developed for each area of performance, for a total of 49 indicators. Some indicators are composite indicators combining two or more indicators to give a more rounded assessment of performance. For example, the early detection of cancer indicator combines measures of breast screening and cervical screening coverage, and the chronic care management indicator is a composite of age standardized admission rates for asthma, diabetes and epilepsy. Three indicators are considered "interface indicators" reflecting the need for health and social services to work together. These indicators are included in the indicator sets for both the National Health Service and the Personal Social Services. Both health authorities and councils with social services responsibilities will be held accountable for performance for these indicators. In addition

to the PAF developed for health authorities, seven indicators have been identified to monitor performance of Hospital Trusts. (see Appendix 5).

The approach taken in Britain involved a multi-year process of development and consultation with consumers and providers. Efforts have been made to increase the quality of data and to develop indicators that are more reflective of government priorities for health (for example, cancer, mental health, coronary artery disease, and primary care). The framework continues to evolve and another round of public consultation is currently underway. Summary and Health Authority-specific results are widely available, including posting on the Internet. The aim of publishing the data is "to ensure that, where there are large and unexplained variations in performance, every effort is made to find out why, and work is put in train to bring about an early improvement." (NHS 2000, p. 4)

As of April 1, 2002, the number of district health authorities under the NHS has been reduced from 99 to about 30 and NHS regional offices are being abolished. Responsibility for health care is increasingly being vested in Primary Care Trusts (PCTs), led by general practitioners and primary care nurses, that commission and provide most local services. It can be assumed that approaches to measure system performance will continue to evolve as these changes are implemented.

4.3 New Zealand

Whereas the NHS performance framework is, over time, being more closely aligned with government strategy, the approach to performance measurement adopted by

New Zealand is based entirely on tracking progress in achieving government's platform for action on health outlined in the New Zealand Health Strategy. (Government of New Zealand, 1999) This strategy consists of 10 goals and 61 objectives. The goals are organized as they relate to the social and physical environment, and specific aspects of health for children, young people, adults, and older people. The objectives include 13 population health objectives targeted for the Ministry of Health and District Health Boards to focus on for the short to medium term. These population health priorities include: smoking, nutrition, obesity, physical activity, suicide, alcohol and drugs, cancer, cardiovascular disease, diabetes, oral health, violence, mental illness, and child health. The Health Strategy also focuses on reducing inequalities for people from lower socioeconomic groups, Maori and Pacific peoples.

Progress in achieving health goals and objectives is reported. These trends are expressed as: tracking toward health, static, tracking away from health, or not yet assessable. Measurement of achievement of an objective is expressed as indicators, with current results compared to target and baseline. Historical trends and requirements for future trends are identified. This approach involves an immense amount of data that is widely reported, including posting on the government website.

In addition to tracking achievement of goals and objectives, New Zealand uses a balanced scorecard approach to track and report three additional types of performance measures: financial measures: quality and customer satisfaction, and operational measures. (see Appendix 6)

The New Zealand Health Strategy was developed with input from a Sector Reference Group comprised of 21 health service consumers and providers. A seven-person Expert Advisory Group provided specific advice regarding goals, objectives, and targets. A discussion document was issued for consultation over a two-month period, and modified in response to written feedback and public meetings. In addition to the Health Strategy, a separate strategy has been developed to address disability in New Zealand.

The extensiveness of the performance measurement framework used in New Zealand is truly impressive. Most notably, it reflects a population health approach, targeting populations at particular risk, and focusing on the broad determinants of health. The level of detail enables meaningful measurement of progress. For example, within the objective related to nutrition, specific targets have been established for: daily number of servings of bread/cereal and vegetables, daily intake of calcium and sodium, percentage of the diet composed of total fat, saturated fat plus trans-fatty acid, and sucrose and other free sugars, proportion of the population with a body mass index above thirty, and proportion of infants being breastfed at three months and six months.

4.4 United States (USA)

It is difficult to identify the ways in which performance of American health systems are measured, because of the many different approaches to ownership and organization of health services in the USA. Many organizations participate in an accreditation process through the National Committee for Quality Assurance (NCQA). The Health Plan Employer Data and Information Set (HEDIS 3.0) is widely used. This

version of HEDIS examines process and outcome measures across the continuum of care, for both private sector and public sector (Medicare and Medicaid) members. In addition to examining health outcomes, HEDIS examines access, member satisfaction, and cost of care. Measures have been selected based on relevance (for example, known impact on health outcomes, within the influence and control of the health plan), scientific soundness (for example, validity, sufficient statistical power), and feasibility (for example, relative cost, protection of patient confidentiality). (NAHQ, 1999)

NCQA also uses a Quality Compass, a national database containing both HEDIS and accreditation information from 329 health plans across the USA. National and regional averages are reported for nine indicators: advising smokers to quit, use of beta blockers, breast cancer screening, cervical cancer screening, Caesarian section rates, childhood immunizations, retinal exams for diabetes, prenatal care in the first trimester, and overall member satisfaction. These measures are intended to stimulate improvement efforts related to both cost and quality.

Although financial sustainability and member satisfaction are important elements of performance measurement in many American health systems, increasing focus is being places on measurement of health outcomes. Many organizations use outcomes databases such as the Maryland Quality Indicator Project, the Cleveland Health Quality Choice Program and ORYX PLUS (developed by the Joint Commission on Accreditation of Health Care Organizations). ORYX Plus consists of 32 measures, including those related to cardiovascular, obstetric, oncology, perioperative, and trauma care, medications, and infection control measures. Over 1000 hospitals participate in the Maryland Quality

Indicator Project, which includes inpatient and ambulatory outcome-based clinical indicators.

Since 1988, Pennsylvania has required all its hospitals to collect and submit clinical outcomes data to the Health Care Cost Containment Council (HCCCC). The June 2001 report of the HCCCC evaluates quality among the state's 17 health maintenance organizations (HMOs), using indicators related to : prevention and wellness, management of ongoing illnesses, acute care, access and service, member satisfaction, and finances. (see Appendix 7) This approach is interesting in that it includes a balanced perspective of HMO performance and focuses attention on a relatively small number of health conditions or issues which are presumed to be representative of plan performance or reflect major health or performance issues. The report card does not include standards or targets for each indicator although the report explains whether a higher or lower rating is desirable. The report is intended for many audiences. It enables providers to measure outcomes, stimulates quality improvement, and evaluates current treatment strategies. For policy makers, it identifies variation in practice and provides a tool for more informed policy decisions. For consumers, it is intended to assist in choosing an HMO and to educate the public about common medical conditions (the report includes user-friendly explanations of each indicator and why it was selected).

A balanced scorecard approach is used by some of the larger American health systems. In the Henry Ford Health System, spider diagrams are used to report performance from three perspectives: operational performance, quality, and customer satisfaction (see Appendix 8) (Shortell 2000).

The drivers for measuring system performance are somewhat different in the United States, compared to Canada. The importance of competitive advantage and financial viability is reflected in the measures used by many American health systems. Of more relevance to Canada is the focus on selected clinical indicators that are evidence-based and deemed to be best practice.

5 Canadian Case Studies

Within this context of theoretical models and international approaches, it is interesting to examine the approach to performance measurement adopted by health districts in various parts of Canada. For purposes of this paper, the author examined the South Fraser Health Region, Capital Health (Edmonton), Saskatoon District Health and Capital Health (Halifax). The constant change being experienced in Canadian health care is reflected in the fact that two of these health systems have undergone significant restructuring during the period in which this research has been conducted.

5.1 South Fraser

5.1.1 Provincial Approach

The British Columbia (B.C.) Ministry of Health has established a strategic plan that includes five domains in which the health authorities can influence performance: health of British Columbians, accessibility, affordability and sustainability, quality, and working environment. (Government of British Columbia, 2001) Performance reporting includes an annual report of health authority performance indicators. The March 2001 report, Assessing the Performance of Our Health System, (see Appendix 9) provides an

extensive overview, with data reported for the province as a whole and by health district. The indicators are grouped around the five domains identified in the Ministry of Health's strategic plan. The indicators are also related to four of the six British Columbia health goals (and associated objectives) that address the following: living and working conditions, physical environment, health services, and disease and injury prevention (indicators have not yet been developed for the health goals that address aboriginal health and individual capacities, skill and choices). Each indicator includes a brief analysis of the results, a definition, rationale, comparison (target and or benchmark) and data source.

This set of indicators is intended to look at population health from the perspective of service delivery. It is intended to complement the annual report published by the Office of the Provincial Health Officer (PHO) which reports on the health of British Columbians. Indicators in this report include measures related to health status, living and working conditions, individual capacities, skills and choices, physical environment, health services, aboriginal health, and disease and injury prevention. (see Appendix 10)

5.1.2 South Fraser

South Fraser Health Region developed a performance framework that is an integral part of its business-planning framework. Performance data are used to establish priorities in the three-year business plan, which includes goals that reflect quality improvement initiatives. Performance is reported and monitored at three levels: Board, Executive, and Coordinating Team (clinical program) using the CCHSA four quadrants of responsiveness, system competency, client/community focus, and worklife.

South Fraser has placed considerable emphasis on measurement to improve quality. Its performance framework is referred to as the Quality Scorecard. A strong link is made between performance measurement and business plan development, with corporate priorities reflecting areas targeted for improvement based on analysis of current performance. A distinction has been made regarding reporting to the Board, Executive and clinical teams. Indicators continue to evolve and gaps still exist at the clinical team/program level. (see Appendix 11 for proposed indicators)

South Fraser has the benefit of well-developed reporting of population health data and health authority performance data at the provincial level, with comparative data available for all health districts. As of January 2002, South Fraser has been incorporated into the new Fraser Health Authority, one of five health districts in British Columbia. The provincial government will be establishing global performance measures for these districts as well as local organizational measures for improvement purposes.

5.2 Capital Health (Edmonton)

5.2.1 Provincial Approach

Alberta Health and Wellness has established four provincial health goals:

1. Sustain and improve the delivery of accessible, effective, quality health services;
2. Improve health and well-being through protection, promotion and prevention strategies;
3. Support and promote a system for health; and
4. Optimize the effectiveness of the health authorities.

Objectives and key performance measures have been established for each of these goals. Each health authority is required to provide a quarterly report on Key Service Areas (e.g. increased home care and long term care services, improved access to selected diagnostic procedures and surgical procedures compared to provincial target). As part of the annual business planning cycle, each health authority is required to report progress on the provincial goals, using predetermined performance measures and provincial targets, enabling comparability of performance across the province. Additional performance measures apply only to highly specialized and provincial. In addition, individual health authorities are required to report annually on goals and performance measures established specifically by that health authority. Alberta Health and Wellness produces a report on the health of Albertans. (see Appendix 12) and an annual report of selected performance indicators. (see Appendix 13)

5.2.2 Capital Health (Edmonton)

Capital Health (Edmonton) was one of the first integrated systems in Canada and it is still one of the largest and most mature integrated health systems in Canada. This is evident in the comprehensiveness and sophistication of its approach to performance measurement, which involves three main components:

1. **Business Planning:** Goals, strategies and key results are identified for each of Capital Health's five core businesses: providing health information, promoting health, treating illness and injury, providing supportive care, and advancing

education and research. Progress on achievement of these goals is tracked and reported through a variety of tools, including the annual report and business plan. Each Capital Health goal is linked to one of the four Alberta Health and Wellness goals.

