QI Primer: Using Quality Improvement to Improve the Health Care Transition Process

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About This Primer

We have designed this Quality Improvement (QI) Primer as a companion piece to use with the Got Transition® Six Core Elements of Health Care Transition™ (HCT). This document is intended to help you understand QI and apply it to your work. Within each core element, you will find brief comments about and illustrations of relevant QI aspects of the HCT work, with a link to the appropriate section in this QI Primer for more detailed information.

Within this QI Primer, you will find the following sections:

Sections I through VIII will give you the background, knowledge, tools, and examples you need to get started in improvement work. Health Literacy (Section IX) and Co-Production (Section X) are key elements of patient-centered care that link closely with QI; incorporating these principles will help ensure you are providing the best care possible for your patients and their families. If you would like to delve more deeply into these topics, you will find materials in Resources and References (Section XI).

I. What Is Quality Improvement?

Introduction

In this section, we will develop an understanding of quality improvement (QI), including its history, its relationship to research and other related sciences, and how it can benefit health care teams and patients.

Quality improvement is defined as "a continuous and ongoing effort to achieve measurable improvements in the efficiency, effectiveness, performance, accountability, outcomes, and other indicators of quality in services or processes which achieve equity and improve the health of the community."[1] Change is not the same as quality – you can have change without improvement. However, all improvement *does* involve change. Likewise, research and improvement are not the same and have different objectives.

Furthermore, note that as you delve into QI (also sometimes called "improvement science"), you are likely to encounter two related fields: reliability science and implementation science.

- Reliability science strategies are also used by QI teams to ensure high reliability.
- The topic of implementation science has been gaining popularity – you will see that many of the tools and vocabulary used in discussions of implementation science echo what you've learned about in QI, but be aware that implementation science is tied much more closely to traditional research than it is to QI.

Table 1 provides a snapshot of the differences between QI and traditional research including implementation science. For the purposes of this primer, we will focus on QI.

Table 1. Differences Between Quality Improvement and Transitional Research

	Quality Improvement (QI)	Implementation Science/ Traditional Research
Aim	Care improvement	New knowledge
Test Observability	Observable	Blinded or controlled
Bias	Accept consistent bias	Design to eliminate bias
What to Measure	"Just enough" data, small sequential samples	"Just in case" data
Hypothesis Flexibility	Flexible, changes based on learning	Fixed
Testing Strategy	Sequential tests	One large test
Determining if Change is Improvement	Run charts, Shewhart control charts	Hypothesis, statistical tests (t-test, F-test, chi square), p-values
Response to Context Variation	Use to test resilience of process design	Control or eliminate effects of confounding variables
Data Confidentiality	Data used only by those involved with improvement	Research subjects' identities protected

Adapted from Solberg LI, et al. (1997).

Essential Learning

- **Organizational commitment to quality**
  - Focus on systems, not individuals
  - Helps staff, doesn't hinder
- **Emphasis on wide spectrum of "teams"**
  - Foster teamwork and group problem solving
  - Focus on the customer (colleague or patient)
  - Incorporate the voice of front-line staff and customers
- **Structured approach to the work**
  - Use small tests of change
  - Maintain frequent, ongoing measurement for data-driven decision-making
  - Continuous process, does not end

A. Frameworks and Methods

There are several frameworks used in QI, any of which ensures that changes are carried out in a methodical, controlled way. A framework gives you a structure to manage the improvement work. All current frameworks are based on the underlying theories of the pioneers in QI: Walter Shewhart, W. Edwards Deming, and Phillip Crosby. While several frameworks have applications in health care, the most widely used is the Model for Improvement. It has been adopted by the Institute for Healthcare Improvement (IHI), the most well-known QI organization whose work is aimed at improving patient outcomes, experience, and reducing the cost of care.

Table 2. Quality Improvement Frameworks

	PDCA	Model for Improvement	Six Sigma	Lean
Developed by	Walter Shewhart, W. Edwards Deming, Late 1980s	Associates in Process Improvement, 1990s (used by IHI)	Motorola, 1980s	Toyota, 1950s
Purpose	Problem solving & process improvement; an iterative four-stage framework	Accelerating improvement efforts within a system; composed of three questions and the PDSA cycle	Reducing errors and variation within a system	Eliminating all non-value added activities from a system

Adapted from AHEC QI 101, a Quality Improvement course sponsored by Charlotte Area Health Education Center.

B. Theory of Profound Knowledge

Created by Dr. W. Edwards Deming, the Theory of Profound Knowledge reflects all the components you must take into consideration when you want to do improvement work. Dr. Deming recognized that an organization is a system of connected people and processes; a change to one impacts the others. The Theory of Profound Knowledge has four components:

- **Appreciation of a system**
  - All health care settings are a system
  - Understand overall system processes, e.g., supply, demand, flow, customers
- **Knowledge of variation**
  - Identify and understand the variation that exists in the systems in which we work and in which patients receive care
  - Recognize there is a range of variation and it is important to understand the underlying causes to decide if action is needed
- **Theory of knowledge – investigates the question "how do we learn?"**
  - What it is, how it is acquired, what people know, how sure we are they know
- **Knowledge of psychology**
  - Human nature, behavior, motivation, limitations, interactions

Key Point: When you combine subject matter knowledge and profound knowledge, you find the crossroads for improvement.

Please note that as you undertake improvement work, you may encounter elements from the next three sections (*Selecting Improvement Projects*, *Successful Teams*, and *The Model for Improvement*) in a different order or simultaneously.

II. Selecting Improvement Projects

Introduction

In this section, we will look at the considerations that factor into identifying and prioritizing a project. Successful improvement work hinges on aligning stakeholders' perceptions and preferences with improvement opportunities and required resources. When selecting improvement work, consider several factors: What is the current environment? Is there a gap? Has a new guideline been published? Is there a strategic connection to your organization? Is there passion for the work? Is there senior leadership support?

Essential Learning

Often the environment – whether at a local, state, or national level – can influence the project. Examples include the IHI's "5 Million Lives" campaign or the national discussion on improving the transition of youth to the adult health care system. Using a project proposal form or following a formal process helps teams determine project feasibility. Below we will discuss sample forms to select and prioritize improvement work.

Essential Tools

The project proposal form and the project selection matrix are planning and communication tools that help ensure your project is well organized at the outset, fills a needed gap, meets organizational priorities, and has the resources and support necessary for success.

You can use the ***Sample Quality Improvement Project Proposal Form*** (see *Appendix*) to communicate with your team members and key stakeholders, as well as leadership. The ***Sample Project Selection Matrix*** (see *page 6*) allows you to score and rank project components and establish alignment with system goals and further prioritize work. It is especially useful when a committee or other decision maker is determining resource allocation.

Instruction for Using Project Selection Matrix:

1. List criteria for selecting projects on the y-axis (gray highlight areas)
2. List all the projects you are considering*
3. Review each project and assign a value based on each project selection criteria (criteria can be weighted)
4. Total the score for each project (blue highlighted area)
5. Sort the scores from highest to lowest

*Also consider what support is needed for projects: data abstraction, data analytics, data display, QI coaching

Sample Project Selection Matrix

Project Title	Data demonstrates that a gap exists	Improves patient safety	Decreases the cost of care	Improves efficiency, saves time	Improves patient satisfaction	Improves staff satisfaction/High interest from staff	Improves patient outcomes	Regulatory	USNWR	National priority or collaborative network	Strategic connection to organization goals	**Total Score**
	Assign value to each criterion based on a 1-5 scale (1=poor and 5=excellent)											
Neonatal Abstinence Syndrome	5	3	5	5	3	4	5	1	1	3	3	**38**
Rheumatology Referral Process	5	5	3	4	5	5	5	1	1	1	5	**40**
Time to Antibiotics	5	4	5	3	4	4	5	2	3	5	4	**44**
Care Coordination for Chronic Care	4	4	4	2	4	2	5	1	1	2	3	**32**
HPV Vaccination in ID Clinic	4	4	3	2	3	3	5	1	1	1	3	**30**
Improving Flu Vaccination	3	4	4	2	3	4	5	1	4	3	3	**36**

Adapted from Population Health Improvement Partners, improvepartners.org.

Note that the column headers in your own selection matrix will be populated with the priorities that matter to your organization, which will help ensure you have the commitment and support necessary for successful execution.

Practice Tip: As you will notice repeatedly throughout this Primer, the pieces you need to have in place for successful improvement work are the will, the ideas, and the execution. Formally assessing and aligning these elements when you first choose your project will help ensure more productive improvement work down the road.

III. Successful Teams

Introduction

In this section, we will explore the many factors that influence a team's success. This includes team composition and characteristics, specific roles that should be filled and what tasks they perform, what to expect regarding interpersonal relationships, and how to facilitate more effective collaborations.

A QI team is essential to the success of any improvement effort. QI cannot be done in a vacuum or as one person. Whomever touches the process must improve the process. And all delivery of care is a process . . . some simple, others more complex.

Essential Learning

A team is a group of people working together, with specific roles, toward a common purpose or goal. Teams out-perform individuals when addressing complex problems, and improving health care is complex. There are different types of teams in health care: care teams, work (virtual) teams, and QI (project) teams. At a minimum, the health care transition (HCT) team should include youth/young adults, parents/caregivers, and pediatric and adult clinicians.

QI teams out-perform individuals when:

- **More efficient use of resources is required**
- **Task is complex**
  - Path forward is unclear
  - Creativity is needed
  - Fast learning is necessary
- **Cooperation is essential to implementation**
  - Members have a stake
  - Task or process is cross-functional
  - No one individual has sufficient knowledge

For teams to be successful they need:

- **A plan for improvement (Model for Improvement)**
  - Clear goals
  - Scientific approach (data/root cause)
- **Beneficial team behaviors**
  - Clearly defined roles
  - Clear communication
  - Balanced participation
- **Established ground rules**
  - Well-defined decision process
  - Awareness of group process

A. Five Team Basics

1. **Maintain small number of team members – more than 12 people can make consensus difficult, and meeting dread will develop if the team is not moving forward. Be sure to include:**
   - Representatives of the owner of the problem or process
   - Naysayer
   - Culture carrier
   - Decision maker/access to decision maker

2. **Seek members with interpersonal and complementary skills:**
   - Technical expert
   - Problem solver
   - Detail-oriented person and a big picture thinker
   - Newcomer and a veteran
3. **Identify common purpose – take the time to explore, shape, and agree**
   - Set clear objectives
   - Ensure all are equally motivated to reach the goal
   - Questions to narrow down the problem:
     - What is the problem?
     - Is there a challenge with performance?
     - What is the unifying problem?
     - Are you in crisis management mode?
   - Celebrate the small wins
4. **Use a commonly agreed upon approach, i.e., Model for Improvement, LEAN, Six Sigma, etc.**
5. **Ensure mutual accountability: individual accountability and/or performance evaluation**

B. Roles

Identifying and understanding team roles also contributes to successful teams. Effective team members share openly, contribute fully, listen to others, support the team leader, complete assignments between meetings, communicate effectively, and accept responsibility for testing changes.

Role: Team leader

- Keeps work on track
  - Follows a data-based method
  - Participates in carrying out work between meetings
  - Retains authority, participating selectively and carefully
- Manages communication between the team and organization
  - Meets with the sponsor between scheduled team meetings for periodic updates
  - Keeps official team records
- Helps team resolve problems

Role: Coach

- Teaches basic methodology
  - Teaches data collection and analysis
  - Helps team graphically present data
  - Focuses on team's process more than product
- Guides team's efforts
  - Encourages team to seek causes of problems
  - Attends meetings but is neither leader nor member
- Works with team leader between meetings
  - Assists team leader in structuring or breaking down tasks
  - Helps team leader revise plans in response to feedback

Role: Sponsor

- Maintains overall responsibility, authority, and accountability for effort
  - Selects and defines improvement project
  - Determines resources
  - Ensures changes made by the team are monitored

- Reviews and supports team's efforts
  - Reviews progress and runs interference
  - Ensures stakeholders have appropriate involvement
  - Feeds data and lessons learned into a system for future improvements
  - Meets periodically with the team leader

Practice Tip: Most teamwork involves changes, and change is seldom easy. People often seem resistant to change because they fear the impact it will have on their personal experience and the potential for added work. They may worry about revealing their own shortcomings, associate change with negative past experience's, or simply fear the unknown. Taking the time to develop a well-structured team can help alleviate this resistance.

Tuckman: 5 Stages of Team Development: Teams will go through several stages. There are over 100 group formation models, however most highlight Tuckman's five stages. These stages reflect both positive and negative interactions, which can have a significant impact on a team's success (or failure).

Tuckman's stages are shown to left. The forming stage is a time of awareness and orientation, while the storming phase is typically marked by conflict. When a team reaches norming, they are experiencing cooperation and cohesion. In performing, the team succeeds in terms of productivity and task performance. And in the final stage, adjourning, the team concludes their collaboration.

