Using PDSA Cycles in Community Settings: Case Studies of Plan, Do, Study, Act Cycles

100 Million Healthier Lives

CONVENED BY Institute for Healthcare Improvement

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About 100 Million Healthier Lives and the SCALE Series

100 Million Healthier Lives (100MLives) is an unprecedented collaboration of change agents across sectors working to transform the way we think and act to create health, well-being, and equity. As part of 100MLives, the Robert Wood Johnson Foundation (RWJF) generously funded Spreading Community Accelerators through Learning and Evaluation (SCALE), an initiative that began in January 2015 and ended its second iteration, SCALE 2.0, in April 2019.

SCALE 2.0 (2017 - 2019) included work with more than 200 communities and 500 health care organizations through four core initiatives:

1. SCALE Health & Care (now known as Pathways to Population Health)
2. Regions of Solutions
3. States of Solutions
4. Community Health Accelerators Initiative

The goal of SCALE was to work with communities and health care organizations to accelerate their journeys toward what RWJF refers to as a Culture of Health. In SCALE 2.0, the community coalitions began creating tools, resources, and strategies to adapt improvement science and make it more accessible for individuals from all backgrounds. Through these experiences, we gathered core models that have proven to be essential in advancing community-based improvement initiatives.

All of this work is built on the 100MLives Core Principles. To make this work possible, 100MLives collaborated with many partners, each of whom brought unique expertise and knowledge. These partners include but are not limited to:

- SCALE Communities
- SCALE-Up Communities
- SCALE Coaches
- SCALE Implementation Team
- SCALE Evaluation Team
- Institute for Healthcare Improvement
- Georgia Health Policy Center
- Heluna Health

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Overview

Improving a system or process can be extremely rewarding. The field of quality improvement (QI) is quickly growing, and not just in the health care field. Over the past four years, a group of communities within the 100 Million Healthier Lives (100MLives) SCALE (Spreading Community Accelerators through Learning and Evaluation) initiative used a set of Community of Solutions skills[1] to improve their communities' health, well-being, and equity. One of these Community of Solution skills is Leading for Outcomes, which includes using QI to set aims, measure progress, identify changes that will make a difference in people's lives, and test those changes in, and with, their communities.

The expectation in SCALE was that QI would become embedded within each community's work. As the leaders in each community learned about improvement, they noticed that good examples from community settings, especially about how to test specific ideas for change, were often hard to find. This guide shares the opportunities, challenges, and learnings related to one key tool in the improvement toolbox — Plan-Do-Study-Act (PDSA) cycles — and includes community-based examples. This guide contains the following sections:

1. What is a Plan-Do-Study-Act (PDSA) Cycle?
2. Examples of PDSA Cycles
3. Tips for Documenting your PDSA Cycles
4. Some Key Lessons
5. Common Challenges and Ways to Address Them

A **Glossary of Terms** at the end of this document will help define some of the most commonly used terms.

What is a Plan-Do-Study-Act (PDSA) Cycle?

The Model for Improvement,[2] as shown in **Figure 1** below, is a simple yet powerful tool for accelerating improvement. It includes three fundamental questions and the PDSA cycle to determine if the change(s) made results in improvement.

[1] Saha S, Howard P, Lewis N, McPherson M, Schall M. *Foundations of a Community of Solutions: SCALE 1.0 Synthesis Report*. Boston: 100 Million Healthier Lives, convened by the Institute for Healthcare Improvement; 2017. (Available at www.ihi.org/100MLives)

[2] Langley GL, Moen R, Nolan KM, Nolan TW, Norman CL, Provost LP. *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance* (2nd edition). San Francisco: Jossey-Bass Publishers; 2009.

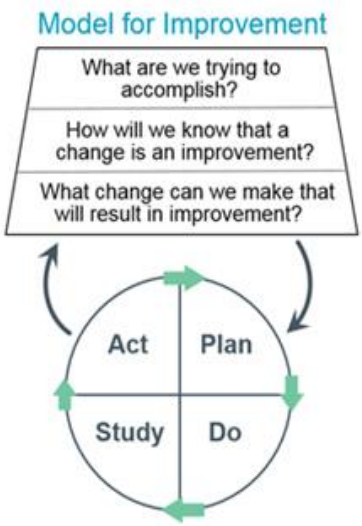


Figure 1: The Model for Improvement

The PDSA cycle is a way to test a change in four steps: 1) Develop and document a plan to test the change (Plan); 2) Carry out the test (Do); 3) Observe and learn from what happens (Study); and 4) Determine what modifications should be made to the test and what to do next (Act).

PDSA cycles are used by a group once they have set an aim, developed measures to guide improvement, and identified changes that they think will help them reach their aim. The next step is to test a change (or changes) in the real world. A change is doing something in a new way, such as creating a different process to enroll community members in a program or installing lighting to make a park safer for community residents. The term PDSA is shorthand for testing a change — by planning it, trying it, observing the results, and acting on what is learned. Predicting what will happen when a change is made is a key piece to planning the cycle and studying the results. This is the scientific method used for action-oriented learning.

Many PDSA cycles are needed to fully refine a change. The learning from each PDSA cycle informs the next one, creating an iterative learning process. A template for developing your own PDSA cycles is shown in **Appendix A** and is also available at: http://www.ihi.org/resources/Pages/Tools/PlanDoStudyActWorksheet.aspx.

Within this guide, we include several examples of PDSA cycles, as well as tools and templates that were created within the context of each community's use of the Model for Improvement to enhance some aspect of health, well-being, and equity within their communities.

A Personal Example: Making Biscuits

People often learn best when they apply new concepts and skills to everyday examples. The following PDSA cycle uses making biscuits from scratch as an example. It also illustrates how a template can be used to document multiple PDSA cycles that are all related to a particular project aim. It is helpful for improvement teams to keep track of the status of each cycle to show the relationship between the first one and subsequent ones. A blank template is given in **Appendix B**.

