RUTGERS Center for State Health Policy

Promising Path to Success [PPS]: Quality Improvement Toolkit

RUTGERS School of Public Health

OVERVIEW

This toolkit is designed to provide assistance in employing a Quality Improvement (QI) framework to the development and study of quality improvement in settings where services are provided to support with emotional, behavioral, or mental health ("E/B/MH") conditions. We employ a general Quality Improvement framework and provide supplementary materials specific that may be of assistance throughout this document.

WHAT IS QUALITY IMPROVEMENT (QI)?

Quality improvement (QI) is a set of activities deliberatively and collaboratively undertaken with the goal of improving a system's processes and/or outcomes. *Processes* include a series of actions or steps that are taken in order to achieve a particular end. In pediatric behavioral health treatment settings, this might include improving practice to be consistent with best practice and available evidence, including but not limited to screening and treatment of E/B/MH conditions. *Outcomes* are the results, end products, or consequences of those processes. In pediatric practice, this may include patient health or behavioral health outcomes thought to improve as a result of the QI project.

QI originates from the business community, with a rich history dating back to the early 1900's. The use of QI methods in business particularly helped catapult Japan into a leadership position in the auto and electronic industries following World War II. In the second half of the 20th century, the US military, airlines industries, and health care organizations began to adopt QI tools to decrease errors in their processes and improve outcomes.

Following publication of the Institute of Medicine's Crossing the Quality Chasm, the health care system identified using QI methods as critical for improving health care processes and patient outcomes.

WHY A QI FRAMEWORK TO PROMOTE PROVISION OF QUALITY HEALTHCARE FOR CHILDREN WITH E/B/MH CONDITIONS?

We chose to employ a QI framework for two reasons:

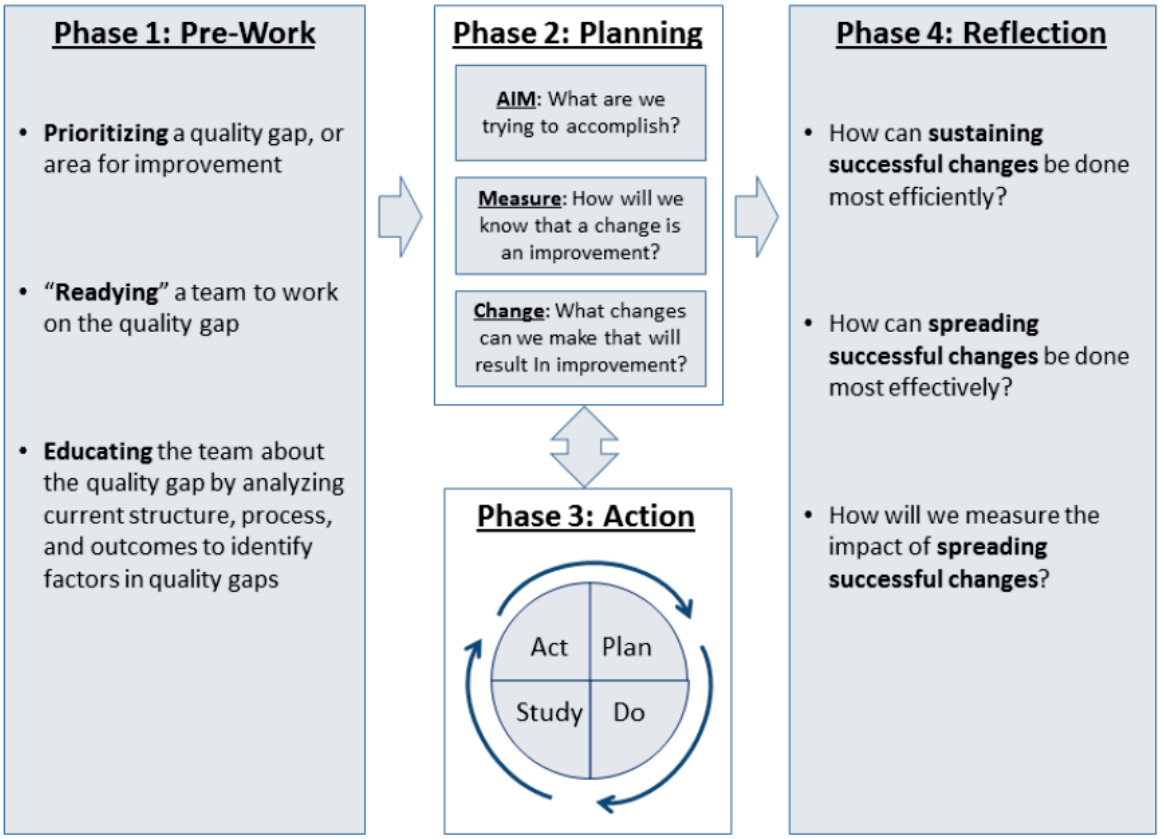
- *QI's* focus is on improving processes and outcomes and can be applied to almost any topic. QI stresses first experimenting with small changes, where financial and motivational risks are minimized, and then spreading to a larger population once improvements have been tested. Given both complexity of delivery systems and potential for unintended consequences, a QI framework provides opportunity for customization to specific delivery system challenges and ongoing evaluation of these efforts.
- *QI* is likely a process that you are familiar in using for respective practices and capitalizes on recent commitments in mental health care and continuous quality improvement.