Table 3. Tuckman's 5 Stages of Team Development

Forming	Awareness and orientation
Storming	Conflict
Norming	Cooperation and cohesion
Performing	Productivity and task performance
Adjourning	Separation and dissolution (or project or of team) (transformation)

By the end of the project, positive teams typically have:

- Been successful and achieved their goal
- Formed bonds with other team members
- Enjoyed working together

Meanwhile, negative teams report:

- Meeting fatigue without any results
- Feeling undermined and unheard
- Feeling disengaged from the purpose

Lencioni: 5 Dysfunctions of a Team: According to Lencioni, there are five common dysfunctions of a team. Understanding the stages and dysfunctions helps teams avoid the more painful elements of teamwork and facilitate more effective improvement work.

Key Point: Most teams follow a predictable path, which can be influenced (for better or worse) by a standard set of factors. Recognizing these recurring patterns can help QI teams avoid frequent pitfalls and achieve greater success.

Essential Tool

The team member selection matrix is a decision-support tool that will help ensure you have the right mix of representatives and the right people in the right role. Use this tool as soon as you start to plan your project. Once you have candidates listed in the rows, use the criteria for members and team characteristics in columns to assess each one. Your team should not exceed 12 members.

Instruction for Using Team Member Selection Matrix

1. Review the criteria for team member and team characteristics in the top row.
2. List all the team members you are considering in far-left column. No more than 6 members on the core team.
3. Use the Member Characteristics (red) columns and enter a "Yes" or "No" to indicate if each criterion is met for a team member. "No" responses should be addressed and you may need to rethink a member if there are too many "No's."
4. Use the Member Skills (blue) columns to enter each criterion stated for each person.
5. Use the Outcome (green) column to enter "Yes/No/Maybe" to indicate team member selection decisions.

Team Member Selection Matrix

	Member Characteristics								Member Skills					Outcome
	Team Lead: Knowledge and understanding of process*	Team Lead: Credible, informal or formal positive influence*	Team Lead: Communication and attention to detail*	Has a passion for quality and improvement	Willing to try new things and take risks	Team oriented creates team "synergy"	Action oriented (get it done!)	Ability and desire to train other on QI methods/tools	Cross-functional team (list person's work function)	Diverse talents and skills (lists special skills)	Process Owner (the person who's responsible for the process) (list Y or N)	Person has a fresh perspective (list Y or N)	Balance the front line and manager/supervisor staff (list F or S/M)	Enter Yes/No/Maybe decisions for each person listed to indicate member selection
Potential Team Members *(NOTE: * are characteristics for Team Lead. A team can have 2 Team Leads)*	*Assign Yes or No response to each red criterion*								*Blue criterion lists data to enter*					
NOTE: No more than 6 core team members														

Adapted from Population Health Improvement Partners, improvepartners.org.

IV. The Model for Improvement

Introduction

In this section, we will delve into the real heart of QI for health care – the Model for Improvement (MFI). By asking 3 key questions, the MFI gives you the framework to ensure changes are planned, tested, and carried out in a methodical way that results in measurable improvements. This section also introduces goals and measures, with more detail on measures included in ***Section V: Measuring for Improvement***.

The MFI was developed by Associates in Process Improvement in 1996 and over the last two decades has been used widely in health care by leading QI organizations such as the IHI. The MFI is an effective and easily understood method that produces specific, measurable results and can be implemented by either large health care systems or a small office practice.

To have system change there must be:

- **Will** to do what it takes to change to a new system
- **Ideas** on which to base the design of the new system
- **Execution** of changes to the system

All three are important to system change. We often have the will but are unsure what changes might lead to improvement. Or, we have great ideas, but lack support for improvement. And finally, we may have both will and ideas but are unsure how to execute the improvement work. The MFI is a simple but robust framework to execute the improvement needed to build will, develop ideas, and create a plan of execution.

Essential Learning

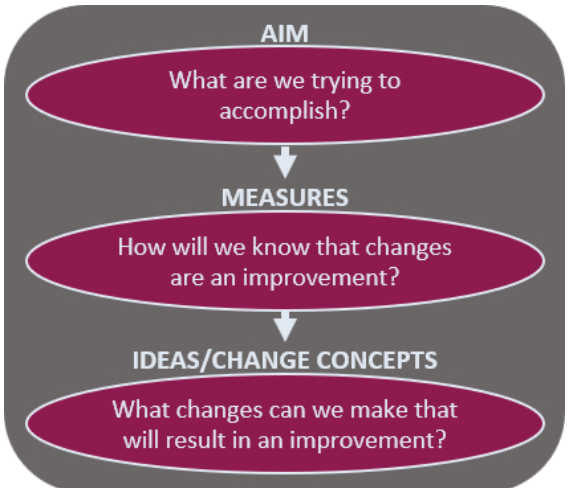
Before starting the improvement work, we often run into barriers. Most of us have experienced lack of:

- Time
- Energy (or a sense of overwhelming work)
- Administrative support
- Knowledge of how to start change
- Training in QI

The MFI is a methodology that keeps your team focused on what you need to do and can help manage these barriers. It is general enough that it can be applied to small projects or larger, population-based problems.

The model consists of three questions:

1. ***Aim***: *What are we trying to accomplish?* This question focuses on what you are trying to achieve and helps your team scope your project to a manageable size.
2. ***Measures***: *How will you know that your changes are an improvement?* This helps your team identify measures that will allow you to ensure the changes you make are improvements.
3. ***Changes***: *What changes can we make?* This allows you to assess the current process/system and identify changes that will lead to improvement.



Adapted from Langley GL, et al. (2009).

Then test the changes – once changes are identified, Plan Do Study Act (PDSA) cycles test the changes rapidly, on a small scale. This allows you to learn and adapt the changes to your specific environment.

A. What Are We Trying to Accomplish?

Writing an aim statement is critical to successful improvement. An aim statement is a written description of the expected accomplishment from the improvement effort and clearly defines the scope of the problem. Aim statements usually generate brainstorming for ideas that can later be tested. They capture early team decisions, align team members, and can be used to communicate with others, especially senior leaders. It is a touchstone throughout the project and should be reviewed at every team meeting. An aim statement consists of 4-5 sentences and a set of measurable goals.

Key components:

- Describes what the project seeks to accomplish
- Establishes rationale/importance
- Identifies a framework that will be used to carry out the work
- Specifies the target population and time period
- Includes *measurable goals*: usually 4-6 that are connected to what you are trying to accomplish
    - E.g., 90% of patients 14-16 will have one readiness assessment completed

B. How Will We Know That a Change Is an Improvement?

Ensuring that change is an improvement usually requires more than one measure – a balanced set of measures helps assure that the *system* is improved. By including measurable goals in the aim statement, the measures have thus been created. For example: if "80% of children should get X", then the measure is "What % of children received X."

Using a measurement table provides clarity and standardization for the person responsible for gathering the data. Operational definitions spell out how an item (or word, or variable) is to be considered for the purposes of the project, which ensures everyone is on the same page. They are critical to good measurement and should be included in the measurement table.

There are different types of measures, usually categorized as outcome, process, or balancing. While the improvement work usually focuses on outcome or process measures, having a balancing measure tells us if we have harmed one part of the system while trying to improve another.

Outcome (Global) Measures

- Related to the aim; i.e., they tell you if you are making progress toward your overall goal
- They are the "voice of the system," reflecting high-level progress
- Usually "distal" in terms of cause-effect; results may take place well into the future

Process (Intermediate) Measures

- Related to key changes/interventions/system-level changes; I.e., they assess the impact of your small PDSA cycles
- They are the "voice of the processes," reflecting what is happening at close range
- Usually "proximal" in terms of cause-effect; results should be visible immediately

Balancing Measures

- Are we improving parts of our system at the expense of others?
- Usually *not linked* to one of the goals, but an added measure
- Listen to skeptics. Their concerns ("Yes, but then X will happen. . .") can often be used for your balancing measure.

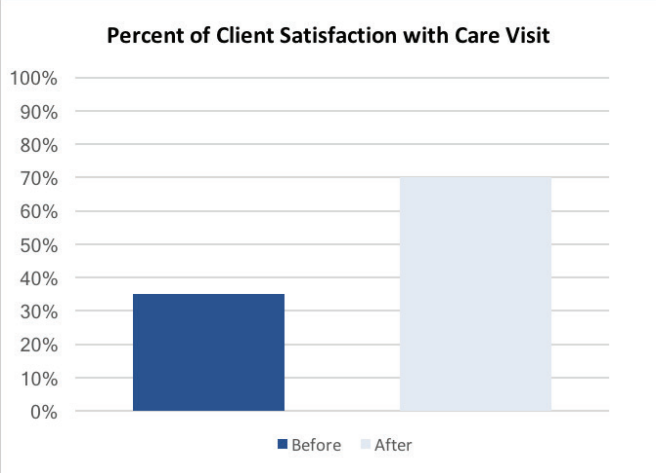
Practice Tip: Often, true clinical outcome measures are too far in the future to be available in the time frame of the improvement effort. In this case, a process measure may become the proxy for the outcome. For example, in diabetic care, the A1C blood test is a process measure; however, it also serves as a proxy measure for a long-term outcome related to cardiovascular diabetic disease.

For more detail on this topic, please see ***Section V: Measuring for Improvement***. Once your measures are chosen and your measurement plan is documented, think about presenting your data so your team can make data-driven decisions. Run charts are key to understanding your data.

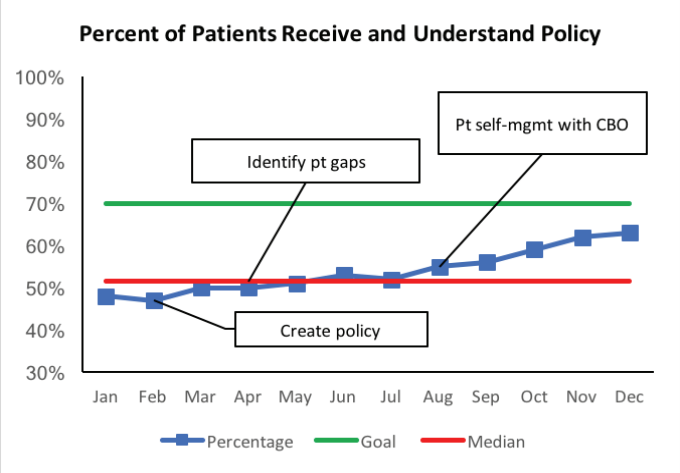
Run Charts: The usual display of measure has been "before and after" as seen in the first bar chart example below. This example demonstrates the results of a team trying to improve immunization rates. While it appears as if the team saw some improvement, this data display does not answer important questions:

- What was the goal?
- What changes were made that led to the improvement?
- Was the improvement sustained?

Bar Chart



Run Chart



Adapted from Population Health Improvement Partners, improvepartners.org.

A run chart is a more robust and useful display, as shown in the second example. This annotated run chart has a title and the ideas the team tested to improve transition policy distribution and usefulness. Now the earlier questions can be answered.

- There is a goal line at 70%, so the team did not reach the goal.
- The changes that did result in improvement are creating a policy, identifying patient gaps, and having the patient work with a community-based organization on self-management tasks.
- And finally, it appears as if the team is on track to reach their goal in the future.

Practice Tip: When used in team meetings, run charts support data-driven decisions, stimulate further discussions about change ideas, and can be used for monitoring sustainability. Change ideas will be discussed further when talking about the third question of the MFI. See ***Section V. Measuring for Improvement*** for a more in-depth discussion of data and measurement.

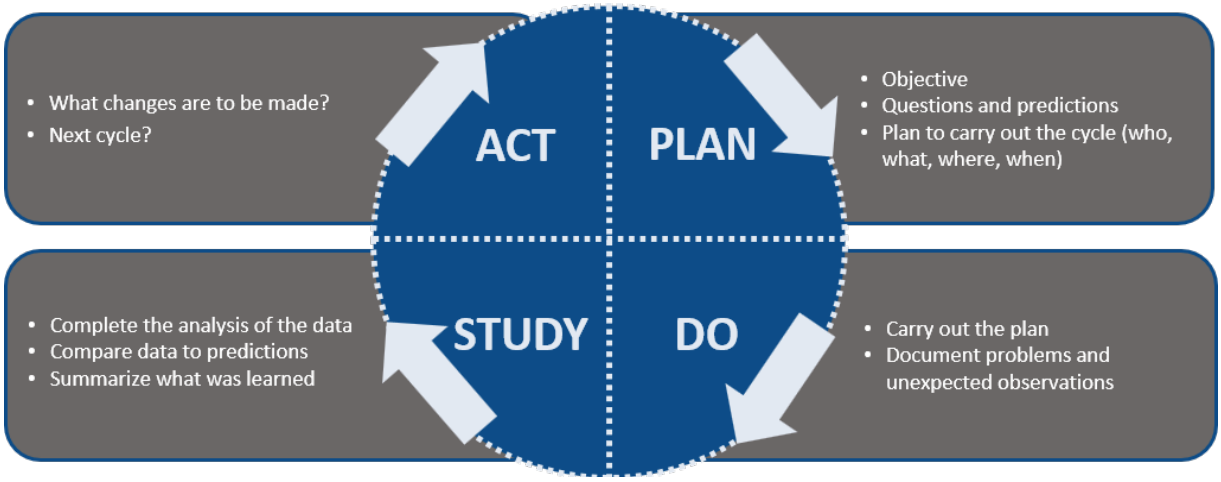
C. What Changes Can We Make That Will Result in Improvement?

