

Practical Quality Improvement for the Allergist/Immunologist



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Quality improvement (QI) has long been part of organized medicine, but has become increasingly more important in the last few years. Clinical expertise and input into QI activities are critical to keep QI grounded in evidence and practice. Busy clinicians face many competing demands; practical strategies are needed to help busy clinicians successfully engage in QI. This article provides a brief history of QI in medicine, notes several commonly used frameworks for QI in health care, and presents a practical QI model that can be applied to the clinical practice of allergy and immunology. © 2016 American Academy of Allergy, Asthma & Immunology (J Allergy Clin Immunol Pract 2017;5:660-4)

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We physicians are trained to provide and pride ourselves on providing patient care based on best evidence. We use data-driven inquiry to identify patient health needs, recommend preventive care and treatment strategies, assess the results of our care plans, and make adjustments. How do we extend our drive to deliver high-quality care for each patient to delivering high-quality care for *all of our patients*? Quality improvement (QI) science offers us tools and techniques to care for our practices like we care for individual patients. This article provides a brief history of the evolution of QI in medical practice, introduces the reader to key high-level QI concepts, and poses a practical

framework for practicing physicians to begin to implement QI in their practices.

THE EVOLUTION OF QI AS PART OF PHYSICIAN PRACTICE

QI “consists of systematic and continuous actions that lead to measurable improvement in health care services and the health status of targeted patient groups.”¹ Deming developed an approach to QI that was applied in the automobile industry, and has since also been extended to other industries.² Each of these industries, including health care, comprises a myriad of inter-linked processes that define a complex system; however, if one focuses on one element of the process of care, there is an opportunity to change the process and improve health care outcomes.

Luca et al.’s 1994 article in the *Western Journal of Medicine*³ provides an overview of the early history of the quality movement in medicine. The improvement movement in medicine began with the founding of the American Medical Association (AMA) in 1847,⁴ the Flexner report in 1910,⁵ and the beginning of the specialty board certification system in 1917.⁶ One of the earliest efforts to improve clinical quality of care was developed by surgeon Ernest Codman, MD, who in 1910 developed the “End Result System of Hospitalization Standardization Program,” which was adopted by the American College of Surgeons (ACS) in 1917.⁷ The ACS joined with the American College of Physicians, the American Hospital Association, the AMA, and the Canadian Medical Association to form the Joint Commission on Accreditation of Hospitals in 1952.⁶ In 1966, Donabedian described the structure-process-outcome model,⁸ which has served as the foundation for modern health care quality measurement: good *structure* of a health care facility leads to high-quality *processes*, which in turn leads to superior patient care *outcomes*.

The QI movement accelerated in the mid-1990s, spurred by the Institute of Medicine’s publication of “America’s Health in Transition: Protecting and Improving Quality” (1996),⁹ “To Err Is Human: Building a Safer Health System” (1999),¹⁰ and “Crossing the Quality Chasm: A New Health System for the 21st Century” (2001)¹¹ reports. The Accreditation Council for Graduate Medical Education (ACGME) and the American Board of Medical Specialties (ABMS) recognized QI as part of “systems-based practice” in their 1999 competencies for training and professional practice.¹² The 24 Member Boards of the ABMS incorporated quality and practice improvement into the framework for Maintenance of Certification (MOC)¹³ in 2000. Several national groups, including the AMA’s Physician Consortium for Performance Improvement, National Quality Forum (NQF), National Committee on Quality Assurance, and national medical societies, have been and are developing quality measures

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TABLE I. NQF endorsed asthma measures

