CHAPTER FOURTEEN

THE MODEL FOR IMPROVEMENT

PDSA ↔ SDSA

Chapter Purpose

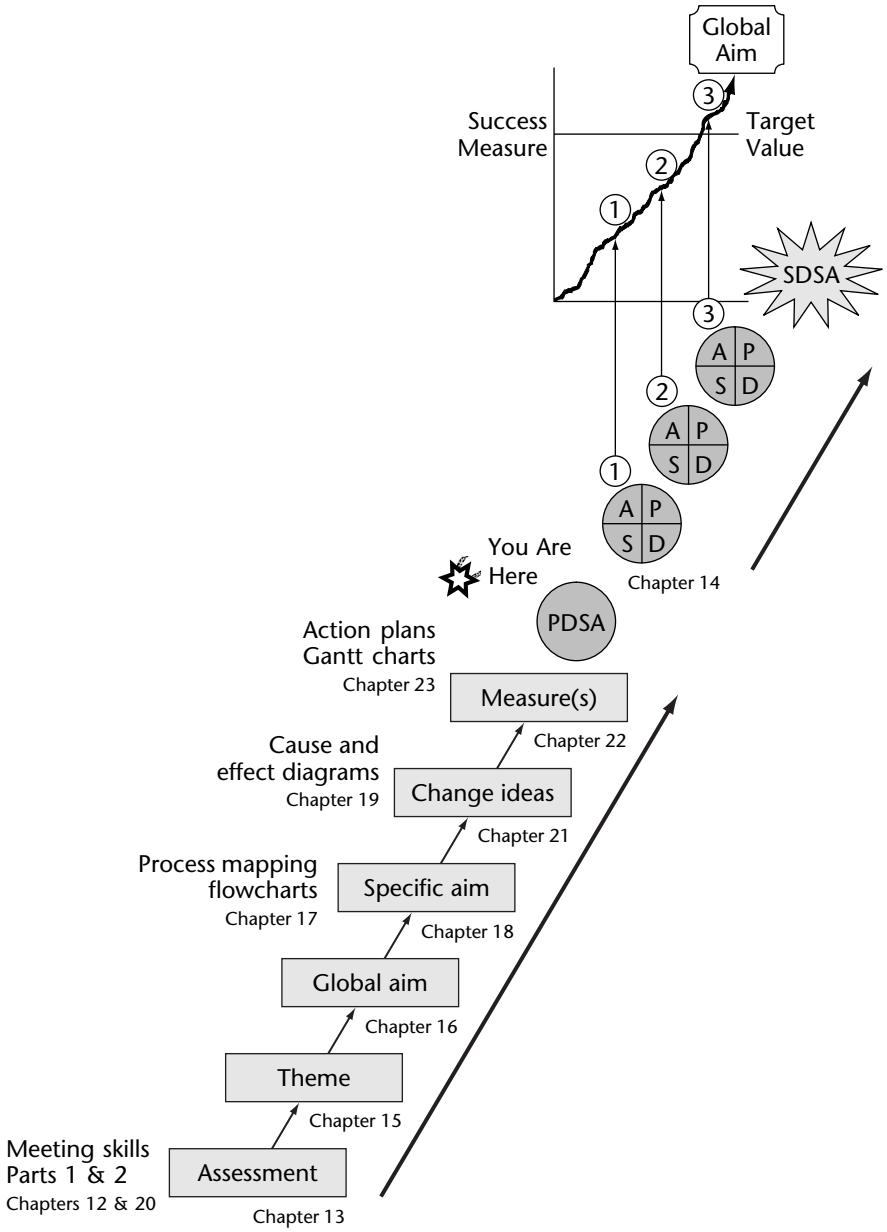
Aim. To understand and apply the model for improvement in conducting disciplined, sequential tests of change for the purpose of making measurable improvements that can be sustained.

Objectives. At the completion of this unit, you will be able to

- Define the model for improvement.
- Describe the two components of the model for improvement.
- List the detailed steps of PDSA model.
- Develop a clear *plan* to test a change.
- Describe the point at which a PDSA cycle becomes a SDSA cycle.
- State where PDSA ↔ SDSA cycles fit in the improvement process.
- Use the PDSA ↔ SDSA worksheet to guide actions.

It is important for all microsystem members to see the road ahead in the improvement journey. The improvement model discussed in this chapter is the method of choice for testing ideas for change leading to improvement. Figure 14.1 shows where you are now in the Dartmouth Microsystem Improvement Curriculum. With this focus on the model for improvement, we bring the scientific method explicitly into the improvement process.

