Institute for Healthcare Improvement

Better Maternal Outcomes: Safe Reduction of NTSV Cesarean Births

A Workbook to Guide Your Improvement Work

Acknowledgments

Seeking to improve outcomes for all people who birth in the United States and their babies and to reduce the stark inequities in maternal health, the Institute for Healthcare Improvement (IHI) engaged in a three-year (April 2018 to October 2021), large-scale project called Better Maternal Outcomes, funded with generous support from Merck for Mothers.

This QI Workbook was developed as part of the Better Maternal Outcomes Rapid Improvement Network. The goal of the network was to equip participants with the knowledge and skills needed to reliably implement promising practices and improve care delivery for all women and newborns around the time of birth.

Thank you to Merck for Mothers for their generous support in funding the Better Maternal Outcomes project. The content of this publication is solely the responsibility of the authors and does not represent the official views of Merck. Merck for Mothers is known as MSD for Mothers outside the United States and Canada.

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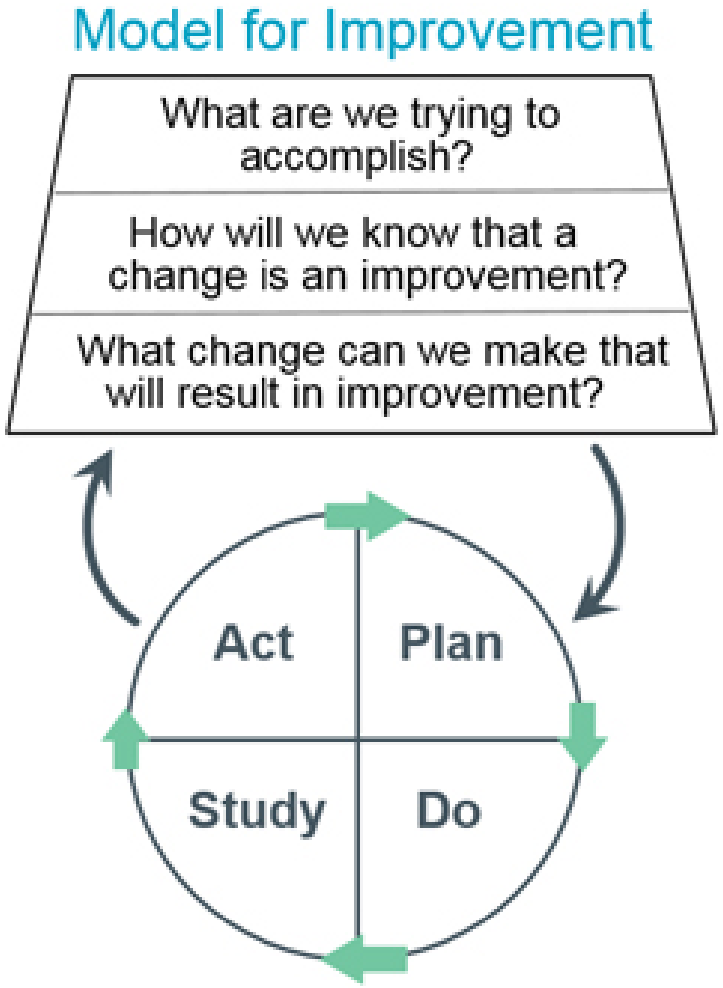
How to Use the Workbook

- Use this workbook to guide your team's improvement projects related to safe reduction of NTSV (nulliparous, term, singleton, vertex) cesarean births.
    - For hospitals that want to work on reducing primary cesarean births rather than focusing only on NTSV cesareans, this is a decision that each health system makes based on their data and improvement opportunities. Many examples in the workbook are applicable to reducing both primary and NTSV cesareans, but you may want to make adaptations for your project.
- Each section describes setting up a core element of a quality improvement project.
- In each section, there is a blank tool template that you can customize for your specific project.
- All workbook examples relate to cesarean birth, but can be adapted to other clinical areas.
- You may want to save your customized tools in a separate file to share with key stakeholders in your facility as your project progresses.

Model for Improvement



- The tools in this workbook are based on the Model for Improvement.
- Answer the 3 questions in any order you choose.
- We advise setting the aim for your improvement project before selecting measures or changes.

The Model for Improvement was developed by Associates in Process Improvement [Source: 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.]

Tools in the Workbook

- Aim Statement Worksheet
- Driver Diagram
- Change Ideas Tracker
- Plan, Do, Study, Act (PDSA) Planning Form
- PDSA Ramp Planning Worksheet
- Measurement Strategy Worksheet

Aim Statement Worksheet

What are we trying to accomplish?

