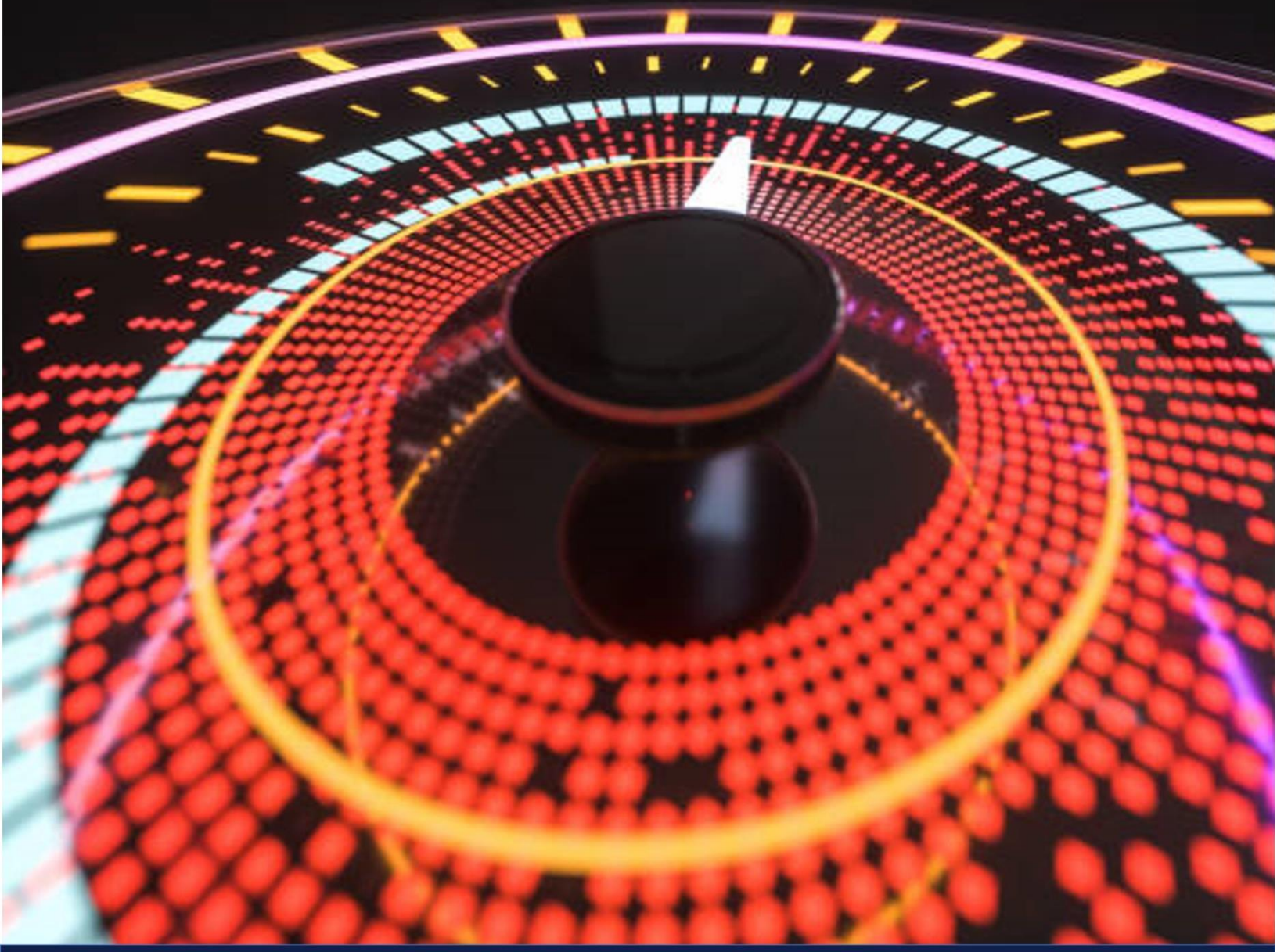
NEW YORK STATE | Department of Health | Bureau of Emergency Medical Services and Trauma Systems

NYS Quality Improvement for Prehospital Clinicians: The New York State Manual



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INTRODUCTION

In 1997, New York State Public Health Law Article 30 Section 3006 gave a framework, and mandate, for an ongoing system to monitor and evaluate the quality and appropriateness of prehospital emergency medical care. This framework and mandate were to pursue opportunities to improve patient care and to resolve identified problems. This manual provides common ground for individuals, agencies, and systems involved with EMS to navigate the quality improvement process.

This manual builds on the work of all those who came before us in the New York State Department of Health Bureau of EMS (NYS DOH BEMS) and the State EMS Council (SEMSCO); they created the path we now travel down. We would like to acknowledge and recognize their efforts in developing and updating a quality improvement manual and process for New York State EMS. Just as quality improvement is an ongoing process from a clinical perspective, so too is the understanding and development of the processes themselves.

This version is a compilation of best improvement practices from both prehospital emergency care and broader healthcare resources. Advances in technology have greatly improved our ability to collect, analyze, and interpret data in a more robust and faster manner than ever before. Continual changes to the EMS landscape, quality improvement methodology, and data collection technologies, require this manual to be a living document. It will reside on the Bureau of EMS website, updated and modified as needed so it undergoes its own continuous quality improvement development process. Throughout the manual, there are embedded links to other organizations, processes, data, and best practices. These provide further thoughts, insight, detail, and ideas that translate into the unique EMS environment.

Starting or reimagining a quality improvement program may seem daunting, overwhelming, or even unnecessary. But it does not have to be. This manual will provide you guidance and information to get you started, which is the biggest step. No matter how small the process improvement project you undertake is, realize that you have joined many others in working to improve the care our systems provide.

Finally, you do not need to do this work alone. Collaborate with other providers (of all levels), EMS agencies (of all types), hospitals, and system resources (Regions, Regional Councils, Program Agencies, Course Sponsors, etc.) to help inform your project and process. Process improvement experts can be found in many industries; their input can help you improve as well.

This manual will attempt to summarize most of the quality improvement literature and convert it into EMS. The modern quality movement's history or a comprehensive list of all approaches are not (and cannot be) included. The document contains links that provide readers the chance to explore the information provided by other trustworthy organizations in order to learn more.

What exactly do the terms quality assurance (QA) and quality improvement (QI) mean?

Health care quality is "the extent to which health services for individuals and populations maximize the likelihood of desired health outcomes and are compatible with current professional knowledge," according to the National Academy of Medicine. (1) In general, the objective of an EMS quality improvement program is to enhance patient and community health outcomes by enhancing the healthcare system to make it safe, efficient, timely, patient-centered, and equitable. As a framework for enhancing the performance of the healthcare system, the IHI Triple Aim specifies three areas of focus:

the patient experience of care, population health improvement, and a decrease in the per capita cost of healthcare.

Currently, when EMS agencies talk about "quality" work, they're talking about Quality Assurance (QA), which looks at things after they happen. Eliminating undesirable results below a predetermined threshold is QA's main goal. QA looks at specific incidents but ignores systemic concerns at large. However, in the grand scheme of things, if we think about the range of the quality care we provide, eliminating only the subpar care does not result in the sustained excellence that is our goal [Figure 1A]. Quality Improvement is a forward-looking and ongoing process, on the other hand, that seeks to enhance the process of care and shift the entire curve in the direction of excellence [Figure 1B]:

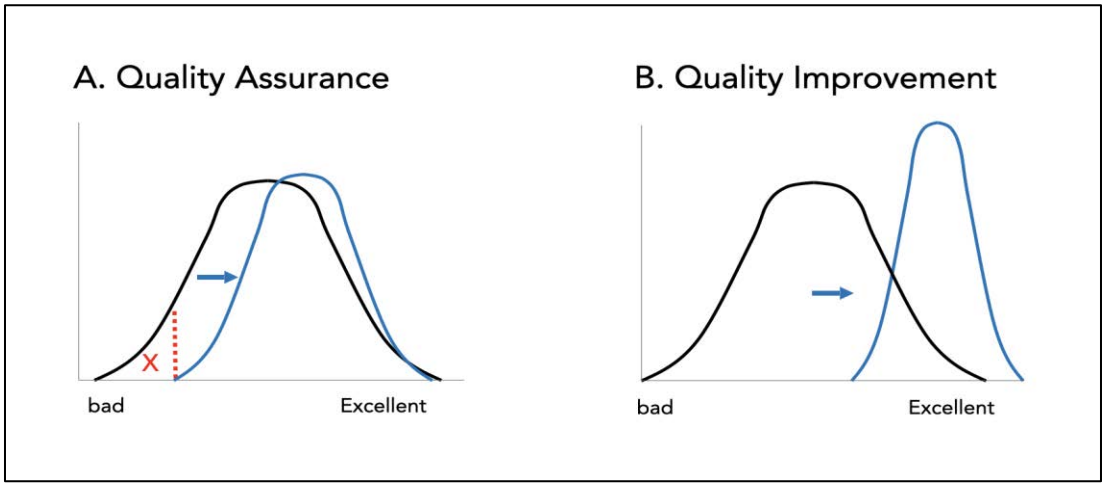


Figure 1: The difference between Quality Assurance and Quality Improvement

QI and QA are integrated within the larger context of quality management, which is the process of supervising all activities and tasks necessary to uphold a targeted degree of excellence [Figure 2].

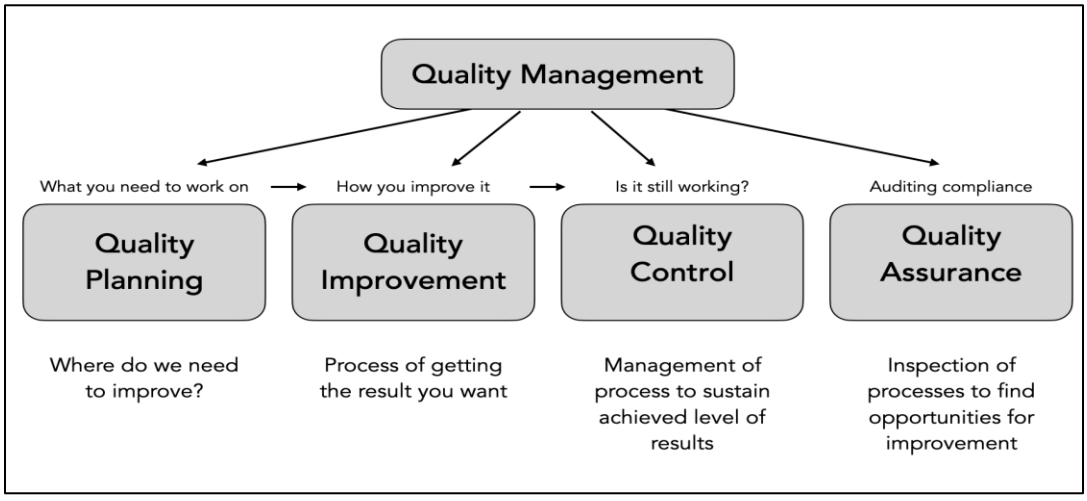


Figure 2: Outline of Quality Management

The goal of quality improvement is achieving a system design that eliminates the need for QA.