FIGURE 14.1. IMPROVEMENT RAMP: MODEL FOR IMPROVEMENT.



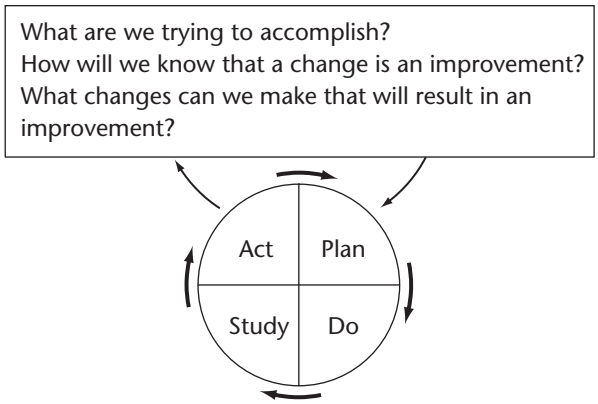
Tom Nolan and his colleagues at Associates in Process Improvement and the Institute for Healthcare Improvement have popularized the model for improvement (Langley, Nolan, Norman, Provost, & Nolan, 1996). This model, by incorporating the PDSA model, uses the scientific method for disciplined improvement. It also reminds improvement teams of the questions they should answer before starting their tests of change (Langley et al., 1996).

What Is the Model for Improvement?

The *model for improvement* (diagrammed in Figure 14.2) provides an overarching framework for testing change ideas that are expected to make improvements. The model has two parts. It starts with three questions to focus your improvement work, and then it leads you to run tests of change using the scientific method, or plan-do-study-act (PDSA) method. This process is shown in more detail in the following list:

1. Fundamental questions come first and clarify the improvement to be tested.
   - *Aim. What are we trying to accomplish?* Setting a clear aim with specific measurable targets.
   - *Measures. How will we know that a change is an improvement?* Qualitative and quantitative measures support real improvement and inform the progress of the change toward the stated aim.
   - *Changes. What changes can we make that will result in an improvement?* We need to create a statement of what we believe we can change to effect improvement. This change idea reflects our hypothesis about causes and effects.
2. Next, the changes are tested using the four steps known as plan, do, study, and act.

FIGURE 14.2. MODEL FOR IMPROVEMENT.



Source: Langley et al., 1996. Used with permission.

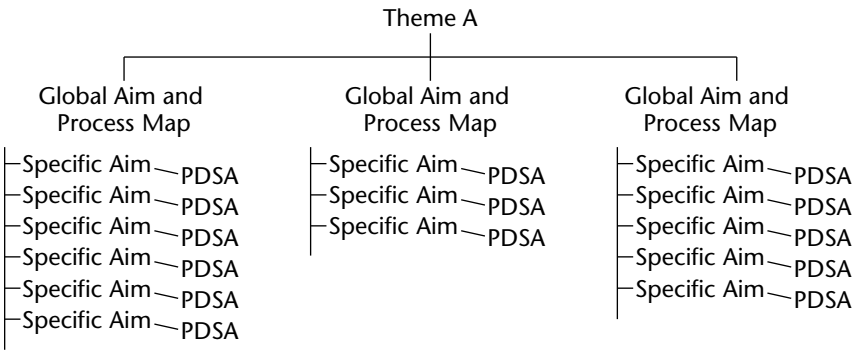
Why Use the Model for Improvement?

The model for improvement provides a clear path forward for testing ideas that are likely to lead to successful improvements. The three questions elicit answers that specify the aim of the test, how improvement will be recognized, and what each specific change is. Addressing these questions helps organizations to avoid starting change without thoughtful planning that has identified the causal systems at work and ways to measure the results. The model for improvement also offers the PDSA method, a scientific approach for testing change and for making improvements.

How Does the Model Fit into the Improvement Process?

The model for improvement, in theory, comes into the improvement process after you have completed your assessments, selected a theme, and developed a global aim. The reality is that it starts when you are able to define a specific aim and when you are getting ready to test some changes. Another way to depict this sequence of moving from theme to global aim to specific aim to testing changes is shown in Figure 14.3. As you can see, a theme may have multiple global aims and specific aims with attached PDSA cycles, and all are connected back to the theme.

FIGURE 14.3. THEMES, AIMS, PROCESSES, AND PDSA CYCLES.