2. **Health Status:** The Medical Officer of Health provides an annual report on health status in the Capital Health region. The report is targeted at the public, and is organized with key indicators related to life cycle and major causes of ill health. (see Appendix 14) This report also profiles information related to heart and stroke, injury, suicide, and healthy aging. In addition to the Report from the Medical Officer of Health, Capital Health produces ad hoc reports related to demographic trends. A comprehensive health status report is produced every three years.
3. **System Performance:** Capital Health tracks system performance in seven areas: quality, appropriateness, satisfaction, financial, access, utilization, and risk management. (see Appendix 15) These are reported quarterly to the Executive and Board.

The performance measures used by Capital Health (Edmonton) are communicated to the public and other stakeholders using a variety of reports, targeted to various audiences. The extensiveness of the performance tracking and reporting, and the use of this information to set priorities, allocate resources and improve quality, reflect a strong commitment to quality improvement and accountability.

5.3 Saskatoon District Health

5.3.1 Provincial Approach

The Saskatchewan Health Districts Act (2000) requires all health districts to report annually to government and to the public on the health status of the health district and the effectiveness of the district health boards programs. The reporting to government is linked to the business planning process. In 2001, Saskatchewan Health issued The Action Plan for Saskatchewan Health Care. This plan represented the provincial government's response to the Fyke Commission on Medicare. (2001) The plan includes ten key initiatives: primary health care, health promotion, Northern and aboriginal health, emergency medical care, better hospital care and long term care, reduction in waiting times, retention, recruitment and training of health are providers, quality, regional health authorities, and sustainability of public Medicare. The plan for quality includes establishment of a Quality Council that will be responsible for monitoring and assessing performance of the health system and informing the public about the quality of health services in Saskatchewan. (Saskatchewan Health, 2001 p. 57)

In 1996 the Saskatchewan Provincial Health District Advisory Committee established an Information Needs Working Group to develop province-wide comparative information for all health boards to use for needs assessment, strategic planning, resource allocation, program development, and program management. The Information Needs Working Group has recently developed a framework for health service and outcome indicators. (see Appendix 16) The framework consists of three components:

1. **Steps to good care:** These indicators are intended to answer the question – how well is the system delivering needed services across the continuum? Indicators relate to inputs (financial and non-financial resources, knowledge, and skills of health professionals); and processes (effective and appropriate use of key services across the continuum of care, efficiency, and integration of services).
2. **Satisfaction:** These indicators are intended to answer three questions: How satisfied are people with the care and services they receive and with their role in decisions about their health care needs? How satisfied is the public with the care and services that are available and the value received for the money sent? How satisfied are health providers with the system in which they work? Client satisfaction indicators relate to access, convenience, cost, treatment, respect for clients' values, needs and preferences, communication, education, and general impressions.
3. **Results:** These indicators are intended to answer the question - what is the impact on population health status, client needs, client quality of life, and decisions regarding delivery infrastructure? Indicators related to results include outputs (effect of efforts to screen and detect disease, effectiveness of treatment regimes and preventive actions), and outcomes (impact on population health, health risk, client quality of life and functional status).

This performance framework is being applied to four population groups: mothers and infants, children and youth, adults and seniors. A maximum of eight core indicators and

additional optional indicators are being developed for each population group. Core indicators must be reported by all health districts. Future plans include:

- Selection of indicators for a fifth population group – communities;
- Further development of optional indicators;
- Development of satisfaction indicators.

5.3.2 Saskatoon District Health

On an annual basis, Saskatoon District Health produces an extensive report on the health of people living in Saskatoon. (see Appendix 17) The report is intended to foster a better understanding of the impact of determinants of health at the local level and to stimulate strategies that cross traditional boundaries. (Saskatoon District Health, 2001) The report includes both extensive comparative data and a series of recommendations based on the findings. Many of these recommendations involve changes to public policy. The health status report provides a comprehensive overview of both health status and the factors that contribute to health or ill health. The report does more than provide data - it uses evidence to identify priorities for action and improvement. It is not clear how this reporting will interface with the new provincial performance framework for health services and outcomes. There appears to be considerable overlap between the two approaches. Adoption of the provincial framework by other districts in Saskatchewan will facilitate inter-district comparisons.

In addition to reporting on health status, Saskatoon District Health has developed a quality framework that uses a balanced scorecard approach to track and report on

selected, mainly operational, indicators. This approach is still under development. (see Appendix 18) It is intended that indicators will be assigned to one of four quadrants:

1. **Client/customer satisfaction** (e.g. concerns/complaints, service times)
2. **Learning opportunities/innovation** (e.g. non-traditional investments)
3. **Financial management (**e.g. budget variance)
4. **Utilization Measures/outcomes** (e.g. length of stay (LOS), outcomes relative to clinical pathways)

This framework will be used at all levels of the organization (unit, care group, Vice President portfolio, Chief Executive Officer, and Board). Quality scorecards will be reported quarterly. Priority will be given to reporting on quality issues that are high risk, high, volume, high cost, and problem prone. Indicators are expected to address the eight dimensions of quality as previously grouped by CCHSA (i.e., safety, accessibility, effectiveness, efficiency, appropriateness, continuity, competence, and acceptability). Establishment of quality targets and evaluation of results will be linked to the Accountability Agreements that are part of the performance management systems for all SDH staff. Quality reporting will also be linked to the SDH planning cycle.

The quality measures currently reported to the Saskatoon District Health Board represent fairly traditional management reports. The development of District-wide and departmental/program-specific goals arising from the business plan and linking results to the Accountability Agreements has considerable potential to ensure organizational alignment. Saskatoon District Health is being restructured as part of the reduction in the

number of health districts arising from the Fyke Commission. It is anticipated that the performance framework for this enlarged district will continue to evolve.

5.4 Capital Health (Halifax)

5.4.1 Provincial Approach

Nova Scotia has not yet developed a provincial framework for performance measurement and reporting. All health districts are required to report CIHI data and selected financial and activity volume data. An annual report with selected system performance measures is produced. (see Appendix 19) The province plans to adopt the CIHI framework and preliminary data set developed by the national Performance Indicators Reporting Committee. (personal communication with Sarah Kramer, November 16, 2001) The Provincial Health Council and Nova Scotia Association of Health Organizations (NSAHO) have jointly undertaken development of performance indicators related to the Nova Scotia health goals. The working group established to develop indicators for the goal of efficient management of the system has suggested potential indicators related to cardiovascular care, emergency care, diabetes care, cancer care, physician and nursing resource planning, and physical and financial resources. Another working group established to develop indicators for the goal of health promotion has suggested potential indicators related to income and employment, education, physical environment, personal health habits, women and children's health, and selected other indicators to be reported on an occasional basis. The Provincial Health Council is at arms-length from government and serves in an advisory capacity. The indicators

proposed through this process may be considered by District Health Authorities but are unlikely to be adopted province-wide.

5.4.2 Capital Health (Halifax)

As one of the first steps in developing an integrated health system, Capital Health (Halifax) committed to measuring, monitoring and reporting on its performance. Capital Health developed a planning and performance measurement framework (see Appendix 20) that includes three components:

1. **Population health measures:** These measures are intended to answer the question - are we improving the health of our population? This part of the Capital Health framework incorporates the population health indicators developed by CIHI. These include measures related to health status (deaths and life expectancy, health conditions, human function and well being); non-medical determinants of health (health behaviours, living and working conditions, personal resources and environmental factors); and selected community and health system characteristics (for example, demographics). (see Appendix 21 for proposed population health measures)
2. **Operational measures:** These measures are intended to answer the question – how well is our system working? This part of the Capital Health framework incorporates the four dimensions of quality and related indicators developed by CCHSA. These include measures related to responsiveness (for example, access), system competency (for example,

safety), client/community focus (for example, patient satisfaction), and worklife (for example, employee satisfaction). (see Appendix 22)

3. **Strategy measures:** These measures are intended to answer the question – are we achieving our strategic goals? This part of the Capital Health framework involves measurement of goals associated with the organization's strategic plan. Currently, these goals are grouped around four strategic directions related to patient/client/community care, healthy workplace, building knowledge, and leadership and advocacy.

The Capital Health performance measurement framework is intended to be used to measure, monitor and report performance throughout the District, at all levels of the organization. For example, at the Board level, operational measures are reported monthly, strategy measures are reported quarterly, and population health measures will be reported annually. Individual clinical programs are expected to develop program-specific population health measures (related to health status and non-medical determinants of health); program-specific operational measures (related to responsiveness, competency, client/community focus, and worklife); and measures of achievement of program-specific goals that align with the Capital Health strategic plan. Non-clinical departments are expected to develop and use operational and strategic measures.

The Capital Health performance measurement framework is designed to be used as a planning tool, with results influencing future plans and tracking achievement of results. It is intended to stimulate quality improvement by identifying aspects of

performance that do not meet targets or standards. It serves as an accountability tool, with reporting internally and externally, including to members of the public through semi-annual reports.

The framework has been in place since January 2001, having been approved at the first official Board meeting of the new organization. The framework continues to evolve. The initial set of operational measures reported to the Board has been revised and streamlined, to focus on fewer, more meaningful indicators and provide more focus on worklife and client/community focus. Lack of information systems in the more rural parts of the District has been a barrier to accessing data for the entire District but this is improving as information systems are developed. The initial rollout of the framework was targeted at teams established for two accreditation surveys. The second target group was the eighteen health interdisciplinary teams that are planning integration of health services. Each of these teams was mandated to develop performance indicators based on the Capital Health framework.

Capital Health has placed emphasis on performance measurement as an accountability tool and is only beginning to emphasize the link between measurement and quality improvement. Capital Health has recently developed a proposed District-wide approach to quality that incorporates the Capital Health performance measurement framework as an essential element. This is intended to place less emphasis on monitoring and more emphasis on improving quality, especially health outcomes. In the first phase of development of this new health system, emphasis has been placed on creation of the performance measurement framework and on reporting of strategy measures and

operational measures at the Board level. The monitoring of strategy measures is well established and has both kept the Board informed and served as an impetus for goal achievement. Strategy measures related to Capital Health's new strategic plan will be reported more broadly as part of a strategy to keep the strategic plan alive and visible at all levels of the organization.

Operational measures are continuing to evolve at the Board level but are still underdeveloped in many departments and programs. Considerable work is needed to achieve this and meet standards established by CCHSA. The approach of encouraging departments and programs to develop their own operational measures, using the District framework, has been effective in some departments but less so in other departments that need more coaching and direction. A core set of performance indicators for use by all departments/programs will be established as part of the District quality management plan. Population health measures are still under development, although Capital Health has effectively used a summary of selected health status and non-medical determinants of health as an impetus for change. The Why Change? document (see Appendix 23) has been widely circulated to internal and external audiences, sending a powerful message regarding the current health status of Nova Scotians and the need to change the way people think about health.

Priorities for future development of the Capital Health performance measurement framework include:

- Inclusion of more data for parts of the District other than the largest acute care facility;

- Development of population health measures, especially those related to health outcomes;
- Development of program and department-specific operational measures for clinical services;
- Further development of worklife;
- Development of goals and related strategy measures arising from the new Capital Health strategic plan.

5.5 Analysis of Performance Measurement in the Four Canadian Health Systems

The four health systems examined in this study are at different stages in their evolution and continue to be influenced by provincial government policy regarding restructuring of health services. The approaches in each of these systems reflect a population health approach that recognizes the influence of non-medical determinants on health outcomes.

