Accelerating quality improvement within your organization: Applying the Model for Improvement
Ashley Crowl, Anita Sharma, Lindsay Sorge, and Todd Sorensen

Objective: To discuss the fundamentals of the Model for Improvement and how the model can be applied to quality improvement activities associated with medication use, including understanding the three essential questions that guide quality improvement, applying a process for actively testing change within an organization, and measuring the success of these changes on care delivery.

Data sources: PubMed from 1990 through April 2014 using the search terms quality improvement, process improvement, hospitals, and primary care.

Study selection: At the authors’ discretion, studies were selected based on their relevance in demonstrating the quality improvement process and tests of change within an organization.

Summary: Organizations are continuously seeking to enhance quality in patient care services, and much of this work focuses on improving care delivery processes. Yet change in these systems is often slow, which can lead to frustration or apathy among frontline practitioners. Adopting and applying the Model for Improvement as a core strategy for quality improvement efforts can accelerate the process. While the model is frequently well known in hospitals and primary care settings, it is not always familiar to pharmacists. In addition, while some organizations may be familiar with the “plan, do, study, act” (PDSA) cycles—one element of the Model for Improvement—many do not apply it effectively. The goal of the model is to combine a continuous process of small tests of change (PDSA cycles) within an overarching aim with a longitudinal measurement process. This process differs from other forms of improvement work that plan and implement large-scale change over an extended period, followed by months of data collection. In this scenario it may take months or years to determine whether an intervention will have a positive impact.

Conclusion: By following the Model for Improvement, frontline practitioners and their organizational leaders quickly identify strategies that make a positive difference and result in a greater degree of success.

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Learning objectives

- Apply the principles of the Model for Improvement to clinical scenarios.
- Examine the three essential questions that frame quality improvement initiatives within the Model for Improvement.
- Summarize the four aspects of the “plan, do, study, act” (PDSA) cycle as part of the Model for Improvement.
- Discuss strategies for implementation and growth of quality improvement initiatives.
- Identify resources that can assist a team to apply the Model for Improvement within their organization.
Preassessment questions
Before participating in this activity, test your knowledge by answering the following questions. These questions will also be part of the CPE assessment.

1. What are the essential steps to the Model for Improvement?
   a. Aim, measure, outcomes
   b. Objective, drivers, results
   c. Process, analyze, measure
   d. Aim, measure, change

2. What are the correct steps in the “plan, do, study, act” (PDSA) cycle?
   a. Do, study, act, plan
   b. Plan, do, study, act
   c. Study, do, plan, act
   d. Act, plan, study, do

3. The Alliance for Integrated Medication Management Collaborative is the following:
   a. Organization that created the Model for Improvement
   b. Nonprofit advocacy organization for medication therapy management services
   c. Regulatory arm of the U.S. Health Services & Resources Administration
   d. Facilitated learning and action environment for improving medication use

Introduction to quality improvement
Royals Community Pharmacy (hereafter referred to as Royals) is located near Lakeville Medical Center (LMC). Many of LMC’s patients use Royals for prescription services because of its convenient location. Over time, LMC physicians and staff have formed collegial relationships with Royals pharmacists secondary to frequent communications around order clarification or clinical issues identified by the pharmacists.

LMC recently formed an Accountable Care Organization (ACO) and is actively seeking contracts with payers that have incentives for achieving quality benchmarks. Royals staff learned that one of LMC’s first quality-related goals is to reduce avoidable hospital readmissions. LMC had collected data showing that the majority of avoidable readmissions were at least in part related to less-than-optimal medication use. Royals staff realized they were in a position to help LMC achieve their goal and decided to approach LMC leaders about collaborating on a quality improvement project focused on improving medication use during the post–hospital discharge transition period. But as the pharmacy staff considered this opportunity, they found themselves unclear about how they should structure the proposed collaboration between the two organizations.

Possibly at no other time in the history of health care have the focus on quality and the expectations for reporting performance been more significant than they are today. Health care reform and the Affordable Care Act both focus strongly on improving the quality of health care while also decreasing the cost. These two concepts increase the value of services and lead to better outcomes in health care systems.1

Previously it was often assumed that quality was associated largely with the clinical knowledge and expertise of health care practitioners. Initially this assumption occurred because medical programs were not standardized in the teaching and training of medical professionals. Programs that would try to influence performance would frequently focus on clinical education, ensuring up-to-date knowledge about illnesses and treatment strategies. In the mid-1920s, a shift began to occur when concepts of the quality improvement model started to arise.2 However, in the early stages this model was focused primarily on health outcomes rather than the structure–process–outcomes model presented by Avedis Donabedian in 1966.3

More recently, it has been recognized that focusing on changes within our care delivery systems can have the greatest impact on quality improvement.2 This can cover a spectrum that extends across all facets of care delivery, including the degree of convenience perceived by a patient in scheduling a medical appointment, effectiveness of workflow across staff and providers in a single setting, or communication strategies that link care providers across settings and organizations.