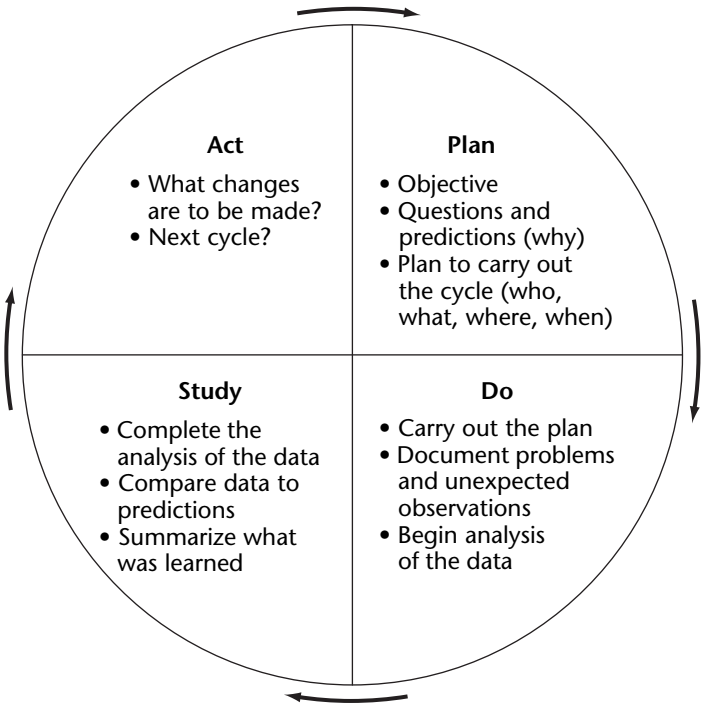


What Is the PDSA Part of the Model?

As mentioned earlier, PDSA stands for plan, do, study, and act. This model is commonly used to conduct tests of change in a disciplined and rapid fashion (see Figure 14.4). This structured, continuous quality improvement method has four steps that are used repetitively to test changes; it provides a clear path forward for testing ideas, learning from the testing, and moving ahead with better-informed actions to make improvements.

Walter A. Shewhart described a four-step improvement process in his 1939 book *Statistical Method from the Viewpoint of Quality Control.* W. E. Deming, a student of Shewhart, encouraged a systematic approach to problem solving and promoted this four-step process for use in continual improvement. Deming first referred to it as the Shewhart cycle. Others have called it the Deming cycle or the Deming wheel or the PDCA (plan, do, check, act) cycle (Deming, 1986).

FIGURE 14.4. THE COMPLETE PDSA CYCLE.



What Are the Benefits of Using PDSA?

The focus of PDSA is *experimentation*—such as testing out new change ideas to see if you can get better results.

- PDSA offers a disciplined model for testing improvements based on four steps: plan, do, study, act. All too often ideas for change are acted on without detailed planning and organization. There is a saying, "The devil is in the details." The discipline of PDSA will help you think through and plan for the "devilish" details of the idea you wish to test. Using this approach will increase your chances of successfully and rapidly reaching your aim.
- PDSA calls for small-scale testing and focuses attention on the theme and aims of improvement. It can lead to early, measured successes and increased staff enthusiasm.
- PDSA can be completed quickly, with minimal expenditure of resources and without taking great risks or using large amounts of time.
- PDSA invites clarity about *who* does *what, when,* and with what materials and supplies to ensure that those involved in the test are clear on roles and functions.
- PDSA makes it clear to all involved in the microsystem that the test is a pilot; to be conducted in a small way over a short period of time. This often diminishes anxiety and resistance to trying out a change idea. Once everyone in the microsystem realizes that the test will inform future activities and improvements, many people will support the test and be interested in the findings.
- PDSA helps staff gain new knowledge and fresh experience. This enables the lead improvement team to improve on the original change idea and thereby increase the likelihood of success.

What Is Involved in Each of the Four Steps of Plan, Do, Study, and Act?

In the *plan* phase you describe the objective and the specific change to be tested. This step clarifies the preparation that must be completed before the test is carried out, and considers the possible *upstream* and *downstream* impacts.

