Monitoring What Matters

Health Quality Ontario's Approach to Performance Monitoring and Public Reporting

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Ontario
Health Quality Ontario

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Executive Summary

Performance monitoring and reporting is a key responsibility of Health Quality Ontario (HQO), as mandated by the *Excellent Care for All Act,* 2010. We are proud of our work and the progress made by HQO and our partners over the last few years, but also recognize that we must continually strive to increase the relevance and impact of our efforts. A clear, explicit strategy is needed to focus that improvement and ensure that HQO is a trusted, independent resource for information on the quality of health care in Ontario. A clear strategy will also have the benefit of informing health care providers, patients and the public in our province on how our monitoring and reporting activities are likely to develop over the next few years.

HQO will capitalize on our mandate that unites performance monitoring and reporting, quality improvement and evidence development roles in one organization. This unique role in the health system will be embraced as our monitoring and reporting activities become more closely integrated with our other mandated areas, as well as the provincial advisory role that HQO fulfils.

Over the next three years, we aim to do the following:

- Continually improve the content of our reporting to Ontarians, to better reflect the indicators that are most meaningful to patients, the public and health care providers.
- Continually improve the timeliness of our reporting, so that Ontarians and health care providers have the information they need to understand very recent performance rather than performance in the distant past.
- Continually improve the clarity and accessibility of our reporting, so that Ontarians can better understand how well their health care system is performing.
- Provide more data to health care providers about their own performance, and in collaboration with our Quality Improvement branch and partners outside HQO work to ensure that this information is used to improve care.
- Continually improve our analysis, so that we can reliably answer questions such as the following: Is health care in Ontario improving? Are Ontarians getting healthier? How does our health care system compare to those in other provinces and other countries? Is health care better in some places in Ontario than others?
- Continually refine and expand the Common Quality Agenda, which will serve as a set of key performance indicators that can be used to monitor the health status of Ontarians and the performance of the health care system. A stable set of key performance indicators can be used to identify opportunities for improvement and will help ensure cohesion across the health care system.

We will use the following reporting vehicles to pursue these aims:

- A yearly report, which will provide a high-level overview of the health status of Ontarians and the performance of the health care system.
- Online reporting, which will provide more detail about the performance of health care providers and the health care system as a whole.
- Theme reports, which will explore key issues of interest to health system stakeholders, and identify areas for improvement.
- Personalized reports to health care providers, which will be used to provide tailored feedback to individual practitioners or organizations.

HQO will also be actively advocating for more comprehensive, timely and better quality data about health care in Ontario and the health of Ontarians. Where new data is needed, HQO may partner with other system agencies to collect data, and in some instances we may collect data ourselves.

Finally, we will continue to improve the way we engage with health care providers, quality improvement champions, system leaders, patients, and the public in our work. To catalyze these efforts, we have established a Health System Performance Monitoring and Reporting Advisory Committee to improve the coordination of reporting activities between health sector organizations, strengthen advocacy and to provide advice to HQO.

Implementation Timeline

HQO will take the following steps to meet our strategic goals. This work will occur within the next 12 months and over the next three years. Further details regarding each goal are provided throughout this document.

Twelve month goals

Reporting

- Publish a yearly report using the Common Quality Agenda set of indicators.
- Release two theme reports, focused on a particular clinical condition, a sector, patient population or data source.
- Develop a process for identifying and prioritizing future topics for theme reports.
- Release personalized reports, initially to primary care providers.
- Develop a communications strategy to increase the awareness and impact of our reporting across multiple audiences.

Measurement

- Design and publish a process that includes expert review for indicator development, prioritization and retirement. This process would also determine whether an indicator is suitable for target setting, benchmarking or outlier identification.
- Prepare an indicator catalogue that lists and defines all measures reported by HQO, as well as some of those we have considered and decided not to report.
- Release an up-to-date data privacy policy and standard operating procedure for HQO.
- Release a white paper describing what data are needed to better monitor health system performance in Ontario.
- Finalize a plan for refining our approach to online reporting.

Engagement

- Establish a provincial Health System Monitoring and Reporting Advisory Committee.
- Implement a plan for greater involvement of patients and the public in our work.

Three year goals

- Develop and begin to implement a strategy to support personalized reporting to individual health care providers and provider organizations across all sectors.
- Launch an updated website that reflects our new approach to performance monitoring and public reporting.
- Include primary care indicators in online reporting.
- Achieve a steady state of eight to 10 theme reports per year.
- Develop and begin to implement a plan to assess the impact of our monitoring and reporting work.
- Have developed performance measurement frameworks for all sectors.
- Publish a white paper on target setting.
- Finalize a provincial data plan for performance monitoring and reporting.
- Be working with leading researchers in Ontario and beyond to continually advance the rigour of our monitoring and reporting activities.

Introduction

Health Quality Ontario's mandate

Health Quality Ontario (HQO) is an arms-length government agency, created under the *Commitment to the Future of Medicare Act,* 2005*.* In 2010, HQO's mandate was broadened under the *Excellent Care for All Act.* Serving as the province's advisor on quality, HQO's legislated mandate is to monitor and report to the people of Ontario about their health status and the performance of the health care system, to support continuous quality improvement, and to promote health care that is supported by the best available scientific evidence.

Current performance monitoring and reporting activities

HQO has been tasked with monitoring and reporting on access to publicly funded health services, health human resources in publicly funded health services, consumer and population health status and health system outcomes. The *Excellent Care for All Act* further notes that the purpose of such monitoring and reporting is to encourage and promote an integrated, person-centred health system; to make the Ontario health system more transparent and accountable; to track long-term progress in meeting Ontario's health goals and commitments; and to help Ontarians to better understand their health system.

HQO has reported performance indicators online since 2010. Reporting is organized by three sectors: long-term care, home care and patient safety in acute care settings. Long-term care and acute care patient safety indicators are reported and are searchable at the provincial and facility levels. Home care results are reported provincially and for the province's 14 Community Care Access Centres, with service provider data scheduled to be added later this year.[1] For several years, HQO also produced a report called *Quality Monitor*, which assessed the performance of the health system and made suggestions for improvement.

With respect to the performance monitoring and reporting activities, we believe that a clear, explicit strategy is needed to focus and increase the impact of our work. Implementing this strategy will help position HQO as a trusted, independent resource of information on the quality of health care in Ontario and also support the other activities of the organization.

How we developed our strategy

This strategy was developed to advance part of HQO's legislated mandate—our responsibility to monitor and report to the people of Ontario on the health status of Ontarians and the performance of the health care system. The strategy development process was informed by previous external reviews of our reporting activities and by canvassing internal knowledge from staff, senior management, colleagues at the Ministry of Health and Long-Term Care and our Board of Directors. An external environmental scan was undertaken to review performance monitoring and reporting activities conducted by selected organizations, provinces and countries known for leadership in performance monitoring and reporting.

An early draft was circulated to stakeholders, patient representatives and other leaders for comment. Feedback was supportive of the overall direction outlined in this strategy and advice

provided will help guide its implementation. A revised draft was posted for public comment prior to being finalized.

Background

Performance monitoring aims to monitor, evaluate and communicate the broad health system objectives of effectiveness, equity, efficiency, responsiveness and productivity.[2, 3] Performance is frequently compared with an average, a target or best-in-class performance.[4] Performance can also be compared across different providers or jurisdictions, as well as over time.

Internationally, performance monitoring and public reporting is increasingly seen as a vital component of a high performing health system. For example, in a transformative call for change following an inquiry into patient safety incidents in Australia, Commissioner Peter Garling asserted that, "public reporting of information about the health system and hospital […] is the single most important driver (or lever) for the creation of public confidence in the health system, engagement of clinicians, improvement and enhancement of clinical practice and cost efficiency."[5] More recently, in a statement on the release of his final report for the Mid Staffordshire National Health Service (NHS) Foundation Trust Public Inquiry, Robert Francis characterized information as "the lifeblood of an open, transparent and candid culture" and stated that it was essential to producing "the fundamental standards of care to which we are all entitled, at the same time as celebrating and supporting the provision of excellence in health care."[6]

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>
> Commissioner Peter Garling,
> New South Wales, Australia

Typically, three audiences engage or are involved in performance measurement: patients and their caregivers, health care providers and institutions, and managerial and supervisory bodies.[7] Patients might decide which cardiac surgeon to see after comparing risk-adjusted outcomes on a public website.[8] Health care providers or institutions could use performance data to identify areas for improvement and monitor the impact of changes over time.[9] For example, a hospital that sees that its emergency department wait times are worse than average might conduct an investigation to determine the reasons why, and change the nature of its relationships with other health care providers to improve patient flow. System-level decision makers can also use performance data to monitor the effects of policy changes, to inform resource allocation decisions and to identify individual health care providers or institutions in need of targeted support.