Most health care organizations are seeking to meet expectations for producing high-quality care delivered to patients and, in doing so, looking at how they can ensure care model design and organizational operations to support improved quality. The Model for Improvement has been identified as an important tool in helping organizations structure improvement work and accelerating their ability to reach quality goals.4 It was designed to help a care team address three essential questions:

1. What are we trying to accomplish?
2. How will we know if a change is an improvement?
3. What changes can we make that will result in improvement?

These questions have guided the design of the Model for Improvement (Figure 1), which includes setting an aim statement, establishing measures that will determine if there is a change, and selecting changes to implement in the process.

Walter A. Shewhart and W. Edwards Deming are credited with initially defining the need for quality improvement and outlining processes that support this work in the 1920s. Deming initially created the concept of “plan, do, study, act” (PDSA) cycles to support systems change within fields of business and industry. He has been referred to as “the father of the third phase of the Industrial Revolution,” as well as the father of quality improvement. His devotion to continual improvement has led to the further creation of transformational theories on quality, management, and leadership.5

The Model for Improvement, developed by Associates in Process Improvement (API) in the 1990s, focused on improvement in health care systems. The model builds on Deming’s work related to the System of Profound Knowledge.4 API then introduced the model to the Institute for Healthcare Improvement (IHI, founded in 1991), which created the foundation for IHI’s Breakthrough Series Collaborative in 1995. The series has
Defining what you want to achieve

In an initial meeting between Royals and LMC leadership, LMC expressed interest in exploring ways in which a partnership could contribute to defined quality-related goals. Everyone agreed to focus initially on improving medication use postacute hospital care. LMC used the Model for Improvement for much of their quality improvement work and suggested that it serve as the framework for collaboration with Royals.

First, a workgroup with staff from both organizations was formed. The group focused on setting a goal that would guide their work. A review of LMC’s readmission rates showed that 27% of patients discharged with nonorthopedic or nonmaternity-related diagnoses were readmitted within 30 days. The group established a goal to reduce avoidable 30-day hospital readmissions to below 15% within 12 months for all nonorthopedic and nonmaternity inpatient stays (aim statement).

Next, the group mapped out, based on their experience and observations, the factors that were influencing the readmission rate. They also began outlining strategies that might help them achieve their goal. Collectively, they outlined a “driver diagram” that allowed the group to establish a common understanding of factors, opportunities, and strategies (Figure 2). Though LMC staff were already aware that medication use was a key factor in readmissions, constructing the driver diagram helped them realize the various points where medication use comes into play in both inpatient and outpatient experiences.

Recalling the three questions outlined in this article’s introduction, a group must ensure it can define what it is trying to accomplish. Thus, the first step in any quality improvement effort is ensuring that everyone involved understands the proposed outcome of the group’s work. Within the Model for Improvement, this effort is referred to as establishing an “aim statement,” which is an explicit description of a team’s desired outcomes expressed in a measurable and time-specific way. This includes defining the type of population or system and the timeframe in which the change will be measured. It is also imperative to include quantitative goals because they provide specificity for measurement.

For example, “increasing time in-range” for patients on anticoagulation therapy is not as specific as “achieving 75% of all international normalized ratio (INR) measurements in-range within 6 months.” All team members must agree on the aim and ensure they have the proper resources to accomplish it. To stay on track, staff should revisit the aim statement frequently at meetings or have it presented visually in key gathering areas to ensure the team members do not lose sight of the goal or try to downsize it. Berwick emphasizes that the Model for Improvement centers on collaboration among health professionals. Aim statements will not be successful if professionals focus only on their specific areas of practice (i.e., physicians deal with medical issues, pharmacists deal with pharmacy issues). That is why it is essential to have a variety of team members devoted to the collaboration.

