Quality Improvement Primers

Quality Improvement Science

Ontario
Health Quality Ontario

ACKNOWLEDGEMENTS

This workbook is the result of the efforts of the Health Quality Ontario (HQO) For additional information about other resources, contact: Health Quality Ontario www.hqontario.ca

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QUALITY IMPROVEMENT IN HEALTH CARE

Quality improvement in health care is a systematic approach to making changes that lead to better patient outcomes and stronger health system performance. This approach involves the application of Quality Improvement (QI) science, which provides a robust structure, tools and processes to assess and accelerate efforts for the testing, implementation and spread of QI practices.

Health care quality improvement really took hold in North America after the publication of the Institute of Medicine's (IOM), "To Err is Human" report in 2000. This analysis reported that between 44,000 and 98,000 Americans die each year as a result of medical errors and called for a national effort to make health care safer, spurring an increased focus on quality improvement activities in health care.[1] In 2004, the Institute for Healthcare Improvement (IHI) launched a campaign aimed at saving "100,000 lives," by reducing morbidity and mortality in hospitals through the utilization of six best practice interventions.[2] In 2005, a Canadian version of the 100,000 lives campaign called *Safer Healthcare Now (SHN)* was launched, using the same six interventions used by IHI.[3]

The *Excellent Care for All Act (ECFAA),* enacted by the provincial government in 2010, places patients first by strengthening the health care system's organizational focus and accountability for delivering high quality patient care. The Act requires every hospital in Ontario to embed quality improvement in their structure and processes.

HEALTH QUALITY ONTARIO'S QUALITY IMPROVEMENT FRAMEWORK

To facilitate quality improvement initiatives in Ontario, Health Quality Ontario (HQO) has developed a comprehensive **Quality Improvement Framework (2013)** that brings together several QI science models and methodologies including the Model for Improvement, as well as traditional manufacturing quality improvement methods such as Lean and Six Sigma. Health Quality Ontario grounded their framework in Deming's System of Profound Knowledge to ensure that the suggested processes could be applied to any quality improvement initiative, in any health care sector. Brief summaries of the QI science models incorporated into HQO's framework can be found below.

Health Quality Ontario's QI Framework consists of six phases. Each of the phases is iterative and designed to build on knowledge gained in the previous phase. The phases are:

1. Getting Started

During this phase of the QI Framework, a quality improvement team is assembled and begins to form an understanding of what improvements

should be made and how the team will know that their efforts have created a positive change. The team can set overall goals/aims that they would like to achieve within specific timeframes and begin drafting a project/QI charter.

During the "Getting Started" phase, improvement teams develop an understanding of where issues exist and where there are potential areas for improvement within the current state. Essential to understanding the current state is learning what the 'customer' - in health care the 'patient' - actually experiences during the health delivery processes and what they would want or need if the processes were to be improved. This understanding of the current state and patient needs can be achieved through a methodology called Value Stream Analysis (VSA). Health Quality Ontario has developed a reference guide to assist in performing a VSA that is available in the Quality Improvement section of HQO's website.

2. Defining the Problem

In this phase the team should take some time to analyze the information obtained by listening to the voice of the patient and what was learned in the "Getting Started" phase. The team can use tools such as fishbone analyses and "5 Whys" to delve further into the information they have collected. The problems that come to the forefront in this analysis will serve to focus the efforts of the improvement team and aid in the collection and analysis of data during the third phase of the Framework—"Understanding Your System."

In the defining the problem phase, the QI team may begin communicating about the improvement journey to facilitate ongoing buy-in and participation in the change process. A story board could illustrate what some of the problems are or thought to be, and how current processes are impacting patients or clients. At this point in time, the story board can include the names of the members of the QI team as well as the goals/aims of the initiative. The "story" should be heartfelt and capture people's interest!

3. *Understanding Your System*

In this phase, teams collect and analyze data related to the problems identified in the previous phases of the Framework. Collecting, compiling and analyzing measures should not require months of time-intensive activity. This should be an exercise completed in real time, yielding just enough data to begin an improvement process. As the team learns about the performance of its system, it will also identify the barriers to better performance that exist within the system.