British Columbia has well-established provincial health goals. Information systems are well developed, enabling tracking of health status and other performance measures at the provincial and health authority level. B.C. has recently reduced the number of health authorities and targeted huge reductions in health expenditures. They are well positioned to monitor the results of these changes from numerous perspectives. The existing approach in South Fraser incorporates the four dimensions of quality defined by CCHSA and links performance measures to the corporate strategic plan and health service plan. South Fraser is now part of the larger Fraser Health Authority, and the

approach to performance measurement will be revised in compliance with new requirements imposed by government

Alberta also has a very well established approach to performance measurement related to provincial health goals. As part of the annual business planning cycle, all health districts are required to provide plans and progress reports related to the provincial health goals. Capital Health (Edmonton) has a comprehensive approach to performance measurement and reporting. In addition to tracking progress on achievement of the Capital Health strategic plan and provincial health goals, Capital Health provides an extensive health status report. Capital Health also reports quarterly to its Executive and Board on a series of quality measures. Benchmarking and other initiatives are also part of the Capital Health (Edmonton) approach to performance measurement.

Saskatchewan is developing a provincial approach to performance measurment that involves health service and outcome indicators by population group. This is a very ambitious undertaking that will take some time to implement. The newly announced Quality Council (encompassing the Heath Services Utilization and Research Commission) will oversee monitoring of health system performance. Although Saskatoon District Health issues an extensive health status report, the use of other performance measures is less well developed and fairly traditional in its approach. This will continue to evolve as this district adopts the provincial framework.

Nova Scotia has a long way to go in developing a provincial approach to performance measurement. Limited information systems and a focus on several rounds of system restructuring have been factors in this province's limited measuring and

reporting of heath status and other performance measures. Capital Health (Halifax) has been in existence for slightly more than a year, but has demonstrated a commitment to performance measurement. A framework has been developed that includes measures related to health outcomes, system operations and goals achievement. Performance indicators continue to evolve, with emphasis currently being placed on development of the initial set of population health measures. Capital Health (Halifax) can benefit from the experience and example of other more mature health systems that already have these measures in place.

Table 2 Comparison of Approaches to Performance Measurement in Four Canadian Integrated Health Systems

	Provincial health status report linked to provincial goals	**Provincial health authorities comparative performance measures**	**System-specific health status measures**	**System-specific operational measures**	**System-specific measures of goal achievement**
Capital Health (Edmonton)	****	Required performance measures identified and reported quarterly-no summary report issued	****	****	****
South Fraser	****	****	Covered in provincial report	***	***
Saskatoon District Health	** new framework developed. Will combine health outcomes and system operations measures	** new framework developed. Will combine health outcomes and system operations measures	****	** will be modified based on new provincial framework	**
Capital Health (Halifax)	* limited report	* limited report	Under development	***	***

Using the CIHI framework for performance indicators for integrated health systems, the following health authority-specific indicators are used (or planned) by all four systems:

Table 3 Common Indicators used in Four Canadian Health Systems (includes-District-specific measures reported by the province)

Health Status	**Deaths** Leading causes of death Mortality rates for heart and stroke, cancer Life expectancy PYLL Infant mortality Suicide rates	**Health conditions** Hospital separations by major diseases Low birth weight Infectious disease rates (Hepatitis C, HIV, TB) Injury rates	**Human Function** Disability free life expectancy Chronic disease rates (heart, stroke, cancer, asthma, diabetes, mental illness)	**Well-being** Self reported health and well being
Non-medical determinants of Health	**Health behaviours** Smoking Alcohol use Physical activity Immunization Teenage pregnancies	**Living/ working conditions** Employment Income Education	**Personal resources** Income assistance rates Dependency ratios	**Environment** Air and water quality
Health system performance	**Competence**	**Acceptability** Patient satisfaction	**Accessibility** Waiting times for cancer care, hip and knee replacements, cardiac surgery	**Appropriateness** C-section rate
	Safety Serious occurrences Staff WCB claims	**Continuity** Waits for continuing care	**Effectiveness** Incidence of vaccine preventable diseases Hip and knee replacement rates Flu and pneumonia admissions or rates	**Efficiency**

Community and Health System Characteristics	Population size and growth rates Age distribution

Another way to assess the approaches used in these systems is to compare their approaches to the principles recommended by Leggat et al. (1998):

1. **Link the model with the organizational strategy**: It is important to provide feedback on attainment of strategic goals, and not just measure and improve operational effectiveness. Porter (1996) points out that although some organizations had superior operational effectiveness, the lack of a strategy that differentiates them from competitors led to diminishing returns. Although the Canadian not-for-profit environment is different than the American systems Porter examined, a focus on strategy is relevant for Canadian health districts that continue to evolve into more integrated systems.
2. **Provide diversified perspectives on organizational performance:** This is consistent with the balanced scorecard developed by Kaplan and Norton (1996) and the approaches recommended by CCHSA and CIHI. A population health approach suggests that system performance measures should address both health outcomes and the many determinants of health.
3. **Limit the number of indicators:** Leggat et al. point out that "creating measures incorporating different perspectives can lead to a bewildering array of indicators which may result in information overload. Attention should be paid to the creation of a parsimonious set of indicators that balances the need for multiple measures with the selection of only those that are critical to monitoring and adjusting organizational operations." (p.13) Selection of the critical few measures helps focus on what is truly important, and recognizes that development and monitoring of indicators

consume scarce resources. The selected measures should reflect the level of assessment (e.g. program versus health system), the latter requiring a more external focus and fewer indicators relating to internal operations. (Leggat et al., 1998, p.14)

4. **Ensure the quality of data and indicators:** Credibility of the performance measurement system is suspect if stakeholders (especially clinicians) do not believe the data is valid, clearly defined, comparable, consistent, timely and relevant. In Canada, this continues to be a matter of considerable debate, as the Canadian Institute for Health Information acknowledges there is significant variation in coding and abstracting practices across Canada. Timeliness of data is critical if it is to be used to change and improve practice. In many jurisdictions, program-specific, free-stranding databases have been established to provide data that clinicians feel they own and trust.
5. **Ensure stakeholder input into development of the model:** Stakeholders may include patients, members of the public, providers, and funders. Studies have shown that information generated internally is more likely to be used than externally generated information. (Oh and Rich, 1996) This finding is reflected in the suspicion with which the MacLean's Magazine reports on health care are viewed by providers. Van Peursem, Pratt, and Lawrence (1995) suggest that internally derived performance information is more likely to be used for decision making, and that, at a minimum, the measures and measurement methodology need to be openly communicated during the development process.

6. **Deploy the performance measurement system throughout the organization:** Luttman et al. (1994) note that if performance measures are seen as the preserve of a select group, a sense of ownership and accountability is unlikely to occur. Individual performance should be linked to that of the organization in order to motivate employees and managers to use and act upon the findings. In some organizations, compensation (especially for senior staff) is linked to organizational performance relative to pre-determined performance targets. Luttman recommends a "pyramid of detail" that enables front line staff to access detailed performance data that encourages maximal performance improvements, while senior levels receive summarized performance reports. Access to data is enhanced by computer systems that allow staff to access data and drill down for further detail.

The CEOs (or their designates) of each of the four health systems studied in this project were asked to score their current approach to performance measurement relative to the principles recommended by Leggat et al. They were also asked to rate the use of performance measurement in improving quality and their overall satisfaction with performance measurement in their system. A scale of 1-5 was used, with 5 indicating the highest level of perceived compliance/agreement. Results are summarized in Table 4.

Table 4 Perception of Current Approach to Performance Measurement within Four Canadian Health Systems

Principles	South Fraser	Capital Health (Edmonton)	Saskatoon	Capital Health (Halifax)
Link with organizational strategy	4.5	4	3	4
Diversified perspectives	5	5	4	4
Limited number of indicators	5	4	4	4
Quality of data and indicators	4	5	3	4
Stakeholder input in development of model	5	4	3	4
Organization-wide deployment	2	2	4	2
Impact on improving quality	4	3	4	3
Overall satisfaction	2	3	3	3

These results suggest that performance measurement is a challenge in these organizations. Performance measurement is linked to business planning and is used to demonstrate accountability to government and the public for system performance. Although these are important and necessary activities, they do not address the purpose of improving quality of care and impacting other determinants that ultimately result in improved health status. The four health systems are attempting to use performance measurement to improve the quality of services and health outcomes. This is being done by an ongoing cycle of: setting priorities for improvement, establishing targets, taking

action, monitoring performance, and holding people, and the heath system as a whole, accountable for results. This is consistent with the Plan, Do, Study, Act (PDSA) quality improvement cycle. However, even where performance measurement is well developed, the impact on quality is unknown or perceived to be "marginal at best." (personal communication with Dr. Robert Bear, March 28, 2002)

There may be several reasons why the link between performance measurement and quality improvement is not as strong as one would hope:

1. Integrated heath systems are relatively new in Canada. During the early stages of integration, changes are often largely structural, and other changes regarding how care is provided and how these systems collaborate with other partners to influence health take time to evolve.
2. Changes in health status and health determinants also take time and it may be too early to judge these results, although other measures of quality such as access, acceptability, safety and efficiency should be more amenable to improvement in the shorter term.
3. Performance measurement is still in its early stages and most often starts at the top, taking time to be understood and used at the operational level where changes can have the greatest impact on quality. Even in Capital Health (Edmonton), which has a well developed, comprehensive performance measurement system, reporting of results occurs primarily at the Board and senior staff level, and results are not widely distributed throughout the organization. Although a portion of the organization

operates within an accountability framework that includes performance indicators, other parts of the organizations (for example, physician leaders and middle managers) do not operate within such a framework. (personal communication with Dr. Robert Bear, March 28, 2002). At the point of recent restructuring in South Fraser, plans were underway to have regional population teams take leadership for performance measurement and accountability for improvement. Indicators had been established and tested, and a quality reporting process and structure had been established. Recent labour disruptions and system restructuring have stalled progress. (personal communication with Cathy Weir, April 10, 2002) Saskatoon has attempted to implement an accountability framework throughout all levels of the organization, using accountability agreements linked to an annual performance review process. Despite this, Saskatoon is also struggling with pushing performance measurement to the service level and determining the appropriate indicators at each level. Some Board indicators are perceived to be too micro, and some service level indicators are perceived to be too macro to be useful. (personal communication with Dr. Cory Neudorf, April 12, 2002) Capital Health (Halifax) has a similar experience. Efforts are underway to disseminate performance measures more broadly within the organization and to promote knowledge management through sharing and use of information to improve quality. It is this author's observation that in Capital Health (Halifax), when data is

perceived to be credible and owned at the service level, it is far more likely to be used to improve quality of services. Therefor data quality and, in some cases, expert interpretation of data, are essential to transform performance measurement into performance management.

Although the four systems studied have taken somewhat different approaches to performance measurement and are at different levels of maturity, some common features exist:

- Measurement of health outcomes by major causes of death;
- Measurement of some non-medical determinants of health, particularly those related to personal health practices (for example, smoking, diet, drinking);
- Measurement of patient satisfaction;
- Measurement of selected worklife indicators (for example, sick time, staff satisfaction);
- Measurement of access for selected diagnostic and treatment services (for example, mammography screening and heart surgery);
- Measurement of compliance with budget.

In effect, these measures represent a balanced scorecard, from three of the four perspectives recommended by Kaplan and Norton (1996) - customer perspective, financial perspective, quality processes, and outcomes. The weakest perspective appears to relate to innovation and learning (for example, timeliness of technology transfer, adoption of best practice, research productivity).