Public dissemination of accurate performance data leads to better accountability at all levels. This increased level of accountability is important, not only because the public has a right to know about the quality of publicly funded services, but also because public reporting has the potential to drive health care improvement.[10,11,12] Change occurs in complex ways (e.g., corrective interventions, incentive schemes, restructuring of expectations, internal pressures, peer learning), many of which can be influenced by performance measurement.[13]

Evidence for Performance Measurement and Public Reporting

A recent systematic review commissioned by the Agency for Healthcare Research and Quality, a government agency in the United States, examined performance measurement and public reporting to assess the evidence for any benefits and harms from this practice.[14] The authors of this comprehensive review of 198 separate studies from eight different countries concluded that public reporting of performance data leads to improvement.

Many observers worry about the unintended consequences of performance monitoring and public reporting.[15] Despite occasional examples where poorly thought out performance monitoring schemes have led to gaming[16] or possibly even harm,[17] the evidence from the systematic review indicates that unintended consequences are usually minor. The benefits of well-designed performance monitoring and public reporting systems therefore likely outweigh the risk of harm.

The evidence suggests that both individual clinicians and organizations respond to performance measurement and public reporting by making positive changes to their behaviours. Patients, however, have not generally used publicly reported performance data to choose their providers, although this may be changing with increasing access to online information.

Types of indicators

Given the complexity of health systems, designing and implementing a high quality performance monitoring and public reporting system is a challenging endeavour. For many important aspects of health care, there is simply insufficient data to assess performance.[18] For example, diagnostic error is a key patient safety concern, but most health care systems do not have the data required to systematically monitor performance in this area.[19] For this and other reasons, it would be premature to monitor and publicly report diagnostic error rates.[20] Nevertheless, we need to ensure we are not just monitoring aspects of care that can be easily measured but continually pushing ourselves to monitor what matters to patients.

One of the most common ways in which to categorize performance information is to separate indicators into three categories: structure, process or outcome.[21,22] For example, a hospital establishes an antimicrobial stewardship program (a structural indicator) that monitors the proportion of intensive care unit patients whose antibiotics are administered in adherence with program guidelines (a process indicator) and also monitors hospital-acquired *C. difficile* infection rates (an outcome indicator).

Whether performance monitoring should focus primarily on process indicators or outcome indicators remains a matter of some controversy. Some jurisdictions, such as the United Kingdom, are moving away from process to outcome indicators.[23] The main reason for preference for outcomes is their obvious importance to patients.[24,25] Patient-reported outcome measures (PROMs)[26] or patient-reported experience measures (PREMs) have matured and become well-understood over the past thirty years[27] and are thought by some to be the most powerful levers for performance improvement.[28] However, because so many different factors influence outcomes, including factors that are beyond the control of the health care provider, in some instances it is more appropriate to focus on process indicators rather than outcome indicators.

Indicators may also be presented as composite indicators, such as summary scoring systems that can then be used to compare and rank providers, institutions and systems, akin to letter grades on

report cards.[29] A Canadian example of composite indicators for performance measurement and reporting was the 2002 Maclean's Health Report that ranked fifty-four health regions using a composite indicator composed of weighted categories of outcomes, prenatal care, community health, elderly services, efficiencies and resources.[30] Although reader-friendly, composite indicators may be oversimplified, have a bias toward easily measured aspects or rely on controversial weighting techniques.[31]

Qualitative data can also be used to examine performance, particularly elements that may be overlooked in quantitative approaches.[32] Greater participation of stakeholders and richer detail can sometimes be found by gathering qualitative data through focus groups or interviews. Qualitative data can also be gathered through consultations with the public, providers and institutions, such as those undertaken by the New Brunswick Health Council in establishing its performance measurement systems. These consultations helped identify highly valued areas and ultimately contributed to the development of a set of indicators for assessment.[33]

Choosing the right indicators for performance monitoring

Given its potential to catalyze change, performance monitoring is becoming increasingly common. Patients themselves are increasingly rating physicians, on websites such as www.ratemds.com, though the quality and reliability of these ratings is limited. In the United States, the Centers for Medicare and Medicaid Services Physician Compare website[34] has begun to release data about how groups of physicians treat diabetes and heart disease. The United Kingdom NHS has a much more comprehensive provider-level public reporting tool through its Choices website that allows patients to compare surgeons and hospitals.[35]

It is worth noting that many indicators may be useful for monitoring local quality improvement initiatives but not for monitoring performance at a health system level. Decisions about whether to report performance at the individual provider or organization level must be made even more carefully, since differences in apparent performance may be explained by various factors, such as patient complexity or data quality, rather than differences in true performance. Attributing poor performance incorrectly would obviously be counterproductive to the aims of performance measurement.[36] As others have said, "it is in everyone's interest that (government, managers, providers and the public) can have confidence in the performance monitoring process, and find the conclusions from it convincing."[37]

Our Strategy

Partnerships and external engagement

Health Quality Ontario believes in strong, collaborative and mutually beneficial relationships and will continue to partner with other reporting agencies and health system partners to strengthen performance monitoring in Ontario. Rather than duplicate work, the various organizations interested in monitoring the performance of various aspects of the health care system can work together to produce a clearer, shared understanding of health system performance, based on sound analyses and robust information.

As part of a group of committees reporting to an HQO Provincial Partnership Table, the new Health System Performance Monitoring and Reporting Advisory Committee will facilitate collaboration and alignment of expertise related to performance monitoring and reporting. This will result in greater sharing and consistency across the system and encourage the use of data to inform decision-making and reporting. The committee will include representatives from provincial and national health care organizations, Local Health Integration Networks, as well as individual members with academic expertise in the area of performance monitoring and public reporting and individual patients and caregivers .The work of the committee will inform and be aligned with the work of HQO's existing sector advisory panels for primary care, home care, long-term care and patient safety in acute care.

We will also increasingly engage with clinicians, not only through their representative organizations but also in a variety of other ways.

Patient, caregiver and public engagement

HQO is also committed to engaging patients, caregivers and the public as valuable contributors to its work, and sees a meaningful role for them in strengthening performance monitoring and reporting. Health system users bring useful information, perspectives, experiences and insights that cannot be obtained elsewhere. An understanding of the benefits of engaging patients, caregivers and the public in appropriate ways for clearly stated purposes is emerging, including for approaches to measurement.[38] The goals of this engagement are chiefly to improve health care experiences, the quality of care and services, and to make the health care system more responsive. HQO is developing a comprehensive strategy to strengthen patient engagement within the organization and throughout the health care system. From a performance monitoring and public reporting perspective, the overarching goal of engaging with patients, caregivers and the public is to ensure that we are monitoring what matters.

Performance measurement framework

Frameworks help focus measurement on the key aspects and objectives of a high performing health system. Other jurisdictions, such as the United Kingdom, have defined such frameworks and used them to identify overarching indicators and areas for improvement. The Canadian Institute for Health Information (CIHI) has developed an excellent framework for monitoring health system performance (See Figure 1).[39]

