

Quality improvement: an overview(Quality Outcomes)

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Quality improvement in health care is a process of analysis and change designed to understand and improve care delivery and best meet the needs of health care customers and society. Quality programs can reduce waste and inefficiency, increase responsiveness, identify goals, increase accountability, and reduce costs.

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Clinicians are being held accountable for the quality of the care they provide in an unprecedented way. Quality improvement (QI), a scientifically based method, can help health care managers and clinicians improve health care through the elimination of waste and inefficiency. QI is a comprehensive approach that is based on an understanding of variation and uses tools specifically designed to help professionals understand and improve processes. The article gives an overview of quality improvement as a useful method for improving the process of clinical practice. Improving the process of care is an important step toward achieving quality outcomes for all health care customers. Key words: health care management, health services, nursing management, nursing quality, process improvement, quality improvement, quality of care, quality outcomes

CLINICIANS are being held accountable in an unprecedented way for the quality of the care they provide. This change in accountability has been brought about by the need to curb the ever climbing costs of health care. In the 1980s, a demand was created by the purchasers of health care services for high-quality, efficient, cost-effective, and competitively priced health services. The competition to provide these services is forcing health care organizations to consider new strategies. To survive, they will need to respond efficiently and effectively to the needs of their customers, both payers and patients.

It is process that produces outcomes. Outcomes are an important component of health services. Through evaluating outcomes, payers and customers assess quality and make choices among services. For providers, knowing outcomes will not necessarily lead to improvements. Quality improvement (QI) methods can help organizations improve the processes in their work that produce the outcomes.

This article describes the key characteristics of QI, why it has emerged as a method for addressing health care quality, and its relevance to clinical practice. This overview is for clinicians who wish to learn more about the basic concepts of QI.

BACKGROUND

The focus on quality, also known as total quality management or continuous QI, evolved in the late 1980s as a strategic method for provider organizations to reorganize their services in response to the competitive market and the demand for change. This approach did not begin in health care. The quality management method was originally conceived by Shewhart at Bell Laboratories in the 1930s and was based on the premise that productivity improves as variation is reduced.[1] The focus on quality as an improvement method did not become well recognized until after World War II, when Japan adopted quality management as a rebuilding strategy. Japan rapidly became the leading international supplier of electronics and automobiles.[2] QI gained attention in the health industry as US corporations achieved success using quality methods to improve performance and productivity.

Between 1988 and 1990, the National Demonstration Project on Quality Improvement in Health Care tested the application of QI methods at 21 different health care sites in the United States.[3] The success of this effort gave enormous momentum to the health care quality movement.

WHAT IS QUALITY?

Many definitions of quality have evolved over time. Donabedian, one of the most widely recognized experts in health quality, defined high-quality care as "that kind of care which is expected to maximize an inclusive measure of patient welfare, after one has taken account of the balance of expected gains and losses that attend the process of care in all its parts." [4(pps-6)] In 1990, the Institute of Medicine defined quality as "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge." [5(p21)]

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Quality, by current standards, presumes an intent toward excellence in meeting the needs of the customer. Langley and colleagues broadly define quality as the "measure of how well a product or service matches a need." [6(p166)] This user-friendly definition can easily be applied to the service of providing health care. As Berwick and associates note, "health care organizations may need a broader, more comprehensive definition [of] and approach to quality," [3(p156)] one that uses a joint approach between clinicians and administrators, is driven by customer needs, and addresses both the content and process of care.

WHAT IS QI?

QI describes the activities employed to improve the performance of a key process. [3] In quality management, engaging in QI is often where most organizations begin. To be most effective, total quality management includes two other closely related efforts: planning and control.

Quality planning includes using specific measures to define quality as it applies to the organization's customers and all aspects of designing and deploying the services designed to meet customers' needs. For example, based on a QI effort, the leaders of a newborn intensive care unit (NICU) may decide to introduce developmentally supportive care. [7-10] The training of the staff, the changes to the NICU environment, and the integration of this approach into care would all be part of quality planning. The QI activity would include the collection of data from parents and evidence from the literature and the comparison of the NICU's outcomes and patterns of care with those of another NICU where developmentally supportive care is routine practice to determine that the current level of care needed to be improved.