PDSA Tracking Sheet Example: Making Biscuits

Action Area:	**Making biscuits from scratch**	**Date Started: August 13, 2017**	**Team:** K. Pratt (Personal PDSA)
Project Aim Statement: **Create consistent biscuits from scratch that are flaky on outside and fluffy on inside – not hard, doughy, or too thick.**			
Objective for This Group of Cycles: **Determine the best method of managing/making the dough and the amount of time and heat needed for baking the dough.**			

	Question/ Prediction/Plan	**Measures**	**What Happened**	**Data Collected**	**What was Found**	**Modifications to Be Made**
Cycle 1	Cooking the dough longer at 400F (lower temp than recipe says) will allow it to be fluffier.	Color & texture of inside and outside of biscuit; taste.	Cooked dough for 15 minutes at 400F.	Hard outside, thin inside – not much fluff, taste – not good	Biscuits were too thin so fluffiness inside not possible and outside was hard.	Add more whipping cream and make bigger biscuit shape and cook at 380F.
Cycle 2	Cooking same amount of time with less heat will allow fluffy inside.	Color & texture of inside and outside; taste.	Cooked stickier dough (more cream) for 19 minutes (time added due to color of outside of biscuit – unexpectedly light color) at 380F.	Soft texture/light color outside, fluffier inside.	Good size biscuits to assess texture. Softer on inside and outside but may be undercooked based on texture.	Cook at 400F and handle the dough less to allow for looser dough (not as bonded together).
Cycle 3	Higher temperature will make softer inside and crustier outside.	Color & texture of inside and outside; taste.	Cooked dough for 20 minutes at 400F.	Crustier outside, soft inside, but not fully cooked inside.	Good size biscuit, outside good, but not fully cooked inside.	Cook at 375F for 20-25 minutes, same size and amount of whipping cream.

Cycle 4	Slower cook time at lower temperature will allow full cook of dough and textures desired.	Color & texture of inside and outside; taste.	Cooked dough for 22 minutes at 375F.	Crusty outside although lighter color, fluffy inside cooked thoroughly.	Good size biscuit fully cooked inside and outside. Perfect texture inside and outside. Very yummy!	Monitor future batches for consistency.
Date of Completion	8/13 – 3 hours to complete process					
Plan to Monitor	Make another batch in a week at 375F – cook time 20 minutes, 1.5 inches tall dough handled lightly, with 125% amount of whipping cream.					

A Community-based Example: Summit County, Ohio

The following is an example of a PDSA planned and carried out by the Summit County, OH SCALE team. This test is the first one in a series of linked PDSAs that were used to develop a robust referral process for a Pathways Community HUB (described below). The team answered the questions for each step in the PDSA as they planned their test. The learnings from each PDSA were carried into the next one until the team had enough evidence to adopt the changes. The first test is described below, and the cycle that immediately followed the first cycle is described in **Appendix C**. Additional community-based PDSAs from other communities are also described in **Appendix D**.

In Summit County, OH, Black infant mortality is 3-4 times the rate of white infants. In 2015, a community collaborative composed of health systems, community-based organizations, public health, a Federally Qualified Health Center, county public systems, and other stakeholders voted to replicate the Pathways Community HUB model in the county. The Pathways Community HUB model is an evidence-based, community care-coordination model that addresses health equity and improves health outcomes.[3] The project launched in April 2016, and to complement national standards for certification, the PDSA framework was used to test how specific parts of the model could be successfully carried out and managed in Summit County.

[3] Redding S, Conrey E, Porter K, Paulson J, Hughes K, Redding M. Pathways community care coordination in low birth weight prevention. *Maternal and Child Health Journal*. 2015;19(3):643-650. doi:10.1007/s10995-014-1554-4.

PDSA 1A: Referral Process between the Community Partner and the HUB

Plan: Plan the test, including a plan for collecting data.

- State the question you want to answer and make a prediction about what you think will happen.
- Develop a plan to test the change. (Who? What? When? Where?)
- Identify what data you will need to collect.

Plan

Objective for this PDSA cycle: The objective is to learn whether a paper referral form at one Women, Infants and Children (WIC) site can be integrated into the Registered Dietician (RD) assessment protocol for one month and if there is an increase in the number of referrals to the HUB for pregnant women.

What question(s) do we want to answer by doing this PDSA cycle?

1) How was the referral to the HUB incorporated into the WIC appointment?
2) How long did the form take to complete?
3) How many referrals were generated to the HUB?
4) Were the referrals appropriate?
5) How many of the referrals converted to engagement in services?
6) What was the impact on referrals?
7) How well did the tracking process work at WIC to monitor the referrals?

Answer the questions: Who, What, When, Where

Who: Client will complete top half of form at intake and RD will complete form with client after an initial assessment. RD will make a referral if the client is interested and has needs. Improvement Advisor (IA) (i.e., quality improvement specialist) and Division Director will collect information. HUB Director will manage referrals at HUB.

What: RD will complete usual assessment at WIC appointment, summarize results with client, and complete the paper referral form. RD will send form to HUB.

When: Data collection and referral process will be tested for ~one month starting 9/6/16. Staff training will take place at a Fairway staff meeting.

Where: Fairway WIC office at 1867 W. Market Street, Akron, OH

Tip: Please note the timeframe for this test — i.e., the team planned to test the new process for approximately one month. Reducing the timeframe for a test can increase the pace of learning. For example, testing the new process with one client and one RD would yield important learning that could then be used to plan

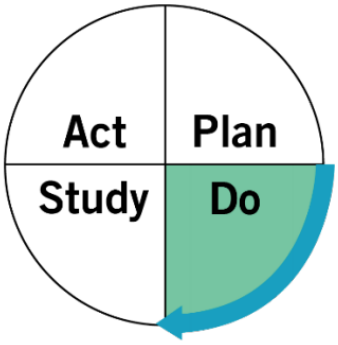
subsequent tests. The predictions about what will happen during the test could also be reduced to fit the size and scope of the test.