After teams have some initial data, they can begin to prepare for the "Designing and Testing Solutions" phase by gathering and brainstorming as many ideas as possible to address the issue or problem.

Testing change ideas provides additional material for the story of a team's improvement efforts. Teams can tell the story of what they have learned, including the improvements achieved to date, through their improvement charters. The more information shared in each phase of the improvement journey, the greater the chances of acceptance when teams are ready to spread improvement.

4. Designing and Testing Solutions

This phase provides teams with the opportunity to be creative by trying different improvement ideas. Teams should begin testing their various improvement ideas using Plan-Do-Study-Act (PDSA) cycles (as described in the Model for Improvement).

5. Implementing and Sustaining Changes

Once teams have assessed their improvement ideas through small tests of change and are confident that the changes are an improvement, they are ready to progress to the "Implementing and Sustaining Changes" phase. During this phase, change ideas are formally implemented into everyday practice in their unit or department.

Ensuring that staff members adopt the changes requires a measurement plan for monitoring adoption and continual improvement. QI teams need to identify a few key measures that will help them determine whether new processes remain effective, detect slippage; and alert leaders, managers and staff if processes are not functioning as intended.

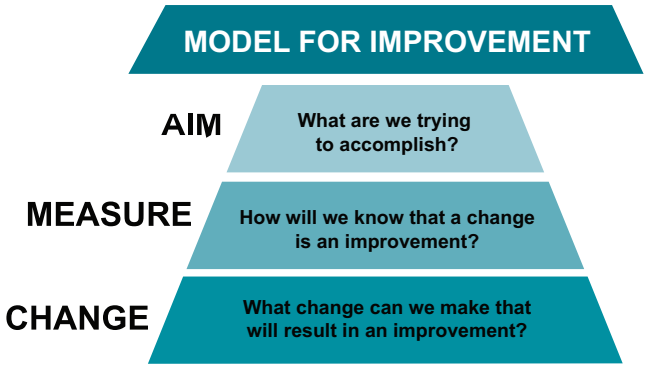
The QI team also needs to continue sharing their improvement story and how the changes they have made positively impact the client experience and outcomes. It is important to clarify the "what's in it for me," in order to help staff understand how they benefit from ongoing improvement.

6. Spreading Improvement

In this phase, successful ideas are implemented on a broader scale. To determine where to begin spreading improvement, the QI team should engage those who accept the changes made and are enthusiastic about further change. In other words, they should follow the path of least resistance. By concentrating first on units or departments eager for change, teams can build the momentum required to engage those individuals or departments who are most reluctant to adopt change ideas.

The spread plan that the team develops should contain key measures for continually assessing the performance and reliability of the improved processes. These measures will allow QI teams to quickly assess whether processes have begun to break down and will allow for immediate action. Rigorous measures are the foundation of continuous quality improvement.

The phases of the improvement framework are laid out in the convenient diagram (right). More detail on each of the steps can also be found on HQO's website.



OVERLAPPING THEMES IN THE QI JOURNEY

There are several key, overlapping themes to consider at each phase of the quality improvement journey. Each of the themes has a background document or 'primer,' which provide further detail and key information on each phase. Each of these primers can be found on HQO's website. The themes of the primers are as follows:

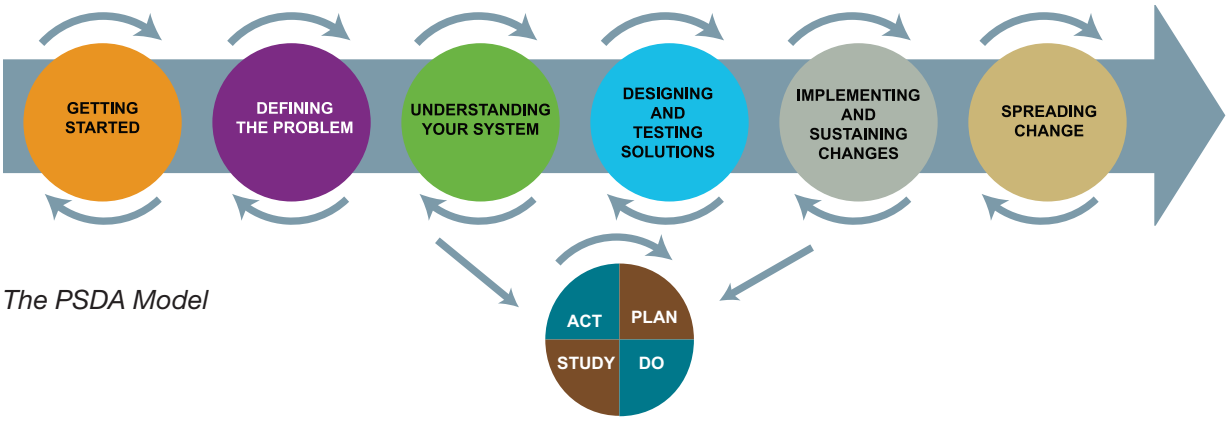
1. **Team Development:** The QI Team needs to be developed through each phase of the framework as its members work together to perform quality improvement work, engage staff, and cooperate with leadership to spread a culture of quality improvement throughout the organization.

2. **Voice of the Customer:** Incorporating the voice of the client/customer/patient/resident in QI initiatives leads to improvements within the service process, resulting in better quality, safety, service and products as well as higher customer satisfaction. By listening to customers, organizations become "leaner" through reductions in waste, resulting in more value-added content, lower costs and the better utilization of resources.

3. **Implementing and Sustaining Changes:** Leaders need to determine how to create an organizational culture of continuous improvement and readiness to support and spread the gains accomplished throughout the six phases of the improvement initiative.

4. **Change Management:** Health care is a service provided for people, by people. Making changes to routines or processes can be difficult. Leaders should make change appealing to the majority of people by considering both the emotional and logical responses of those the change is affecting. For example, "find the feeling" behind why the change will be good and make the change feel small and easy to implement.

5. **Measurement:** All QI initiatives need to employ various methods for gathering, analyzing and applying data in order to create understanding as well as demonstrate improvements and promote long-term sustainability and spread.



The PSDA Model

THEORIES OF QI SCIENCE THAT SUPPORT HQO'S QI FRAMEWORK

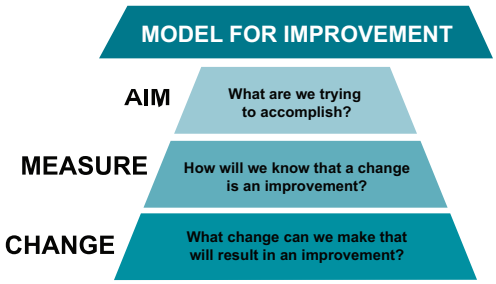
As indicated earlier in this primer, Health Quality Ontario's **Quality Improvement Framework** brings together several QI science models and methodologies, such as the Model for Improvement, as well as traditional manufacturing quality improvement methods such as Lean and Six Sigma. HQO grounded the framework in Deming's System of Profound Knowledge to ensure that the suggested processes could be applied to any quality improvement initiative, in any health care sector. A summary of the applicable theories are presented below.

The Deming System of Profound Knowledge

Health Quality Ontario's QI Framework builds on Dr. W. Edwards Deming's System of Profound Knowledge. This model demonstrates the relationship between four core components: appreciation of a system, understanding variation, building knowledge, and psychology. The effective integration and synthesis of these four components creates *profound knowledge* that is used to understand systems and implement change. Details on this concept can be found in Deming's *The New Economics for Industry, Government, Education*. [4]

Model for Improvement

The Model for Improvement is a simple, yet effective model that assists organizations and improvement teams focus on what they aim to accomplish and improve. Developed by Associates in Process Improvement, the model was created to accelerate change and informs QI from both "thinking" and "doing" perspectives. More information can be found by reading *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance*.[5]



MODEL FOR IMPROVEMENT, "THINKING" PERSPECTIVE:

Essentially, there are three fundamental questions related to the "thinking" component of the Model for Improvement that guide the improvement journey:

1. AIM: What are we trying to accomplish?

Every QI initiative requires a clearly defined goal or "aim" that answers the question: "What are we trying to accomplish?" In the Model for Improvement, the goal is written as an "aim statement."