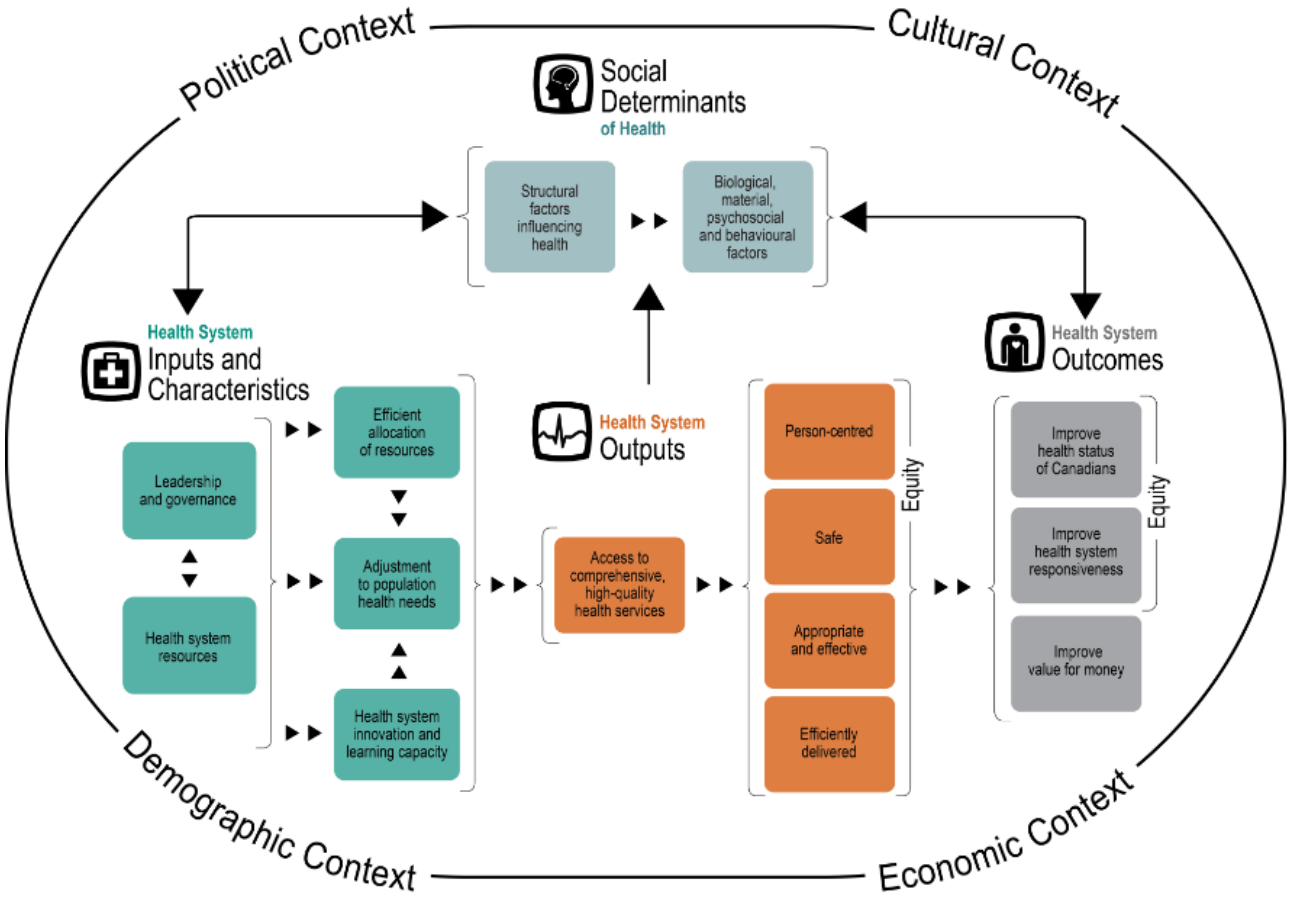


Figure 1. CIHI's health system performance measurement framework

HQO, in collaboration with health system partners, has developed an initial set of Common Quality Agenda (CQA) set of indicators to help focus the system on key priorities. The CQA is organized by sector (e.g., hospitals, long-term care, primary care, etc.) and includes cross-cutting indicators that reflect how well the various sectors work together. The included indicators will evolve over time, in a manner dependent on a number of factors including data availability and current system priorities. In addition to covering all sectors, they will also cover the nine attributes of a high-performing health system – i.e., one that is: accessible, effective, safe, patient-centred, equitable, efficient, appropriately resourced, integrated and focused on population health. Over time, we also anticipate an increased focused on indicators related to patient experience. The CQA set of indicators will be useable for a number of different but related purposes: monitoring and public reporting, accountability, quality improvement and monitoring for evidence uptake. The CQA set of indicators will be continually refined by HQO in partnership with system stakeholders, health care providers and patients.

Analyzing and presenting data

Understanding our collective performance

HQO is committed to providing patients, the public and health care providers with easily accessible, high quality performance data, as close to real-time as possible. Although focused, in-depth information is sometimes needed in our reporting, HQO will seek to maintain an "all-audience" approach by providing summaries tailored to a public audience. More detailed data directed to a provider audience could be contained in the report body or technical appendix.

We are also committed to analyzing and interpreting the data in a manner that will allow for comparisons over time and across regions. Ontarians deserve to know the answers to questions such as: Are Ontarians becoming healthier? Is out health care system improving? How does our health care system compare to health care systems in other provinces and other countries? How variable is health care within Ontario? Do people have equitable access to high-quality health care? Are we meeting targets set by government, external experts and patients? Are particular providers providing especially high or low quality care? Is the experience of care improving from the patient's perspective?

Identifying especially good or poor quality care

Data points that fall at extreme low or high levels of a sample are frequently termed "outliers."[40,41,42,43,44,45,46,47] Outlier data points may indicate exceptionally positive or negative performance, but may also indicate errors in measurement or other methodological problems.[48,49]

HQO believes that the identification of outliers is an important component of health system monitoring and reporting. This type of analysis can help determine measurement challenges and unusual variation in performance in a particular health metric. Variation is not inherently bad and in some cases can indicate that a system is responsive to varying patient needs and preferences.[50] Outlier identification can also help highlight true successes and underperformance. The recent controversy related to unacceptably high mortality and mismanagement at the Mid Staffordshire NHS Foundation Trust in the United Kingdom highlights the risks of not identifying outliers and intervening accordingly.[51]

Three jurisdictions have helped inform our approach to the treatment of outliers: the United Kingdom, Australia, and the United States. In the United Kingdom there has been a recent shift to a more public-friendly approach to presenting performance indicators. Indicators are aligned into clinical categories (i.e., cancer, children's health, mental health, primary care) allowing for comparisons across regions, hospitals or practices. The National Cancer Intelligence Network, a United Kingdom-wide partnership operated by Public Health England, employs funnel plots to assess potential outliers;[52] observations above or below the 99.8 percent funnel bands (or approximately three standard deviations) are classified as outliers.[53] Likewise, indicators under the children's health group are classified in a similar manner.[54] Transparency is one advantage of the funnel plot. If risk adjustment has been successful, outliers are readily apparent from examining the graph itself.[55,56,57] Guidance in detecting and managing outliers is provided through the National Clinical Audit Advisory Group.[58]

The National Health Performance Authority, an independent agency in Australia reports primarily through two websites: MyHealthyCommunities and MyHospitals. Outliers are depicted by line dot-plots, each dot representing an institution, proportional in size to its volume.[59] This representation of data displays variation, and the presence of outliers, without explicitly singling out individual facilities.

Two organizations that attempt to quantify health performance in the United States are the Veterans Health Administration in the U.S. Department of Veterans Affairs[60] and the

Commonwealth Fund, a private foundation.[61] The Veterans Health Administration Hospital Report Card ranks hospitals from highest to lowest (i.e., 100-0) in a league table format, based on a basket of indicators without flagging exceptional performers. The Commonwealth Fund compares performance indicators from local areas all across the United States using a colour-coded matrix table to delineate the different quartiles from one another. The top 90th percentile and the bottom 10th percentile are noted as well.

Any future outlier identification contained in HQO reports will be informed by the above examples and other best practices. The NHS experience, in particular, demonstrates the need to ensure that any outlier reporting is supported by rigorous data analysis standards. It is clear that outlier reporting is an important area of focus to reward organizations striving to improve quality and shines a spotlight on best practices, from which others can learn. On the other side of the performance spectrum, organizations that are underperforming relative to their peers may not have sufficient information to determine this themselves. Notifying them of their relative performance can help identify areas for improvement to providers and management. HQO is especially well positioned to provide targeted support through its quality improvement role.

Increased stratification could further indicate an organization's performance relative to its peers, by categorizing into such groupings as high performing, performing, and under-performing.[62] Sustained trends and early "shifts" in performance over time could also be presented.[63]

Comparisons with other jurisdictions will be expanded to provide readers with information on performance relative to other regions, provinces and countries. International comparisons are seen as especially important in areas of care where Canadian performance currently lags behind the performance of its peers.

Comparisons against targets, standards and benchmarks

The words "target," "standard" and "benchmark" are often used interchangeably, even though they have different meanings in the quality improvement and performance measurement fields. A "target" is a measurable value of desired performance, and may be set by health care providers themselves (e.g., as quality improvement goals) or by external organizations (e.g., for performance measurement, accountability or funding). A "standard" typically represents a minimum value or range of acceptable performance, and is usually set by a funder or regulator. A "benchmark" is a marker of excellence, and is typically determined by examining performance across a range of organizations.

Where there are widely accepted targets or standards (e.g., a wait time for a particular health service), we will monitor performance against those targets, at the provincial level and also at the regional level or the provider level, if appropriate. For some process or outcome indicators, natural targets exist (e.g., the target rate for wrong site surgery is zero). However, for many other indicators, there are no natural targets or government set targets. For example, the optimal rate of falls in a long-term care home is unclear. A long-term care home where no patients ever fall may not be allowing its residents sufficient freedom of movement. For indicators such as these, setting a range of acceptable performance may be most appropriate. A "balanced" interpretation can also be encouraged, so performance on one indicator can be assessed against another related indicator, such as the use of restraints rate versus a resident fall rate.

Benchmarks are different than targets.[64] Benchmarks are based on recent performance of best-in-class organizations and are typically used to give insight into how peers are performing. For some

indicators (such as those reported by HQO in long-term care), HQO has led processes to establish benchmarks, which can then serve as aspirational goals for providers.

It should be noted that the word “target” is often used differently in the quality improvement context. In this context, targets are useful in encouraging “stretch goals” for providers and organizations to reach for. However, these targets are typically set internally, and the expectation is that many targets will not be met, at least not in the short term. (If all quality improvement targets were met, then targets would likely have been set too modestly.)

There are instances when targets may be useful in guiding change and quality improvement for publicly reported indicators, as well. Identifying priority indicators and aspirational targets is an important component of HQO’s Common Quality Agenda initiative. In this case, target setting will be approached carefully, from a system perspective and in partnership with health care providers and patients, and will take into account known and emerging knowledge about sources of performance variation.[65]

There are, however, potential risks to using targets to motivate change. Aside from concerns related to linking targets with financial incentives, an overemphasis on targets may replace professional altruism, induce gaming behaviour, or result in target fatigue.[66,67]

HQO will be mindful of these considerations in identifying additional areas for target setting in our reporting and support for quality improvement activities. We will, in the next 12 months, develop a process that we, and others in Ontario, can use to set targets. In many cases this may involve a range, against which we would compare provider performance in our reporting.