Measure	Description	Developer or Steward
Asthma: pharmacologic therapy for persistent asthma	Percentage of patients aged 5 through 64 y with a diagnosis of persistent asthma who were prescribed long-term control medication. Three rates are reported for this measure: 1. Patients prescribed inhaled corticosteroids (ICS) as their long-term control medication 2. Patients prescribed other alternative long-term control medications (non-ICS) 3. Total patients prescribed long-term control medication	American Academy of Allergy, Asthma, and Immunology
Chronic obstructive pulmonary disease or asthma in older adults admission rate	Admissions with a principal diagnosis of chronic obstructive pulmonary disease (COPD) or asthma per 100,000 population, aged 40 y and older. Excludes obstetric admissions and transfers from other institutions.	Agency for Health Care Research and Quality
Asthma admission rate	Admissions for a principal diagnosis of asthma per 100,000 population, aged 18-39 y. Excludes admissions with an indication of cystic fibrosis or anomalies of the respiratory system, obstetric admissions, and transfers from other institutions.	Agency for Health Care Research and Quality
Asthma admission rate	Admissions with a principal diagnosis of asthma per 100,000 population, aged 2 through 17 y. Excludes cases with a diagnosis code for cystic fibrosis and anomalies of the respiratory system, obstetric admissions, and transfers from other institutions.	Agency for Health Care Research and Quality
Asthma medication ratio	The percentage of patients 5-64 y of age who were identified as having persistent asthma and had a ratio of controller medications to total asthma medications (based on pharmacy medication fills) of 0.50 or greater during the measurement year.	National Committee For Quality Assurance

NQF, National Quality Forum.

meant to guide specialty practice. The Agency for Health Care Research and Quality has established the National Quality Measures Clearinghouse (NQMC) as a resource for summaries of evidence-based quality measures (<https://www.qualitymeasures.ahrq.gov>). The NQMC includes measures related to health care delivery as well as population health measures.

The NQF facilitates continuous QI of the US health care system, to achieve health care delivery that is safe, effective, patient centered, timely, efficient, and equitable (<http://www.qualityforum.org>). The NQF is a not-for-profit, nonpartisan organization. NQF-endorsed measures are evidence based, valid, reliable, usable, and feasible. Consensus standards endorsed by the NQF are regarded as the “gold standard” for the measurement of health care quality. A measure endorsed by the NQF can be used by hospitals, health care systems, and governmental agencies such as the United States Centers for Medicare & Medicaid Services (CMS) for public reporting to encourage QI. There are approximately 300 NQF-endorsed measures. The quality measures for asthma endorsed by the NQF are shown in Table I.

The American Academy Allergy, Asthma and Immunology (AAAAI) is actively involved in the development and maintenance of quality measures via the Measure Stewardship Committee and The Joint Task Force on Quality and Performance Measures, which includes members from AAAAI and American College of Allergy, Asthma, and Immunology (ACAAI). Table II lists the quality measures for asthma, allergen immunotherapy, drug allergy, and chronic urticaria developed by the Quality and Performance Measures Task Force, and stipulates whether these are “underuse” (ie, clinicians are being encouraged to perform these interventions more frequently) or “overuse” (ie, clinical practices

that are being discouraged) measures. All measures shown in Table II are process measures, with the exception of the change in asthma control exceeding a minimal important difference (eg, an increase in 3 or more in the Asthma Control Test score at follow-up visit), and appropriate removal or confirmation of penicillin allergy from a patient’s medical record based on diagnostic evaluation.

MAJOR ELEMENTS OF QI IN MEDICINE Measures

There are 3 general types of measurements used in clinical QI. Outcome measures assess the impact of an improvement effort on a patient, or sometimes, on a system or other stakeholders. These measures can be disease specific (like blood pressure control in hypertension or hemoglobin A1c levels in diabetes) or more patient centric (such as emergency department visits or hospital admissions for asthma exacerbations, asthma-free days, time to third available routine follow-up appointment). Outcome measures are often affected by many parts of the health care system, each of which may require separate or concurrent assessment and intervention to affect change. Furthermore, large sample sizes may be needed to assess the impact of a QI effort on infrequent events, such as mortality. Process measures (such as use of spirometry to diagnose and manage asthma, smoking cessation counseling, assessment of asthma symptoms before allergen immunotherapy injections) assess what a physician or team does as part of an attempt to achieve an outcome. Balancing measures are used to assess unintended consequences of attempted improvement on other parts of care delivery (eg, tracking rates of readmission in association with an intervention to reduce length of stay for asthma hospitalization).