The plan includes clarification of

- The *hunch* that is being tested
- People's roles and functions during the test (planned actions)
- When the test will occur
- The education and training to be conducted before the test
- The data to be collected to determine if the test has been a success
- Who will observe and collect data during the test
- How long the test will be conducted (short period of time)
- What you expect to happen

The *do* phase of PDSA occurs when the pilot test is actually carried out, based on the preparations in the planning step. During the do phase, it is essential to have an identified member of the lead improvement team assigned to oversee the pilot and to collect qualitative and quantitative data and information about the test of change, data and information that will inform the next PDSA cycle. This individual should be ready to

- Document unexpected events
- Hear member feedback about the pilot test
- Have an eye for measured results
- Provide an open ear to listen to the pilot participants' feedback as they run the pilot

The individual overseeing the pilot can hold a *huddle* right before starting it, to ensure that everyone is clear on roles, functions, and processes and to plan time to debrief the participants periodically during the pilot.

The *study* phase occurs after the do phase. It is the period of time that is used to analyze the data, to reflect on results, and to debrief microsystem members about the pilot test experience. Be sure to plan time for reflection. Use the data and information collected during the pilot to evaluate what happened. Your team members should compare what they expected to happen with what actually happened and summarize lessons learned. They should identify any unexpected positive or negative results and determine what could be improved next.

The *act* phase occurs when you and your team are ready to determine whether or not the idea being tested should be modified or abandoned in light of the results achieved. Given what was learned during the test, what is the next step? The team should use what it has learned to improve its next test of change as it moves up the improvement ramp (Langley et al., 1996). Once the team has determined the next step—to refine, abandon, or try on a larger scale—it should start its next PDSA cycle.

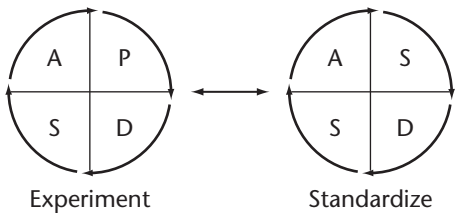
What Is the SDSA Cycle?

Whereas the focus of the PDSA cycle is experimentation, the focus of the SDSA cycle is *standardization*. The idea behind this is simple and powerful. You run experiments (PDSA tests of change) until you reach your measured aim. Then, once you are able to achieve the desired level of performance, you want to maintain these gains by continuing to do the right things the right way. This calls for the adoption of a standard method and its continued use until the time comes to make new improvements.

The SDSA (standardize-do-study-act) cycle is the approach you take once you have successfully done one or more PDSA cycles and have enough experience and measured outcomes to determine that you have reached your original aim. The purpose of using the SDSA approach is to hold the gains that were made using PDSA cycles and to standardize the process in daily work.

Once you have reached the point where you should switch from the PDSA cycle to the SDSA cycle, that is not the end of the story. As new technologies arrive, and as your microsystem gains additional process practice and insight, you may need to move from SDSA back to PDSA again, to learn additional information and to test new ideas and processes. This back-and-forth process—between experimentation and standardizing—will result in higher levels of efficiency and an ability to hold your gains. Never think that once a process is in the SDSA cycle it will stay constant. Ongoing review and evaluation will tell you whether the best-known practice is in place and may reveal that you need to move back to PDSA, as shown in Figure 14.5.

FIGURE 14.5. THE BACK-AND-FORTH RELATIONSHIP OF PDSA AND SDSA.



What Is Involved in Each of the Four Steps of Standardize, Do, Study, and Act?

The first SDSA step is to standardize. Standardized tasks are fundamental for continuous improvement and employee empowerment. Through repeatedly performing a task in a standardized manner, people gain new knowledge and insights for further improvement activities.

Liker (2004) has reminded us that American industrialist Henry Ford, pioneer of the assembly-line production method, once stated, "Today's standardization . . . is the necessary foundation on which tomorrow's improvement will be based. If you think of 'standardization' as the best you know today, but which is to be improved tomorrow-you get somewhere. But if you think of standards as confining, then progress stops" (p. 141). In a similar vein Brent James, a vice president for medical research and executive direction at Intermountain Health Center, Salt Lake City, Utah, often suggests it's more important to do something the same way than to do it the right way, because if you do it the same way you can learn from the results and then discover the best way (personal communication to E. C. Nelson, 1995).