Indicator selection

Indicator catalogue

A single library of indicator definitions can assist in organizing information and making it readily available to users and the public. CIHI has shown significant leadership in establishing such a library.[68] HQO sees value in this approach and will, in the next 12 months, develop a publicly available catalogue of health system indicators used for our performance monitoring and reporting. One of the primary reasons to develop this catalogue is to force us to be fully transparent about our methods. We will be able to better communicate decisions on why we do or do not report certain indicators, as well as provide clear definitions to interested health care providers and the public. In many instances, of course, the HQO indicator library will simply make clear that we have defined an indicator using the same definition as CIHI.

The catalogue would include those indicators we report, as well as those that we have considered and decided not to report. In time, we may also include indicators that are primarily suitable for quality improvement rather than public reporting. The catalogue could also include composite indicators that measure quality on multiple dimensions, indicators not currently measured or lacking a current data source, or indicators in need of further review.

An intake process will be defined and published for new indicators, including those suggested by the public. Criteria are being developed to ensure that proposed indicators meet standards for data quality, statistical rigour and importance.[69] In particular, we want to include indicators that matter most to patients, such as those related to the experience of care.

Wherever possible, indicators would be aligned with those used by other reporting agencies in Ontario, across Canada and internationally. This would help to ensure agreement on key metrics of quality and enables intra- and inter-jurisdictional comparison and benchmarking. This consensus could be reached at the Health System Monitoring and Reporting Advisory Committee and other similar venues.

Reporting vehicles

HQO will use a variety of vehicles to report to the public, including a yearly report, online reporting and theme reports. In addition, we will provide tailored feedback to individual providers to stimulate quality improvement by distributing reports confidentially to health care providers or by supporting the distribution of such reports by our partners. New communications activities will also be developed to promote broader awareness of HQO and of our monitoring and reporting activities, and to highlight key findings of our reporting to the public.

Yearly report

HQO will continue to submit a yearly report to the Minister of Health and Long-Term Care in accordance with the *Excellent Care for All Act*. This report will monitor the health status of Ontarians and the overall performance of the health care system, and will also identify key areas for improvement. The yearly report will use the CQA set of indicators, identified collaboratively with health system partners (as described in the performance measurement framework section). Version 1.0 of this indicator set was publicly released in late 2013. While the indicator set will be modified substantially over the next few years, we anticipate it will become a stable set of indicators, with only a small number of indicators added or removed each year. Comparisons to established targets, as well as national and international benchmarks will be made. The report will also include a section to identify limitations related to the nature of the available data. Together, the CQA and yearly report will provide a flagship product for HQO and inform other work within the organization. Key themes and areas for improvement identified through the report can inform other reporting priorities, opportunities for evidence reviews and quality improvement efforts.

Theme reports

A new series of reports will explore key issues related to health system performance in Ontario. A more in-depth approach will be taken to focusing on a system challenge, describing current performance and providing guidance for improvement. We anticipate that over time we will reach a steady state of eight to 10 releases every year to focus attention on key aspects of the health system. A more frequent publishing schedule will also increase HQO's presence in public reporting, increase media exposure and build HQO's reputation as a trusted resource for health system performance monitoring and reporting in Ontario.

We envision that these reports could be sector-specific, focused on a specific population or illness, analyze gaps in care, or address cross-cutting themes that move us toward an integrated system. An open process will be designed for determining topics that would encourage various audiences outside of HQO to submit topics, including the provider community and the public. HQO would engage researchers, patients and caregivers, stakeholder organizations, and front-line clinicians to assist in evaluating these topics for reporting, based on known priority issues and identified gaps in reporting. We will also strive to align report topics with Ontario priorities for quality improvement, as

well as the publication of new evidence and guidance, with a particular focus on the work of HQO's Evidence Development and Standards branch.

HQO will also ensure flexibility to be able to respond to special requests from the Minister of Health and Long-Term Care; a ministerial prerogative set out in the *Excellent Care for All Act,* 2010*.* A recent report from Alberta, focused on continuity of care, provides one such model for this kind of report.[70]

We aim to produce most theme reports in partnership with other health care system stakeholders. Monitoring performance and reporting in collaboration with other organizations will strengthen analysis, interpretation, and improve impact and uptake, and reduce the burden of data collection for the field. Of course, such partnerships would need to be developed in a manner that preserves our ability to monitor performance independently.

Each report could identify and report indicators, analyze trending over time, compare performance to other jurisdictions and identify targets for performance. In some cases, the reports could be very brief and only contain a few select indicators. Greater reliance on qualitative measurement will also be explored, in partnership with the research community. All indicators contained in these reports would be selected with the assistance of external advisors. This selection process would account for sector and system measurement frameworks, as well as the CQA and HQO's dimensions of quality. Furthermore, certain indicators might be identified as key indicators that could be included in other HQO reports, such as the yearly report or online reporting, to track ongoing performance.

As in the yearly report, it is also expected that recommendations for higher quality data will be a component of each theme report.

Online reporting

Online reporting is an effective mechanism for reaching wide and varied audiences, and also a cost-effective way to provide more detailed data to the public, patients and caregivers, and health care providers. HQO has been a national leader in providing health care performance data online, and we intend to build on this success. In particular, we want to make sure that our website is easy to navigate and provides information for all potential audiences.

Whenever possible, and supported by strong methodology, our reporting will name provider organizations and be at a sufficiently granular level to focus quality improvement, as exemplified by cardiac surgery outcome reporting by the Cardiac Care Network of Ontario.[71] Reporting will follow the guidance outlined above, regarding effectively presenting data, providing comparisons to peers, targets and benchmarks, and outlier identification. Wherever possible, links will be made to other aspects of our performance monitoring (e.g., relevant theme reports), available evidence and quality improvement guidance.

Over the next two years, our online reporting will become more integrated. While continuing to report most of the data we currently report, we will also include more data about the sectors we have not traditionally covered online, including primary care and a broader array of indicators related to hospital care. The site will also become much more engaging and interactive.

Figure 2 illustrates how the HQO indicator catalogue will contain indicators used for in-depth online reporting, and the more selective yearly report based on the CQA. Theme reports would include select indicators from these three sources, as relevant to the topic. This dynamic system will

incorporate external indicators over time, as well as those that are reported and retired. Where possible, HQO indicators would be aligned with indicators reported by other organization

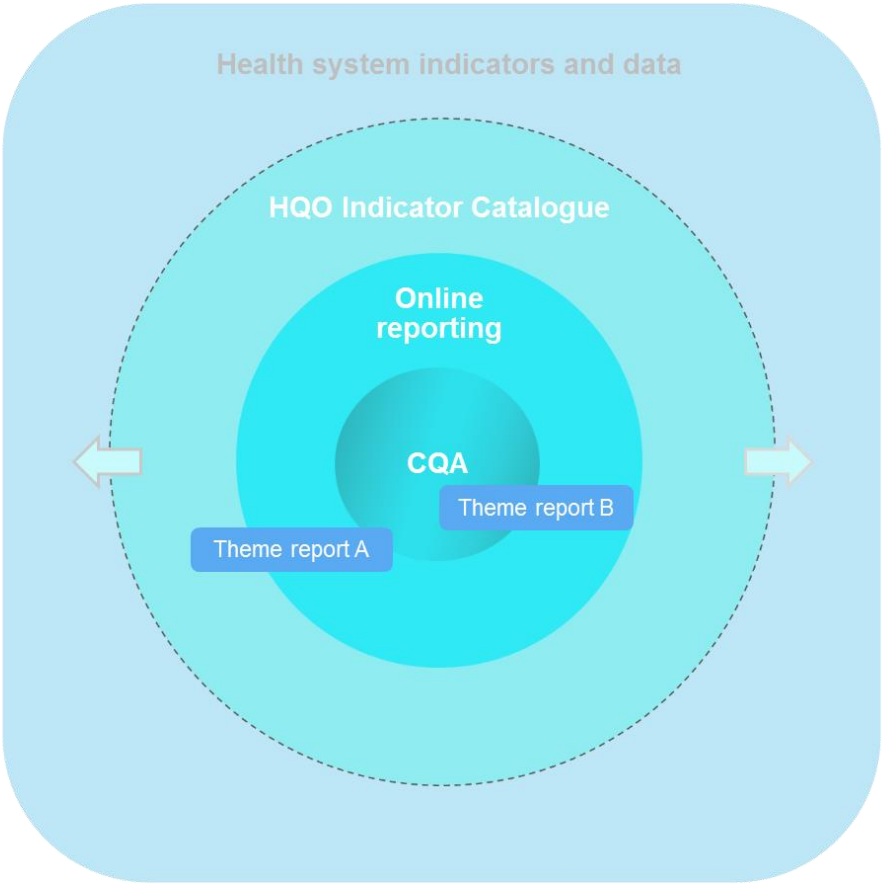
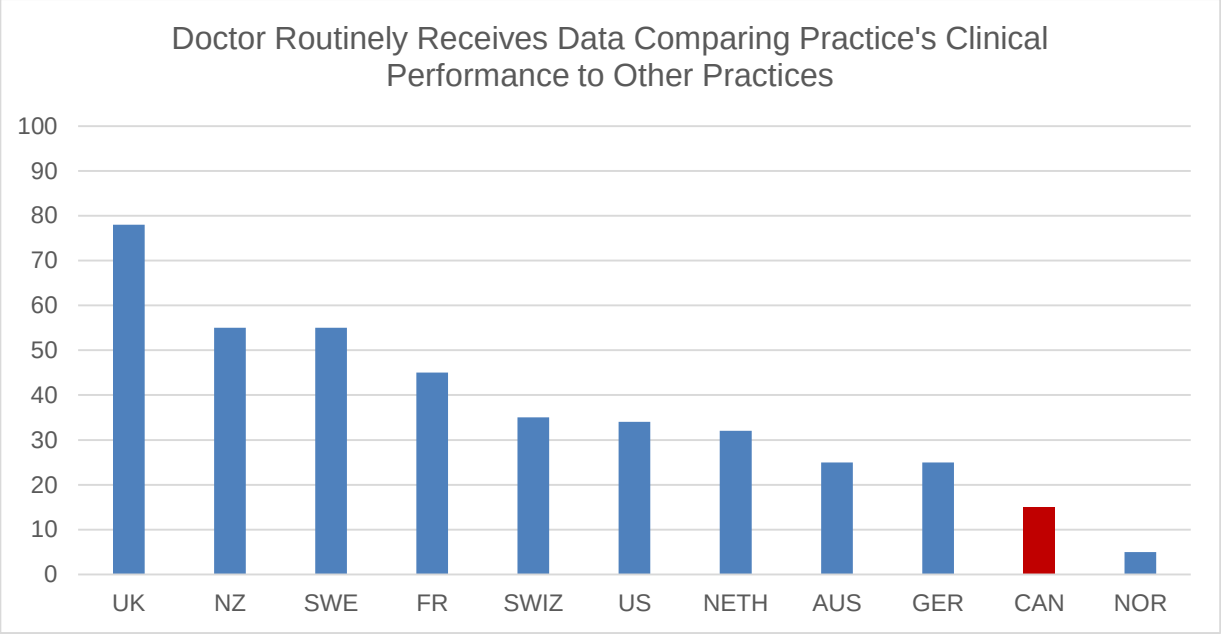


