

Policy Roundtable

Presenting the views of experts from around the world on policy-making as it relates to health care quality

Conceptual frameworks for health systems performance: a quest for effectiveness, quality, and improvement

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Abstract

Issues. Countries and international organizations have recently renewed their interest in how health systems perform. This has led to the development of performance indicators for monitoring, assessing, and managing health systems to achieve effectiveness, equity, efficiency, and quality. Although the indicators populate conceptual frameworks, it is often not very clear just what the underlying concepts might be or how effectiveness is conceptualized and measured. Furthermore, there is a gap in the knowledge of how the resultant performance data are used to stimulate improvement and to ensure health care quality.

Addressing the issues. This paper therefore explores, individually, the conceptual bases, effectiveness and its indicators, as well as the quality improvement dynamics of the performance frameworks of the UK, Canada, Australia, US, World Health Organization, and Organisation for Economic Co-operation and Development.

Results. We see that they all conceive health and health system performance in one or more supportive frameworks, but differ in concepts and operations. Effectiveness often implies, nationally, the achievement of high quality outcomes of care, or internationally, the efficient achievement of system objectives, or both. Its indicators are therefore mainly outcome and, less so, process measures. The frameworks are linked to a combination of tools and initiatives to stimulate and manage performance and quality improvement.

Conclusions. These dynamics may ensure the proper environment for these conceptual frameworks where, alongside objectives such as equity and efficiency, effectiveness (therefore, quality) becomes the core of health systems performance.

Keywords: conceptual framework, effectiveness, health system performance, performance indicator, performance management, performance measurement, quality

Introduction

'Data and facts are not like pebbles on a beach, waiting to be picked up and collected. They can only be perceived and measured through an underlying theoretical and conceptual framework, which defines relevant facts, and distinguishes them from background noise' (Wolfson) [1]. Indeed, many countries have been developing conceptual frameworks for monitoring, measuring, and managing the performance of their health systems to ensure effectiveness, equity, efficiency, and quality. Health systems are expected to achieve and manage results in line with established objectives and quality standards.

A famous statement attributed to Florence Nightingale aptly captures the performance–quality–management relationship: 'The ultimate goal is to manage quality. But you cannot manage it until you have a way to measure it, and you cannot measure it until you can monitor it' [2]. This involves the use of performance indicators (PIs) or measures to capture a variety of health and health system-related trends and factors. PIs require an operational definition of quality to be developed, since they are in essence a quantitative measure of quality [3]. Various stakeholders in health all hope that PIs will provide meaningful data for making decisions and steering health systems [4]. Therefore, and given that conceptual frameworks are often the starting points in PI development, our aims are:

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to understand the underlying concepts of national and international performance frameworks for health systems; to explore effectiveness and its indicators; and to see how and in what context the resultant performance data are used to drive improvement.

Hence, we undertake an exploration of the health system performance frameworks of the UK, Canada, Australia, the US, the World Health Organization (WHO), and the Organisation for Economic Co-operation and Development (OECD). The four countries, besides having documents in English, are all actively developing PIs and frameworks with quality initiatives [5]. WHO and OECD present platforms for international comparisons of health systems, although such comparisons often require a framework for valid 'lesson drawing' [6]. For each country or agency separately, after a brief background, we first explore the conceptual basis for each framework, outlining its contents and performance dimensions. Secondly, we explore effectiveness as a dimension of performance and its indicators. Thirdly, we look at how existing quality initiatives may be linked to the framework. Fourthly, we describe, as the 'mechanism of change', the context and dynamics involved in using the performance information to stimulate improvement. All emerging issues are addressed together in a concluding section.

Methods

We examined the health system, performance frameworks, indicators, quality, and management documents published, mostly on the Internet, about or by the UK, Canada, Australia, the US, the WHO, and the OECD. To retrieve these documents, the basic strategies used were: official websites search, the search of electronic databases, a check of references from selected documents, and the use of a generic Internet search engine.

The first strategy entailed using the search engines and hyperlinks located within the official websites of the departments or ministries or agencies of health of each country and organization: UK (<http://www.doh.gov.uk>), Canada (<http://www.hc-sc.gc.ca>; <http://www.cihi.ca>), Australia (<http://www.aihw.gov.au>), USA (<http://www.health.gov>), WHO (<http://www.who.int>), and OECD (<http://www.oecd.org>). Secondly, PubMed and other electronic databases were searched, and where appropriate, the 'related articles' search tool was also used. Thirdly, we checked the reference lists of all selected documents and articles, from the previous two strategies, to pick out any relevant materials. Finally, the generic Internet search engine Google (www.google.com) was used to source additional information whenever necessary. Materials were strictly included only if they clearly addressed all or aspects of the chosen discourse of this study. This paper explores only the recent past and present experiences of health system performance assessment, especially before and after the *World Health Report 2000* [7].

With regular and focused feedback in our research group, particular attention was paid to the part(s) of frameworks that dealt with health system performance wherever such frame-

works encompassed other aspects of health as well. Subsequently, effectiveness as a concept and a domain of performance was explored in each framework. The contents of Tables 1, 2, and 4 are summaries of major exploratory findings. Table 3 is a minimal theoretical sample of effectiveness indicators chosen only if they were explicitly used or proposed officially, to reflect their types and to link them to the system objectives, usually within the functional areas of the health system where they are used.

Results

UK

Background. The UK introduced the National Health Service (NHS) in 1948 as a single publicly funded and publicly provided (Beveridge) system to ensure universal access. In the 1980s, amidst growing costs, the then Conservative government introduced the use of PIs using administrative and hospital data. By 1990s, the NHS was re-invented to reflect a managed internal market, underscoring the use of general practitioners (GPs) as primary fund-holders and health authorities as complementary purchasers. Again, in 1997, the Blair administration gave the already ailing NHS the modernization agenda for the 21st century. This began with a series of plans, largely replacing the internal market bureaucracy with integrated care, based on partnership and driven by performance [8–12]. For a country with a long history of a national approach to its health system and PIs, these new plans refocused the UK on a more ambitious coherent national framework (for performance assessment, management, accountability, and quality of care). This involves improved collaboration and funding (from a health budget of 6.9% of GDP in 1999 to 9.4% of GDP by 2008). Simply put, the modern NHS organization can be viewed as having 'strategic health authorities' (from October 2002, after abolishing the old 95 health authorities in April 2002) and special health authorities. Beyond these are NHS Trusts (for acute and specialized hospital services), which in the flow chart are distal to the newly introduced Primary Care Trusts (PCTs) comprising GPs, nurses, pharmacists, dentists, opticians, NHS Walk-in Centers, Mental Health Trusts, Ambulance Trusts, NHS Direct, and population screening services. The PCTs fund, plan and commission health services for their local communities, integrate health and social care for patients, and are poised to control 75% of the NHS budget eventually [13].

Performance framework. Under the Public Service Agreement between the UK Treasury and the Department of Health, a National Performance Frameworks initiative created the NHS Performance Assessment Framework (PAF). This NHS PAF will address these areas of improvement: performance fund, earned autonomy, performance information system, and development of NHS performance indicators. Conceptually, the framework is based on a *balanced scorecard* approach, and is a unified system of measurement, assessment and reward, designed to give a more rounded picture of NHS performance [14]. This balanced scorecard concept implies

Table 1 Synopsis of national frameworks for health system performance

	UK	Canada	Australia	USA
Type of health care system	Nationaized, but with recently devolved responsibility; publicly funded	Federal, territorial, and provincial, with common principles; mixed but mainly public funding	Federated, shared national and state roles; public and private driven; mixed funding	Pluralistic, with combined state and federal regulation; private-sector driven; mixed but mainly private funding
Performance framework	Coherent national framework, with a comprehensive set of indicators and targets aiming at six areas of performance; multi-domain local use of PIs being entrenched	Coherent national framework, with indicators for health and health system performance; supported by those for community and health system characteristics	Evolving coherent national framework and indicators; nine-dimension approach; monitoring inputs, outputs, and outcomes	Weak coherent, national approach; proposed a six-domain performance framework; sturdy set of operational (i.e. locally used or health care plan specific) indicators
Conceptual basis for framework	Based on a balanced scorecard approach; to be reported as a 'performance star' ratings system	'Roadmap Initiative' to improve quality, utilization, comparability, information dissemination, and functioning of health system	Three-tier relational concept to reflect the impact of system performance and health determinants on health status and outcomes	Purchaser dependent and quality management framework; supported by a population health model and patient-oriented performance reporting
Performance improvement drive ('mechanism of change')	Controls assurance, accountability and use of benchmarking indicators; financial incentives; 'earned autonomy'	Benchmarking, accountability, planning, and measurement; premised on high quality health information system	Professionalism (with benchmarking practices), accountability and market dynamics; local use of financial incentives	Market dynamics (and more recently, quality) through selection by and choice of health care purchasers and consumers
Quality of care initiatives	Quality as main national priority recently; clinical governance (NSF, NICE, CHI, NPSA, NPF)	Continuous quality improvement as a priority in health care services (HC, CCHSA, NQI, CMA)	Integral part of framework; system performance defined in terms of quality of care (NHPC, ACSQHC, NHPAC, NICS)	Quality reporting in public domain and other initiatives (NFQMR, IOM, AHRQ, JCAHO, HEDIS)
Linking system performance objectives (effectiveness to quality)	Ensuring access to effective, prompt and high-quality care	Improving health promotion, access, system effectiveness and quality	Defining performance explicitly in terms of quality and effectiveness among other dimensions	Improving system-wide effectiveness and quality of care processes and outcomes; evolving national policy
Managerial goals	To reflect need for corporate governance, using focused benchmarking	To allow for timely, flexible and right decision making at all levels; integrated management	To inform decision making while ensuring timeliness of performance reporting	To facilitate access to information and public reporting; offsetting market failures