TABLE II. Clinical performance measures developed by Quality and Performance Measures Task Force

Asthma measures	
• Asthma: assessment of asthma control—ambulatory care setting (underuse)	
• Asthma control: minimal important difference improvement (underuse)	
• Lung function/spirometry evaluation (underuse)	
Allergen immunotherapy measures	
• Allergen immunotherapy treatment: allergen-specific immunoglobulin E (IgE) sensitivity assessed and documented before treatment (underuse)	
• Documentation of clinical response to allergen immunotherapy within 1 y (underuse)	
• Documented rationale to support long-term aeroallergen immunotherapy beyond 5 y, as indicated (underuse)	
• Achievement of the projected effective dose of standardized allergens for a patient treated with allergen immunotherapy for at least 1 y (underuse)	
• Assessment of asthma symptoms before administration of allergen immunotherapy injection(s) (underuse)	
• Documentation of the consent process for subcutaneous allergen immunotherapy in the medical record (underuse)	
Urticaria measures	
• Laboratory tests for connective tissue disease (overuse)	
• Laboratory tests for food allergy (overuse)	
• Laboratory tests for inhalant allergy (overuse)	
• Laboratory tests for hereditary or acquired angioedema (overuse)	
• Higher doses of antihistamines (underuse)	
Drug allergy measures	
• Penicillin allergy: appropriate removal or confirmation (underuse)	
• Proportion of patients with a history of seafood allergy for whom risk reduction measures are recommended in association with contrast media administration (overuse)	
• ASA challenge procedures in patients with a history of ASA “allergy” with current clinical indication for ASA therapy (underuse)	
• Diagnostic evaluation of patients with a history of local anesthetic reaction (underuse)	
• Recommendation to avoid other sulfa containing medications in patients with sulfonamide allergy (overuse)	
• Diagnostic evaluation of patients with a history of penicillin allergy (underuse)	
• Recommendation concerning future use of ARBs when clinically indicated in patients with a history of ACE inhibitor associated angioedema (underuse)	

ACE, Angiotensin converting enzyme inhibitor; ARB, angiotensin receptor blocker; ASA, aspirin.

Aim statements

Aim statements are foundational to any QI effort. An aim statement is a specific articulation of the group of patients to whom the improvement is targeted (who?), the measure to be improved and the baseline measure (what?), the desired target for improvement—often based on benchmarking a target established by other successful practices or results from the literature (how much?) and a timeline for improvement (by when?). For example: “Within 12 months, we will increase the percentage of patients with asthma at Happy Mountain Allergy, Asthma, and Immunology Center with an Asthma Control Test at their first visit from 33% to 80%.”

Methods

Many QI methods have been adopted from other industries to health care, including Lean^{14,15} and Kaizen events,¹⁶ Six-

Sigma and DMAIC (Define, Measure, Analyze, Improve, Control),^{17,18} and A3.¹⁹ One of the most commonly used frameworks is the Plan-Do-Study-Act (PDSA) cycle. With origins in the work of Walter Shewhart and Deming,²⁰ the PDSA cycle has been adapted to health care by Berwick,²¹ Langley,²² and many others, allowing physicians and others to develop and examine small sequential tests of change over time, with each effort being informed by the successes and challenges of previous efforts. The Institute for Healthcare Improvement (www.ihp.org) and the United States Department of Veterans Affairs QUERI (Quality Enhancement Research Initiative) programs (http://www.queri.research.va.gov/implementation/quality_improvement/default.cfm) offer excellent reviews and tools on several QI methods and associated tools applicable to health care practice.