Targeting a population and defining a team to lead quality improvement work

After completing its driver diagram, the group turned its attention to testing changes and where these efforts would be focused. LMC is a large organization, averaging 32 discharges each day. The group was concerned that it would be difficult to focus initial quality improvement efforts on all patients being discharged. As they drilled down further into LMC data, the team realized that the readmission rate from two internal medicine units was significantly higher than that of other units. These two units averaged 11 discharges daily. The group also recognized that not all patients discharged from LMC were also patients at Royals. Royals’ review of prescription errors

Helping many organizations fill gaps in their design and implementation of quality improvement systems, resulting in improvements in clinical outcomes, reduction in costs, and enhanced efficiency. National and federal entities, such as CMS, have promoted use of the Model for Improvement across health care organizations to reduce the gap between what organizations know about quality improvement and what organizations do to improve quality. IHI has supported the incorporation of the Breakthrough Series in more than 1,000 health care organizations since 1995, and these organizations have realized significant improvements in their quality initiatives. Some examples include reducing wait times by 50% and intensive care unit costs by 25%.

The Model for Improvement was designed to serve as a framework for organizational activity in improving processes and outcomes. The model is ideal for use in health care settings because there are several processes involved within a system and a constant need for improvement. For instance, an organization may use this model to improve wait time for patients, reduce adverse drug events, or avoid prescription errors. By focusing on testing small changes in the processes associated with care delivery and measuring performance over time, an organization can accomplish rapid improvement and better outcomes. The Model for Improvement also allows an organization to invest less time and fewer resources in relation to the degree of change that can be achieved.

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Figure 1. The Model for Improvement by Langley and colleagues

What are we trying to accomplish?

How will we know that a change is an improvement?

What changes can we make that will result in improvement?

Act
Plan
Study
Do

Source: Reprinted with permission from John Wiley & Sons.
records indicated that approximately one-half of the discharged patients were receiving initial medication orders postdischarge from the pharmacy.

With this information, the group determined to focus its initial quality improvement efforts on those patients discharged from the two internal medicine units who chose to receive medications from Royals (population of focus). The group was confident that the size of this population would be manageable for testing changes and evaluating results within their existing patient care activities.

Before moving ahead, the group determined that it was not necessarily the best set of individuals to lead this effort. The initial group consisted of positional leaders for LMC and Royals, but this group would not be implementing the quality improvement work. As a result, a new group of practitioners was identified to operationalize the various strategies that would be tested for quality improvement. A quality improvement nurse was asked to lead the newly formed group’s activities. Knowing that initial tests of change would be focused on internal medicine patients, a physician who was recognized for strong collaborations was asked to participate. A nurse from one of the internal medicine units, recognized for her ability to communicate positively with her colleagues, joined the team, as did one of the LMC staff pharmacists. Royals’ pharmacy manager asked the staff pharmacist who had originally heard about LMC’s ACO program and who had suggested pursuing a partnership to represent Royals to join the team as well. The manager provided flexibility with her schedule so that she could spend time in the hospital to better understand the care systems from the inpatient perspective.

**Figure 2. Driver diagram for reduced hospital readmissions**

<table>
<thead>
<tr>
<th>Aim/Outcomes</th>
<th>Primary Drivers</th>
<th>Secondary Drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce 30-day avoidable hospital readmissions to less than 15% of all non-orthopedic, non-maternity patients within 12 months.</td>
<td>#1 – Medication errors</td>
<td>A. Overdose of medication</td>
</tr>
<tr>
<td></td>
<td>#2 – Patient education on medications</td>
<td>B. No medication treatment</td>
</tr>
<tr>
<td></td>
<td>#3 - Reinfection</td>
<td>C. Duplicate medication</td>
</tr>
<tr>
<td></td>
<td>#4 – Skilled care requirements</td>
<td>D. Patient continued stopped medications</td>
</tr>
<tr>
<td></td>
<td>#5 – Social factors</td>
<td>A. Did not follow instructions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B. Did not take medication</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C. Did not know how to use medication</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A. Miscommunication with SNF*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B. Lost to follow up</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C. Duplicate medications</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A. Can’t afford medication</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B. No housing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C. No transportation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D. Health literacy</td>
</tr>
</tbody>
</table>

Abbreviation used: SNF, skilled nursing facility.
IHI discusses the importance of defining a population of focus, also known as a subpopulation. A population of focus can be defined in several ways, but it most commonly includes narrowing down a total population by disease, race/ethnicity, or a certain health system. Defining a population of focus when testing change is imperative, as this is typically done on a small scale before implementing to a total population. As we touch on later in this article, defining a population of focus helps to identify a group that is easily manageable, therefore allowing early detection of improvement and quicker dissemination of successes to broader populations.

