



The ABCs of PDCA Grace Gorenflo and John W. Moran¹

The Public Health Accreditation Board's (PHAB) voluntary accreditation program emphasizes the importance of quality improvement, and has catalyzed health department activity in this arena. The Accreditation Coalition, comprising national public health leaders, defines quality improvement in public health as the following:

"Quality improvement in public health is the use of a deliberate and defined improvement process, such as Plan-Do-Check-Act, which is focused on activities that are responsive to community needs and improving population health. It refers to a continuous and ongoing effort to achieve measurable improvements in the efficiency, effectiveness, performance, accountability, outcomes, and other indicators of quality in services or processes which achieve equity and improve the health of the community."²

The Plan-Do-Check-Act cycle (PDCA) has been embraced as an excellent foundation for, and foray into, quality improvement for public health departments, as it is both simple and powerful. Its simplicity comes from the systematic, straightforward and flexible approach that it offers. Its power is derived from its reliance on the scientific method, i.e., it involves developing, testing, and analyzing hypotheses. This foundation offers a means to become comfortable with a host of quality improvement methods and techniques, and to progressively evolve into addressing more complex problems, employing additional QI tools, and migrating to system-wide approaches to QI.

PDCA is based on the "Shewhart cycle," and was made popular by Dr. W. Edwards Deming, considered by many to be the father of modern quality control.³ During his lectures in Japan in the early 1950s, Deming noted that the Japanese participants shortened the cycle's steps to the now traditional plan, do, check and act. It is interesting to note that Deming preferred plan, do, *study*, and act because the translation of "study" from Japanese to English has connotations closer to Shewhart's intent than does "check."⁴ This model has been around for 60 years and it is relevant in today's public health world, providing a defined and well tested process to achieve lasting improvement to the problems and challenges public health is now facing.

Spending adequate time in each phase of the PDCA cycle is imperative to having a smooth and meaningful quality improvement process. The elements put forth here comprise a deliberate process based on the scientific method, and help ensure that improvement efforts are conducted in a way that will maximize the degree of success achieved.

Before beginning the PDCA process, it is important to assemble the team that will participate and to develop a communications plan about the effort.

Assemble the team

PDCA involves a team approach to problem solving. To begin, designate a team leader and team members, and address the following questions:

- Do we have the right people (i.e., those who are directly involved with the area needing improvement)?
- Does the team need training?



Who will facilitate the team and process?

Another key step is to develop a team charter⁵, which serves to provide focus and clarity regarding the team's work. Additional resources on tending to teams as they move through the PDCA process may prove useful to optimize the team's performance.⁶

Communication plan

Those involved with or impacted by improvements must be kept informed of the changes, timing, and status of the quality improvement project. It's important to establish a communication plan at the outset of the improvement effort, and to communicate and post progress on a regular basis, in a highly visible location, for all to see. Storyboards⁷ offer a cogent picture of key points in the PDCA cycle, and can be an effective venue to tell the story as the team moves through its improvement work.

Phases of the PDCA Model

The phases of the PDCA model below assume that just one underlying, or root cause will be addressed by testing just one intervention. When undertaking the PDCA process, the team may decide to address more than one root cause, and/or to test more than one intervention to address a root cause. In such instances, it will be important to measure the effect of *each* intervention on the root cause it is intended to address.

Plan: The purpose of this phase is to investigate the current situation, fully understand the nature of any problem to be solved, and to develop potential solutions to the problem that will be tested.

1. **Identify and prioritize quality improvement opportunities.** Usually a team will find that there are several problems, or quality improvement opportunities, that arise when programs or processes are investigated. A prioritization matrix⁸ may help in determining which one to select. Once the quality improvement opportunity has been decided, articulate a problem statement. Revisit and, as appropriate, revise the problem statement as you move through the planning process.
2. **Develop an AIM statement⁹** that answers the following questions:
 - a. What are you seeking to accomplish?
 - b. Who is the target population?
 - c. What is the specific, numeric measure(s) you are seeking to achieve?
 - d. The measurable improvement objective is a key component of the entire quality improvement process. It's critical to quantify the improvement you are seeking to achieve. Moreover, the entire aim statement also will need to be revisited and refined as you move through the planning phase.
3. **Describe the current process** surrounding the problem in order to understand the process and identify areas for improvements. Flow charts and value stream mapping are two examples of methods to accomplish this.
4. **Collect data on the current process.** Baseline data that describe the current state are critical to further understanding the process and establishing a foundation for measuring improvements. The data may address, for example, time, people, space, cost, number of steps, adverse events, and customer satisfaction. A host of tools are available to collect and interpret data on the



process, such as Pareto charts, histograms, run charts, scatter plots and control charts. The data collected must be aligned with the measures listed in the aim statement.