6 Proposed Performance Measurement Framework

What then are the lessons learned from this review of theoretical models, international experiences, and the approaches adopted by four Canadian integrated health systems? As Romanow (2002) points out in his preliminary report on the future of health care, "while steps have been taken to expand knowledge about our health system, more needs to be done to develop and share consistent, comparable, and timely information about health outcomes and improve accountability". (p. 36) There is much to build on from work that already reflects considerable consultation and consensus building. In particular, the CIHI indicator model, the four CCHSA quality dimensions, and the recent work done by the national PIRC provide direction for a framework that could be used across jurisdictions, enabling inter-provincial and interagency comparisons. The experiences of the four health systems studied in this paper also provide real life experience that should be helpful in moving from theory to practice.

The following principles are proposed to guide development of a performance measurement framework for integrated health systems:

- Concrete measurable **health goals** should be established, and progress tracked on achievement of these goals. At a minimum, these goals should be established at the provincial level, with consideration given to shared goals at a regional or national level. The effectiveness of this approach, as demonstrated by the United Kingdom and New Zealand experience, results in clarity of purpose, a focused, co-ordinated effort to improve quality of care and health outcomes, and accountability to the public

for results. Although there are provincial variations in health status and the social, economic, political and technological environment, the provinces have much in common in terms of their health goals. Most importantly, there is a shared desire to improve health status related to the most frequent causes of death and disability (for example, heart disease and cancer), and a desire to positively influence the determinants of health. The experiences in British Columbia, Alberta, and to a lesser degree in Saskatchewan, have shown that accountability can be enhanced by required reporting of agreed upon performance measures by all health districts as part of their annual business planning process, and other regularly scheduled reporting requirements. A rigorous, standardized reporting framework, linked to the business planning cycle for all districts within a particular province, should be established. Ideally, health needs and system performance would be considered in establishing funding levels for each district.

- The performance framework should be more that a measurement tool. It must be an impetus for action and a tool to help improve quality. This is most effective when the framework is **applied to all levels of the health system**. Most importantly, it needs to be understood and applied at the point of care where process changes can influence health outcomes. A framework can be developed and approved at the corporate level if there has been appropriate, credible consultation in its development. It must be understood, interpreted and applied at the service level. This implies that a culture of quality improvement exists, and every individual understands and is held accountable for his/her contribution to quality. The performance measures at the service level

should reflect compliance with evidence-based practice. Many of the American tools used to measure performance are service-specific and clinical practice-based.

- The performance framework must measure **health status**. Although health outcome research is still in its infancy and effective information systems are usually lacking, we have considerable data that can be useful and enhanced over time. The CIHI framework is helpful in categorizing four types of health outcomes: death/life expectancy, heath conditions, human function, and well being. CIHI regularly reports on health status of Canadians, using interprovincial comparisons, and Health Canada and Statistics Canada periodically conduct national surveys that provide useful information regarding human function and well being.

  When selecting which measures of health status should be included in the performance measurement framework, priority should be given to those aspects that represent the greatest burden of disease and disability. Health status and determinants of health tend not to change significantly over short periods of time and measurement is sometimes difficult and often costly. Reporting on an annual or biannual basis is appropriate, with less frequent reporting of selected measures that require large-scale (usually national) surveys.

- The performance framework must address **non-medical determinants of health**. Once again, the CIHI framework is useful in grouping these determinants into four manageable categories: health behaviours, living and working conditions, personal resources, and environmental factors. Inclusion of selected measures related to these determinants provides a more balanced perspective of health, the health system,

and our society. The health status reports in Saskatoon, Alberta and British Columbia are good examples of meaningful reporting on non-medical determinants of health using a variety of communication tools for various audiences, including the general public. The Why Change? document in Capital Health (Halifax) is a good example of less being more in capturing public attention regarding health status and some of the factors that influence poor health.

- The performance measurement framework must include measures related to system operations that are tracked more frequently than health status and health determinants. **Operational measures** are needed to help manage the system at the macro and micro level. This should be the stimulus for continuous quality improvement in areas where performance does not meet standards or targets. The CIHI framework includes eight dimensions of system operations (acceptability, accessibility, appropriateness, competence, continuity, effectiveness, efficiency, and safety). Experience has shown that these dimensions are inter-connected and frequently overlap. That is one reason why CCHSA regrouped these dimensions into four quality dimensions: responsiveness, system competency, worklife, and client/community focus. Most Canadian health districts are accredited by CCHSA. Therefore the use of the four quality dimensions as defined by CCHSA for both regular performance measurement and periodic external reviews by CCHSA surveyors would help simplify the performance measurement approach and make the accreditation process less artificial. One of the biggest challenges in developing operational measures is to measure responsiveness and access. Numerous initiatives are underway, including the

Western Waitlist Project. Although in some instances (for example cardiac surgery and cancer care) the relationship between waiting time and health outcomes is known, we do not know this for many other conditions, and in some instances (for example orthopaedic surgery) there may be benefit in delaying surgery. Health outcomes research will eventually help answer some of these questions. Similarly, differences in rates of selected procedures (for example Caesarian sections, knee replacements) should be viewed with caution until we can ascertain whether higher or lower rates are desirable from the perspective of health outcomes and how much of the variation in rates reflects disease burden and other factors that explain regional differences.

- A population health approach implies a focus on reducing inequities in health status among **sub-populations**. In a Canadian context, this usually includes a focus on at-risk populations such as children, seniors, and aboriginal people. At a minimum, a performance measurement framework should specifically address health status and health determinants related to these sub-populations. Other areas of focus could include maternal health, women's health, and/or health of rural versus urban populations. The framework developed by Saskatchewan Health, that includes core indicators and optional indicators for mothers and infants, children and youth, adults, and seniors is an excellent approach, with a relatively manageable number of indicators for both health services and health outcomes. The New Zealand approach of developing health goals and performance measurements related to aboriginal people could serve as a model for Canada.

- Some of the limitations that have been experienced in transforming data into knowledge to assure quality is a lack of expertise in interpreting the data and seeing how this knowledge can be used to change practice and outcomes. An effective performance framework must involve **knowledge management** - feedback to experienced and knowledgeable health professionals who can make judgement of compilations of data related to health outcomes and quality. In some cases this expertise may reside within the organization or may need to be accessed through affiliated academic institutions or other sources. Increasingly, academic health sciences centres are recruiting clinical scientists with expertise in health outcomes. Capital Health (Halifax) is forging closer linkages with the Dalhousie University Department of Community Health and Epidemiology (which includes a Population Health Research Unit) as part of its strategy to enhance health outcomes research. Staff in this department are helping Capital Health (Halifax) select population health measures, and will be involved in accessing and interpreting the data on an ongoing basis. Use of expert interpretation of data from multiple data sets lends credibility to the information among those clinicians and policy makers who are in the best position to apply the information to improve care and influence public policy that affects health. Naylor et al. (2001) point out that desired changes in system performance will be stalled unless specific strategies are adopted to manage change. They note that professionals change more readily when available research evidence is strong, clinical issues are sharply drawn, opinion leaders and local champions are positioned to

convince their peers of the merits of responding to evidence, and information systems give real-time feedback.

- **Data availability and data quality** are significant limitations in establishing any performance measurement framework. Caution needs to be exerted in measuring what we can, rather than what we need. CIHI data have come under considerable scrutiny and criticism because of variation in coding and abstracting practices (and incentives) across Canada. Efforts are underway to address these issues, and we can expect that continuous improvement in data quality will result. Similarly, many health systems are investing in user-friendly information systems. Data gathering and reporting are expensive. Therefore, priority should be given to those critical few measures that are most meaningful in terms of accountability and useful in terms of stimulating quality improvement.
- Advice from communications experts should be sought in developing **reporting tools** that are customized for different target audiences. In particular, reports aimed at the public need to express complex information in ways that the public can understand and relate to in terms of their own experience with the health system and their personal responsibility for health.

Using these principles, the following performance measurement framework is proposed by this author:

Table 5 Proposed Performance Measurement Framework

Health Status			
Deaths	**Health conditions**	**Human function**	**Well-being**
Life expectancy Cancer death rates (total, breast, lung, colo-rectal) Circulatory deaths Respiratory deaths Suicides Accidental deaths	Age-adjusted rates and hospital admission rates for chronic diseases* Hip fracture rate in adults and seniors Low birth weight Vaccine preventable infectious diseases** Hepatitis C New cases of AIDS/HIV Chlamidia Salmonella, E-coli 0157, Campylobacteriosis Tuberculosis	Disability free years	Self-rated health, self esteem, and mastery

* arthritis, diabetes, asthma, ischemic heart disease, stroke, end stage kidney disease, chronic lung disease, cancer {lung, breast, cervical, prostate, colorectal, oral, malignant melanomas}

** pertussis, haemophilus influenza type b, hepatitis A and B, Meningococcal infections, pneumococcal infections

Non-medical Determinants of Health			
Health Behaviours	**Living and Working Conditions**	**Personal Resources**	**Environmental Factors**
Smoking rates Regular heavy drinking Physical activity Breastfeeding (rate and duration) Teenage pregnancy rate Immunization rates Screening mammography age 50+ Pap smears age 18-69 Substance abuse in children and youth Injuries (including motor vehicle, spousal assault, child abuse and neglect)	High school and post secondary graduation Unemployment (total, long term, youth) Low income Income assistance Housing affordability Violent crime rate and youth crime rate	Literacy Children and youth in care Population on public assistance School readiness Independent living by seniors 65+ Caregiver burden	Air quality Second-hand smoke Water quality

Health System Operational Measures			
Responsiveness Wait times for selected diagnostic and treatment services (e.g. cardiac surgery, hip and knee replacement, mental health and addiction services, MRI, CT, radiation therapy) Wait time for home care and long term care Wait time in emergency for inpatient bed Wait time in ER for triage Level 3 patients Access to primary care providers Access to palliative care, rehabilitation and chronic pain services Access to health information Access to specific health professional expertise (e.g. specific specialists)	**System competency** Vaginal birth after C-section Use of beta blockers, ACE inhibitors, and other evidence-based practices Breast conserving surgery Nosocomial infections Preventable hospital admissions MNRH days Survival rates for AMI (30 and 365 days) and stroke (30 and 180 days) 5 year survival for lung, prostate, breast and colorectal cancer 5 year survival for transplantations Hospital admission rate for influenza and pneumococcal pneumonia Readmissions for cardiac failure, AMI, pneumonia and GI bleed Hospitalization for ambulatory care sensitive conditions Multiple medication use among seniors Bed occupancy Surgical cancellations for hospital-related Reasons Compliance with approved budget % budget for administration Serious occurrences Claims	**Worklife** Workplace injuries Sick time Staff satisfaction with decision making latitude, job flexibility, leadership, communication, opportunities for personal growth and development, and other workplace factors Vacancy rate and recruitment time for selected hard to fill positions Voluntary turnover rates Overtime Benefit plan use for antidepressants and other selected drugs	**Client/Community Focus** Patient satisfaction Public confidence in health system and satisfaction with opportunities to influence health policy

Community and Health System Characteristics			
Procedure rates CABG Hysterectomy Myringotomy Hip and knee replacements	**Human Resources** Physicians (FPs and specialists), nurses, and selected other health professionals per capita	**Expenditures** Total per capita health expenditures Per capita expenditures and % of health budget for drugs, physicians, hospitals, continuing care, and capital	**Population profile** Total population and trends in growth and geographic distribution Age distribution (current and trends)
Measures of Goal Achievement Other measures, as required, to measure progress on provincial and organizational-specific strategic plans.			