PIs, performance indicators; NSF, National Service Frameworks; NICE, National Institute for Clinical Excellence; CHI, Commission for Health Improvement; NPSA, National Patient Safety Agency; NPF, National Performance Frameworks (of the Public Service Agreement between the UK Treasury and Health Departments); HC, Health Canada; CCHSA, Canadian Council for Health Services Accreditation; NQI, National Quality Institute; CMA, Canadian Medical Association; NHPC, National Health Performance Committee; ACSQHC, Australian Council for Safety and Quality in Health Care; NHPAC, National Health Priority Action Council; NICS, National Institute of Clinical Studies; NFQMR, The National Forum for Quality Measurement and Reporting (The Quality Forum, following the 1997 President's Commission on Consumer Protection and Quality in Health Care); IOM, Institute of Medicine; AHRQ, The Agency for Health Research and Quality (to produce a National Quality Report in 2003 with the help of the IOM); JCAHO, Joint Commission on Accreditation of Healthcare Organizations; HEDIS, the Health Plan Employer Data and Information Set (of the National Committee for Quality Assurance).

Table 2 Synopsis of two international frameworks for health system performance

	WHO	OECD
Performance framework	Five main indicator-framework reflecting three major health system goals with their average levels and distribution	Six main performance indicator-framework reflecting the average levels and distribution of three basic goals of a health system
Conceptual basis for framework	Concepts of health system boundaries (and health action), goals, health system efficiency, and functions	Concepts of quality, equity (of health outcomes, access, and financing), and macro- and micro-efficiency
Effectiveness	Improving health outcomes; overall health system performance or efficiency	Improving health outcomes
Quality	Quality as a subset of overall goal attainment (average levels of health and responsiveness)	Quality captured also by levels of attainment of health outcomes and responsiveness
Management and policy	Scope of accountability on three levels; EHSPI; stewardship for all-embracing regulatory oversight	'Performance management' cycle for health system performance and policy analysis; international comparison to drive improvement and standardization

EHSPI, Enhancing Health System Performance Initiative (of the WHO).

that 'the overall set of indicators should give a balanced picture of the organization's performance, reflecting the main aspects, including outcomes and the users' perspective' [15], and originally includes the four perspectives: service user, internal management, continuous improvement, and financial (taxpayer's) perspectives [16,17].

In order to achieve this balanced view, six areas of performance are identified within the health authority PAF, namely: (a) health improvement; (b) fair access; (c) effective delivery of appropriate health care; (d) efficiency; (e) patient/carer experience; and (f) health outcomes of NHS care [14]. At NHS Trust level, the framework has only four major performance areas: (a) clinical effectiveness and outcomes; (b) efficiency; (c) patient/carer experience; and (d) capacity and capability. Within the PAF, a set of 'national headline NHS Performance Indicators' gives a summary of NHS activities, addressing a wide range of issues such as mental health, cancer treatment, waiting lists, access to GPs, overall population health, and staffing [18]. This relatively small set of national headline indicators, published annually, will be supported by 'benchmarking indicators', which contain more specific background information, thus identifying good or bad performance in all NHS areas [14,18].

The indicators found in the NHS PAF are primary and community based. These PI sets also undergo constant development and improvement, as new data sources are made available. Furthermore, regular national surveys of patient/user and staff experiences of the NHS would be conducted. The Commission for Health Improvement (CHI) would regularly inspect and rate the NHS.

Indicators of effectiveness. In the NHS PAF, *effectiveness* is conceptualized as 'outcomes of NHS care' and 'effective delivery of appropriate health care: to recognize that fair access must be to care that is effective, appropriate and timely and complies with agreed standards' [9,14]. The measures for

effectiveness are thus operationalized to include other performance domains such as appropriateness, timeliness, fair access, and quality of care. The PI would reflect the set priorities for the health system and would measure progress against pre-defined key standards and targets. For instance, the Department of Health has identified four generic categories of serious harm with quantifiable targets such as 40% reduction of prescribing errors by 2005 [19]. Other targets include a reduction in waiting times for an outpatient appointment to a maximum of 3 months, and a reduction in the maximum wait for a hospital operation to 6 months, all by 2005 [20]. Priority health areas in the UK are mental health, care for the elderly, cancer, coronary heart disease, and diabetes.

Presently, some 10 indicators are used in this framework to capture effective delivery of health care. Examples are: percentage flu vaccination among people aged 65 years and over, percentage of patients aged 65 years discharged home within 28 days following hospital treatment for fractured hip, primary care management (emergency admission rates for acute conditions), mental health in primary care (age-standardized prescribing rates of benzodiazepines), prescribing rates of antibacterial drugs, prescribing rates of ulcer healing drugs, and organ donor rates. Most of these PIs are process and/or outcome measures, emphasizing the focus on desired results and the processes that yield these outcomes.

The set targets monitored by these PI are considered to be specific, masurable, achievable, relevant, and time-limited (reflecting the SMART paradigm), and relate to national and local NHS objectives as embodied in its core principles of provision of universal and comprehensive services, patient responsiveness, staff value, and support, reducing health inequalities, quality improvement, and fair funding.

Quality improvement initiatives. In essence, quality or 'excellence' is used in the new framework in 'its broadest sense of doing the right things, at the right time, for the right people,

and doing them right – first time’ [9]. The national indicator sets, though not direct measures of quality on their own, are meant to draw attention to where quality problems may exist within the health system [14]. These PIs would reflect clearly the link between processes and patient-experienced quality. A core theme of a modernized NHS, health care quality improvement has been transformed from its early 1990s managed internal market environment, where standard of care was reformed through professional clinical audit [21], to its present integrated care milieu with increased emphasis on quality under the concept of clinical governance. Clinical governance is ‘a framework through which NHS organizations are accountable for continuously improving the quality of their services and safeguarding high standards of care by creating an environment in which excellence in clinical care will flourish’ [10].

The National Service Frameworks (NSFs) initiative, which is subordinate to the Public Service Agreement, will set national standards, establish performance measures for judging progress, define models for specific care groups or services, and set up implementation support programs [5]. There are currently four NSFs – for mental health, care for the elderly, coronary heart disease, and diabetes. Linked to these and the NHS PAF are: monitoring of national standards of care by the CHI [22]; clinical guidelines and evidence-based assessments of health technologies provided by the National Institute for Clinical Excellence (NICE) [23]; and local measures under the new Primary Care Trusts (PCTs). Several other major organizational efforts towards health care quality improvement include those of NHS Modernization Agency [24], National Patient Safety Agency [25], National Clinical Governance Support Team, General Medical Council, medical specialist associations, and royal colleges. The new National Clinical Assessment Authority [26] will address concerns over the performance of an individual doctor [13]. Accreditation is another important quality tool in the UK NHS and its latest initiative, Improving Working Lives Standard, is designed to create working conditions that better equip NHS staff with skills to improve patient service. In Scotland, quality improvement initiatives include independent accreditation programs (such as Health Quality Service), the National Care Standards Commission which monitors the private sector, the Clinical Standards Board, and the Scottish Intercollegiate Guidelines Network. However, many of these initiatives are being absorbed into the Quality Standards Board for Scotland [27].

Mechanism of change. Two driving tenets of the NHS PAF are continuous service improvement and accountability [9,14,18]. The PAF strives for objectivity to enable clinicians, managers and relevant stakeholders to make the necessary decisions and improvement. It employs the National Benchmarking Service for comparative analysis between NHS organizations, and is supported by the Performance Analysis Toolkit. This toolkit is an information support system that allows PCTs and NHS Trusts to benchmark their performance and that of relevant secondary care providers against peers, hence gaining a better insight into the underlying reasons for their performance variations.