WHERE DO I BEGIN? CLARIFICATION OF A PROBLEM

The Institute of Medicine has outlined six areas for healthcare system improvement:

1) *Safety*: reducing harm and medical errors;
2) *Effectiveness*: matching care to research evidence;
3) *Patient-centeredness*: honoring individual patients with respect for patient choice;
4) *Timeliness*: reducing wait for both patients and providers;
5) *Efficiency*: enabling appropriate resource utilization with reduction of waste; and
6) *Equity*: reducing racial and ethnic disparities in healthcare.

This framework presents numerous options for improvement initiatives. The truth is that this can seem so wide when you first start doing QI work that it can be overwhelming. So where do you even begin? Actually, it's simple: tackle each issue one at a time.

Today's EMS typically learns about issues in one of two ways:

As a best practice, we assess system-wide data to gauge our success (we will dive into this in much more detail in the section on QUALITY MEASURES below). We evaluate our performance and consider whether it meets our desired standards. For example, keeping in mind that prehospital blood glucose measurement is an important part of prehospital stroke care (as it both identifies reversible causes of stroke mimics and speeds up subsequent care), we can assess whether our organization routinely measures blood glucose in patients with suspected stroke by. If our organization isn't consistently accomplishing this, we have identified an important issue in need of improvement.

QA procedures are one of the more typical methods used to identify issues. We need to approach issues from a system perspective in order to move from QA to QI. "Most serious medical errors are committed by competent, caring people doing what other competent, caring people would do," according to Donald Berwick of the Institute for Healthcare Improvement. (4) The "traditional" perspective on adverse events in medicine holds that only poor and inexperienced practitioners make mistakes, and that they should be fired, demoted, or retrained. Over time, this approach, often known as "name, blame, and train," does not increase patient safety. If we do not alter the system, eventually someone else will make the same mistake.

Approaching QA from a system perspective requires identifying system factors that influence the outcome. A useful tool to guide this approach is the Fishbone diagram [Figure 3], which enables you to systematically identify these factors.

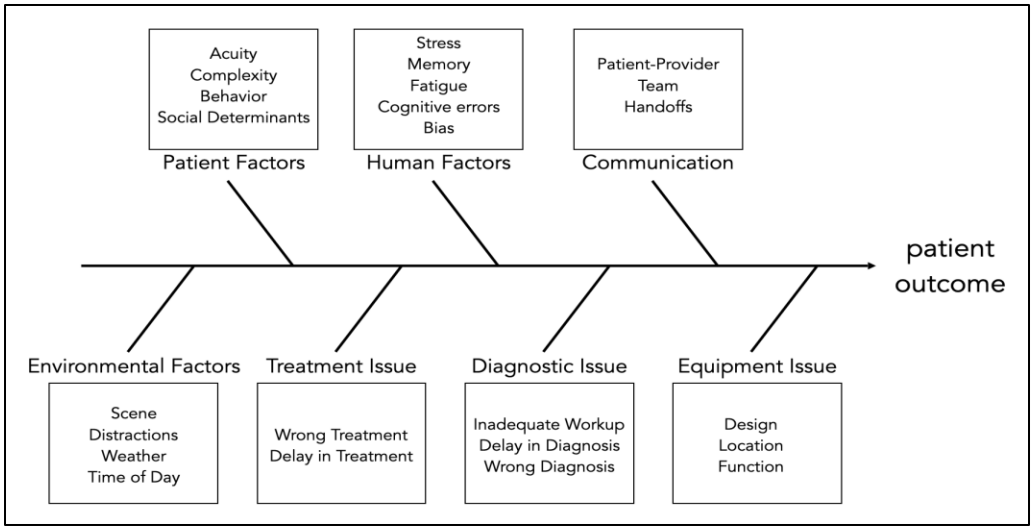


Figure 3: Fishbone Diagram

The benefit of using this method is that it makes it easier to pinpoint the issues that underlie errors and serves as a springboard for determining just how widespread the issue is. Consider the following scenario.

The local emergency department notifies you that your EMS service brought in a 54 yo male as a stroke alert with right sided weakness and altered mental status. He had a seizure on arrival to the Emergency Department. His blood sugar was checked and found to be 26 mg/dL. After administration of IV dextrose, his neurologic symptoms resolved. You find out by reading the EMS Patient Care Record that no prehospital blood sugar testing was done.

If you review this case and remediate a single EMS clinician, it will not change the system. If you examine your system-wide performance of checking blood sugar on patients with altered mental status or stroke symptoms, you may find that this is not done as often as it should be. Improving this at the system level can help prevent the next adverse outcome and improve care for patients throughout the system.

People sometimes choose their initiatives by starting with a solution rather than a problem, which is a common mistake in quality improvement. As an illustration, someone might desire to implement a new piece of equipment, new service line, training program, etc. It is crucial to begin with an issue that needs to be solved rather than a problem that needs a solution. The answers that result in actual progress will frequently surprise us, as you will see when we examine frameworks for creating improvements below.

THE SCIENCE OF IMPROVEMENT

Even when we find an important problem, expertise and experience in EMS alone are insufficient to make significant improvements to EMS operations, clinical care, and ultimately patient outcomes. Subject matter expertise can help define the goals of improvement efforts and identify critical components of achieving those goals. Making actual changes that result in sustained improvement requires different expertise. For example, as a community, we may decide that we want to improve neurologically intact survival for cardiac arrest. As professionals we know that that improving bystander

CPR and compression fraction are important to meeting this goal. However, finding ways to actually improve bystander CPR rates and verifying their success is far more complex. Reflecting on our own experiences of organizational change, most of us can find truth in the following statement: "Thinking about doing something better is often easy; actually making a change usually is not." (*5*)

Deming's System of Profound Knowledge

While subject matter expertise is essential to making changes that are practical and result in improvement, it is equally important to have knowledge of improvement science to plan, implement, and evaluate effective change. W. Edwards Deming was an American statistician who defined a framework of thought and action for leaders who wish to improve their organization. He called this framework the "System of Profound Knowledge"[SPK]. The ability to make effective change that results in improvement relies on both subject matter expertise and the ability to apply the SPK [Figure 4].

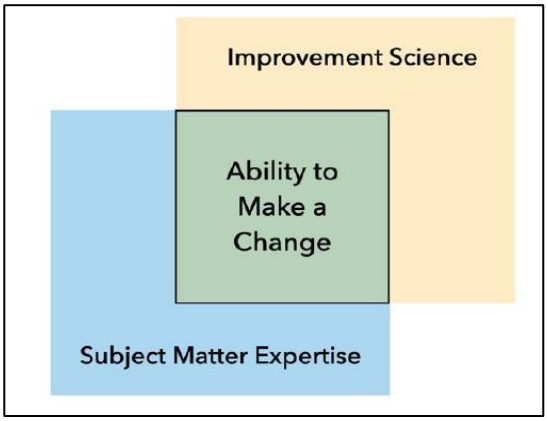


Figure 4: The ability to make a change requires both Subject Matter Expertise and an Understanding of Improvement Science. (Modified from The Improvement Guide by Langley et. al. (*5*))

The System of Profound Knowledge consists of four components which act as lenses through which to examine and assess improvement initiatives:

1. Appreciation of the system: leaders must consider how any individual change affects the entire system.

The Central Law of Improvement is that "every system is perfectly designed to deliver the results it produces."(*5*) Systems are made up of equipment, people, and processes that help produce an outcome. Optimizing outcomes has less to do with optimizing the individual components of the system than it does with optimizing the overall system that is ultimately responsible for patient outcomes.

This has direct implications for bringing about lasting change. First of all, it widens the range of options for how to enhance patient outcomes. Continuing the example of neurologically-intact cardiac arrest survival, if the goal is to improve time to CPR initiation, this may be better solved by improving the process of dispatcher-assisted CPR through pre-arrival instructions than by increasing response times. Second, it prompts leaders to consciously consider the unintended consequences of the change they are attempting to implement. For example, a goal of increasing IV placement success rates by rewarding

providers who achieve a high percentage of success might have an unintended consequence of fewer attempts in more challenging patients who may actually need IV access. Or, it may increase false documentation rates of actual IV attempts made. A discussion how to measure unintended consequences in in the MEASUREMENT STRATEGIES section.

2. Understanding of variation: Variability in outcomes is an inevitable part of every system, including EMS. No two patients are exactly the same and no two patient encounters are exactly alike. There are, however, two general types of variation that require different approaches to make changes that result in sustained improvement:

   Common cause variation: Random variation that is built into the system.

   Special cause variation: unexpected events that affect outcome.

The medication error example below highlights differences between common cause variation and special cause variation.

The Feel Good EMS Organization (FGEO) tracks the prevalence of medication errors. According to FGEO, there is a high rate of both underdosing and overdose of pediatric patients' drugs across the board. While the rate varies from month to month, overall, there seems to be some random variability. As random variation that reflects the underlying system, this is an illustration of **common cause variation**. Dosing pediatric medications is a complicated process that includes weight measurement, calculations, and several delivery routes. A comprehensive overhaul of the system for administering pediatric drugs is necessary to reduce the frequency of medication mistakes. One potential solution would be to introduce weight or age-based estimation tools to eliminate calculations using dosage cards or other cognitive aids. (6)

The adverse effects or medication errors associated with a certain high-risk medication, however, grew significantly as we followed medication errors over time. This is an illustration of a **special cause variation** and should prompt improvement specialists to investigate precipitating factors. Investigation revealed that the rise in medication errors started when drug concentrations were changed as a result of a national drug shortage.

There is a propensity in EMS to emphasize special cause variation (or blaming of individual providers, which is not only unhelpful, but harmful). However, system-level improvements are required to enable long-term, significant, sustained transformation. It is vital to track data over time in order to successfully facilitate system improvements. This will be covered in the section on DATA COLLECTION AND INTERPRETATION.

3. Building knowledge:

Deming's view of knowledge includes that concept that organizations learn only when the people within them learn. Knowledge cannot be built without the ability to theorize and make predictions. The fundamental idea of knowledge development is that a change is made based on a prediction of what might happen. However, a flawed model of learning assumes a cause-and-effect relationship between two events because they occurred close to one another when, in reality, they occurred only by chance. To prevent high-risk medication dosing errors, quick-reference cards that fit on badges for medications such as fentanyl, ketamine and midazolam are distributed. It's anticipated that the cards will result in

fewer dosing errors. Improvement experts do not just assume that the intervention accomplishes its goal. Instead, medication error rates are continually measured, and the intervention is assessed to determine if any changes might help us better achieve our goal.