Figure 2: Indicator environment – nested reporting.

Personalized reporting

There is a wealth of health system data in Canada and in Ontario, yet we lag other jurisdictions in providing health care providers with meaningful information about their own practice. A recent Commonwealth Fund survey found that only 15 percent of Canadian primary care physicians routinely receive data comparing their practice's performance to others. Figure 3 shows the extent to which Canada lags internationally, using primary care physicians as an example.



Source: 2012 Commonwealth Fund International Health Policy Survey of Primary Care Physicians

Figure 3: International comparison of provider-directed performance data

This information can help providers assess their performance relative to peers, encourage quality improvement and peer learning. Indeed, evidence suggests that improvement is most likely to occur when performance measurement is targeted at providers themselves.[72] Furthermore, recent evidence indicates that performance information can be much more motivating than financial incentives.[73]

This information does not have to be publicly reported to drive change. In fact, many indicators are not ready to be publicly reported (e.g., due to concerns about the completeness of data, the inability to adequately adjust for differences in patient populations, etc.). In addition to being a lever to drive change, personalized reporting can also be a vehicle for testing and refining new indicators that may be useful to practitioners in leading early change, but not are yet suitable for drawing conclusions about performance between groups.

HQO will be more active in personalized reporting by:

- Engaging providers to determine what reports would be helpful to their practice and how information could be presented in meaningful and actionable ways;
- Providing data, such as through the Primary Care Practice Reports,[74] or supporting others in providing such data;
- Linking high and low performers to encourage learning and quality improvement;
- Developing standards and guidelines to support other organizations or agencies that wish to do similar work;
- Helping providers identify local indicators to complement provincially reported ones;
- Developing tools, such as scorecards that address performance in key clinical areas;
- Advocating for improved information sharing with providers, the development of data sources, and leveraging innovative peer review/audit information platforms;
- Exploring opportunities to act as a central hub for multi-facility quality improvement monitoring collaboratives, and encouraging participation in existing initiatives such as the

American College of Surgeon's National Surgery Quality Improvement Program (ACS NSQIP); and

Data sources

HQO's ability to monitor and publicly report on the performance of Ontario's health care system, as well as the health status of Ontarians, is highly dependent on the quality and quantity of data available to HQO.

Table 1 identifies most of the primary data sources used in our work

Databases/data sources used historically & presently by HQO	Data provider	Sectors
Active Physician Registry	Ontario Physician Human Resources Data Center	PC
BORN Information System	BORN Ontario	PC,AC
Canadian Community Health Survey	Institute for Clinical Evaluative Sciences	PC,LTC,general
Cardiac Care Network Cardiac Registry	Cardiac Care Network	AC
Client Agency Program Enrolment database	Institute for Clinical Evaluative Sciences	PC
Client and Caregiver Experience Evaluation Survey	Ontario Association of Community Care Access Centres	HC
Client Profile Database	Ministry of Health and Long-Term Care	HC,LTC,AC
College of Nurses of Ontario	College of Nurses of Ontario	PC,general
Commonwealth Fund International Health Policy Survey	Commonwealth Fund	PC,AC,LTC,HC
Continuing Care Reporting System	Canadian Institute for Health Information*	AC,HC,LTC
Corporate Providers Database	Ministry of Health and Long-Term Care	PC,general
Critical Care Information System	Ministry of Health and Long-Term Care	AC
Cytobase	Cancer Care Ontario	PC
Discharge Abstract Database	Institute for Clinical Evaluative Sciences (ICES), Cancer Care Ontario (CCO), Ministry of Health and Long-Term Care, Canadian Institute for Health Information*	PC,AC,LTC,HC
HIMSS Analytics	Ontario Hospital Association	PC
Home Care Database	Institute for Clinical Evaluative Sciences, Ministry of Health and Long-Term Care	HC
Home Care Reporting System	Canadian Institute for Health Information*	HC
Immunization Records Information System	Public Health Ontario	PC
Integrated Client Management System	Cancer Care Ontario	PC
Laboratory Reporting Tool	Cancer Care Ontario	PC
National Ambulatory Care Reporting System Database	Institute for Clinical Evaluative Sciences, Ministry of Health and Long-Term Care, Canadian Institute for Health Information*	PC,AC,LTC,HC
NRC-Picker patient satisfaction survey	Ontario Hospital Association	AC
Ontario Breast Screening Program	Cancer Care Ontario	PC
Ontario Cancer Registry	Cancer Care Ontario	PC,AC
Ontario Diabetes Database	Institute for Clinical Evaluative Sciences	PC,AC
Ontario Drug Benefits Database	Institute for Clinical Evaluative Sciences	PC,LTC
Ontario Health Insurance Plan Claims Database	Ministry of Health and Long-Term Care, Institute for Clinical Evaluative Sciences	PC,AC,LTC,HC

Ontario Healthcare Financial & Statistical Data Warehouse	Ministry of Health and Long-Term Care	PC
Ontario Mental Health Reporting System	Institute for Clinical Evaluative Sciences, Canadian Institute for Health Information	PC,AC
Ontario Stroke Audit	Institute for Clinical Evaluative Sciences	AC
Pathology Information Management System	Cancer Care Ontario	PC
Resident Assessment Instrument-Home Care	Ontario Association of Community Care Access Centres	HC
Resident Assessment Instrument – Minimum Data Set 2.0	Institute for Clinical Evaluative Sciences	LTC
Registered Persons Database	Institute for Clinical Evaluative Sciences	PC,AC,LTC,HC
Self-Reporting Initiative	Ministry of Health and Long-Term Care	AC
Surgical Efficiency Targets Program	Ministry of Health and Long-Term Care	AC
Vital Statistics	Statistics Canada, Ministry of Health and Long-Term Care	PC,general
Wait Time Information System	Cancer Care Ontario	AC
Web-Enabled Reporting System	Ministry of Health and Long-Term Care	AC
WSIB Enterprise Information Warehouse	Workplace Safety and Insurance Board	PC,AC,LTC,HC

*data collector/primary holder. AC: acute care, HC: home care, LTC: long-term care, PC: primary care.
Note: not all data sources cover all patients or providers within a sector.

Table 1. HQO data sources

Ontario is data rich and compares favourably with many jurisdictions in the collection and availability of health information.[75,76] Nevertheless, the data sources available in Ontario do not provide a comprehensive picture of the health system and, in some cases, the availability of data lags other jurisdictions. In the United Kingdom, for example, the NHS is able to extract primary care data from electronic medical records into a central data repository. This data is made available to approved individuals and organizations that can demonstrate benefit to patient care and support of the NHS. It is expected that this rich data will enhance research, reporting and quality improvement in the primary care sector.[77] Some researchers and organizations have taken steps to gather similar data in Ontario, though these efforts have to date been limited to either certain providers (e.g., in primary care) or specific clinical areas (e.g., cardiac surgery). Comprehensive data in certain sectors, such as primary care and community care, is still not available in Ontario.