The framework is designed to provide reliable, timely information for effective and efficient ‘in-year management’ in the decentralized NHS where patients and the primary care givers are placed at the management frontier. Therefore, the PI publications come with summary reports for NHS management use [18]. Subjected to the Performance Star Ratings System [28], the PIs will be published with any relevant assessments made by the CHI, giving the NHS organizations an overall performance rating. Under-performing organizations will be inspected biennially, as against the national 4-yearly, in order to stimulate earlier intervention. Supported by the Treasury’s Performance Agreements, financial and other incentives would be developed to encourage and reward high performance with clear access to the NHS Performance Fund and ‘earned autonomy’, respectively [8,9,29]. The NHS Performance Fund, designed to work in parallel with the Primary Care Initiative scheme and from April 2002, the Personal Social Service Performance Fund, will support local initiatives that contribute to the actualization of the NHS Plan. ‘Three star’ organizations (i.e. with highest levels of performance) will have a free hand to decide where and how to use funds, while ‘two star’ ones will require the approval of their Regional Office. ‘One and zero star’ organizations will work with the Modernization Agency after due consultations with their Regional Office. Regional Offices, the Modernization Agency and researchers will periodically assess these schemes, and their findings will be used to develop and spread best practices [30].

In addition, the framework is driven by accountability to the patient (so as to rebuild public confidence) and to Parliament for public expenditure. The Public is involved in shaping the framework, firstly by being part of the consultations mechanism as well as the national experience surveys, and secondly by having access to the published performance information. All these are meant to exist within a strong and continually updated modern health information and communication system that spans the national, regional and local levels of the NHS. The first national PI publication, which reflects these many changes, the rating system and any relevant CHI assessments, is expected during summer 2003 for the 2002/03 NHS performance assessment [22].

Canada

Background. The Canadian health care system is a large, complex and mainly publicly funded (‘Medicare’) system that covers virtually all the cost of medically necessary physician and hospital services, under a federal scheme, encompassing provinces and the more autonomous territories. The Saskatchewan province first began this as a universal hospital insurance program in 1947, expanding it in 1962 to insure physician services. By 1972, all provinces and territories had followed suit. Other major supplementary health services such as drugs, dental care, physiotherapy, and home care are financed via a complex mix of public and private insurance and out-of-pocket payments. In the 1980s, a series of reports from the Royal Commission and Task Force ushered in health care reform across Canada [31]. A tide of health

Table 3 Sample of indicators that capture ‘effectiveness’ within the explored performance frameworks

Performance indicator	Country/organization	Target level in health system	Type of measure	Relation to system function or objective
Percentage of children immunized against MMR (measles, mumps and rubella) and diphtheria by age 2 years	UK NHS [14,18]	National, regional, local	Process	Disease prevention and health promotion among the young
Percentage of patients discharged back to usual place of residence within 56 days of emergency admission to hospital with a stroke, aged 50 years and over (age and sex standardized)	UK NHS	National, regional, local	Outcome	Effective management, reduction of hospital stay, and rehabilitation of the elderly
Emergency admission rate for asthma and diabetes per 100000 population (age and sex standardized)	UK NHS	National, regional, local	Outcome	Primary care management of acute chronic conditions
Number of new cases of tuberculosis reported in a given year	Canada [34,42]	National, provincial/territorial/regional	Outcome	How well the system prevents disease or its progression
Age-standardized rate of deaths due to hypertensive disease for persons aged 50–64 years	Canada	National, provincial/territorial/regional	Outcome	Effectiveness in avoiding mortality due to medically treatable conditions
The risk adjusted rate of all cause in-hospital death occurring within 30 days of first admission to an acute care hospital with a diagnosis of acute myocardial infarction	Canada	National, provincial/territorial/regional	Outcome	How well services work
HIV education and the practice of safe sex	Australia [54,55]	National, regional, local	Outcome	Promotion of healthy lifestyles and behaviors
Notification of measles at ages 0–14 years (immunization)	Australia	National, regional, local	Outcome	Public health; primary care provision
Percentage of women aged 50–69 years who are screened for breast cancer and screening program sensitivity	Australia	National, regional, local	Process, outcome	Disease prevention and control

Table 3 *continued*

Performance indicator	Country/organization	Target level in health system	Type of measure	Relation to system function or objective
Cervical cancer screening and its reduced mortality	USA [69,74,75]	National, state, health plan, local	Process, outcome	Preventive care via screening and intervention
Percentage of patients with diabetes with blood pressure below 140/90 mmHg (using the DQuIP measure set)	USA	National, state, health plan, local	Outcome	Chronic care; specific priority condition
Proportion of nursing home residents with pressure ulcers at stage 2 or higher	USA	National, state, local	Outcome	General chronic and end-of-life care
Procedures likely to be used by 20% or more (e.g. coronary angiography, carotid endarterectomy)	USA	National, state, health plan	Process, outcome	Avoiding overuse and reducing inappropriateness of specific procedures
Health attainment measured using DALE	WHO [7]	International, national	Outcome	Health improvement goal
Burden of disease in DALYs by cause, sex, and mortality stratum	WHO	International, national	Outcome	Health improvement goal
Overall health system performance index	WHO	International, national	Composite outcome	Composite goal performance: efficiency
Infant mortality	OECD [66,102]	International, national	Outcome	Health improvement by reducing avoidable mortality
Avoidable hospitalizations by selected conditions	OECD	International, national	Outcome	Health improvement by reducing avoidable hospitalizations
Life expectancy at age 65 years	OECD	International, national	Outcome	Health status improvement

DQuIP is the Diabetes Quality Improvement measure set [69]; DALE, disability-adjusted life expectancy; DALYs, disability-adjusted life years.

reforms in the 1990s saw the creation, by provincial and territorial governments, of legislated health regions that oversee the daily operation of the health system [32]. Recently, there has been an increasing shift to non-institutional (community-based) care and an emphasis on health promotion and population health [33].

Performance framework. Health system performance is part of the Canadian Health Information Roadmap Initiative Indicators Framework [34]. This framework is designed to answer two basic questions: (a) how healthy are Canadians; and (b) how is Canada's health care system performing? As a common approach to health and health care system, this Roadmap Initiative, which is based on the population health model, conceptualizes its health indicators framework in terms of provision of high quality comparative information on four dimensions: (a) health status; (b) non-medical determinants of health; (c) health system performance; and (d) community and health system characteristics [34,35]. The latter two dimensions would capture various aspects of health system performance by measuring the health services received by residents in each region and the contextual characteristics of the community and/or the health system.

The eight domains of health system performance in this framework are: (a) acceptability; (b) accessibility; (c) appropriateness; (d) competence; (e) continuity; (f) effectiveness; (g) efficiency; and (h) safety [34,36]. Currently, these dimensions, except acceptability, competence, and continuity, appear to be supported by several PIs. Under the community and health characteristics, the PIs are further grouped into those that provide contextual information about: (a) community; (b) health system; and (c) resources. For some of the PIs, quality, definition and availability of data are currently uncertain, while only Province-level data exist for a few others. Conceptually and operationally, the framework drives and is driven by Canada's health information system, an integrated network of health information initiatives and structures that can track health factors and health care regionally, provincially and nationally. Furthermore, this framework is supported by periodical pan-Canadian surveys to elicit consumer expectations, priorities, satisfaction, and opinions [31,33,37,38]. In order to track changes in health care, Canada's First Ministers endorsing this framework agreed in the fall of 2000 to provide comprehensive and regular reports on health programs and services, including 14 specific indicators spanning health status, health outcomes, and quality of service, beginning reporting in September 2002 [39].

Since 1998, the Canadian Institute for Health Information [40], Statistics Canada, Health Canada [41], and some 500 people from many other principal groups, ministries, and stakeholders at national, regional, and local levels have been collaborating to develop and implement the framework, to boost existing health information networks and infrastructure, to improve analysis of the information being captured, and to disseminate the information for improving Canadians' health and their health care system.

Indicators of effectiveness. Here, *effectiveness* is conceptualized as a domain of health system performance where 'the care/service, intervention or action achieves the desired results' [34,36]. This concept is operationalized to better track information

on major recent and emerging health issues, in keeping with the overarching aim for better health through improved health care using comparable quality data on key indicators for health and health services [42]. The core indicator set in the framework is meant to mirror approved national goals, strategies, guidelines, standards, and benchmarks.

Some of the indicators employed in the Canadian framework to capture the performance domain of effectiveness include: respective number of new cases of pertussis, measles, HIV, and chlamydia reported in a given year; age-standardized pneumonia and influenza hospitalization rates at age 65 years and older; age-standardized death rates due to medically treatable diseases such as cervical cancer, pneumonia, and unspecified bronchitis; and age-standardized acute care hospitalization rates for ambulatory-care-sensitive conditions. Some of these indicators also capture domains of accessibility and appropriateness, as is the case with ambulatory-care-sensitive conditions.