4. Psychology of Change

The success of a system and any quality improvement initiative depends on how well it can involve the system's frontline clinicians. The success of improvement efforts depends on those making the changes understanding how people interact with the system and how they are motivated (or not) to make and maintain change. One key psychological consideration change specialists should be aware of is that people are more likely to commit to a change that they have helped create it. The people who really carry out the job within the system ultimately determine whether reform initiatives are successful or unsuccessful, and the most effective projects involve their input from the very beginning.

THE MODEL FOR IMPROVEMENT:

A FRAMEWORK FOR EFFECTIVE CHANGE

The Model for Improvement is a tool for accelerating improvements in projects. It consists of three guiding questions and a continuous cycle of re-evaluation that helps build knowledge about the system and measure whether improvement occurred. [Figure 5]

Figure 5: The Model for Improvement (Modified from The Improvement Guide by Langley et. al. (*5*))

Change does not happen overnight. Change should be seen as a journey instead. "**What is trying to be accomplished?"** should be the first question anyone who is engaged in creating lasting change has to ask. This may sound straightforward, but it requires careful consideration, including being specific and realistic. How to create a good project and aim will be covered in the section on CHOOSING A PROJECT AIM.

Once the goal is clear, objective criteria must be developed to determine whether it was achieved. This is a quality measure. A quality measure is critical to answering the second question, "**How will we know if a change is an improvement**?" To know if a change leads to an improvement, measurements must be taken and assessed. This makes it possible to assess how well the efforts have worked. Answering this question during the project development phase is essential to assuring that the project is something achievable within the system. How to develop quality measures will be discussed in the section on MEASUREMENT STRATEGIES.

Improvement champions are prompted by the third question, "What change may be made that will result in an improvement?" to consider how a system might be altered to generate a different outcome. Frontline clinicians should be included in this discussion since they are in a unique position to observe how the system affects the outcome. How to create change theories is covered in the section on DEVELOPING A CHANGE.

Every change must be preceded by a prediction, according to Deming's System of Profound Knowledge, even though not all changes lead to improvement. The opportunity to learn about what works and what doesn't is provided by each PDSA cycle so that more (hopefully effective) changes can be made in the future. The Model for Improvement is an iterative process that can be summed up as the Plan-Do-Study-Act (PDSA) cycle which will be detailed in the chapter on PDSA CYCLES.
Working on quality improvement projects is both challenging and rewarding. It necessitates concentration and a dedication to failing forward. In many QA/QI programs, changes are implemented but the improvements—or lack thereof—are not continuously measured. Working on quality improvement projects necessitates turning on the light, identifying areas for improvement, and deciding to take action. A strong framework is provided by the Model for Improvement, which not only promotes change but change that leads to improvement.

WHAT ARE WE TRYING TO ACCOMPLISH? CHOOSING A PROJECT AIM

Once a problem has been identified and chosen for improvement, an aim statement should be created. Developing an aim statement helps guide the QI process and maintains the essence of the quality improvement process, which is to identify areas of excellence and identify areas in need of improvement. The aim statement serves as the primary point of departure to guide activities and lay the foundation for the PDSA cycle (Plan, Do, Study, Act).

An aim statement answers the question of "what is trying to be accomplished?" The QI committee should develop well defined, evidence-based, and patient centered outcomes that should be addressed by an improvement project. Goals and objectives in a successful AIM Statement should meet the SMART criteria for goals/objectives: Specific, Measurable, Achievable, Relevant, Timebound

The following guidelines, according to the Institute for Healthcare Improvement (2021), will assist in developing a strong aim statement. (7)

1. State the aim clearly
2. Include numerical goals that require a fundamental change to the system
3. Set stretch goals – a stretch goal can be thought of as unachievable or unrealistic, but if you improve even half of it, it's still a significant improvement. (*8*)

4. Avoid aim drift – in the example below, the number of patients receiving the appropriate assessment will be met 99%. Aim drift is the natural tendency to move the goal lower, to 90% or 85%, especially if the beginning compliance is low. To avoid this, begin each meeting by restating the goal and refocusing the team on the improvement objective.
5. Be prepared to refocus the aim

An example of a quality improvement project related to blood sugar measurement and documentation in suspected stroke.

What?	The baseline measurement and documentation of blood sugar in patients with suspected stroke at our agency is 52%. Our goal is to improve blood sugar measurement and documentation in patients with suspected stroke.
For Whom?	Patients with suspected stroke.
By When?	within 6 months.
How Much?	90% of all patients with suspected stroke will have a blood sugar measured and documented.
Full Statement	90% of patients with suspected stroke will have a blood sugar measured and documented within 6 months.

Template from National Institute for Children's Health Quality (2021) (*9*)

MEASUREMENT STRATEGIES: HOW WILL WE KNOW THAT CHANGE IS AN IMPROVEMENT?

Is change an improvement?

EMS quality improvement has always been difficult to measure. For quality improvement projects, creating a measurement plan can frequently help ensure that a project goal can be measured in a useful way. Without a measure, it will be extremely difficult to determine whether the project goal has been achieved and whether it has had an effect on the care given. It may seem difficult to choose or develop a quality measure, collect the data, and organize it meaningfully. The main processes in developing a measurement strategy will be covered in this chapter, along with options to employ available resources to aid in quality improvement initiatives.

What is a quality measure?

Quality measures are standards for measuring the performance of healthcare providers to care for patients and populations. (*10*) Quality measures can identify important aspects of care like safety, effectiveness, timeliness, and fairness.

The combination of quality measures and their measurement provide a more complete picture of the overall quality of care being delivered because each quality measure concentrates on a different component of healthcare delivery. Quality measures address many parts of healthcare, including:

- Health outcomes
- Clinical processes
- Patient safety
- Efficient use of healthcare resources
- Care coordination
- Patient engagement in their own care
- Patient perceptions of their care
- Population and public health

Creating a quality measure statement:

Title: A title and description of what the measure relates to is the first component of a quality measure statement.

Denominator: The given population to which a measure applies (i.e., the number of people who should have received an action or service). The denominator is the lower part of a fraction used to calculate a rate. (Example: Patients greater than 18 years of age with atraumatic chest pain).

Numerator: The subset of patients in the denominator for whom a clinical action or service has been provided or for whom a particular outcome has been achieved (i.e., the number of people that actually received an action or service). The numerator is the upper part of a fraction used to calculate a rate. (Example: Patients who have an ECG performed.)

Exclusions/Exceptions: The terms exclusions and exceptions are often used interchangeably, although there are subtle differences. An exclusion is a condition that removes a defined group of patients from the denominator because the measure would not appropriately apply to them. Exceptions depend on clinical judgment and remove patients from both the numerator and denominator. Exceptions are due to medical reasons (e.g., patient is in cardiac arrest), patient reasons (e.g., patient refuses) and system reasons (e.g., ECG machines are broken). (*11*)

The National EMS Quality Alliance (NESMQA) has developed eleven quality measures. Although it is recommended that local EMS agencies concentrate on these widely established quality standards, nothing prevents agencies from launching additional quality improvement initiatives and creating their own. Below is an example of a NEMSQA quality measure, including the title, description, numerator, and denominators. It is important to note, that some measures may have more than one denominator depending on the population of interest (all patients, patient over 18 years of age, pediatrics (2-17 years old), etc.).

Measure ID	Measure Title	Measure Description	Initial Patient Population	Denominator	Numerator	Denominator Exclusions	Denominator Exceptions	NQS Domain	Measure Type	Traditional or Inverse	Scoring Method
Asthma-01 **Previously Pediatrics-02*	Administration of Beta Agonist for Asthma	Percentage of EMS responses originating from a 911 request for patients with a diagnosis of asthma who had an aerosolized beta agonist administered.	All EMS responses originating from a 911 request for patients greater than or equal to 2 years of age with a primary or secondary impression of asthma exacerbation or acute bronchospasm.	**Population 1:** EMS responses in the initial population **Population 2:** EMS responses in the initial population for patients greater than or equal to 18 years of age. **Population 3:** EMS responses in the initial population for patients age 2 to 17 years of age.	**Numerator for Populations 1-3 (Calculate 3 Rates):** EMS responses patients who had an aerosolized beta agonist administered by an EMS professional during the EMS response.	None	None	Clinical Process - Effectiveness	Process	Traditional	Proportional

Measurement Statement

A measurement statement is a declaration of a plan to measure the impact of a project. It is a specific, numerical value that is used to describe how the change will be measured in service of the project aim. The vague ideas of improvement need to get transformed into a very specific, clear definition of what exactly is being talked about. To create a strong measurement statement, *operational definitions* need to be defined.

For example, if an EMS agency wants to improve blood glucose measurement in stroke patients, it is important to identify the specific population of interest. Is the focus on all patients with a primary impression of stroke? What about TIA? What about patients where stroke is documented as the secondary impression?

Types of Measures

There are categories of measures in quality improvement that capture specific aspects of care and resources for care.

System Measure	Stroke	STEMI	Lights & Sirens (Safety)
Outcome Measure	● Modified Ranken Scale at 3 months after stroke ● NIHSS at Hospital Discharge	● Mortality and morbidity due to STEMI	● Motor vehicle crashes ● Injuries to patients, EMS providers and the public
Process Measure	● FSBS by EMS ● Stroke Center Destination by EMS ● Documentation of LKW ● Documentation of prehospital stroke scale ● Prehospital stroke alert ● Prehospital scene time ● Time to thrombolytics or embolectomy	● EKG Performance ● Time to EKG ● ASA Administration ● Scene Time ● Prehospital STEMI Notification ● Appropriate Destination ● Time to thrombolytics or percutaneous intervention	● Lights and Sirens to the scene (Response) ● Lights and Sirens during patient Transport
Balancing Measure	● Over triage to stroke center	● Delay in other aspects of care ● Over triage rate leading to prolonged transport to the right facility which subsequently reduces ambulance availability in a community	● Response time for patients requiring critical intervention ● Patient satisfaction

System Measure: Measures of structure are the foundation of quality measurement. These measures evaluate different attributes—such as medical staff, resource availability, and policies. For example: ALS Units per Region

Outcome Measure: Outcome measures look at the intended—or unintended—effect of care on the patient and assess whether care goals were met. They answer the question, "what are the end results of the QI work?"

Process Measure: Process measures use evidence-based guidelines to assess the extent and quality of services provided to patients and incorporate evidence-based best practices into improvement efforts. They answer the question, "are we doing the right things to achieve the goals?"