Create a plan for collection of data

RD will code "at-risk pregnancy" in the WIC computer database to track referrals made. IA will review WIC schedules to count number of pregnancy appointments, number of no-shows, and number of appointments kept. Data will be reviewed at the end of the month at the Fairway site. Division Director will check in with staff weekly to obtain feedback. At the end of the month, the team will discuss results with staff and obtain feedback and suggestions.

Predictions (for questions above based on plan)

1) Process will be well-integrated into RD appointment time.
2) Form will take less than 10 minutes to complete.
3) About half of the pregnancy clients will convert to a referral to the HUB.
4) 75% of the referrals will be appropriate for HUB services.
5) At least 50% of the referrals will convert to fully enrolled clients at the HUB.
6) Impact on clients and staff will be limited.
7) Tracking process will work well.



Do: Run the test on a small scale.

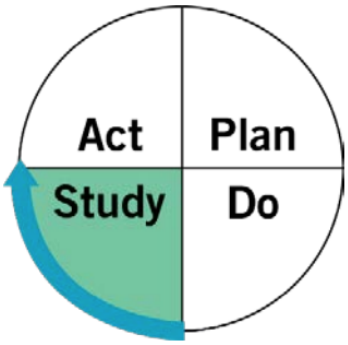
- Carry out the test.
- Document problems and unexpected observations.
- Collect and begin to analyze the data.

Do

Carry out the change or test; collect data and begin analysis

Test carried out as planned: paper referral form was tested at one site for a month. RDs incorporated some of the new questions into their assessment process and used the information to make a HUB referral. No major problems encountered.

Data tracking proceeded as planned: referrals were coded in the system; weekly schedules to assess caseloads/no-shows; HUB referrals were tracked.



Study: Analyze the results and compare them to your predictions.

- Complete, as a team, if possible, your analysis of the data.
- Compare the data to your prediction.
- Summarize and reflect on what you learned.

Study

Complete analysis of data

Of the 39 pregnant women seen at Fairway WIC, 35 were referred and agreed to HUB care coordination services.

Ten of the 35 were in the first trimester; 11 of the 35 were in the second trimester.

For 16 of the 35, this was their first pregnancy.

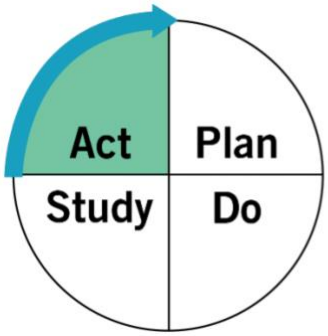
Compare the data to your predictions and summarize the learning

1) Referral was incorporated into the dietitian section of the visit. There was a lot of interest and discussion. Two changes were needed in the form: inclusion of language at home/need for interpreter and city/zip. Consent from two clients was not obtained and they had to be followed up with. Fourteen of 18 clients were contacted by phone. The form was incorporated into the WIC introduction certification packet.
2) Form did not take too long to complete. No reported problems.
3) Thirty-five referrals in a month were generated.
4) Appropriate referrals: 14 of the 35 were in the third trimester and close to delivery, which is not an ideal time for a referral. Some had language barriers and some participants were white or outside the targeted zip codes.
5) Engagement (enrollment of those referred) was difficult. Community Health Workers (CHWs) reported having difficulty contacting the participants and some declined once the CHW made contact.
6) Center was at capacity and could benefit from the referrals that meet program eligibility — will incorporate into referral process.
7) Tracking process was fine. The only delay occurred during one week when the RD was out and another one had to cover. There was a surge of referrals the following week.

Team discussion

- There was confusion about what to tell the clients and how to explain the enhanced care coordination and home visiting.
- There was a gap in time between referral and connecting with the family for the first time (i.e., engagement).
- When the CHWs went to WIC, the level of success was greater than when only an institutional system referral was made.

- A challenge in the testing was caused by RDs' rotating schedules, with some still working on the old referral system.



Act: Based on what you learned from the test, make a plan for your next step.

- Adapt (make modifications and run another test), adopt (test the change on a larger scale), or abandon (don't do another test on this change idea).
- Prepare a plan for the next PDSA.

Act

Are we ready to make a change? Plan for the next cycle.

1) Heather to draft a script for WIC staff and to present at WIC staff meeting.
2) Two questions added to form: language/need for interpreter and zip code/city.
3) Number of pregnancy certifications that resulted in an appointment were sent to Aimee.
4) Expand testing to Arlington and Summit Lake and Barberton sites starting October 1 as these sites are in target areas. An expected challenge is the technology which may cause delay of referrals to the system. Start October 11.
5) Provide new brochures.
6) HealthCheck bag given to clients will include information about Pathways HUB.
7) Document reasons for referral in contact with CHWs.

Tips for Documenting Your PDSA Cycles

Often in community work, teams will be working with volunteers, students, and part-time workers who may not have time to commit to writing a lot of documentation. This can make it challenging to document your plan, what you did, what you learned, and what you will do differently going forward. Documentation is important because it helps to avoid duplicating efforts a few months down the line when the teams may not be able to remember what was done.

Documentation is also important as a way for communities that are successfully tackling complex health or social issues to share their work with others. There are many ways to document the PDSA cycle framework meaningfully. See helpful tools in the **Appendix** for planning, carrying out, and documenting PDSA cycles, including the following:

- PDSA Worksheets for planning and completing a PDSA cycle (**Appendix A**)
- A simple PDSA Tracking Table to easily document multiple PDSA cycles (**Appendix B**). Using this table eliminates the need to write out every detail; you can just answer the basic questions.

Some Key Lessons

One benefit of using PDSA cycles in a community setting is the opportunity to involve community members directly in designing and testing ideas for change. This process of co-design can help to build trust and enable collaboration that will strengthen the community's ability to expand and sustain their work. Testing allows team members, especially community members themselves and/or those in direct services or "on the ground," equal opportunity to participate and jointly coordinate the efforts while learning from the results. This shared planning, testing, learning, and decision making offers clear differences and many advantages as compared with other situations where decisions are made by individuals not directly connected to the process.