The number of proposed performance measures can be managed by determining frequency of reporting. Many of the measures of health status and non-medical determinants of health should be reported annually, biannually or even less frequently, depending in part on availability of data. Many of the proposed operational measures should be monitored on an ongoing basis as a tool for prioritizing and measuring quality improvement initiatives. These measures could be reported on a monthly, quarterly or annual basis, depending on the priority within the organization.

The availability of data and resources available for performance measurement, monitoring and reporting will influence the choice of performance measures and frequency of reporting. Community-specific considerations (for example, the magnitude of specific health issues) will also influence these decisions. Grouping data related to specific target groups (for example, aboriginal people) and/or stages in the life cycle (for example, children) create a clearer picture of results and health issues for these groups. Specification of data related to aboriginal people is particularly important where they represent a significant part of the population. There is extensive evidence of poorer

health status among aboriginal people and many health districts and governments are targeting this area for improvement in determinants of health and health outcomes.

7 Conclusion

Performance measurement must be a focus of government, boards, and health care leaders responsible for the quality of care and stewardship of resources. Increasingly, members of the public expect a high level of accountability by their health systems, similar to other services largely funded through tax-based government funding. The highly popular and visible MacLean's Magazine report on universities is now joined by regular report cards related to health care. Information regarding health care costs, access, safety, and other aspects of quality regularly makes front-page news. The public is rightfully concerned regarding the performance and sustainability of a health system that is perceived to help define our country. Comparisons with accepted standards or peer tend to lend credibility to performance reporting.

Lessons can be learned from the literature on theoretical models, international experiences, and the approaches of Canadian integrated health systems that have already established performance measurement frameworks. The performance measurement framework proposed by this author is based on this evidence. It can serve as a focus for dialogue, debate, and hopefully assistance, to governments and health systems that are developing or seeking to improve existing performance measurement frameworks.

In Canada , we are still in the relatively early stages of implementing integrated health systems and measuring their performance. Further research is required. In particular, the following research questions merit further study:

1. Do integrated health systems improve selected aspects of quality (such as access, continuity, satisfaction, efficiency, and effectiveness), compared to more traditional health service structures?
2. Do health systems that focus on performance measurement perform better than health systems with less focus on performance measurement?
3. Is performance measurement done at arms-length from health systems more credible to providers, funders and the public?
4. What are the most effective strategies to deploy performance measurement and performance management throughout all levels of an organization?
5. What criteria used in selecting performance indicators have the most credibility among clinicians?
6. What approaches to performance measurement have the most impact on quality?
7. What specific performance indicators have the most impact on quality?

Performance measurement is challenging but it is not optional. Public accountability for the performance of health organizations and systems is here to stay. Subjective self-assessment is no longer credible. Governments, members of the public, health providers, and others expect more rigorous evaluation, based on credible markers of performance excellence. They deserve no less.

8 Acknowledgements

Appreciation is expressed to South Fraser, Capital Health (Edmonton), Saskatoon District Health, and Capital Health (Halifax) for their participation in this research project and their generous sharing of material related to performance measurement.

Thanks are also extended to Judith Skelton-Green, FCCHSE and Bob Smith, FCCHSE for serving as mentors to me throughout my pursuit of fellowship. Their encouragement and support have been invaluable.

9 Appendices

Appendix 1: Health Indicators Confirmed at CIHI Consensus Conference (CIHI, 1999)

<table>
<tr><th colspan="4">Health Status</th></tr>
<tr><th>Deaths</th><th>Health Conditions</th><th>Human Function</th><th>Well-Being</th></tr>
<tr><td>Infant mortality
Perinatal deaths
Life expectancy
Circulatory deaths
Cancer deaths
Respiratory deaths
Suicide
Unintentional injury deaths
Pertussis deaths
AIDS deaths
Potential Years of Life Lost (<75)
Inequalities in life expectancy</td><td>Overweight
Arthritis
Diabetes
Asthma
Chronic pain
Depression
Injury hospitalizations
Food and waterborne diseases</td><td>Functional health
Disability-days
Activity limitation
Health expectancy</td><td>Self-rated health
Self-rated “excellent” health for 2 consecutive years
Self-esteem
Mastery</td></tr>
<tr><th colspan="4">Non-Medical Determinants of Health</th></tr>
<tr><th>Health Behaviours</th><th colspan="2">Living and working Conditions</th><th>Personal Resources</th><th>Environmental Factors</th></tr>
<tr><td>Smoking rate
Youth smoking rate
Smoking initiation (average age)
Regular heavy drinking
Physical activity
Breastfeeding</td><td colspan="2">High school and post-secondary graduation
Unemployment rate
Long-term and youth unemployment
Low income rate
Children in low income families
Income inequality
Housing affordability
Crime rate and youth crime rate
Decision-latitude at work</td><td>School readiness
Social support
Life stress</td><td></td></tr>
<tr><th colspan="4">Health System Performance</th></tr>
<tr><th>Acceptability</th><th colspan="2">Accessibility</th><th>Appropriateness</th><th>Competence</th></tr>
<tr><td></td><td colspan="2">Influenza immunization, 65
Screening mammography, women age 50-69
Pap smears, age 18-69
Childhood immunizations</td><td>Vaginal birth after caesarean
Breast-conserving surgery
Caesarean sections</td><td></td></tr>
<tr><th>Continuity</th><th colspan="2">Effectiveness</th><th>Efficiency</th><th>Safety</th></tr>
<tr><td></td><td colspan="2">Quitting smoking
Low birthweight
Pertussis
Measles
Tuberculosis
HIV
Chlamydia
Pneumonia and influenza hospitalization
Deaths due to medically-treatable diseases
Ambulatory Care Sensitive conditions</td><td>Surgical day case rates
May not require hospitalization
% Alternative level of Care days
Expected compared to actual stay</td><td>Hip Fractures</td></tr>
</table>

Community and Health System Characteristics	
• Population count • Teen pregnancy /teen births • Expenditures per capita • Doctors and nurses per capita • Hospital days per capita (possibly duration of stay)	• CABG rates • Hip replacement • Knee replacement • Hysterectomy • Myringotomy

Appendix 2: Indicators proposed by PIRC
(PIRC, 2001)

	Indicator Area	Proposed Recommendations
1	Life expectancy	F/P/T jurisdictions to report on life expectancy and DFLE (disability-free life expectancy
2	Infant mortality	F/P/T to report on infant mortality
3	Low birth weight	F/P/T to report on low birth weight
4	Self-reported health	F/P/T to report on self-reported health (CCHS)
5	Change in life expectancy	F/P/T to report on (a) age-standardized mortality rates for: lung, prostate, breast, colorectal cancer; (b) 30 day inpatient mortality for all AMI and stroke; (c) 5 year survival rates for lung, prostate, breast, colorectal cancer; (d) relative survival rates for: AMI (356-day) and stroke (180 days)
6	Improved quality of life	F/P/T to report on age-standardized rates of hip and knee replacements as surrogate measures of health-related QOL; propose functional assessment tools, etc. for future
7	Reduced burden of disease, injury, illness	F/P/T to report on: (a) incidence and outcomes of complications of diabetes (source: NDSS); (b) VPD: incidence rates of selected reportable conditions; hospital admission rates for influenza and pneumococcal pneumonia; (c) incidence rates for lung, prostate, breast, colorectal cancer; (d) PYLL due to injury, four cancers (above), AMI, stroke
8	Waiting times for key services	F/P/T to report on: (a) waiting times for cardiac surgery, hip and knee replacement surgery; radiation therapy for breast, prostate cancer, to the extent possible, and (b) estimated proportion of population waiting and length of wait for selected services (medical specialist; diagnostic tests; surgery)
9	Patient satisfaction	F/P/T to report on public/patient satisfaction (CCHS)
10	Hospital re-admission	F/P/T to report re-admissions for cardiac failure, acute myocardial infarction, pneumonia, and GI bleed
11	Access to 24/7 first contact services	F/P/T to report access to health care advice, routine and immediate treatment services
12	Home and community care	F/P/T to report: (a) rates of hospitalization for ambulatory care sensitive conditions; (b) volume/utilization of home/community services per capita and per capita 75+; (c) estimated % of population receiving homemaking, nursing, physiotherapy or respite services
13	Public health surveillance	F/P/T to report incidence rates for selected notifiable diseases (e.g. hepatitis A and B, salmonella, E coli 0157, pertussis, TB, chlamydia)
14	Health promotion	F/P/T to report on smoking, obesity, physical activity, flu immunization; strategy to be developed for future reporting on child immunization, breast cancer screening

Appendix 3: Selected WHO Rankings for Health System Performance based on 1997 Data (WHO 2000)

Health Attainment	Japan-1 Canada-12 UK-14 USA-24 New Zealand-31
Responsiveness	USA-1 Japan-6 Canada-7/8 (tie) New Zealand-22/23 (tie) UK-26/27 (tie)
Fairness	Columbia-1 Japan-8/11 (ties) UK-8/11 (ties) Canada 17-19 (ties) New Zealand-23-25 (ties) USA- 54/55 (tie)
Overall Health System Attainment	Japan-1 Switzerland-2 Norway-3 Sweden-4 Luxembourg-5 France-6 Canada-7 Netherlands-8 UK-9 Austria-10 USA-15 New Zealand-26
Health System Performance	Oman-1 Japan-9 Canada-35 UK-24 USA-72 New Zealand-80

Appendix 4: National Health Service Health Authority Performance Indicators (NHS, 2000)

Health Improvement	Deaths from all causes (ages 15-64) Deaths from all causes (ages 65-74) Deaths from cancer Deaths from all circulatory diseases Suicide rates Deaths from accidents Serious injury from accidents
Fair Access	Inpatient waiting list Adult dental registrations Early detection of cancer Cancer waiting times Number of GPs Practice availability Elective surgery rates Surgery rate-coronary artery disease
Effective Delivery of Appropriate Health Care	Childhood immunizations Inappropriately used surgery Acute care management Chronic care management Mental health in primary care Cost effective prescribing Returning home following treatment for stroke Returning home following treatment for a fractured hip
Efficiency	Day case rate Length of stay Maternity unit costs Mental health unit costs Generic prescribing
Patient care experience	Patients who wait less than 2 hours for emergency admission Cancelled operations Delayed discharge First outpatient appointments for which patient did not attend Outpatients seen within 13 weeks of general practitioner referral Percentage on waiting list 18 months or more Patient satisfaction

Health Outcomes	Conceptions below age 18 Decayed, missing or filled teeth in 5 year olds Readmission to hospital following discharge Emergency admissions of older people Emergency psychiatric re-admissions Stillbirths and infant mortality Breast cancer survival Cervical cancer survival Lung cancer survival Colon cancer survival Deaths in hospital following surgery (emergency and non-emergency admissions) Deaths in hospital following a heart attack Deaths in hospital following a fractured hip

Appendix 5: NHS Trust Level Performance Indicators (NHS, 2000)

Effective Delivery of Appropriate Health Care	Discharge form hospital (stroke) Discharge from hospital (fractured neck of femur)
Health outcomes of NHS Health Care	28 day emergency re-admission In-hospital premature deaths (30 day perioperative mortality-emergency admission) In-hospital premature deaths (30 day perioperative mortality -non-emergency admission) In-hospital premature deaths (30 day mortality following AMI) Deaths following fractured neck of femur