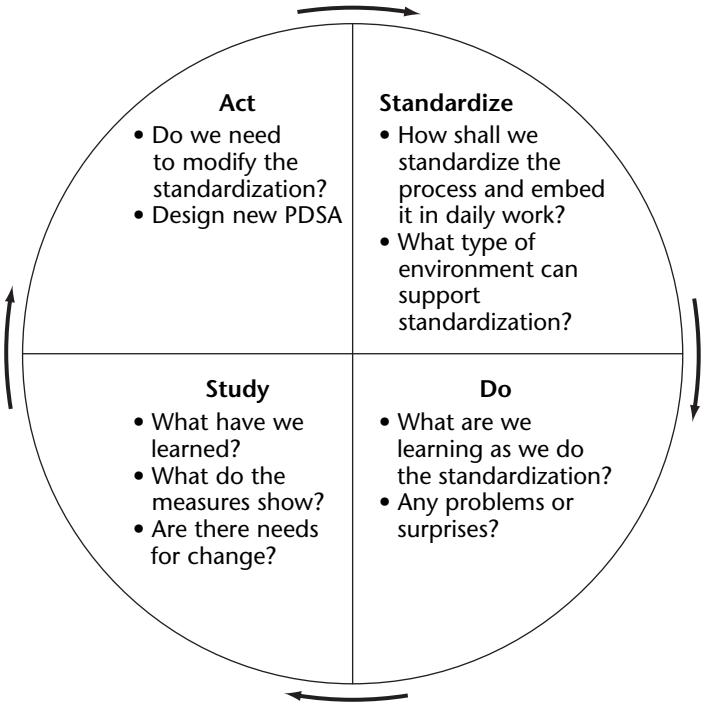
This is the important assumption that supports SDSA thinking: it couples standardization with learning. It is through standardizing and stabilizing the process that learning and deeper insight occurs and processes and outcomes can be continuously improved.

The *standardize* phase in the SDSA cycle starts with determining how the current best process will be standardized in your daily work (Figure 14.6). A good first step toward standardization is to make a deployment flowchart to show who should do what and in what order. Also consider how you can shape the environment to help the process unfold reliably and consistently. Think about new habits your microsystem has adopted successfully. What helped it to maintain them? How will new employees be oriented to them? This can help you and your team gain insight into how to successfully maintain this new improvement, by making the new standard method a habit.

What are you learning in the *do* phase about the standardization within daily work? As you perform the new standardized process, what helps to ensure that it is done in a standardized way? What inhibits it from being done consistently?

As you *study* the standard process, what measures let you know whether the process is being done consistently? How many times does the process not get completed in a standard way? When you talk with those involved in the new process, what can you learn about the reasons the process is or is not consistent? Based on the lessons from the field, are there signs that SDSA should move back to PDSA? What are the indications for change?

FIGURE 14.6. THE COMPLETE SDSA CYCLE.



To *act,* consider what changes need to occur and be tested. Review the PDSA cycle and design a new pilot based on the knowledge you have obtained using the standard process. Once you have conducted the new PDSA cycle, be prepared to move back to SDSA after you have tested and refined the new improved process, and once again consider making a deployment flowchart to make the standard process clear to all.

What Tools Can Assist Your PDSA Cycle ↔ SDSA Implementation?

The PDSA ↔ SDSA worksheet shown in Figure A.15 in the Appendix is a helpful tool. It provides a map and reminders for conducting PDSA ↔ SDSA work. Many frontline teams use this worksheet to guide and record progress. (You can also find this worksheet at http://www.clinicalmicrosystem.org.)

What Are Some Tips for Using the PDSA ↔ SDSA Method?