Aim Statement: Overview

- An aim statement is the answer to the first question in the Model for Improvement, “What are we trying to accomplish?” The aim statement communicates your project’s ambition and timeframe.
- Effective aim statements delineate clear, specific plans for the project and clarify the intended improvements to the system.
- The prompts on the next slide will help you write an effective aim statement to achieve the long-term goal of safely reducing NTSV cesarean birth.
- The checklist will help you identify opportunities to strengthen the aim statement.

Example Aim Statement Worksheet

What? What's the problem or opportunity?

Reduce complications, unnecessary surgeries, and improve experience of care for patients and families, and reduce our hospital's NTSV (nulliparous, term, singleton, vertex) cesarean birth rate

How much? By how much will you improve, or "how good" do you want to get?

Reduce from 29% to 23.6%, in line with Healthy People 2030 goals

By when? What is the date by which you will achieve the level of improvement you've set out to accomplish?

In one year (by April 1, 2022)

For whom? Who is the customer or population who will benefit from the improvement?

All women on the Labor and Delivery Unit who meet the definition of NTSV

Where? What are the boundaries of the process or system you're trying to improve? Where does it begin and end?

In the Labor and Delivery Unit at ABC Hospital

Completed aim statement:

To reduce complications and improve patient care and experience, we will reduce the percentage of NTSV cesarean births for women on the Labor and Delivery Unit of ABC Hospital from 29% to 23.6% by April 1, 2022.

Ask a colleague to check your work and recommend improvements:

- ❑ Is the problem or opportunity clearly stated?
- ❑ Do you know what the team is going to do about the problem?
- ❑ Has the team set a numerical goal to quantify the amount of improvement they'd like to make?
- ❑ Do you know the calendar date by which the team plans to achieve the goal?
- ❑ Is it clear who will benefit from the improvement?
- ❑ Is the scope of the project clear?
- ❑ Do you know why this improvement effort is important?

Tool Template: Aim Statement Worksheet

What? What's the problem or opportunity?

How much? By how much will you improve, or "how good" do you want to get?

By when? What is the date by which you will achieve the level of improvement you've set out to accomplish?

For whom? Who is the customer or population who will benefit from the improvement?

Where? What are the boundaries of the process or system you're trying to improve? Where does it begin and end?

Completed aim statement:

Ask a colleague to check your work and recommend improvements:

- [ ] Is the problem or opportunity clearly stated?
- [ ] Do you know what the team is going to do about the problem?
- [ ] Has the team set a numerical goal to quantify the amount of improvement they'd like to make?
- [ ] Do you know the calendar date by which the team plans to achieve the goal?
- [ ] Is it clear who will benefit from the improvement?
- [ ] Is the scope of the project clear?
- [ ] Do you know why this improvement effort is important?

Driver Diagram

What change can we make that will result in improvement?

Driver Diagram: Overview

- To achieve your aim, the team should have a strong theory about what will lead to the intended improvement. Driver diagrams are one method to share your theory about how you'll achieve your aim.
- A driver diagram shows the relationship between the overall **aim** of the project and the **primary drivers** and **secondary drivers** that contribute directly to achieving the aim.
- When developing a driver diagram, enlist team members familiar with different aspects of the system you intend to improve and subject matter experts. One individual is unlikely to have a clear view of an entire complex system.

Driver Diagram: Overview

- **Primary drivers** (also called “key drivers”) are the most important influences on the aim
  - No more than 2 to 5 primary drivers are recommended
  - In most cases, teams will benefit from tying a process measure (see Measurement section) to each primary driver
- **Secondary drivers** are influencers on (or natural subsections of) the primary drivers
  - You may have several secondary drivers for each primary driver
  - **Specific change ideas** to test accompany each secondary driver, and you may have many change ideas for each secondary driver

Example Driver Diagram: Safe Reduction of NTSV Cesarean Birth (Based on AIM Bundle)

Aim

- Reduce the percentage of NTSV cesarean births for women on the Labor and Delivery Unit of ABC Hospital from 29% to 23.6% by April 1, 2022
- Close the gap in NTSV cesarean rates between Black and White women by 10% by April 1, 2022

Primary Drivers

- System Readiness
- Recognition and Prevention
- Response
- Reporting and Learning Systems

Secondary Drivers

System Readiness

- Train all clinicians on non-pharmacological interventions to support labor progress such as Spinning Babies®, use of peanut balls, turning women with epidurals every 1 to 2 hours
- Support women in accessing and engaging doula supports
- Implement unit-based drills and simulations
- Develop standard tools for labor triage and standard guidelines for admission or women presenting in spontaneous labor
- Develop standard policies regarding criteria for induction