Testing using PDSA cycles also offer the opportunity to break down complex issues into manageable pieces so that communities can identify and address the different layers of a problem or issue. Because PDSAs are linked through a theory (e.g., as depicted in a driver diagram[4]) of what it will take to achieve an aim, the community can also benefit from the multiplicative effect of a number of tests that may be taking place at the same time. (See Maricopa County and Healthy Monadnock examples in **Appendix C**). Adequate coordination, documentation, and tracking of these multi-level interventions, as well as clear measures and metrics, can help achieve a combined impact.

There are several key learnings from the Summit County example as well as from the examples in **Appendix C**. First, a critical component for all the PDSA cycles is the role of **prediction**. Stating what it is that you expect to happen, and why, helps to sharpen the reason and plan for the test and leads to actions you can take based on the results. Secondly, **trust** is a key component of using the PDSA cycle framework, because many partners are needed to collect the data and participate in the cycles. Demonstrating in practice the idea that the data will be used for learning and not for judgement — a hallmark of the QI approach — often requires managing complicated relationships and intentionally cultivating trust. Third, given that communities are very complex systems, it is often helpful to **begin by mapping the system** and identifying the parts of the system where you will focus your efforts. This can help create a common understanding of the context for the PDSA cycles. From this starting point, PDSA cycles can be planned and common metrics[5] used to evaluate the test.

Common Challenges and Ways to Address Them

In this section, we present some of the challenges that communities can anticipate as they apply quality improvement overall and the specific practice of conducting PDSA cycles to their work. We also provide ideas for how to address those challenges.

Building Quality Improvement Expertise

Most communities lack experience with quality improvement and are at only the beginning stages of building a quality improvement infrastructure and skills — i.e., developing QI expertise in their communities, having regular training programs, implementing measurement approaches that align with learning instead of

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[4] Hayes H, Howard P, Schall M, et al. *Teaching Driver Diagrams to Advance the Work of Community-Based Collaboratives.* Boston: 100 Million Healthier Lives, convened by the Institute for Healthcare Improvement; 2019. (Available at www.ihi.org/100MLives)

[5] Stiefel MC, Riley CL, Roy B, McPherson M, Nagy JM. *Health and Well-being Measurement Approach and Assessment Guide*. Boston: 100 Million Healthier Lives, convened by the Institute for Healthcare Improvement; 2020. (Available at www.ihi.org/100MLives)

judgment. The SCALE Communities addressed this challenge by designating one person, called a Local Improvement Adviser (LIA), to be trained in QI science and methods. These local experts were then able to use their new skills in leading and training others as they set aims, identified and tested changes, and tracked their progress. Communities can use IHI's online resources to build their QI expertise.

Meeting Funding Expectations

Funders often want to see immediate results for health and/or social outcomes in a short timeframe. This can put pressure on communities to start at full scale instead of testing in order to fully develop changes that are ready for scale. However, even when rapid results are expected, communities can still use improvement methods, including PDSA cycles, in the service of overall project results. For example, in the Summit County example shared earlier, one of the outcomes of the HUB model was to enroll mothers in an evidence-based prenatal health program. In this case, the team used a series of PDSA cycles to test a key component of the program — the referral process.

In other community initiatives, it may not be possible to pilot the intervention because of the investments, partnerships, or nature of the work. For example, building a park in the Tenderloin neighborhood in San Francisco (see **Appendix D**) did not easily lend itself to conducting PDSA cycles since the location of the park and the type of park were already established. However, potential programs and interventions to be provided at the park were testable.

Using Data for Improvement rather than Judgment

Communities may have access to large community databases through needs assessments and other data sources but may have limited experience with data collection for improvement. This requires a shift in mindset and practice from using data exclusively for long-term outcomes to collecting small sets of data for decision making about the changes that are needed to achieve those long-term outcomes. Linking the results of testing with long-term outcomes can help policymakers and system leaders to understand the importance of using data for guiding improvement and learning rather than solely for judgment, accountability, and evaluation.

Gaining Access to Data

Data in communities related to overall, high-level, community aims (e.g., improving health, well-being, and equity), or even related to project-level aims (e.g., improving safety in a park), may not be readily available. Data sharing agreements, a memorandum of understanding (MOU), or more formal contracts with health systems, public health departments, or state agencies can be used to support data collection for high-level aims. Formalizing data sharing relationships, including determining roles/responsibilities among key stakeholders, may be necessary to support data collection at the project level. It is also possible and recommended to consider which other sources of data might be available and more easily accessible, especially for initial PDSA cycles. For example, someone can count the number of people who attend a community gathering, or during the COVID-19 pandemic, local data may be publicly available on testing, infection, and hospitalization rates in specific areas of a city or county or for specific populations.

Conclusion

We hope this guide is helpful to you as an improvement leader and to your communities as you make plans and take action to improve health, well-being, and equity. This guide was created by communities who participated in 100MLives as SCALE Communities in the spirit of teaching and learning. As you apply the guidance given here and learn from your own experience, we hope that you will share what you are doing and what you have learned with others. Please consider sharing your work in the 100 Million Healthier Lives Change Library on Community Commons.

Glossary

For definitions of commonly used terms in this guide and other publications related to SCALE and 100 Million Healthier Lives, please refer to our 100MLives Glossary of Terms.

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Appendices

Appendix A: PDSA Questions

(Source: Institute for Healthcare Improvement's Quality Improvement Essentials Toolkit http://www.ihi.org/resources/Pages/Tools/Quality-Improvement-Essentials-Toolkit.aspx)

Objective:

Plan: Plan the test, including a plan for collecting data.

- Questions and predictions
- Who, what, where, when
- Plan for collecting data

Do: Run the test on a small scale.

- Describe what happened. What data did you collect? What observations did you make?

Study: Analyze the results and compare them to your predictions.

- Summarize and reflect on what you learned.

Act: Based on what you learned from the test, make a plan for your next step.

- Determine what modifications you should make — adapt, adopt, or abandon.

