Institute for Healthcare Improvement

Better Maternal Outcomes: Reducing Harm from Obstetric Hemorrhage

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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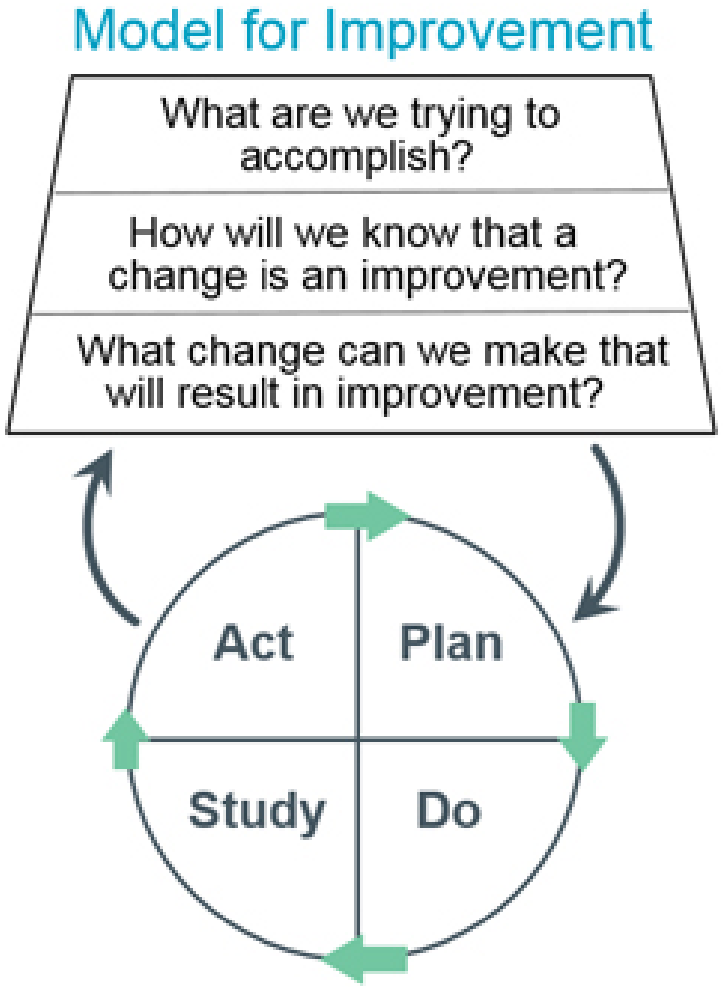
How to Use the Workbook

- Use this workbook to guide your team's improvement projects related to reducing harm from hemorrhage.
- 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.
- 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 page will help you write an effective aim statement to achieve the long-term goal of eliminating preventable obstetric hemorrhage-related morbidity and mortality.
- The checklist will help you identify opportunities to strengthen the aim statement.

Example Aim Statement

The example aim statement on the next page relates to quantitative blood loss (QBL).

- One common error Labor and Delivery teams make is inaccurate estimation of how much blood was lost.
- Inaccurate estimations have been shown to cause denial of severity, which can lead to delays in treatments.
- The cumulative QBL improves situational awareness. By performing QBL, the medical team can recognize hemorrhage earlier and more consistently based on a woman’s actual blood loss.

Example Aim Statement Worksheet

What? What's the problem or opportunity?

Increase the use of quantitative blood loss (QBL) on the Labor and Delivery Unit in order to prevent denial and delay in treatment of postpartum hemorrhage

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

Improve from a baseline of 25% of deliveries using QBL to 100% using QBL

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

In 6 months (by May 1, 2021)

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

All women who deliver on the hospital's Labor and Delivery Unit

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 prevent denial and delay in treatment of postpartum hemorrhage, we will increase the percentage of deliveries using QBL on the Labor and Delivery Unit at ABC Hospital from 25% to 100% by May 1, 2021.

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?