Tracking progress

Tracking data over time is important to establish baseline measures, the natural variation of measures before improvement efforts, to track the effects of attempted improvement, distinguish improvement from random fluctuation of data over time, guide adjustment in improvement interventions, and assess the sustainability of achieved improvements. Although a detailed discussion is beyond the scope of this article, physicians should become familiar with standard QI reporting methods including run charts and statistical control charts.²³

PHYSICIAN INVOLVEMENT IN QI

Physician input and meaningful engagement is critical to keep QI efforts grounded in evidence and practice. The ultimate goal of, and primary rationale for, physician engagement in QI is that the use of structured improvement frameworks can help improve processes and outcomes of care for patients. However, using QI in practice has several additional benefits for practicing physicians, especially with the Centers for Medicare and Medicaid Services move toward Merit-based Incentive and Value-Based Payments under the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA).²⁴ As noted above, involvement in QI helps diplomates certified by the American Board of Allergy and Immunology (ABAI) meet the Improvement in Medical Practice component of MOC. Clinical faculty who participate in QI help their ACGME-accredited training programs meet Next Accreditation System requirements; engaging in QI with activities with trainees can be beneficial to patients, the training program, and helps trainees learn QI and systems-based practice skills.

Physicians may perceive several barriers to participating in QI initiatives, including time, multiple competing practice, regulatory and other demands, lack of knowledge on QI basics, difficulty accessing practice data, and perceived lack of relevance of QI to clinical practice. Resources on foundational aspects of QI are increasingly available through the Institute of Healthcare Improvement's Open School (<http://www.ihp.org/education/ihopenschool/Pages/default.aspx>); continuing medical education providers, specialty societies, hospitals, and other groups are increasingly offering QI educational opportunities. Practical, intuitive frameworks that leverage existing data resources and allow QI participation to meet multiple demands are critical to maximize physician effort and minimize the risk of QI becoming a “one-off” activity.

TABLE III. Applying the Clinical Quality Application Model to allergy and immunology

1. Specify what you are trying to improve in your practice (or make better for your patients), and which patients you are trying to make the improvement for.	We will record Asthma Control Test scores at initial and follow-up visits for all patients with asthma who receive care at the Happy Mountain Asthma Center.
2. Identify the data that will be used to guide this effort (ideally from data already being gathered in practice for reporting to other entities, claims, etc.).	Asthma Control Test scores that will be entered into a flowsheet in our electronic medical record for all patients with asthma.
3. Identify where you are starting from (your baseline measures).	At baseline, 33% of patients with asthma have an Asthma Control Test performed on their first visit, and 50% of patients have an Asthma Control Test performed on at least 1 follow-up visit.
4. Specifically state your goal—improve by how much and by when?	By 12 mo: • 80% of patients will have an Asthma Control Test performed on initial and at least 1 follow-up visit • >65% of patients with asthma will have exhibited an improvement in asthma control that exceeds the minimal important difference in Asthma Control Test score, which has been defined as ≥ 3.²⁵
5. Identify (and write down) specific steps you are going to take to try to improve.	An asthma educator will be responsible for recording Asthma Control Test scores in the electronic medical record.
6. Specify a period of time to assess progress.	These data will be assessed every 3 mo for a period of 1 year.
7. After the specified period of time, assess how well the initial improvement plan worked. a. What does the follow-up data show? b. What worked well? c. What didn't work so well?	After 12 mo, 66% of patients have an Asthma Control Test documented on their initial visit, and 70% of patients have at least 1 follow-up Asthma Control Test documented. 68% of patients who have both an initial and at least 1 follow-up Asthma Control Test documented have achieved at least a 3-point improvement in test scores.
8. On the basis of initial results, specify steps for further improvement, or steps to sustain the initial improvement.	The practice is doing a good job at achieving control for patients in whom a baseline and at least 1 follow-up Asthma Control Test has been documented. We are unsure if patients without such documentation are achieving similar results. We will ask our office staff to proactively flag all new asthma patients as needing an Asthma Control Test. Each week we will ask office staff to review asthma patient charts and identify follow-up patients in need of an Asthma Control Test. These patients will be flagged on their next visit.
9. Assess how well subsequent improvement attempts worked and make further adjustments until the desired level of improvement is achieved and sustained.	After another 6 mo, 95% of new patients have a documented Asthma Control Test, and 83% of patients have at least 1 follow-up Asthma Control Test. 75% of patients who have both an initial and at least 1 follow-up Asthma Control Test documented have achieved at least a 3-point improvement in test scores.
10. Determine next steps in applying the improvement effort to others, or determine an additional area for improvement and repeat the process.	Next steps may include: • Continuing this effort to ensure that >80% of asthma patients have an Asthma Control Test documented on every visit. • Using validated tools to record outcomes in patients being seen at initial and follow-up visits for other conditions—for example, chronic urticaria, chronic sinusitis, or allergic rhinitis.