While application of the process of quality improvement outlined by the Model for Improvement is critical to achieving success, equally important is having the right team to lead and carry out the work. The right team involves members who know what the improvement process includes, bring strengths suited to help guide the process along, and represent three areas of expertise: system leadership, technical expertise, and those involved with the system day to day.4

Often the responsibility for leading a project is perceived as the domain of someone with “manager,” “director,” or “coordinator” in his or her title—someone with a formal title of leadership. Yet the success of a change initiative depends greatly on the work of individuals who demonstrate leadership and take on the role of coordinating change without an official title. Placing responsibility for coordinating this effort with informal leaders can be remarkably powerful for an organization and can generate effective results. One reason for this is that the individuals leading the work are passionate about the project; they want to do the work instead of feeling they have to do it.

This is also important when considering technical problems versus adaptive challenges.1 It is easier to address technical problems. Resolving a technical problem usually relies on current knowledge, and formal leaders within an organization can often address the problem quickly and easily. People tend to respond to change focused on addressing a technical problem without much resistance. Examples of technical challenges viewed as “projects” include implementing a new computer system to support prescription dispensing or remodeling a sterile product preparation area according to USP 797 standards.

Adaptive challenges are more difficult to address because success is rooted in people’s willingness to act or behave differently—a human element that creates a unique challenge for the leader.1 Addressing adaptive challenges requires experimentation, because knowledge about how to achieve the desired outcome may be unknown. This work must engage “those who have the problem” to ensure buy-in. In fact, success in leading this type of change often depends on nonauthority figures creating the solution.

Table 1 outlines the key differences between technical problems and adaptive challenges.2,3,12 Typically, quality improvement work is adaptive in nature: it requires experimentation, engagement of frontline practitioners, and an openness to doing things differently. In the scenario above, the leadership team likely increased its chances of creating meaningful success by giving most of the responsibility for finding the solutions that will improve the readmission rate to practitioners who are excited to discover what will work.

### Defining measures and identifying changes

Measurement is a key step in the Model for Improvement process because it answers the question, “What changes are being made that can lead to an improvement?” Three main sets of measures have to be balanced in all improvement efforts: outcome measures, process measures, and balancing measures. These types of measurement will be expanded on below. It is also important to note that measurement is not solely intended to accept or reject the aim statement; rather, it is used for the purpose of learning. Furthermore, measurement helps to refine the aim statement.8

Several characteristics of measurement involved with process and learning improvement differ from those of typical research measurement, and these differences are important to distinguish. For instance, the focus is on the day-to-day work and the new knowledge that can be found. The improvement process also involves several sequential tests versus a large test. The goal of these continuous tests is to gather just enough data to learn from the data and then move on to complete another cycle. The test or measurement does not need to be perfect, but it should provide new information. These are small tests, but they can promote significant change and thus accelerate improvement. It is also important to highlight the downfalls of typical research measurement, including increased costs, the burden of collecting data, and the slow time associated with the process. Research measurement also is usually too complicated for most individuals involved with a health care system.15

### Types of measurement

As stated previously, three types of measurements are used in quality improvement: outcome measures, process measures, and balancing measures.14 Out-
come measures ask how the system influences value that patients have related to their health and well-being. They also look at the impact on other stakeholders, such as employees, the community, or payers. Examples of outcome measures include obtaining a lipid panel to assess adherence to statin therapy for patients with hyperlipidemia. Process measures aim to answer whether improvements are on course to have a positive impact on the system and whether the steps in the system are being performed as intended. For instance, when looking at hyperlipidemia, a process measure looks at the number of patients whose lipid panel was measured 4 to 12 weeks after the initiation or adjustment of statin therapy.

Last, balancing measures strive to ensure that improvements on one part of the system do not cause new problems in another part of the system. As an example, balancing measures for centralizing the call center in a health system to ensure easier access for appointments do not increase the wait time for patients who are calling to make an appointment. Making any improvements takes time, so to determine if improvement has really occurred, it is necessary to observe patterns over time.

Several measures were identified by the quality improvement team relevant to tracking progress toward their aim. The team knew the baseline readmission rate on the two internal medicine units, and they could continuously monitor their readmission rate in 1-week periods against this baseline. A run chart updated weekly would be the mechanism to display their progress.

Because an improvement in the readmission rate would require several weeks of monitoring to detect, the team used its driver diagram to identify other factors that could be measured via both process measures and outcome measures. The primary drivers for change were focused on patient social issues, medication management, patient education, risk for infection, and skilled care requirements. One of the first process measures the team implemented focused on the success in having nursing staff establish medication management appointments for postdischarge follow-up at Royals. The team tracked the percentage of patients scheduling appointments before their discharge as well as the number of appointments they actually completed.

