Rapid Cycle Quality Improvement (RCQI)

A Resource Guide to Accelerate Improvement Efforts for Health Resources and Services Administration (HRSA) Grantees

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Quality Improvement Overview

The Health Resources and Services Administration (HRSA) identifies quality improvement (QI) as consisting of systematic and continuous actions that lead to measurable improvement in health care services and the health status of targeted patient groups.¹ QI is a continuous process that employs rapid cycles of change over time. QI models create:

1) The structure, which represents the attributes of settings where care is delivered;
2) The process, to determine whether or not good medical practices are followed; and
3) The outcome – the impact of the care on health status.

Several models create a specific framework on how quality improvement skills and techniques can be applied to improve care and outcomes. This document will focus on the use of Rapid Cycle Quality Improvement (RCQI) defined as "a quality improvement method that identifies, implements and measures changes made to improve a process or a system."² RCQI is based on The Model for Improvement, developed by Thomas Nolan, PhD and colleagues at Associates in Process Improvement. The Model for Improvement is a simple yet powerful tool proven to accelerate improvement efforts and has been used successfully by hundreds of healthcare organizations as well as educators, community based organizations, and many other organizational settings.³ The model consists of two parts: addressing three fundamental questions and engaging in tests of change.

Three Fundamental Questions

- **What are we trying to accomplish?** Develop a specific, time-limited and measurable aim statement.

- **How will we know if a change is an improvement?** Identify process and outcome measures to collect over time in order to track improvement and progress toward the aim statement.

- **What changes can we make that will result in improvement?** Identify ideas for changes to try out to accomplish the aim.

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3. See the Institute for Healthcare Improvement's website (www.IHI.org) for stories on improved outcomes using the Model for Improvement
The Model for Improvement uses a structured process whereby organizations focus on specific elements of care in need of improvement, and conduct small tests of change while measuring the impact of those changes on key process and outcome measures.

**RCQI vs. Research**

Research is defined in 45 CFR 46.102(d) and 45 CFR 164.501 as “a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge.” RCQI, unlike research, has two potential focuses: (1) translating existing knowledge into clinical practice to improve healthcare quality, and (2) discovering new innovations to improve healthcare quality that have not yet been researched.

RCQI takes a systems approach to support organizations that use the theory of prediction to test ideas and identify those that lead to the greatest improvements within these systems. This philosophy focuses on the process of discovery through experience, allowing organizations to alter or “tweak” their hypothesis and then test again. RCQI allows the application of several tests over time to identify the most successful ideas: those that have the largest impact on the overall program outcomes.

**RCQI and the Advanced Nursing Education Program Funding Announcement**

This resource guide has been developed to support organizations interested in submitting an application to the Funding Opportunity Announcement (FOA) titled Advanced Nursing Education Program (funding opportunity number HRSA-15-046). This FOA directs applicants to use RCQI to develop and test innovative, academic-practice partnership models for clinical training within the graduate nursing education programs that prepare graduate nursing students to provide safe, quality care within the complex environment of the nation’s evolving healthcare system. This resource guide reviews the Model for Improvement, relates the model to specific sections of the application, and provides practical examples to show how applicants might use RCQI. Please note these are simply examples, and should not be considered directives of what applicants should include in their applications.

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THE MODEL FOR IMPROVEMENT

The Model for Improvement is a simple yet powerful tool proven to accelerating improvement efforts and has been used successfully by hundreds of healthcare organizations to improve many different healthcare processes and outcomes.⁵

According to the Improvement Guide,⁶ the Model for Improvement is made up of a set of three fundamental questions that drive all improvement and the Plan-Do-Study-Act (PDSA) cycle. While the term PDSA cycle is familiar to many, it is often misunderstood and/or misused. While the three questions in the model for improvement can be answered in any order, all three questions must be addressed while embarking on improvement activities. Each of the three questions in the Model for Improvement will be reviewed in more detail below.

To view an informational video reviewing the Model for Improvement click here.