Balancing Measure: These measures determine whether changes designed to improve one part of the system are causing new problems in other parts of the system. They answer the question, "are the changes being made to one part of the system causing problems in other parts of the system?" For example: does improvement in 12 lead acquisition, lead to delay in other aspects of care?

Because outcome metrics frequently rely on hospital-based data that are not always simple for EMS agencies to obtain, EMS frequently uses evidence-based process measures to evaluate the effectiveness of treatments. For example, evidence supports that the time from first medical contact to cardiac catheterization improves outcomes for STEMI patients, but if EMS agencies are not connected to a hospital system that shares outcome data it is difficult to assess whether improvement in care led to improved outcomes. Instead, evidence-based key process measures can be identified, like time to ECG, which can be easily tracked by EMS agencies and reduce on-scene time therefore reducing contact to catheterization time.

Measure Selection

To assist with choosing measurement strategies, the following 3 recommendations are provided:

1. Choose a project that can be easily measured. Create a well-defined measure statement with data elements that are straightforward to collect.

2. Choose a measurement strategy that aligns with existing quality measures built to work within the electronic medical record, for instance National EMS Quality Measures.

3. Identify a project of value that requires robust measurement strategy development but be prepared to devote time and resources to this effort.

Recommendations for Measurement Strategy

The following recommendations should be considered when collecting data.

Reduce the administrative burden for data collection

Make it as easy as possible for staff to collect data. If data is not easily captured electronically from prehospital care reports (PCR), consider developing a simple, specific data collection tool that can be easily completed. It should enable a focused review of a patient in the population of interest.

Improve the care (and the system), not just the documentation

Although improvement in documentation is often a side effect of a focused quality improvement effort, resist the temptation to fix the documentation alone. Having a quality project that "improves the documentation" or concentrates on inserting the data precisely where it needs to be in the PCR is not recommended.

Engage frontline EMS clinicians in measurement strategy

Frontline clinicians and supervisors have great insight into how to capture data. They are the people using the system and often will have answers to how best to inform the data strategy.

Utilize Existing EMS Measures

When possible, do not reinvent the wheel. There are existing measures that could be used as part of the measurement strategy that are already validated.

National EMS Quality Alliance (NEMSQA)

The goal of NEMSQA is to provide useful and applicable quality metrics that give EMS organizations access to resources for integrating into their local quality improvement. Numerous EMR/PCR vendors have included these measures in the tools they offer to their customers.

AHA Mission: Lifeline® EMS Recognition

The American Heart Association has developed the Mission: Lifeline EMS recognition program to showcase excellent STEMI care. They also sponsor Mission: Lifeline Stroke to recognize excellent care of stroke patients. Both the STEMI and Stroke programs connect EMS and receiving hospitals to coordinate care. AHA developed evidence-based metrics for both STEMI and Stroke to help measure agency and system performance. EMS agencies should review these and follow their examples and processes for other improvement efforts.

DEVELOPING A CHANGE: WHAT CHANGE CAN WE MAKE THAT RESULTS IN IMPROVEMENT?

Improvement fundamentally requires change, but not all change leads to improvement. Many of us have either led or been on the receiving end of changes that did not accomplish their aim. One of the most fundamental tenets of Improvement Science is the recognition that every idea for change starts as an untested prediction. We must build knowledge about our system and test predictions before forward with implementing them across the system. Fundamentally, the assumption should be that everyone is trying to give patients the best possible care. The role of leadership is to make doing the right thing this easier, either by removing friction or fueling the right action.

Changes that result in improvement affect how the task or activity is carried out, which is necessary if we are to improve the system of care we offer. (5)Changes that alter how the work or activity gets done in EMS usually fall into one of the following categories:

(1) *Eliminating waste, improving workflow and optimizing inventory:* For example, it is possible that blood sugar is not checked in stroke patients because the glucometer is kept somewhere not readily accessible, or blood sugar measurement has not become a standardized component of the assessment of a patient with stroke. Improving workflow would consider how we can either make the glucometer more accessible (remove friction) or standardize the incorporation of blood sugar measurement as part of stroke assessment (add fuel).

(2) *Better managing time*: Better managing time requires an understanding of processes that lead to the end product. For example, in the context of stroke patient management the process includes: patient assessment, stroke recognition, patient movement, hospital destination decision and prenotification. To improve blood sugar measurement, we need to acknowledge this process and that some processes (such as patient assessment and movement) compete for the EMS clinician's time. Effective solutions will consider how each team member spends their time over the course of care and identifies opportunities to reduce waste and substitute a care priority.

(3) *Designing systems to avoid mistakes*: EMS clinicians are human beings, and therefore will make errors. It is easy to forget to do something in the context of the uncertainty and time pressure of prehospital care, not to mention fatigue and middle-of-the-night work. Designing error-proof systems considers how to prevent these mistakes, for example, incorporation of checklists for prehospital stroke that include blood sugar measurement or charting software that makes sure that blood sugar is charted in the correct location for subsequent data extraction.

(4) *Changing the work environment:* The environment in which we work can impact performance. While EMS clinicians work and make decisions under stressful and conditions, the goal of leadership should be to create an environment where engagement in improvement is valued, high performance is recognized, and errors are seen as opportunities to learn and improve the system of care.

So how do we come up with change ideas to test? Ideas for developing changes that result in improvement usually derive from one of the following approaches (*5*):

1. *An Understanding of processes and systems of work*: Everything we do in EMS can be broken down into a process. The best way to understand how the process works is to "walk the line" with frontline EMS clinicians to understand their process of care, either with direct observation, detailed case review or simulation.

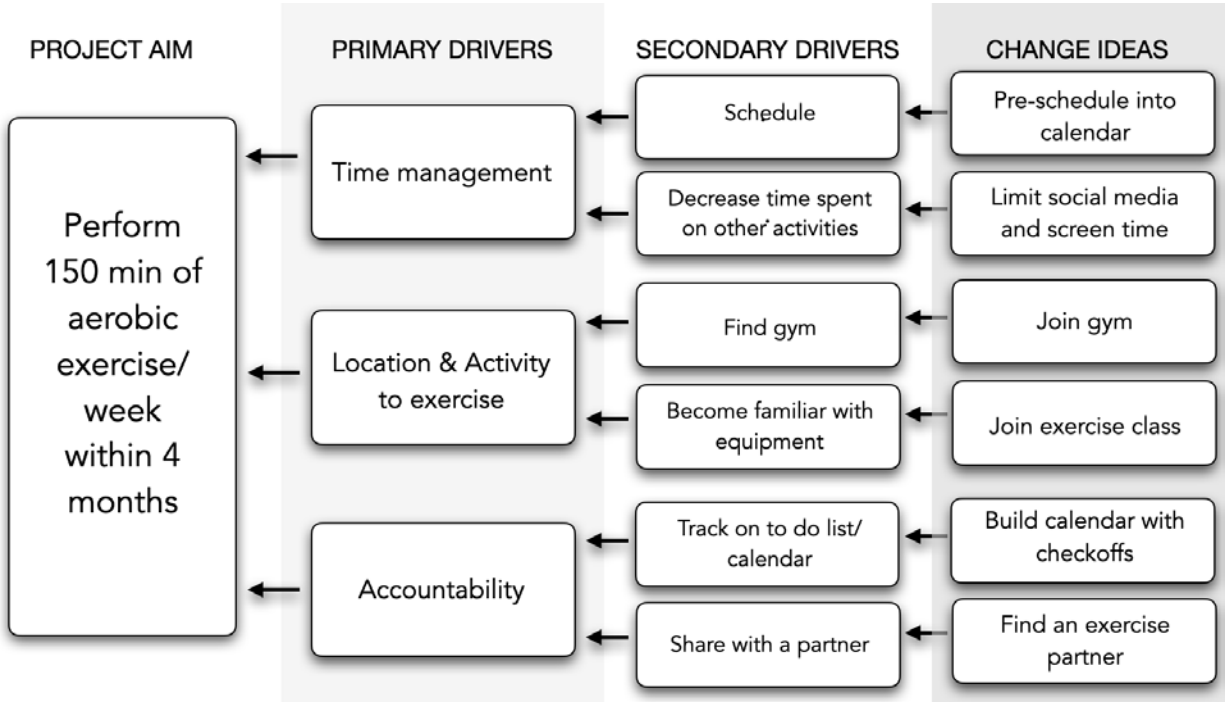
2. *Creative Thinking*: The goal of creative thinking is to challenge "the way we have always done it". There are many things that we do in a certain way out of habit or because we assume that they are fixed. Creative thinking asks what if we didn't have to do it this way? What new possibilities arise? What would be the ideal way to do this?

3. *Adapting known good ideas*: Is there a system or agency (or even individual provider) that already does this well? What did they do to achieve this level of performance? Is that something that we may be able to implement?

One of the most useful tools for developing change ideas is the Driver Diagram. A driver diagram visually displays what contributes to (or drives) the aim of the project. It is made up of key or primary drivers that directly contribute to achieve the aim, and the secondary drivers which are components of the primary drivers. The utility of a driver diagram is that it can be used by improvement teams to collectively and deliberately brainstorm change ideas, which may give rise to ideas that would not have been considered otherwise.