Sweden provides another example of a rich, health outcome-focused, data environment through widespread funding and adoption of disease registries. A world leader, there are almost 90 government-supported clinical registries in Sweden. Use is high and funding continues to dramatically increase due to their perceived benefit to research and care. The national cataract registry, for instance, has information on 95.6 percent of all cataract removals since 1992.[78]

The ACS NSQIP collects clinical data from patient records to allow participating hospitals (including a very small number of Ontario hospitals) to measure and improve the quality and complication rates of surgical care. Data is risk-adjusted, outcomes-based and can be benchmarked. Participating hospitals can assess their performance and monitor their quality improvement interventions with data.[79] Ontario's Cardiac Care Network also publicly reports hospital-level performance on post-operative mortality rates for a number of cardiac procedures.[80]

Administrative data can be useful for public reporting, particularly for service volume indicators. However, data from clinical, rather than administrative sources can have a number of general advantages, including being more directly reflective of patient care, timelier, more readily benchmarked, and more supportive of quality improvement at the individual provider. Data collection can also be more easily incorporated into provider workflow and record systems, and

data submission can be overseen by those focused on education and quality improvement, rather than funding.[81] That kind of oversight can also encourage collaboration between public reporting programs and providers to ensure standardization, promote quality improvement, and to aid with assessing impact.[82]

Our role in improving the quality of data in Ontario

HQO is not currently permitted to hold the identifiable personal health information required to maintain such registries, but we do intend to support and partner with health system partners that can hold this data to better measure the performance of our health system. We will play a larger role in building on the strengths of available data and emphasizing the importance of health outcome data. We will advocate for stronger, timely data and the coordination of the collection and use of information among health system partners. Where appropriate, HQO will advocate for the collection of new data sets and modification of existing ones. Regarding specific indicators, HQO will use the indicator vetting process (described in the indicator catalogue section) to identify indicators that would improve health system monitoring, but currently lack a high quality, standardized data source. If the benefit of collecting that information outweighs the harms (e.g., data collection burden), HQO will work with others to support and develop data collection systems.

There are other forms of data that are not personal health information that we may also begin to collect. For example, we could survey health care providers, at either the individual or institutional level, to gain information about the structures and processes that are associated with high quality care.

Within the next 12 months, HQO will produce a white paper that articulates current and near-term data arrangements, as well as a longer-term vision for improving access to information on the performance of Ontario's health system. An important guiding principle is that any new data collection must improve practice and patient care, while limiting the burden of data collection to providing organizations, and front-line care providers. Data quality will also be addressed, and HQO will advocate for stronger relationships with audit and inspection agencies in the health system that are enabled under the *Personal Health Information Protection Act,* 2004.

Linkages to Quality Improvement and Evidence Development and Standards

The impact of our performance monitoring and reporting can be increased by links to the other mandated areas of HQO; namely evidence development and quality improvement, as well as to our role as the province's chief advisor on quality. HQO is uniquely positioned to leverage and strengthen these linkages in implementing this strategy and providing leadership to improve the quality of health care in Ontario.

HQO will work to strengthen the ties between monitoring performance at the system-level and also providing useful information to individual providers. Emphasis will be placed on processes and outcomes that are most amenable to change. For example, a commonly reported primary care indicator is the proportion of patients seen in the community within seven days of discharge from a

hospital. Reporting this data retrospectively may help assess system performance, but does little to help individual providers that do not have access to data to track in real-time. A primary care clinic may not know when patients are admitted or discharged from hospital, may be too overwhelmed with complex discharge summaries to track real-time performance, or may not know that the patient sought care elsewhere after being discharged. For these reasons, it may be more meaningful for clinics to track performance on associated indicators to post-discharge follow-up, such as access indicators like third-next available appointment, proportion of calls answered at the office, or indicators of patient-centredness to encourage ongoing contact between the patient and provider. This stronger alignment between system indicators and quality improvement indicators, as illustrated in Figure 4, will assist health providers and organization in developing their Quality Improvement Plans and meeting system goals.[83]

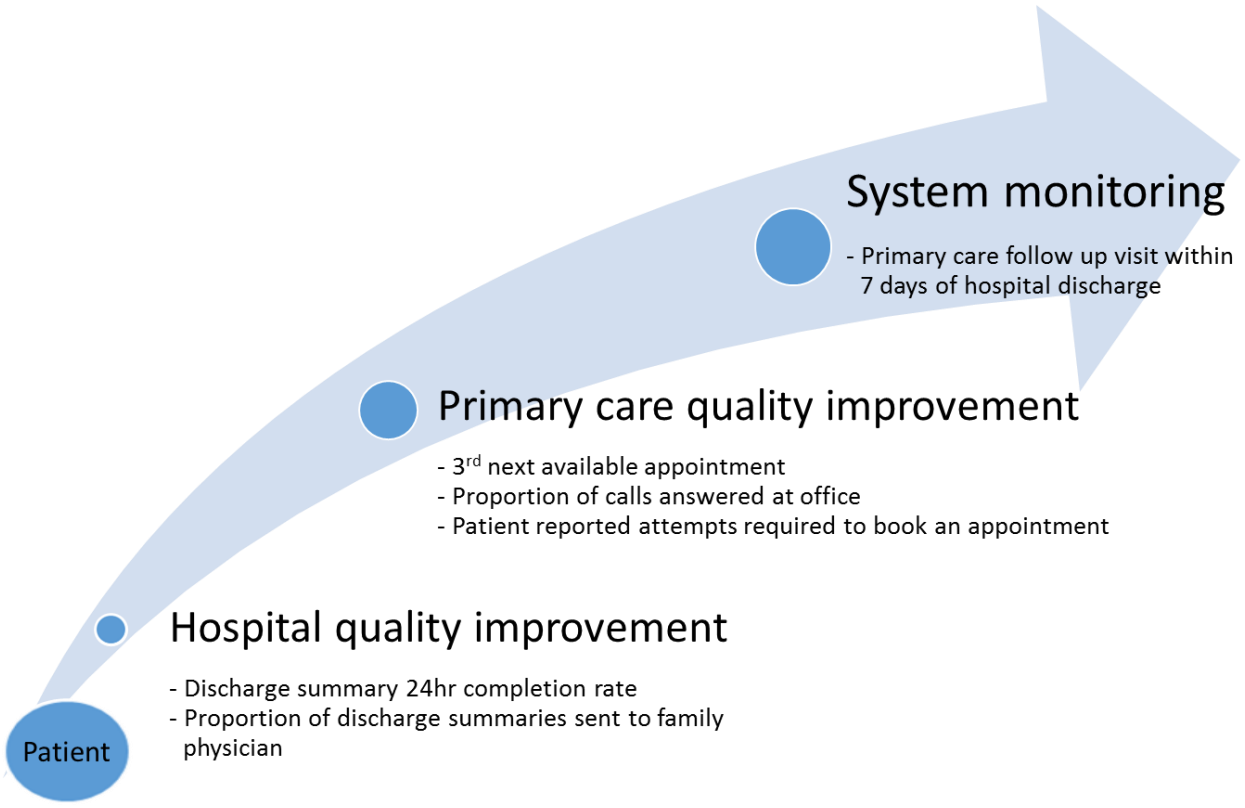


Figure 4: Indicator cascade – from quality improvement to public reporting.

As we strengthen personalized reporting to individual providers, HQO will also work to ensure that the information provided remains meaningful, is actionable and supports quality improvement efforts over time. Quality improvement support will promote the uptake of this reporting, as well as build on lessons from the work of other health system partners in this field.[84]

HQO's Evidence Development and Standards branch works with clinical experts, scientific collaborators, and field evaluation partners to assess the evidence of effectiveness, cost-effectiveness, and safety of health interventions; and to formulate evidence-based recommendations, guidelines and standards. This work will continue to inform performance monitoring and reporting through the indicators we report and the themes we select for special reports. One aspect of health system performance that we will continue to monitor is the rate at which new evidence and guidance is taken up by the health care system. HQO publishes an

annual report that monitors the use and uptake of Ontario Health Technology Advisory Committee (OHTAC) recommended health interventions and technologies since 2003. This report provides one method of determining regional variations in access to evidence-based health care.

Concluding remarks

This strategy has described HQO's future plans to monitor and publicly report on the health status of Ontarians and the performance of the health care system in Ontario. HQO is committed to working towards a high performing health system that provides excellent care for all Ontarians and believes that performance monitoring and public reporting is an important element of the quality agenda. We look forward to implementing this direction and will continue to engage those who work in health care, patients and caregivers and the wider public.

Glossary

Baseline
The status of performance before an intervention or ongoing measurement, against which progress can be assessed or comparisons made.

Benchmark
A reference point against which performance can be assessed; Benchmarks are typically based on recent or inferred performance by a group of comparable organizations.

Box plot
A method of graphically representing data in quartiles, or four equal groups of the data; Box plots may include vertical lines (or “whiskers”) that indicate variability beyond quartiles.

Confidence interval
Shows the amount of uncertainty in measurement by giving a range of results from the study that is likely to include the “true” value. The confidence interval (CI) is usually stated as “95% CI,” which means that the range of values have a 95 in 100 chance of including the “true” value.