Appendix 6: New Zealand Performance Reporting Measures
(Government of New Zealand, 1999)

Operational Indicators	Case mix weighted average length of stay for inpatients DRG-based case mix ALOS for inpatients and day cases Resourced beds inpatient occupancy rate Physical capacity beds inpatient occupancy rate Operating theatre management YTD overhead expenses as % of total costs Direct personnel salaries per inpatient day equivalent Case mix weighted elective day stay surgery % Staff turnover to FTEs
Quality and Customer Satisfaction Indicators	Patient satisfaction-inpatients Patient satisfaction-outpatients Hospital acquired blood stream infections
Financial Indicators	Operating surplus/deficit Operating result to revenue ratio Operating result to funds employed ratio Revenue to funds employed ratio Debt to funds employed (debt plus equity) Acid test (Quick) ratio Debt service cover ratio

Appendix 7: Quality Measures for Pennsylvania's Commercial HMOs
(Health Care Cost Containment Council, 2001)

Prevention and Wellness	% of adult members advised to quit smoking during a doctor's visit Hospitalizations for avoidable admissions related to ear nose and throat infections, GI infections, kidney/urinary tract infections, hypertension, and COPD
Management of Ongoing Illnesses	Hospitalization, preventive care measures, and disease management initiatives related to diabetes Hospitalization and follow-up for mental illness, antidepressant medication management
Acute Care	Screening and procedure data, ALOS, complication and reconstruction rates for breast cancer Fusion rates, ALOS, complication rates for neck and back procedures
Access and Service	Membership, number of hospitals, primary care physicians and specialists
Member satisfaction	General satisfaction, ability to get needed care, ability to get care quickly (wait times), satisfaction with customer service
Financial Indicators	Revenue, medical loss and administrative expenses, margins, current ration, net worth to total liabilities

Appendix 8: Henry Ford Health System Indicators
(cited in Shortell, 2000)

Operational Performance	Net income, membership, volumes, case costs including pharmacy and dialysis costs, case mix, supplier and workforce diversity, voluntary employee turnover
Quality	Pediatric immunization, mammography, cervical cancer screening, non-surgical heart mortality, C-section rate, CABG mortality, home infusion treatment completion rate, ACE inhibitors, Coumadin, hospice pain management, beta blockers, diabetes
Customer satisfaction	Inpatient, outpatient, nursing home, home infusion, hospice, and home care satisfaction , behavioral satisfaction, access satisfaction,

Appendix 9: Indicators in Assessing the Performance of Our Health System
(British Columbia Ministry of Health and Ministry Responsible for Seniors, 2001)

Domain	Indicators
Health status	Immunization rates Rate of pertussis Hospitalization from pneumonia and influenza (>age 65) Smoking rates (age 12-18) Confirmed falls in licensed adult care facility New cases HIV Cases of selected food and water borne diseases % waterworks systems and food premises with high hazard rating
Accessibility	Follow up after hospitalization for persons with mental health diagnosis Residential beds for age 75+ Home support paid hours and visits Days for adult day care Acute weighted cases Waits of elective hip and knee replacements % licensed facilities/premises and water systems inspected annually %referrals out and in
Affordability and Sustainability	% surgical day cases expected compared to actual LOS ALC days as % of total inpatient days Admissions for ambulatory care sensitive conditions % MNRH cases
Quality	Readmission rates for mental health Infant mortality Low birth weight rates PYLL and age standardized mortality rates Influenza immunization for staff in residential care Confirmed reportable incidents in licensed facilities
Working environment	Accepted WCB claims Days lost and costs due to WCB claims

Appendix 10: Health Status Indicators in British Columbia
(British Columbia Ministry of Health, 1999)

Health Status	Self reported health and mental health Functional health, activity limitation and disability days Health conditions (overweight, chronic conditions, high blood pressure and heart disease, diabetes, asthma, allergies, chronic pain, mental illness) Deaths (infant mortality, PYLL, life expectancy)
Living and working conditions	Employment (unemployment, workplace injuries, decision latitude at work) Income (low income, income assistance, income inequality) Participation and social integration (social support, volunteer rate, crime, children and youth in care) Housing and community design (housing need)
Individual capacities, skills and choices	Healthy child development (low birthweight, breastfeeding, family functioning School readiness) Learning opportunities (high school graduation, post secondary education, grade 12 exam completion) Healthy choices (smoking, regular heavy drinking, physical activity, healthy eating, bicycle helmet use, high risk sexual practices, teen pregnancy) Independent living (age 65+)
Physical environment	Air (pollution, second hand smoke) Water (water quality index and boil water advisories) Food (critical hazards in food premises, food quality samples exceeding guidelines) Land and soil (blood lead levels in children) Sustainability (greenhouse gas emissions, energy consumption, land in protected areas)

Health services	Access (childhood immunization, flu immunization, screening mammography, pap smears, smoking cessation services, dental visits, unmet health care needs) Doing the right things (opportunities for self care, use of protocols and guidelines, breast conserving surgery, C-sections, antibiotic prescribing, preventable hospital admissions, MNRH days, expected compared to actual stay, ALC days, community follow-up post discharge) Improving health (improved health behaviours, deaths due to medically treatable diseases)
Aboriginal health	Health status (self rated health, infant mortality, PYLL, life expectancy) Factors affecting health (high school completion, unemployment, low income, community control)
Disease and injury prevention	Non-communicable disease (heart and stroke deaths, cancer incidence and mortality, respiratory disease deaths, mental health hospitalizations, neural tube deaths) Communicable diseases (vaccine preventable diseases, TB, HIV, sexually transmitted diseases, food and waterborne diseases, waterborne disease outbreaks) Injuries (unintentional injuries, hip fractures, spousal assault, child abuse and neglect, illicit drug deaths, suicide)

Appendix 11: Proposed Indicators for South Fraser

(South Fraser Health Region, 2001)

	Responsiveness	Competency	Client focus	Worklife
Board	Surgical waitlists Access to community programs Capture rate by service ALC days ALOS Bed closures due to staff shortages LTC beds	ALC beds and LOS Surgical cases versus budget ER visits Funding Capital construction	% resources applied to target populations Volunteer and auxiliary hours Complaints Mammography and PSA rates Teen pregnancy rate Immunization rate Low birth weight rate	Satisfaction Vacancies and resignations % budgeted positions filled Grievance rate Professional development $/employee Overtime
Executive/ Org.	% ALC patients ALC ALOS ALC beds MNRH cases Surgical cancellation rate Utilization pattern rate changes Hip and knee Replacement rates Physicians per capita	C-section rate VBAC rate Hip fracture hospitalization rate Pneumonia and flu hospitalizations Immunization rates Mammo screening rates Acute MI 30 day in-hospital mortality Injury hospitalization rate Hysterectomy rate Inflow/outflow ratio Hospitalization rate from falls in 65+ Overtime Sicktime % budget on admin and clinical Medication utilization Diagnostic utilization % incidents resulting in adverse events	Wait times Growth rate and other demographics	Quality of worklife survey WCB total claims, back strain claims, costs and days lost
Teams: **Seniors**	Waitlists and response times Home support hours	Compliance with national CPGs ER utilization	Self reported health Client satisfaction Caregiver satisfaction	Staff turnover Geriatric training Vacancies

	required Vs # of staff Residential bed turnover and LOS	Changes in practice following training Technology supports	Consumer participation	
Mental health	Readmissions Wait times	Unusual occurrences Use of care plans	Consumer/family member participation on committees Consumer/family satisfaction	Continuing education
Maternal/ Child and youth/ Women	Perinatal access at 20 weeks gestation Perinatal preregistration Alternative prenatal education rate	Low birthweight Breastfeeding education rates	Client satisfaction with prenatal services Delivery capture rates	Recruitment and exit rates Rate of GPs opting out of maternity care Worklife satisfaction
	Food shortage rate in	Immunization rates Pertussis rate Infant mortality	Client satisfaction with prenatal Smoking rates age 12-18	Recruitment and exit rates Worklife satisfaction
	Wait times for mental health services Female suicide rate Mammo screening rate	Hip fracture 50+ Female heart disease 20+ Female smoking	Rate of disadvantaged 19+ females # females by age	Worklife satisfaction Staff access to women's health programs
Adult:				
Emergency	ER triage time ER	Stretcher occupancy	Client satisfaction	Paid hours for education
Medical	Diabetes incidence Capture rates for diabetes education Waitlist for diabetes e certified diabetic educator rate Preventable admissions for ambulatory care sensitive conditions MNRH rate % referrals out to acute care, rehab, tertiary care % referrals in Expected versus actual LOS	Prevalence and management of risk factors in diabetics Hospitalization for pneumonia and influenza PYLL and mortality rate HIV infection rate Rate of camphylobacteriosis, cryptosporidiosis and giardiasis Unplanned readmissions	New diabetic satisfaction with diabetic education	

Critical Care	Angiography waits Transfers out for critical care	ARDS survival rate Timely thrombolytic therapy rate	Patient/family satisfaction	Staff vacancies CAM certification
Surgery	Waits for cancer surgery and adjuvant therapy Surgical patient capture rate Inpatient waits for surgery or procedures Waits for hip replacement and knee surgery Acute weighted cases Day surgery rate	Complication rate for breast biopsy Pre-op morbidity Post-op mortality Wait times for home nursing care	Patient/family satisfaction	
Mental Health	%FTEs within benchmark caseload Readmissions Wait times	Unusual occurrences Care plan use	Written policies/protocols with selected community service providers Consumer/family satisfaction	Continuing education/ skill building opportunities
Seniors/ Hospice/ Palliative	Adult day care days Home support paid hours Residential beds ALC days Hip and knee replacement age 65+	ER visits age 75+ Flu immunization rate of residential staff		Vacancy rates in key geriatric positions WCB claim rates and time lost in extended and continuing care
	Palliative program access rate of home deaths Timely service rate for palliative care	Location of death rates Home care service days rate of palliative deaths		
	LTC spaces Hip and knee replacement waits Residential care wait times Hospital admission rate of residential clients due to falls	Immunization rates age 65+ Residential clients immunization rates Home care visits		

Appendix 12: Health Status Indicators in Alberta
(Alberta Health and Wellness, 1999)

Life expectancy
Self reported health
Leading causes of death and illness (heart, cancer, respiratory disease, stroke, motor vehicle accidents, workplace injury, farm injuries, mental illness
Personal health practices (smoking, motor vehicle and bicycle safety exercise and healthy weight regular access to screening for blood pressure, PAP tests, mammograms, breast exams, drinking, awareness of how to protect from HIV, se of illegal drugs, gambling)
Public satisfaction with health services
Environment (air quality, water quality, water and recreation, pesticides, food safety)
Child and youth health Infant mortality, low birth weight, fetal alcohol syndrome, birth defects, breastfeeding, medical treatment, immunization, deaths, illness, injuries, mental health, child abuse, health practices, suicide, youth crime

Appendix 13: Alberta Health and Wellness Selected Performance Indicators
(Alberta Health and Wellness 2000)

Self reported health
Most common doctor services
Top five causes of death
Smoking rates
Access to physicians
Public ratings of access
Wait time for cancer treatment
Cardiac surgery volumes and waits
Hip and knee replacement surgery volumes and waits
Wait times in emergency for an inpatient bed
MRI procedure volumes and waits
Individuals classified as high priority and waiting for long term care bed
Home care clients and hours of service
Public ratings of quality and effect of care on health