Example completed driver diagrams are shown for a non-clinical example (exercising regularly) and clinical example (improving blood glucose measurement and documentation) in Figure 6 below

A:



B:

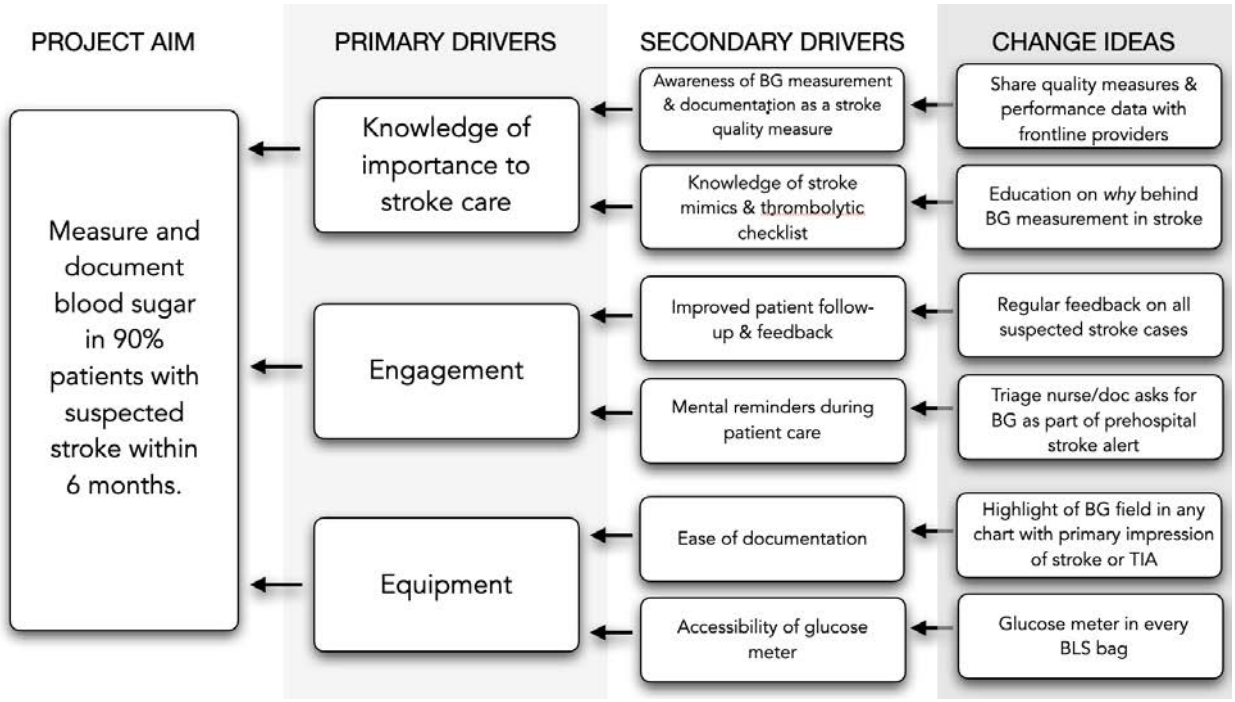


Figure 6: Sample driver diagrams for a non-clinical example of exercising regularly (A) and a clinical example of improving blood glucose measurement in suspected stroke (B).

PDSA CYCLES

One of the most common pitfalls of quality improvement projects is starting too big. What does this mean? Teams develop a change idea and move directly to implementing the idea, investing significant time and resources, only to find out that they did not solve the underlying problem. **Before implementing change ideas, they must be tested** and only fully implemented if they are successful. Without testing, change theories are only hunches.

The method for testing changes is known as the PDSA cycle.

The Plan Do Study Act (PDSA) consists of a logical sequence of four repetitive elements: **Plan**, **Do**, **Study** and **Act**:

- **Plan:** This requires making a prediction of what will happen and why and developing the plan for testing it including a plan for collecting the data.
- **Do**: Execute the plan and test the change. Document problems or observations.
- **Study**: Review the test, analyze the results and identify learnings.
- **Act** Based on what you learned in the study step - If the change did not work, go through the cycle again with a different plan using what you learned in the first round. If successful, incorporate lessons learned from the test into broader changes. Use what was learned to plan new improvements and begin the cycle again.

PDSA cycles should **start small** as many rapid, small-scale tests early-on inform more successful change later on [Figure 7]. In addition, PDSA cycles should engage stakeholders, including frontline clinicians, to foster engagement in the improvement project. Early PDSA cycles can focus on building knowledge about the system through interviews, direct observation or simulation that subsequently can be used to test changes. As understanding of the system is expanded and confidence built that a change would result in improvement, that change can be tested first on a small scale and then more widely if it demonstrates effectiveness.

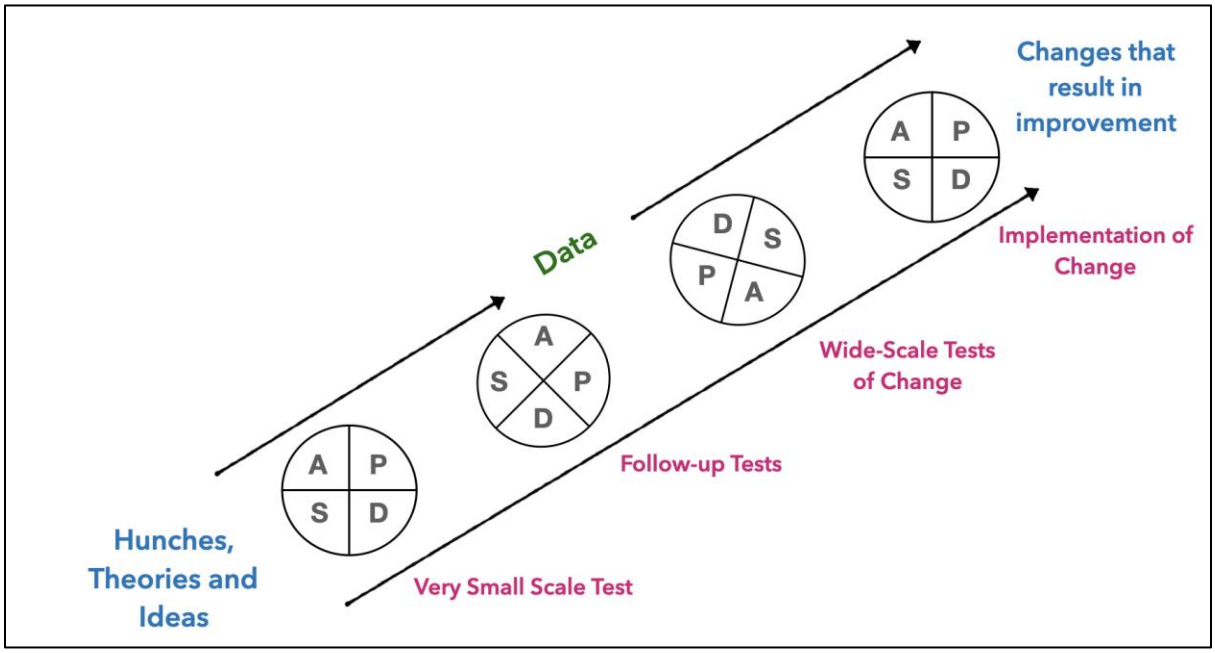


Figure 7: PDSA Cycle Progression. Figure adapted from Provost and Murray. The Health Care Data Guide: Learning from Data For Improvement. (*12*)

DATA COLLECTION AND INTERPRETATION

Data Collection:
It's crucial to pick data collection techniques that work for the targeted quality improvement project. Data should describe the desired outcome and the collection process should not be onerous.

Steps in the data collection process:

1. Selecting the data and assessing type of data
2. Determining a collection method
3. Developing operational policies and procedures
4. Validating and piloting measurement tools
5. Collecting the data
6. Improving your collection methods and monitoring data collected
7. Interpreting and displaying your data

Data: There are two types of data:

- Quantitative

- Qualitative

The methods used to obtain each differ, as do the types of analysis performed with the data.

Quantitative data is relayed in numbers and can be counted. It may be used to; describe a phenomenon such as characteristics of patients surviving out of hospital cardiac arrest; evaluate relationships against each other; evaluating cause and effect; and comparing the differences between groups.

> For example, the NEMSQA measure Hypogylcemia-01 is the percentage of EMS responses originating from a 911 request for patients with symptomatic hypoglycemia who received treatment to correct their hypoglycemia. The measure is clearly defined and is derived from a numerator, a number expressing EMS responses for patients receiving patient to correct their hypoglycemia during EMS response and a denominator, including, EMS responses in the initial population for patients greater than or equal to 18 years of age. (*13*)

Qualitative data is not easily quantified in numbers and is descriptive in nature.

> For example, you would like to understand your staff's views on issues regarding retention. You may choose to create a survey with a box for free-response answers to a question about how they think retention may be improved.

1. Selecting the type of data

Selection of data type is directly tied to the aim statement. It is important to ensure the data collected meets the requirements for answering the measurement aim. For example, identifying whether an average number of medication administrations is sought versus the number of differing patients who received medication will provide very different information. Ensuring the data links back to the measurement question is imperative and if the data isn't readily available, creating a mechanism to collect the data is important.

2. Creating and selecting a data collection tool

Creating or identifying a data collection tool can take many forms. It may be relatively simple, such as an attachment, an excel chart with downloaded data, or may be more complicated such as an online survey with branch points. There are numerous metrics and measurement tools that have already been validated. Creating a new measure or tool requires testing and validation prior to distribution.

Below are sample collection methods including their advantages and challenges:

Method	Purpose	Advantages	Challenges
Direct Observation	To gather accurate information about how a program operates, particularly about processes	● View operations as they are actually occurring ● Adapt to events as they occur	● Difficult to interpret behaviors ● Observations can be difficult to categorize ● Time consuming ● Expensive
Existing Data	To gather information on the target audience or the target measure	● Can provide much information in relatively little time ● Makes use of already gathered information ● Helps to chart changes over time ● Provides evidence about the problem ● Involves minimum effort or interruption of the target audience	● Can be out of date ● Data synthesis can be difficult ● May not address specific questions of concern ● Data is restricted what already exists ● Statistical data may not address perceptions of the problem, or may not address cause
Questionnaire, Survey, or Checklist	To quickly or easily get lots of information from people in a non-threatening way	● Can be completed anonymously ● Easy to analyze and compare ● Can administer to many people ● Many prior validated questionnaires exist	● Wording can bias target audience responses ● Might not get careful feedback ● Impersonal ● Sampling and statistical expertise may be needed
Focus Group	To explore a topic in depth through group discussion - such as gathering reactions to an experience or suggestion understanding common complaints, and so forth; useful in evaluation	● Can quickly and reliably get common impressions ● Can be efficient way to get range and depth of information in a short time frame ● Can convey key information about projects and programs	● Can take substantial time ● Can be hard to analyze and compare ● Difficult to schedule ● Requires an adept facilitator for safety and closure

(Adapted from C. McNamara, *http://managenthelp.org/evaluatn/fnl_eval.htm*)

3. Develop Operational Definitions and Procedures

1. Develop an operational definition for your measure as noted previously in MEASUREMENT STRATEGIES. This includes the specific conditions or characteristic criteria making it appropriate to include a particular case in the data.
2. Define the exact procedure for measuring the item at hand e.g., identify the specific behaviors being sought or actions that define start and stop times. Developing procedures includes identifying who is accountable and responsible for data collection and the expectations surrounding collection. This includes procedures for completion and submission of the measurement tool.
3. Design or obtain the measurement tool.
4. Create a routine monitoring plan and change plan for the period of data collection.

A note on Data Organization and Security

Personally identifiable data, as well as sensitive information, must be secured and current best practices should be followed. Controls around data include: (1) password protection, (2) encryption when located on portable devices, (3) limitations on access, (4) Identifiers, data, and keys (if appropriate) should be kept in a different secure location, (5) use of secure cloud-services, (6) when using third party vendors to include confidentiality agreements, and (6) a plan for and destruction of data after completion of the study.

4. Validate and pilot the measurement tool and procedures

Once a measurement instrument is selected, validation and piloting of the instrument is necessary. This ensures the tool being used accurately measures the item of interest.