Recognition and Prevention

- Visibly identify all NTSV patients in charts and in central monitoring locations (i.e.., nurse's station, physician lounge)
- Use standard techniques for fetal heart rate assessment
- Educate patients on options for pain management and labor support
- Increase provider comfort with longer 2nd stage, encourage patience with labor on the unit
- Identify potential complications during prenatal care to minimize unexpected complications during admission
- Offer intermittent auscultation to support freedom of movement

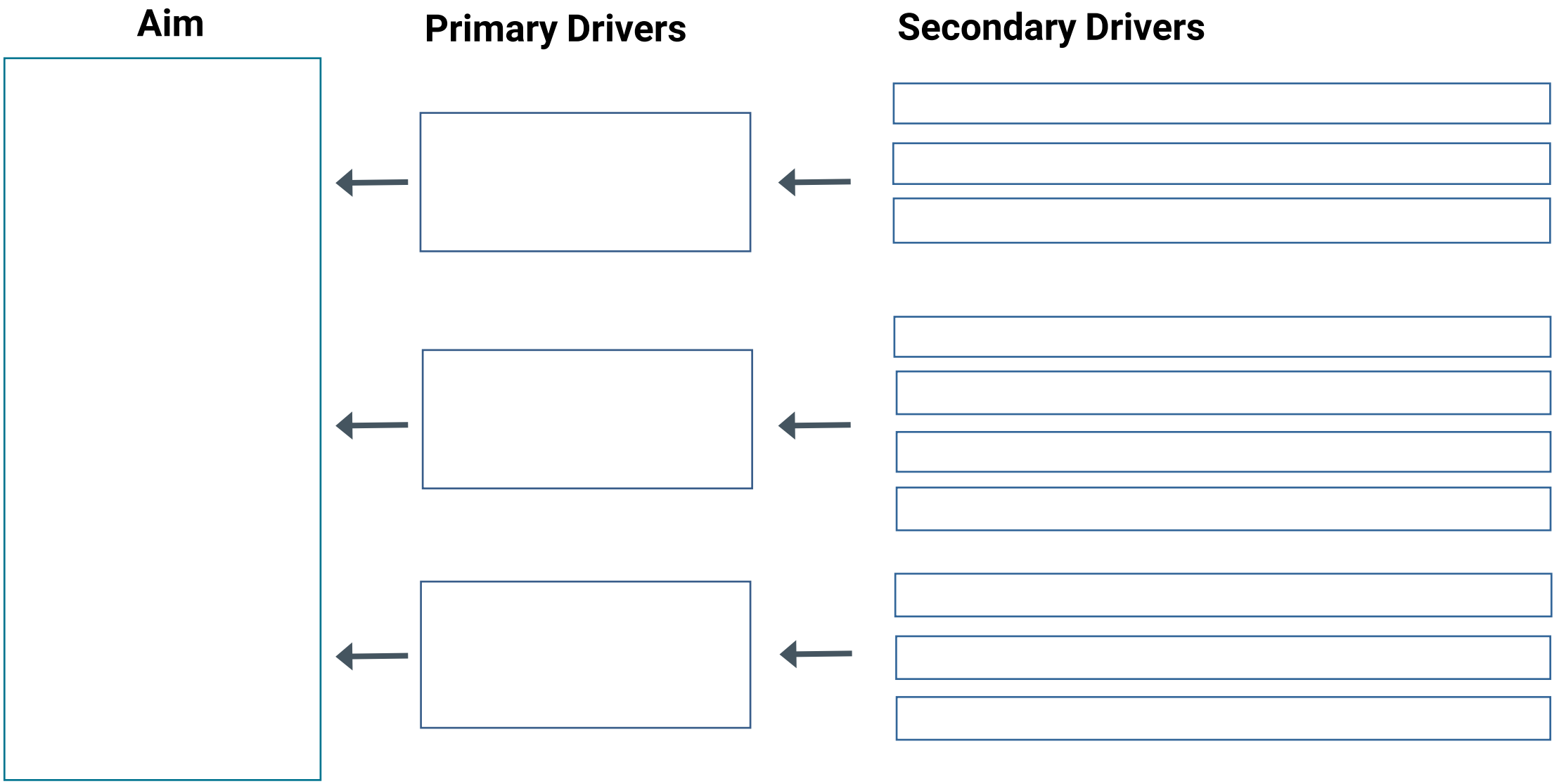
Response

- Use a pre-cesarean birth surgical checklist for labor dystocia and failed induction
- Use standard guidelines for fetal heat rate (FHR) monitoring and interpretation
- Use a checklist that guides management of abnormal FHR and other complications
- Use objective language when discussing fetal condition with patients

