



ED PIP: Diagnostic Phase

Guides: Monitoring and Evaluating Process Changes

Monitoring and Evaluating Process Changes – Overview


Outcome	<ul style="list-style-type: none"> ■ Enhanced insight regarding measurement as it relates to quality improvement work
Definition: 'What is it?'	<ul style="list-style-type: none"> ■ Step-by-step directions on how to select measures, display associated data, and interpret graphical data displays in order to engage in effective and successful quality improvement efforts
Objectives: 'What is it used for?'	<ul style="list-style-type: none"> ■ The appropriate use of measurement in quality improvement work is contingent upon an Improvement Team having the ability to: <ul style="list-style-type: none"> – Identify appropriate measures and their associated data collection plans – Effectively display data to make process performance visible – Determine if a change resulted in improvement – Understand if gains/improvements are being sustained
Benefits:	<ul style="list-style-type: none"> ■ There are many benefits to ongoing attention to measurement including an enhanced ability to: 1) identify appropriate foci for improvement efforts; 2) monitor performance as compared to established goals; 3) re-focus the Improvement Team away from anecdotes and one person's perspective; 4) communicate progress to both management and staff
When to use	<ul style="list-style-type: none"> ■ Measurement is an important consideration throughout all phases of a quality improvement initiative

Tip for integrating Lean principles into healthcare:

- *Part of successfully implementing Lean in healthcare is adopting common language that may have originated in manufacturing and internalizing how it is used in a healthcare environment*
- *In order to ensure that improvements are sustainable, we need to consistently monitor and evaluate changes*

Monitoring and Evaluating Process Changes – Measures Selection

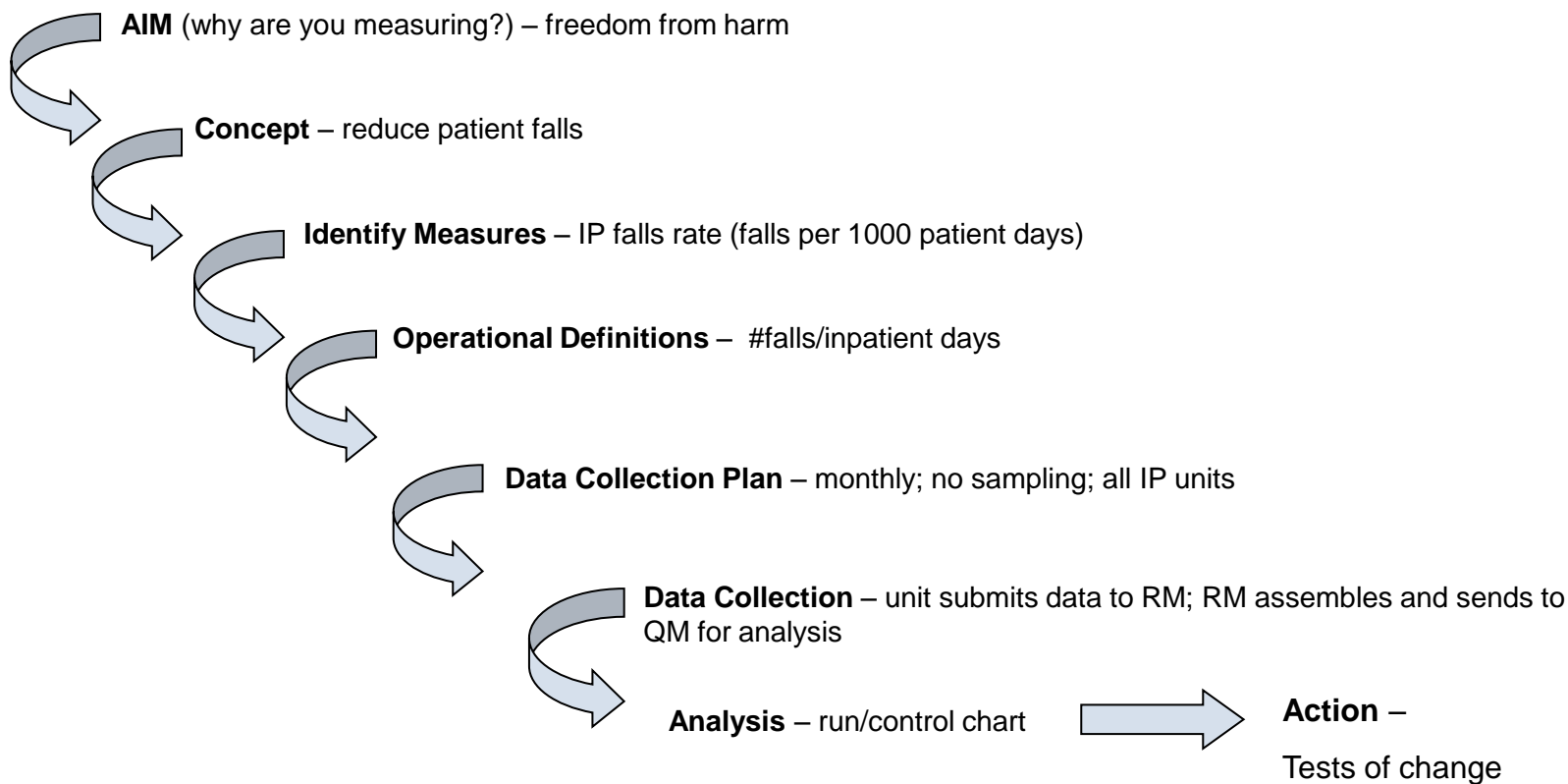
Outcome Measures	<ul style="list-style-type: none">■ Outcome measures capture the voice of the customer and reflect how the overall system is working■ Examples – ED ALOS by CTAS level, inpatient ALOS, ED LWBS
Process Measures	<ul style="list-style-type: none">■ Process measures are sometimes referred to as the voice of the process and they reflect how steps in the system are performing■ Examples – Time intervals or turnaround times (TAT) are common process measures; for example, Radiology TAT or Laboratory TAT are process measures
Balancing Measures	<ul style="list-style-type: none">■ Balancing measures provide the Improvement Team with information on whether efforts are causing unintended adverse consequences elsewhere in the system■ Examples – Percentage of patients readmitted within seven days, patient satisfaction