Several prior validated measures are available to EMS agencies, some of which were discussed previously. If creating a novel measurement tool, it is necessary to validate the measure itself. Expertise should be consulted if validation is necessary.

5. Collect the Data

It is tempting to jump directly to data collection. But, planning first is necessary.

In the collection phase, the data is gathered according to the preceding plan. Once data is collected, it is cleaned, re-coded, and, if necessary, transformed.

> **Data cleaning** refers to the process of fixing or removing incorrect, duplicate, or incomplete data in the set.
> **Recoding** is a process to fix errors, such as skips in survey submissions.
> **Transforming** means converting the data from one format to another to facilitate data analysis.

6. Improving data collection and monitoring

During data collection it is necessary to ensure data collection guidelines are being followed. Periodically assess, on a preplanned schedule, the collection system and data obtained. If discrepancies are found the system should be reviewed, and a change plan initiated.(*14*)

7. Interpreting & Displaying Data

Communicating findings in a meaningful way is a key step in process change. There are a variety of methods of analysis and tools to present data. (*15*) A sample is presented below.

Run Charts: Graph data over time

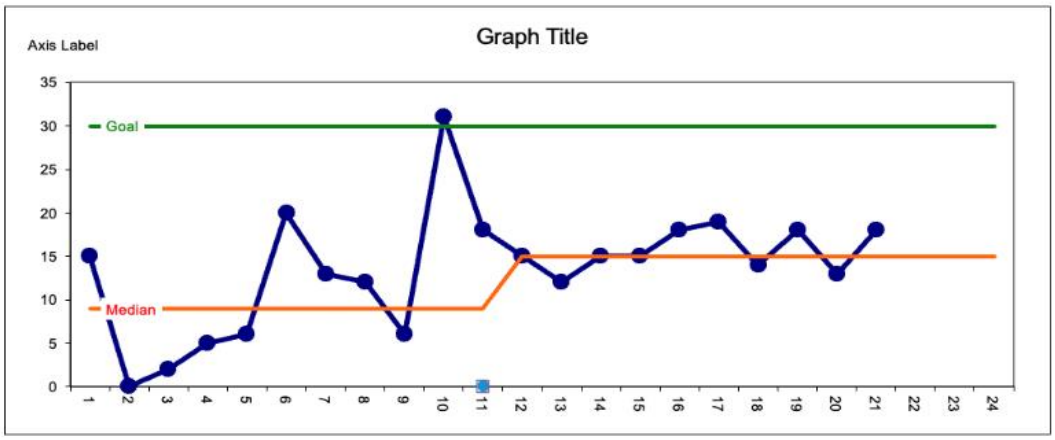


Figure 8: An example run chart

Control Charts: describe a measure over a period of time and can differentiate between common cause (for example change due to the implementation phase of a PDSA cycle) or random variation. Control charts typically contain an upper and lower limit. (*16*)

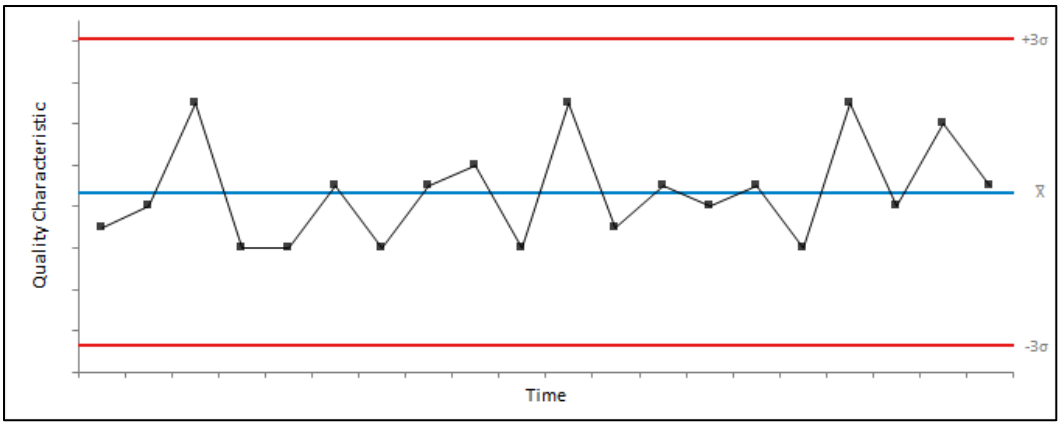


Figure 9: An example control chart

Dashboards: Display key measures over time. Dashboards provide insight to current performance and may include color indicators to describe data that meets a goal, is in process, or not meeting a goal.

Statistical Analysis & Displays: There are a variety of statistical analyses that may be used to interpret data. The specific tests are determined by the type of data, the number of items measured, as well as the design of the quality improvement project. The results of these tests may be presented in tables, graphs, or other visual displays. Consider seeking consultation and assistance for various analyses.

THE PSYCHOLOGY OF CHANGE

Change takes dedication and focus by both leaders and team members. Many in EMS leadership positions have ideas on how to create system-wide change. Leaders spend considerable time thinking of how changes, when implemented, will have outcomes that benefit patients, providers, their agency, and system. We challenge you to think of a recent change that you either had direct involvement in or witnessed within your agency and alas, failed.

First, reflect; What was the aim of this change? Who was it supposed to benefit? How was the change implemented? Why do *you think* the change failed and what was responsible for the failure? Perhaps the change sounded like a good idea but never gained formidable traction with the frontline staff. Maybe, the change was not well communicated and sustained. Who were the stakeholders that developed and implemented the policies of change, did they have the power to create change on the scale the process demanded? Does your agency leadership and/or frontline staff meet change with resistance or are people encouraged to present ideas that may challenge the status quo?

The psychology of change is an area where quality improvement seeks to draw closer "what we know" and "what we do" and eliminate barriers in process implementation. The Institute for Healthcare Improvement (IHI) defines psychology of change as "the science and art of human behavior as it relates to transformation". As EMS leaders, we are expected to light the torch of change that is then carried by our frontline providers. EMS leaders must address the emotional responses that come with both suggestions of new ideas and implementation of change, including resistance, insecurity, complacency, and fear of being rejected.

In 2017, the IHI, after extensive research, introduced the Psychology of Change Framework. (*17*) The framework addresses the central goal of "Activating people's agency" which is to enable both people's power and courage. Power, according to the IHI, is the utilization of people, their skills, knowledge, experience, and relationships to spread change to a scalable level within an organization. Courage is the ability for individuals, groups, and systems to act when positioned against challenge. To activate peoples' agency, the IHI has published five interrelated domains of practice. Unleashing intrinsic motivation, co-design people driven change, co-produce in authentic relationships, distribute power, and adapt in action [Figure 10]

Figure 10: Hilton K, Anderson A. IHI Psychology of Change Framework to Advance and Sustain Improvement. Boston, Massachusetts: Institute for Healthcare Improvement; 2018. (*17*)

Intrinsic motivation

What motivates people to effectuate change? Many times, leaders will attempt to motivate staff with extrinsic tools that incentivize by rewarding or putting systems in place that will punish those who do not adopt change. According to psychologists, these kinds of extrinsic motivators don't meet a person's psychological demands. Rather, utilizing intrinsic motivation could positively impact the momentum and speed in which change comes to fruition. Seeking feedback from staff about what matters to them and what they value can help leaders to create spaces and conditions that allow for a sustained collective force with a cause rather than a consequence.

Co-Design People Driven Change

The central goal of the EMS Agenda for the future 2050 is to support a "People centered system".(*18*) We must think deeply about our system performance and how it aligns with this goal. Our patients, communities, hospitals, clinics, front-line staff, and administrators all have a hand in what we do and how we do it. Therefore, it would make sense that, when we embark on quality improvement initiatives, we seriously consider how to include these consumers and how their input might influence the planning stage of these initiatives. In short, co-designing people driven change is considering the end user of any quality improvement effort. When changes in your process occur, were they transparent to all affected? Are the front-line staff or patient's opinions ever considered? If they are, where in the process does that occur (e.g., in the development phase or after the process has already been implemented)? We suggest being mindful of including all people touched by improvement processes along the way, in the initial phases and frequently throughout the project implementation. Including those affected by change allows for the individual or collective to express emotions and barriers mentioned previously. There is no better way to cause change apprehension than making people feel as if they were not included in the process.

Co-Produce in Authentic Relationship

The end point of quality improvement is transformation. System transformation does not occur in a silo, by one individual. Although an agency leader can be highly impactful on the tone and pace an organization adopts change, it takes input and action on all levels (e.g., hospital, patient advocacy groups, frontline staff). “Co-production” is when leaders choose to involve not only the executive staff and people in traditional power positions within the agency but seek to invite input from others in non-traditional power roles. “Authentic relationships” are the components leaders should work to foster. When leaders invite frontline staff or patients to participate in the change process, their input should not be topical. If leadership already has their mind made up about a process change and how it will occur, this is not a shared purpose. When all individuals are invited to the table but only some actually participate, the IHI refers to this as a transactional tokenism. Do we include individuals at all levels of decision making? If so, how much do frontline staff impact the end decisions in the change process? Do some individuals feel they witness change rather than participate? Leaders must nurture the individual’s psychological safety throughout the process so that all participants feel part of the change process. When we co-produce authentic relationships, the team commits clearly to their roles, and ensures everyone feels involved.

Distribute Power:

According to the IHI, power is not a position but rather something that results from individuals utilizing, to the best of their ability, their skills, knowledge, experience, and capacity to act for a cause. When change is crafted and implemented, we often run up against power struggles that create barriers. Perhaps some individuals feel their interests were not served in the early stages of change (i.e., their input was not solicited) or, in the later stage individuals may resist change causing system disruption. Agencies can distribute power by creating conditions for teams to share responsibility and accountability by enhancing their assets. The IHI promotes working in a distributed leadership structure in which leadership of a group is shared in committees of individuals who are affected by quality improvement initiatives. The groups must be balanced between people who have unique assets and authority to advance the collective aim rather than an individual who is in position of power (e.g., a supervisor or manager) asserting dominance over the process. To establish a shared aim in a quality improvement project, early on, team members on every level, should take time to share with each other what their interest in the project is, what assets or skills they bring, and how do they think that the goals of the team will impact the agency and system. Norms and agreements on how to move forward in a cohesive effort must be established to prevent any individual or group from becoming marginalized during the process of challenging status quo and enacting change.