5. **Identify all possible causes** of the problem and determine the root cause. While numerous causes will emerge when examining the quality improvement opportunity, it is critical to delve in and carefully identify the underlying, or root cause of the problem, in order to ensure that an improvement or intervention with the greatest chance of success is selected. Brainstorming is a useful way to identify possible causes and a cause and effect/fishbone diagram and the 5 Whys are useful for determining the actual root cause.
6. **Identify potential improvements** to address the root cause, and agree on which one to test. Once the improvement has been determined, carefully consider any unintended consequences that may emerge as a result of the implementing improvement. This step provides an opportunity to alter the improvement and/or develop countermeasures as needed to address any potential unintended consequences. Revisiting the aim statement and revising the measurable improvement objectives are important steps at this point.
7. **Develop an improvement theory.** An improvement theory¹⁰ is a statement that articulates the effect that you expect the improvement to have on the problem. Writing an improvement theory crystallizes what you expect to achieve as a result of your intervention, and documents the connection between the improvement you plan to test and the measurable improvement objective.
8. **Develop an action plan** indicating what needs to be done, who is responsible, and when it should be completed. The details of this plan should include all aspects of the method to test the improvements - what data will be collected, how frequently data are collected, who collects the data, how they are documented, the timeline, and how results will be analyzed.

Do: The purpose of this phase is to implement the action plan.

1. Implement the improvement.
2. Collect and document the data.
3. Document problems, unexpected observations, lessons learned and knowledge gained.

Check/Study: This phase involves analyzing the effect of the intervention. Compare the new data to the baseline data to determine whether an improvement was achieved, and whether the measures in the aim statement were met. Pareto charts, histograms, run charts, scatter plots, control charts and radar charts are all tools that can assist with this analysis.

1. Reflect on the analysis, and consider any additional information that emerged as well. Compare the results of your test against the measurable objective.
2. Document lessons learned, knowledge gained, and any surprising results that emerged.

Act: This phase marks the culmination of the planning, testing, and analysis regarding whether the desired improvement was achieved as articulated in the aim statement, and the purpose is to act upon what has been learned. Options include:



1. **Adopt:** Standardize the improvement if the measurable objective in the aim statement has been met. This involves establishing a mechanism for those performing the new process to measure and monitor benchmarks on a regular basis to ensure that improvements are maintained. Run charts or control charts are two examples of tools to monitor performance.
2. **Adapt:** The team may decide to repeat the test, gather different data, revise the intervention, or otherwise adjust the test methodology. This might occur, for example, if sufficient data weren't gathered, circumstances have changed (e.g., staffing, resources, policy, environment, etc.), or if the test results fell somewhat short of the measurable improvement goal. In this case, adapt the action plan as needed and repeat the "Do" phase.
3. **Abandon:** If the changes made to the process did not result in an improvement, consider lessons learned from the initial test, and return to the "Plan" phase. At this point the team might revisit potential solutions that were not initially selected, or delve back into a root cause analysis to see if additional underlying causes can be uncovered, or even reconsider the aim statement to see if it's realistic. Whatever the starting point, the team will then need to engage in the Plan cycle to develop a new action plan, and move through the remaining phases.

PDCA offers a data-based framework based on the scientific method. This simple yet powerful format drives continuous and ongoing efforts to achieve measurable improvements in the efficiency, effectiveness, performance, accountability, outcomes, and other indicators of quality in services or processes which achieve equity and improve the health of the community.

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References:

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- ² This definition was developed by the Accreditation Coalition Workgroup (Les Beitsch, Ron Bialek, Abby Cofsky, Liza Corso, Jack Moran, William Riley, and Pamela Russo) and approved by the Accreditation Coalition on June 2009.
- ³ <http://en.wikipedia.org/wiki/PDCA> - accessed 12/2/2009
- ⁴ <http://en.wikipedia.org/wiki/PDCA> - accessed 12/2/2009
- ⁵ J. Moran and G. Duffy. Team Chartering. *Quality Texas Newsletter*, April 10, 2010 (available at www.naccho.org/toolbox/ in the Quality Improvement Toolkit)
- ⁶ Team Assessment, team charter, team manager self-assessment, team process review checklist, and T. Kuras and J. Moran. 20 Questions to Ask Your Team. *The Quality Management Forum*, Winter Edition, Vol. 23, Number 4, 1997 are all available at <http://www.naccho.org/toolbox/> in the Quality Improvement Toolkit
- ⁷ A number of national efforts to support QI in public health have used a storyboard format that was developed by the Michigan department of public health and can be accessed at <http://nnphi.org/CMSuploads/Storyboard-Guidelines-FINAL-05868.pdf> (accessed 3/26/10)
- ⁸ Bialek, R., Duffy, G. L., Moran, J. W. (2009). *The Public Health Quality Improvement Handbook*. Milwaukee, WI: ASQ Quality Press. This resource contains all of the quality improvement tools mentioned in this paper.
- ⁹ [http://www.accreditation.localhealth.net/MLC-2%20website/Michigans QI Guidebook.pdf](http://www.accreditation.localhealth.net/MLC-2%20website/Michigans%20QI%20Guidebook.pdf) – accessed 3/26/10
- ¹⁰ Ibid.