

# Fundamentals of Health Workflow Process Analysis and Redesign

## Unit 10.8b Quality Improvement Methods

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## Unit Objectives

Upon successful completion of this unit the student is able to:

- Describe Strategies for Quality Improvement
- Describe and recommend tools for quality improvement
- Compare and contrast the quality improvement methodologies and tools and their appropriate uses in the health care setting

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## Topics – Unit 10.8

### First lecture

- Foundations of Quality Improvement

### This lecture

- Methods for Quality Improvement
- Tools for performing quality improvement
- A culture of Quality Improvement
- Mistakes in Quality Improvement

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## Strategies for Quality Improvement

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## Organizational Culture

- Quality Improvement projects can be aided or impeded by the organizational culture
- Organizational Culture factors to consider
  - Leadership
  - Ability to adapt to change
  - Communication ability
  - Understanding of change or need for change
- Factors needed for success
  - Making quality improvement part of the job
  - Leadership support is essential for quality improvement activities to succeed.

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## Leadership Support

Leaders can enable quality improvement in their health care settings by:

- Creating and promoting a quality vision
- Increasing staff capacity to support quality improvement
- Motivating staff to participate in QI projects
- Establishing the QI teams
- Demonstrating support of use of metrics to measure performance
- Making sure that the 'voice' of the patient is heard and acted on
- Involving staff and patients
- Including QI in the budget

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## Exercise

Identify an area in your life that you would like to improve, such as:

- Develop better study habits;
- Give up smoking;
- Eat healthier foods;

Think through the challenges you will face, the factors that may influence your success, the steps that you might consider taking to assure success, how you will know if you succeed.

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Reflect on these notes of the challenges you will face, the factors that may influence your success, the steps that you might consider taking to assure success as we review the quality improvement method and tools

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## Quality Improvement Methods

- Many methods
- Human-centered and supportive of the implementation of Health IT
- Originally tailored for enterprises, not necessarily health care.

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## API Improvement Model

- Tom Nolan and Lloyd Provost
- Simple model for Process Improvement based on Deming's PDSA cycle
- Three fundamental questions form basis of improvement
  - What are we trying to accomplish?
  - How will we know that a change is an improvement?
  - What changes can we make that will result in improvement?

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## Baldrige Criteria and Related Systems

- Originally developed and applied to business
- 1987 - Malcolm Baldrige National Quality Award created Public Law 100-107 (1987)
- Healthcare specific criteria (1997)

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## FOCUS-PDCA

- 1980s – Dr. Paul Batalden and team developed model.
- **F**ind an opportunity for improvement
- **O**rganize an effort
- **C**larify current understanding
- **U**nderstand the process variations and capability
- **S**elect a strategy
- **PDCA** cycle test the strategy

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## IHI Breakthrough Series Model

- Institute for Healthcare Improvement
- Model support breakthrough collaborative series
  - 20-40 healthcare organization
  - Working together
  - 6-8 months
  - Improving a specific clinical or operational area

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## ISO 9000

1. International **Standards** Organization
2. 1987 – initial ISO 9000 guidelines for performance improvement.
3. Components
  1. Design and develop a QI program
  2. Create a sociocultural environment and a structure that supports improvement
  3. Reduce or avoid quality losses
  4. Define QI responsibilities
  5. Develop an improvement planning process
  6. Develop an improvement measurement process
  7. Develop an improvement review process
  8. Carry out QI projects
  9. Analyze the facts before you decide to do QI

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## Kaizen

- Kaizen - Japanese for change for the better; the common English term is *continuous improvement*.
- Term connotes ongoing improvement involving everyone
- Assumes our way of life deserves to be constantly improved
- Includes improvement practices

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## Lean thinking

- Sometimes called the “Toyota Production System”
- Consists of 5 steps:
  - Identify which features create value
  - Identify the sequence of activities, called the value stream
  - Make the activities flow
  - Let the customer pull the product or service through the process
  - Perfect the process

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## Lean thinking

- Assumptions underlying lean thinking are”
  - People value the visual effect of flow
  - Waste is the main restriction to profitability
  - Many small improvements in rapid succession are more beneficial than analytical study
  - Process interaction effects will be resolved through value stream refinement
  - People in operations appreciate this approach
  - Lean involves many people in the value stream
- Transitioning to flow thinking causes vast changes in how people perceive their roles in the organization and relationships to the product

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## Six Sigma

- Hewlett-Packard, Motorola, GE
- Directly from quality thinking in the 1930s
- 6σ, Six Sigma combines established methods such as statistical process control, experimental design and FMEA in an overall framework.
- Aim to reduce variation
- DMAIC
  - Define
  - Measure
  - Analyze
  - Improve
  - Control

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## Six Sigma DMAIC

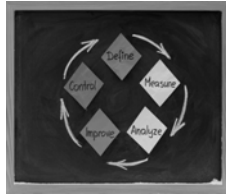
**Define** - project goals and boundaries are set, and issues are identified that must be addressed to achieve improved quality

**Measure** - Information about the current situation is gathered in order to obtain baseline data on current process performance and identify problem areas

**Analyze** - Root causes of quality problems are identified and confirmed with appropriate data analysis tools

**Improve** - Solutions are implemented to address the root causes of problems identified during the analysis phase

**Control** - Improvements are elevated and monitored. Hold the gains.



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## Quality Improvement Tools

The following tool are recommended by Ransom, et al. for different health care scenarios.