Answering this question is often the fun part of improvement work. The ideas to be tested come from many sources: patients, the people doing the work (frontline staff), others who have had success, clinical guidelines, and formal change packages that have been developed.

Start with a change concept, which is a broader, general approach to change (e.g., a transition policy/guide). This helps teams generate a smaller, more specific idea that can be tested (e.g., asking 5 patients what they understood about the policy/guide or what was missing in the policy/guide). Change concepts come from evidence and models that have been shown to work in other organizations, industries, etc. However, change concepts need to be adapted to the specific setting of the team. Testing and adaptation are accomplished using the PDSA cycle.

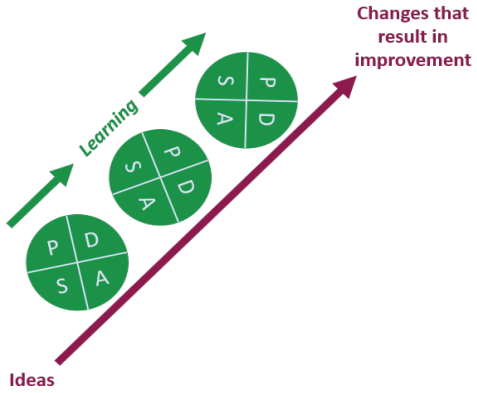
The PDSA cycle is foundational to all improvement methods including MFI, Lean, and Six Sigma. Developed by Walter Shewhart, he originally called it the PDCA cycle (Plan, Do, Check, Act). W. Edwards Deming modified the "check" to "study" for more reflection. PDSA cycles force us to be methodical, clarify what we are trying to learn with this idea, make a prediction, and reflect on the learning from the cycle. They allow rapid adaptation and implementation of changes in busy health care settings.

Essential Tools



Adapted from AHEC QI 101, a Quality Improvement course sponsored by Charlotte Area Health Education Center.

The ***Model for Improvement PDSA Planning Worksheet*** (see *Appendix*) captures key details of each PDSA cycle a team completes. Teams should use it when preparing their tests of change, including information about what they hope to learn, predictions about what will happen, and specific plans (who, what, when, where) for the test of change and the data collection. Results from the test will also be captured here, which will be crucial as you analyze your data and annotate your run charts (more on this is ***Section V: Measuring for Improvement***). Ideally, a form should be completed for *each* PDSA the team does. Over time, your PDSA forms will become the narrative of your improvement work, and this record will be extremely helpful as you move forward – PDSA forms can refresh your memory on details you forget over time and are extremely helpful in spreading or sharing for future work.



Adapted from Langley GL, et al. (2009).

As illustrated on the left, each PDSA cycle for a change builds on the test before: teams start with an idea, go through numerous test and change cycles, resulting in improvement.

D. Size of Tests, Tests in Parallel

Often the biggest challenge when testing with PDSA cycles is the cycle size. Teams try to do large cycles with a lot of patients over several weeks. Large cycles do not enhance learning and can delay improvement. In *The Improvement Guide*, Langley et al. illustrate the relationship between cycle sizes, costs of failure, and organizational commitment in "Deciding on the Scale of the Test." Your staff's readiness for change will also impact your approach to testing. You could adapt *The Improvement Guide*'s advice to assess staff readiness as:

Table 4. Assessment of Staff Readiness

Confidence result will bring improvement	Failure Impact	Resistant	Indifferent	Ready
Low	Big	Very small scale test	Very small scale test	Very small scale test
	Small	Very small scale test	Very small scale test	Small scale test
High	Big	Very small scale test	Small scale test	Large scale test
	Small	Small scale test	Large scale test	Implement

Adapted from Langley GL, et al. (2009)

Teams can also accelerate improvement by testing different ideas in parallel. The example below demonstrates testing different change ideas in every component of the care model; likewise, teams can test different change ideas in parallel from the Six Core Elements of Health Care Transition™.

PDSA Tip: Changes in Parallel

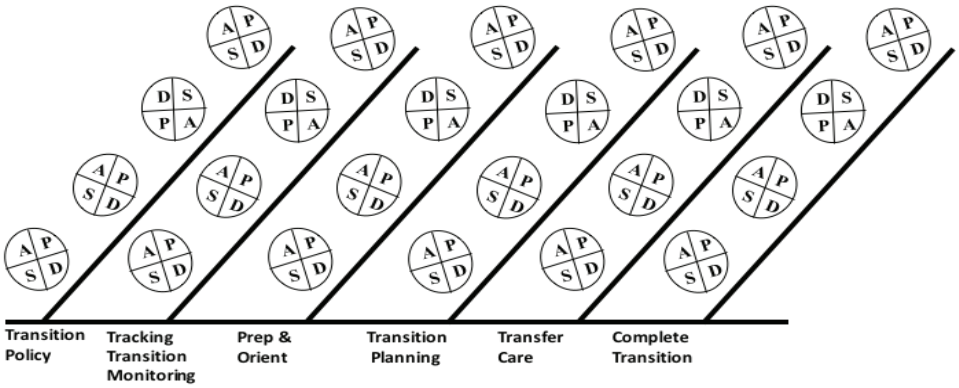


Image from ST3P UP, sponsored by Patient Centered Outcomes Research Institute® (PCORI) Award MCSC-1608-35861 Titled A Comparative Effectiveness Of Peer Mentoring Versus Structured Education Based Transition Programming For The Management Of Care Transitions In Emerging Adults With Sickle Cell Disease.

Key Points and Practice Tips for PDSA Cycles:

- Do initial cycles on smallest scale possible
  - "Cycle of 1" is usually best
- "Failed" cycles are good learning opportunities when small. Ask:
  - Was the test conducted well?
  - Does the change tested need modification in our setting?
  - Was the prediction / theory wrong?
- When tests are "successful," test under as many conditions as possible
  - Special situations (e.g., busy days)
  - Factors that could lead to breakdowns (e.g., different staff or physicians involved)
  - Things "naysayers" worry about (e.g., "It will not work when Dr. Diehard is not here.")
- The "study" is specific to the PDSA cycle you are running
- The data collected in a PDSA cycle:
  - Usually not one of primary project measures and is specific to that PDSA cycle
  - Usually ends with PDSA cycle
  - Can be qualitative, not just quantitative

V. Measuring for Improvement

Introduction

In this section, we will address measurement's role in QI, including the purpose of measurement, what comprises a balanced set of measures, considerations for quantity of and processes for data collection, and some basic principles for data display.

Measuring is a crucial element of improvement work. Without it, teams have no idea if changes are leading to improvement, which changes cause what results, and whether they are on track to achieve their aim.

Essential Learning

A. Why Measure?

There are many reasons and roles for measurement in improvement work. A summary of uses includes:

- To identify gaps/needs for QI project(s)
- To monitor progress toward project goals/aim
  - Usually requires more than one measure
  - A balanced set of measures helps ensure that the *system* improved in measures that:
    - Are linked to measurable goals in the aim statement
    - Show improvement quickly and include outcomes
    - Monitor for unintended consequences
- To generate ideas for improvement
- To evaluate rapid tests of change (PDSAs)
- To monitor for sustainability
- See ***Section VI.A: Key Driver Diagram*** for an illustration of measures at different system levels

You may decide to measure some level of cost or simple return on investment to build will for the work and ongoing support. Baseline data is very helpful to see where your process was before the project started and is sometimes needed to make the case for change. It is also important to note that all data will have inherent variation, especially in a real-world situation.

B. Aspects of Good Project Measures

There are several key features of good project measures. Of greatest importance, teams must ensure they do not create too much of a data burden yet capture meaningful information. Teams also need to consider how data will tell the "story" of their project. The most successful data packages reflect the following:

- Quantitative (numeric; outcome, process, and balancing) + qualitative (non-numeric) data
- Meaningful and understandable information for stakeholders, aligns with stakeholder priorities
  - Note that "stakeholders" encompasses a wide range of individuals, from those who do the work to those who experience the outcome
- Baseline levels are not too high, thus confirming the team's assertion that an improvement opportunity exists. Furthermore, it will be difficult to see improvement if the starting point is high.
- Data must be perceived as valid, especially among leaders
  - If possible, use measures based on or consistent with nationally recognized guidelines or benchmarks.
  - If you must create new measures, share them with your stakeholders and test them using PDSA cycles to determine if the measures will be perceived as helpful/valid.
  - Make sure to clearly define the measures so that everyone has a clear understanding of "what to count" and "how to count it." Using a measurement table is a great way to define the measures.

As previously discussed, there are 3 types of measures:

- **Outcome**: These are the ultimate results we are trying to achieve. For example:
  - Clinic's percentage of overall improvement on health care transition implementation, as measured by Got Transition's Current Assessment of Health Care Transition or Process Measurement Tool
  - Number of patients who have an adult visit within 3 months of their 18th birthday
  - Percent of patients who felt they were prepared for the transition to adult care, as measured by Got Transition's Health Care Transition Feedback Surveys for youth/young adults and parents/caregivers
- **Process**: What we do to achieve the outcome. For example:
  - Number of patients who receive welcome and orientation packet at new adult practice
  - Number of completed transfer packages given to adult provider
  - Number of completed transition readiness/self-care skill assessments
  - Number of referrals made to community-based organizations
- **Balancing**: What we could "mess up" while trying to improve processes and outcomes; monitors for unintended consequences. For example:
  - Satisfaction with the time spent with provider when increasing efficiency
  - Number of additional minutes required for visit time
  - Accuracy and completeness of a form when trying to streamline a process
  - Number of printed policies left behind in exam room or found in the trash
  - Skeptics are a good source for balancing measures: "Great idea, BUT…this could mess up X"

Practice Tip: Qualitative data also plays a valuable part in measuring improvement work. Both quantitative and qualitative data communicate crucial information about the work. Stakeholders will have different preferences for data. Some like the hard numbers, while others like to hear the stories. Make sure your project includes both types because together they can enhance the impact of your measurement.

C. Data Sampling

Many teams are tempted to collect as much data as possible. A team should collect *just enough* data to confirm the current situation, effects of changes tested, etc. It is unlikely that a different conclusion will be drawn based on a larger volume of data. The cost and effort required to obtain large amounts of data, particularly when it may be difficult to access, outweigh the benefits of acquiring it.

- Measure to speed learning and improvement, not to slow it down
- Measurement is not the aim; improvement is the aim
- You may learn as much or more from small samples

There are several data sampling strategies:

Probability sampling:

- Simple random sampling (random number generator)
- Systematic random sampling (start at a random number and fixed interval thereafter)

Non-probability sampling:

- Accidental samples (take next "n" people who walk by)
- Quota samples (random sampling until quota buckets filled)
- Judgment sampling (use "knowledge" [end users] to identify most informative samples)

Judgment sampling is the most common form used in improvement work. For example, you are doing a project to increase the percentage of teens with sickle cell disease who have an emergency care plan. Look for sample opportunities to *most rapidly ascertain* if our interventions are leading to improvement. For example:

- Find out when there is sickle cell clinic or regular hematology clinic
- Do "drive-by" observations of providers
- Do spot checks of the trash and room to see if handouts were left behind

Practice Tip: Remember that your process will have variation (and that variation will follow a distribution). For more information and an illustration of these points, see the "Run Chart Rules" section below. You need just enough data to know if the distribution has changed, or if a point is outside the expected distribution. Strive to minimize the measurement burden:

- Try to limit the number of measures to 3-5.
- Measure frequently using small sample sizes.
- Keep data collection as easy as possible and use existing sources to collect needed data.
- Measuring is not going to change things; use measures to inform decisions that drive change.

D. Data Collection

When developing a data collection strategy, consider the utility and accessibility of existing data sources. In some health care settings, the electronic medical record (EMR) serves as a valuable source of data. When possible, population pulls from the EMR are ideal. However, inability to extract data from the EMR should not stop the improvement work. Simple data collection tools can be used instead, such as:

- Email surveys (e.g., SurveyMonkey)
- Check sheets (simple structured, prepared data collection form)
- Small chart audits

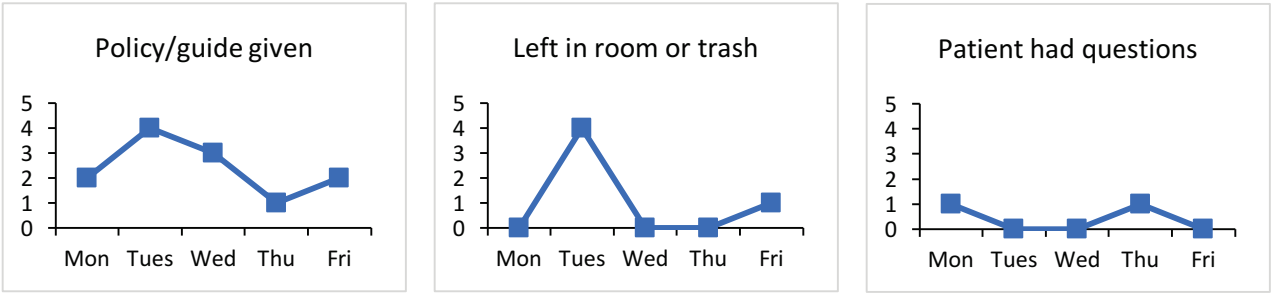
For example, a check sheet is a generic tool that can be adapted for a wide variety of purposes.