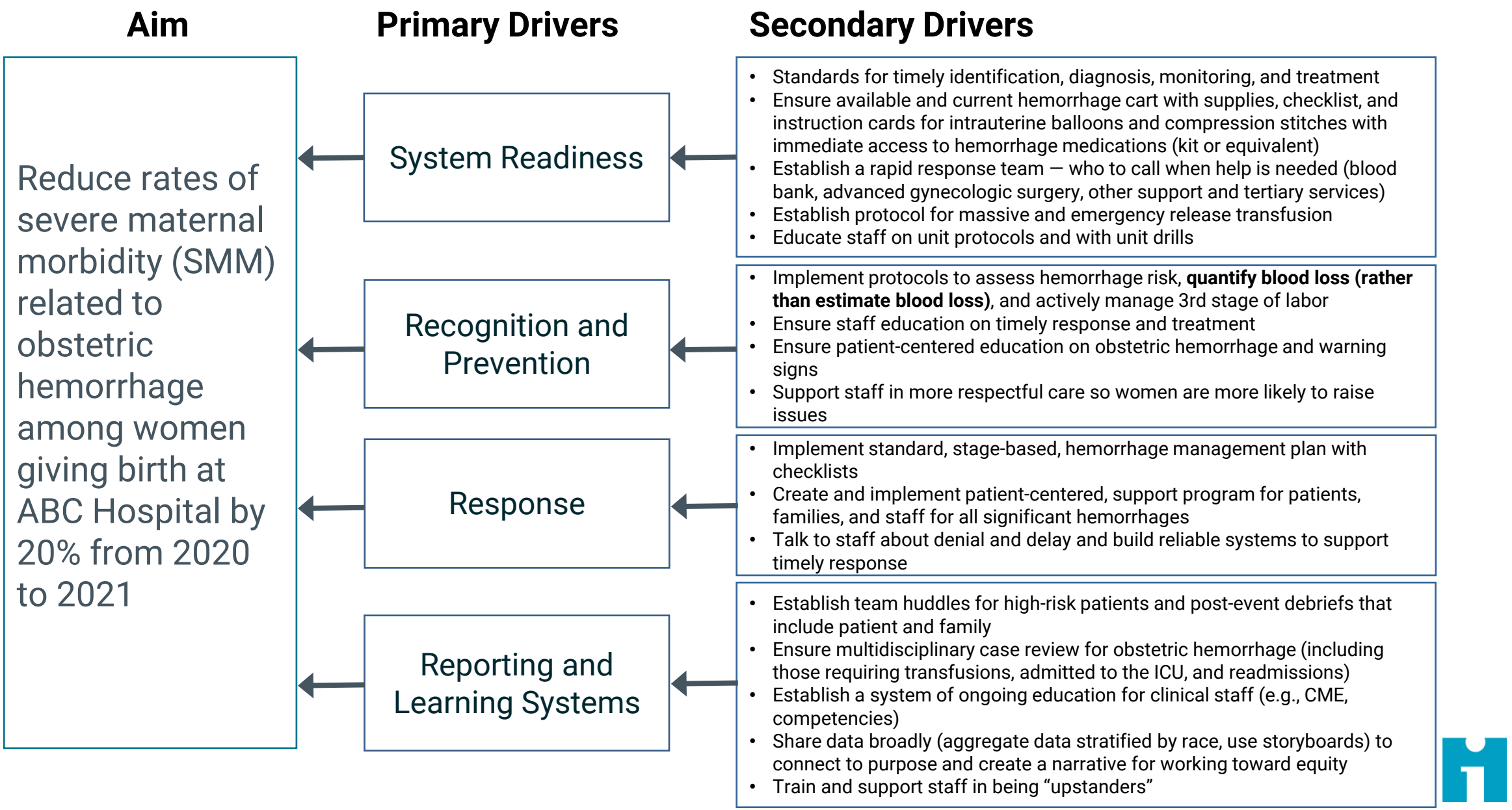
Driver Diagram: Overview

- 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.