Reporting and Learning Systems

- Implement team huddles for high-risk patients and post-event debriefs that include patient and family
- Conduct multidisciplinary case reviews for all NTSV cesarean births to identify specific drivers of C-sections
- Create a system of ongoing education for clinical staff (e.g., CME, competencies)
- Share data broadly (aggregate data stratified by race, use storyboards) to connect to purpose and create a narrative for working toward equity
- Share provider-level cesarean birth rates
- Track data based on race and ethnicity to identify trends; during case reviews, discuss how implicit and explicit bias affects C-section rates

Tool Template: Driver Diagram



Change Ideas Tracker

What change can we make that will result in improvement?

Change Ideas: Overview

- Change ideas: Specific, identifiable changes that will bring about improvement, that will lead you in a desirable direction toward achieving your aim.
- Testing a change idea on a small scale using Plan-Do-Study-Act (PDSA) cycles enables trial and learning, minimizes risks, and helps teams observe how the system or process responds to the change.
- As you learn from a change, continue testing and use data acquired from the change and defined measures to track your progress.
- Using PDSA cycles, develop subsequent tests and refinements in the change idea to build confidence in the change.

Change Ideas: Overview

- This section gives you an opportunity to do a quick check on the current status of key change ideas related to:
  - **Safely reducing NTSV cesarean births**
  - **Reducing inequities in cesarean birth outcomes**
    It is important to ensure that as you work to reduce NTSV cesarean births, you are also centering equity and ensuring that improvements are not widening disparity gaps.
- You can then plan which ideas you will test and implement next.
- The first table is a completed example, followed by a blank table template.

Example Change Ideas to Safely Reduce NTSV Cesarean Births

Below are some change ideas to safely reduce NTSV cesarean births. You may be reliably doing some of these things, but not others. For each change idea, use an "X" to indicate the current status of testing.

Category	Key Change Idea	Not Yet Tested	Plan to Test	Currently Testing	Implemented
Readiness	Clinician training on labor support techniques (e.g., Spinning Babies®, use of peanut balls)				X
Readiness	Provider and patient education on pain management techniques			X	
Recognition	Visibly identify NTSV patients in patient charts and central monitoring areas (i.e., at the nurse's station)				X
Recognition	Use standard techniques for fetal heart rate assessment, such as intermittent auscultation	X			
Response	Use objective language when discussing fetal condition with patients		X		
Response	Use pre-surgical checklist for labor dystocia or failed induction	X			
Reporting	Conduct regular case reviews of all NTSV cesareans with staff and patients/families			X	
Reporting	Share provider-level NTSV cesarean birth rates		X		

Tool Template: Change Ideas to Safely Reduce NTSV Cesarean Births

Below are some change ideas to safely reduce NTSV cesarean births. You may be reliably doing some of these things, but not others. For each change idea, use an "X" to indicate the current status of testing.

Category	Key Change Idea	Not Yet Tested	Plan to Test	Currently Testing	Implemented
Readiness	Clinician training on labor support techniques (e.g., Spinning Babies®, use of peanut balls)				
Readiness	Provider and patient education on pain management techniques				
Recognition	Visibly identify NTSV patients in patient charts and central monitoring areas (i.e., at the nurse's station)				
Recognition	Use standard techniques for fetal heart rate assessment, such as intermittent auscultation				
Response	Use objective language when discussing fetal condition with patients				
Response	Use pre-surgical checklist for labor dystocia or failed induction				
Reporting	Conduct regular case reviews of all NTSV cesareans with staff and patients/families				
Reporting	Share provider-level NTSV cesarean birth rates				

Example Change Ideas to Reduce Inequities in Cesarean Birth Outcomes

Below are some change ideas to reduce inequities in cesarean birth outcomes, to ensure that improvements to safely reduce NTSV cesarean births are not widening disparity gaps. For each change idea, use an "X" to indicate the current status of testing. Add your own change ideas in the blank rows.

Key Change Idea	Not Yet Tested	Plan to Test	Currently Testing	Implemented
Stratify data by race and ethnicity to identify gaps in care experience and outcomes		X		
Develop an organizational equity dashboard to share progress toward equity goals across the organization			X	
Offer regular opportunities for staff and providers to participate in implicit bias and upstander training				X
Engage women and families of color with lived experience in improvement efforts	X			

Tool Template: Change Ideas to Reduce Inequities in Cesarean Birth Outcomes

Below are some change ideas to reduce inequities in cesarean birth outcomes, to ensure that improvements to safely reduce NTSV cesarean births are not widening disparity gaps. For each change idea, use an "X" to indicate the current status of testing. Add your own change ideas in the blank rows.