Another process measure focused on the results of medication management evaluations conducted by the Royals team, who documented the number and type of medication-related problems for each patient reviewed. Biweekly, the quality improvement team would review a summary of these assessments to look for patterns and potentially identify problems that could be prevented through changes in the inpatient care process.

Identifying changes through driver diagrams. To answer the question, “What changes can we make that will result in improvement?” first you need to evaluate the system and processes. One way to do this is by using driver diagrams to define the system in a visual display. The goal is to brainstorm with team members to determine what key factors will impact the aim statement. Then these drivers are grouped together as either primary, secondary, or tertiary (continuing to other levels as necessary). Primary drivers include factors that directly influence the desired aim, while secondary drivers are factors that act upon the primary drivers. It is not unusual for a team to identify more secondary than primary drivers.

Secondary or latter drivers then become the focus of strategies that can be implemented to drive change in the system, which in turn become the focus for PDSA cycles (see following section). Defining secondary drivers so that they are measurable is important, as measurable secondary drivers help track progress made toward the aim statement. Driver diagrams provide a visual map of how factors are related and possible steps to take to measure and implement change.

PDSA cycles: the foundation for testing change

After establishing an aim, defining measures, and identifying areas of opportunity, the quality improvement team must implement changes it anticipates will lead to improvement in the measures. The PDSA cycle represents the mechanism to implement this work and thus serves as the guide and road map to the Model for Improvement.

PDSA cycles rely on an iterative process of planning for a small rapid test of change, trying it, observing the results, and acting on what is learned. PDSA cycles can be applied to situations in which one is starting new improvement projects, developing new services, or defining a repetitive work process. A well-defined driver diagram assists in this process, as it will not only list factors influencing the aim but also describe strategies that could be used to direct those factors of influence. Each of these strategies can be tested through PDSA cycles, and this starts with planning for a small change tested rapidly within a small number of encounters. A goal or purpose of the test is identified, a theory is predicted about what will eventually happen and why, and success metrics are established and defined. Success metrics help in the development of a plan to test the change and include answering critical questions, such as who, what, when, where, and why data need to be collected. Predictions are made during this phase to help clarify why a change will lead to improvement.

The cycle starts with the “plan” for conducting the small test of change. The plan needs to specifically describe the objective of the change being tested, predict what will happen and why, and develop a course of action to test the change. During this stage, test designs can be used to facilitate measurement; these include observational, before-and-after, time series, and factorial. An observational design includes examining an ideal system that the team wants its system to depict. They are simple, low in cost, and have little risk associated with them. They give the team the ability to review a different design to determine if it is a worthy investment. An example is a hospital considering use of a new spirometry device. Rather than testing the device directly in their hospital, they collect data from two other hospitals that have already implemented the new device. Then they could compare accuracy, costs, etc., with their current device. There can be downsides to this design, as settings may not be similar across different organizations.

Before-and-after design is one of the most commonly used test designs. It involves comparing baseline data to the data collected after a change has been implemented. Unfortunately, this design can have disadvantages related to interpretation of the results if an unrelated change occurs during the time a
change is made. Thus it is important to run continuous tests to help offset results occurring by chance.4

Four time-series designs are used to collect data. These are beneficial when collecting data over a period of time. A run chart, a graph that looks at data over a period of time, is one important tool for determining the effectiveness of change. This tool guides quality improvement work by displaying a pattern of data that can be observed as change occurs. It also gives direction to any progress being made and helps teams visualize the value of the change as improvement work is being done. Perlá and colleagues provide additional information about run charts and the application of this tool to evaluate change over time.15 Another is factorial designs, which include tests with multiple changes. An excellent resource for understanding test designs in more detail can be found in The Improvement Guide by Langley and colleagues.4

During the plan stage, answers to the questions who, what, when, why, and where are formulated. Let’s walk through an example as we look at the partnership between LMC and Royals. The goal was to connect patients who were being discharged from LMC with a pharmacist at Royals to help improve medication use and decrease medication-related errors. The nursing staff would verbally tell patients to schedule an appointment with a Royals pharmacist upon discharge. This was an effective way to increase the show rate, compared with nurses scheduling appointments for patients before they leave the hospital is the best modification for increasing patient visits with Royals pharmacists. Their plan was to continue this modification with another 10 patients who were being discharged from the two internal medicine units. To summarize the cycle:

**Plan:** To increase the show rate for patients scheduled to see a pharmacist at Royals, LMC nursing staff planned to schedule patient visits for an additional 10 patients before they were discharged from the hospital. The nursing staff called Royals to schedule each patient visit prior to their discharge. The team predicted that 50% of the patients would arrive for the visit within 7 days of hospital discharge. They planned to follow up with Royals after 1 week to determine how many patients followed through with their appointment.