WHAT IMPROVEMENT MODELS ARE AVAILABLE?

A number of different conceptual approaches and models exist to guide QI projects, whether the *Institute for Healthcare Improvement (IHI) Model for Improvement, Lean, Six Sigma, and the FOCUS Plan-Do-Study-Act model*. These models share similar conceptual frameworks for improvement.

We highlight below a modified version of the IHI's Model for Improvement that highlights some project management tools which may be helpful when planning for a QI effort. This modified version has been used by several health systems in the Northeast (see Figure 1).

FIGURE 1. Modified IHI Model of Improvement



Phase 1. PRE-Work. Phase 1 consists of three PRE-work steps**:**

- **P**rioritizing a quality gap, or area for improvement
- "**R**eadying" a team to work on the quality gap
- **E**ducating the team about the quality gap by analyzing current structure, process, and otucomes to identify factors that may provide an opportunity to improve the quality gap

Phase 2. PLANNING. During Phase 2, the QI team develops a *charter,* a living document that organizes critical pieces of information about the project and answers three questions identified in the IHI Model for Improvement, specifically:

- Aim: What the team aims to accomplish with the project.

- Measure: How the team will measure whether or not the changes made are an improvement.
- Change: What *change strategies*, or planned changes, the team plans to implement.

Ideas about measurement tools and change strategies may come from the research literature, programs developed by similar organizations, or brainstorming activities. These can be documented on a *measurement planning form* and a *change strategy brainstorming form*. The project aim, measure(s), and change strategies are often detailed in a *key driver diagram*, which captures an entire QI project in a single diagram and provides a measurement framework for monitoring progress.

Often aims, measures, and change strategies change over time as a QI team learns more. Similarly, the charter may need to be updated. The key driver diagram helps a team to stay "grounded" about their overarching goal.

Phase 3. ACTION. During Phase 3, the QI team completes a series of small, discrete changes using *Plan-Do-Study-Act (PDSA) cycles*. These changes build on the knowledge gained in Phases 1 and 2 and from preceding PDSA cycles.

PDSA cycles involve 4 steps:

1. **Plan:** Identifying small tests of change to implement
2. **Do:** Implementing rapid, incremental changes
3. **Study:** Measuring and tracking anticipated and unanticipated consequences
4. **Act:** Reflecting on the results and adapting, adopting, or abandoning the change

Two types of data may be collected during PDSA cycles:

- *Quantitative data*, or numeric data collected from surveys, rating forms, or from administrative data, such as a health record
- *Qualitative data*, or what people write or say about changes in a narrative format

Quantitative data from PDSA cycles are often captured in *run charts* or *statistical process control charts*, that display changes in a project's processes and outcomes over time. For an introduction to run charts, Perla, Lloyd, and Murray describe the opportunities available for employing run charts as an analytical tool to learn from variation in healthcare processes in an introductory article published in BMJ Quality/Safety. For informative introduction to statistical process control charts, please see the following reference, entitled "Use of Control Charts in Healthcare," written by Woodall, Adams, and Benneyan. (See references for additional details.) Qualitative data help to understand people's experiences with changes. This type of data also may help identify unintended consequences, both positive and negative, of change strategies.

The IHI has templates for many of the tools suggested in this toolkit (like the charter, key driver diagram, and measurement planning form) available through the IHI Open School. See Additional QI Resources on page 20. Templates and descriptions are also in the Appendix.

Phase 4. REFLECTION. If changes are positive, the QI team considers:
Sustaining successful changes,
Spreading successful changes, and
Measuring impact

WHAT DOES PHASE 1 (PRE-WORK) TYPICALLY INVOLVE?

TASK 1. Prioritizing the quality gap.

Identify the quality gaps relevant to your setting. These frequently arise out of concerns identified in the course of everyday activities within your workplace. In our prior work, state agencies and pediatric and child and adolescent psychiatrist leadership within a state have sought to identify where there systems fail to meet the mental health guidelines set by the American Academy of Child and Adolescent Psychiatry. Quality gaps can often be resolved on a number of different levels by a variety of different actors.

TASK 2. Readying the team.

This step involves *identifying the team members and setting up "operating agreements"* for how the team members will work together.

Team members frequently include:

- 1-2 team leaders who direct day-to-day operations
- A "management sponsor" or champion whose role is to make sure the team has the appropriate resources and the commitment from the organization to move forward
- A QI advisor or technical expert to assist the team in identifying appropriate QI methods
- Content experts who may serve as consultants
- Team members who represent different stakeholder groups or constituents who have a stake in the outcome of the project and are interested in identifying and testing changes

QI teams often craft *operating agreements* to help govern their work together. Because these agreements may change over time, operating agreements are often viewed as "dynamic" and subject to change.

Operating agreements are documents that specify terms on engagement:

- Ground rules to establish how team members will interact with each other
- Guidelines for how team members will communicate with each other
- Roles and responsibilities of each team member
- How key decisions will be summarized
- A timeline, or spreadsheet, with milestones, tasks, due dates, and the names of responsible team members of each task

TASK 3. Educating ourselves about the quality gap.
The last step in Phase 1 involves team members educating each other about the quality gap to be addressed and considering potential change strategies.