Key Change Idea	Not Yet Tested	Plan to Test	Currently Testing	Implemented
Stratify data by race and ethnicity to identify gaps in care experience and outcomes				
Develop an organizational equity dashboard to share progress towards equity goals across the organization				
Offer regular opportunities for staff and providers to participate in implicit bias and upstander training				
Engage women and families of color with lived experience in improvement efforts				

PDSA Planning Form

What change can we make that will result in improvement?

PDSA Cycles: Overview

As part of the Model for Improvement, Plan-Do-Study-Act (PDSA) cycles are a useful tool to test and document change ideas.

- **Plan:** Develop a plan to test the change
- **Do:** Carry out the test
- **Study:** Observe, analyze, and learn from the test
- **Act:** Determine what modifications, if any, to make for the next PDSA cycle

PDSA Cycles: Overview

PDSA cycles are a good way to:

- Test change ideas on a small scale initially, to understand the effect of a change on a system or process to ensure the change is leading to the desired result.
- Using multiple PDSA cycles, a team can test, refine, and adapt change ideas to the environment while gaining staff buy-in.

PDSA Planning Form: Overview

- For each change idea you test, fill out one PDSA Planning Form (see template).
- In most improvement projects, teams will test several different change ideas, and each change idea may go through several PDSA cycles as you continue to learn and refine the idea.
- Keep a file (either electronic or hard copy) of all PDSA cycles for all the changes your team tests in order to share your learning when spreading the change idea.

Example PDSA Planning Form

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

Questions and predictions: Will a standard technique and language for fetal heart rate (FHR) interpretation create more clarity and consistency in decisions about cesarean birth?

Prediction: A standard technique will allow labor to progress naturally longer and reduce the chance of a C-section, with no adverse effects on mom or baby. Providers may need additional coaching to get comfortable using the technique and language.

Who, what, where, when: The unit nurse manager will train the team on the technique and how to interpret and communicate abnormalities. Documentation for this process will be posted in the delivery room where the change is being tested. For the next delivery, the team will use the technique to interpret any abnormalities in FHR and communicate with the patient about whether a cesarean birth should be considered.

Plan for collecting data:

- Team debrief: How long was labor able to progress? Did the mother have a cesarean birth? Were the technique and standard language used? What worked well? What was challenging? What was the level of effort for the team?
- Follow up with patient: Did the birthing person feel informed and comfortable with how FHR information was presented?

2. Do: Run the test on a small scale

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

- Team was able to find the information on the technique and use it to interpret the FHR monitoring.
- Team was able to communicate to the patient using the standard language and debrief as a team.

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

Summarize and reflect on what you learned:

- As the team predicted, a standard technique for FHR interpretation allowed them to more clearly and confidently discuss next steps and communicate the information objectively to the patient. The labor progressed naturally and the team believed the standard technique made this more likely to happen. However, there was still some disagreement about next steps, which might merit further team training and a better decision-making process. The patient reported feeling informed about the process and next steps based on the FHR interpretation.

4. 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:

- **Adapt:** The team will meet to debrief the last delivery and come to an agreement on next steps for various FHR scenarios to ensure everyone is on the same page. Then the same team will test this process again for the next delivery using the same technique and standard language.
- The team is engaged to make the process work, so will continue to test the process until they feel confident with it before expanding the test to other teams that are more resistant to using the standard technique and language.

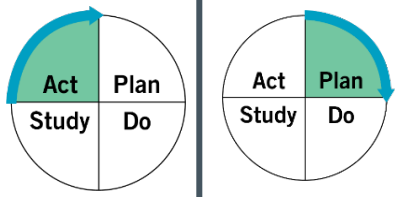
Tool Template: PDSA Planning Form

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

Questions and predictions:

Who, what, where, when:

Plan for collecting data:



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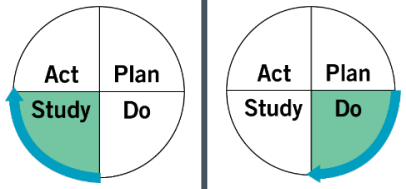


3. Study: Analyze the results and compare them to your predictions

Summarize and reflect on what you learned:

4. 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:

PDSA Ramp Planning Worksheet

What change can we make that will result in improvement?