WHAT ARE WE TRYING TO ACCOMPLISH?

RCQI is a powerful tool that ensures organizations can accomplish measurable and meaningful results as quickly as possible. However, before an organization can accomplish improvement, it must create a measurable description of its organization’s desired improvement. Doing so requires a critical look at the current systems and processes to identify where the greatest opportunity for improvement exists. Organizations must also make many decisions around what can feasibly be accomplished within a specific timeline. The first question in The Model for Improvement asks: “What are we trying to accomplish?” This question is often referred to as an aim statement.

The purpose of an aim statement is to provide QI teams with clear, well-defined goals. It provides a sense of direction and allows your QI team to identify the steps that should be taken to meet the end goal. Organizations are more likely to successfully improve quality when they establish effective aim statements.⁷ A strong aim statement should include:

- **What** – what do you hope to accomplish in this improvement project?
- **For Whom** – who is the target population for this improvement work?

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⁵ See the Institute for Healthcare Improvement’s website (www.IHI.org) for stories on improved outcomes using the Model for Improvement
• **By When** – what is the deadline for accomplishing this improvement project?
• **How Much** – in specific and measurable terms, how much improvement do you plan to accomplish by your deadline?

Aim statements can be seen as the destination to your improvement work. You may take several different paths to this destination, but it will keep an improvement team focused on what, specifically, you want to accomplish. An aim statement can be applied to anything you want to improve.

More information on developing project aims can be found on this page of the HRSA website.

**AIM STATEMENTS AS THEY APPLY TO THE FOA**

When preparing a response to the current FOA on Advanced Nursing Education Program (ANE), you have been asked to create a logic model: a one-page diagram that represents the conceptual framework of the proposed work. There are many components to a logic model, but an aim statement will address the goals and outcomes described in this model. Goals are often written as general statements of improvement, therefore using an aim statement methodology to clarify your goals will allow you to clearly articulate what you seek to accomplish by the end of the FOA.

Similarly, the workplan needed for the “Response to Program Purpose” section of the current FOA on ANE asks you to create objectives and sub-objectives for the project goals. The FOA states “objectives and sub-objectives should be specific, measurable, achievable, realistic and time-framed”. These are the essential elements of an aim statement.

**EXAMPLE AIM STATEMENT**

As you work to prepare a response to the current FOA on ANE, you will create several different objectives and sub-objectives for your workplan. While your work within this FOA will focus on many different things, an example of one objective in your workplan might be to focus specifically on ensuring all preceptors meet certain competency requirements. For this objective, you might write an aim statement such as the example below.

“By June 2016, XYZ University will ensure that 100% of clinical preceptors are prepared to facilitate a positive clinical experience for students. All preceptors will undergo an annual clinical competency evaluation and will score at least 90% competency in four domains:

1. Student evaluation
2. Goal setting
3. Teaching strategies
4. Demonstration of organized knowledge”

By establishing this aim, you are stating specifically what it is you hope to accomplish in this objective. While you are not setting forth exactly “how” you might accomplish this, you are giving yourself a measurable end.
**HOW WILL WE KNOW A CHANGE IS AN IMPROVEMENT?**

All quality improvement endeavors begin with the identification of a need: acknowledging there is a gap between the current performance of a system and the performance you strive to achieve. While quality improvement is not about data collection and measurement, without it we are unable to assess if we have accomplished the change we seek.

In RCQI work, measurement allows an organization to determine if a change or a new project is actually leading to improvement. This is based on the realization that not all change is truly an improvement to a system. As discussed previously, the first step to beginning a RCQI project is to create a specific and measurable aim. This identifies where an organization hopes their work will take them. To assess if you are accomplishing your aim, you should establish a small set of measures to track over time. These are often referred to as a “family of measures.” These measures will fall into two main categories: outcome measures and, process measures. A video describing these types of measures created by the Institute for Healthcare Improvement (IHI) can be found [here](#).