Appendix 14: Health Status Indicators in Capital Health (Edmonton)
(Capital Health, 2000. How Healthy Are We? A Report from the Medical Officer of Health)

Life Cycle	Indicators
Babies	Life expectancy Birthrate Age of mother Rate of teenage mothers Low birth weights Infant mortality Emergency visits Hospital admissions
Children and youth	Number of children and youths Hospitalization rates and causes ER visits and causes Mental health Causes of deaths Smoking Nutrition Immunization Education Challenging circumstances (low income, housing, shelters, protective care)
Adults	Age distribution Leading causes of death ER visits Hospitalization Risk factors (physical activity, BMI) Communicable diseases Incomes Ethnicity Air quality Water safety Food safety
Seniors	Age distribution Causes of death Causes of hospitalization Causes of ER visits

Appendix 15: System Performance Measures for Capital Health (Edmonton)
(Capital Health, 2001)

Performance Area	Sample Indicators and Measures
Quality	% stat lab tests meeting turnaround times Percentage of stat, priority and routine lab tests Readmission rates for inpatients, day surgery patients, maternity patients and newborns
Appropriateness	% day surgery C-section rate % vaginal birth after C-section # at risk pregnant mothers cared for in the home 5 subacute program discharge locations
Satisfaction	Satisfaction with care, length of stay, care in the home, food
Access	ALOS in ER for adult admissions % hours on ambulance diversions Joint replacement waiting list Cardiac surgery waits Waits for MRI and CT by urgency category Urgent referrals from home care to LTC Wait time for continuing care Elective surgery postponements
Utilization	% maternity patients contacted within target time and infant rostered for developmental follow-up % ALC days Clinical activity of province wide services as % of expected ALOS MARVs (Made in Alberta Relative Values) per inpatient separation
Risk Management	# decubiti per 1000 resident days in continuing care**,** and before and after admission Patient/family concerns and commendations Review processes/investigations initiated Environmental health orders issued #HIV and hepatitis C cases Flu immunization Infant and child immunization Staff exposures to blood and body fluids Lawsuits in clinical services New WCB claims Lost time injury rate and hours lost in continuing care Average hours sick leave per FTE and site % vacant nursing positions
Financial	Community and home based expenditures as % of total Expenditures and clinical activity as % of expected Administrative expenditures as % of total

Appendix 16: Saskatchewan Framework for Health Services and Outcome Indicators

(Saskatchewan Health, 2001. Health Service and Outcome Indicators by Population Group: Overview)

Population Group	Core Indicators	Optional Indicators
Mothers and infants	Prenatal care At risk birth weight Infant mortality Avoidable hospitalizations of infants Duration of breast feeding Adolescent pregnancy	Peri-natal mortality
Children and youth	Early childhood assessment and referral Incidence of vaccine-preventable disease Intentional and unintentional injuries and death Substance abuse Incidence of respiratory disease Incidence of sexually transmitted disease	Child abuse and neglect Immunization rates for two-year-olds Readiness to learn Child oral health status
Adults	Prevalence of selected chronic diseases Potential years of life lost Mental health status Prevalence of heath risk behaviours Intentional and unintentional injuries Other indicators related to steps to good care will be developed	Avoidable hospitalizations Cervical cancer screening Need for support for activities of daily living
Seniors	Rate of accidental falls Influenza/pneumonia vaccination Perception of good health All-cause mortality Need for support for activities of daily living Mental health status Multiple medication use Outcomes of stroke or heart attack	Prevalence of disability, handicap or chronic conditions Rate of fractures Institutional days following palliative care designation

Appendix 17: Indicators in SDH Health Status Report
(Saskatoon District Health, 2000)

Health determinant/status	Indicators
Population	Population size First nations Population projections Household family structures Dependency ratios
Social environment	Income Poverty Food security Cost of living Employment Education Children not in school Culture and language
Physical environment	Housing Population density Mobility Air quality Water quality
Morbidity/mortality	All cause mortality Life expectancy Leading causes of death Premature death Hospital separations
Chronic disease	Ischemic heart disease Stroke Lung cancer Diabetes Asthma Chronic lung disease Pneumonia and influenza Breast cancer Prostate cancer Colorectal cancer Other preventable cancers (cervical, oral, malignant melanomas) Cancer screening
Injury prevention	Injury related deaths and hospitalizations Accidental falls Motor vehicle injuries Bicycling injuries Homicide and purposely inflicted injury Crime statistics
Behaviour and health	Self reported health status Smoking Alcohol use Physical activity

Family health	Reproductive health Teenage birth rates Low birth weight Infant mortality and morbidity Child health Adolescent health Young adults health Adult health seniors health
Mental health	Happiness Social support Suicide Hospitalization for mental disorders Mortality rates for mental disorders
Infectious diseases	Measles Pertussis Haemophilus influenza type b Hepatitis B Immunization coverage Sexually transmitted diseases Hepatitis C AIDS/HIV Enteric infections

Appendix 18: Quality Measures Reported to SDH Board
(Saskatoon District Health, 1999)

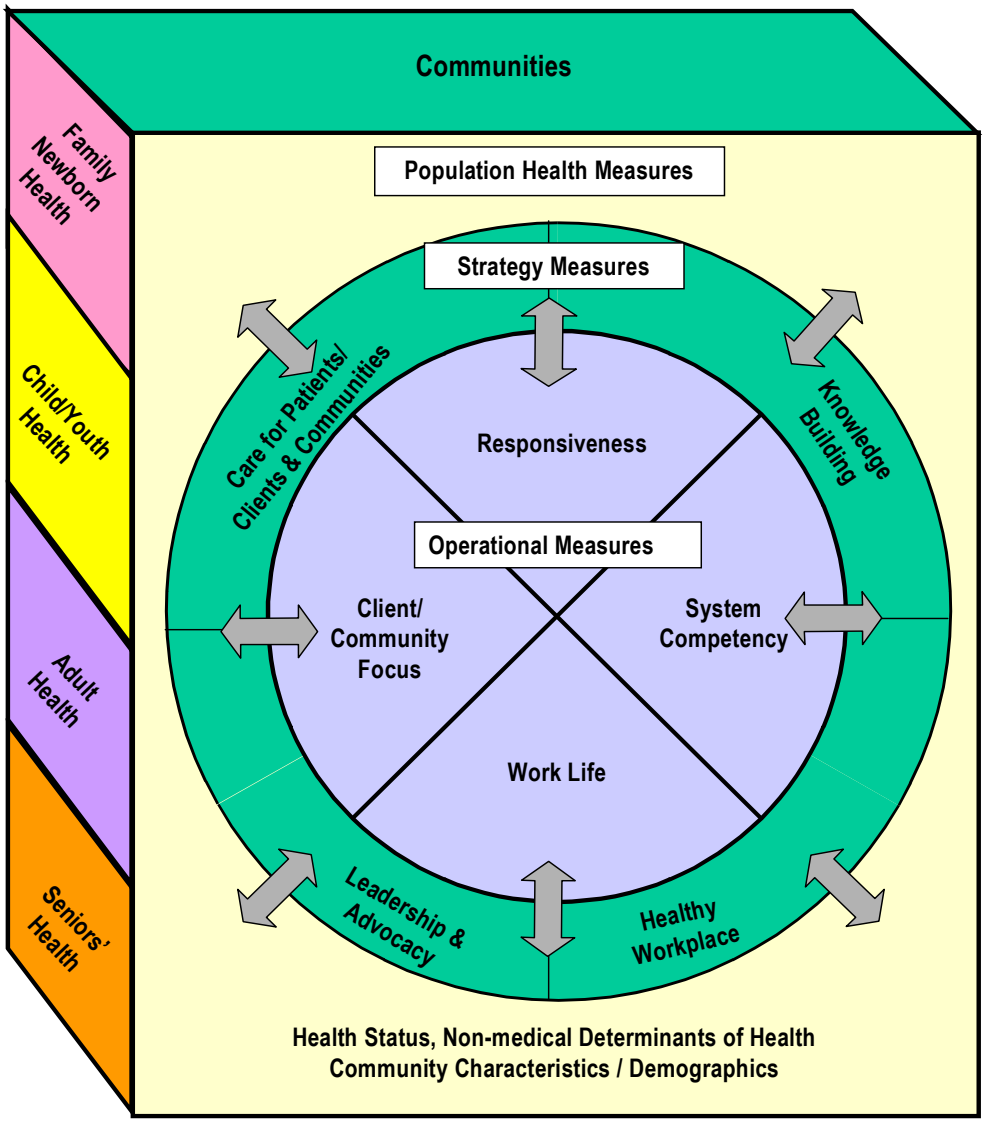
Perspective	Quality Measures
Client	Client representative report Media reports Client satisfaction
Financial	Budget variance Budget plan Audited financial statements Service agreements
Learning and innovation	Staff education Risk management report Community grants WCB report Work situation report Student contract data Research grants Aboriginal health initiatives Workplace demographics MAC report Quality development initiatives
Utilization/internal process	Planning report Wait times Service volumes Readmission rates Population health data (including mortality, morbidity, aboriginal health status, immunization rates) Hospital acquired infection rates Clinical pathway outcomes

Appendix 19: Nova Scotia Health System Performance Measures
(Nova Scotia Department of Health, 2001)

Acute Care	Patient days /1000 Beds/1000 ALOS ALC days/1000 MNRH separations and days % SDAS % elective surgery as day surgery % hernia repairs as day surgery % laproscopic cholecystoscopies as day surgery Total hip replacements/100,000 Total knee replacements/100,000 Hysterectomies per 100,000 Cardiac catheterizations /100, 000 Angioplasties per 100,000 CABGs per 100, 000 Urgent and elective cardiac surgery wait times Non-elective readmissions within 7 days and 30 days of discharge Average days over/under CIHI expected length of stay for the top 5 CMGs Pneumonia/influenza rate/100, 000 Ambulatory care sensitive conditions separations/100,000 Inflow/outflow ratio
Mental Health	Separations Patient days ALOS Ambulatory care visits (total and selected disorders)
Addiction Services	Number of clients (total and by Program)

Public Health	Breast feeding rate on discharge Flu vaccination rates Chlamidia rate /100,000 AIDS per 100,000 HIV per 100,000
Tobacco Control	Smoking rate Smoking rate during pregnancy Smoking rate age 15-19 Environmental tobacco smoke % homes with children 0-11 where someone smokes regularly Compliance rate of retailers
Home Care	Caseload Admissions (total, acute care, chronic care) Home oxygen new starts
Emergency Health Services	Ground ambulance volumes Survival rates Air ambulance volumes
Service expenditures	Total $ physician services Number and $ physician services per beneficiary Population per GP Pharmacare Rx (# and $) % Children with annual dental checkups Dental restorations per child
Women's Health	C-section rate Mammography screening rate Breast cancer incidence and mortality Cervical cancer incidence and mortality

Appendix 20: Capital Health Planning and Performance Measurement Framework
(Capital Health, 2001. CDHA Planning and Performance Measurement Framework)



Appendix 21: Proposed Capital Health (Halifax) Population Health Measures
(Capital Health, 2002)