- When data is observed and collected repeatedly by the same person or at the same location
- When data is collected on the frequency or patterns of events, problems, errors, etc.

Example Check Sheet

	Mon	Tues	Wed	Thurs	Fri
Policy/guide given	||	||||	|||	|	||
Left in room or trash		||||			|
Patient questions	|			|	

This data is then converted to run charts as follows:



Essential Tool

The ***Project Measurement Plan*** (see *Appendix*) is a communication tool that helps a team spell out how measures will be tracked and describes who will collect them, when, how often, etc. The plan often includes a table documenting measures and data collection plans, with descriptions of measures and operational definitions. This ensures everyone involved agrees about the measurement process. The project measurement plan is created at the beginning of the project and revisited regularly throughout the life of the project. Thus, you may use this tool to capture changes in your measures, documenting what the change was, who authorized it, when, and the reason.

E. Displaying Measures

Once you begin to collect your measures, think about how the measures will be visually displayed and communicated, including whether you will use a run chart versus a bar graph. When displaying data, create graphs that are easy to read. One key principle for developing graphs is to use the least ink possible. Excel has a function that automatically adds legends, data point text, etc.

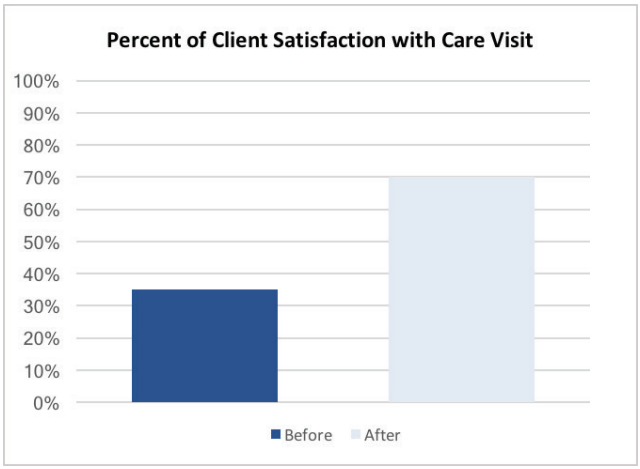
Common Quantitative Display

- Bar charts are used to establish a gap (comparison to benchmark, goal, before and after).
- In QI, run charts are most often used to display data over time. Run charts are a dynamic display of data over time. They require no statistical calculations and should be easily understood. Data points are plotted around a median line, and annotated run charts include boxes (also called annotations) that correspond PDSAs.

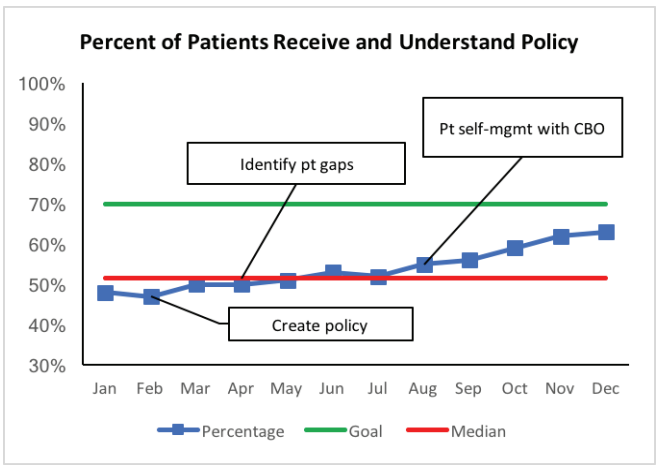
Instruction for Creating a Run Chart

1. Set the horizontal scale (x-axis) – usually time
2. Set the vertical scale (y-axis) – receipt of variable being measured
   - Make vertical scale high or low enough to encompass variation in future data and your goal
   - Most of the data should lie in middle half of graph
3. Create a useful title
4. Add additional information: goal line, annotations of changes or unusual events
   - It is vital to add annotations to your run charts, as this links data with relevant tests of change. Without run chart annotations, you cannot be sure which changes were effective or detrimental to your outcomes.
5. Plot the median

Bar Chart



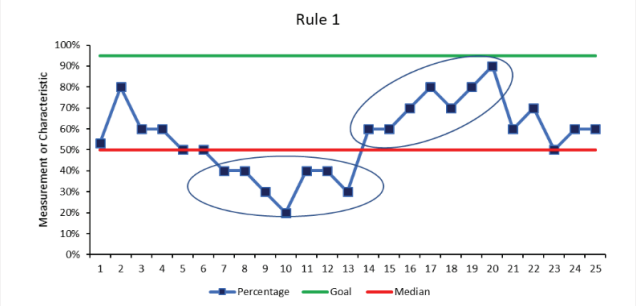
Run Chart



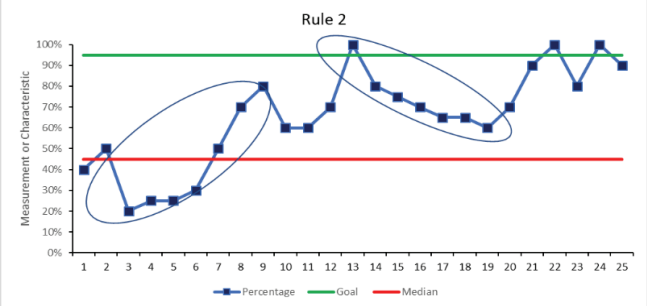
Adapted from Population Health Improvement Partners, improvepartners.org.

There are four patterns to help determine if improvements are based on a random versus a nonrandom pattern. Provost and Murray's *Health Care Data Guide* refers to these as "rules." If you see one of these patterns occur in your data, it indicates something nonrandom is taking place. These "rules" should inform the team as to the impact of their changes.

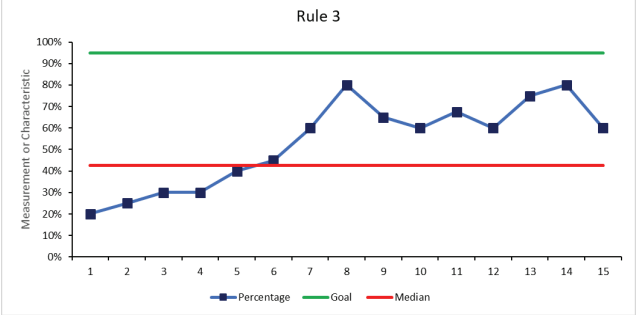
Run Chart Rule 1:
Six or more consecutive points above or below median.



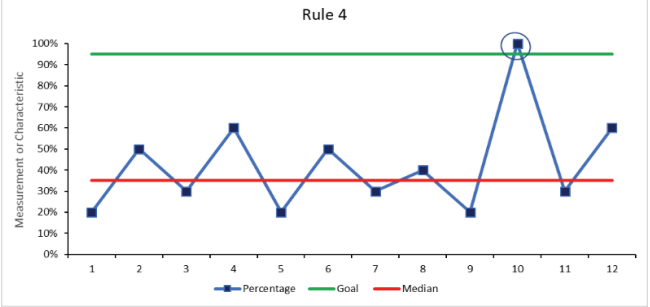
Run Chart Rule 2:
Five or more consecutive points going up or down.



Run Chart Rule 3:
Too few or too many runs (crossings of the median) – Please refer to the *Health Care Data Guide* by Provost and Murray, Table 3.4, page 80, to apply this.



Run Chart Rule 4:
Astronomical value!



For example, in the run chart on page 20 (Percent of Patients Receive and Understand Policy), we see Rules 2 and 3 apply, indicating nonrandom change. This informs the team that the changes they made (creating a policy, identifying patient gaps, and initiating patient self-management) are impacting the run chart.

Key Points: To recap Measuring for Improvement:

For all measures:

- Use a measurement plan to document your work
- Use simple collection tools
- Use the least ink possible to display data (i.e., use run charts instead of bar charts)

For project measures:

- Use quantitative and qualitative data
- Choose a concise set of measures related to your goals with Process, Outcome, Balancing
- Use run charts for displaying data over time
- Start collecting your baseline data as soon as possible

VI. Tools for Improvement

Introduction

In this section, we will review a wide variety of QI tools. In addition to those specifically placed in other sections, there are many quality tools that help teams gather the information needed to advance their work, several of which are discussed below. For more information on tools, refer to Nancy Teague's *The Quality Toolbox*.

Ask your team:

- Where are we in the QI process?
- Do we need to expand or focus our thinking?
- Is it time to evaluate?

Essential Learning

Typically, QI tools can be divided into two main categories – tools related to planning and tools related to data collection or analysis. However, there is significant overlap, which provides valuable learning.

When you are planning the work, identifying root cause, or developing ideas, these tools are often used:

- Key Driver Diagram (KDD)
- Flow map (process flows/value stream map/swim lane flow map)
- Simplified Failure Mode and Effects Analysis (sFMEA)
- Fishbone diagram
- 5 Whys & 5 Hows
- Seven Step Meeting Process
- Brainstorming
- Affinity diagram
- Impact/prioritization matrix

When you are collecting or analyzing data, these tools are used:

- Check sheets
- Pareto chart
- Run chart
- Survey
- Benchmarking

A few of the most commonly used tools are described in detail below.

A. Key Driver Diagram (KDD)

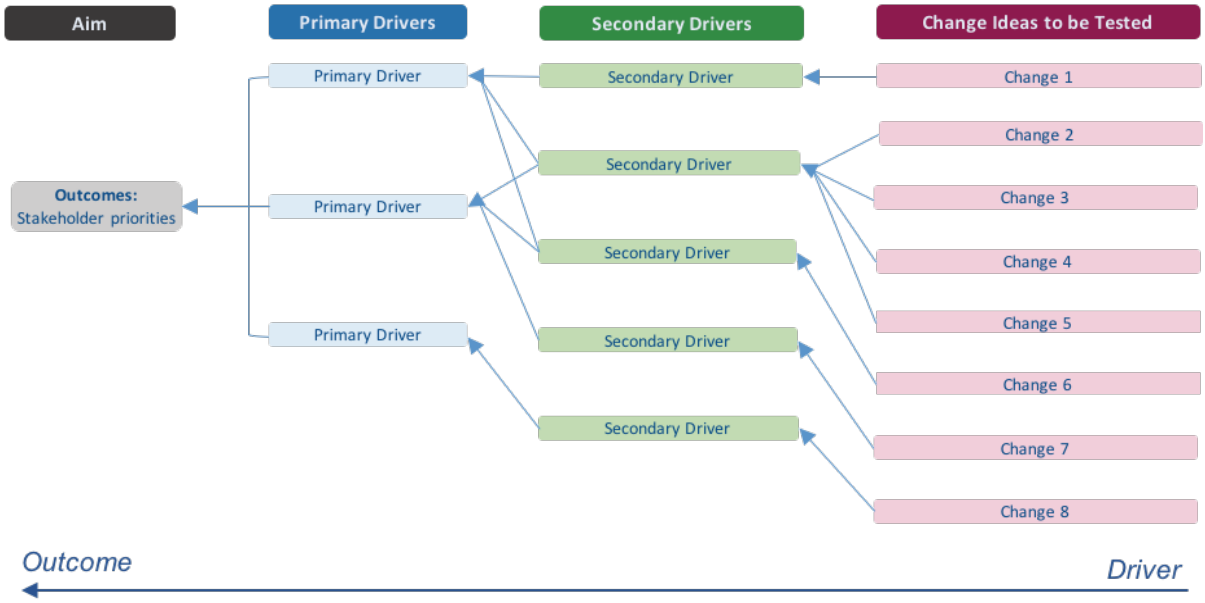
KDDs help teams understand a system and the system drivers that lead to outcomes. They can include structures, processes, culture, personnel, and much more. Understanding the system is critical to improving outcomes. KDDs may be used to prioritize resources, develop a measurement plan, or present the work to stakeholders or leadership.