Again, these PIs are mostly process and/or outcome measures. Structural indicators emerge from the part of the framework concerned with community and health system characteristics when one includes the categories of health services and resources. Though they are not direct measures of health system performance, health services indicators may provide extra information on configuration of the health care system (e.g. the presence of a tertiary hospital and contact with health professionals). Resources might show staffing information such as number of physicians or nurses per capita.

Quality improvement initiatives. As a major drive for the Canadian framework, quality in health care is viewed as a multi-dimensional and a multi-perspective concept. Its quality improvement initiatives involve two basic strategies: continuous quality improvement and certification/accreditation [43,44].

Continuous quality improvement is used as an internal management philosophy to effect strategic improvement in quality, focusing on processes of health care and its delivery, consumers, continuous monitoring of quality, education, devoted management, and long-term commitment. Accreditation is a tool employed by the Canadian Council on Health Services Accreditation (CCHSA), a non-governmental organization, to stimulate the integration of the PI framework and quality improvement in Canada [36,43]. CCHSA has developed a philosophy and a framework by introducing its 'Achieving Improved Measurement' (AIM) accreditation program. This will allow for benchmarking between organizations to boost quality improvement in four dimensions: responsiveness, system competence, work life, and client/community focus. The PIs are seen as a guide to monitor, evaluate, and improve service processes, outputs, outcomes, and hence quality of care. As such, each PI will be linked to a quality dimension and a harmonized standard.

The Canadian Medical Association [45] also has a series of quality management workshops developed in cooperation with provincial/territorial medical associations and the CCHSA, for physicians, senior clinical managers, and other professionals. This series focuses on practical tools for managing quality, risks, effectiveness, efficiency, and utilization [43].

Mechanism of change. Performance improvement is a cornerstone of the Canadian health indicators conceptual

Table 4 A summary of quality, effectiveness and management dynamics linking health systems performance frameworks of the UK, Canada, Australia, USA, WHO, and OECD

Level of use in the health system	Quality motive	Quality and effectiveness tools	Performance management dynamics
Patients/ consumers	Patient participation and empowerment	Strengthening patient feedback; increased patient participation in decision-making; survey on needs, satisfaction, and experience; patient education	Greater responsiveness; shared decision-making in condition management; service quality survey, needs anticipation and alignment of system objectives to reflect these; satisfying patient 'information hunger'
Professional providers	(a) Self-regulation and clinical governance	Career-long medical education; learning from incidents and adverse events; involvement in cross-cultural and interdisciplinary health care teams; clinicians at the quality frontier ('take a lead')	Continued learning and growth; fine-tuning processes, outcomes; clinical risk management; corporate 'team player' culture to remove barriers and to foster professional exchanges; 'on-the-floor leadership' and culture of excellence
	(b) Extrinsic regulation	Clinical audit; evidence-based practice guidelines and protocols; professional re-certification; use of performance indicators and targets	Professional peer review; 'health care manuals' to ensure quality and disease management; individual quality assurance; revealing points and places of weakness for action
Provider institutions	(a) Self-regulation	Continuous quality improvement and total quality management; information systems and performance framework to assess input-process-outcome links; community-based integrated care tools and attributes for target populations	Self-sustaining excellence in quality processes and outcomes; analytical framework to gain timely and 'balanced picture' management information; re-engineering delivery process around the patient across care continuum
	(b) Extrinsic regulation	Accreditation and certification; public disclosure of performance, benchmarking, and comparisons using standardized indicators	Perpetuation of high standards; managing quality, sharing best practices and strategies, and getting 'good report cards'
Health care purchasers	Pan-institutional quality drive	Financial incentives; managed care dynamics; standard population-based indicators of quality to compare health care plans or organizations	Recognizing, motivating and rewarding improvement; tackling market failures; choosing responsive, effective and efficient health care organizations
Government or policy makers	Coherent, national approach	Reforms, regulation/stewardship; national priorities, system objectives, performance targets and standards of care; national community-based integrated care strategies and policy; consumer protection and rights legislation; performance/health information technology system; assuring health technology assessment and more research; enacting public accountability of all stakeholders; financial and other incentives (e.g. 'earned autonomy'); overarching national health system performance, quality and management framework	Consistency and coordination; focusing on key health activities, patient-oriented targets, safety and quality standards; community-based approach and de-fragmentation of service and care delivery; reducing information asymmetry, errors and litigation; information analysis, reporting, and dissemination for education; cost-effectiveness and system effectiveness mechanisms; transparency and increased public access; performance rating, motivation and rewarding; comprehensive approach to effectiveness, efficiency and equity; informed policy-making

framework [34,43]. The Roadmap Initiative seeks to create an 'integrated system' that reduces inefficiency, improves equity and strengthens effectiveness by focusing on patient needs and *evidence-based decision-making*. Its underlying concept is premised on integration of health care knowledge with high quality information technology to foster 'learning and innovation' [35]. The initiative encourages the identification and sharing of 'best practices' within an environment where collected useful data are transformed into timely, management information. This is in tandem with the AIM framework, which seeks to support clinical, governance, and management functions, by focusing on how well organizations voluntarily use PI data to comprehend and improve their service processes and outcomes. There is therefore multi-level use of professional accountability, guidelines, continued education, comparable indicator data, continuous quality improvement and accreditation.

In addition to assisting managers and other decision-makers to make the right decisions at the right time and the right place, the initiative places the patient at the heart of this performance improvement drive through such empowerment exercises as consultations, surveys, health education and promotion, and community-based care initiatives [31,46].

Australia

Background. Australia is characterized by an established universally accessible national health care system, within a federated structure where funding, delivery, and regulatory responsibilities are shared by the national and state governments [47–49]. In this complex system of mixed service types and provision [49], the Commonwealth (i.e. the Federal Government), States, and Territories jointly fund public hospitals and community care, whereas the Commonwealth uses its general taxation revenue to fund most out-of-hospital medical services and health research [50]. The 1990s were a period of concerted efforts by the national and state Health Ministers working with many stakeholders to develop a coherent national framework for assessing the Australian health system [51–54]. These efforts were directed at national quality of care, health outcomes and clinical indicators. From 1999 onwards, the Federal Government refocused on improving the health system performance through a series of national initiatives aimed at rationalizing and converging current efforts. By 2000, the National Health Performance Committee (NHPC) commenced work on the new Australian health performance measurement framework, adapted from the Canadian Health Information Roadmap Initiative Indicators framework [55].

Performance framework. Conceptually, the Australian national health performance framework, which is based on a health determinants model, is non-hierarchical but relational, as it pays attention to other contextual variables that may considerably influence health care inputs, processes, outputs, or outcomes. The framework has three tiers: (a) health status and outcomes; (b) determinants of health; and (c) health system performance. Equity is seen as an all-encompassing property of these three tiers [55]. Health conditions, human function,

life expectancy and well-being, and deaths are the four dimensions contained in the 'health status and outcomes' section of the framework. The 'determinants of health' tier includes environmental and socioeconomic factors, community capacity, health behaviors, and person-related dimensions.

Health system performance boasts of nine dimensions, namely: (a) effectiveness; (b) appropriateness; (c) efficiency; (d) responsiveness; (e) accessibility; (f) safety; (g) continuity; (h) capability; and (i) sustainability. This part of the performance framework poses the question: 'How well is the health system performing in delivering quality health actions to improve the health of all Australians?' In doing so, the framework reports on system-wide performance from *population health* programs, *primary care*, *acute care*, and *continuing care* services, thus reflecting the four main sectors in the health care continuum of Australia. The selective and still developing national indicator sets that populate this framework may in some areas span more than one domain of performance. Development work on the indicators hopes to achieve an operationalization of the inputs, outputs, and outcomes model [55,56] along various performance domains, while paying particular attention to national priority areas [57]. The PIs framework also explores the possible integration of program effectiveness, and policy frameworks for national strategies, such as the National Chronic Disease Prevention Strategy, with the population health model. The system is also exploring a widespread local use of PIs [5].

On technical and epidemiological grounds, the national PIs are developed and selected to conform to existing data definitions and established national health information development processes, thus enabling their incorporation into the National Health Data Dictionary, where a core set of uniform definitions exists [55,58]. General selection criteria employed in the framework require that these PIs be: worth measuring; measurable (valid and reliable) for diverse populations, paying particular attention to priority ('indigenous and bush') populations; understood by people who need to act; able to galvanize action at national, state, or local levels either individually or collectively; relevant to policy and practice (i.e. feasible actions can improve a performance area covered by an indicator); reflective of time-varied action results in various aspects of national health; and collectable and reportable in a cost-effective manner.