Adapt in Action:

The model for improvement asks us, as agents of change, to adopt the PDSA model. When we start to act, we should expect both success and failures along the way and must be equally transparent about both. Success that works toward achieving our goal should be celebrated. Reporting failures requires all involved to be honest and forth coming. Agencies should examine failures for variation and adapt their processes to accommodate anything that places barriers to achieving the set aim. It is crucial, however, in the process of identifying failure that groups maintain a principle of psychological safety. Discussions surrounding failure must not be punitive but instead an opportunity to learn. When we act, we begin to

acquire a higher level of knowledge of how our plan is functioning and what adjustments are necessary. Teams and individuals should be celebrated for adopting a growth mindset. Psychologist Carol Dweck writes much about "the growth mindset", which in summary is the perception that some people believe individuals can develop competences and intelligence over time and others cannot. (*19*) To adapt within the action of quality improvement, leaders should praise individuals when they demonstrate effort and commitment to the process, rather than waiting on the end result. Simply put, the ongoing, actionable process can be very rewarding to activating an individual's agency.

CONCLUSION

We began this manual with the definition of healthcare quality:

"The degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge." (*1*)

Fundamentally, the mission of EMS is to improve the health of our communities. To realize this vision, we must be honest with ourselves and ask the question: "How do we know we are doing a good job?". This requires *measuring* our performance so that we can begin the process, over a series of many steps, to improve the care that we deliver. While the process is not fast and the path not straight, it is incredibly worthwhile.

Take the first step.

APPENDIX A: ESTABLISHING A QI COMMITTEE

Various models can be used to establish a QI Committee, based on the resources that are available in the specific organization or area. Agency-specific quality improvement activities should ideally be conducted by the most capable person(s) available within each agency. Per PHL Article 30, Section 3006, *every ambulance service and advanced life support first response service shall establish or participate in a quality improvement program, which shall be an ongoing system to monitor and evaluate the quality and appropriateness of medical care provided by the ambulance service or advanced life support first response service and which shall pursue opportunities to improve patient care and to resolve identified problems.*

The quality improvement program may be conducted independently or in collaboration with other services, with the appropriate regional council, with an EMS program agency, or with a hospital. A quality improvement (QI) committee should have multiple members, some of whom do not participate in the provision of care by the service. It may be practical to combine a smaller number of agency level members with members from other agencies within a region to have an optimal QI Committee size and representation. This is done to ensure objective review and to develop thoughtful solutions. The size of the committee should be manageable, yet large enough to support the anticipated workload. An optimal number of members is usually 6-10. It is recommended that the QI Committee include at least one physician with the other members coming from a variety of professions, including nursing, emergency medical technicians, advanced emergency medical technicians, or other appropriately qualified allied healthcare personnel. QI Committees assume a leadership role in the organization and/or the region, therefore there is a need for structured feedback, education and training, mutual respect, and professionalism among committee members and between agencies and committees.

A key role on the committee is the QI Coordinator. The QI Coordinator should be knowledgeable in prehospital policies, protocols and procedures, and the general QI processes outlined in this manual. Agencies should consider enlisting the expertise of their Agency Medical Director, Regional Medical Director, a senior prehospital provider from the agency, or quality improvement specialists from other local agencies/industries. The prehospital provider representative should be currently credentialed and certified at the highest level of care provided by the agency.

The duties of QI Coordinator include interfacing with EMS providers, educators, field supervisors and the Agency Medical Director; reviewing patient care reports (PCRs); reviewing existing protocols and policies; developing CME curriculum; and reviewing consumer communications.

According to the National Highway Traffic Safety Administration, the following developmental stages provides the framework for the modern-day EMS manager/QI Coordinator:

1. building potential for success by developing an awareness throughout the organization that QI is a worthwhile endeavor
2. expanding agency-wide knowledge of, and capability in, QI practices and techniques
3. fully integrating the strategic quality planning process and related actions into daily EMS operations. (*20*)

Strategic issues often center around how the organization relates to the larger environment it resides in. Effective strategic planning will take advantage of the strengths and weaknesses, found within the organization to minimize or overcome the opportunities and threats (found in the external environment). These forces, strengths, and weaknesses from within the organization, and opportunities and threats from outside the organization are constantly stressing the agency. The best way to handle

the stress is to capitalize on the strengths and minimize the weaknesses, while taking advantage of every opportunity to succeed and reducing or eliminating threats to the organization's performance.

The QI Coordinator sets the direction for, and the character of, the QI Committee's activity. Historically, QI programs have focused on the clinical aspects of the EMS providers, typically by retrospective review of patient care reports. This method is important and has its place, however, it is narrow in its scope. QI Coordinators should be "big-picture" thinkers and consider all aspects of the organization having either direct or indirect effect on patient outcome and customer satisfaction.

There are many resources available to the QI Coordinator, including, but not limited to: existing protocols and policies; agency specific data from PCRs; input from field supervisors and other experienced providers; educational curriculum; and customer satisfaction surveys.

The QI Committee should document its authority and process in the form of a written QI Plan. Typically, the written plan provides a pathway for the QI process in the following sections:

- Introduction;
- Mission statement;
- Justification;
- Goals and objectives;
- Methods;
- Identification of benchmarks and monitors;
- Flow of information; and
- Feedback loop

The QI Process: Two-Way Communication

It is imperative that QI Committees establish a pathway for two-way communications. Communicating information to the QI Committee is generally the first step in the process so improvement plans can be created. However, QI Committees must filter information back to the providers, agencies, regions, or to the NYSDOH BEMS (as needed) as investigations are undertaken, improvement cycles started, and PDSA Cycles completed and refined.

The scope of resolution includes efforts to foster a partnership between EMS providers, agencies, and those individuals responsible for medical oversight in the agency and the region. It cannot be overstated that the purpose of the QI initiative is to ensure the highest quality patient care. As such, guiding change is a principal activity of a QI program, and feedback is an essential part of the process. Providing both positive feedback and opportunities for improvement are the only way to improve the care provided by EMS agencies and regions.

During any session in which problems are being discussed, it is imperative for leadership and the QI Coordinator to set the stage that the discussion is an open forum and that observations and thoughts are welcome in order to encourage participation. Facilitators should be prepared to guide a productive brainstorming session focusing on the system and not the individual.

APPENDIX B: CONFIDENTIALITY AND PROTECTED HEALTH INFORMATION: IT'S OK TO SHARE

The use of protected health information (PHI) is an essential component of a Quality Improvement Program ***and is acceptable under the law when used in health care operations.*** Agencies and providers are responsible, however, for ensuring that health information and a patient's identity are limited to bona fide QI activities required by statute, regulation, and policy. Ultimately, agency policy determines who has access to PHI, and how that information is shared.

Since its enactment in 2003, the federal Health Insurance Portability and Accountability Act (HIPAA) has provided strict guidance on how protected health information (PHI) can be utilized with the healthcare industry, including emergency medical services.

In summary, the major thrusts of HIPAA are to:

- Establish a universal language for healthcare providers and payers of healthcare services;
- Modify pre-existing privacy standards;
- Give patients new rights to access their own health care records and to know who else has access to them;
- Restrict disclosure of health information to the minimum number of people needed to fulfill the intended purpose;
- Establish new criminal and civil sanctions for improper use and disclosure; and to
- Establish new requirements for access to records by researchers and others.

Our discussion of HIPAA requirements within the scope of this document is limited to the use of PHI in the quality improvement process. As stated in 45 CFR 164.512:

> *A covered entity may disclose PHI to a health oversight agency for said oversight activity authorized by law including audits; civil administrative or criminal investigations; inspections; licensure or disciplinary actions; civil, administrative or criminal proceedings or actions; or other activities necessary for appropriate oversight in the health care system"*

Per PHL Article 30 Section 3006.3, notwithstanding any other provision of law, none of the records, documentation or committee actions or records required pursuant to this section shall be subject to disclosure under Article 6 of the Public Officers Law or Article 31 of the Civil Practice Law and Rules, except as hereinafter provided or as provided in any other provision of law, no person in attendance at a meeting of any such committee shall be required to testify as to what transpired thereat.

Any person in good faith and without malice provides information to further the purpose of this section or who, in good faith and without malice participates on the Quality Improvement Committee, shall not be subject to any action, civil damages or other relief as a result of such activity.

Regional protocols and policies are developed by the REMAC to direct real-time care. NYSDOH Regulation and Policy Statements and Federal Regulations give agencies guidance on how to use draft agency-level PCR policies and how to properly collect, analyze, store and release PHI.

Therefore, according to HIPAA and other applicable standard practices, PHI can be shared among and between covered entities including, but not limited to: agency level QI committees; regional level QI committees; REMACs; REMSCOs; Program Agencies; SEMAC; SEMSCO and the NYSDOH.

APPENDIX C: QUICK START GUIDE

SAMPLE QUALITY IMPROVEMENT PROJECT PROCESS

1. FORM A QUALITY IMPROVEMENT COMMITTEE REPRESENTATIVE OF THE ORGANIZATION, INCLUDING THE MEDICAL DIRECTOR AND OPERATIONAL LEADERSHIP

This committee must take ownership of agency issues and commit to addressing them. The best way of doing this is by documenting the commitment in writing.

We, Bill Johnson - VP of Operations, Maggie Smith - Medical Director, Christina Jones- Training Coordinator, Steven Fernandez – Quality Assurance Director, Charles McGrath- Paramedic, and Kelly Williams- EMT, are committed to improving patient care by our organization.

2. IDENTIFY AN IMPORTANT PROBLEM AND CREATE A WRITTEN AIM STATEMENT

An aim statement answers the question of "what is trying to be accomplished?" The QI committee should develop well defined, evidence-based, and patient-centric outcomes that should be addressed by an improvement project. An effective AIM Statement should meet the SMART criteria for goals/objectives: Specific, Measurable, Achievable, Relevant, and Timebound.

90% of patients with suspected stroke will have a blood sugar measured and documented within six months.

3. USE AN EXISTING QUALITY MEASURE OR IF NECESSARY, CREATE A QUALITY MEASURE

Quality Measure Statement

Title: A description of what the measure relates to:
New York State Department of Health, Bureau of Emergency Medical Services and Trauma Systems- New York State Quality Standards- Standard 2019 DQS 06: Stroke and TIA patients receiving Blood Glucose Monitoring.

Denominator: The total population to which a measure applies.

- *Response Type of Service Requested (eResponse.05) is equal to 911 Response (Scene)*
- *Provider Primary Impression (eSituation.11) is equal to: Stroke (Cerebral infarction, unspecified)* ***or*** *TIA (Transient cerebral ischemic attack, unspecified)*

Numerator: The total population receiving the measure.

- *Procedures Performed (eProcedures.03) is equal to: Glucose measurement, blood (procedure)*

Exclusions/Exceptions: A condition that removes a defined group of patients from the denominator because the measure would not appropriately apply to them.

- *None*

4. CREATE A STARTING POINT AND BEGIN TO MEASURE YOUR PERFORMANCE

Use automated software from your ePCR vendor, the ImageTrend NYS Bridge, or your Regional Program Agency to do a review for a given timeframe. It is important to select collection methods which meet the needs of the intended quality improvement project. Data should describe the desired outcome and the collection process should not be onerous.