For a perinatal center, an example of QI might be the introduction of a birthing center. Planning might involve developing quality measures using internal consumer satisfaction data and requests for such services or benchmarking (ie, comparing specific measures from the perinatal center with those of other birthing centers and reviewing the results). Benchmarking is not always helpful because the index organization may still need to make improvements despite its favorable standing compared with others. Quality planning would involve the actual planning and implementation of the birthing center.

The other component of quality management, quality control, describes all the effort required to maintain an optimum level of performance. This includes establishing ongoing systems of measurement, responding to the information, and instituting change to maintain an optimum process.

WHY QI?

One of the basic tenets of QI theory is that, as quality improves, the costs associated with rework, error, and inefficiency go down. [3] Waste, rework, and errors are expensive. One study found that the costs associated with medication-related problems alone resulted in almost \$1.5 million spent over a 2-year period at one university hospital. [11] This "outcome" information deserves attention, yet it tells little about the processes that produced these results. QI involves applying scientific methods to understand and improve the processes that produce the outcomes.

Besides reducing costs, a quality approach is anchored, as indicated in its definition, in satisfying the needs of the customer. [3] Being sensitive to the needs of patients and their families, from the patient's perspective, is a defining dimension of quality. It is one that requires a special knowledge of the customer and creativity beyond what is required for improving processes and reducing costs.

Consider the following analogy. Perinatal and neonatal nurses care for patients with complex needs, such as high-risk women in labor or critically ill infants. As nurses care for these patients, they are continually gathering data on vital signs, contractions, respiratory effort, or behavioral cues. In addition to assessing the patient, the nurse constantly assesses the patient's interaction with the environment. Are the lights too bright? Are the bed and patient in the right position? Is the isolette or radiant warmer providing the correct amount of heat? The nurse continually assesses the data, notes variation, and makes decisions about whether the variation is within an expected range. When there is a change in the tracing of a contraction, or when an infant's oxygen saturation drops significantly, data are assessed and, based on the information, a decision is made about whether to make an intervention. The nurse assesses the impact of the intervention (outcome) and makes a judgment about its effectiveness. To be a competent clinician, the nurse must have knowledge, skill, and experience to understand, analyze, and act on clinical data. He or she must be an expert at using the scientific process

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(nursing process) of collecting and assessing data, planning for and implementing interventions, and evaluating the results in the clinical setting. This is an ongoing cycle of learning. It is a process of QI.

QI offers an intuitive, user-friendly framework for clinicians who are adept at the scientific or nursing process. The scientific method is applied to improve process in the same way that a clinician applies it to improve the well-being of an individual patient. An effective, productive clinician depends on many "processes" in the course of work, such as available and functional monitors, adequate and accessible supplies, knowledgeable and available colleagues for consultation and clinical management, and timely and reliable laboratory results. When any of these processes breaks down, quality of care suffers. A QI approach allows managers and staff members to manage processes in much the same way as a clinician manages patients. Managing a process effectively requires knowledge of QI and a set of skills.

KEY CONCEPTS FOR QI

Leadership

Managers at each level must be able to provide visionary leadership and empower their staff to achieve that vision. Managers also must be able to create an environment that supports collaborative problem solving. Improvements are best achieved and maintained when there is effective leadership at all levels of the organization, from the board room to the patient's bedside.[12] Leadership at the board and executive levels is needed to allocate resources for quality measurement and QI efforts, and leadership at the bedside is necessary to bring insight, creativity, and direct knowledge to the work of improvement.

Systems thinking

A system is a perceived whole whose elements "hang together" because they continually affect each other over time and operate toward a common purpose.[13] Change in one process will probably depend on an interaction or change in another process, so that an understanding of the system is critical for successful change.[7] For example, improving the return transport of stable infants to the community hospital will depend on an understanding of the NICU's process, that of the community hospital, and that of the ambulance service.