Appendix B: PDSA Tracking Table Template and Example

This worksheet can be used to document multiple PDSA cycles, all related to a particular project aim. It is helpful for improvement teams to keep track of the status of each cycle in order to show the relationship between the initial and each subsequent cycle. In addition to the template, an everyday example for making biscuits from scratch is given to illustrate how the form can be used to capture the learning from each test.

PDSA Tracking Sheet Template

Action Area:		**Date Started:**		**Team:**		
Project Aim Statement:						
Objective for This Group of Cycles:						
	Question/ Prediction/Plan	**Measures**	**What Happened**	**Data Collected**	**What Was Found**	**Modifications to be Made**

Cycle 1						
Cycle 2						
Cycle 3						
Additional cycles as needed…						
Date of Completion						
Plan to Monitor						

Appendix C: PDSA Cycle 1B, Summit County, Ohio

Aimee Budnik and Cory Kendrick

Note: This PDSA cycle is linked to the Summit County PDSA Cycle 1A described on page 8 of this document.

DATE: 10/5/16 PDSA Cycle 1B: Referral Process

Objective for this PDSA Cycle: The objective is to test the paper referral form at three additional WIC sites for one month to see if the process can be integrated into the RD assessment protocol at the new sites and if there is an increase in the number of referrals to the HUB for pregnant women.

Is this cycle used to develop, test, or implement a change?

Test a change (HUB referral form tested at three new WIC sites to identify pregnant women for HUB service coordination)

What question(s) do we want to answer on this PDSA cycle?

1. How was the referral to the HUB incorporated into the WIC appointment?
2. How long did the form take to complete?
3. How many referrals were generated to the HUB?
4. Were the referrals appropriate?
5. How many of the referrals converted to engagement in services?
6. What was the impact on the HMG referrals?

7. How well did the tracking process work at WIC to monitor the referrals?
8. How did the other sites compare to Fairway's experience and number of referrals?

Tip: Please note the timeframe for this test — i.e., the team planned to test the new process for approximately one month. Reducing the timeframe for a test can increase the pace of learning. For example, testing the new process with one client and one registered dietitian at each new site would yield important learning that could then be used to plan subsequent tests. The predictions about what will happen during the test could also be reduced to fit the size and scope of the test.

Plan

Plan to answer questions: Who, What, When, Where

Who: Client will complete top half of form at intake and RD will complete with client after assessment. RD will make referral if client is interested and has needs.
IA and Division Director will collect information. HUB Director will manage referrals at HUB.

What: RD will complete usual assessment at WIC appointment, summarize results with client, and complete the paper referral form. RD will send form to HUB. When: data collection and referral process will be tested for ~one month starting 10/11/16. Staff training at Fairway staff meeting.

Where: WIC staff meeting — Heather will present potential script; include pathways HUB program description with HealthCheck bag and brochures.

Plan for collection of data: Who, What, When, Where

RD will code "at-risk pregnancy" in WIC computer database to track referrals made.

RD at WIC will review schedules to count # of pregnancy appointments, # of no-shows, # of appointments kept.

Data will be reviewed at the end of the month at the Fairway, Arlington, Summit Lake, and Barberton sites.

Division Director will check in with staff weekly to obtain feedback. At the end of the month, team will discuss results with staff and obtain feedback and suggestions.

Predictions (for questions above based on plan):

1. Process was well integrated into RD appointment time.
2. Form will take less than 10 minutes.
3. About half of the pregnancy clients will convert to a referral to the HUB.
4. 75% of the referrals will be appropriate for HUB services.
5. At least 50% of the referrals will convert to fully enrolled clients at the HUB.
6. Impact on HMG will be limited.
7. Tracking process worked well.

Do

Carry out the change or test; collect data and begin analysis.
Paper referral form will be tested at three additional sites for a month. Dietitians will incorporate some of the new questions into their assessment process and use the information to make a HUB referral.

Data: tracking code in the system; weekly schedules to assess caseloads/no-shows; HUB referral tracking.

Study

Team reviewed the data that showed 184 referrals (119 active and 65 inactive clients). They also learned additional information about the referrals:

- 5 sent to HMG
- More referrals specific to target populations, including clients in their first trimester
- Referrals came from all sites
- Technology and handwriting were challenges

The team also discussed additional information they gathered through the test such as illegible or missing data, including client names, phone numbers, and addresses; the name of the specific clinic; referral dates, insurance company, and card numbers, etc. They noticed that they were seeing a lot of clients whose due date and referral date were within 30 days of each other and even some that were past the due date. Since their mission is to get to the moms as early as possible, it would be ideal for them to get referrals from clients who are 20 weeks and under in their pregnancies. In addition, some referrals were for clients who were not eligible for the program based on need or those who were not interested in the program when contacted.

Predictions Compared to Data

1) Process was well integrated into RD appointment time. (Yes, all agreed — # of referrals of supports this.)
2) Form will take less than 10 minutes. (Yes)
3) About half of the pregnancy clients will convert to a referral to the HUB. (Yes, more than half did.)
4) 75% of the referrals will be appropriate for HUB services. (Yes, data proves.)
5) At least 50% of the referrals will convert to fully enrolled clients at the HUB. (Yes, data shows.)
6) Impact on HMG will be limited. (Yes, there were multiple attempts to send referrals to HMG and they were at capacity.)
7) Tracking process worked well. (Yes, updating currently to share with WIC.)

Some sites using old forms — WIC staff to update packets.

Act

Are we ready to make a change? Plan for the next cycle.

Yes. Discussed going electronic and providing logins but still challenges with that process. May pilot with Summit Lake.

Challenge: secretary located at Fairway and if one person entered referrals electronically—batching. Entering in more information on the dietitian side will increase appointment length and disrupt discussion opportunities about HUB.

Testing the referral form process: send new referrals with screen shot of WIC demographics and pregnancy information when referral sent. See if there is improvement in data.

Review with staff about need for 1st trimester pregnancies.

Discussed plans to return favor of referrals as HUB staff meet with referrals partners and can connect women back to WIC.

Supervisor to run low birth weight and preterm stats by clinic and zip codes (new baseline).