Team members share their own experiences and seek out data to inform understanding of challenges. Topical areas where additional data may be of assistance include:

- The scope of the quality gap
- How different stakeholders may perceive the quality gap
- What change strategies may address the quality gap?
  Example of a relevant resource to inform this work is the American Academy of Pediatrics Implementation Guide providing resources to implement a number of clinical guidelines endorsed by the Academy, with measures, key driver diagrams, implementation tools, and educational materials, available here .
- How different stakeholder groups may perceive any proposed change strategies
- What other similar organizations are doing and how their organization compares (often termed "benchmarking")

There are a number of QI tools that teams may use to portray any information when educating themselves about a quality gap. Some examples include:

- *Cause-and-effect (fishbone)* diagrams that categorize issues
- *Flowcharts* and *process maps* that capture processes
- *Graphs* (bar graphs, pie charts, histograms, Pareto charts) that display data
- *Spaghetti diagrams* that map processes on a physical floorplan

Appendices provide examples of cause-and effect or "fishbone" diagrams and flowcharts/process maps.

WHAT DOES PHASE 2 (PLANNING) INVOLVE?

In Phase 2, major goals are typically to organize the information learned so it is accessible to team members and can be used to guide the project aims, measurement approaches, and proposed change strategies.

Two tools that help in organizing information are the *charter* and the *key driver diagram*.

A charter usually includes:

AIM: What the team aims to accomplish with the QI project.
MEASUREMENT: How the team will measure if the change made is an improvement
CHANGE: What change strategies the team plans to implement to make an improvement

In a charter, the ***aims statement*** gives a team a clear direction for the QI project and helps to prevent wasted time and effort. An aims statement should be "SMART": Specific, Measurable, Attainable, Realistic, and Timely.

Your ideas for an aims statement:

_____

_____

[For example, an aims statement might: By *X date*, *X%* of children and adolescents in foster care prescribed psychotropic medication within *X practice* will have a documented informed consent on record that is consistent with established protocols.]

Measures help evaluate processes and systems and help a team to know if changes lead to an improvement. Data from these measures help the team make decisions about next steps.

Change strategies are actions the team takes to make improvements in the systems or process.

WHAT DOES PHASE 3 (ACTION) INVOLVE?

Phase 3 involves a series of PDSA cycles to test change strategies. In general, early PDSA cycles are small, discrete changes. Typically, it is wise to use the PDSA cycle forms (See Appendix) to document any changes made.

Both narrative and quantitative data can be used for PDSA cycles, including tools such as:

Observational data	Participant observations
Narrative data	Semi-structured interviews, focus groups
Quantitative data	Run charts, statistical process control charts

Quantitative data from PDSA cycles can be displayed in *run charts* and statistical process control charts.

- Run Chart – Simple line graph that displays observed data over time to determine whether changes made are leading to improvement.
- Statistical Process Control Chart – Statistical tool used to distinguish between variation in a process resulting from "common causes" and variation from "special causes." Displays observed data over time and determines if a process is stable or unstable.

DESCRIPTION AND TEMPLATES OF RELEVANT QI TOOLS

Charter Form
Measurement Development Form
Change Strategy Brainstorming Form
PDSA Cycle Form
Flowchart
Cause-and-Effect Diagram
Key Driver Diagram
Additional Resources on QI

Most descriptions and templates for QI tools are modified from the Institute for Healthcare Improvement's Open School. Originals available at www.ihi.org unless otherwise noted.

CHARTER FORM

A charter is used at the beginning of a QI project to explicitly state the project's objective, its team members, aims, defined measures, and changes. QI projects often change over time. The charter is a "living document" that is updated throughout the project.

Project Title:	
Team Leader:	Executive Sponsor:
Team Members, Names and Roles (i.e. Team Leader(s), Champion, Sponsor etc.):	
Name:	Position and Organization or Department:
Patients/Clients/Family Who Will Benefit:	Types of Clinical and Administrative Staff, Suppliers, etc. Involved:
Aim Statement (What are we trying to accomplish? Numerical target for improvement, over what time?):	
Measures (How will we know if we are improving?): Structure Measures: Outcome Measures: Process Measures: Balancing Measures:	
Change Ideas (What can we try that will result in an improvement?):	
Business Case (Are health system costs reduced by addressing the problem?):	
Link to Organizational Strategy:	
Term of Project (Start and Stop Dates):	Project Budget:
Anticipated Milestones:	
Estimated Time Required for Staff Participation:	

MEASURE DEVELOPMENT FORM

A measure development form helps you to define each measure you will be using in your QI project.

Measure	
Type (i.e. outcome, process, balancing)	
Rationale (why this measure is needed)	
Operational definition of measure (mathematical, what or who to count & how to count it)	
Exclusions (any observations not included in the measure)	
Useful stratifiers (which variables or factors are useful to look at, e.g., different times of day, time of week)	
Data collection & sampling method (how you will collect data, how frequently)	
Display (how the data will be displayed for evaluation, e.g., run chart, control chart, etc.)	
Goal of the measure (what improvement would look like)	
Source (citations/references)	

Modified from the IHI tools at www.ihi.org, 2013.

CHANGE STRATEGY BRAINSTORMING FORM

A change strategy brainstorming form is used when thinking about which change strategies are appropriate for your aim. It may help to think about why you are considering this specific change strategy (rationale), who may be involved (stakeholders), and any barriers or facilitators that may be involved.