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## Basic Tools

- **FLOWCHART**
  - a map of each step of a process
  - a good starting point for a team seeking to improve an existing process or attempting to plan a new process or system.
- **Cause-and-Effect Diagram**
  - Ishikawa, or fishbone, diagram
  - assist in organizing the contributing causes to a complex problem (American Society for Quality 2000).
- **PARETO CHART**
  - 80 percent of the wealth in Italy was held by 20 percent of the population (Pareto)
  - 80 percent of the variation of any characteristic is caused by only 20 percent of the possible variables
  - helps management concentrate resources on correcting major contributors to variation (American Society for Quality 2000).
- **CHECK SHEETS**
  - used to measure the frequency of events or defects over short intervals
  - immediately provides data to help to understand and improve a process.

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## Basic Tools

- **RUN CHART**
  - plots of data, arranged chronologically
  - used to determine the presence of some types of signals of special cause variation
  - A center line (usually the median) is plotted Along with the data to test for shifts in the process
- **CONTROL CHART**
  - consists of chronological data along with upper and lower control limits that define the limits of common cause variation
  - used to monitor and analyze variation from a process
  - use to determine if process is stable and predictable
- **HISTOGRAM**
  - a graphical display of the frequency distribution of the quality characteristic of interest
  - makes variation in a group of data readily apparent
  - assists in an analysis of how data are distributed around an average or median value.
- **SCATTER DIAGRAM**
  - show the relationship between two variable
  - can help to establish the presence or absence of correlation
  - does not indicate a cause-and-effect relationship

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## Basic Tools

- **AFFINITY DIAGRAM**
  - can encourage people to develop creative solutions to problems
  - A list of ideas is created, then individual ideas are written on small note cards. Team members study the cards and group the ideas into common categories.
  - use to help achieve order out of a brainstorming session (American Society for Quality 2000).
- **CURRENT REALITY TREE**
  - employs cause-and-effect logic to determine what to change
  - Identifies root causes or core problem
  - Use to create a consensus among those involved with a problem (Heim 1999).
- **INTERRELATIONSHIP DIAGRAM**
  - helps to identify patterns of cause and effect between ideas
  - can help management recognize the patterns, symptoms, and causes of systems resistance
  - can help to pinpoint the cause(s) of problems that appear to be connected symptoms (American Society for Quality 2000).

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## Basic Tools

### MATRIX DIAGRAM

helps to answer two important questions when sets of data are compared:

- Are the data related?
- How strong is the relationship?
- The quality function deployment (QFD) House of Quality is an example of a matrix diagram.

### PRIORITIES MATRIX

- a series of planning tools built around the matrix chart
- helps when there are more tasks than available resources and management needs to prioritize based on data rather than emotion
- allows a group to systematically discuss, identify, and prioritize the criteria that have the most influence on the decision and study the possibilities (American Society for Quality 2000).

### TREE DIAGRAM

- helps identify the tasks and methods needed to solve a problem and reach a goal
- creates a detailed and orderly view of the complete range of tasks that need to be accomplished to achieve a goal.
- can be used once an affinity diagram or interrelationship diagram has identified the primary causes and relationships (American Society for Quality 2000).

### PROCESS DECISION PROGRAM CHART

- a type of contingency plan that guides the efforts of a team when things do not turn out as expected
- actions to be completed are listed, then possible scenarios about problems that could occur are developed
- Management decides in advance which measures will be taken to solve those problems should they occur
- helpful when a procedure is new and little or no experience is available to predict what might go wrong (American Society for Quality 2000).

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## Basic Tools

### FAILURE MODE AND EFFECTS ANALYSIS

- FMEA is a method for looking at potential problems and their causes as well as predicting undesired results
- developed in the aerospace and defense industries and widely applied
- normally used to predict product failure from past part failure, but it can also be used to analyze future system failures
- Enables people to focus energy and resources on prevention, monitoring, and response plans where they are most likely to pay off

### POKA-YOKE

- Japanese name for "mistake proofing"
- can be thought of as an extension of FMEA
- puts special attention on human error

### CREATIVITY TOOLS

- Although this group is not known as a fixed list of specific tools-that would be incongruent with the concept of creativity-it typically includes brainstorming, mind maps, Edward deBono's (1999) six thinking hats, and the use of analogies
- help one look at processes in new ways and identify unique solutions

### STATISTICAL TOOLS

- used for more sophisticated process data analysis
- help understand the sources of variation, the relative contribution of each variable, and the interrelationships between variables

### Statistical process control (SPC)

- a graphic means used to monitor and respond to special causes of variation
- statistical techniques that can be applied to both parametric and nonparametric data
- allows the analysis of the statistical significance of more complex interrelationships

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## Quality Improvement Mistakes

### Mistakes in Purpose & Preparation

- Error #1: choosing a subject which is too difficult or which a collaborative is not appropriate
- Error #2: Participants not defining their objectives and assessing their capacity to benefit from the collaborative.
- Error #3: Not defining roles or making clear what is expected of individuals taking part in the collaborative as faculty or participants
- Error #4: Neglecting team building and preparation by teams for the collaborative

From: Jovretveit, Quality and safety in health care, 2002

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## Quality Improvement Mistakes

### Mistakes in Planning and Operations

- Error #5: Teaching rather than enabling mutual learning
- Error #6: Failing to motivate and empower team
- Error #7: Not developing measurable and achievable targets

### Mistakes in transition and implementation

- Error#8: Failing to learn and plan for sustaining

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2. Califf, Robert M., Translating Clinical Trials into Practice, (Keynote). Texas Heart Institute Journal vol 33, no 2 (2006) 192196.
3. [www.iso.org](http://www.iso.org)
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5. Ransom, Scott B., Joshi, Maulik S., and Nash, David B. ed., The Healthcare Quality Book: Vision, Strategy, and Tools, Health Administration Press, Chicago, Illinois, AUPHA Press, Washington, D.C., 2005.

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