Using a KDD helps teams:

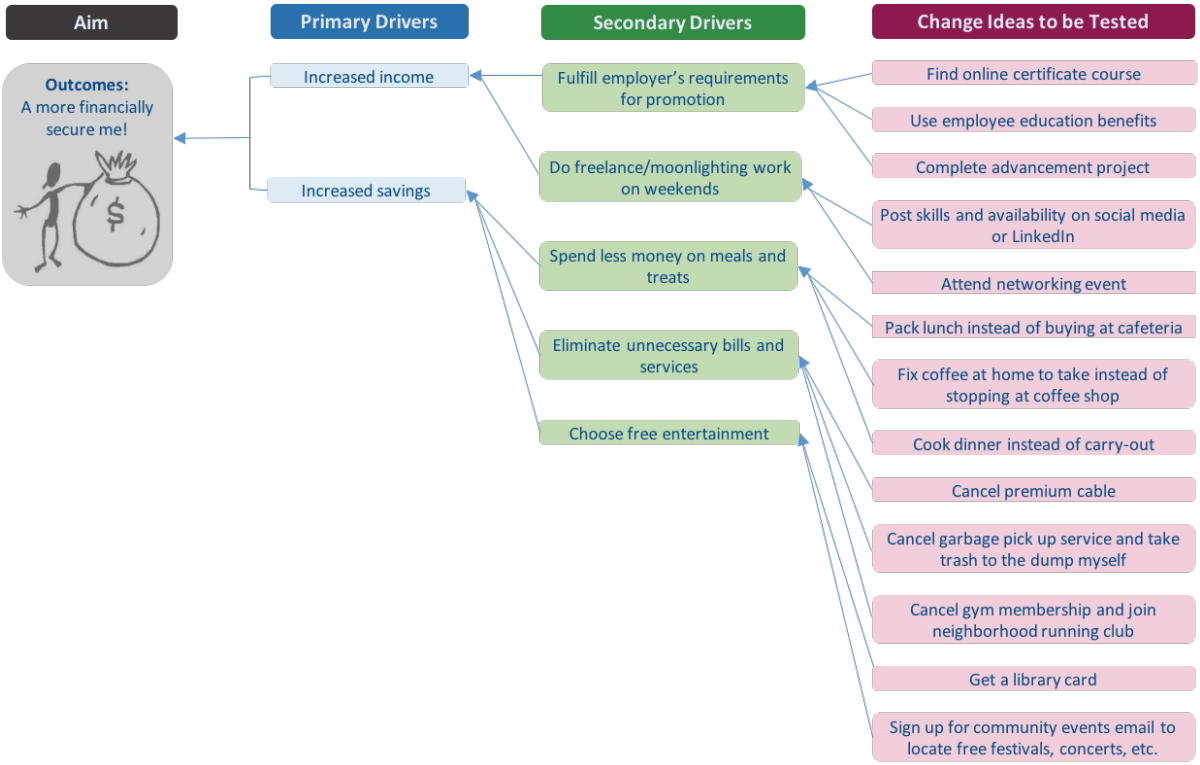
- identify their theories ("key drivers")
- focus on cause and effect relationships in complex systems
- communicate
- organize work

A KDD is structured as a three-level logic chart and typically shows primary ("key") drivers, secondary drivers, and usually a final column of changes to be tested. Secondary drivers with common resources, management, equipment, patients, etc. can be grouped to become your primary drivers. Primary drivers can be prioritized and assigned to a team to work on. Secondary drivers are the structures, processes, or aspects of culture that contribute to desired outcomes. They are necessary and sufficient for improvement. Ideally, they are also evidence-based or shown to work elsewhere. Below is a graphic of a key driver diagram. The second example is for improving financial savings. The third example is a KDD for improving transition of care for patients with sickle cell disease.

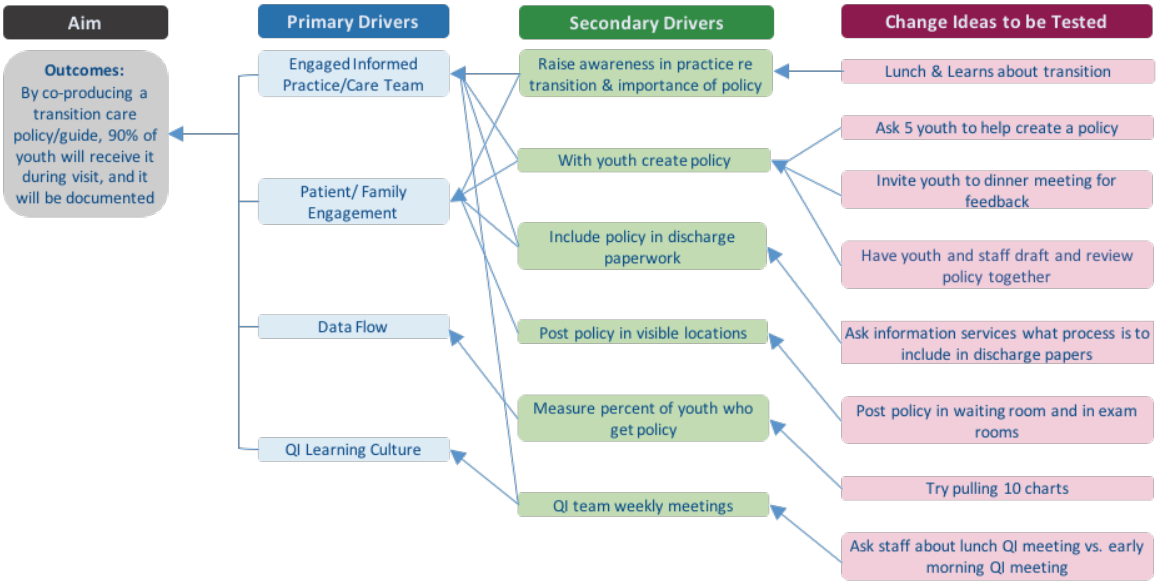
Example: Key Driver Diagram



Example: A Plan for Improved Savings



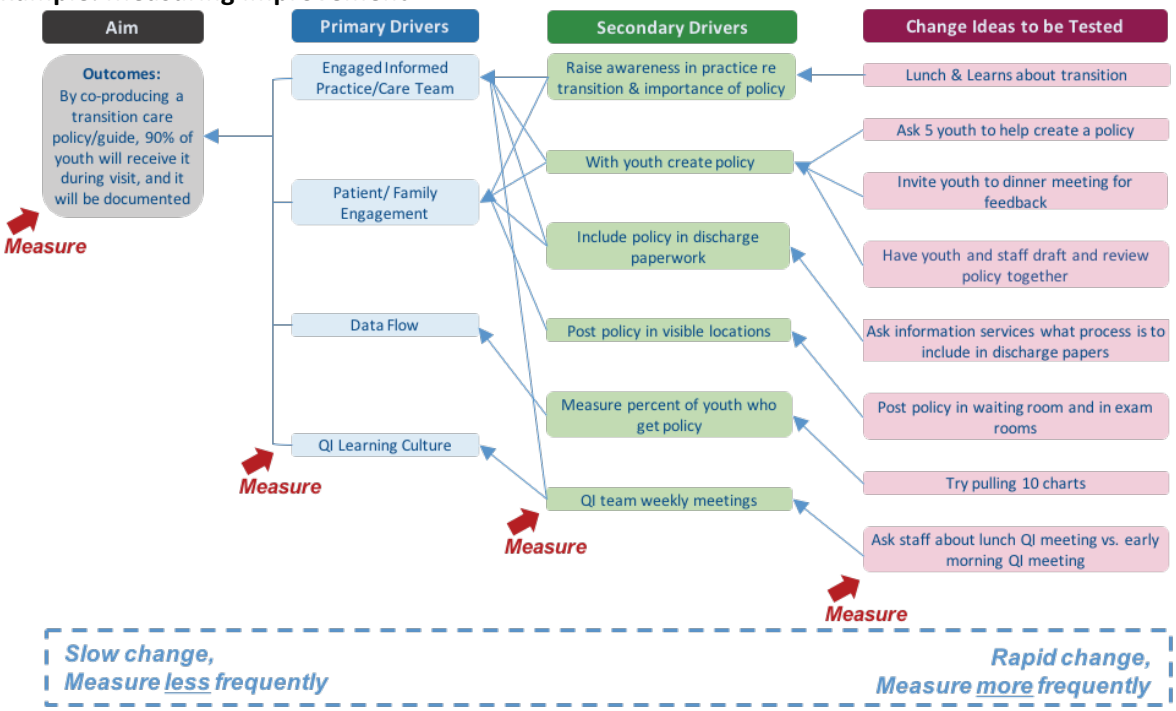
Example: Improving Sickle Cell Care



Adapted from ST3P UP, sponsored by Patient Centered Outcomes Research Institute® (PCORI) Award MCSC-1608-35861 Titled A Comparative Effectiveness Of Peer Mentoring Versus Structured Education Based Transition Programming For The Management Of Care Transitions In Emerging Adults With Sickle Cell Disease.

A KDD can also be used to develop the measurement plan. Having measures at each level of the KDD ensures a balanced set (see ***Section V: Measuring for Improvement***). The following KDD demonstrates the different levels of measurement within the KDD.

Example: Measuring Improvement

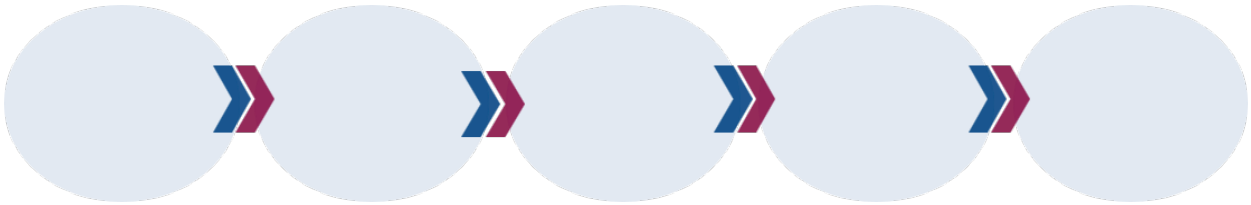


B. Flow Map

A flow map is a visual display of each step in a process placed in sequential order. It can include activities, decision points, inputs and outputs, staff involvement, time required, and measurement. Flow maps are useful for processes ranging from manufacturing to services to health care. They illustrate how things are or how things could be. Most importantly, a flow map can help teams understand a process better, find improvement opportunities, share information, resolve contradicting perspectives, or simply record a process or plan a project. Posting the flow map gives staff an opportunity to clarify the steps and ensure everyone is on the same page.

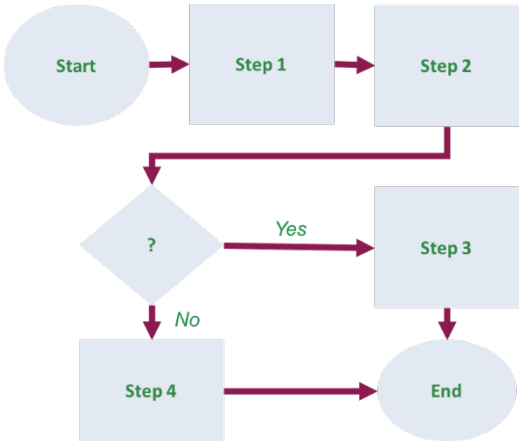
Instruction for Creating a Flow Map

1. Have a very clear definition of the process in question and agree on the level of detail needed.
2. Write the process at the top of the page and discuss parameters for where/when the process starts and stops. Next, brainstorm items for inclusion, using small slips of paper.
3. Once all the ideas are collected, arrange them in the proper order.
4. When the team is agreed on the sequence, add arrows to show the flow between steps.
5. Finally, share the flow map with others who participate in the process and ask if they feel it is accurate.



The **detailed** flow map, shown below, breaks activities into major and minor categories; in addition to items such as inputs, outputs, and decisions, this format captures delays, repetition, and other details. These are especially useful when a team needs to thoroughly understand a process to identify and plan improvement opportunities, helping teams map out "as-is," "should-be," and "to-be" processes. They can be helpful when training people on a process.

Building on the regular flow map, detailed flow maps incorporate additional exploration after arranging the brainstormed items. Teams should work through steps required when something goes awry, alternate paths from decision points, and inputs and outputs at each step. After adding these items, the team should again share it with a wider audience for feedback. For more information on this subject, see Nancy Tague's *The Quality Toolbox*.