Process

A process is a set of causes and conditions that interact across the continuum to transform inputs into outcomes.[14] Clinically translated, the process of providing clinical care involves many sources of inputs:

- * people (nurses, physicians, and other health care providers; patients and families; housekeepers; administrators)
- * materials (medical supplies, paper, linen) information (test results, reports, rounds, literature, histories)
- * machines (monitors, radiant warmers, birthing tables, operating room equipment)
- * environment (space, color, temperature, noise level)

Together, these inputs create interactions and processes that create a system of care. Poor quality results from waste, rework, and error, usually associated with problems in process, not individuals. Process thinking uses a problem-solving approach. For example, the night shift has experienced an increase in the number of incident reports over the past few months. Further investigation reveals that all the incidents occurred with new hires. A productive approach would be to gather more data and review the recruitment and orientation processes for new staff because these may need to be improved. On the other hand, new staff may have been better trained in reporting all errors, and further investigation may reveal a constant error rate with an increase in reporting for this group.

For most groups, QI work begins with the effort to improve a key process. A key process can loosely be defined as one that abides by the Pareto principle: When there are a number of contributors to an overall effect, relatively few of those contributors account for the bulk of the effect.[15] Using the return transport example, if reducing the time from the decision to transfer to arrival at the community hospital were the goal, many inputs would be identified as reasons for

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delay, but most of the delays could probably be attributed to only a few factors.

Variation

Knowledge of variation helps elucidate what causes outcomes, not just whether the outcomes are good or bad. Shewhart[17] described two types of variation: common cause variation and special cause variation. Common cause variation results from random variation inherent in the system over time, which affects everyone and the outcomes and is seen in a stable process. The fluctuations in the daily census or the fluctuations in the average response time for the neonatal transport team are examples of common cause variation. Special cause variation occurs for reasons that are not part of the system but rather result from special or unusual circumstances. For example, a severe blizzard in early January may result in a much higher than average number of deliveries for the month of September.

Variation within any quality characteristic is expected. Mortality and morbidity rates, nosocomial infection rates, medication errors, waits and delays, cesarean section rates, and employee turnover rates are outcomes generated by processes that can be measured. A manager's or clinician's response to these measures should be based on an understanding of the type of variation observed. Sometimes improvements are made by reducing the degree of common cause variation.

The process associated with a particular outcome is best described through the collection of data over time. Controlling the variation in the process is desirable because it will allow a prediction of outcomes if the process is stable.[7]

Data

To gain knowledge about a process, quality characteristics are identified and measures developed. From these data come information, and from the application of information comes knowledge. Shewhart stated "Knowledge begins in data and ends in other data." [16(pp101-103)] Basing changes and decisions on data is the concept that will engage most clinicians in QI activity. Types of data include physical measurements, descriptive data, consumer survey data, and employee feedback. Specific data analysis methods have been developed for use in QI to elucidate variation associated with processes. These methods include control charts, run charts, histograms, and Pareto charts, to name a few. Using these tools will help clinicians localize and understand the root causes of their process problems. These tools provide a "picture" of the data that can be most useful for tracking changes.

Involvement and cooperation

Those directly involved with the process usually have insight into what is working and what is not. Successful improvements often require the involvement of more than one or two people. Involving key people in the QI process increases their participation in supporting change because they are working on a common goal. Sometimes the most valuable participants are those who can present opposing points of view; also, if their area is under consideration for change, their concerns can be included.

Customer focus

Customers are defined as those served by the processes being improved and may be many different people, depending on the point of reference. In Patient care, the most obvious customers are patients and families. For the organization, the customers may be physicians, employees, payers, and the community at large. Identifying the customers and including their input represent an important part of the QI process.

Creativity

A quality approach often assumes that the current methods are not the most effective. Often the solution to the problems lies in using a totally new approach or a creative rework of an existing process. Inventing a new idea requires effort and techniques, which, when properly applied, can help clinicians bring about significant improvements.[7,17]

WHERE TO START?