Potential Change Strategy	Rationale for Change Strategy	Source (e.g., literature, other program)	Stakeholders Who Need to be Involved	Potential Barriers to Change Strategy	Potential Facilitators to Change Strategy

PLAN-DO-STUDY-ACT (PDSA) CYCLE FORM

The PDSA cycle form helps a QI team to articulate why they are implementing a change strategy, what they hope to see happen, and what they learned.

Objective for this PDSA Cycle: _____ Date:_____

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

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

_____

_____

PLAN

1. What is our plan? (Consider: Who, What, When, Where, and How?)
2. What is our data collection plan? (Consider: Who, What, When, Where, and How?)
3. What do we predict will happen?

_____

_____

_____

DO

1. How did we carry out the change or test?
2. What data did we collect?
3. What worked? What didn't? Why?

_____

_____

_____

STUDY

1. How did we analyze the data, and what were the results?
2. How do our pediatricians compare to the date?

_____

_____

ACT

1. Based on the learnings in "study", above what are our next steps?

_____

FLOW CHART

Flowcharts allow you to draw a picture of the way a process actually works so that you can understand the existing process and develop ideas about how to improve it. A high level flowchart, showing 6 to 12 steps, gives the panoramic view of the process. These flowcharts show clearly the major blocks of activity or the major system components in a process. High-level flowcharts are especially useful in the early phases of the project. A detailed flowchart is a close-up view of the process, typically showing thousands of steps. These flowcharts make it easy to identify rework loops and complexity in the process. Detailed flowcharts are useful after teams have pinpointed issues or when they are making changes in a process.

Using a flowchart has a variety of benefits:

- It helps to clarify complex processes.
- It identifies steps that do not add value to the internal or external customer including: delays, needless storage and transportation, unnecessary work, duplication, added expense, before breakdowns in communication.
- It helps team members gain a shared understanding of the process and use this knowledge to collect data, identify problems, focus discussions, and identify resources.
- It serves as a basis for designing new processes.

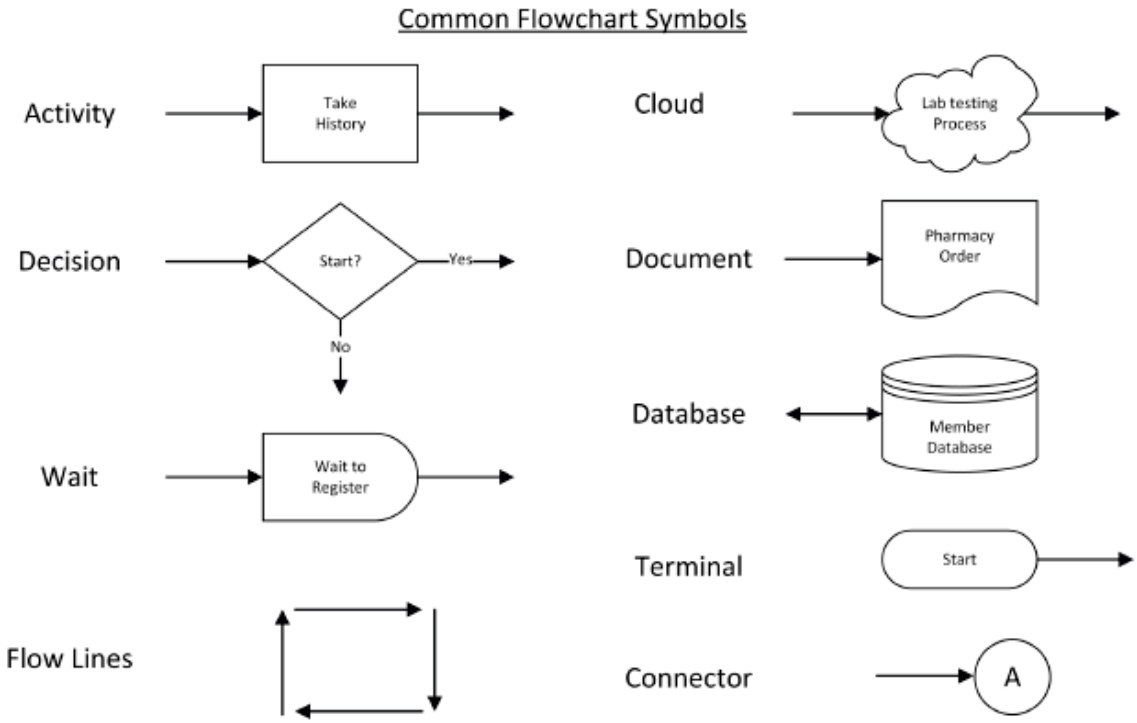
Directions for creating a flowchart:

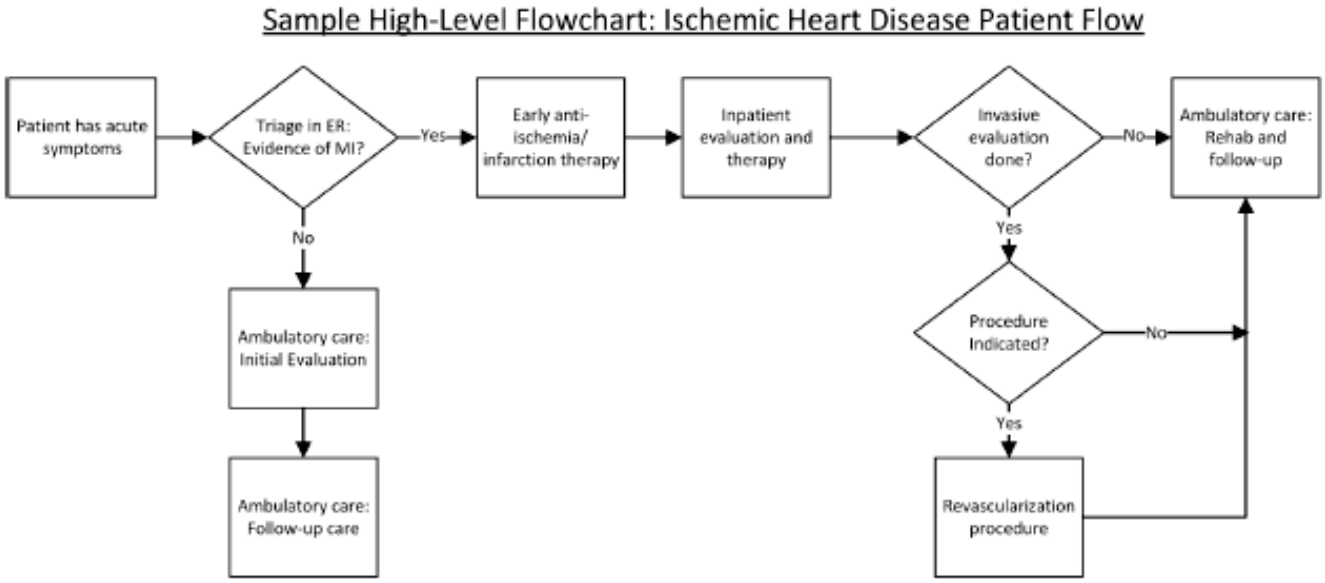
1. Get the "right" people involved – those who know the process best.
2. Agree on the use of the flowchart and the level of detail required.
3. Decide on the format of the flowchart - high level of detail.
4. Define the first and last steps in the process (by observing, brainstorming, or consulting with people responsible for each step).
5. Document the process steps in sequence. Note that some steps are parallel, that is, they happen the same time. Describe the process as it really exists, not the ideal. Include what happens when there are problems in the process.
6. Use decision symbols, choose the most natural branch, and continue to the end.
7. Use "clouds" or notes for unfamiliar steps and continue to the end.
8. When you reach the last step, go back to fill the branches.
9. Read through the flowchart to check for accuracy and completeness.
10. Assign action items to fill in unfamiliar steps and verify accuracy.
11. When the flowchart is complete and accurate, analyze it, use it, and keep it up to date.

Modifying a flowchart:

All tools are meant to be helpful. The flowchart can be annotated to include names of people, barriers identified, and any other information helpful to the team.

Common Flow Chart Symbols





CAUSE-AND-EFFECT (FISHBONE) DIAGRAM

A cause-and-effect diagram, also known as an Ishikawa (after its developer) or "fishbone" (after its shape) diagram, is a graphic tool used to explore and display the possible causes of a certain effect. It will help to identify potential changes to test for your quality improvement project.

Why is it such a valuable tool to you and your team?

- It helps teams understand that there are many causes that contribute to an effect.
- It visually displays the relationship of the causes to the effect and to each other.
- It helps identify areas of improvement within your project.

What is a cause? Causes are parts of a system and forces outside a system that directly influence the outcome, or aim, of your project. For example, one cause of low hand hygiene compliance rate is provider behavior. In other words, getting providers to change their behavior (and wash their hands) directly influences the compliance level within the unit or hospital.

There are lots of causes that contribute to a certain effect. Take poor hand hygiene, for example. What are the contributing factors? Sometimes clinicians are too busy. Sometimes they wash their hands but may not use proper hand washing techniques. Other times the gel dispenser in the hospital is broken or the gel dispenser may work properly, but it is empty.

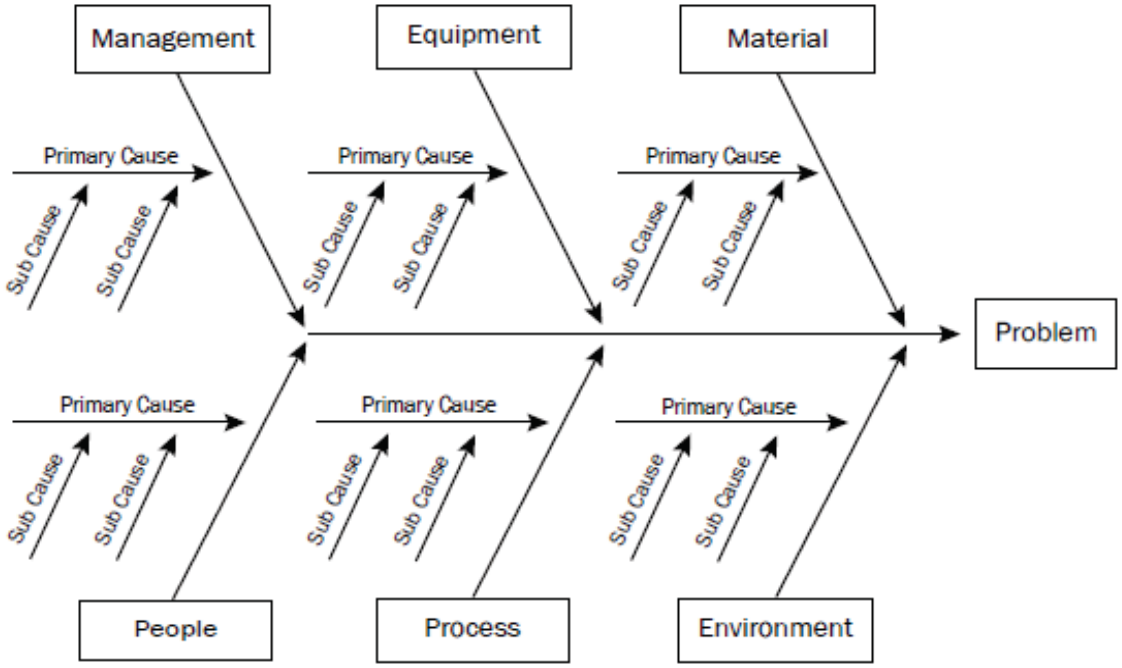
Consider these six categories of causes:

1. **Materials:** Supply, design, availability, and maintenance
2. **Methods and Process:** Steps in care process and steps in supply chain
3. **Environment:** Staffing levels and skills, workload and shift patterns, administrative and managerial support, and physical plant, policies, and regulations
4. **Equipment:** Any equipment/tools needed to get the job done
5. **People:** Staff knowledge and skills/training, competence, patient behavior, and supervision
6. **Measurement:** Data collection, definition of measures, and sampling issues

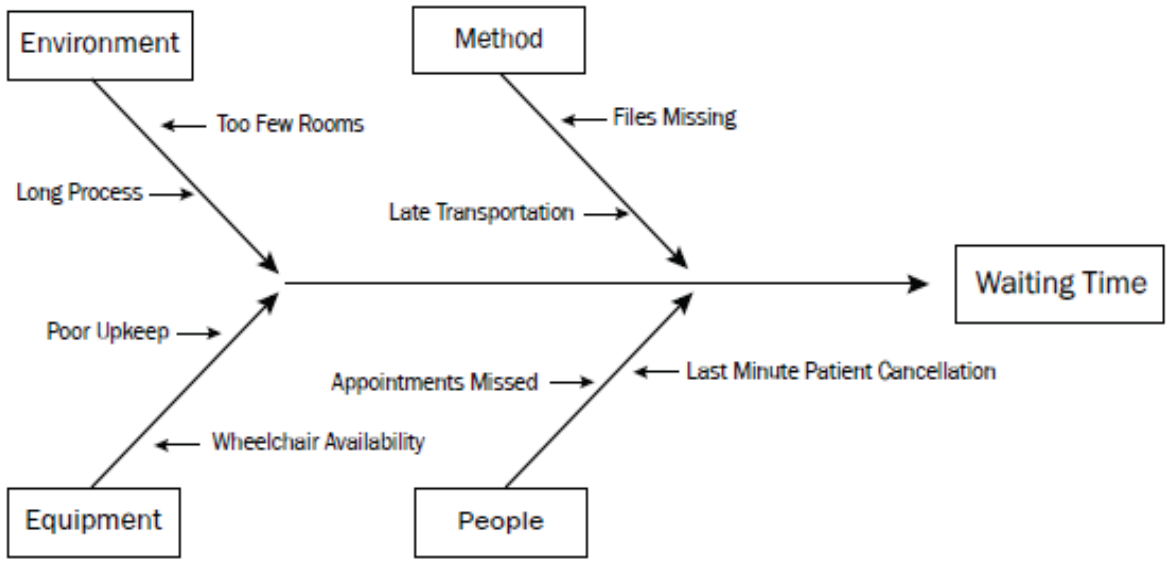
What are the steps required to construct a cause-and-effect diagram?