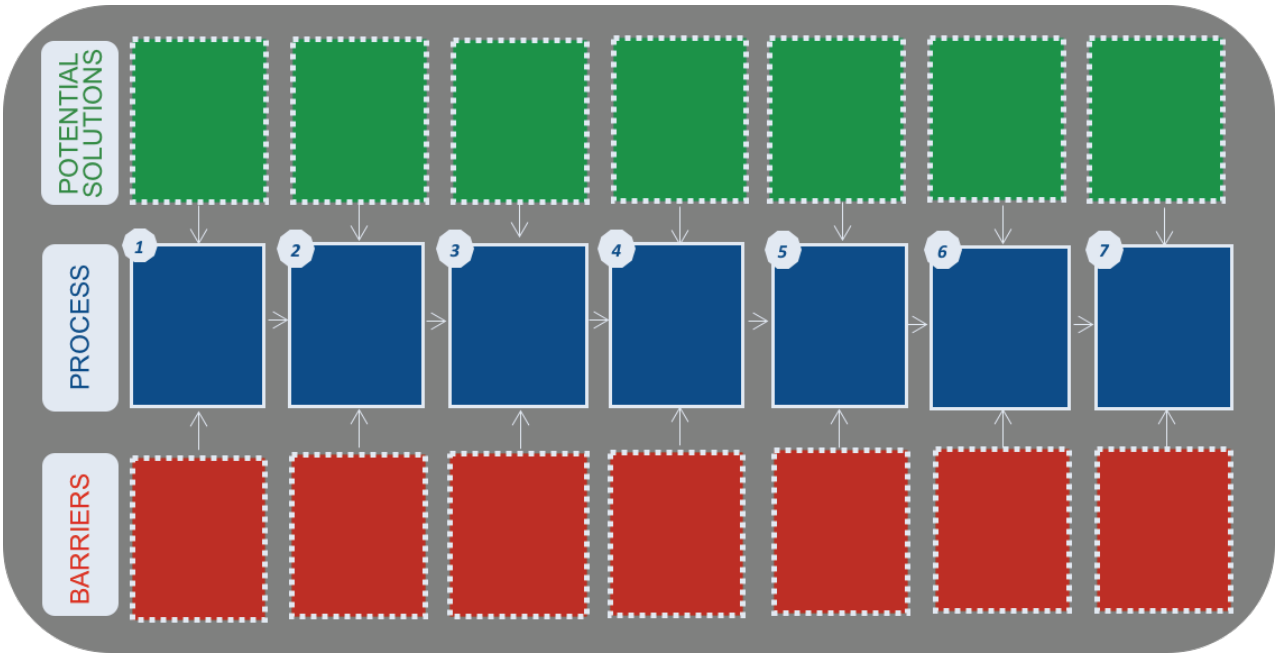


C. Simplified Failure Mode and Effects Analysis (sFMEA)

An sFMEA is a tool to identify possible failures. It can be used at many levels (team or a larger organization) to prepare for failures in a system, process, service, etc. After identifying possible failures, teams brainstorm solutions to each potential problem.

Instruction for Creating an sFMEA

1. Start with your process flow map.
2. Gather data to identify problems or barriers. Direct observations and interviews can be an excellent source of this information. List all the barriers, gaps, or problems related to each step in the red boxes.
3. List possible solutions for each problem in the green boxes. Information can come from research, data analysis, brainstorming, Pareto charts, and key driver diagrams.
4. Finally, choose some solutions for potential PDSAs.



Adapted from the copyrighted Simplified Failure Mode Effects Analysis Worksheet (sFMEA) from Cincinnati Children's Hospital Medical Center. This version of the sFMEA has been modified and has been reprinted with permission.

D. Fishbone

A fishbone diagram helps teams better understand a problem. It may also be called an Ishikawa or cause-and-effect diagram. Identifying possible causes requires broad thinking and can help a team generate ideas or actions.

Fishbone diagrams provide structure for brainstorming, corral collective knowledge, and help the team cast a wide net for ideas. This is especially useful when a problem has multiple causes. It also breaks the problem into smaller pieces so teams can consider causes and prioritize attention on which causes to tackle first.

As with other planning tools, teams need to first agree on the problem (the "effect"), then brainstorm causes. Causes are grouped into categories, sometimes labeled generically as the "4 Ps" (People, Equipment, Policies, and Practices) and/or the "5 Ms" (Machines, Manpower, Materials, Methods, and Measurement). (You will find variations on and combinations of these labels.) Draw a "fishbone" of the ideas, placing the problem at the "head." "Bones" link cause and effect, with ideas placed on the branch of the appropriate category (ideas can appear in multiple places).

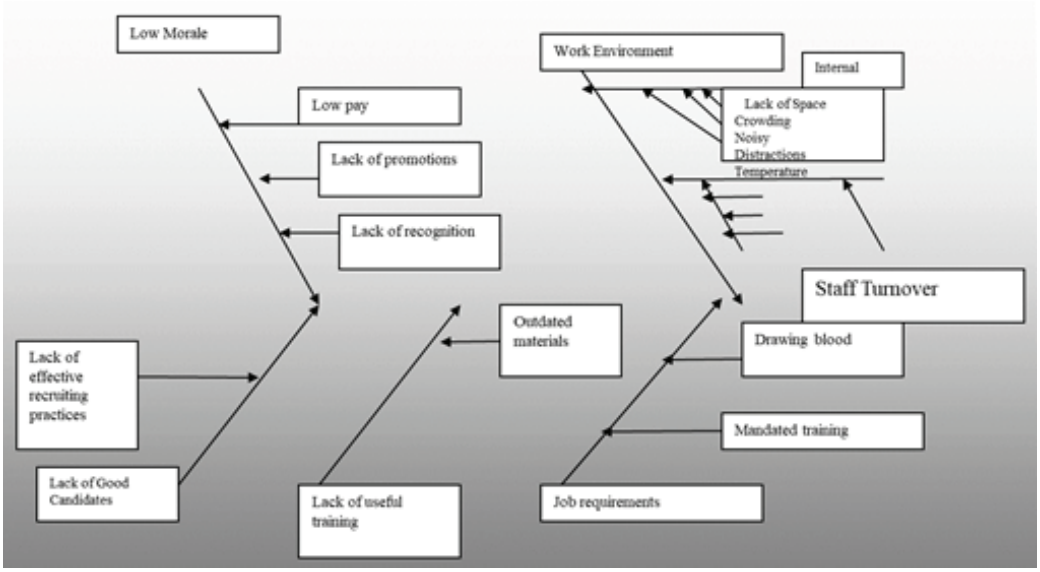


Image from AHEC QI 101, a Quality Improvement course sponsored by Charlotte Area Health Education Center.

To develop the most complete picture, teams should consider *all* causes, not just those within their control. Facilitators should let the team determine idea placement, and teams should ask someone outside the group to review the diagram for accuracy and completeness.

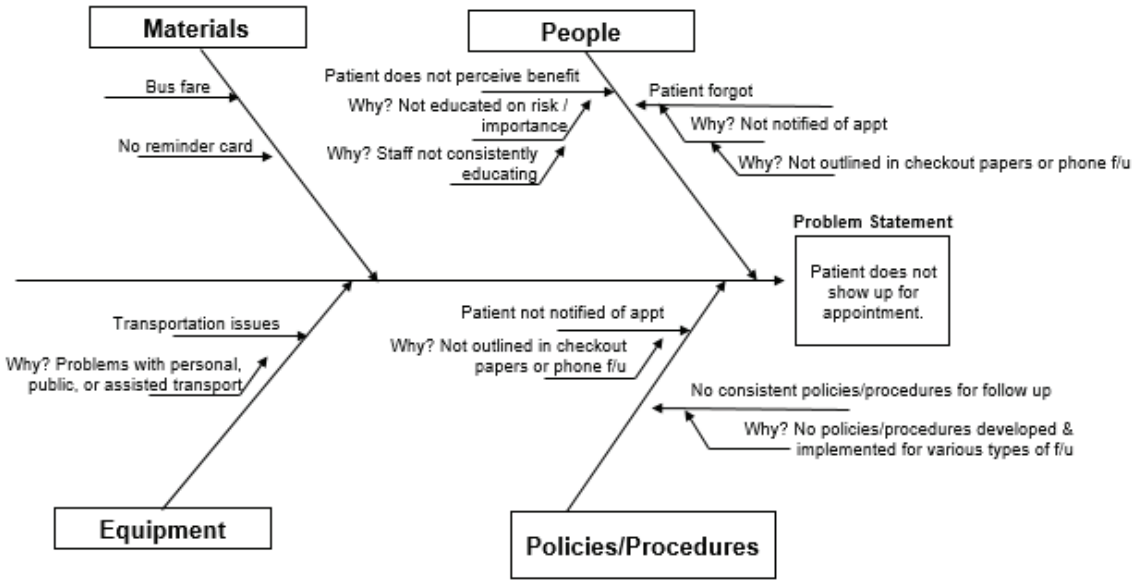


Image from AHEC QI 101, a Quality Improvement course sponsored by Charlotte Area Health Education Center.

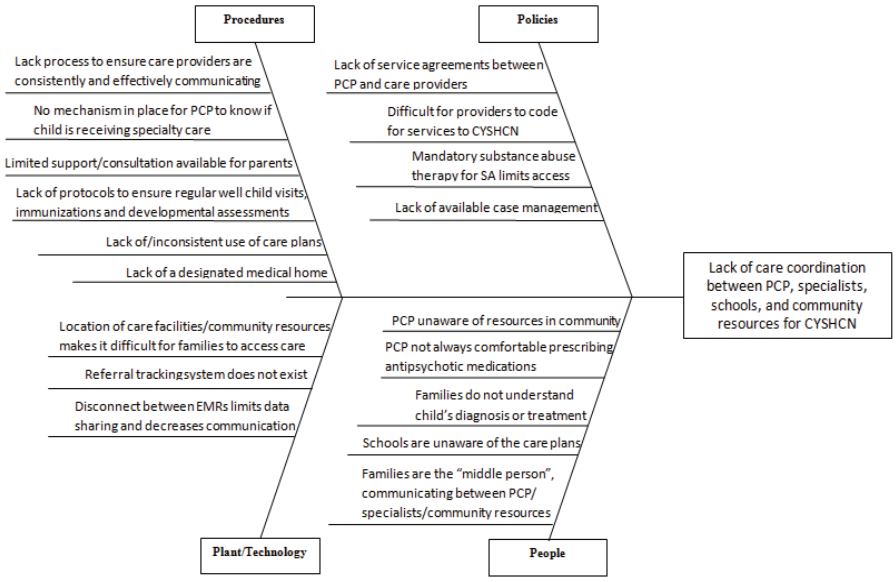


Image from AHEC QI 101, a Quality Improvement course sponsored by Charlotte Area Health Education Center.

There are many types of fishbone diagrams, such as process fishbone, time-delay fishbone, desired-result fishbone, reverse fishbone, cause enumeration diagram, and CEDAC (**c**ause-and-**e**ffect **d**iagram with the **a**ddition of **c**ards).

E. 5 Whys and 5 Hows

The 5 Whys and 5 Hows are a series of detailed questions that help teams describe a problem, drill down to the root cause, and identify a solution to test. They are helpful when teams need to dig a little deeper but are having trouble doing so. Both help clarify the problem, with 5 Hows also used to develop a detailed solution. They pair well with the fishbone diagram.

5 Whys		5 Hows	
PROBLEM *I am starving at 10AM and eat anything I can find*		**SOLUTION** *My shopping list needs to include quick breakfast items so that I am not starving at 10AM*	
Why do you do this?		***How will you accomplish this?***	
I don't eat breakfast.	Why?	I need to identify a variety of quick items that will make me feel full.	How?
I don't have time to fix anything.	Why?	I need to make a permanent shopping list that includes these items.	How?
There is nothing easy & quick in the house to eat.	Why?	I need check the pantry before I go to the store.	How?
I did not buy breakfast bars or yogurt.	Why?	I need to mark the items I need on the list.	How?
The items were not on the shopping list.	Why?	I need to take the list with me to the store.	How?

Adapted from Population Health Improvement Partners, improvepartners.org.

F. Pareto Charts

Pareto charts support data collection and analysis and display information as a bar graph. They help determine the prevalence of a problem, identify the most significant issue out of several problems, or drill down from broad causes to specific pieces. Key benefits are that they relate cause and effect, facilitate communication, and illustrate which situations are more significant (arranged in order from left to right).

When creating a Pareto chart, decide the data to be used, timeframe, and measures. Collect your data and set the numeric scale for the chart. Make a bar chart with the height of each labeled bar signifying cost or frequency (highest to lowest).

Example:
This Pareto chart shows how nurses on the pediatric surgery floor want to improve the discharge process to open beds for new patients.

1. Team brainstormed and voted on what they thought were causes of delays.
2. Team collected data to assess hypothesis and identify the greatest improvement opportunity.
3. Team created a Pareto chart to display what they learned about leading causes of delays.

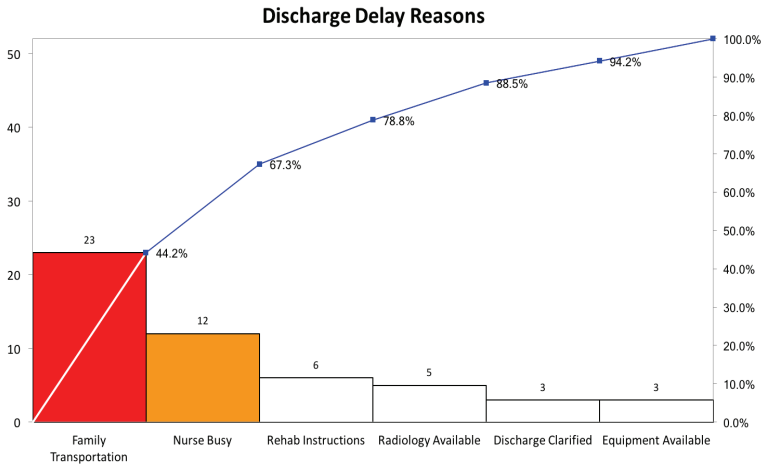


Image from AHEC QI 101, a Quality Improvement course sponsored by Charlotte Area Health Education Center.