-  Because healthcare systems are very complex and processes are often interrelated, it is inappropriate to use a single measure when determining improvement to a particular system
- Improvement work should be guided by a “family of measures” which includes outcome, process, and balancing measures
- Typically, it is recommended that no more than eight measures be identified and therefore considerable thought should be put into the measures selection process

Source: Provost, L. & Murray, S. (2007). “The Data Guide: Learning from Data to Improve Health Care.”

Associates in Process Improvement and Corporate Transformation Concepts, pp. 3-3.

Monitoring and Evaluating Process Changes – The Quality Measurement Journey



Source: Provost, L. & Martin, L. "Back to Basics: Building Essential Skills for Quality and Patient Safety."

Presented at the 2007 IHI National Conference. Orlando, Florida.

Monitoring and Evaluating Process Changes – Operational Definitions

- Once measures have been selected, operational definitions must be specified
- The operational definition gives meaning to a concept such as “error”
- Operational definitions mitigate the risk that data will be collected differently by different people or at different points in time
 - Define both the numerator and the denominator if appropriate
 - Identify if the operational definition is different than standard definitions
 - List any inclusion or exclusion criteria
 - Determine if sampling will be used to obtain the data and describe the sampling plan
 - For each data element, define the unit of measurement and the degree of precision (for example, ALOS may be measured in hours/minutes in the ED, while it is much more appropriate to measure ALOS in days for admitted patients)
 - If the data requires the observer to make a judgement such as “late” or “inappropriate”, list the criteria that will guide the observer to accurately make that determination




- The aim for data collection with improvement work is utility not perfection
- We want “just enough” data which is usually obtained through small sequential samples

1) Lloyd, R. (2004). *Quality Health Care: A Guide to Developing and Using Indicators.* Jones and Bartlett Publishers, pp. 56-61.

2) Provost, L. & Murray, S. (2007). *The Data Guide: Learning from Data to Improve Health Care.* Associates in Process Improvement and Corporate Transformation Concepts, pp. 3-3.

Monitoring and Evaluating Process Changes – Data Collection Plan

- Beyond the identification of appropriate measures, fulsome consideration must be given to the data collection plan
- The data collection plan should answer the following questions:
 - Where is the data located? (e.g. chart, direct observation, computer system etc.)
 - How frequently will you measure? (e.g. daily, weekly, monthly)
 - How will you display the data? (e.g. run chart versus control chart)
 - Who will be responsible for collecting the data and creating the graph(s)?
 - Who will review the graphs? How often?