Indicators of effectiveness. The framework conceptualizes *effectiveness* of the health system as a performance dimension where 'care/intervention/action achieves the desired result in an appropriate timeframe' [55]. The Australian 'effective' dimension includes explicitly the time component, so as to evaluate whether health interventions are primarily achieving the expected or desired outcomes within the proper time context. Moreover, the framework advocates that the intervention or care must be to people most at need.

Indicators for the 'effectiveness' dimension are drawn mostly from the prevention and early detection performance areas of population health, and as such include HIV education and the practice of safe sex, as well as breast screening and detection of small size cancers. These measures tend to be output and/or outcome, or in the short-term, process indicators.

Operationally, the 'effective' dimension can subsume the domains of quality, appropriateness, access and timeliness.

On a national level, benchmarks are being developed but these already exist at territorial and state levels [59], as well as hospital levels [51,60].

Quality improvement initiatives. Considered an integral part of the Australian framework, 'quality' with an increased consumer focus in the system has similar dimensions to those of performance [61]. 'A system will only perform well if it is delivering high quality interventions in a cost-effective manner' [55]. Quality improvement and safety are the foci of various national initiatives such as the National Health Priority Action Council (NHPAC), the National Institute of Clinical Studies (NICS) and the Australian Council for Safety and Quality in Health Care (ACSQHC).

The NHPAC, a recent establishment, advises on the coordination and progress of Australia's National Health Priority Areas, namely cardiovascular disease, cancer, injury, asthma, depression, and diabetes mellitus. Backed by financial incentives for primary care programs, NHPAC acts to improve care through performance monitoring in specified disease diagnosis and management. The newly formed NICS independently promotes best evidence practices using effective implementation strategies, while the ACSQHC directs and reports on national data usability, quality improvement, and safety issues. The Australian Council on Health Care Standards is an independent, non-profit organization that undertakes performance assessment and accreditation [62]. The Quality Improvement Council, a national non-profit organization, is another important promoter of quality, through its Standards and National Review and Accreditation Programs [63].

Additionally, tools identified in the Australian health system for quality improvement include: accreditation; strengthening consumer feedback and participation; development of information systems to provide high quality data; promotion of evidence-based practice; supporting health infrastructure; development of health care teams among professional groups; reporting of and learning from adverse events; and introduction of clinical risk reduction programs [64]. Quality of care indicators are being developed, as part of an integrated national agenda, to converge with the health system performance framework.

Mechanism of change. An intrinsic aim of the Australian framework is to improve system performance vis-à-vis capacity building [54,57]. The framework aims at performance comparison across States, Territories and nationally, thus encouraging improvement in identified areas within the health system. Hence, timely public performance reporting at local, regional and national levels within an integrated information network is seen as a tool to drive improvement. Using its robust data system [58,65], the national framework will enhance epidemiological analysis to clarify the relationship between health inputs or programs, processes, outputs, and outcomes. Locally, intra- and inter-organizational performance comparison and benchmarking may drive improvement. International comparisons seem to stimulate performance improvement in the Australian health system.

Another powerful incentive identified in the national framework is the existence of enhancement funds for institu-

tions, and a number of local and national financial incentives aimed at health care providers [50,64]. These incentives operate within a structure of national initiatives geared towards improving national performance capacity, quality, and safety. Overall, it is hoped that the framework will be a valuable instrument for outlining trends, facilitating data use at health system level for benchmarking purposes, informing decision-making and appraising progress towards tackling health issues [55].

USA

Background. The US has a pluralistic, decentralized health system with mostly private (largely employer-based) funding and variable state and federal regulation [5,66]. The Federal Medicare public insurance program only caters for the elderly (over age 65 years old) and the disabled, while the federal-state Medicaid program covers low income and disabled persons. Many insured and uninsured are exposed to out-of-pocket payments. The numerous health care plans and networks, being in the private sector, operate in a competitive market environment where patients and health care purchasers make their selection based on performance information (or quality) and economic grounds (or cost). The US has a staunch background in the development, analysis and reporting of PIs within the public domain and in health care networks albeit mainly fragmented in approach. With government and private support, the system has witnessed a lot of research activities on effectiveness, consumer empowerment, and quality of care. Nonetheless, the fragmented US health system still has to develop a concrete coherent national performance indicators framework. At the level of health care plans and networks, PIs are employed locally for assessment, management and improvement. In the last few years, there have been initiatives aimed at strengthening the national capacity and developing core indicators frameworks.

Performance framework. At the national level, the US has a number of mostly still developing health system performance framework initiatives, namely: (a) a proposed national health system improvement framework [67]; (b) a population health improvement model [68]; (c) the National Health Care Quality Report [69]; and (d) two prominent, widely used but non-national, performance reporting initiatives – the Consumer Assessment of Health Plans Study (CAHPS) and the Health Employer Data Information Set (HEDIS®) [70]. Other performance assessment initiatives include the Quality Improvement Organization (QIO) program of the Centers for Medicare and Medicaid Services [71], the ORYX initiative of the Joint Commission on Accreditation of Healthcare Organizations [72], and the quality measures of the Foundation for Accountability [73].

The Institute of Medicine (IOM) proposed a framework for national system improvement, outlining six performance domains: (a) safety; (b) effectiveness; (c) patient-centeredness; (d) timeliness; (e) efficiency; and (f) equity. The IOM argues that 'a health care system that achieves major gains in these six areas would be far better at meeting patient needs' [67]. PIs that can populate such a system re-invention framework are accessible in the National Quality Measures Clearinghouse™

(NQMCTM), a national repository of indicators maintained by the Agency for Healthcare Research and Quality [74].

'Healthy People 2010' is a concurrent national public health vision launched in 2000, the third of its kind since 1979, with 467 objectives in 28 focus areas, based on a determinants of health or population health model [68]. The 10-year targets set out in this project call for renewed communal efforts towards 'healthy people in healthy communities', requiring health providers to have more prevention-oriented practices, scientists to do more research, communities and businesses to support health promotion policies, and individuals to make healthy lifestyle choices. 'Healthy People 2010' has two broad demography-based goals: firstly, the improvement of the quality and years of healthy life of an aging USA, and secondly, the elimination of health disparities among its diverse populations. In order to track its progress, the project publishes a set of 10 'leading health indicators' addressing physical activity, overweight and obesity, tobacco use, substance abuse, responsible sexual behavior, mental health, injury and violence, environmental quality, immunization, and access to quality health care.

The National Health Care Quality Report is a conceptual framework for measuring the performance improvement of the US health system in its provision of high-quality care. The prototype of this report expected in 2003 will address two main dimensions: health care quality and consumer perspectives on health care needs. Components of the health care quality dimension are: (a) safety; (b) effectiveness; (c) patient centeredness; and (d) timeliness. Consumer perspectives on health care needs – reasons for seeking care – are conceived to cover: (a) staying healthy; (b) getting better; (c) living with illness or disability; and (d) coping with the end of life. The framework propounds combining these components of the two main dimensions in a matrix so as to explore their inter-relationship. For instance an indicator can be 'effectiveness – staying healthy' in a cell of the matrix, where presumably health conditions and population characteristics related to equity as universal issues would apply within each cell [69].

Indicators of effectiveness. In the IOM proposed US framework, *effectiveness* refers to 'providing services based on scientific knowledge to all who could benefit, refraining from providing services to those not likely to benefit (avoiding overuse and underuse)' [67]. According to the JCAHO, *effectiveness* is 'the degree to which the care is provided in the correct manner, given the current state of knowledge, to achieve the desired or projected outcome(s) for the patient' [74]. Underlying the operationalization of this concept are the domains of safety, quality, appropriateness, timeliness, continuity, and availability.

Numerous effectiveness of care indicators found in the NQMCTM and HEDIS® are widely used at the level of managed care plans or health networks and include: childhood immunization status, chlamydia screening in women, prenatal and postpartum care, flu shots for adults aged 50–64 years, cholesterol management after acute cardiovascular events, and advising smokers to quit [74,75]. The National Quality Report framework stipulates that effectiveness should be assessed according to type of care (e.g. preventive care; acute,

chronic and end-of-life care) or for specific conditions. Therefore, the indicators would reflect just about these areas or priority conditions. These PIs are predominantly process and outcome measures, as the national framework avoids structural indicators, citing the weakness of the links between most system structures and outcomes of care. The use of process and outcome PIs is said to mirror the interests of American consumers and providers in practice-related (or outcome-validated process) and outcome indicators [69]. Hence, the framework aims to link performance to system targets via its functions.