Example:
This Pareto chart shows what was missing from a sample of 10 ADHD initial visit records. All 10 charts were missing documentation of the first 4 categories, which represent 80% of the problem, and should be addressed first if possible.

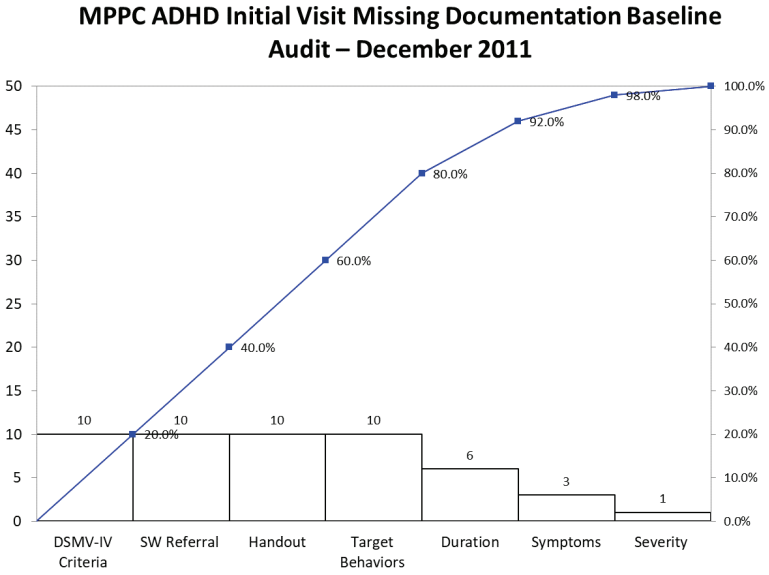


Image from AHEC QI 101, a Quality Improvement course sponsored by Charlotte Area Health Education Center.

Example:
This Pareto chart illustrates disease rates by age.

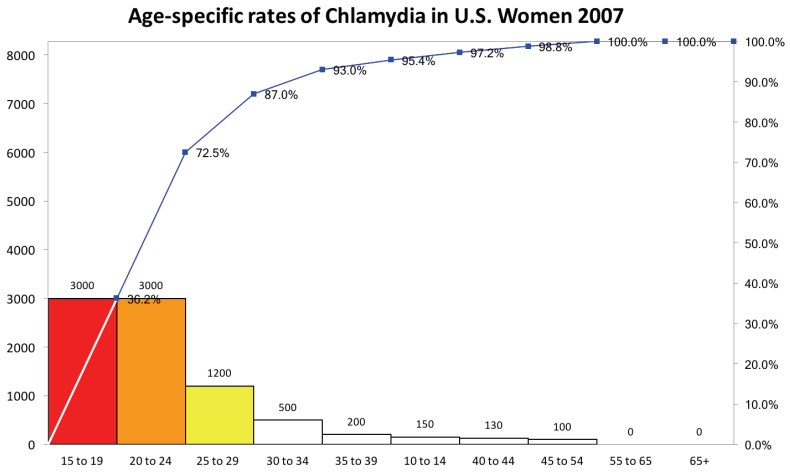


Image from AHEC QI 101, a Quality Improvement course sponsored by Charlotte Area Health Education Center.

VII. Sustaining Improvement

Introduction

In this section, we will discuss the role of sustainability in QI. We will review the steps teams need to complete in order to protect their work from entropy, to establish a reasonable level of measurement frequency, and to maintain stakeholder support.

Once you have progressed through planning, testing, and implementing only those changes that lead to improvement demonstrated by the data, think about sustaining and spreading the work. If you are at or above goal for 6 or more months, consider shifting to sustainability. Be aware that failure to devote sufficient time to this phase results in erosion of the improvement within months.

Essential Learning

Many crucial steps underpin sustainability, such as assigning ownership, building the change into the system (rather than relying on individuals), continuing to measure, and seeking senior leader support.

Choose an individual to "own" the sustainment. As the process owner, they will provide status reports to senior leaders, resume team meetings as needed, watch the data for regression, and manage ongoing improvement. This person keeps the necessary staff informed and engaged, including repeating training and sharing the project's successes.

A. Hardwiring Changes

You can help hardwire change by incorporating the new process into job descriptions, and including improvement discussions in recruitment, performance evaluations, and merit increases. Anticipate potential disruptions, such as staff turnover and absences, by cross-training staff on changes and new processes. Providing new staff with QI training and initiating frequent discussions about improvement will help build a culture of QI to support changes. Your efforts will be most successful if these strategies are employed across the system or practice, not on an individual basis. Remember to involve patients and families when planning for sustainability.

B. Ongoing Knowledge Management

Continued measurement is crucial for sustainability, although you can begin to measure less frequently. Gradually scale back to alternating months, then quarterly, and eventually annual measurement. Without data, the changes you've instituted will erode and entropy will take over – but you must reduce the data burden to enable your team to move on to other improvement work. Choose one or two measures from your balanced set, which will indicate early on when the process starts to slip. Share this data at staff meetings and have a plan ready in case your data does start to reveal loss of reliability.

Senior leaders remain important during sustainability. Create a clear, succinct report and share it regularly to keep them informed. Keep your work visible through posters and presentations, and request senior leader support in removing barriers and providing resources such as sufficient training time for new staff.

Essential Tools

Sustainability Checklist: Maintaining Your Success (see *Appendix*) is an organizational tool that helps you make sure all the pieces are in place –people, processes, measurement – to help prevent your improvement work from reverting back to the previous state.

Practice Tip: Remember that as we discussed in ***Section I: What is Quality Improvement?*** reliability science strategies are also used by QI teams to ensure high reliability when establishing sustainability.

VIII. Spreading Improvement

Introduction

In this section, we discuss how to spread your successful improvement work to other areas. This includes an understanding of the pieces necessary for successful spread and the predictable pattern that change adoption often follows.

Spreading the improvement work is another part of change management. It may not always be the "last" thing you do; sometimes it's appropriate to spread some elements before the fully changed process is in place – when there's enough data to show the change is an improvement and the team is confident that the change idea is ready for spread.

Essential Learning

In his definitive book *Diffusion of Innovations*, Everett Rogers explained spread:

> "Diffusion is the process by which an *innovation* is *communicated* through certain *channels over time* among the members of a *social system*." (Rogers EM, *Diffusion of Innovations*, *pg 11*.)

The team must work together to determine spread readiness. Questions to help guide this include:

- Did the initial team succeed in improving the process or outcomes?
- Is staff in the spread location familiar with QI and the chosen methodology (e.g., the Model for Improvement)?
- Is there buy-in at both the front line and senior leader levels?
- Do you have a very specific definition and plan for the spread?

Many factors impact spread success. First is the "perceived attributes" of the change. Five attributes increase the likelihood of spread:

1. Relative advantage over current process or system
2. Compatibility with current process or system
3. Complexity
4. Trialability – can the change be tested with little investment (risk/cost/time)?
5. Observability – is the change visible?

The second factor is the target social environment. The Diffusion Curve illustrates the natural distribution of a population's willingness to adopt a change, commonly displayed as a bell curve. An individual's position on the curve can shift depending on the specific change in question. **Innovators** usually initiate a change, but the real momentum lies with **early adopters**. Early adopters are open to change and more socially integrated than innovators. Peers farther along the curve trust the early adopters and respect their opinions; thus, innovators will see the greatest success by targeting early adopters first. Teams should identify the early adopters and the best ways to reach them, and the **early majority** will soon follow suit. The **late majority** are likely to join after the first groups embrace the change. The final group, the **traditionalists**, or **laggards**, are left with no choice but to change or be left behind. In his classic book *Diffusion of Innovations*, Everett Rogers allocated the diffusion curve as follows:

- 2.5% Innovators
- 13.5% Early Adopters
- 34% Early Majority
- 34% Late Majority
- 16% Traditionalists

It is tempting for improvement teams to target those with the largest gap, but investments are best made in the other groups. Focusing your efforts on the laggards wastes resources and is unlikely to result in change anyway.

Lastly, strong leadership is crucial for successful spread. The leader must project a shared vision, inspire buy-in and commitment, and clearly state that status quo is unacceptable. This means understanding the changes, including their impact on people and how they will result in improvement. The best leaders know how to target influential people and help them understand the need for change.

Other factors may be specific to the local site. In these cases, data and incentives can help illustrate the need for change. It often helps to highlight other locations' successes. Visiting these sites can be invaluable.

Spread teams must continue consistent measurement, but the volume can often be reduced. Sometimes spread leads to new improvements to the change idea, and this needs to be captured for further learning. Celebrate and communicate your successful spread work.

Key Points: QI tools continue to be valuable during spread. Expect that some adaptations will be needed in the new location, and PDSA cycles will be required. Choose a spread champion who is invested, knows the data, can facilitate staff buy-in, and support the overall process.

Essential Tools

A ***Spread Checklist*** (see *Appendix*) is a structural tool that helps ensure all the pieces are in place for successful spread. It includes considerations you need to address in the areas of Organization, Communication, Social System, Measurement, and Knowledge Management. This should be completed before you start to spread.

IX. Health Literacy

Introduction

In this section, we will turn to the topic of health literacy, which is an important companion to QI. When the two are combined, they are a powerful force to improve care for patients. After providing some background information on health literacy, we will describe strategies for improving written and spoken communication.

Health literacy is a critical element of the health care system; without addressing this aspect of care, we will never achieve better outcomes. Patients may only spend 10 minutes in a physician visit but are responsible on their own at home for understanding how to follow treatment instructions, take medications, navigate the health care system, and coordinate care across different subspecialties. This aspect of "care delivery" becomes complicated in the world of health care transition: successful transition is entirely dependent on an effective relationship between providers and patients, including clear communication and understandable processes.

Essential Learning

Healthy People 2020 defines health literacy as "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions." This can be expanded to include the ability to access and navigate the health care system.

Dr. Richard Carmona, former U.S. Surgeon General, mentioned health literacy in 200 out of 260 speeches while in office.[2] He pointed out that providers often don't realize patients do not understand the information and instructions they are given and that providers need to work on narrowing the gap. Patients face an increasing "continuum of confusion," as they are tasked with everything from preventive self-care, immunizations, and self-monitoring to appropriate use of a myriad of system facilities, navigating complex scheduling, understanding insurance and billing, and tackling extensive printed information. Historically, the health care system has placed the burden and responsibility for all of this on the patient in their most vulnerable time, instead of simplifying the health care system.

This disconnect is not surprising. Providers spend many years training in their field, then working with this information daily. Patients must quickly adapt to new information and take responsibility for understanding, remembering, and acting on it. They often receive this information during times of great stress, when they are not feeling well, and/or have just received a new and scary diagnosis. Many patients feel shame about their inability to understand, read, etc. and thus hide this deficit from their care team.

QI can help providers incorporate health literacy strategies and can help providers see the experience through the patient's eyes. When done properly, health literacy strategies shift the balance by decreasing patient burden and increasing patient capacity. There are clues about a patient's health literacy capacity that providers can look for such as:

- Frequently missed appointments: lack of follow-through on tests or referrals
- Incomplete registration forms: inability to give coherent, sequential history; rarely asks questions
- Non-compliance with medication: inability to name medications, explain purpose or dosing; pills identified by looking at them, not reading the label

A few statistics help to illustrate the magnitude of the problem. According to the National Assessment of Adult Literacy, 36% of the adult population have basic or below basic literacy skills.[3] Some key findings in recent studies demonstrate the impact low literacy has within the health care environment:

- The cost of low health literacy to the US economy is estimated to be $106 billion - $238 billion annually
- More than 3 in 4 emergency room patients do not understand instructions doctors give them after visits
- Adults with low literacy skills also have difficulty managing the health of their children

Committed care teams value patient engagement and the voice of the patient, but families must also understand what the care team is telling them in order to participate to their fullest capacity. All information must be shared in a way that families can understand, and communication must be structured in a way that encourages patients and families to share their ideas openly.

Health literacy strategies become very important and tricky in the context of health care transition. As patients move from pediatric to adult care, they are suddenly responsible for their own care, often for the first time in their lives. The challenges of these new responsibilities are increased by the natural changes in maturation, judgment, and decision-making which youth and young adults experience.

The Agency for Healthcare Research and Quality (AHRQ) has developed a comprehensive toolkit to help care teams address health literacy from 4 areas: written communication, spoken communication, self-management skills and empowerment, and supportive systems. The full toolkit can be accessed at (https://www.ahrq.gov/health-literacy/quality-resources/tools/literacy-toolkit/index.html). For the purposes of this primer, we will focus primarily on written communication and briefly on spoken communication.