**Do:** Before patients were discharged from the hospital, nurses scheduled them to see a Royals pharmacist on a day and time that was convenient for them within 7 days of discharge.

**Study:** Six of the 10 patients who were scheduled to meet with a Royals pharmacist followed through on their appointment. The quality improvement team learned that having nurses schedule appointments for patients before discharge was an effective way to increase the show rate, compared with asking patients to schedule appointments on their own. The team identified a gap in their data on patient satisfaction with this process.

**Act:** The team decided to continue scheduling appointments at Royals before patient discharge. To address the gap

<table>
<thead>
<tr>
<th>Data types</th>
<th>Examples</th>
</tr>
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<tbody>
<tr>
<td>Continuous measurements</td>
<td>Temperature, Weight, Time to complete a task</td>
</tr>
<tr>
<td>Counts of observations</td>
<td>Number of people in a waiting room, Number of patients admitted to a hospital between noon and 4:00 p.m., Number of complaints received</td>
</tr>
<tr>
<td>What people think; how they feel</td>
<td>Responses to a survey, Rating a new procedure on ease of use, Rating perception of care</td>
</tr>
<tr>
<td>Ratings</td>
<td></td>
</tr>
<tr>
<td>Rankings</td>
<td>Ranking items of importance</td>
</tr>
</tbody>
</table>

Source: Adapted from Table 2.1 in reference 4.
in patient satisfaction, the team planned to obtain feedback from patients who showed up to their appointment at Royals. The PDSA cycle would continue until the process is ready for implementation.

**Spread strategies to generate impact**

Once a change has been tested on a small scale and has been refined after going through several PDSA cycles, it is ready to be applied on a larger scale. Rolling out strategies known to have a positive impact on the aim will be expected to permanently alter the way work is done and generate additional improvements in outcomes in populations beyond the original population of focus. The process of implementing successful strategies is supported by documentation of previous PDSA cycles. Documentation helps those responsible for spreading change adapt the strategies to different groups or other parts of the organization. The importance of communication during this process cannot be understated. Testing change by using PDSAs may have engaged only a small number of people who were invested in the improvement effort. Taking this work to a larger group of players requires clarity in describing why a change is needed and the benefits that have been realized from the change on a small scale.

Langley and colleagues provide a framework to help spread an initiative. First, ensure that the organization is ready for the spread. This step requires strong leadership engagement to expand the initiative to a larger setting. In addition, engaging organization leaders is necessary because more resources are likely to be needed. Second, provide a description of the change to be implemented and the appropriate evidence supporting it. A spread process should be created that involves a communication, measurement, and work plan. Measurement must continue in this phase to allow for changes to be made if necessary. Continuing the measurement in this phase allows for optimal outcomes and execution of the change.

**Experience applying the model**

While the Model for Improvement has been used by hundreds of organizations to drive change, there is not a large amount of literature available explicitly describing the experience of organizations. Two examples are highlighted here.

Glasgow and colleagues describe their experience with a project by the Institute for Healthcare Improvement (IHI) and Associates in Process Improvement that focused on improving self-management of diabetes and heart failure and involved 21 teams from different health care organizations across the United States. Specific aim statements were not provided but focused on aspects of self-management. Each team then completed approximately 15 to 20 PDSA cycles. Examples of heart failure PDSA cycles included discharge follow-up, pharmacy prefills, and education on heart failure and self-management. Examples of diabetes PDSA cycles included linking self-management goals to registry goals, education on self-management, and initiating support groups. Results from the PDSA cycles showed an improvement in self-management from 19% at baseline to 93% in patients with heart failure and from 3% at baseline to 23% for patients with diabetes. The most successful teams did not focus on coming up with the perfect plan but instead saw the benefits of testing different strategies and jumping into PDSA cycles. They also identified the most appropriate staff to be involved with the initiative.

Taylor and colleagues examined a way to reduce the number of falls among nursing home residents at high risk for falling. They determined that the following team members needed to be involved: a falls nurse to serve as clinical champion, two certified nursing assistants, a physical therapist, a director of nursing, and a member of the maintenance staff. They also identified that behavioral change among nursing home staff was necessary to create a culture of safety and a blame-free environment. They highlighted certified nursing assistants as key to leading the implementation of change, as they are closely involved with nursing home residents and are in the best position to reduce the risk of falls. They also determined that frequent (weekly to monthly) meetings were necessary to ensure that processes were implemented. They used the Falls Management Program (FMP) tool originally created by the Vanderbilt University School of Medicine. This tool includes a 2-day learning session for team members and also reviews key steps to be implemented for quality improvement. The FMP was used in this quality improvement intervention in 19 out of 42 nursing homes in Georgia. The 19 nursing homes that used FMP maintained stable fall rates. However, the 23 nursing homes that did not implement FMP had a 26% increase in falls.