While determining what process and outcome measures you might track, a few tips are important to remember.

1. The measures you select should help you measure progress towards your aim.
2. The measures should be closely related to the system you are working to improve so that it is sensitive enough to indicate change to the system.
3. Don’t track too many process measures and lose sight of your outcome.
4. Identify measures that can be collected frequently, rather than quarterly/annually.
5. Ensure the collection of this data is feasible and practical.

**VARIOUS LEVELS OF MEASUREMENT**

Organizations are accustomed to collecting and reporting data. These data may be used internally to make program decisions, are reported to governing and accrediting bodies or to current or future funders, or used in a rigorous evaluation. It is important to acknowledge that the types of data collected and reported for each of these purposes are vastly different. According to Solberg, Mosser, & McDonald (1997),

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outcomes, they typically aggregate an outcome across a population and provide little insight into how process might be changed in order to improve the outcome.

3. **Measurement of improvement**: Measurement for improvement is exactly that, a measurement to determine if improvements can be realized in care and outcomes for patients. Improvement measurement is useful to: (1) identify where a system might need focused improvement efforts, (2) collect measurement data over time to determine when improvement has been accomplished, and (3) assess the system's ability to sustain improved outcomes.

The following information taken from Solberg, Mosser, & McDonald (1997) describes some of the specific differences between measurement for improvement, accountability and research.

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Improvement</th>
<th>Accountability</th>
<th>Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aim</td>
<td>Improvement of care (efficiency &amp; effectiveness)</td>
<td>Comparison, choice, reassurance, motivation for change</td>
<td>New knowledge (efficacy)</td>
</tr>
<tr>
<td>Test Observability</td>
<td>Test observable</td>
<td>No test, evaluate current performance</td>
<td>Test blinded or controlled</td>
</tr>
<tr>
<td>Bias</td>
<td>Accept consistent bias</td>
<td>Measure and adjust to reduce bias</td>
<td>Design to eliminate bias</td>
</tr>
<tr>
<td>Data</td>
<td>“Just enough” data, small sequential samples</td>
<td>Obtain 100% of available, relevant data</td>
<td>“Just in case” data</td>
</tr>
<tr>
<td>Testing Strategy</td>
<td>Sequential tests</td>
<td>No tests</td>
<td>One large test</td>
</tr>
<tr>
<td>Determining if a Change is an Improvement</td>
<td>Run charts or Shewhart control charts (statistical process control)</td>
<td>No change focus (maybe compute a percent change or rank order the results)</td>
<td>Hypothesis, statistical tests (t-test, F-test, chi square), p-values</td>
</tr>
<tr>
<td>Confidentiality of the Data</td>
<td>Data used only by those involved with improvement</td>
<td>Data available for public consumption and review</td>
<td>Research subject’s identities protected</td>
</tr>
</tbody>
</table>
**Dynamic vs. Static Data**

RCQI data focus on the use of dynamic data, which are time-series data used over time. This is preferred over static data, which are data aggregated to represent less frequent time intervals (see graphs below). For this reason, data collection should be done in real time and track the impact of change ideas over time. Run charts—graphs of data over time—are one of the most important tools in quality. For more information on Run Charts, please refer to the course offered through IHI open school entitled “Using Run and Control Charts to Understand Variation”.

RCQI data are always for learning, not judgment. The end goal is to improve outcomes for either patients and/or healthcare providers. While the data collected through PDSA’s and other RCQI efforts indicate whether changes are being realized, it is not a system by which to judge or analyze an organization. Most importantly, organizations should use these data to make informed decisions about whether their changes are leading to improvement. Using these data will support organizations trying to make meaningful improvement, while maximizing their resources.

**Applying Improvement Measurement To the FOA**

The FOA on ANE is focused on the use of improvement data. This FOA asks applicants to submit a workplan that includes objectives and sub-objectives with specific and measurable goals. To do this, applicants should identify core outcome measures by writing aim statements for these objectives and/or sub-objectives. The workplan also asks applicants to identify core activities associated within each of these objectives and/or sub-objectives. In doing so, applicants have an opportunity to identify a core set of process measures, which could be used to track progress in meeting the outcomes of each objective.