Improving written communication includes many strategies and tools to make materials easier to read, understand, and act upon. The points below will apply to any written communication, including but not limited to education pamphlets, research results, consent forms, patient instructions, letters, and policies.

A. Summary of General Policies for Written Communication

Message (clarity): include a clear, brief take-away message
Word Choice: use common, easy to understand words
Sentence Structure: be simple and direct
Tone: make the reader feel empowered and ready to act
Numbers: health literacy includes problems with calculations such as quantity, time, and risk
Format, Layout, and Graphics: make reading easier by using certain font styles, spacing, and design
Literacy Level: use a 6th grade reading level or lower, using a formal scoring system

B. Details and Examples for Implementation in Written Communication

Your first step is to apply the first six strategies below to simplify your writing, then score the document for its literacy level. Repeat this cycle until you reach the desired reading level.

Message (clarity)

- Limit content to a few key points
- Focus on “need to know” points
- Offer ways to learn more, including non-written options (hotlines, support groups, etc.)
- Be specific; don’t assume readers know what to do

Word Choice

- Use “living room” language
- Use 1- or 2-syllable words
- Avoid jargon
- The CDC provides a free “Plain Language Thesaurus” to help replace medical words (https://www.plainlanguage.gov/media/Thesaurus_V-10.doc)
- When you cannot replace a medical term, give a definition or example (e.g., “rheumatologic disease [pain in your joints]”)
- Use the exact same wording every time

Sentence Structure

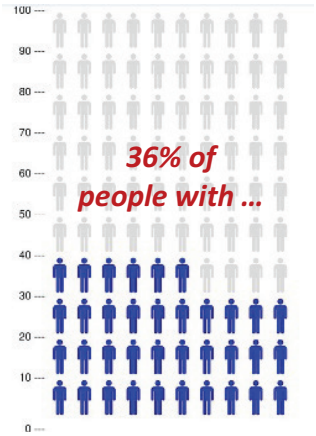
- Keep sentences under 10 – 15 words
- Use an active voice
- Use bulleted lists
- Avoid extra words like “very” and “actually”

Tone

- Use “you” and “your” to address the reader
- Use positive language

Numbers

- Very big (over 100) or very small (less than 1) numbers can be hard to imagine
- Use absolute (e.g., “8 out of 16”) not relative (e.g., “twice as many”) terms
- Use pictures and stories. E.g., iconarray.com converts risk or frequency into graphics:



Format, Layout, and Graphics

- Start with key points and repeat them at the end
- Use headers
- Use short bulleted lists and group related items
- Build in white space and use graphics
- Left justify paragraphs
- Use 12-point or larger type, and at least 1.5 space between lines
- Limit use of bold, italics, and all capital letters
- Use underlining to draw attention to key points

Literacy Level

To assess grade level:

- The best option is to put materials through Health Literacy Advisor™. This is licensed software, which must be purchased. It may be worth the investment for your organization if you will be writing multiple documents.
- The Flesch-Kincaid grade score can be obtained free of charge using “Readability Statistics” in Microsoft Word.
  - Click on Review → Spelling & Grammar → Readability Statistics → Flesch-Kincaid grade level
  - Please note, this method often underestimates a document’s reading level, so assume the real grade is a bit higher.

- Other scoring tools* include:
  - PEMAT – Patient Education Materials Assessment Tool, more available at https://www.ahrq.gov/ncepcr/tools/self-mgmt/pemat.html
  - SMOG – Simple Measure of Gobbledygook, more available at http://prevention.sph.sc.edu/tools/SMOG.pdf
  - SAM – Suitability Assessment of Materials, more available at https://ogg.osu.edu/media/documents/health_lit/WRRSAM.pdf and http://aspiruslibrary.org/literacy/SAM.pdf

*Note that these tools go beyond basic grade level scores to provide a more in-depth assessment of how understandable a document is.

Practice Tips: Remember to keep the patients' needs in mind, as they are your primary audience:

- Don't assume the health literacy management embedded in your EMR is enough. Take the steps above to assess readability for yourself.
- Be aware of your own population.
  - For example, if the average reading level in your community is 3rd grade, that should be your target. Try to use even more pictograms, etc.
- Writers may be conflicted about the audience, trying to serve both the provider and the patient.
  - For example, an asthma action plan that includes all possible medications makes completion easier for the provider but much more difficult for the patient.

C. Spoken Communication Strategies

Improving spoken communication includes strategies that fall into two main categories: conveying information and encouraging questions.

Conveying information: There are strategies providers can use to ensure their oral communication is clear:

- Teach Back – Have the patient recap what you've discussed *in their own words*. Revisit points that were unclear. It might take some practice to incorporate Teach Back seamlessly into your conversation. Be clear that you carry the burden for successful communication, not the patient. For example: "I want to make sure I did a good job of explaining this. Tell me how you will educate your spouse on the new plan."
- Use plain language
- Limit the teaching points to 3 points per session
- Chunk and Check – break information into smaller pieces, confirm patient understanding before moving on

Encouraging questions: Encouraging questions are a little different, as they empower the patient and enhance communication between patient and provider.

- Ask Me 3® – a structured format that helps guide a patient in knowing what to ask https://cdn.ymaws.com/www.npsf.org/resource/resmgr/AskMe3/AskMe3_HealthLiteracyTrainin.pdf
  - What is my main problem?
  - What do I need to do?
  - Why is it important for me to do this?
- Providers should ask open-ended questions in general and especially when inviting questions from patients:
  - "What questions do you have?", *not* "Do you have any questions?"

If you are part of a larger health care organization, look to your institution's Patient Experience, Patient Education, and Health Literacy consultants to help you with this work.

X. CO-PRODUCTION

Introduction

In this section, we will briefly address co-production. Like health literacy, co-production works well with QI to improve the care experience for patients and their families. Co-production is a design process in which patients, families, and providers work together to develop the best system of care.

Essential Learning

This kind of collaboration was inspired by changes in civil rights and social care in the US during the 1970s. Political economist Elinor Ostrom explored the impact of a disconnect between service delivery and users, based on her observations that police lost their relationship with community members when they switched from foot to car patrols, which coincided with an increase in crime rates – their direct interaction had helped keep crime at bay. Ostrom identified several public service areas in which results were influenced more by human connection than by high expenditures – i.e., both parties perform better in a reciprocal relationship. This idea was spearheaded in the justice system by civil rights law professor Edgar Cahn, who impacted crime and repeat offender rates by including families in the judicial process.

The concept made its way into health care through Anna Coote's work at the King's Fund highlighting the inherent symbiosis between doctors and patients. This approach is at odds with the market-focused model in which interventions are done *to* or *for* patients, rather than *with* them. A more collaborative, participatory approach has regained favor as the public and the health care industry look for more effective, sustainable models.

Key aspects of co-production include the belief that every person adds value, with *all* involved working as equals. The use of data and end-user perspectives that are fundamental to co-production are also hallmarks of QI, making these two approaches to improving care delivery highly compatible.

XI. Resources and References

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Available Resources

AHRQ Health Literacy Universal Precautions Toolkit, https://www.ahrq.gov/health-literacy/quality-resources/tools/literacy-toolkit/index.html

Institute for Healthcare Improvement, http://www.ihi.org/

Helen Osborne, https://healthliteracy.com/helen-osborne/

Population Health Improvement Partners, https://improvepartners.org/

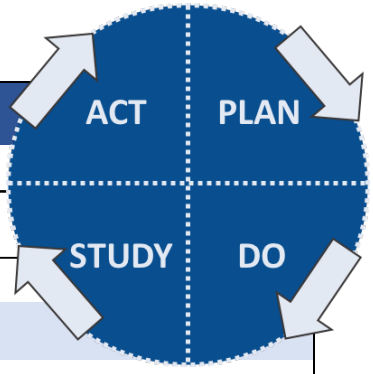
Reliability Science, http://www.ihi.org/Topics/Reliability/Pages/default.aspx

Appendix

SAMPLE QUALITY IMPROVEMENT PROJECT PROPOSAL FORM

Name of Project
Submission Date
Team Members
Provider or Leadership Champion
Data Source *What are the ways this data can be measured? What is the evidence there is a problem (baseline data if it exists)? Please attach.*
Project location *E.g. department/floor/site*
Project Sharing/Scholarly Work *Where do you want to share this project learning? E.g. name of conference or journal*
Project Description
Why/Rationale *Please include a reference abstract demonstrating that the improvements proposed are evidence-based*
Who/Where *Target population and location*
What *Describe the improvement you want to make*
How *Ideas for improvement*
When *Timeframe for project*
Describe the potential impact for this project *Check all that apply. Add comments if necessary.* ☐ Improves patient safety ☐ Decreases the cost of care ☐ Improves efficiency/saves time ☐ Improves patient satisfaction ☐ Improves staff satisfaction ☐ Improves patient outcomes ☐ High teammate benefit ☐ Other

Model for Improvement PDSA Planning Worksheet



Team Name: _____

Cycle: _____ **Date:** _____

PLAN

Objective for this cycle:

Questions:

Predictions:

Plan for change or test: who, what, when, where:

Plan for collection of data: who, what, when, where:

DO

Carry out the change or test. Collect data and begin analysis. Describe observations, problems encountered, and special circumstances.

STUDY

Complete analysis of data. Summarize what was learned.

ACT

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

PROJECT MEASUREMENT PLAN

Aim Statement *Include here what you plan to improve, by when, the overall reason for improving, and with what tools:*							
Goal	**Measure Name & Operational Definition** *What type of measure?* • *Outcome* • *Process* • *Balancing*	**Data Collection**					
		Sample Size *How many?*	**How will it be collected?** *Process & data collection instruments to be used*	**How often?** *Frequency*	**When will it be collected?** *Time period*	**Who will collect, analyze, & graph the data?**	**Notes**

Measurement Plan from Population Health Improvement Partners, www.improvepartners.org.

SUSTAINABILITY CHECKLIST: MAINTAINING YOUR SUCCESS

Developing systems to sustain high quality care requires ongoing effort. Maintaining these systems assures that all of your hard work pays off in the long run. Use the following checklist to assist you in sustaining your improvements.

- ☐ **Our senior leader(s) are involved in keeping everyone focused on sustaining our improvements**. They are knowledgeable about the program and communicate about its importance and its results at staff meetings, as well as informally day-to-day.

- ☐ **We have a program coordinator or team** who is responsible for reviewing our data, designing ongoing improvements, and facilitating communication among the staff.

- ☐ **We make sure our systems are independent of the people involved** by informing/involving all staff, making training part of our new employee orientation, and cross-training staff for critical roles related to the program.

- ☐ **We include criteria related to the program in our recruiting and hiring practices** to make sure our care teams have the knowledge, skills, and abilities needed to sustain our improvements.

- ☐ **We communicate our improvements to our patients** in order to involve them in sustaining the improvements and create additional accountability for our program.

- ☐ **We create, adapt, or use existing tools** to make it easier for everyone to follow the procedures and systems we have established.

- ☐ **We continuously measure results** in order to know for ourselves: "Is it still working?" However, to simplify measurement, once our goals are reached we shift to an auditing mode (decreasing the frequency and quantity of data collected) so that data collection is easier to sustain.

- ☐ **We share our success with all of our staff**, including sharing success stories, data, and celebrating our achievements.

Checklist from AHEC QI 101, a Quality Improvement course sponsored by Charlotte Area Health Education Center.

SPREAD CHECKLIST

Establishing structures and practices that promote and support successful spread of changes throughout your organization is essential for continuous improvement. Use this checklist to assist in spreading your improvements:

ORGANIZATION

- ☐ **Leadership.** Leadership (executives) is engaged; proposed changes are aligned with strategic plan; incentives have been identified; and dedicated time has been established for improvement team members.

- ☐ **Better Ideas.** The case for change is established; data to support changes is available; benefits across groups are identified; and steps involved in adopting changes are documented.

- ☐ **Set-up.** Key groups and target population are identified; roles for previously successful teams are established; and clear spread strategy is identified (communication plan, IT, etc.)

COMMUNICATION

- ☐ **Communication.** Plan for raising awareness is established; communication channels are identified; and a strategy for transferring technical knowledge is selected.

STRENGTHEN THE SOCIAL SYSTEM

- ☐ **Key messengers.** Those responsible for explaining the new system to the target population are engaged; communities of practice are established; and strategies to support both groups are identified.

- ☐ **Communities and Technical Support.** Successful sites have a strategy for helping new teams; necessary tools and documents to support change are readily available and organized, including strategies for overcoming barriers in target population

- ☐ **Transition Issues.** Strategies for ongoing leadership support and connection to the front-line teams have been identified.

MEASUREMENT & FEEDBACK

- ☐ **Measurement and feedback.** A plan for measurement is established, including staffing to support measurement activities and a system for two-way communication and feedback is established.

KNOWLEDGE MANAGEMENT

- ☐ **Knowledge Management.** A plan for capturing, documenting and organizing new learning on the changes, the spread process, and overcoming barriers is in place.

Checklist from AHEC QI 101, a Quality Improvement course sponsored by Charlotte Area Health Education Center.

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