QUALITY AND PRACTICE IMPROVEMENT IS LIKE TAKING CARE OF PATIENTS: A MODEL

Practicing physicians can use the following steps (a “Clinical Quality Application Model”) to design and implement QI efforts in their practice:

1. Specify what you are trying to improve in your practice (or make better for your patients), and which patients are you trying to make the improvement for.
2. Identify the data that will be used to guide this effort (ideally from data already being gathered in practice for reporting to other entities, claims, etc.).
3. Identify where you are starting from (your baseline measures).

4. Specifically state your goal—improve by how much and by when?
5. Identify (and write down) specific steps you are going to take to try to improve.
6. Specify a period of time to assess progress.
7. After the specified period of time, assess how well the initial improvement plan worked.
a. What does the follow-up data show?
b. What worked well?
c. What didn't work so well?
8. On the basis of initial results, specify steps for further improvement, or steps to sustain the initial improvement.

9. Assess how well subsequent improvement attempts worked and make further adjustments until the desired level of improvement is achieved and sustained.
10. Determine next steps in applying the improvement effort to others, or determine an additional area for improvement and repeat the process.

Determining what one is trying to improve (step 1) is like conducting an initial visit with a new patient, trying to determine “the problem you are trying to solve.” Determining the data to guide the effort (step 2) is akin to ordering initial laboratory or imaging studies to determine a patient’s current condition (step 3). Determining the goal (step 4) is akin to setting a target for the patient based on established treatment guidelines. Identifying the specific steps for improvement (step 5) and the time to assess initial progress (step 6) is like developing a treatment plan and determining time for initial follow-up. The initial assessment of how well the improvement effort worked (step 7) is similar to assessing the results of a treatment plan during patient follow-up, followed by adjustments in treatment plan (step 8) and additional follow-up assessment (step 9) until the patient has reached goal, at which point a maintenance treatment plan is developed (step 8) and continually assessed in follow-up (step 9). The “what next” (step 10) phase is similar to applying the lessons learned to additional patients.

Table III demonstrates how the Clinical Quality Application Model can be used to develop and implement an allergy/immunology practice-relevant assessment/QI activity. This process can help allergist/immunologists investigate and evaluate their patient care practices, appraise and assimilate scientific evidence and improve their practice of medicine, and meet the ABAI’s once-every 5-year Improvement of Medical Practice MOC component.

CALL FOR PRACTICE PEARLS FROM ALLERGISTS/IMMUNOLOGISTS

We hope that the Clinical Quality Application Model can serve as a practical tool to help practicing allergists/immunologists develop and implement strategies to improve patient care. For those interested in publishing and sharing learnings with other colleagues, please consider submitting your QI challenges and solutions as Practice Pearls to *JACI: In Practice* (www.jaci-inpractice.org).

CONCLUSION—ENRICHING THE PRACTICE OF ALLERGY AND IMMUNOLOGY THROUGH QI

Quality is a journey, not a destination.

The goal of QI in allergy/immunology practice is to improve quality of care so patients with allergic/immunologic disorders experience improved health care outcomes and satisfaction. Improvement in patient care requires meaningful participation by practicing clinicians in QI activities. The practical QI model we have described can be used by physicians to develop and implement practice-based QI activities to close gaps between the current and desired state of care. Because reaching improvement goals often takes several attempts, the model can be continually applied until the desired state of improvement is achieved. The model then entails measuring once again to confirm that goals have been sustained. Then, the model can be applied toward new goals for improvement. Using structured frameworks for continually assessing practice can help

physicians deliver and improve quality of care to the patients we serve.

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