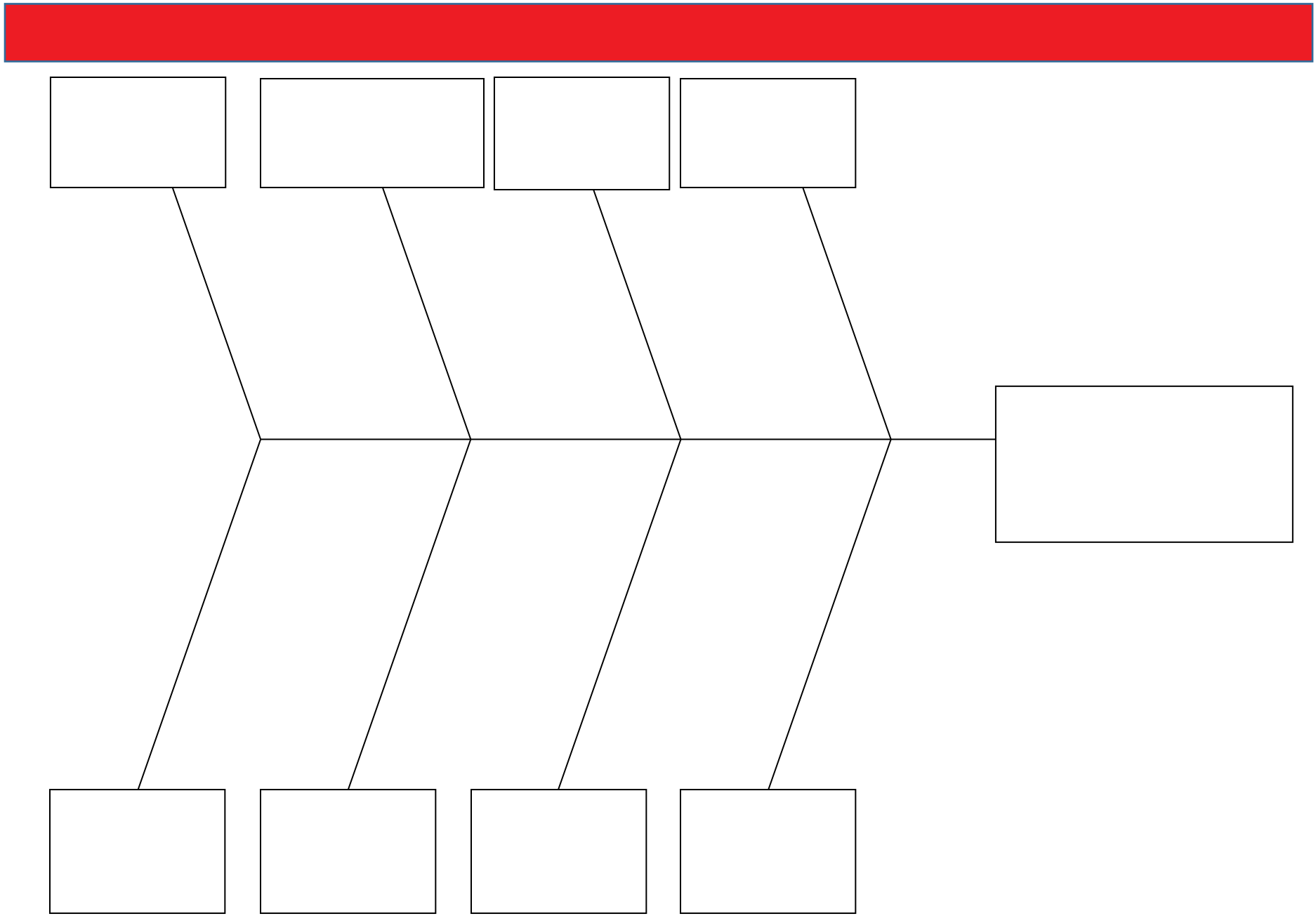
1. Write what you are trying to change in a box on the right-hand side of the page.
2. Draw a long horizontal line to the left of the box.
3. Decide on the categories of causes that the team wants to use. As mentioned above, useful categories of causes in a classic fishbone diagram include Materials, Methods and Process, Environment, Equipment, People, and Measurement. Another way to think of categories is in terms of causes at each major step in the process.
   (Note: These categories can vary depending on your project. Manufacturing sometimes follows the "5 M's": man, machines, materials, methods, and measurement. Nonmanufacturing systems sometimes use the "5 P's": patrons, people, provisions, places, and procedures. Just make sure the categories you chose fit your project.)
4. Draw diagonal lines above and below the horizontal line (these are the "fishbones"), and label with the categories you have chosen.
5. Brainstorm and collect a list of cause for each category.
6. List the cause on each fishbone. If a cause has a secondary cause, draw a branch bone to show relationships among the causes.
7. Develop the causes by asking, "Why?" until you have reached a useful level of detail – that is, when the cause is specific enough to be able to test a change and measure its effect.

Fishbone Chart Template



Fishbone Example: Patient Waiting Time





KEY DRIVER DIAGRAM

A driver diagram is a powerful tool that helps you to translate a high level improvement goal into a logical set of underpinning goals ("drivers") and projects. It captures an entire change program in a single diagram and also provides a measurement framework for monitoring progress.

To create a driver diagram:

- Start with a clearly defined, measurable aim. It should describe what you intend to achieve and by when.
- Get a group of subject matter experts together. Ask them to brainstorm the areas where improvement is needed. Consider using a flowchart or cause-and-effect diagram.
- Cluster the ideas to create an agreed set of "drivers.'' Make sure you use language like "improve" or "decrease" for each driver.
- Discuss the need for new drivers or whether some of the drivers should be eliminated (if they are wrong or immaterial).
- Identify the links between the drivers to create primary, secondary, and possibly tertiary drivers.
- Select change strategies that you believe will impact upon your drivers.

1. The outcome or aim

The driver diagram starts with a clearly defined and measurable outcome or aim.

2. Primary drivers

The overall outcome or aim is linked to primary drivers, or factors that are believed to have a direct impact on the aim. This first set of underpinning factors are referred to as primary drivers because they 'drive' the achievement of your main outcome or aim. These drivers may act independently or in concert to achieve the overall aim.

