

# Building a Real-World Quality Improvement Curriculum

Quality improvement (QI) has become a recognized component of graduate medical education (GME) (1). A number of authors have described ways to incorporate QI into a GME curriculum (2–4). This article describes the QI curriculum at one community hospital and the ways it builds value for the institution and its residents while at the same time remaining workable within a busy internal medicine residency. The program is conducted within a 523-bed tertiary care hospital with 27 residents and 12 core faculty.

## The Structure

The curriculum is built on three principles. First, we have created a foundation of institutional support, taking advantage of the fact that QI is an integral part of this health system. The residency can draw on institutional expertise in QI project management and research from hospital staff whose principal assignments are Joint Commission readiness, performance improvement, auditing of Centers for Medicare and Medicaid Services quality measures, and outcomes tracking. Leadership provides ready access to data and analyst expertise because we select projects that support the institution’s core strategic aims within both the hospital and clinic.

Importantly, the program leadership promotes incorporation of the quality curriculum across all aspects of the residency (5). Resident QI education is incorporated into morning report, grand rounds, morbidity and mortality

conferences, and other institutional activities. All core faculty are required to mentor residents on QI projects and time is allocated for this work. The department supports a 0.1 full time equivalent (FTE) QI Curriculum Director and a 0.3 FTE analyst who helps to analyze practice experience.

A second principle is to build a QI knowledge base within the residency. The QI Curriculum Director and other faculty teach QI methods and tools to faculty and residents. All our physicians share an interest in improving patient care, so we encourage core faculty to turn their good ideas as well as their pet peeves about practice flow and environment into opportunities for study and improvement.

We teach root cause analysis, but we emphasize small-scale cycles of plan-do-study-act (PDSA) (6) as the best way to test and refine ideas. Rather than viewing success as a publishable paper, we measure the resident’s ability to lead small changes and then scale up to improve the care system for patients.

Our third principle is to use project-based learning (7) to empower residents to pursue their passions. We aim for every resident to “catch the bug” for QI, so individual residents select and lead a project that resonates with their own career interests (Figure 1). Mentors guide project selection utilizing a matrix that emphasizes the “triple aim” (8) and the principle of effort versus yield (9). Extensive templates, tools, and checkpoints provide structure and increase the probability of successful sustainable change (10). To measure system-level

**FIGURE 1. Helping Residents Catch the “QI Bug”**

Aim	Intervention	Outcome
Improve adherence to noninvasive positive pressure ventilation (NIPPV) therapy among residency continuity clinic patients.	Mail a survey and notification of services available to all patients with an ICD-9 diagnosis suggesting that NIPPV is indicated.	249 NIPPV patients were identified and sent letters; 96 (39%) returned the survey. 27 received interventions to improve NIPPV adherence.
Reduce inappropriate prostate-specific antigen (PSA) tests based on United States Preventative Services Task Force recommendation against screening men age 75 or older.	Add a shared decision-making tool and standardized documentation to the clinic electronic health record.	In the year prior to implementation, 33 men ≥ 75 underwent inappropriate PSA testing. During the 10 months after implementation, only 10 men ≥ 75 underwent PSA testing, although none utilized the shared decision-making tool.
Improve recognition and treatment of osteoporosis among patients admitted with hip fracture.	Create a standardized discharge order form in concert with the orthopedic and fracture team.	A standardized discharge order form was developed, but was poorly utilized. Root cause analysis was performed to determine why the form was not used and multiple areas for intervention were identified.
Reduce practice variation and improve efficiency of care for patients with diabetic ketoacidosis (DKA).	Develop a standardized order set for treatment of DKA in the intensive care unit.	A standardized order set was implemented. A second resident is currently analyzing whether time to resolution of acidemia and time spent hypokalemic were shorter post-intervention.

outcomes multiple times over the three-year project, residents work with their assigned analyst to design and run queries of the hospital and clinic electronic health record (EHR).

At the end of their project, residents are encouraged to present, publish, and use QI work to pursue fellowships. New interns see senior residents making a contribution to their future careers, which fuels enthusiasm for developing their own QI project.

### Workability for the Residency

A vibrant QI curriculum cannot be sustained unless it is workable within the time and budget constraints of the residency. We have identified strategies for success as well as cures for some common pitfalls.

#### Find Shining Eyes

For residency QI projects to succeed, the resident must put in long hours of unsupervised and often uncelebrated work. Consequently, we carefully listen to residents during the project selection process to find a project for which they feel great passion. We watch for what conductor Benjamin Zander has called “shining eyes” (11).

#### A Brick, a Wall, or a Cathedral?

Once they get excited about a problem, residents tend to envision drastic overhauls of complex processes. We encourage them to bite off a manageable piece of a project (add a brick) without losing their passion for the big-picture process (building the cathedral).