Appendix D: Additional Community-based Examples

The examples below include personal as well as community-based PDSA cycles. Often, individuals understand PDSAs by applying them to a personal situation and then can transfer their understanding to a community objective.

In all of these examples, PDSAs were used to test an idea, measure if the change was an improvement, and document whether the change resulted in improvement. The examples demonstrate various methods for documenting learning from PDSA cycles. Please note that some of the examples include several linked PDSA cycles. Community work is often messy and complicated. Very often a project or team will need more than one or two PDSA cycles before they can implement the change, i.e., make it permanent. Projects may have five to eight cycles or even more. It is important to link the learning from one cycle to inform the plan for the next one.

Example 1: Get Healthy

(Adapted from Shekiya Miller personal example)

Cycle: #1

Start Date: 7/31/17 End Date: 8/13/17

Project Title: Get Healthy. My goal is to increase my endurance (in the short term) and decrease my cholesterol and weight (in the long term).

Objectives of this Cycle: Do 30 minutes of cardio at least 5 times a week for the next two weeks by going to the gym.

Plan

Test Plan: Do a cardio workout at the gym 5 times in the evening during work week and once during the weekend over the next two weeks.

Predictions: I will be able to get to the gym every day, but I may not be able to do a full 30 minutes each day except for Thursday and Friday. On those days I will be able to do a longer workout because I'll be in Rock Hill (which is closer to my house).

Data Collection Plan: I will use MyFitnessPal to track the number of days I get to the gym and the number of minutes I do cardio exercise at the gym.

Do

Observations:

Week 1: I was tired from my commute from Lancaster on two days this week, so I went to the gym two days on the weekend instead. On the five days I was at the gym, I was able to complete 30 minutes of cardio.

Week 2: Unexpected scheduling of events for me to attend (handling some family matters) so I only was able to get to the gym three days this week. On the days I was at the gym I was able to complete 30 minutes of cardio.

Study

Summary: Unexpected events that occurred, including some after 5pm. This affected my schedule, causing some shifts in my ability to go to the gym.

Act

Describe next PDSA cycle:

Test Plan: Next week I will be more efficient to make it to the gym in the morning on some days instead of the evening; and I will also plan to go to the gym twice on the weekend; and not all workouts have to include weightlifting.

Predictions: By getting to the gym in the morning I will be able to avoid unexpected events that may come up during the day that would prevent me from getting to the gym in the evening. I will do longer workouts (including weightlifting) on Thursday (b/c in Rock Hill) and on Saturday/Sunday depending on my schedule. I predict I will make it to the gym at least 5 days next week, and complete at least 30 minutes of cardio on those days.

Data Collection Plan: I will continue to use MyFitnessPal to track number of days at the gym and the number of minutes I do cardio exercise while I am at the gym.

Example 2: Healthy Monadnock, New Hampshire

Tricia Zahn and Candance St. John

Healthy Monadnock is a "community engagement initiative designed to foster and sustain a positive culture of health throughout Cheshire County and the Monadnock region" (source: https://healthymonadnock.org/). The PDSAs below depict the variety of uses for PDSAs in a community project that was sponsored by Cheshire Medical Center, a partner of Healthy Monadnock. The variation in the use of the tools, the data collected, and the objectives of each PDSA cycle demonstrate the flexibility of the QI tools. These are examples of quick cycles and modified versions of documenting PDSAs. Results are shown in Table 1 below.

The two PDSA cycles described below were designed to increase the number of providers referring patients to Prescribe for Health (P4H), a program for patients with chronic health issues that can be managed through addressing social determinants of health.

PSDA 1: Use provider education

The team predicted that more providers would make referrals to the program once they attended a provider education program. The team held "Lunch'n'Learns" for providers in December 2017 and monitored referral rates. The referral rates increased following the lunch sessions, but the team wanted to make even more progress. They planned a new PDSA cycle to test another idea.

PDSA 2: Offer the "Activity is Good Medicine (AIGM)" program

The team predicted that offering the AIGM program to providers would increase referrals. The AIGM program includes Community Health Worker support for patients as well as updates on patient activity in the electronic medical record (EMR).

The team worked with the local YMCA to make the AIGM program an option for providers and patients. The team monitored referral rates for the next few months. After the introduction of the AIGM program, the team saw a significant statistical shift in referrals, which was consistent with their prediction.

Summary: This team really thrived off of PDSA cycles because they were a new team with varying levels of power so it was nice for them to all brainstorm drivers and change ideas to reach their aim and then get consensus and buy-in on which ideas to try right in that space; it accelerated the timeline for sure!

Example 3: Tenderloin Neighborhood in California

Will Douglas

This community, the Tenderloin neighborhood in San Francisco, CA, provides an example of testing ideas when an element of the intervention (in this case, a community park) is already in place and can't be as easily experimented upon without major resources. Instead, the focus of the PDSA framework was to identify what elements could be tried or tested and then discussed with community members to collect feedback. Because of the nature of the community project and collaboration with community members, in some instances the formal PDSA process was adapted to a more informal session, using feedback rather than quantitative indicators to test results. However, these feedback sessions did build trust and showed the value of co-design. One challenge was that the traditional use of run charts to visualize and analyze data was not very practical because the nature of the information collected included a wide range of variables (e.g., park users, consistency of testing change ideas, other external factors, etc.) and limited organizational capacity to collect data especially since some of the measures were difficult to assess over time.

"Our approach was to look at what improvement(s) we could try and test within and outside of existing processes and loop back a week or two later and discuss what folks learned. It was less structured, but it did work as an approach to think intentionally and critically about change. The emphasis was more on lessons learned than perhaps how strongly the change idea addressed a driver." -Will Douglas

Some examples of change ideas that were tested with this adapted PDSA method included:

- Onsite stewardship of parks (roles, responsibilities, and tools) to enhance engagement and safety
- Adding a second entrance to a park to improve use among seniors
- Hosting cultural events at a park to improve sense of belonging
- Improve use by specific / target populations by offering a family night at Boeddeker Park
- Testing engagement strategies by park stewards to positively create a welcoming environment for all park users
- Identifying the programs that offered new and expanded use by community members

Throughout this process, what was most remarkable was that the community improved how it collaborated across organizations in order to support and measure the park's success, while at the same time considering the effect on park safety. This learning was shared across organizations and occurred because of the co-design process and use of the PDSA framework.