The aim statement should have the following characteristics:

Clarity: A clear and specific aim is an essential component of an unambiguous QI plan. The statement should share how much the QI initiative will change something. Examples might include aiming to decrease adverse events or undesirable wait times by half, or to improve a measure by 50%.

Time-specific: The statement articulates when the goal will be achieved.

Stretchable: The aim should be supported by a stretch goal. A goal of small, incremental change (e.g., moving from below average to average, or changing by 10%) does not necessarily represent a real breakthrough in quality and/or justify stakeholder investment. It is helpful to review the practices of leading organizations and established benchmarks for support in setting a stretch goal.

Real value: The aim should meet the expectations and needs of patients and clients. Please refer to *Voice of the Customer* primer for more details.

Example of a poor aim statement:
We will work more efficiently to reduce wait times for new patients this year.

Example of a good aim statement:
Within seven months, we will reduce wait times for all new patients referred to our specialty clinic from 53 days to no more than 26 days.

2. Measures: How will we know if a change is an improvement?

To determine whether changes made during QI initiatives are actually leading to tangible improvement, information on the impact of changes needs to be collected, analyzed and reported. This information processing is called *performance measurement.* Performance measurement provides concrete evidence to support the case for change. By demonstrating tangible results, performance measures (or simply 'measures') can increase buy-in for an initiative. For more information on using measures in your quality improvement initiative, please refer to HQO's *Measurement Primer.*

TYPES OF MEASURES

There are four types of measures that can be used to gauge your team's progress and support the achievement of aims:

Outcome measures are the "voice of the patient or customer" and capture system performance. They answer the question "what are the end results of our QI work?" Examples include reductions in infection rates, wait times, and falls.

Process measures are the "voice of the workings of the system." Process measurements are those that capture the changes your quality improvement efforts make to the inputs or steps that contribute to system outcomes. Examples include the percentage of time staff complies with a best practice recommendation (e.g., bundle compliance with the 'bundle' of best practices to prevent ventilator associated pneumonia).

Balancing measures determine whether changes designed to improve one part of the system are causing problems in other parts of the system. Balancing measures include staff and client satisfaction, or financial implications. For example, does this QI change improve staff satisfaction but decrease client satisfaction?

PDSA measures are collected with each test of change (PDSA) that is carried out. These measures provide knowledge about the effect of each change attempt on the process and system.

3. Changes: What changes can we make that will result in improvement?

Once an aim is in place and measures are established, teams need to identify promising ideas to improve quality through change. **Change ideas** are actionable steps for change targeted at improving specific processes, often originating from brainstorming sessions with your team and evidenced-based best practices. For example, a change idea for improving access might be to "schedule pre-booked appointments on days of the week that have the least demand". These ideas are practical and can be readily tested.

In cases where no clear, evidence-informed change ideas exist, the team could start with a **change concept** to help generate ideas and then develop specific change ideas for testing. The IHI defines a change concept as "a general notion or approach to change that has been found to be useful in developing specific ideas for changes that lead to improvement."[6]

Thus, change concepts are essentially broader theories or approaches to improving quality, e.g., reducing waste, improving work flow, standardization, and other principles common to QI methodology.

Thus, a change idea is a specific idea while a change concept is an umbrella with many change ideas under it. For detailed information on change ideas and concepts, please see HQO's *Change Concepts and Ideas* primer.