Using a model to guide the improvement effort is recommended. Langley and colleagues[7] offer a practical model for

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making improvements that is readily adaptable to health care. It is being used by the Boston Children's Hospital to guide QI activity. The model uses the cycle for improvement illustrated in Fig 1 and the following three practical questions:

1. What are we trying to accomplish? In answering this question, clinicians can clarify the aim and keep the project focused on that aim. The answer should be practical and concise (eg, "To make changes in our return transport process to provide better service to our customers in a timely fashion").
2. How will we know that a change is an improvement? Once the aim is clarified, the clinicians need to identify the criteria that will be used to measure the impact of their changes. To answer this question, clinicians will need to be able to measure the criteria over time to determine the effectiveness of their interventions. Using the return transport example, after discussion and using observations from their practice, the clinicians might decide to measure the number of return transports by time of day, day of the week, and the time between the decision to return transport and arrival at the community nursery.
3. What changes can we make that will result in an improvement? The clinicians, if representative of those involved in the care and return transport of infants, would list those changes that they predict will lead to an improvement in the timeliness of the return transport process (eg, begin clinical rounds in the intermediate nursery before NICU rounds, include the primary nurse and those responsible for discharge planning, anticipate the return transport the day before if clinical stability criteria are met, choose one transport service, etc).

[Figure 1 ILLUSTRATION OMITTED]

This model is based on using knowledge to make improvements, and the questions help direct the effort in a practical way.

The plan-do-study-act (PDSA) cycle describes the framework for doing the work of testing, learning, and making changes.[2] In the return transport example, the clinicians may decide to implement one of the changes using the criteria they have identified as measures of improvement. The PDSA model is the repetitive cycle used to test one of the changes and its impact on the process as measured by the criteria. Using this method assumes that making change is a continuous and evolving cycle, that tests do not always go as planned, and that the measures may not respond to the changes.

Most QI work involves working with groups of clinicians and support staff. Table 1 provides a practical guide for doing QI work with groups.

Table 1. Practical guidelines for doing QI with groups

Issue	Comments
Define the aim	Keep the definition simple and focused; revisit throughout the process to ensure that this is the problem being addressed.
Organize a team	Keep the group as small as possible; ensure that key stakeholders (those carrying out or affected by the changes) are included. Individuals can be included as consultants and kept informed through other channels of communication (eg, e-mail) if their participation is desired but not necessary for every meeting.
Provide leadership	Pick skilled, committed group leaders who will follow through and keep the group motivated. A collaborative model is strongly

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	encouraged for all patient care processes. Consider nurse and physician coleaders.
Provide facilitation	Facilitation should be invisible to the group yet effective. Facilitator must have expertise in quality improvement tools, must be perceived as serving the group to achieve the common purpose, and should serve as consultant to the leaders.
Set goals	Be specific and realistic, define goals that can be measured, and revisit the goals frequently during the process.
Gather data	Be focused. Before data are gathered, define measures for each goal and identify who will gather the data, how and when the data will be gathered, who will analyze the data, and how the data will be presented. Gather a few data elements and test the data collection process before collecting data.
Analyze data	Present data visually using graphs, histograms, control charts, etc.
Take the next steps	Identify the next steps and have a "to-do" list at the end of each meeting with clearly assigned responsibilities.
Keep things simple	Even seemingly simple improvement projects quickly become complex.
Select the best time	Survey the participants and get commitment on the best time for meetings for everyone (should be based on the optimum time for clinicians). Begin with weekly or biweekly meetings to get started; project the total number of meetings anticipated and commit to that number.
Provide food	Food improves attendance at early morning and lunch hour meetings and is greatly appreciated by clinicians.
Run meetings efficiently	Use realistic agendas and be timely; know when to bring in consultants.
Work off line	For large projects and large groups, delegate as much work as possible to subgroups, whose work can then be shared with the larger group.
Communicate	Identify the best method for communication among group

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	members; e-mail allows group members or consultants to participate "off-line."
Provide a schedule	Give the group members a clear sense of what will be involved, how much time they will need to commit to the effort, and expectations for follow-up.
Promote ownership	The workflow of the group will be more successful if there is a sense of ownership of the work by the members of the group.
Commit resources	Managers will need to commit staff time, mentorship, and resources for measurement.

In health care, QI is everyone's responsibility. With leadership, motivation, and resources, health care organizations can improve the efficiency and quality of their care to better serve their customers. QI uses scientific methods to elucidate and manage the variation inherent in the process of delivering health care services. With skilled support and training, staff nurses can be directly involved in managing and improving the processes through which they provide patient care.

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