The selection criteria for the individual indicators address the overall importance of the aspect of performance or quality being measured, the scientific soundness and the feasibility of the indicators. For the indicator set as a whole, balance, comprehensiveness, and robustness are the desired criteria [69].

Quality improvement initiatives. According to the IOM, health care 'quality' is 'the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge' [76]. Quality of care and safety are such major political and public issues [5,77] driving the US national health system initiatives that a whole framework for multi-level reporting has been commissioned to track health care quality progress at national, state and local levels. This National Quality Report being undertaken by the IOM on behalf of the Agency for Health Research and Quality (AHRQ) is seen as 'a collection of annual reports tailored to the needs and interests of particular constituencies' [69]. It will examine the quality of care provided by the entire system to the general population and major subgroups. The AHRQ also has a three-part Quality Indicators project, a refinement of its Healthcare Cost and Utilization Project (HCUP). This is a federal–state–private collaboration to create a uniform set of health care quality indicators based on hospital administrative data [78].

Prior to the Quality Report, The President's Advisory Commission on Consumer Protection and Quality in Health Care Industry had in 1998 concluded that too many Americans received substandard quality care, bearing in mind that some 41 million lived without the benefit of health insurance security. It then recommended federal patients' rights legislation and national quality assessment and reporting. It also proposed a three-dimension quality measurement framework to focus on technical quality, accessibility, and acceptability [79]. Subsequently, the National Forum for Quality Measurement and Reporting was established in 1999 as a non-profit public–private partnership concerned with the promulgation and endorsement of core quality PIs (for the health system to gauge progress towards national goals) and provision of accessible information to all health actors [80,81]. The Centers for Medicare and Medicaid Services (formerly Health Care Financing Administration) which provides the governmental public health insurance to 74 million Americans also uses PIs to facilitate quality improvement [71].

Other key quality improvement tools within the US context include: refocusing of group health care purchasers on

high quality services; consumer empowerment; paying special attention to ‘vulnerable populations’ (such as the poor, elderly, children); accountability of all health actors; error reduction systems and ‘culture of safety’; investment in health information systems; advancement of evidence-based practice; greater health care professional collaborations and peer review; and accreditation, licensing, and certification [79].

Mechanism of change. The use of PIs to foster actual overall performance improvement in the US health system is predicated largely on two main mechanisms: public reporting and economic accountability [82–84]. As a public accountability tool, performance reporting efforts for consumers – in addition to some selective provider-level reporting – include the CAHPS and HEDIS® initiatives. CAHPS serves as survey protocol sponsored by AHRQ [78], Medicare, Medicaid, and a host of private purchasers for collecting and reporting consumer’s experiences with their health plans. It aids purchaser and consumer selection/choice of health plans and stimulates competitive performance of health care plans. The National Committee for Quality Assurance (NCQA) working with purchasers, researchers, health plans and consumer advocates developed the HEDIS® as a reporting data set of standardized PIs – that assess care and service quality, access to, and satisfaction with care, service use and membership, finance, and management provided by health plans and networks – drawing data from administrative (enrollment and claims) sources, medical records, and member surveys [75,85]. A nonprofit private body, NCQA also uses the HEDIS® for accreditation purposes and keeps data in the public domain through its ‘Quality Compass’ database. These aforementioned consumer-focused reporting initiatives play a role in improving US health system performance via the mechanisms of changing provider behavior, facilitation of consumer selection and choice, purchasing/commissioning decisions, and regulation by public accountability [83].

Besides, the market dynamics of the US health care make ‘choice’ and ‘exit’ potent regulation mechanisms for driving performance and enforcing accountability [84]. This economic accountability model [86] operates within a market context where effective use of performance data to change the health system aims at policy makers, purchasers, providers, and the public for its purposes.

WHO

Background. On the 24 June 2000, the WHO, the leading international health agency, published its *World Health Report 2000* (WHR 2000) [7], which was devoted to assessing health system performance in 191 member countries. This report defines health systems, and sets out why they matter, their evolution, their goals, and their functions. It then goes on to propose and develop a performance framework ‘to help Member States measure their own performance, understand the factors that contribute to it, improve it, and respond better to the needs and expectations of the people they serve and represent’ [7]. The report presents the results in a number of

league tables and plots, which among others show current achievements against potential. Applauded though the WHO framework was, it also generated a lot of debate, as the league tables and underlying methodology among other issues were intensely controversial [87–97]. WHO is currently revising its concepts and methods for the next round of reporting [87].

Performance framework. The WHO Health System Performance Assessment framework [7] builds on a number of essential concepts, namely: health system boundaries, objective, goals, health system efficiency, health system functions, and enhancing policy relevance of health system performance framework [87,98]. Under the concept of *health system boundaries*, a health system is defined operationally as comprising ‘the resources, actors and institutions related to the financing, regulation and provision of health actions’ [98], where *health actions* are ‘all activities whose primary purpose is to promote, restore or maintain health’ [7]. Better health is thus considered the main *objective – raison d’être* – of a health system, and hence its primary goal. Furthermore, this main objective of improving health is taken to have two socially desirable goals of ‘goodness’ (to mean that a health system responds well to what people expect of it) and ‘fairness’ (to imply that the response is equal to all, without discrimination).

There are therefore fundamentally three *goals* of a health system: (a) improving health; (b) enhancing its responsiveness to the expectations of the population; and (c) assuring fairness of financial contribution [7]. Applying two ‘components of assessment’, viz. average level and distribution, the goal of ‘improving health’ is further split into two: (a) average health status; and (b) reducing health inequalities. ‘Responsiveness’ then includes two major components: (a) respect for persons; and (b) client orientation. For the third goal, fairness in financial contribution, only its distribution, but not its average level, is considered. Level of resources is treated as an extrinsic variable for judging performance. The levels of goal attainment for both health improvement and responsiveness reflect the overall quality of the health system, whereas the distributional measures (each of health, responsiveness, and financial contribution) describe the equity of the system [98]. Hence, the five major components of health system performance according to WHO are: the overall level of population health, the distribution of health in the population, the overall level of responsiveness, distribution of responsiveness within the population, and the distribution of the health system’s financial burden within the population. Performance is estimated from the weighted sum of the above-listed five components, and an ‘overall indicator of attainment’ is calculated. The weights came from a survey of goal preferences of some 1006 respondents from 125 countries.

Health system efficiency refers to a composite goal performance index depicting how well the health system achieves the socially desirable mix of the five components of performance goals. *Health system functions*, in this framework revolve around four core areas – stewardship, financing, resource generation, and service provision [7,87,98].

Indicators of effectiveness. The WHO conceptual framework does not explicitly use the term *effectiveness*, but appears to operationalize *health* (improvement/outcome) as an all-embracing

objective of the health system. As such, the framework delineates a number of measures such as probability of mortality before the age 5 years, or between the ages of 15 and 59 years, life expectancy at birth, mortality by cause and sex, and disability measures. It finally combines these measures to estimate one measure of overall population health, terming it the 'burden of disease' or the numbers of disability-adjusted life years (DALYs) lost. In judging how well the objective of good health is being achieved, WHO also uses the indicator disability-adjusted life expectancy (DALE), an estimate of the number of years that a person would live in full health. DALE is calculated from three types of data: the age-specific survival fraction, estimated from birth and mortality rates; the age-specific prevalence of each type of disability; and the weight assigned to each type of disability [7,99].

Given its defined set of three major goals for a health system, the framework conceives 'composite goal performance' as *efficiency*. It argues that efficiency depicts 'how well a health system achieves the desired outcomes given available resources' [98]. Using a scale obtained from an upper limit or 'frontier' (i.e. the maximum attainable in a health system) and a lower boundary (i.e. minimum attainable) analyses, WHO estimates the health system's *potential*. It then relates outcomes and health system resources in two ways – the first relates resources to average health status (DALE), and the second relates resources to the overall attainment indicator based on all five performance components [7].

Quality, management, and policy issues. Quality is not considered as a performance measure in the WHO conceptual framework, but is seen as a subset of overall goal attainment [98]. Improving and managing performance supported with relevant policies are areas of interest for the framework, prompting the establishment of the Enhancing Health Systems Performance Initiative (EHSPI). This is borne out of WHO's idea of *enhancing the policy relevance of health system performance assessment* mentioned above, and involves regional consultations with countries, research institutes, and other international organizations [87,100]. Nationally, EHSPI would feed policy debate, link evidence to actions, and develop national capacity to monitor and improve performance. Globally, EHSPI would guide further developments of the framework, methods and a stronger international evidence-base for policy.