THE MODEL FOR IMPROVEMENT - "DOING" PERSPECTIVE: PLAN-DO-STUDY-ACT (PDSA) CYCLES

Testing & Implementing Change Ideas

The "doing" component of the model for improvement relies on a continuous process of developing and conducting small tests of change (PDSA cycles). This approach allows teams to try an improvement idea before fully implementing the change. A PDSA cycle can build knowledge for further testing, demonstrate the benefits of new ideas, and can be used to engage staff. Small tests of change may help in uncovering the undesirable effects of changes, allowing QI teams to modify or abandon a change idea that has unintended consequences.

Step 1 PLAN (who, what, where, when, and why)

- State the purpose of the PDSA—are you developing a change idea, testing a change, or implementing a change?
- What is your change idea?
- What indicator(s) of success will you measure?
- How will data on these indicators be collected?
- Who or what are the subjects of the test?
- How many subjects will be included in the test and over what time period?
- What are your predictions as to what will happen?

Step 2 DO

- Conduct the test.
- Document the results, measurements, challenges and unintended consequences.

Step 3 STUDY

- Analyze the data and study the results.
- Compare the data to your predictions.
- Summarize and reflect on what was learned.

Step 4 ACT

- Refine the change idea based on lessons learned from the test.
- Prepare a plan for the next test. Dependent on results the idea should be adopted, adapted or abandoned.

Each change idea needs to be tested through a series of PDSA cycles. The process of using a series of PDSA cycles to test an idea is called a PDSA *ramp*. A QI team can implement PDSA ramps one after the other or simultaneously.

HQO has developed a **PDSA tool** to assist QI teams create and document a PDSA ramp. This tool can be found in the "Designing and Testing Solutions" phase of HQO's Quality Improvement Framework.

Example of an aim statement: *In 30 days, 99% of patient appointment bookings will include the collection of a health card number.*

A PDSA example might be to test out a new way of booking patient appointments for the next three patients calling in. As those appointments are booked, the receptionist notices that the current booking process didn't include confirming the patient's health card number. So, the process is changed to include a script to request the number and that small test of change is completed. The test may then progress to test the next 10 patients calling in.

Lean thinking is not about a one-time improvement in a process but rather about the continuous pursuit of quality and continuous quality improvement.

Lean

Lean is another QI methodology that health care teams can use to make improvements to health care delivery processes. Lean thinking is the belief that there is a more simple, better way of doing our day-to-day work through the continuous identification and elimination of waste (inefficiencies, errors, and non-productive or non-value-added activity) from our processes.

Lean is about making the work environment efficient and more effective and improving safety, quality, costs, and service delivery. The objective of applying Lean methodology is to release time for more direct care and to integrate quality improvement into daily activities.

Lean is not about making people work harder but about removing non-value-added activities (waste) from the environment so that people can work more efficiently with fewer errors and less need for rework due to errors. Lean is primarily about ensuring that the right thing happens at the right time, by the right person, and that staff is engaged in the change process.[7]

Waste is anything that does not add value from the point of view of the customer, whether internal or external. Please see HQO's *Voice of the Customer* primer for more information on this subject. Within the HQO primers, we have used the term "customer" when referring to QI science and "patient" when describing the external customer in health care.

Lean teams are taught the eight most common forms of waste and how to identify and remove waste from work processes. According to Lean, the eight most common forms of waste are: overproduction, waiting, transportation, non-value added processing, excess inventory, defects, excess motion and underutilized people. You can learn more about these forms of waste in the "Waste Walks" tool, which can be found on HQO's website.

