MEASUREMENT TOOLS: A Brief Tutorial

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CONTINUOUS QUALITY IMPROVEMENT TRAINING

MEASUREMENT TOOLS: Overview

- These are tools that are used to thoroughly understand the current state of the process and collect reliable data on process speed, quality, and costs that would subsequently be used to expose the underlying causes of problems.
- Some of the most common measurement tools are process maps, capability analysis and pareto charts.

Source (The Lean Six Sigma Pocket Toolbook)

MEASUREMENT TOOLS: Process map

- A process map is a graphical representation of a process, set in a way that allows the workings of the process to be seen.

- Benefits of a process map include:
  - Easy to use;

  - Provides a high-level, visual depiction of critical elements and handoffs; and

  - Useful as a training aid.

Source (http://asq.org/service/body-of-knowledge/tools-process-map)

MEASUREMENT TOOLS: Process map

Designing a process map involves the following steps:

- Determine the scope of the process to be defined.
- Draw a "start" step for the process.
- Observe all of the steps in the process.
- Draw a symbol for each step.
- Verify that the finished process map accurately portrays all the steps of the process.

Tips

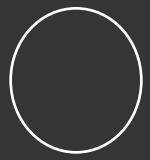
- Always date a process map.
- Always do as much of the mapping where reality is. Endeavor to go to where the work occurs.
- Maintain version control; decide who is authorized to update the chart and under what conditions.
- Concentrate on the process, not the tools and symbols.

Source (The Lean Six Sigma Pocket Toolbook; http://asq.org/service/body-of-knowledge/tools-process-map)

MEASUREMENT TOOLS: Process map examples

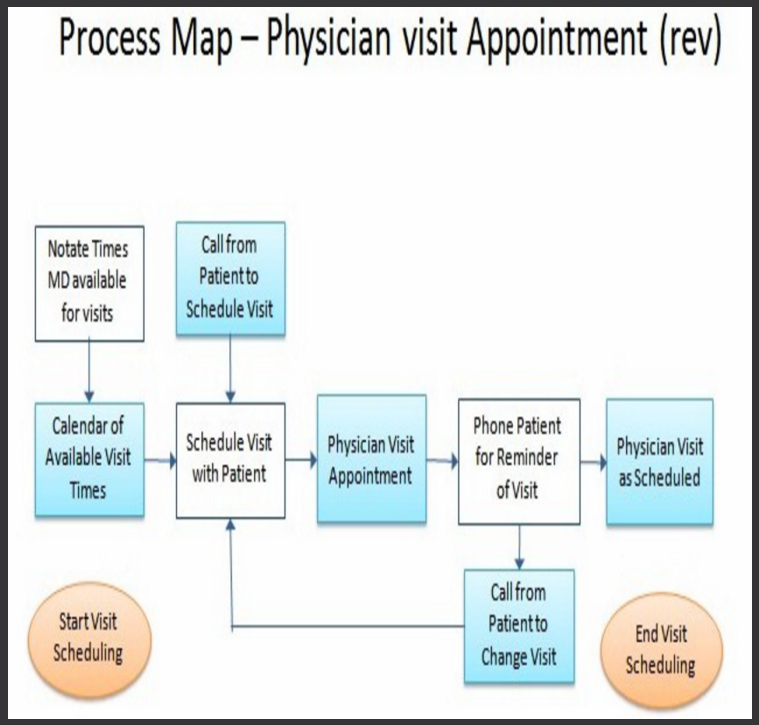
- Examples of common symbols used in process map:

Activity



Start/Stop point

Decision point



Source (https://cahps.ahrq.gov/quality-improvement/improvement-guide/analysis-of-results/Quantitative-Analyses/Performance-Problems_Tools/Process-Mapping.html)

MEASUREMENT TOOLS: Capability Analysis

- Capability analysis is a tool that offers a way of measuring and quantifying the voice of the customer (specification limits) in relation to the voice of the process (control limits).

- Most processes have some performance limits and variation that will be acceptable to the customer. The extent to which the "expected" values fall within these limits determines how capable the process is of meeting requirements.

Source (www.uhbristol.nhs.uk)

MEASUREMENT TOOLS: Capability Analysis

Designing a capability analysis involves the following steps:

- Determine the voice of the customer specifications(lower and upper specification limits if applicable).
- Collect variable data. At least 0 data points would be required.
- Check the distribution.
- Review the Cp and Cpk values. Review the histogram and the data distribution in relation to the customer specifications.
- Draw your conclusion. Is the process capable, marginal or not capable?

Source (http://asq.org/service/body-of-knowledge/tools-capability-analysis)

MEASUREMENT TOOLS: Relevant definitions

- **Normal** distribution: A set of data that follows a normal curve or bell curve where the height in relation to the width is proportionate and looks like a bell (higher than wider).

- **Cp***:* The ratio of total variation allowed by the specification to the total variation actually measured from the process. A capable process has a Cp >1.33.

- **Cpk***:* The ratio or index that indicates if a process is capable of meeting product or service specification limits (lower or upper). It measures the ratio of the total variation and the distance of the mean from the closest limits. Cpk>1.33 is an indication of a capable process.

Source (http://asq.org/service/body-of-knowledge/tools-capability-analysis)