Applicants have also been asked to construct a logic model, or a pictorial representation of the proposed activities, and how they will drive the intended outcomes. The “outputs” section of this logic model will serve as a comparable location to identify process measures. Similarly, the “outcomes” section will be an ideal location to identify some core outcome measures for an objective.
**Example**

In the example aim statement described earlier, we established an aim focused on assessing clinical competency of all preceptors so that students have a positive clinical experience. As an aim, this is the long-term goal, established with specific and measurable criteria. As an applicant working to accomplish this aim, it will be critical to set up a few measures to track over time to assess if progress is being made. In establishing these measures, you will need to look at both process and outcome measures. The process measures help ensure you are making the changes needed to meet objective. The outcome measures will inform you if an improvement has been realized in the population. For this particular example, there are two populations for whom you are working to improve the outcome: (1) clinical preceptors and (2) students. Below is a list of measures that you might track while working on this objective within your workplan.

<table>
<thead>
<tr>
<th>Potential Process Measures</th>
<th>Potential Outcome Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of preceptors</td>
<td>Total number of preceptors scoring at least 90% competency in each domain</td>
</tr>
<tr>
<td>Total number of preceptors completing annual</td>
<td>Total number of preceptors scoring at least 90% competency in all four domains</td>
</tr>
<tr>
<td>competency evaluation</td>
<td>% of preceptors reporting they feel prepared to supervise clinical students</td>
</tr>
<tr>
<td>Total number of preceptors receiving education</td>
<td>% of students meeting clinical objectives</td>
</tr>
<tr>
<td>to improve clinical competency</td>
<td></td>
</tr>
</tbody>
</table>

It is important to remember that measurement for RCQI is different from other forms of measurement, such as measurement for clinical research or program evaluation. The measurement needed for a RCQI project should be specific and sensitive to the system you are working to improve. The measures might incorporate validated tools, but this is not a requirement. What is more important when collecting data for RCQI is that the measures do two things: (1) inform your decisions regarding if the proposed change is an improvement, and (2) evaluate the system supporting the change to ensure the necessary processes exist to sustain the work.
WHAT CHANGES CAN WE MAKE THAT WILL RESULT IN IMPROVEMENT?

Once your organization has established a specific aim statement and a family of measures to track while you work to accomplish your aim, it is time to identify ideas to try so that your organization can accomplish your aim. Identification of ideas to try is often the easiest part of any improvement project. These ideas are referred to as “change ideas.” A change idea is any idea you might try out to change or improve a specific system. Change ideas can come from a number of places, including, among others, literature, professional associations, conferences, and colleague experiences. Change ideas are the heart of all improvement work. Organizations interested in doing RCQI must identify a series of ideas to try while working to accomplish the overall aim.

The beauty of RCQI is that it also involves a process of prediction based testing to allow organizations to gain confidence that an idea is leading to improvement. Therefore, organizations have the ability to try several ideas and see which works best – a level of adaptability and agility that makes RCQI unique.

RCQI always begins with a change idea, but how that change idea is introduced to the system is what makes this model different from many others. RCQI pushes organizations to try an idea, on a very small scale, to test out what this idea might be like in the current system. By starting very small, organizations have the opportunity to try something new, while causing a minimal amount of burden and disruption to the current system. Organizations using this method also have the opportunity to learn quickly whether the idea being tested might in fact be the right idea for their system, or if perhaps it is not well suited for the current system.