Example 4: Decrease Food Waste at School Breakfasts in Maricopa County, Arizona

Becky Henry

Maricopa County in Arizona is one of the largest health districts in the United States. The Health Department in Maricopa County works with many collaboratives and networks to assess the health of the community and develop policies to improve it. One project that Maricopa County supported was to assess and decrease the amount of food waste during breakfast at one of the county schools. The team worked with the school system to implement multiple PDSA cycles and shared this documentation with the Public Health Accreditation Board (PHAB) as part of their annual report.

The documentation tool that was used by the team to describe their quality improvement project is shown below. As part of the project, the team tested several change ideas using PDSA cycles, including:

- Addition of a menu board and signage clarifying school breakfast requirements (I.e., take three food items, at least one fruit, milk not required)
- Providing verbal prompts to students during meal period
- Educating parents, students, and staff via school newsletter (i.e., take three, at least one fruit, milk not required, arrive early)
- Educating students and staff via PowToon video (i.e., take three items, at least one fruit, milk not required)
- Serving canned fruit or applesauce instead of whole fruits (because whole fruits were more likely to be wasted)

Description of QI Project	
1) How was the need for the QI project determined? Check all that apply.	
	Site Visitors/Site Visit Report
	Accreditation Committee letter about accreditation status
	Customer feedback
	Performance management system
	Health status gathered through community statistics, focus groups, etc.
	Staff suggestion
x	Other: please describe: Stakeholder request
2) What is the existing effort or gap for which improvement is needed? What was the aim statement, including the specific measurable targets set for the activity? *If you have a storyboard that addresses all the following questions, you can upload the storyboard rather than responding to questions 6-9 in the section.*	
The National School Breakfast Program (SBP) provides cash assistance to states to operate nonprofit programs in schools. One Maricopa County School, Madison Rose Lane Elementary, requested help from the Maricopa County Department of Public Health in assessing and decreasing the amount of waste seen during breakfast. An initial baseline of plate waste was determined by completing a plate waste study during the breakfast period on January 24, 2019. The plate waste was completed using both the SCrAP method, which groups uneaten food into categories and then weighs them, as well as the Quarter-Waste Method, which relies on visual determination of the percent of each item that was consumed based off of pictures of finished trays. Both methods have benefits and challenges. After reviewing the baseline data, an aim was set to reduce breakfast food waste at Madison Rose Lane Elementary School by 50% by June 1, 2019. Specific targets for this improvement included: ● Reduction in total pounds of waste from 102.76 to 51.38 ● Reduction in pounds of unopened liquid waste from to 32 to 16 (this was prioritized as a key root cause) ● Reduction in pounds of opened liquid waste from 46 to 23 ● Reduction in pounds of unopened food waste from 8.8 to 4.4	

- Reduction in pounds of opened food waste from 15.6 to 7.8
- Increase in percent of trays with all items at least half eaten from 48% to 72%

3) What tools and implementation methods were used? Please describe what approach you used (e.g., PDCA, Lean), what tools you used (e.g., process mapping, fishbone diagram), how you determined root causes, and if you conducted a pilot.

A Pareto chart was used to determine that liquid waste made up the greatest amount of food waste by weight and that whole fruits were more likely than other foods to be less than half eaten. Strategies for addressing these root causes were identified through a review of model practices such as those included in Smarter Lunchroom materials. Strategies tested include:

- Addition of a menu board and signage clarifying school breakfast requirements (take three, at least one fruit, milk not required)
- Providing verbal prompts to students during meal period
- Educating parents, students and staff via school newsletter (i.e., take three, at least one fruit, milk not required, arrive early)
- Educating students and staff via Powtoon video (take three, at least one fruit, milk not required)
- Serving canned fruit or applesauce instead of whole fruits

The full plate waste study was completed twice more on April 25th and May 16th with liquid-only versions of the SCrAP method being completed on March 12th and April 11th. The result of these observations was plotted on a run chart and analyzed as time went on. The PDSA model was used to record which strategies were being employed during which weeks and what impact they seemed to have on plate waste.

Through observation it was also hypothesized that limited seat time may influence plate waste, so team members used a check sheet to complete observations every few weeks during the testing period to record arrival times and number of items taken. A scatter plot was then used to look for relationships between these two variables. No significant positive or negative correlation was seen, leading the group to determine that students arriving with limited time to eat were likely to take as many items as students who arrived earlier. This supports the hypothesis that limited seat time caused by later arrivals may contribute to waste, although additional study is needed to confirm this.

4) What are the outcomes of the QI project, including progress towards the measurable targets that were set? Please provide specific data.

As the project progressed, a focus on reducing unopened liquid waste was prioritized. This is the only metric which had a greater than 50% improvement.

- Total pounds of waste decreased from 102.76 to 59.49 (42% improvement)
- Pounds of unopened liquid waste decreased from to 32 to 15 (55% improvement)
- Pounds of opened liquid waste decreased from 46 to 28 (40% improvement)
- Pounds of unopened food waste decreased from 8.8 to 5.3 (39% improvement)
- Pounds of opened food waste decreased from 15.6 to 11.8 (24% improvement)
- Trays with all items at least half eaten increased from 48% to 68% (42% improvement)

Strategies that appear promising and deserve further testing include:

• Clear signage and menu board • Multi-media clarification of requirements (i.e., take three, one fruit, milk not required) • Connecting waste messaging to student's desire to be environmentally friendly The team plans to continue a second phase of this project in the 2019-2020 school year and will further explore ways to continue improvements and track how well gains are maintained.
5) To which PHAB Reaccreditation measure(s), if any, does this QI project apply?
Measure 3.1 from PHAB reaccreditation measures: Provide health education and health promotion policies, programs, processes and interventions to support prevention and wellness.