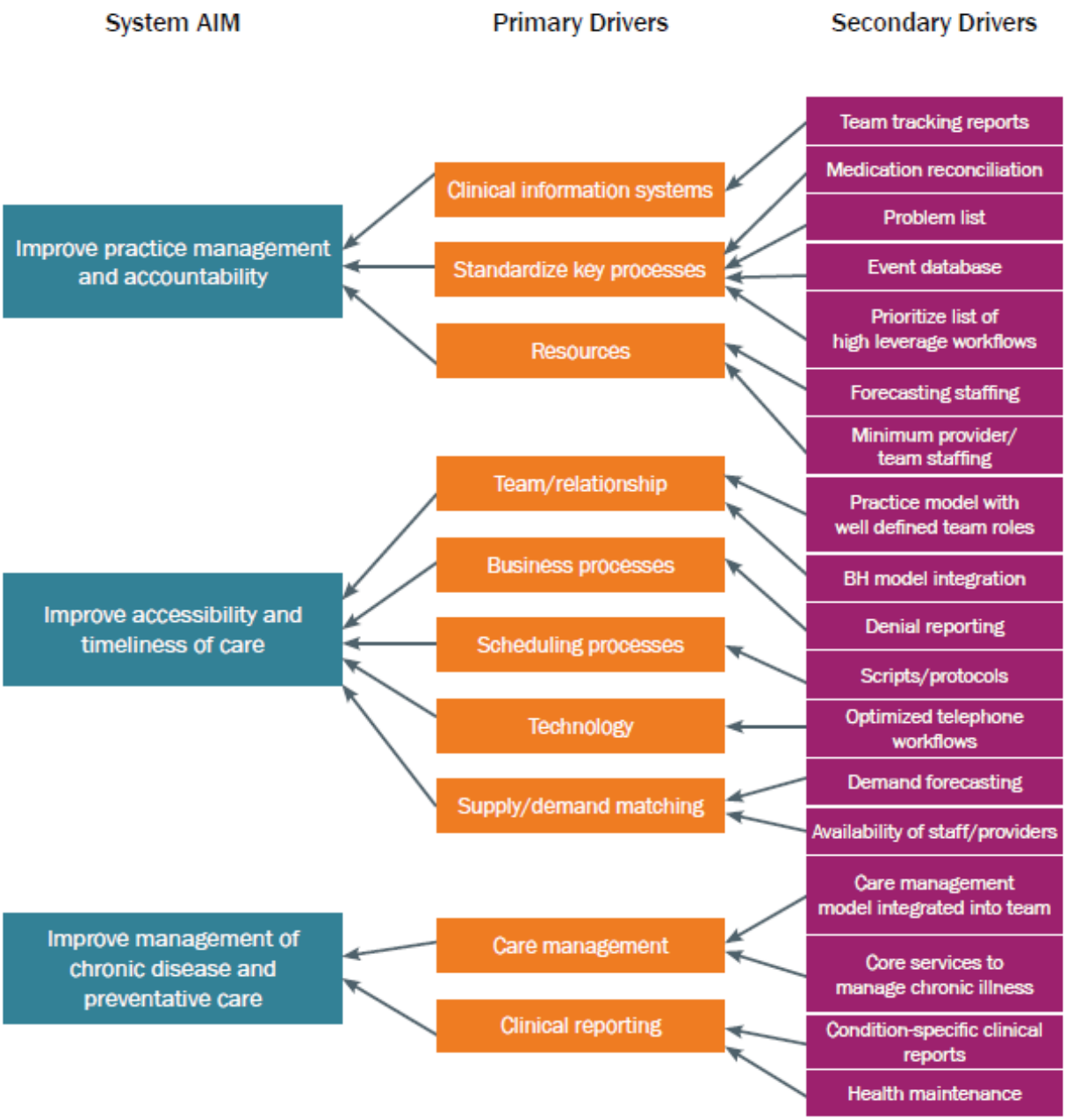
3. Lower level drivers

The process of breaking down an aim can continue to lower levels to create secondary or tertiary drivers, and even further if required. The driver diagram can then capture change strategies you plan to implement through PDSA cycles that address these different drivers (i.e., workout 3x/wk, walk the dog, stand while on the phone).

4. Projects, interventions, changes

The ultimate goal of a driver diagram is to define the range of change strategies that you may want to undertake.

KEY DRIVER SAMPLE



ADDITIONAL QI RESOURCES

Books:

Langley GJ, Moen RD, Nolan KM, Nolan TW, Norman CL, Provost LP. The Improvement Guide. 2nd Ed. San Francisco, CA: Jossey-Bass; 2009

Ogrinc GS, Headrick LA, Moore SM, Barton AJ, Dolansky MA, Madigosky WS. Fundamentals of Healthcare Improvement: A Guide to Improving Your Patients' Care. 2nd Ed. Oakbrook Terrace, IL: Joint Commission Resources and IHI. 2012.

Jackson TL. Mapping Clinical Value Streams (Lean Tools for Healthcare Series). Boca Raton, FL: Taylor and Francis. 2013.

Papers:

Woodall WH, Adams BM, Benneyan JC, and VISN 1 Engineering Resource Center. Statistical Methods in Healthcare, Faltin F, Kenett R, Ruggeri F, eds., Wiley, 2011

Perla R, Provost L, Murray S. The run chart: a simple analytical tool for learning from variation in healthcare processes. BMJ Qual Saf 2011. 20, 46-51.

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Websites:

Institute for Healthcare Improvement: www.ihi.org
IHI Open School:
http://www.ihi.org/education/ihiopenschool/Pages/default.aspx Lean
Enterprise Institute: www.lean.org

Adapted from:

Daudelin, D, Mackie TI, and Leslie, LK. Quality Improvement Toolkit for Pediatric Practices, Tufts Clinical and Translational Sciences Institute, Tufts Medical Center, 2012.