#### Sample the Soup

Busy residents tend to want to implement elaborate new processes (e.g., a pathway for depressed clinic patients) and then come back a year later to measure outcomes. Often, the new process has one or two flaws which, unaddressed, can foil an entire year’s work but can be easily identified and fixed by taking a sample of the first 10 patients going through the process. A cook does not have to eat the whole pot of soup; just a taste will reveal the need for more salt.

#### Solve a Real Problem

Occasionally, residents or faculty mentors will happen upon what sounds like a great QI project, but residents must confirm that their idea addresses a true practice gap and that

potential interventions are based on a root cause analysis as well as available evidence.

### Scope and Schedule to Support Resident Project Leadership

When necessary, we partner with the chief resident to schedule a resident’s QI block to maximize their efficacy (e.g., toward the end of a PDSA cycle to allow data assessment). We have learned to be judicious when partnering with institutional QI initiatives. Major projects may provide great opportunities but run on their own schedule, which may be faster or slower than the resident can work.

### Create an Explicit Schedule with Clear Roles and Responsibilities

Residents have some help with scheduling major meetings but are expected to create a timeline and meet deadlines. Specific responsibilities, which are delineated in support materials, help the residents as well as their mentors stay on task.

### The Process

In addition to a well-built structure, a clear process is critical to a successful QI program. Because making system-level changes and measuring their effects takes time, our curriculum is spread over the three years of residency and ideally extends beyond into practice (Figure 2). Residents are introduced to QI principles early in their first year, and these concepts are reinforced and expanded through readings and conferences. Most important, residents learn while engaging in meaningful work by completing their own QI project. A two-week QI rotation is built into both the postgraduate year (PGY) one and PGY-2 to identify a problem, perform root cause analysis and background research, propose interventions, implement a protocol, measure outcomes, and analyze results. Specific checkpoints for presenting and writing their findings to-date keep residents on task and promote a smooth transition to a finished product. Evaluation forms completed by faculty mentors at the end of each academic year assess progress, explicitly delineate learning objectives, and ensure residents complete the curriculum successfully.

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**FIGURE 2.** Overview of Quality Improvement Curriculum Process

Mentorship			
Didactics and Reading			
PGY-1	PGY-2	PGY-3	Clinical Practice
<ul style="list-style-type: none"> <li>• Problem Statement</li> <li>• Root Cause Analysis</li> <li>• Background Research</li> <li>• Propose Intervention</li> </ul>	<ul style="list-style-type: none"> <li>• Implement Protocol</li> <li>• Measure Outcomes</li> <li>• Analyze Results</li> </ul>	<ul style="list-style-type: none"> <li>• Conclusions</li> <li>• Reflections</li> </ul>	<ul style="list-style-type: none"> <li>• Lifelong Quality Improvement</li> </ul>
Presentation and Writing			

usually three to six months, should be clearly spelled out. The letter and discussion that accompanies it need to define for the resident the measures being used to assess compliance and success within the remediation period. To this end, the letter of deficiency should clearly outline expectations for improvement such as, "In the next three months, Dr. C will have no further deficiencies in dictations..." or "Dr. D will perform at/above expected level on 3 mini-CEX's..." The plan should also include a schedule for meetings with the PD, mentor, and chief residents.

Last, the letter of deficiency should define potential actions if unsatisfactory performance continues. These actions include further time on remediation/delayed promotion, suspension or termination, negative/marginal board annual ratings, or nonrenewal of contract. If necessary, the last option is often an easier route since no termination is involved.

Residents should have a face-to-face meeting with faculty to review the letter and discuss its implications. Residents need to be told upfront what information may be communicated to others. At this time, residents should again be given a copy of the GME academic improvement policy and instructions on how to appeal. Formal hearings are not required for academic issues. Disciplinary actions will involve human resources and hearings may ensue. When possible, it is best for the resident and the program to keep issues based on competency or milestones so that they remain in the academic realm.

## Conclusion

A successful remediation program requires careful planning and establishment of both structure (CCC) and processes

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## Conclusion

A strongly grounded QI curriculum can add value to both the institution and residency while remaining fluid and fun. We consider the curriculum development process our own QI project as we continually re-evaluate and redesign our program based on feedback. ☺

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(academic improvement, letter of deficiency, dismissal). It is critical that program leadership and remediation faculty are well acquainted with program and institutional academic policies and that these are provided, and explained, to residents early and often. To help educate the resident on deficiencies and to defend your committee's actions if needed, it is critical to document all steps, including resident behavior requiring remediation, feedback/discussion with the resident, remediation plan and reevaluation plan, notification of consequences, action, and appeals. The remediation process should be rewarding; residents can benefit tremendously from faculty taking the time to work individually with them. However, not all remediations end well; if the decision is academic and follows due process, the courts are on your side. ☺

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