**Resources to support implementation**

IHI, an organization whose mission is to “improve health and healthcare worldwide,” promotes the Model for Improvement as the framework to guide performance improvement efforts. For this reason, IHI is an important source of educational resources for the model, many of which are available at no cost (www.ihi.org). A few noteworthy examples are highlighted here:

- *The Quality Improvement and Patient Safety Glossary* is a comprehensive listing of terms and tools frequently used to support quality improvement in a health care organization.

- *The Science of Improvement on a Whiteboard!* is a set of videos that provide a brief but effective introduction to the Model for Improvement via a Web-based platform.

- IHI Open School offers a range of online courses in patient safety, improvement capability, quality, cost and value, person- and family-centered care, triple aim for populations, and leadership. The full course catalog includes more than 25 contact hours for nurses, physicians, and pharmacists and offers a Basic Certificate of Completion for select fundamental courses.

While IHI resources can be important tools to support quality improvement efforts within an organization, a collaborative is a facilitated shared learning and action environment focused on generating improvement in a defined area of practice. The Alliance for Integrated Medication Management (AIMM) Collaborative is a national effort to create a commu-
nity of practice focused on improving medication use within participating organizations. AIMM, previously titled the Patient Safety and Clinical Pharmacy Services Collaborative (PSPC) is the nonprofit organization responsible for this breakthrough effort. Initiated in 2008 by the U.S. Health Resources & Services Administration, the effort supports improvement of health care across the country by integrating evidence-based comprehensive medication management services with the care and management of high-risk, high-cost patients.

The model uses an “action learning system” designed to spread leading practices that have been shown to produce the intended results. In a 12-month process, improvement efforts are organized around national learning sessions where participants convene to learn about leading practices. Learning events are followed by action periods during which teams apply selected strategies using the Model for Improvement. During action periods, teams are expected to implement process improvement strategies and to document and report results. While the learning sessions are the primary vehicle for content delivery focused on assisting teams in achieving improvement results, support is also provided during action periods through monthly topic-focused conference calls, Web-based educational programs, and peer coaches.

This performance improvement model has proven the benefits of a structured process that combines regular, facilitated learning sessions and dialogue across a community of practice with team-level accountability during action periods. The model helps health care organizations enhance the safety and effectiveness of medication use among the highest-risk patients across the country. Teams engage in a collaborative learning process designed to support current practice change, measure improvement on defined measures in a defined population of patients, establish a “value statement” based on their performance improvement efforts, and prepare for opportunities to communicate the value of their services to stakeholders. These statements are powerful and proven in their ability to allow health care providers and administrators to successfully apply lessons learned to systems improvement efforts. Ultimately, they result in documented achievements in patient health outcomes.

Conclusion
The Model for Improvement is a simple tool that can be used across a variety of health care systems to improve quality within an organization. By focusing on small tests to create and measure change, improvement is seen faster within an organization, compared with use of a typical research measurement.

References
CPE assessment

Instructions: This assessment must be taken online; please see “CPE information” for further instructions. The online system will present these questions in random order to help reinforce the learning opportunity. There is only one correct answer to each question.

1. What are the essential steps to the Model for Improvement?
   a. Aim, measure, outcomes
   b. Objective, drivers, results
   c. Process, analyze, measure
   d. Aim, measure, change

2. The essential question, “How will the team know that a change is an improvement?” correlates to what step?
   a. Aim
   b. Change
   c. PDSA
   d. Measurement

3. Using the Model for Improvement helps organizations
   a. Reduce costs
   b. Increase positions
   c. Improve outcomes
   d. Both a and c

4. Research measurement is not ideal for quality improvement initiatives because
   a. The costs are low risk.
   b. Limited data are collected.
   c. The process is slow to complete.
   d. It is too simple for most health care workers.

5. The first step in the model for improvement is
   a. Forming the right team
   b. Creating a PDSA cycle
   c. Identifying factors for a driver diagram
   d. Implementing change

6. The aim statement should be
   a. Broad
   b. Vague
   c. Specific
   d. Extensive

7. Driver diagrams are the following:
   a. Graphs of change over time
   b. Charts of outcomes after change implementation
   c. Measurement of change
   d. Visual display of factors involved in the process

8. What is the main goal of the PDSA cycle?
   a. Test change.
   b. Analyze results.
   c. Create objectives.
   d. Implement new processes.