Effectiveness
Relates to providing care processes and achieving outcomes, as supported by scientific evidence.

Efficiency
Relates to avoiding waste, including waste of equipment, supplies, ideas and energy.

Equity
Relates to providing care that does not vary in quality because of personal characteristics such as gender, ethnicity, geographic location and socioeconomic status.

Funnel plots
A graphical depiction of data where each point represents a study, indicative of study size. These plots can be used to detect bias – a symmetric funnel indicates a relationship between effect and study size.

Impact monitoring
Measurement of performance or care outcomes, following a program or care intervention.

Indicator
A quantitative or qualitative variable that provides a valid and reliable way to measure achievement, assess performance, or reflect changes connected to an intervention. Indicators can assign a quantity to an attribute and detect error or variation in performance.

Monitoring
Routine tracking and reporting of priority information about a program, project, or activity, its inputs and intended outputs, outcomes and impacts.

Outcome
The change in a patient’s health state resulting from a care intervention, regardless of whether the intervention was intended to change that health state.

Outlier

A value that "lies outside" (is much smaller or larger than) most of the other values in a set of data.

Patient engagement
In system planning and reporting, patient engagement is carried out by collaborating with patients (and caregivers) to ensure their voices and perspectives are represented, and information meaningful to their care decisions is provided.

Performance
The degree to which an intervention or organization operates according to specific criteria, standards, or guidelines or to which it achieves results in accordance with stated goals or plans.

Process
A health care-related activity performed for, on behalf of, or by, a patient.

Public reporting
Efforts to provide the public with information that allows rating or comparison of areas, groups, or individual providers according to standards of quality, patient experience or resource use.

Qualitative data
Data collected using qualitative methods, such as interviews, focus groups, observation, and key informant interviews. Qualitative data can provide an understanding of social situations and interaction, as well as people's values, perceptions, motivations and reactions. Qualitative data is generally expressed in narrative form, pictures or objects (i.e., not numerically).

Quantitative data
Data collected using quantitative methods, such as surveys or through administrative data. Quantitative data is measured on a numerical scale, can be analyzed using statistical methods, and can be displayed using tables, charts, histograms and graphs.

Scatter plot
A graph in which the values of two variables are plotted along two axes; the pattern of the resulting points in the plot reveal any correlation between the variables.

Sentinel surveillance
Ongoing, systematic collection and analysis of data from certain sites (e.g., based on location, focus, population served) selected for their potential to provide an early indication of change.

Standard
A value or range of acceptable performance defined by a provider, between peers, or, typically, by an external authority.

Target
The objective a program or intervention is working towards, expressed as a measurable value; the desired value for an indicator at a particular point in time.

Validity
The extent to which a measurement or test accurately measures what is intended to be measured.

References

1. Health Quality Ontario. Yearly reports [page on the Internet]. Toronto; 2014. Available from http://www.hqontario.ca/public-reporting/yearly-reports.

2. Smith P, Mossialos E, Papanicolas I, Leatherman S. Performance Measurement for Health System Improvement. Cambridge: Cambridge University Press; 2009.

3. Institute of Medicine. Crossing the quality chasm: a new health system for the 21st century. Washington, DC: Institute of Medicine of the National Academies, Committee on Quality of Health Care in America; 2001.

4. University of British Columbia Centre for Health Services Policy Research [Internet]. Vancouver (BC): Peckham, S. Approaches to Accountability: indicators across different sectors; 2014 February 25. Available from: http://www.chspr.ubc.ca/sites/default/files/file_upload/hpc/2014/Stephen%20Peckham%20Slides%20-%20CHSPR2014.pdf.

5. State of New South Wales. Special Commission of Inquiry. Final Report of the Special Commission of Inquiry: Acute Care in NSW Public Hospitals – Volume 2. New South Wales; 2008.

6. United Kingdom. The Mid Staffordshire NHS Foundation Trust Public Inquiry. Chairman's Statement. [Internet]. London. 2013. Available from: http://www.midstaffspublicinquiry.com/sites/default/files/report/Chairman%27s%20statement.pdf.

7. Marshall MN, Shekelle, PG, Leatherman S, Brook RH. The public release of performance data. JAMA. 2008; *283*: 1866-1874.

8. Berwick DM, James B, Coye MJ. Connections between quality measurement and improvement. Medical Care. 2003; 41(Supplement 1):I30-38.

9. Hibbard JH, Stockard J, Tusler M. Does publicizing hospital performance stimulate quality improvement efforts? Health Affairs. 2003; 22(2):84-94.

10. Bevan G, Hood C. Have targets improved performance in the English NHS? British Medical Journal. 2006; 332:419-422.

11. Morris K., Zelmer J. Public reporting of performance measures in health care. 2005. Canadian Policy Research Networks. 2005 February.

12. US Agency for Healthcare Research and Quality. Public Reporting as a Quality Improvement Strategy. Closing the Quality Gap: Revisiting the State of the Science. Evidence Report No. 208. Maryland (USA); 2012.

13. Contandriopoulos D, Champagne F, Denis JL. The Multiple Causal Pathways between Performance Measures' Use and Effects. Medical Care Research and Review. 2014; 71(1):3-20.

14. US Agency for Healthcare Research and Quality. Public Reporting as a Quality Improvement Strategy. Closing the Quality Gap: Revisiting the State of the Science. Evidence Report No. 208. Maryland (USA); 2012.

15. Royal Statistical Society. Performance Indicators: Good, Bad, Ugly. Journal of the Royal Statistical Society. 2005; 168(1):1-27.

16. British Medical Association. Survey of Accident and Emergency Waiting Times. London: BMA, 2000.

17. Salisbury C, Goodall S, Montgomery AA, Pickin DM, Edwards S, Sampson F, et al. Does Advanced Access improve access to primary health care? Questionnaire survey of patients. British Journal of General Practice. 2007; 57(541):615-621.

18. Smith P, Mossialos E, Papanicolas I, Leatherman S. Performance Measurement for Health system Improvement. Cambridge: Cambridge University Press; 2009.

19. Wachter RM. Why diagnostic errors don't get any respect – and what can be done about them. Health Affairs. 2010; 29(9):1605-1610.

20. Schiff GD. Diagnosis and diagnostic errors: time for a new paradigm. BMJ Quality & Safety. 2014;23:1-3.

21. Campbell SM, Braspenning J, Hutchinson A, Marshall M. Research methods used in developing and applying quality indicators in primary care. British Medical Journal. 2003; 326(7293):816-819.

22. Donabedian A. Evaluating the quality of health care. Milbank Memorial Fund Quarterly. 1966. 44(3):106-126.

23. United Kingdom. Equity and Excellence: Liberating the NHS. London: Department of Health; 2012.

24. Campbell S, Shield T, Rogers A, Gask L. How do stakeholder groups vary in a Delphi technique about primary mental health care and what factors influence their ratings. Quality and Safety in Healthcare. 2004; 13(6):428-434.

25. Donabedian A. Explorations in quality assessment and monitoring, Vol. 1: The definition of quality and approaches to its assessment. Ann Arbor: Health Administration Press; 1980.

26. Ware J, Sherbourne C. The MOS 36-item short-form health survey (SF-36).1. Conceptual framework and item selection. Medical Care. 1992; 30(6):473-483.

27. Fitzpatrick R. Patient-reported outcomes measures and performance measurement. In: Smith P, Mossialos E, Papanicolas I, Leatherman S. Performance Measurement for Health system Improvement. Cambridge: Cambridge University Press; 2009. p. 63-86.

28. United Kingdom. High Quality Care for All: NHS Next Stage Review Final Report. London (UK): Department of Health; 2008.

29. Smith P. Developing composite indicators for assessing health system efficiency. In: Smith P, editor. Measuring up: improving the performance of health systems in OECD countries. Paris: Organisation for Economic Co-operation and Development; 2002.

30. Maclean's Magazine. Health Report 2002. 2002 June 17.

31. Goddard M, Jacobs R. Using composite indicators to measure performance in health care. In: Smith P, Mossialos E, Papanicolas I, Leatherman S. Performance Measurement for Health system Improvement. Cambridge: Cambridge University Press; 2009:339-368.

32. McDavid JC, Hawthorn LRL. Program Evaluation and Performance Measurement: An Introduction to Practice. Thousand Oaks, California: Sage Publications; 2006.

33. New Brunswick Health Council. Our Health. Our Perspectives. Our Solutions. Results of our first engagement initiative with New Brunswick citizens. Moncton, New Brunswick: 2010. [Internet] Available from http://www.nbhc.ca/sites/default/files/Our%20Health%20Our%20Perspectives%20Our%20Solutions%20-%20Results%20EN%20VF%20041110.pdf.

34. Centres for Medicare and Medicaid Services [Internet]. Baltimore (MD). CMS Physicians Compare Fact Sheet; 2014. Available from: https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/physician-compare-initiative/Downloads/Physician_Compare_Fact_Sheet_2013_Redesign.pdf.

35. United Kingdom. Your choices: consultant choice. London: National Health Service; 2014.

36. McGlynn, E. Measuring Clinical Quality and Appropriateness. In: Smith P, Mossialos E, Papanicolas I, Leatherman S. Performance measurement for health system improvement. Cambridge: Cambridge University Press; 2009. p.87-113.