PDSA Ramps: Testing Changes and Scaling Up Tests

- **Start small:** When testing changes, it is important to start small but don't stay there very long! With each test, predict what you will do if the test works so that you continue to move the work forward.
- **Scale up tests by multiples of 5:** A common sequence for testing is to start with 1 patient, then move to 5 patients, then 25 patients, etc.
- **Test under a wide range of conditions**

An example of a PDSA Ramp using this sequence is provided in the workbook.

PDSA Ramps: Testing Changes and Scaling Up Tests

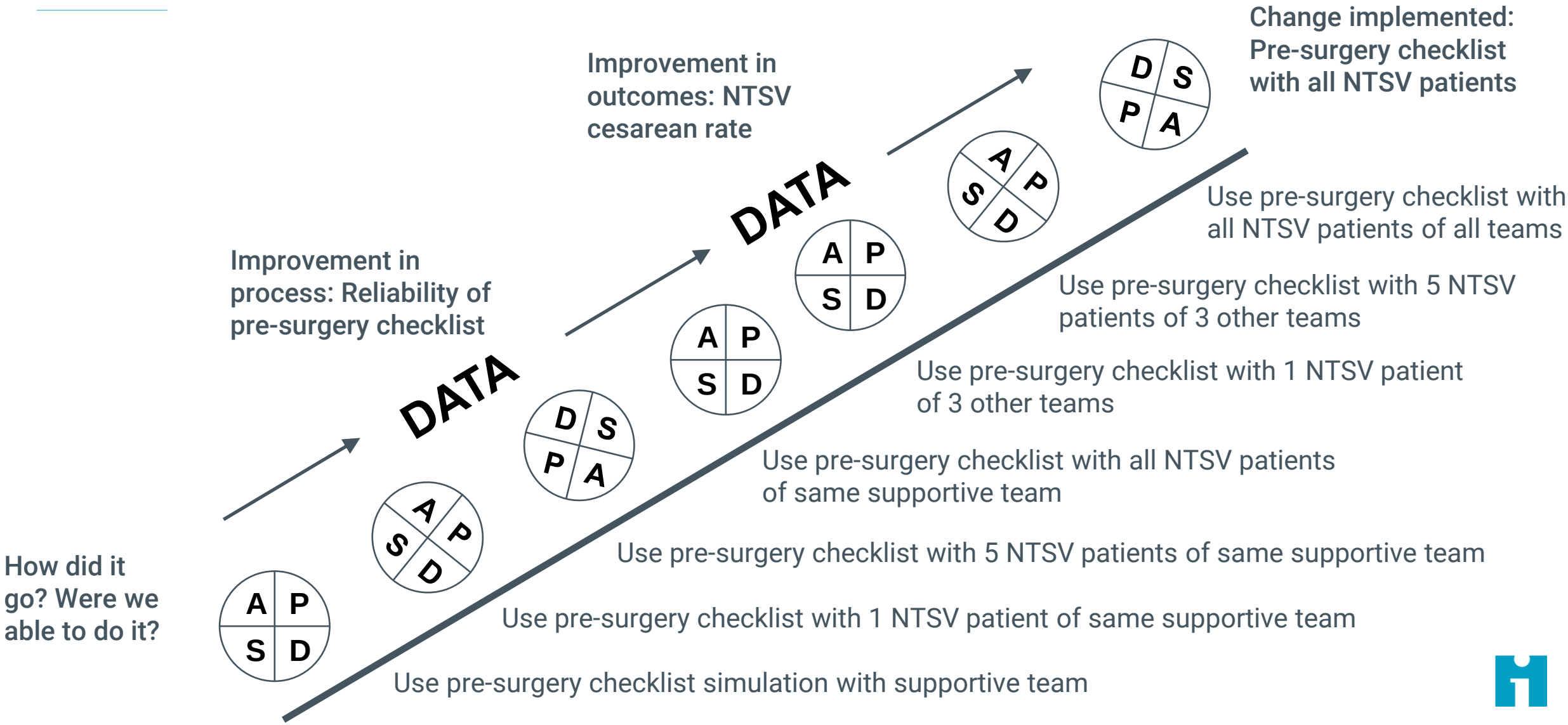
After each PDSA cycle, decide if you should:

- Implement the change as is (adopt the change idea)
- Drop the change entirely (abandon the change idea)
- Modify and test again (adapt the change idea)
- Increase in scope (expand the change idea)
- Test the change idea under other conditions