The 5 principles of Lean

1	*Specify who your "customer" is for your Lean initiative and identify what "value" is, from the customer perspective.*	*A customer may be internal (e.g., a resident) or external (e.g., a vendor)*
2	*Map the process*	*The status of virtually every process should be apparent (this knowledge can be acquired over time), allowing for easy comparison of expected versus actual performance. Process mapping is a tool used to create a "picture" of the process so that all activities are obvious.*
3	*Improve flow by eliminating waste*	*A process "flows" or progresses more efficiently when inefficiencies and errors are permanently removed from the process steps.*
4	*Create a pull system that's based on customer demand.*	*This is about understanding the customer demand for your service and then creating your process to respond to the level of demand. In other words, you supply only what the customer wants when the customer wants it.*
5	*Pursue excellence.*	*Lean thinking is not about a one-time improvement in a process but rather about the continuous pursuit of quality and continuous quality improvement.*

What Lean Is

- Solutions to customer needs
- Identification and removal of process waste
- Redeployment of resources into value-added activities
- Reduction or elimination of defects
- Improving process flow
- Doing necessary and efficient tasks
- Continual improvement
- Focusing on value-added activities
- Quality at point of service

What Lean Is Not

- Focused on provider needs
- Writing new policies or procedures
- Job reduction
- Measuring quality into the service
- Batch and queue
- Doing a lot of work
- One-time random improvement
- Busy work that fills your day
- Speeding up an inefficient or ineffective process

Suggestions for further reading on QI science and its applicability to Ontario's health care system:

- American Society for Quality Tools
- Six Sigma Quality Tools and Templates

Organizations that Support Quality Improvement (Canada)

- Canadian Patient Safety Institute
- Institute for Safe Medication Practices

Organizations that Support Quality Improvement (International)

- A System for Profound Knowledge - The W. Edwards Deming Institute (US)
- Agency for Healthcare Research and Quality (US)
- Australian Commission on Quality and Safety in Health Care (AU)
- Institute for Healthcare Improvement (US)
- Joint Commission on Accreditation of Healthcare Organizations (US)
- National Association for Healthcare Quality (US)
- National Patient Safety Foundation (US)
- National Quality Forum (US)
- NHS National Patient Safety Agency (UK)

RECOMMENDED READING

Baker, R., MacIntosh-Murray, A., Porcellato, C., Dionne, L., Stelmacovich, K. & Born, K. (2008). *High Performing Healthcare Systems: Delivering Quality By Design*. Toronto: Longwoods-Publishing.

Dennis, P. (2007). *Lean Production Simplified: Plain-Language Guide to the World's Most Powerful Production System*. New York: Productivity Press.

Imai, M. (1997). *Gemba Kaizen: A Commonsense, Low-Cost Approach to Management*. Columbus: McGraw-Hill.

Langley, GL, Nolan, KM, Nolan, TW, Norman, CL, & Provost, LP. (1996). *The improvement guide: a practical approach to enhancing organizational performance*. San Francisco: Jossey-Bass.

Womack, J.P., & Jones D.T. (2003). *Lean Thinking: Banish Waste and Create Wealth in Your Corporation*. New York: Productivity Press.

1 Institute of Medicine (2000). Committee on Quality of Health Care in America. *To Err Is Human: Building a Safer Health System.* Washington, DC: The National Academies Press, p. 26.

2 The Institute for Healthcare Improvement (2004). Overview of the 100,000 Lives Campaign. Retrieved from http://www.ihi.org/offerings/Initiatives/PastStrategicInitiatives/5MillionLivesCampaign/Documents/Overview%20of%20the%20100K%20Campaign.pdf

3 Safer Healthcare Now (2013). About SHN. Retrieved from http://www.saferhealthcarenow.ca/EN/Pages/default.aspx

4 Deming, W.E. (1994). *The New Economics for Industry, Government, Education.* Cambridge: the MIT Press.

5 Langley G.L., Nolan K.M., Nolan T.W., Norman C.L., Provost, L.P. (2009). *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance*. San Francisco: Jossey-Bass, p. 23

6 Institute for Healthcare Improvement (2012). *Using Change Concepts for Improvement.* Retrieved from http://www.ihi.org/knowledge/Pages/Changes/UsingChangeConceptsforImprovement.aspx

7 Womack, J.P & Jones, D.T. (2003). *Lean Thinking: Banish Waste and Create Wealth in Your Corporation.* New York: Productivity Press, p. 15

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