-  • Note: Unless you have planned a very long improvement project, monthly data collection is too infrequent to adequately guide your efforts

Source: Provost, L. & Murray, S. (2007). "The Data Guide: Learning from Data to Improve Health Care."

Associates in Process Improvement and Corporate Transformation
Concepts, pp. 3-3.

Tips and Tricks for monitoring and evaluating process changes and collecting data for improvement

- A few key measures which reflect the aim of the improvement effort and make it tangible should be regularly reported throughout the life of the project (daily, weekly, or monthly depending on the timeline of the project)
- It is important not to rely too heavily on process measures – a family of measures which includes process, outcome and balancing measures is required
- Display the key measures visually on time series charts
- If possible, leverage existing databases and routinely collected data when developing measures
- A balanced set of three to eight measures will ensure that you can answer the question – “how will we know that a change has resulted in an improvement?”

Source: Provost, L. & Murray, S. (2007). “The Data Guide: Learning from Data to Improve Health Care.”

Associates in Process Improvement and Corporate Transformation
Concepts, pp. 3-3.

Monitoring and Evaluating Process Changes – Data Display

- Displaying data over time is essential for determining if process changes have had the desired effects; run/control charts will allow an Improvement Team to make informed predictions and thus manage a project effectively
- Key to quality improvement work is understanding the variation that exists in data and making good management decisions based on this variation
- All data exhibits variation – run charts are the most basic tool for distinguishing between special cause and common cause variation
- It is important not to overreact to common cause variation; “tampering” occurs when an outcome is treated as special cause when actually it was common cause variation (this can result in increased variation and degradation of the process)
- If common cause variation exists but the process is stable and predictable at an unacceptable level, fundamental changes to the system must be made in order to achieve improvement



- Aggregated data or data presented in a tabular format is not appropriate to guide quality improvement work as Improvement Teams cannot make predictions about future performance nor provide insights to identify/explain past variations
 - A run chart can be started as soon as the first data point is available

Monitoring and Evaluating Process Changes – Variation

Common Cause

- Random variation is inherent in the process over time, affects everyone working in the process and affects all outcomes
- “Tampering” occurs when we treat an outcome as special cause when actually it was common cause variation (this can result in increased variation)
- Successive samples from a stable process differ only by chance
- Data points are equally likely to be above or below the median
- If a system is demonstrating common cause, but the measure under examination is “stable” at an unacceptable level, it is necessary to re-design the system in order to achieve change

Special Cause

- Special cause is due to irregular or unnatural causes that are not inherent in the design of the process
- Affect some, but not necessarily all aspects of the process
- Results in an “unstable” process that is not predictable
- A successful change, or degradation in the system, is demonstrated by special cause
- It is up to individuals operating in the system to determine if the conditions resulting in special cause need to be eliminated or emulated
- It is a mistake to treat special cause variation as common cause. By not acknowledging that something is different, we lose the opportunity to replicate (if the special cause represents improvement) or address (if the special cause represents degradation)

Tips and Tricks for Monitoring and Evaluating Process Changes Using Run Charts

Although the interpretation of run charts has been covered elsewhere in the toolkit, it is appropriate to review some helpful tips and tricks:

- Best practice is to place a trend line on a run chart **only** if that chart demonstrates one of the four signals for non-random change (shift, trend etc.)
- It is important to be aware of the impact of unequal denominators when viewing rate/percent data on a run chart – each data point should have a denominator that is within +/- 25% of the average denominator size
- Run charts do not always have to be in time order; for example, data could be displayed in location or provider order (in these instances data points are not connected by a line)
- If the time intervals on the run chart are not equal, data should be displayed in a way that makes the impact of the unequal time intervals more evident

Source: Provost, L. & Murray, S. (2007). "The Data Guide: Learning from Data to Improve Health Care."

Associates in Process Improvement and Corporate Transformation Concepts, pp. 3-3.

Monitoring and Evaluating Process Changes – Barriers to Good Measurement

- Measurement is threatening – this is particularly the case if organizations have previously used data to instil a sense of fear in employees
- The desire for precision – measurement for quality improvement does not have to be as precise for controlled experiments
- Using standards as performance objectives – this is problematic as standards are generally used to establish minimum thresholds for performance. Operating to standards is contrary to continuous quality improvement which is the pursuit of perfection