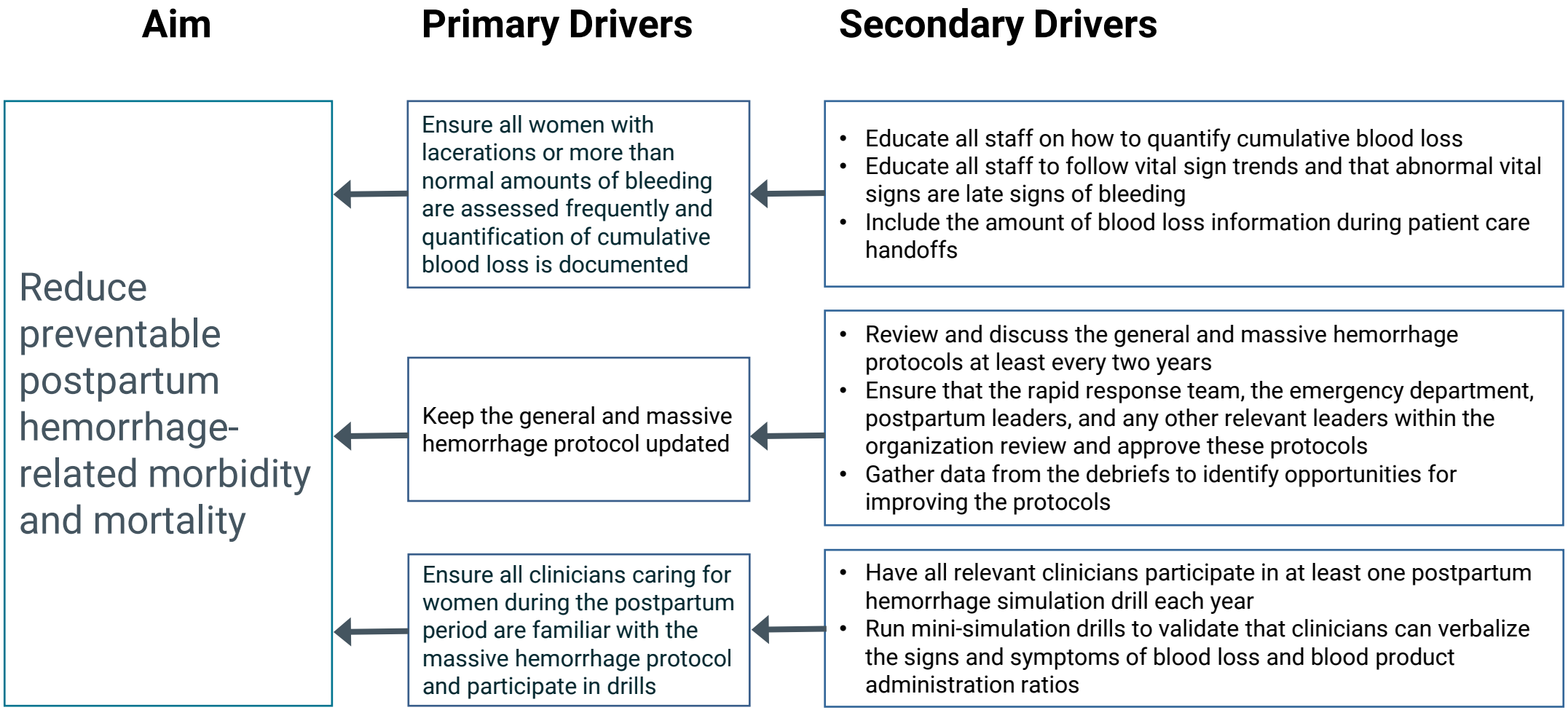
Driver Diagram: Overview

- **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

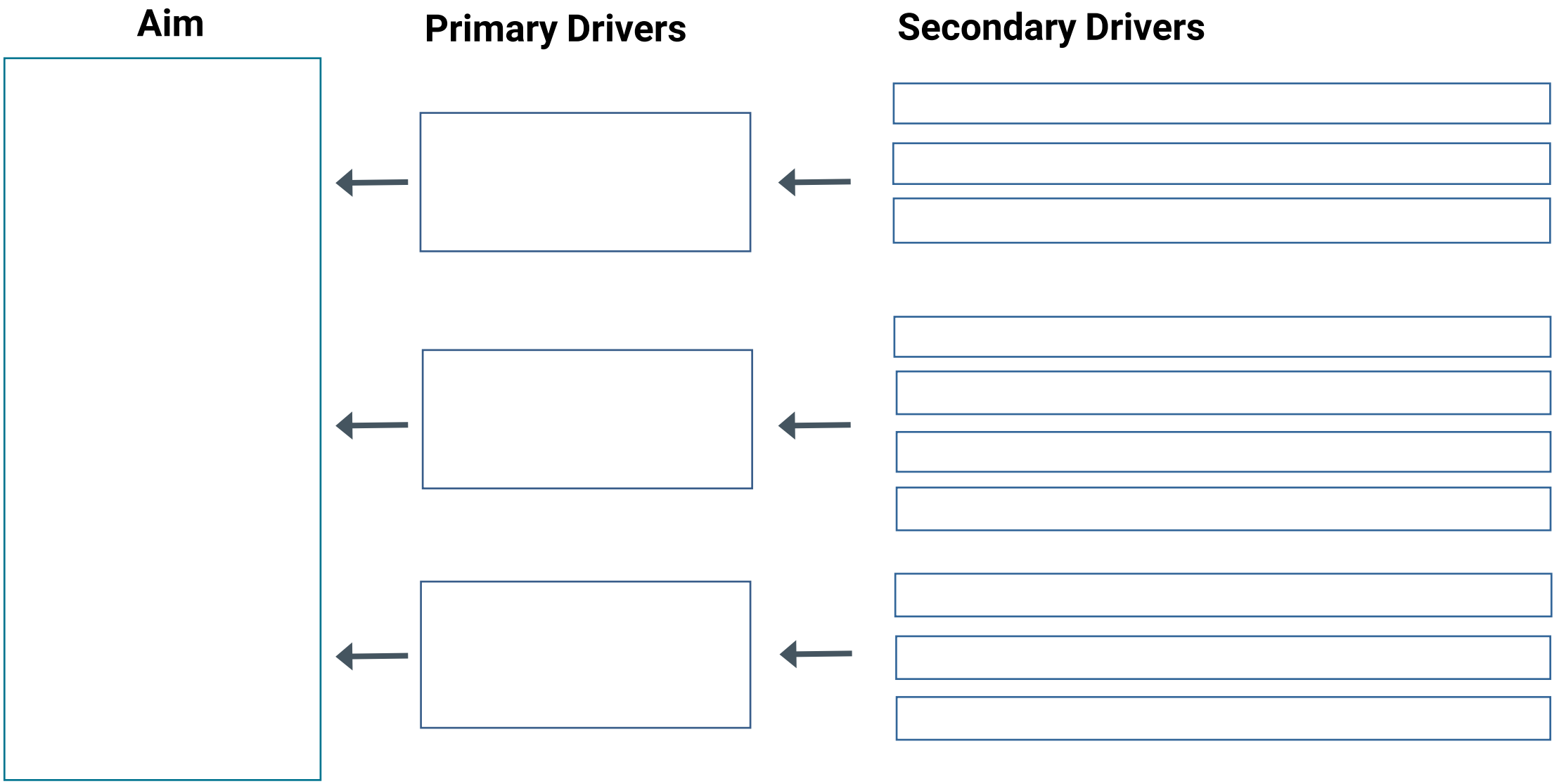
Example Driver Diagram: Obstetric Hemorrhage Bundle



Example Driver Diagram: Postpartum Hemorrhage Mortality



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:
  - **Reducing harm from hemorrhage**
  - **Reducing inequities in hemorrhage outcomes**
    It is important to ensure that as you work to reduce harm from hemorrhage, 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 Reduce Harm from Hemorrhage

Below are some change ideas to reduce hemorrhage-related morbidity and mortality. 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	Build hemorrhage cart and identify reliable process for restocking				X
Readiness	Conduct quarterly, unit-wide hemorrhage simulation drills			X	
Recognition	Perform QBL for all deliveries (vaginal and cesarean)				X
Recognition	Incorporate education about hemorrhage in discharge instructions for moms	X			
Response	Conduct active management of the 3rd stage of labor		X		
Response	Develop partnerships with emergency department staff to deliver timely care for returning postpartum patients	X			
Reporting	Conduct regular post-event debriefs with staff and patients/families			X	

Tool Template: Change Ideas to Reduce Harm from Hemorrhage

Below are some change ideas to reduce hemorrhage-related morbidity and mortality. 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	Build hemorrhage cart and identify reliable process for restocking				
Readiness	Conduct quarterly, unit-wide hemorrhage simulation drills				
Recognition	Perform QBL for all deliveries (vaginal and cesarean)				
Recognition	Incorporate education about hemorrhage in discharge instructions for moms				
Response	Conduct active management of the 3rd stage of labor				
Response	Develop partnerships with emergency department staff to deliver timely care for returning postpartum patients				
Reporting	Conduct regular post-event debriefs with staff and patients/families				