TESTS OF CHANGE: PLAN-DO-STUDY-ACT (PDSA) CYCLES

One of the most common tools for improvement is the Deming (or Shewhart) Cycle. This method is also known as Plan-Do-Study-Act (PDSA), and it is well suited for many improvement projects. The PDSA cycle is shorthand for testing a change - by planning it, trying it, observing the results, and acting on what is learned. This is the scientific method used for action-oriented learning. Many quality improvement practitioners believed that the Study stage (also known as the Check stage) of the process meant to simply measure the improvement and move forward to the Act stage. More detailed information on PDSA cycles can be found on the Testing for Improvement page of the HRSA website.

The PDSA Cycle starts at the Plan stage. During this phase, an organization has the opportunity to create a formalized plan on how they will test an idea. Any idea being tested with a PDSA cycle must have a prediction. The prediction is an organization’s best guess at what

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they think will happen when the new idea is introduced into the system. Predictions are often written in “if then” statements: “If I do [X], I predict [Y] will happen.” The planning phase of the PDSA also formalizes the details of your test, who will test, when, what data will be collected, etc. Plans should be manageable and within the control of the RCQI team. If a plan is developed that cannot feasibly be done without the approval of key leadership, then the plan is likely too large.

Once a plan has been developed, it is important that an organization moves into the “do” stage as quickly as possible. RCQI work is about learning rapidly through experience, therefore organizations must initiate their plan to gain insight as to whether or not their prediction is accurate. While in the “do” stage, organizations will collect the necessary data identified in the plan while also observing any problems or unexpected events while trying the idea.

The focus of the “study” stage is to further analyze the results and observations obtained during the “do” stage and to compare these results to the original prediction. Organizations are seeking to determine if the change seems to improve the system, while also identifying other factors that influence their ability to continue testing the change. The learnings identified in the “study” phase give direction to what the organization will do next.

Now a team has come full circle to the “act” stage. The act stage is critically important to PDSA cycles. Organizations must take the learnings and findings from this current cycle and make some decisions regarding what will be done different in the next phase. Organizations are “tweaking” the idea and the process so that the best possible results can be accomplished. Each tweak or PDSA cycle strengthens the case for why this new idea is effective, and why the new idea should become standard practice. A short video developed by IHI describing PDSA cycles can be found here.

While organizations should start PDSAs on a very small scale, the intention is always to find ideas that improve the system so that improved outcomes can be realized. With that in mind, any idea tested should feasibly be able to be incorporated as part of standard practice.

**Applying PDSA Cycles To The FOA**

While writing a response to the FOA for ANE, an applicant has the opportunity to identify a series of ideas they are interested in trying. These ideas might appear in the workplan under key “activities’ and/or “deliverables/products”. An applicant might identify specific change ideas and what the plan would be to test this idea. Any action on this test would come after applicants have been awarded funding. If the applicant has previous experience using PDSA cycles in relationship to the needs addressed by this application, the applicant might include this information in the “need” section of their response.

**Example**

Continuing to work on our example of improving the competency of clinical preceptors, a quick literature review will find numerous assessments of clinical competency. Each of these is a potential change idea that you might try to accomplish your aim. A change idea is simply an idea on how to do this differently. Change ideas can be simple or complex, based in literature or the experience of professionals.
For this example, let us say a grantee selects a specific instrument already created to assess clinical competency. By selecting this tool, the grantee is beginning the process of testing a change idea. The specific change idea is the tool and this idea is being tested with a prediction. For this example, the prediction would be:

“If I use a specific tool to assess the competency of clinical preceptors, I will be able to ensure all preceptors have a common baseline competency, and therefore improve my confidence that students have access to high-quality preceptors.”

RCQI is a prediction-based trial and error process. While you might start with one specific tool that you either create, or was developed and validated, your prediction remains the same. The next step in RCQI is to use a PDSA process to try out your hypothesis. In doing so, you would try out the use of your tool on a small scale. The scale is important in RCQI because it is meant to be “Rapid” – something you can do quickly to see if your idea works. For this example, a PDSA would involve the specifics outlined in the table below.