37. Royal Statistical Society. Performance Indicators: Good, Bad, Ugly. Journal of the Royal Statistical Society. 2005;168(1):1-27.

38. McQuillen K, Davis CL, Ho K, McGowan P, Resin J, McEwan K, Kallstrom L, Rauscher C. Case studies from British Columbia's Patients as Partners Initiative. Journal of Participatory Medicine. 2013; 5.

39. Adapted table reproduced from a report, with permission. Canadian Institute for Health Information. A performance measurement framework for the Canadian health system. Ottawa; 2013. Available from: https://secure.cihi.ca/free_products/HSP_Framework_Technical_Report_EN.pdf.

40. Bird SM, Cox D, Goldstein H, Farewell VT, Goldstein H, Holt T, Smith PC. Performance indicators: Good, bad, and ugly. Journal of the Royal Statistical Society. 2005;168:1-27.

41. Morton A, Mengersen K, Waterhouse M, Steiner S. Analysis of aggregated hospital infection data for accountability. Journal of Hospital Infection. 2006;76:287-291.

42. Bayman E, Chaloner K, Hindman B,Todd M, and the IHAST Investigators. Bayesian methods to determine performance differences and to quantify variability among centers in multi-center trials; the IHAST trial. BMC medical research Methodology. 2013,13:5.

43. Woodall W, Adams B, Benneyan J. The use of control charts in healthcare. In: Faltin FW, Kenett RS, Ruggeri F, editors. Statistical methods in healthcare. Chichester (UK): Wiley; 2012.

44. Ohlssen DI, Sharples LD, Spieglehalter DJ. A hierarchical modelling framework for identifying unusual performance in health care providers. Cambridge (UK): MRC Biostatistics Unit; 2007.

45. Jones, HE and Spiegelhalter DJ. The identification of "unusual" health-care providers from a hierarchical model. The American Statistician. 2011; 65:154–163.

46. Seaton SE, Barker L, Lingsma HF, Steverberg EW, Manktelow BN. What is the probability of detecting poorly performing hospitals using funnel plots? BMJ Quality and Safety. 2013;22(10):870-6.

47. Department of Health. Patient reported outcome measures (PROMs) in England: A method for identifying potential outliers. London; 2001. Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/216651/dh_128447.pdf.

48. Eason VJ and McColl JH. Statistics glossary. Glasgow; accessed 2014 April. Available from: http://www.stats.gla.ac.uk/steps/glossary/presenting_data.html#out.

49. National Clinical Audit Advisory Group. Detection and management of outliers. London; 2011. Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/213767/dh_123888.pdf.

50. Health Quality Ontario [Dr. Joshua Tepper blog posting on the internet]. Toronto; 2014 Mar 13. Available from: http://www.hqontario.ca/about-us/blog.

51. Public Inquiry, Francis R. Report of the Mid Staffordshire NHS Foundation Trust Public Inquiry. London; 2013 Feb. Available from: http://www.midstaffspublicinquiry.com/sites/default/files/report/Executive%20summary.pdf.

52. Spiegelhalter DJ. Funnel plots for comparing institutional performance. Statist. Med. 2005;24:1185-1202.

53. Public Health England. National Cancer Intelligence Network, PCT profiles. Accessed 2013 April. Available from: http://www.ncin.org.uk/profiles/gynae/primary_care_trusts/Funnel_Plot/funnel_plot/atlas.html.

54. Public Health England. National Child Measurement Programme. Accessed 2013 April. Available from: http://fingertips.phe.org.uk/profile/national-child-measurement-programme.

55. Ieva, F,Paganoni AM. Detecting and visualizing outliers in profiling via funnel plots and mixed effect models. MOX-Report. 2013;26.

56. Dover DC, Schopflocher DP. Using funnel plots in public health surveillance. Population Health Metrics. 2011;9:58.

57. National Joint Registry. NJR adopted statistical methodology for potential outlier identification. London; 2008 July. Available from: http://www.njrcentre.org.uk/njrcentre/Portals/0/Documents/England/Stat_Meth.pdf.

58. Healthcare Quality Improvement Partnership. Outlier guidance for audit providers. London; 2011 January. Available from: http://www.hqip.org.uk/outlier-guidance-for-audit-providers-issued-by-hqip-and-the-department-of-health/.

59. National Health Performance Authority. Time in emergency statistics. Sydney (Australia); accessed 2013 April. Available from: http://www.nhpa.gov.au/internet/nhpa/publishing.nsf/content/Time-in-emergency.

60. Veteran's Affairs. FindingTheBest. Accessed 2013 April. Available from: http://va-hospital.findthebest.com/.

61. Commonwealth Fund. Rising to the Challenge. 2002. Available from: http://www.commonwealthfund.org/~/media/Files/Publications/Fund%20Report/2012/Mar/Local%20Scorecard/1578_Commission_rising_to_challenge_local_scorecard_2012_FINALv2.pdf.

62. Bureau of Health Information [homepage on the Internet]. Sydney (Australia): 2013. Available from: http://www.bhi.nsw.gov.au/.

63. Saskatchewan Health Quality Council. Quality Insight [homepage on the Internet]. Regina: 2013. Available from: http://www.qualityinsight.ca/.

64. Smith PC, Mossialos E, Papanicolas I, Leatherman S. Performance measurement for health system improvement. Cambridge (UK): Cambridge University Press; 2009.

65. Bird SM, Cox D, Goldstein H, Farewell VT, Goldstein H, Holt T, Smith PC. Performance indicators: Good, bad, and ugly. Journal of the Royal Statistical Society. 2005;168:1-27.

66. Propper C, Sutton M, Whitnall C, Windmeijer F. Did 'targets and terror' reduce waiting times in England for hospital care? Bristol (UK); 2007. Available from: http://www.bris.ac.uk/cmpo/publications/papers/2007/wp179.pdf.

67. Wismar M, McKee M, Ernst K, Srivastava D, Busse R. Health targets in Europe; learning from experience. European Observatory on Health Systems and Policies; 2008.

68. Canadian Institute for Health Information. Indicator library [page on the Internet]. Accessed 2014 April. Available from: http://indicatorlibrary.cihi.ca/display/HSPIL/Indicator+Library?desktop=true.

69. Health Quality Ontario. Quality improvement [page on the Internet]. Toronto; 2014. Available from: http://www.hqontario.ca/quality-improvement.

70. Health Quality Council of Alberta. Continuity of Patient Care Study. Edmonton; 2013 Dec 19. Available from: http://www.hqca.ca/assets/files/December%202013/Dec19_ContinuityofPatientCareStudy.pdf.

71. Cardiac Care Network. Report on Adult Cardiac Surgery in Ontario. Toronto; 2012.

72. US Agency for Healthcare Research and Quality. Public reporting as a quality improvement strategy. Closing the quality gap: revisiting the state of the science. Evidence Report No. 208. Maryland (USA); 2012.

73. Kolstad JT. Information and quality when motivation is intrinsic: evidence from surgeon report cards. NBER Working Paper No. 18804; 2013.

74. Health Quality Ontario [page on the Internet]. Toronto; 2014 Feb 13. Available from http://www.hqontario.ca/quality-improvement/primary-care/practice-reports.

75. Institute for Clinical Evaluative Sciences. Quality assessment of administrative data: an opportunity for enhancing Ontario's health data. Toronto; 2007.

76. Lix L, Neufeld SM, Smith M, Levy A, Dai S, Sanmartin C, Quan H. Quality of administrative data in Canada: a discussion paper. Saskatoon; 2012. Available from: http://www.usaskhealthdatalab.ca/wp-content/uploads/2012/09/Workshop_Background-Document-updated-AppendixD.pdf.

77. National Health Service. The Information Centre for Health and Social Care. General practice extraction service [business case on the Internet]. 2012. Available from: http://www.hscic.gov.uk/media/1530/GPES-appointment-business-case-published/pdf/GPES_published_Appointment_Business_Case_v2.0.pdf

78. National Cataract Registry [page on the Internet]. Sweden; 2014. Available from: http://www.kataraktreg.se/.

79. American College of Surgeons. National Surgical Quality Improvement Program [page on the Internet]. Chicago; 2014. Available from: http://site.acsnsqip.org/about/.

80. Cardiac Care Network. Report on Adult Cardiac Surgery in Ontario. Toronto; 2012.

81. Dehmer J et al. Public reporting of clinical quality data. Journal of the American College of Cardiology. 2014;63(13):1239-45.

82. Drozda JP et al. Health policy statement on principles for public reporting of physician performance data. American College of Cardiology Foundation Writing Committee to Develop Principles for Public Reporting of Physician Performance Data. Journal of the American College of Cardiology. 2008;51(20):1993-2001.

83. Health Quality Ontario. Quality improvement planning [page on the Internet]. Toronto; 2014. Available from: http://www.hqontario.ca/quality-improvement/quality-improvement-planning.

84. Ivers N. [Unpublished presentation to Health Quality Ontario]. Institute for Clinical Evaluative Sciences; notes provided at lecture 2014 April 3.

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