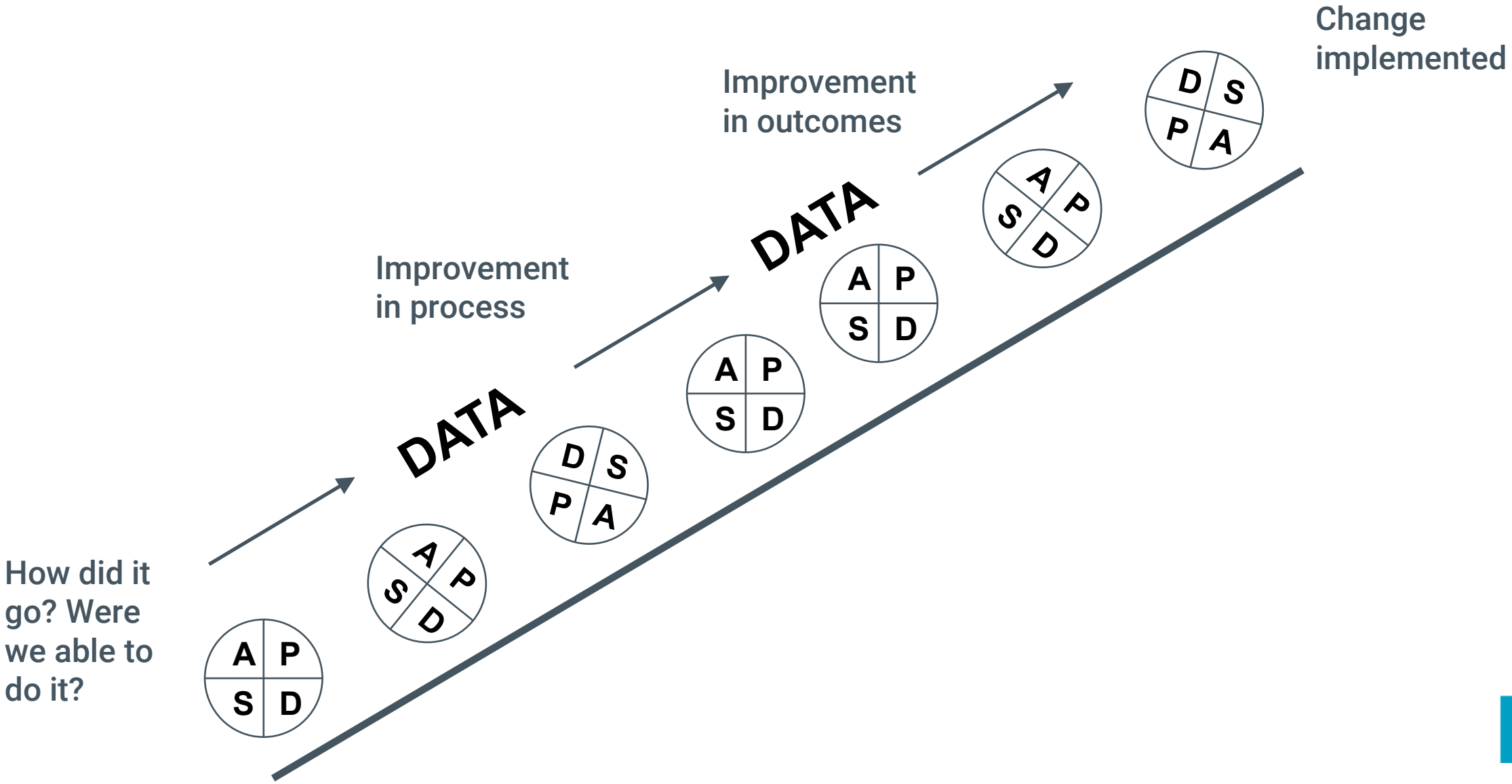
When should you implement a change?

- When you have a reliable process; there is nothing more that needs to be learned for the change to operate as planned
- There is evidence of improvement (quantitative and qualitative)
- You have local champions for the change
- The change idea has been tested under a variety of conditions
- The cost of failure is low or mitigated

Example PDSA Ramp Planning Worksheet



Tool Template: PDSA Ramp Planning Worksheet



Measurement Strategy Worksheet

How will we know that a change is an improvement?

Measures: Overview

Measures help you know if you are on track to achieve your aim, answering the question, “How will we know that a change is an improvement?”

- It is important to have a balanced set (or family) of measures to help track progress.
- There are three types of measures for improvement: outcome, process, and balancing measures (see next page).
- Don’t forget to define each measure and develop a clear plan for how you will collect data, data reporting frequency, and your goal.