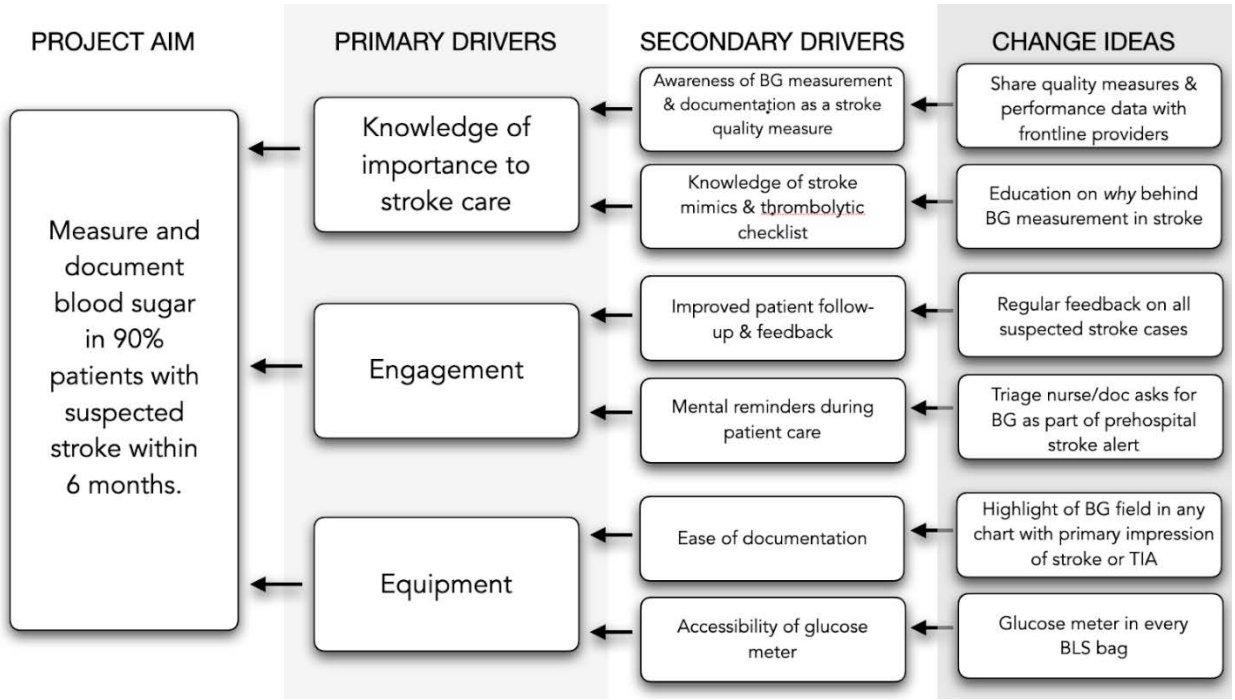
To find the percent of 911, stroke or TIA patients receiving Blood Glucose Checks:

$$\frac{\textit{65 patients met glucose measurement}}{\textit{100 patients met 911 } \textbf{\textit{and}} \textit{ Stroke or TIA criteria}} = 0.65 \qquad 0.65 \times 100 = 65\%$$

Therefore, 65% of all 911, Stroke or TIA patients received a blood glucose check, identifying an important area for improvement.

5. WHAT CHANGE CAN WE MAKE THAT RESULTS IN IMPROVEMENT?

Use a driver diagram to brainstorm potential changes that you can make to improve performance.



6. TEST YOUR CHANGE IDEAS WITH PDSA CYCLES.

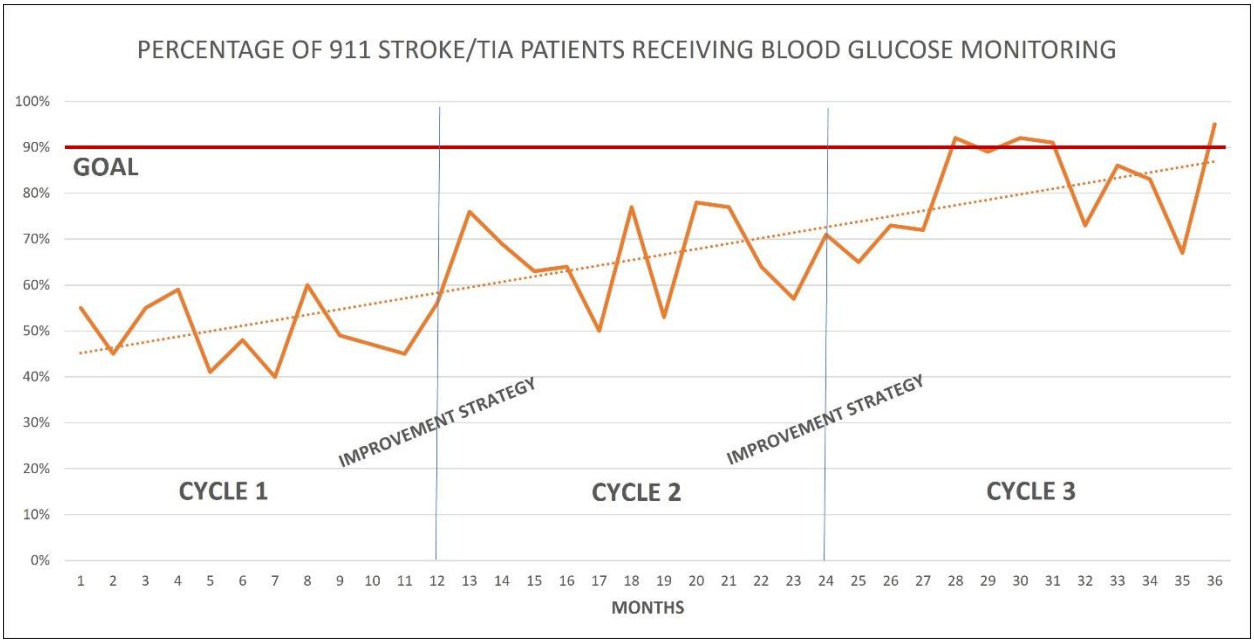
- ***Plan**: This requires making a prediction of what will happen and why and developing the plan for testing it including a plan for collecting the data.*
- ***Do**: Execute the plan and test the change. Document problems or observations.*
- ***Study**: Review the test, analyze the results, and identify learnings.*
- ***Act** Based on what you learned in the study step - If the change did not work, go through the cycle again with a different plan using what you learned in the first round. If successful, incorporate lessons learned from the test into broader changes. Use what was learned to plan new improvements and begin the cycle again.*

Remember to start small:

1. Discuss your ideas with the EMS clinicians: have you identified the correct barriers? Are there any that you did not think of? Do they have other ideas?
2. Trial interventions first with a small group (e.g. one crew, one station) before implementing more widely.

7. GRAPH DATA OVER TIME ON A RUN CHART

Track your data with a run chart to measure improvement over time.



8. **CONTINUE THE PDSA CYCLE AND EVALUATE OPPORTUNITIES FOR IMPROVEMENT WITH THIS AND OTHER MEASURES**

   Consider the ideas in the psychology of change section and adapt to changes in technology, the environment, the workforce, society, and the industry. Consider dashboards as a way to provide insight to current performance. They may include color indicators to describe data that meets a goal, is in process, or not meeting a goal. Be sure to plot them over time in a run-chart to see trends.

9. **SHARE YOUR AGENCY'S NEWLY ESTABLISHED "BEST PRACTICES" WITH NEIGHBORING AGENCIES, PROGRAM AGENCIES, REGIONAL COUNCILS, ETC…**

APPENDIX D: GLOSSARY

Adverse Event: An event in which injury to the patient results from medical care or intervention.

Benchmark: A scientifically-validated, regionally-accepted, or nationally-recognized endpoint.

Continuous Quality Improvement: The sum of activities undertaken by the agency to provide confidence to its patients and maintain a standard of excellence. It is a dynamic process based on multiple activities to maintain the ultimate goal of the Emergency Medical Service System: the provision of timely, efficient and effective prehospital care to all those who need it.

HIPAA: Health Insurance Portability and Accountability Act, promulgated in 1996. Designed to simplify the administration of the health insurance industry by setting national standards for transfer of protected health information, confidentiality of protected health information, and the management of health care financing.

Indicators: Any of a group of predetermined values that are of high risk to the provider or agency that should be periodically reviewed to reduce risk. They can be either high or low volume.

Near Miss: Occurrence of an error or hazard that could have resulted in an adverse event but did not because of intervention or chance (also called a potential adverse event).

Outcome Evaluation: Deals with the results of care provided. This deals with stabilization and survival through to recovery and hospital discharge.

Outlier: Case that falls out of acceptable standards, accompanied by documented reason for the anomaly.

Patient Outcome Monitors: Types of measurable outcome to gauge effectiveness of prehospital interventions, such as: difficulty breathing rating pre/post treatment; correlation of return of spontaneous circulation (ROSC) to time of defibrillation/presenting arrhythmia; hospital disposition for patients receiving ALS care; and correlation between survivability and cumulative prehospital care options

Process Evaluation: Deals with the use of resources and appropriateness of such utilization. This deals with patient processing, triage, utilization of available resources, etc.

Program Outcome Monitors: Types of measurable outcome to gauge effectiveness of the organization, such as: performance consistent with medically accepted standards; adequacy of resource allocation; resource management; vehicle maintenance/preventive maintenance; and training program.

Protected Health Information: Individually identifiable information; linking a person's health information to their identity.

Remediation Process: The scope of resolution to identified results, includes efforts to foster a partnership between prehospital EMS providers, provider agencies, and those individuals and agencies responsible for medical oversight in the region. Guiding change is a principal activity of the QI program, and positive feedback is an essential part of the process.

Reportable Event: Title 10 of the New York State Codes, Rules and Regulations (10NYCRR), Part 800.21(q) and (r) delineate the specific circumstances which require an EMS agency to immediately report to the Department of Health, Bureau of Emergency Medical Services. Examples of a reportable event may include, but not be limited to, a defibrillator failing to analyze and/or shock or an ambulance stretcher toppling over from its highest position and injuring a patient.

Retrospective Review: Review of system processes after they occur. This is accomplished through PCR review, critique sessions, patient complaints, etc.

Statistical Monitor: Types of measurable outcome to ensure compliance with pre- established benchmarks, such as: cardiac arrest outcome; time of dispatch to arrival of ambulance; technician skills report; and treatment appropriate to patient condition and technician availability.

Structural Evaluation: Deals with the presence of mandated resources and includes standard setting for non-personnel issues. This includes evaluating physical facilities, equipment stocking and control procedures, etc.

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