Health Status			
Deaths	**Health conditions**	**Human function**	**Well-being**
Life expectancy PYLL Infant mortality Top 5 causes of death Suicide rates	Top 5 causes of hospitalization Rates of chronic diseases Pertussis Chlamydia AIDS/HIV Hepatitis B a C Salmonella E-coli 0157 Campylobacteriosis Meningococcal disease Tuberculosis	Disability-free years	Self-rated health Self rated mental health
Non-medical Determinants of Health			
Health Behaviours	**Living and Working Conditions**	**Personal Resources**	**Environmental Factors**
Smoking rates Regular heavy drinking Physical activity Breastfeeding (rate and duration) Teenage pregnancy rate Immunization rates Screening mammography age 50+ Pap smears age 18-69 Motor vehicle injuries	High school and post secondary graduation Children not in school Unemployment (total, long term, youth) Income Income assistance Housing affordability Violent and youth crime	Population on public assistance Dependency rates Literacy	Air quality Exposure to second-hand smoke Water quality

Appendix 22: Operational Measures Capital Health (Halifax)
(Capital Health, 2002)

Responsiveness	Wait times for Semi-Urgent A cardiac surgery, chemo, radiotherapy, diabetes education, community mental health services, ER triage Level 3, admission from ER, mammography screening, % ER patients at Level 5 Surgical cancellations Flu immunization rates Inter-site transfer for admission times Patients placed and awaiting access to home care and LTC Cervical screening Deaths on cardiac surgery waitlist
System competency	Ambulatory care sensitive cases Current ratio Debt/assets Compliance with budget % budget on administration Claims % day surgery Serious occurrences
Client/community focus	Patient/client satisfaction Complaints resolved rate Public opinion Community Health Board membership retention Fundraising per capita
Worklife	Cost/workload unit Learner satisfaction WCB claims Overtime Retirements Vacancies not filled at 60 and 180 days % budget on staff development Sick time % performance reviews completed Staff and physician satisfaction

Appendix 23: Why Change the Way We Look at Health?
(Capital Health, 2001)

Bibliography

Alberta Health and Wellness. (1999). The Report on the Health of Albertans: Looking through a Wider Lens. Edmonton: Government of Alberta.

Alberta Health and Wellness. (2000). Alberta's Health System: Some Performance Indicators. Edmonton: Government of Alberta.

Alberta Health and Wellness. (2001). Health Authority Business Plan and Annual Report Requirements. Edmonton: Government of Alberta.

Beiser, M., Shore, J.H., Peters, R. & Tatum, E. (1985). Does Community Care for the Mentally Ill Make a Difference? A Tale of two Cities. American Journal of Psychiatry, 142, 1047-1052.

British Columbia Ministry of Health. (1999). A Report on the Health of British Columbians. Victoria: Government of British Columbia.

British Columbia Ministry of Health and Ministry Responsible for Seniors. (2001). Assessing the Performance of Our Health System. Victoria: Government of British Columbia.

Canadian Council on Health Services Accreditation. (2001). Indicators and the AIM Accreditation Program. Ottawa: CCHSA.

Canadian Institute for Health Information. (1999). National Consensus Conference on Population Health Indicators: Final Report. Ottawa: CIHI.

Canadian Institute for Health Information. (2000). Health Care in Canada. Ottawa: CIHI.

Capital Health. (2000). Capital Health Authority Annual Report 1999-2000. Edmonton: Capital Health.

Capital Health. (2000). Capital Health Business Plan: 2000/01 –2002/03. Edmonton: Capital Health.

Capital Health. (2000). How Healthy Are We? A Report from the Medical Officer of Health. Edmonton: Capital Health.

Capital Health. (2000). How Healthy Are We? Health Status in the Capital Health Region: A Technical Report. Edmonton: Capital Health.

Capital Health. (2001). Performance Indicators and Measures for Quarterly Reporting: Executive Version. Edmonton: Capital Health.

Capital Health. (2001). Quarterly Report on Key Service Areas: Fourth Quarter Report 2000/2001. Edmonton: Capital Health.

Capital Health. (2001). CDHA Planning and Performance Measurment Framework. Halifax: Capital Health.

Capital Health. (2001). Why Change the Way We Look at Health?. Halifax: Capital Health.

Capital Health. (2002). Plan for Reporting Operational Measures. Halifax: Capital Health.

Capital Health. (2002). Proposed Population Health Measures. Halifax: Capital Health.

Donabedian, A. (1990). The Seven Pillars of Quality. Archives of Pathology. 114, 1115-1118.

Evans, D.B., Tandon, A., Murray, C.J.L. & Lauer, J.A. (2001). Comparative Efficiency of National Health Systems: Cross National Econometric Analysis. British Medical Journal, 323, 307-310.

Flood, A.B., Shortell, S.M., & Scott, W.R. (1994). Organizational Performance: Managing for Efficiency and Effectiveness. In Leggatt, S.G., Narine, L., Lemieux-Charles, Barnsley, J., Baker, G.R., Sicotte, C., Champagne, F., & Bilodeau, H. (1998). A Review of Organizational Performance Assessment in Health Care. Health Services Management Research, 11, 3-23.

Gillies, R.R. (1993), Conceptualizing and Measuring Integration: Findings from the Health Systems Integration Study, Hospital and Health Services Administration, 38 (4), 467-489.

Government of New Zealand. (1999). The New Zealand Health Strategy. Retrieved August 15, 2001 from www.moh.govt.nz-moh.nsf.

Government of New Zealand. (2000). Progress on Health Outcome Targets 1999. Retrieved August 15, 2001 from www.moh.govt.nz-moh.nsf.

Government of Saskatchewan. (2000). Health Districts Act. Regina: Government of Saskatchewan.

Haberstroh, C.J. (1965). Organization Design and Systems Analysis. In J.G. March (Ed.), Handbook of organizations. Chicago: Rand McNally.

Hawaleshka, D. (2001). Living Long, and Living Well. MacLean's, October 29, 46-56.

Harrigan, M. (2000). Quest for Quality in Canadian Health Care: Continuous Quality Improvement. 2nd Ed. Ottawa: Health Canada.

Health Canada. (2001). The Population Health Template: Key Elements and Actions That Define A Population Health Approach. Ottawa: Health Canada.

Health Promotion Research Group. (2001). Health G.A.I.N.S. Project: Health Promotion Research Group Final Report. Halifax: Provincial Health Council.

Health Services Utilization and Research Commission. (2000). System Performance Indicators: Toward a Goal-Based Health System. Issues & Directions Paper. Saskatoon: HSURC.

Institute of Medicine.(1999). To Err is Human: Building a Safer Health System. Washington: National Academy Press.

Kanter, R.M. (1981). Organizational Performance: Recent Developments in Measurement. Annual Review of Sociology, 7, 321.

Kaplan, R. S. & Norton, D. P. (1996). Using the Balanced Scorecard as a Strategic Management System. Harvard Business Review, January-February, 75-85.

Leatt, P., Pink, G. H., & Guerriere, M. (2000). Towards a Canadian Model of Integrated Healthcare. Healthcare Papers, 1(2),13-35.

Leggatt, S.G., Narine, L., Lemieux-Charles, L, Barnsley, J., Baker, G.R., Sicotte, C., Champagne, F., & Bilodeau, H. (1998). A Review of Organizational Performance Assessment in Health Care. Health Services Management Research, 11, 3-23.

Lehman, A.F. (1994). Continuity of Care in Client Outcomes. Millbank Quarterly, 72, 105-122.

Luttman, E.J., Siren, P.B., & Laffel, G.L. (1994). Assessing Organizational Performance. Quality Management in Health Care, 2(4), 44-53.

Management Goal Research Group. (2001). Health G.A.I.N.S. Project: Management Goal Final Report. Halifax: Provincial Health Council.

Marshall, R. (2000) The Best Health Care. MacLean's. June 5, 8-32.

Maxwell, R.J. (1984). Quality Assessment in Health. British Medical Journal, 288, 1470-1472.

McEwan, K. & Elliot, M. G. (2001). Accountability and Performance Indicators for Mental Health Services and Supports: A Resource Kit. Ottawa: Health Canada.

National Association for Healthcare Quality. (1998). NAHQ Guide to Quality Management (8th ed.) Glenview: NAHQ.

National Health Service. (1998). A First Class Service: Quality in the New NHS. Leeds: NHS.

National Health Service. (1999). Quality and Performance in the NHS: High Level Performance Indicators. Leeds: NHS.

Naylor. C.D., Iron, K., & Handa, K. (2001). Measuring Health System Performance: Problems and Opportunities in the Era of Assessment and Accountability. Ottawa: Health Canada.

Nova Scotia Department of Health. (2001). Annual Statistical Report 2000/01. Halifax: Government of Nova Scotia.

Oh, C.H., & Rich, R.F. (1996). Explaining the Use of Information in Public Policymaking. Knowledge and Policy, 9(1), 3-35.

Ontario Hospital Association and University of Toronto. (2001). Hospital Report 2001: Acute Care. Toronto: University of Toronto.

Page, S., & Cramer, K. (2001) MacLean's Rankings of Health Care Indices in Canadian Communities, 2000: Comparisons and Statistical Contrivance. Canadian Journal of Public Health, July-August, 295-298.

Pennsylvania Health Care Cost Containment Council. (2001). Measuring the Quality of Pennsylvania's Commercial HMOs: A Managed Care Performance Report. Philadelphia: PHCCCC.

Performance Indicators Reporting Committee. (2001). Proposed Recommendations for Comparable Reporting in 2002. Ottawa: PIRC.

Porter, M.E. (1996). Operational Effectiveness Is Not Strategy. Harvard Business Review. November-December, 61-78.

Romanow, R.J. (2002). Shape the Future of Health Care: Interim Report of the. Commission on the Future of Health Care in Canada. Ottawa: Commission on the Future of Health Care in Canada.

Rosenheck, R. (1998). Service System Integration, Access Services and Housing Outcomes in a Program for Homeless Persons with Severe Mental Illness. American Journal of Public Health, 88, 1610-1615.

Saskatchewan Health. (2001). Health Service and Outcome Indicators by Population Group: Overview. Regina: Government of Saskatchewan.

Saskatchewan Health. (2001). The Action Plan for Saskatchewan Health Care. Regina: Government of Saskatchewan.

Saskatoon District Health. (1999). SDH Quality Framework. Saskatoon: Saskatoon District Health.

Saskatoon District Health. (2000). The Health of Our Community: Health Status Report 2000. Saskatoon: Saskatoon District Health.

Shortell, S.M., & Kaluzny, A.D. (2000) Health Care Management: Organization Design and Behaviour (4th ed.). Albany: Delamar.

Shortell, S. M., Gillies, R.R., Anderson, D.A., Erickson, K. M., & Mitchell, J.B., (2000). Remaking Health Care in America (2nd ed.). San Francisco: Jossey-Bass.

Smith, P. (1994). Large Scale Models and Large Scale Thinking: the Case of the Health Services. Omega International Journal of Management Science, 23(2), 145-157.

Snail, T.S. & Robinson, J.C. (1998). Organizational Diversification in the American hospital. Annual Review of Public Health, 19, 417-453.

South Fraser Health Region. (2000). Business Plan Framework. Surrey: SFHR

South Fraser Health Region. (2001). Quality Scorecard. Surrey: SFHR.

Statistics Canada. (2001). How Healthy are Canadians? Health Reports. Vol.12, No.3, Ottawa: Statistics Canada.

Van Peursem, K.A., Pratt, M.J., & Lawrence, S.R. (1995). Health Management Performance in Strategy Research: A Comparison of Approaches. Accounting, Auditing & Accountability Journal, 8(5), 34-70.

World Health Organization. (2000). The World Health Report 2000. Geneva: WHO.

Zelman, W.A. (1996). The Changing Health Care Marketplace. San Francisco: Jossy-Bass.