To be an iterative process, it is critical that the next steps for action are determined at the end of any PDSA cycle. While trying out new ideas is common, doing so within the constructs of this process is rare. This is a common pitfall of RCQI work; organizations often begin to try a new idea without ever reflecting back on if their prediction is true. Doing so often leads to frustration, and it fails to reach the original outcomes set forth. Below is an example of what this process might look like through a series of cycles.
**Change Idea:** Assess all preceptor competency in 4 domains

<table>
<thead>
<tr>
<th>PDSA Cycle</th>
<th>PDSA Cycle 1</th>
<th>PDSA Cycle 2</th>
<th>PDSA Cycle 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plan</strong></td>
<td>Use evidence-based tool on with one preceptor. Prediction: I will better understand preceptor competency and can support preceptor where limitations are found.</td>
<td>Meet with next 5 preceptors and tell them meeting will take at least 1 hour. Predict using the tool will provide better information, and giving specific time information will allow for completion of tool.</td>
<td>Reorganize tool to address 2 weakest domains first. Allow preceptors to see tool in advance and let them know it will take at least 1 hour to complete. Test with all preceptors for one class for one semester.</td>
</tr>
<tr>
<td><strong>Do</strong></td>
<td>Used tool with preceptor; found it to be a bit time consuming and was not able to finish the entire tool.</td>
<td>Used tool with all 5 preceptors. 4 completed tool, 1 ran out of time and thought the tool was unnecessary.</td>
<td>Tests continue to be successful; 80% of preceptors completed tool. Same 2 domains continue to be weakest.</td>
</tr>
<tr>
<td><strong>Study</strong></td>
<td>Preceptor was not expecting to meet for so long. More information gained in 2 factors completed, but was not able to complete tool.</td>
<td>Tool worked great with 4 preceptors. One preceptor thought the tool was not needed. All preceptors seem to score lowest in 2 of 4 domains.</td>
<td>2 of 4 domains are consistently the weakest. Preceptors seem to have similar struggles with these too. Education needed to improve them.</td>
</tr>
<tr>
<td><strong>Act</strong></td>
<td>Test with the next 5 preceptors but will tell the preceptor we need to meet for longer time to ensure completion.</td>
<td>Continue testing tool but will reorganize domains to get through 2 weakest first. Will also provide tool to preceptors in advance for review.</td>
<td>Plan education session to address 2 weakest domains. Test using tool more frequently but only assess 2 weakest domains to see if improvement is realized.</td>
</tr>
</tbody>
</table>
CONCLUSION

RCQI is a simple yet powerful tool to support professionals and students to achieve improved outcomes. When embarking on any improvement endeavor it is important to remember the need for balance in the Model for Improvement. No single question can support the depth necessary for an improvement effort. Staying focused on each of these three questions and using the iterative process of testing through PDSA holds the greatest potential for improved outcomes and processes. This model has been successfully used by a wide array of health care professionals and educators across the county and around the world. RCQI can support improved educational experiences which can ensure positive student outcomes, i.e., students are prepared to excel as health professionals upon completion of their education and training.
This resource guide was prepared by Amanda Norton, MA, an independent quality improvement consultant, and Jean Moore, DrPH of the Health Workforce Technical Assistance Center.

The Health Workforce Technical Assistance Center (HWTAC) is based at the Center for Health Workforce Studies. HWTAC conducts a number of initiatives each year designed to provide expert assistance with health workforce data collection, analysis and dissemination. This resource guide is one such initiative.

HWTAC is supported by HRSA of the U.S. Department of Health and Human Services (HHS) under grant number U81HP26492, a Cooperative Agreement for a Regional Center for Health Workforce Studies, in the amount of $1,820,048. This content and conclusions are those of HWTAC and should not be construed as the official position or policy of, nor should any endorsements be inferred by HRSA, HHS or the U.S. Government.

The Center for Health Workforce Studies (the Center) is an independent, not-for-profit research organization based at the School of Public Health, University at Albany, State University of New York. The Center's mission is to provide timely, accurate data and conduct policy-relevant research about the health workforce.
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