WHO stipulates that the 'scope of accountability' should be approached on three levels, focusing on the performance of national systems, and of subsystems and institutions, and the overall attainment of health system goals. It uses the notion of *stewardship*, one of its four major functions of a health system, to take regulation further by including six sub-functions: overall system design, performance assessment, priority setting, intersectoral advocacy, rule setting (i.e. health care regulation and sanitary regulation of goods and services), and consumer protection. Stewardship at the national level encompasses the definition of basic strategies for the whole health system, the assurance of an enabling environment for all health actors, and the promulgation and maintenance of rules for the system [7,98]. At the international level, stewardship will provide an evidence base to assist countries in

improving their systems, and will influence appropriate global research towards achieving health goals. This entire enterprise has had a tremendous impact on national interests in health system performance.

OECD

Background. The Organisation for Economic Co-operation and Development (OECD), in keeping with its establishing Convention signed in Paris on 14 December 1960 and enforced on 30 September 1961, has brought together countries sharing the principles of the market economy, pluralist democracy, and respect for human rights [101]. The 30 industrialized member countries of OECD hold that 'good health is essential for people to flourish as citizens, family members, workers and consumers' [102]. The organization stipulates that modern health systems, aided by technological advances, are pivotal to good health promotion and disease cure or management, ceding that such gains come at a cost. Growing demand on health systems, increased consumer expectations, aging populations, concerns about medical errors and the increasingly expensive health technologies vis-à-vis bulging public financing have prompted many member countries to develop performance measurement and management frameworks that capture equity, quality and efficiency goals within their health systems [103–105]. Parallel to these developmental efforts and to enable international comparisons, reporting, and evidence-based policy-making, the OECD has proposed a conceptual framework adopting many aspects of the WHO health system performance framework [104]. The framework, which does not suggest any weighting scheme for system goals, focuses on health system performance but not on the broader issues of public health.

Performance framework. The OECD proposed health system performance framework contains three main goals: (a) health improvement and outcomes; (b) responsiveness and access; and (c) financial contribution and health expenditure [104,105]. These goals are subjected to two 'components for assessment' to explore system achievement, namely: *average level* and *distribution* of each goal. As a result, six components of health system performance emerge from this matrix, where the average levels of the three aforementioned goals are taken to measure *efficiency* and their respective distributions indicate *equity*. Unlike in the WHO framework, where access is seen as a determinant of responsiveness, here 'access' is designated as an essential component of 'responsiveness', so as to address issues of equity of access within the OECD framework. In terms of dimensions of performance, the OECD framework has four main ones, thus: (a) health improvement/outcomes; (b) responsiveness; (c) equity (of health outcomes, access and finance respectively); and (d) efficiency (both macroeconomic and microeconomic).

The OECD compiles and publishes key indicators in printed (*Health at a Glance*) and electronic (*OECD Health Data*) formats [66,102]. The 10 main data fields found in these databases are: health status, health care resources, health care utilization, expenditure on health, financing and remuneration, social protection, pharmaceutical market, non-medical

determinants of health, demographic references, and economic references. The data for the many indicators contained within these data fields come from member countries, the Eurostat *New Cronos* database, the WHO's *World Health Statistics Annual*, the WHO-Europe *Health for All*, and other international databases.

The OECD identifies three types of health systems among its member countries. The first type, as in the US, is a health system with private health insurance and private providers and where purchasers can influence unit costs and level of health expenditure. The second type of health system, as in The Netherlands, is financed mainly by social health insurance with private or mixed providers, where the government largely determines the level of health expenditure. The third type, known as national health service, exemplified by the UK, involves financing mostly by general taxation with mainly public providers, where the government also controls level of health expenditure but microeconomic efficiency is determined by providers and managers purchasing health care for consumers [105].

Indicators of effectiveness. In the OECD framework, *effectiveness* is conceptualized as 'health outcomes' 'defined narrowly as those changes in health status strictly attributable to the activities of health systems' [104,105]. Though uninterested in health status itself determinable by many factors, the framework capitulates that uncertainties still exist within the used indicators of effectiveness owing to the difficulty of teasing health care impact from the impact of health status determinants. These PIs are operationalized health status measures of avoidable morbidity or mortality, or process measures which are held to be highly outcome-correlated [104].

Examples of these PIs include: vaccination rates, avoidable hospitalizations by selected conditions, incidence of infectious diseases, low birth weight, perinatal mortality, infant mortality and avoidable mortality by selected conditions. As part of its Ageing Related Disease (ARD) Project, the organization will collect data on survival rates from cancer, in-hospital mortality due to acute myocardial infarction, as well as breast and cervical cancer screening. Vaccination rates and breast/cervical cancer screening are designated as process-of-care measures. Rates of avoidable morbidity or mortality are included upon evidence that appropriate and timely health intervention would prevent the disease or treat its early stages [106]. These PIs are taken to reflect the health outcome/improvement goal of OECD health systems. When more countries link their databases on individual diagnoses, interventions and death, it is expected that longitudinal and disease-course analyses would make it easier to estimate comparative health outcomes.

Quality, management, and policy issues. The OECD captures quality in the levels of health outcomes and responsiveness, and tackles 'performance management' as 'the whole set of institutional and incentive arrangements by which performance information is (or is not) used to influence performance in health care systems' [104,105]. The identified pan-OECD instruments of performance improvement consist of professional self-regulation, market or quasi-market drive and external scrutiny by way of peer review, licensing, publicizing PIs,

and 'contract re-negotiation.' The approach may be singular or joint, usually supported by financial and non-financial incentives and governmental regulation to ensure quality, efficiency and equity [84,105].

The OECD performance measurement and improvement cycle [107] has four main compartments: the *health care system*, *conceptualization and measurement*, *analysis*, and *action/management* [104]. Policy makers and managers within the health care system are expected to identify weaknesses. After conceptualization and measurement, achievements are compared with objectives. Under 'analysis,' *ex ante* evaluation should reveal the causes of low performance and the cost-effectiveness of the needed improvement, while *ex post* evaluation will monitor the undertaken improvement activities and generate an 'evidence base' for anticipated policy-making. Eventually, any or all of four basic health actors – consumers, providers, managers, and governors – would initiate actions or behavioral changes so as to achieve performance improvement. The same cycle has been proposed for summarizing the phases of health policy and management initiatives aimed at improving health system performance [105].

In either case, analysis and investigation may be required in order to identify how to improve performance. International comparison could foster international benchmarking, improved quality, informed policy-making especially for health care spending [108] and on health technology diffusion [109], the sharing of good performance measurement and management practices [104], and hence could contribute to standardization of concepts and definitions [106].

Discussion

First and foremost, we acknowledge the shortcomings of this study's methodology. Internet sources used in the exploration can change and can bias retrieval where important hyperlinks are not readily accessible. There is also the issue of vagueness and questionable reliability of published official data, leaving much room for speculation as to the true implications of policies and terms. Contributions of the private sector are usually neglected in any study of official initiatives. Moreover, this field of discourse is a very dynamic one, as all the study bodies frequently update their practices and proposals. Nonetheless, much effort has been spent to eschew these potential biases, by being thorough and objective. This discussion will analyze stepwise: the various conceptual bases, effectiveness as a concept, the resultant proxy roles of public health and health services, other operationalization issues surrounding indicators of effectiveness, the quality–effectiveness relationship, the mechanism of change, and briefly, the idea of 'performance environment'.

Conceptual bases

There are almost as many conceptual frameworks as there are countries and organizations studied (Tables 1 and 2). The overwhelming drive has been improving health [110] and managing the health system around the consumer. Conceptually,

the UK NHS framework leans more on a balanced scorecard concept (though not its original four perspectives [17], but it chooses a six-area approach) that is performance management driven, while the Australian, and to a large extent the Canadian, frameworks pursue a more relational concept of health and health system – an informational, health determinants model. This model, from Lalonde [111], makes allowance for the role of the socioeconomic environment, genes or host's constitution, lifestyle, and health care (system) in determining health. If these factors are not considered when frameworks and PIs are developed for monitoring health vis-à-vis health system performance, one runs the risk of spurious conclusions about the relationship between health and health care (or more narrowly medical care) [112,113]. Though supported by a population health determinants program, the US approach remains largely fragmented with its market and consumer information tilt. Ultimately, national health systems have their own priorities and must seek supporting structures for performance. The WHO and OECD frameworks encourage international comparability, availability of data, and evidence-based performance, and offer policy support to Member States. Nonetheless, there are varying degrees of divergence in concepts and operationalization of targets, effectiveness, performance dimensions, and assessment. Part of this divergence lies in the difficulty of building a conceptually sound framework around existing data and initiatives, while measuring performance gaps and maintaining international comparability, a move perhaps stimulated by the WHR 2000. Another important cause of these differences is the tendency towards accommodating the political, epidemiological, economic, and managerial perspectives of key stakeholders.