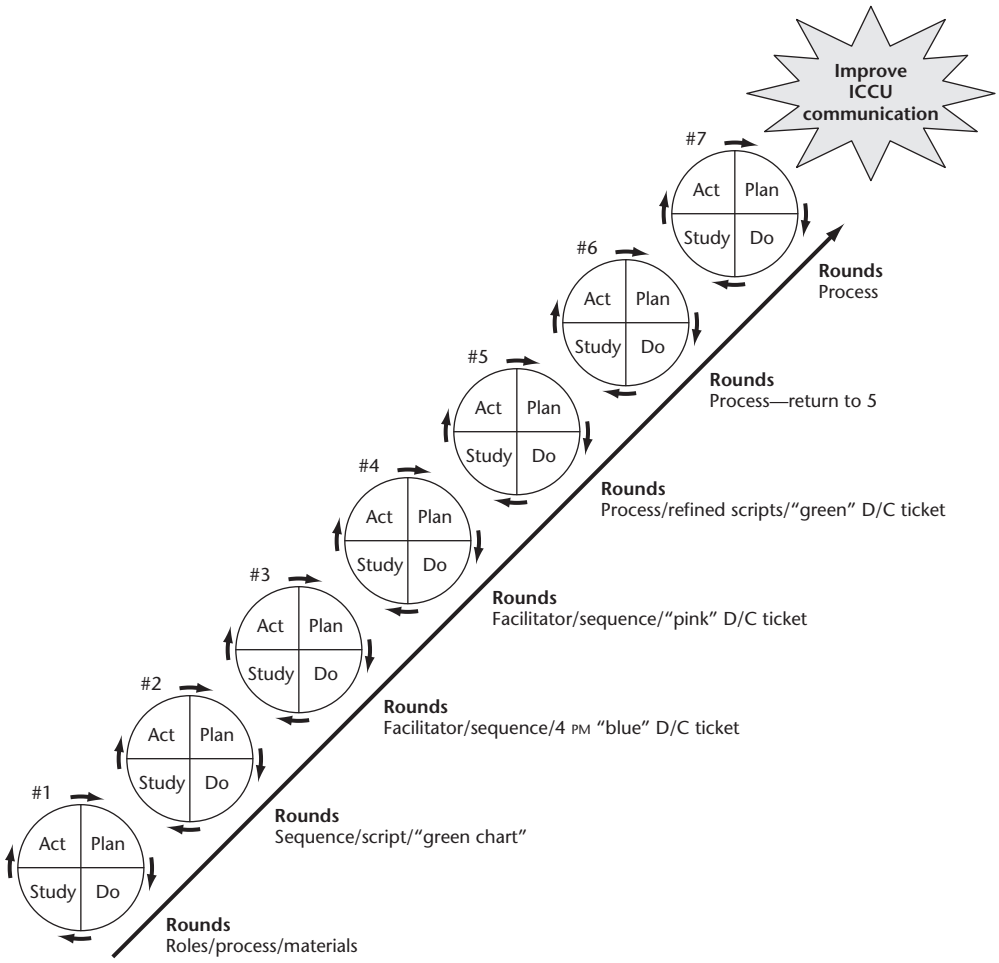
- Always start with a specific aim statement.
- Answer the question, What are we trying to accomplish?
- The question, How will we know if this is an improvement? can only be answered with data.
- Small tests of change done in short periods of time accelerate learning and pave the way to rapid improvement. For example:
  - Start with six patients
  - Test for three shifts
  - Test for two days
  - Start with one to two providers
  - Sample every other patient or process
- Designate someone to *oversee* the test and be the ears, eyes, and support to those engaged in it.
- Offer participants the opportunity to debrief *frequently* during the pilot.
- Have fun with special food or materials during the pilot.
- Celebrate completion of the first pilot, to encourage staff to continue.
- Post results in your microsystem space for all to see.
- When going to SDSA, use a deployment flowchart to provide a clear picture of who does what and in what order.
- When doing SDSA, schedule regular reviews to reflect on the process, monitor results, and avoid *slippage*.
- Sustain the effort by having a clearly designated work process *owner* who leads the SDSA phase of the process change.
- Alert senior leaders to the fact that PDSA ↔ SDSA is being used to make improvement.

Case Studies

Intermediate Cardiac Care Unit (ICCU)

The ICCU lead improvement team members reviewed the model for improvement to become aware of the path ahead of them and to become more knowledgeable about the discipline of improvement. They believed this would support their becoming a community of scientists. Figure 14.7 shows how the ICCU team used multiple PDSA cycles within the improvement model to reach its aim of improved communication.

FIGURE 14.7. THE ICCU'S PDSA RAMP OF TESTS.



Note: D/C = discharge.

Plastic Surgery Section

Review of the improvement model by the section's interdisciplinary lead improvement team provided the structure and discipline of improvement. The team members were eager to have successful improvements, and the model gave them a path forward to follow and a way to measure progress. With all

that the lead improvement team was learning about the processes to be improved, the improvement model provided a paced, disciplined way to move through improvement activities without being overwhelmed.

Review Questions

1. What is the model for improvement?
2. What is a PDSA cycle, and how does it differ from a SDSA cycle?
3. Can an improved process move between PDSA and SDSA cycles?
4. What are the key elements of each phase of PDSA and SDSA?
5. When does an improved process move from SDSA to PDSA?

Between Sessions Work

1. Review and discuss the model for improvement, to clarify the path forward for the lead improvement team.
2. Review the PDSA ↔ SDSA worksheet (Figure A.15) to gain insight into the next steps.

References

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