9. What question(s) do you need to keep in mind before applying the PDSA cycle?
   a. Who are the key stakeholders?
   b. How will we know that a change is an improvement?
   c. How many changes must we implement to see results?
   d. How can we test change?

10. Which of the following is a good example of an initial PDSA cycle?
    a. Testing a new appointment system in the primary care clinic for 1 month
    b. Testing a new method of scheduling patients who arrive between 8:00 and 9:00 a.m. on Monday morning.
    c. Asking providers to spend more time educating patients with diabetes on lifestyle modifications and following up with the group in 2 weeks.
    d. Testing a new lab procedure for measuring glycosylated hemoglobin (A1c) values and following up in 3 weeks

CPE information

To obtain 2.0 contact hours (0.2 CEUs) of CPE credit for this activity, you must complete the online assessment and evaluation. A Statement of Credit will be awarded for a passing grade of 70% or better on the assessment. You will have two opportunities to successfully complete the assessment. Pharmacists who successfully complete this activity before July 1, 2018, can receive CPE credit. Your Statement of Credit will be available upon successful completion of the assessment and will be stored in your ‘My Training Page’ and on CPE Monitor for future viewing/printing.

CPE instructions:
1. Log in or create an account at pharmacist.com and select LEARN from the top of the page; select Continuing Education, then Home Study CPE to access the Library.
2. Enter the title of this article or the ACPE number to search for the article and click on the title of the article to start the home study.
3. To receive CPE credit, select Enroll Now or Add to Cart from the left navigation and successfully complete the assessment (with randomized questions) and evaluation.
4. To get your Statement of Credit, click “Claim” on the right side of the page. You will need to provide your NABP e-profile ID number to obtain and print your Statement of Credit.

Live step-by-step assistance is available Monday through Friday from 8:30 am to 5:00 pm ET at APhA Member Services at 800-237-APhA (2742) or by e-mailing education@aphanet.com.
11. Your clinic determined that a new method of measuring A1c readings that was implemented in a 24-hour period has decreased the error rate by 50%. What would be a good “second cycle” PDSA?
   a. Implement the process completely throughout the clinic.
   b. Try the process for a full week.
   c. Try the process while also making changes to other lab procedures.
   d. Implement the process throughout the health system.

12. What are the correct steps in the PDSA cycle?
   a. Do, study, act, plan
   b. Plan, do, study, act
   c. Study, do, plan, act
   d. Act, plan, study, do

13. A run chart is a tool used for which of the following?
   a. To identify the purpose or goal of the project
   b. To display a pattern of data that can be observed as change occurs
   c. To evaluate a project over time
   d. Both b and c

14. After a change has been tested on a small scale and is ready to be expanded to the entire organization, what is this process called?
   a. Spread
   b. Implementation
   c. Communication
   d. Initiation

15. Which of the three steps of the spread process must continue in this phase to show optimal outcomes?
   a. Communication
   b. Plan
   c. Measurement
   d. Resources

16. “Open School” is a quality improvement educational program sponsored by
   a. Alliance for Integrated Medication Management
   b. Institute for Healthcare Improvement
   c. National Quality Alliance
   d. Pharmacy Quality Alliance

17. The Alliance for Integrated Medication Management (AIMM) Collaborative is
   a. The organization that created the Model for Improvement
   b. A nonprofit advocacy organization for medication therapy management services
   c. A regulatory arm of the Health Services & Resources Administration (HRSA)
   d. A facilitated learning and action environment for improvement of medication use

18. Which of the following content areas is addressed within the IHI Open School?
   a. A guide to standards established by National Committee on Quality Assurance (NCQA)
   b. An overview of strategies to succeed in pay-for-performance systems
   c. Measurement strategies of the Triple Aim in patient populations
   d. CMS payment policies associated with the Accountable Care Act

19. In a collaborative, an “action learning system” includes
   a. Community-specific learning activities followed by structured group action periods
   b. Structured group learning activities followed by community-specific action periods
   c. A learning system that provides a set of measures that an organization must apply to improvement efforts
   d. A process by which organizations establish a common population of focus

20. The former name of the AIMM Collaborative is
   a. Patient Safety and Clinical Pharmacy Services Collaborative
   b. Clinical Pharmacy Services for Patients Collaborative
   c. Institute for Healthcare Improvement Medication Management Collaborative
   d. National Collaborative for Advancing Medication Therapy Management