Effectiveness as a concept

The notion of *effectiveness* – the degree to which the objectives of a program, care, service, or system are achieved [114] – illustrates the foregoing. The UK, Canadian, Australian, and US applications of effectiveness span other performance dimensions and pertain to service or care delivery achieving desired results and being evidence-based, accessible, appropriate, timely, and of high quality. The US goes further to include avoiding overuse and underuse of services. In all four nations, the implication is that there are standards and objectives for gauging these results. Unfortunately, these objectives are sometimes unclear or too numerous to be manageable. Neither is the achievement rating system well developed (although the UK performance star rating system has been applied to acute health services). Internationally, WHO and OECD tackle the concept of effectiveness in terms of efficiency and health outcomes, reflecting an economic way of thinking. It has been argued that PIs for health outcomes should relate to those aspects of care alterable by health care or organizational variables [115,116]. Whichever way one goes about it, the objectives, which should be realistic and set *a priori*, must be explicitly quantifiable or at least amenable to minimum quantification, or else the very notion of effectiveness becomes meaningless [114].

Public health and health services

In practice, the studied countries seem to use mainly public health issues and priority areas of health care as proxies for health system objectives, perhaps reflecting an endeavor to link public health and health services within health system performance (Table 3). This may be an inadvertent result of the national approach to health of populations, and the aggregation of health services towards the macro-level, respectively. Moreover, priority health conditions such as diabetes, coronary heart disease, and cancer reflect the known health service strengths as well as the epidemiological needs of these industrialized nations. In any health system performance assessment, the challenge remains in capturing non-medical determinants of health, as depicted in the Canadian and Australian frameworks, but poorly so in the WHO and OECD frameworks. Nevertheless, the distinction between public health (with the wider issues of population health determinants) and health services (with the narrower issues of clinical care and cure) should be made clear, articulating their relationship to the overall health system.

Operationalization of effectiveness indicators

To operationalize PIs which measure the degree to which objectives are being met or not, the explored countries and organizations use a combination of means to overcome data problems and the difficulty of defining and measuring objectives in a reliable and valid manner. For instance, the UK, Canada, and Australia make extensive use of existing data in developing and applying their PIs, while creating new data sources when possible, in conformance with current databases and newly selected indicators. A trade-off between scientific objectivity and feasibility appears to be at work in how these effectiveness indicators are conceptualized and operationalized, just as these countries and agencies strive to appease both purists and pragmatists. Furthermore, most of the indicators of effectiveness in these frameworks are outcome and, less so, process measures. The value of a process measure, which is usually more sensitive to differences in quality [117], is reliant on the strength of the evidence that links it with ultimate outcomes [69,118]. While the correct relationship between health care effectiveness and improved health outcomes remains unsettled [114,115,119], different stakeholders still have different views as to what processes or outcomes should be measured and how [110,120]. A mixture of PI types may be more useful to assess effectiveness from various stakeholder perspectives [121].

As an illustration, one could look at childhood immunization, found in nearly all the frameworks, as an effectiveness indicator. Politicians want accountability of all health actors involved in vaccination programs, and seek good immunization coverage percentages for the electorate and the international community. Epidemiologists who look for robust PIs may be interested in: the population effectiveness of immunization among children at age 2 years; its attributable effectiveness which is the difference in, say, measles notification between the immunized and non-immunized children at that age; its

population attributable effectiveness or the proportion of children who would gain from immunization, to show the impact of vaccination on the population; and its relative effectiveness which is the ratio of the outcome (incidence of measles) between the immunized and non-immunized 2-year-olds. Economists fight for cost-effective immunization programs, best resource allocation, and maximal social benefits with minimum societal inputs or costs. Managers want to set goals, develop and implement immunization strategies for achieving them and measuring performance, and therefore need to use timely, prescriptive performance information to improve how the vaccination program is run, efficiently and effectively. From the foregoing, it becomes a difficult task to operationalize childhood immunization as a useful PI that captures effectiveness of preventive care. Whatever combination that is chosen will depend on who owns the performance framework thus calling for value judgment and balancing of perspectives, data availability and reliability, the exact priorities of the system, and the temporal nature of the defined outcome given the intervention.

Effectiveness or quality

An interesting trend in all the frameworks is the implicit and explicit link between the concepts of ‘effectiveness’ and ‘quality’. This is understandable, given the growing concerns about safety, service delivery, and quality of patient care [122–127]. Donabedian defines quality as ‘the ability to achieve desirable objectives using legitimate means’ [128]. As the Australian framework points out, a system can only be said to be performing, in this case achieving desired objectives, if it delivers high quality interventions, care or services [55]. The IOM renders quality as increasing the likelihood of desired health outcomes, consistent with best current professional knowledge [76], and effectiveness as provision of services based on scientific knowledge to all who could benefit, avoiding overuse and underuse [67]. Quality may then be a composite or subset of main outcome indicators (e.g. OECD and WHO), may be developed in a supportive framework (e.g. USA) [69], or effectiveness can be viewed as a dimension of quality [61,67,129]. ‘Quality of care’ is increasingly referred to as ‘performance’ [110,130–132], but may well be ‘quality of technical performance’ from its current measurements [133,134]. Quality of care becomes a proxy for the quality of the whole health system where the main business is clinical care. Clinical governance [135–137]. Indeed, the four countries and two agencies use a combination of tools for performance and quality improvement. This multi-level approach, if clearly obtainable and optimally synergistic in a health system as shown in Table 4, may indeed prove more promising in ensuring quality of health care delivery. This has been illustrated elsewhere under the unifying concept of community-based integrated care [138]. However, what is currently the case is that these countries have a myriad of often overlapping quality initiatives and reporting or public disclosure mechanisms. Several studies have debated the usefulness of such public disclosure of quality or performance data [130,139–143].

Mechanism of change

Information from PIs ‘can be used to monitor the overall strategy or operational performance of the organization, as an instrument of hands-off control over the lower levels of the organization, as a tool for day-to-day management by the street-level bureaucrat, or they can form part of the process of individual appraisal and in allocating performance related pay’ [144]. The exact organizational learning [145] and mechanism of change involved in using the resultant data to drive improvement remain a challenge [146,147], poorly researched, and at best, vague at policy and managerial levels. This may be due to the problems of turning these PIs into management indicators [148], of complex specifications [149,150], and of trying to capture quantitatively the many intangibilities encountered [151]. After comparing outcomes or performance components with desired targets or objectives, shortfalls must be identified and explanations put forward [152]. Ways are then explored to maximize achievement of these objectives, thus fine-tuning the service and care processes, changing patterns of delivery, or simply making the objectives more realistic and attainable [114]. Comparing and sharing best practice through benchmarking policy-making and accountability – political, public, and professional – are prominent improvement drives [153]. All four countries recognize and use regulatory mechanisms in order to achieve effectiveness and quality, as is seen in the example of the UK NHS [154,155]. The financial and non-financial incentives such as ‘earned autonomy’ [156] find more local application in the health system, and should be good management tools provided the standards are uniform, fair, and pragmatic. All these exist in a context of policies designed to govern implementation and management. However, a lot of the explored government documents detailed so much policy reform as to risk becoming a ‘perpetual-motion machine’ with a perpetual cycle of ‘high hopes and inflated rhetoric’ [157]. This makes it all too likely for the health policy reform to break down when implementation is attempted [158]. It still remains governmental responsibility to clearly design the guiding policies and strategies, to set relevant targets [159] with a ‘communitarian constitution’ [160], to aid the development of an overarching performance measurement and management framework for its national health system with integrated information systems [131], and to ensure accountability.

Performance environment

After creating and populating such a framework based on evidence, structure and needs, the government must go beyond the *content* of the framework to modify the *context*, or what we will term here as the *performance environment* in which it would be accepted, applied and appraised. Such a *performance environment* will include the concept of performance management [104,161], but will pay specific attention to how a particular conceptual framework relates to any existing health information and communications infrastructure, public health initiatives, regulatory institutions, welfare and social services, health actors or users of the framework, strategic policies, incentives, ‘organizational culture’ [162], and management mechanisms.

Conclusions

These performance measurement and management frameworks still need to address some conceptual and operational issues concerning effectiveness and quality. They should elucidate effectiveness and quality at health services level and then, at health systems level, and in so doing clarify their approach to public health, health services and health system performance. Also, indicators of effectiveness should be clearly linked to realistic, pre-defined, and unambiguous system-wide targets or outcomes. Timely, prescriptive performance data are important for improving processes and outcomes to achieve set targets. While these data do not necessarily provide management information, there are various mechanisms and initiatives that may be linked to these frameworks to ensure performance and quality improvement. A health system performance framework should not replace actual performance but should find its niche in a regulated performance environment and stimulate a culture of continuous improvement.

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