Example 5: South Carolina Center for Fathers and Families

Improvement Team of Father to Father, Inc. (Charleston, SC)

The example below highlights the use of the PDSA tracking form, i.e., a table to track the PDSA cycles, learning, and measures. The South Carolina Center for Fathers and Families supports six coalitions throughout South Carolina and is committed to supporting fathers to become great fathers. This community hired an Improvement Advisor who trained Data Quality Managers at each coalition to teach and apply quality improvement methods.

In this example, the South Carolina Center for Fathers and Families had received a large amount of funding from the Administration for Children and Families. This federal grant required that the non-profit have exit surveys completed from all fathers who participated in their program. Unfortunately, intervention specialists and case managers struggled with obtaining exit surveys. Often, once a father found a job or achieved some of their major goals, they did not visit the local coalition again. The Project Officer shared that exit surveys were critical for the non-profit to continue with the grant funding. Below is an example of the PDSA cycles used to track the process to improve the number of exit surveys obtained.

Action Area:	Completing exit surveys	Date Started: 01/21/2019		Team:	S Wilson, D Laurie, A Mouser, S Anderson, T Middleton-Smalls	
Project Aim Statement: Charleston office will improve the # of exit surveys completed by 50% by 3/31/2019.						
Objective for This Group of Cycles: To obtain 5 exit surveys per week at the Charleston site (current and retroactive participants)						
	Question/ Prediction/Plan	**Measures**	**What Happened**	**Data Collected**	**What was Found**	**Modifications to Be Made**
Cycle 1 January 10, 2019 - January 17, 2019	Will having participants complete exit surveys prior to total disengagement assist with ensuring that exit surveys are completed? If participants miss more than two sessions consecutively (disengagement point), Wilson, Mouser and Laurie will inquire about having them complete the exit survey, to ensure this is completed before complete disengagement.	# of participants completing or leaving program, # of exit surveys completed, # of contacts made	Wilson, Mouser and Laurie were busy with court, intake, and preparing for group – no one was able to reach out to contacts about exit surveys. Huddle with team on XXXXXX	0 exit surveys, 0 contacts made, potential opportunities were missed.	We decided that we needed to set aside at least one hour a week to dedicate time for exit surveys.	Thursday from 2-4 to focus on exit surveys Reminder email
Cycle 2 January 17, 2019 - January 25, 2019	Will the team have time for exit surveys with the 2 hours on Thursday and a reminder email from DQM? Plan: Thursday from 2-4 to focus on exit surveys Reminder email	# of participants completing or leaving program, # of exit surveys completed, # of contacts made # of team members who carved out the time (how much time did it take)	Huddle with team on 01/17/19 (not all team members present) Laurie, Anderson, Middleton-Smalls met and were not able to do much because they needed more information. Anderson reached out	2 exit surveys (Anderson), no team members carved out time, XXX potential were missed.	Ragland was going to talk to team members about it, Anderson was going to schedule an appointment to do exit surveys together as a team.	Ragland speak to team on 1/28/19, team meets on 2/1/19, change to Friday – data day, team was going to attempt to do exit surveys immediately after group session.

			directly to Mouser and Wilson. Wilson did not have time this week but promised to do 10 the following week. Anderson met with Elmore and Strother to let them know that it was not completed.			
Cycle 3 January 25, 2019 - February 1, 2019	Will changing the day of exit survey entry and getting team members to complete immediately following group increase exit survey numbers? Plan: Ragland speak to team on 1/28/19, team meets on 2/1/19, change to Friday – data day, team were going to attempt to do exit surveys immediately after group session.	# of contacts made, # of surveys completed after group	Ragland and Anderson met with team via telephone 01/28/19. This meeting reiterated the importance of exit surveys and being able to get them completed.	2 exit surveys completed immediately following group.	Using the group approach can assist with ensuring surveys are completed; however, outreach, as well as other staff, is going to get involved to assist with completing more exit surveys. This will be further discussed at our next meeting on 02/07/19.	Team members to include Laurie, Pearson, and Smalls will work during group sessions to ensure that those who qualify complete their exit surveys. Laurie will make contact via phone or home visit for those who are closed or disengaged.
Cycle 4 February 2, 2019 - February 15, 2019	Will doing the exit surveys after group with all team members involved as well as outreach making contacts and home visits increase exit survey completion?	# of contacts made, # of surveys completed after group, # of exit surveys completed based on outreach measures	Anderson met with team members to discuss barriers to completing surveys. Reminder email to be sent to staff on 2/13/19 in regard to surveys to hopefully encourage completion.	2 exit surveys completed. Another 1 survey attempted; however, participant was a no-show.	Not many surveys or attempts were made using this approach. Team to identify another approach to completing surveys on their own, and not based on the ideas from DQM and Program and	Team member, Lead Interventionist Sean Wilson, came up with an idea and all team members agree that this approach will work. Plan: Team members will come together on Wednesday, 2/20/19 and all will work together to make phone calls and get surveys

					Operations Director.	completed. Mouser and Wilson will place calls; Anderson, Laurie and Tracy will be set up to complete surveys over phone or make appts for surveys to be completed. After this is completed, those that could not be contacted by phone will have an attempt made to contact them via a home visit.
Cycle 5 February 19, 2019 - February 22, 2019	Will completing the exit surveys as a group allow us to complete at least 10 exit surveys (if not more)?	# of completed exit surveys completed as a group	Group came together and completed 16 exit surveys as a group.	Team identified participants based on their attendance and whether they were close to completing the organizational requirements.	Team was able to see that completing the exit surveys together allowed the exit surveys to be completed faster and easier.	Team will continue to meet bi-weekly to discuss exit survey completion and progress to ensure that they do not fall behind on this again.
Date of Completed PDSA	3/22/2019					
Plan to Monitor to Ensure that Improvement is Maintained	DQM will monitor the # of exit surveys weekly and communicate findings with all team members. Please see attached letter for details.					