Example Change Ideas to Reduce Inequities in Hemorrhage Outcomes

Below are some change ideas to reduce inequities in hemorrhage outcomes, to ensure that improvements to reduce harm from hemorrhage 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 training				X
Engage women and families of color with lived experience in improvement efforts	X			

Tool Template: Change Ideas to Reduce Inequities in Hemorrhage Outcomes

Below are some change ideas to reduce inequities in hemorrhage outcomes, to ensure that improvements to reduce harm from hemorrhage 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 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: What are the most important factors to increase the accurate and reliable tracking of cumulative quantitative blood loss (QBL) for vaginal deliveries?
Prediction: Team will be able to track cumulative QBL, but will find a few open questions that need to be clarified. If vaginal delivery patient has >500 ml cumulative blood loss, intervention will start immediately.

Who, what, where, when: For the next vaginal delivery patient, the team will track cumulative QBL. The nurse manager for the unit will put a scale in the delivery room. The physician champion will train the team on the methods to ensure everyone knows how to calculate blood loss.

Plan for collecting data:

- Team debrief: Was the team able to track cumulative QBL? What worked well? What was challenging? What was the level of effort for the team?
- Review patient chart: Cumulative blood loss and length of time for patient to receive desired intervention using protocol

2. Do: Run the test on a small scale

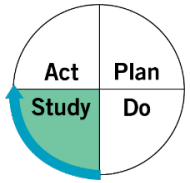
Describe what happened. What data did you collect? What observations did you make?

- Team was able to track cumulative QBL on the patient, although team had a hard time finding the scale. There was some confusion among team members about the calculation.
- Team felt the workload was higher with this method and believe more training and process mapping is needed to improve workflow.
- Patient had >500 ml blood loss, so additional intervention was not needed

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

Summarize and reflect on what you learned:

- As the team predicted, they were able to track cumulative QBL, although they learned a lot about necessary items and process flow to improve accuracy, ease, and reliability of the process.



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 same team will track cumulative QBL on the next vaginal delivery with improvements to the process (e.g., scale placement, clearer instructions on how to do the calculation) and revised process flow.
- The team is engaged to make the process work, so will continue to test the process until they feel confident that they can track cumulative QBL reliably, easily, and accurately before expanding the test to other teams that are more resistant.

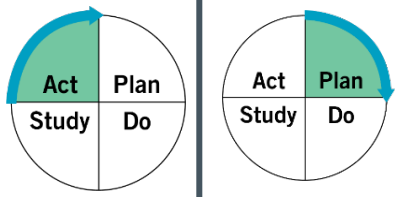
Tool Template: PDSA Planning Form

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

Questions and predictions:

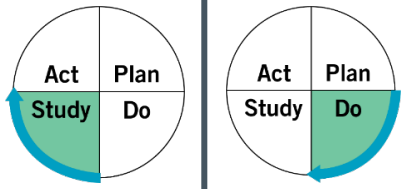
Who, what, where, when:

Plan for collecting data:



2. Do: Run the test on a small scale

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



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

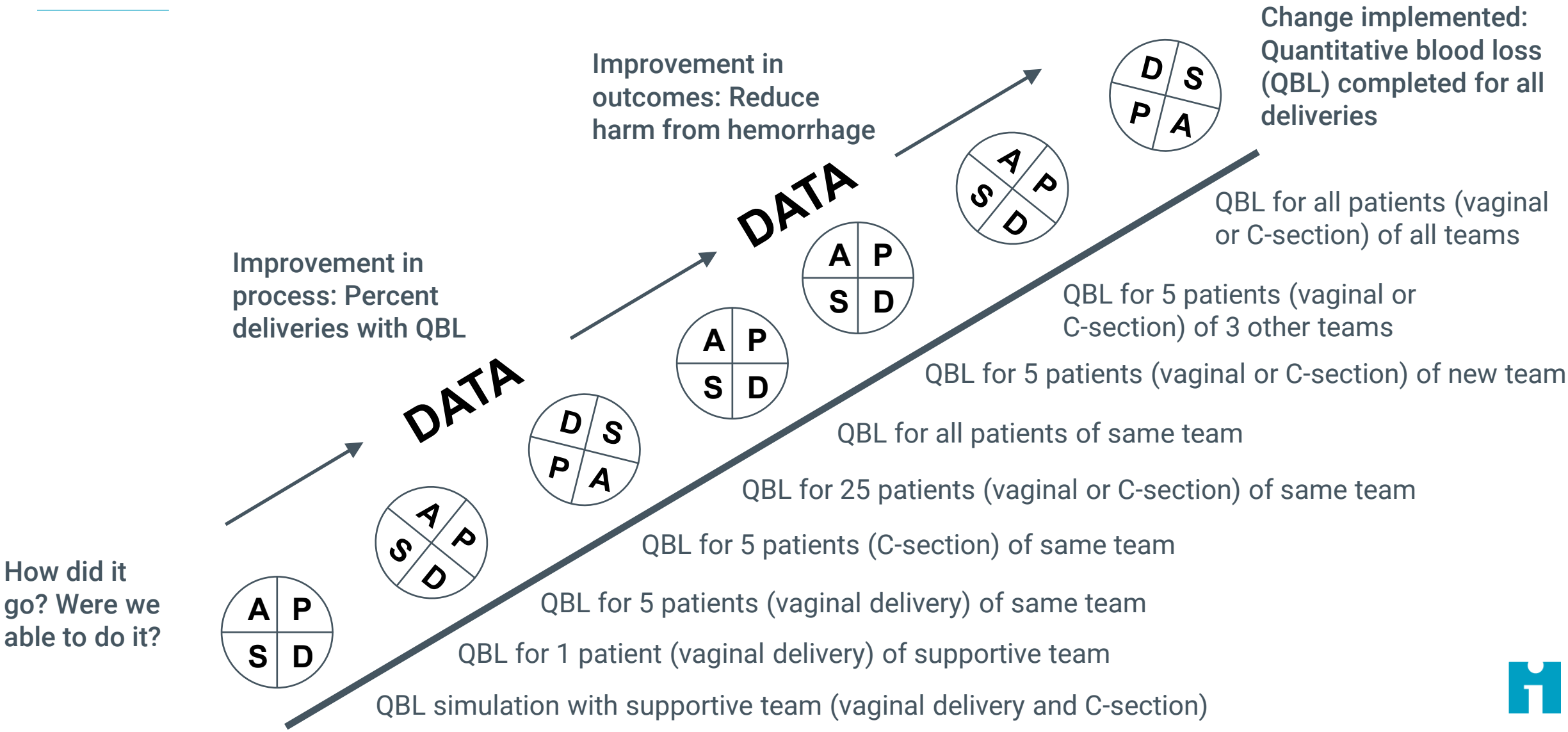
After each PDSA cycle, decide if you should:

- 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

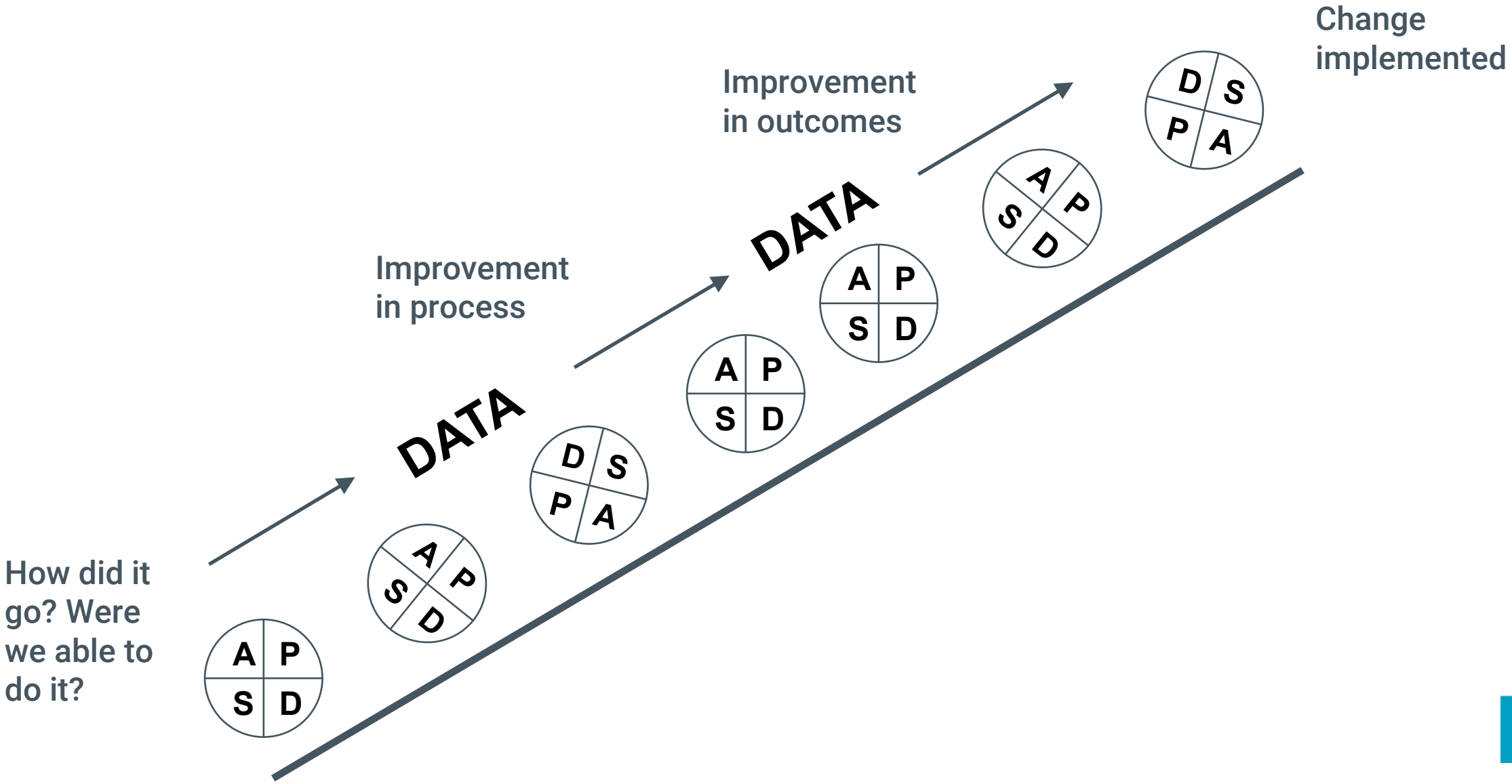
When should you implement a change?

- 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 hemorrhage-related severe maternal morbidity from (x/1,000 deliveries to y/1,000 deliveries, x% to y%, x/year to y/year) for individuals delivering on the Labor and Delivery Unit at ABC Hospital by November 1, 2021.

Measure Type	Measure	Measure Definition
Outcome	Hemorrhage-related severe maternal mortality (SMM)	• **Denominator:** All mothers during their birth admission, excluding ectopics and miscarriages • **Numerator:** Among the denominator, all cases with any non-transfusion SMM code • Stratify data by race, ethnicity, and language
Process	Percentage of deliveries where quantitative blood loss (QBL) is used	• **Denominator**: Total number of mothers delivering on the unit • **Numerator:** Number of mothers with quantitative and cumulative blood loss techniques used • Report estimate in 10% increments (round up) • Formal measurement can include any method beyond visual estimate alone, such as under-buttock drapes with gradations, weighing clots and sponges, suction canisters with gradations, etc. • Stratify data by race, ethnicity, and language
Process	Percentage of deliveries where hemorrhage risk assessment is performed	• **Denominator**: Total number of mothers delivering on the Labor and Delivery Unit • **Numerator:** Number of mothers assessed for risk level at least once between admission and birth, and shared among the team • Stratify data by race, ethnicity, and language
Process	Percentage of deliveries where a complication occurred that had a team debrief after the event	• **Denominator**: Total number of cases where a complication occurred • **Numerator:** Number of cases where a complication occurred that had a team debrief within one week of the adverse event
Balancing	Staff workload	Staff experience of workload (as measured by regular staff experience survey)

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.

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.