Three Types of Measures for Improvement

Measure Type	Characteristics	Recommended Number
Outcome	• Voice of the customer or patient • How is the system performing? • What is the result? (“so what” measure) • Always links back to your aim	1 to 2

Process	• Voice of the workings of the system
	• Are the parts/steps in the system performing as planned?
	  ○ Can be an early indication of improvement in the outcome
	  ○ Careful not to overdo the number
		3 to 5

Balancing	• Looking at a system from different directions/dimensions
	• Looks at the impact a change may have on other parts of the system
	  ○ Unintended consequences
	  ○ Upstream/downstream
	• Optional measures, but wise to include
		1 to 2

Example Measurement Strategy Worksheet

Aim Statement: Reduce the percentage of NTSV cesarean births for women on the Labor and Delivery Unit at ABC Hospital from x% to y% by April 2022.

Measure Type	Measure	Measure Definition
Outcome	NTSV cesarean birth rate (TJC PC-02)	• **Denominator:** Total number of nulliparous patients delivered of a live term singleton newborn in vertex presentation • **Numerator:** Among the denominator, number of women who had a cesarean birth • Stratify data by race, ethnicity, and language
Process	Percent of NTSV patients who received non-pharmacological labor support	• **Denominator**: Total number of NTSV patients who delivered on the unit • **Numerator:** Among the denominator, number of patients who received non-pharmacologic labor support • Stratify data by race, ethnicity, and language
Process	Elective inductions prior to 39 weeks (TJC PC-01)	• **Denominator**: Total number of patients delivering newborns with >= 37 and < 39 weeks of gestation completed • **Numerator:** Among the denominator, number of patients who had elective (non-medically-indicated) inductions • Stratify data by race, ethnicity, and language
Process	Percent of NTSV cesarean deliveries where multidisciplinary case review occurred after the event	• **Denominator**: Total number of NTSV cesarean deliveries • **Numerator:** Number of case reviews for NTSV cesareans that occurred within one week of the delivery • Stratify data by race, ethnicity, and language
Balancing*	Unplanned NICU admissions	• **Denominator**: Total number of live births without identified pre-existing conditions (preemies, maternal drug use, birth defects or other fetal conditions) • **Numerator:** Among the denominator, number of infants who were admitted to the NICU after delivery • Stratify data by race, ethnicity, and language
Balancing	3rd and 4th degree lacerations	• **Denominator**: Total number of vaginal deliveries • **Numerator:** Among the denominator, number of women who had a 3rd or 4th degree laceration during delivery • Stratify data by race, ethnicity, and language

*Note: Hospitals already reporting to The Joint Commission often choose to use TJC PC-06 (unexpected newborn complications) as a neonatal balancing measure instead of unplanned NICU admissions.

Tool Template: Measurement Strategy Worksheet

Aim Statement:

Measure Type	Measure	Measure Definition

Additional QI Resources

Additional QI Resources

- Learn more about the Model for Improvement and PDSA cycles on the Institute for Healthcare Improvement website (ihi.org).
- The Science of Improvement on a Whiteboard: In these short videos, Robert Lloyd, Vice President at IHI, breaks down some basic QI tools in 2- to 8-minute videos.
- Additional videos on using data for improvement:
  - The Science of Improvement: Establishing Measures (3-minute video)
  - What's the Difference Between Research and QI? (2-minute video)
  - What Do We Mean by Measurement for Judgment? (5-minute video)

Additional QI Resources

- IHI Quality Improvement Essentials Toolkit: Maternal Health: Four core quality improvement tools are described in the toolkit, along with specific maternal health examples.
- Council on Patient Safety in Women's Healthcare: Implementing Quality Improvement Projects Toolkit
- Better Maternal Health: Reducing Inequities Through Community Collaboration: Brief reports describe the experience of four US communities, participants in the Better Maternal Outcomes: Redesigning Systems with Black Women project, to improve outcomes and reduce racial inequities in maternal outcomes for Black people who birth.

Additional Cesarean Birth Resources

- Council on Patient Safety in Women's Healthcare: AIM Bundle on Safe Reduction of Primary Cesarean Birth
- California Maternal Quality Care Collaborative: Toolkit to Support Vaginal Birth and Reduce Primary Cesareans
- California Maternal Quality Care Collaborative: My Birth Matters website to help pregnant women and birthing people learn more about birthing options

Institute *for* Healthcare Improvement

For 30 years, the Institute for Healthcare Improvement (IHI) has used improvement science to advance and sustain better outcomes in health and health systems across the world. We bring awareness of safety and quality to millions, accelerate learning and the systematic improvement of care, develop solutions to previously intractable challenges, and mobilize health systems, communities, regions, and nations to reduce harm and deaths. We work in collaboration with the growing IHI community to spark bold, inventive ways to improve the health of individuals and populations. We generate optimism, harvest fresh ideas, and support anyone, anywhere who wants to profoundly change health and health care for the better. Learn more at ihi.org.