Washington Association of Medical Staff Services
Lake Chelan, Washington

Quality Improvement Tools and Best Practices

Jon Burroughs, MD, MBA,
FACHE, FACPE
May 29, 2014
Quality assurance versus performance improvement
Early Quality Thinkers, Concepts and Tools

• Frederick Taylor’s “The Principles of Scientific Management” (1911) (individual v. system improvement)
• Frank and Lillian Gilbreth (standardize to ‘best practices’ and eliminate ‘waste’)
• Walter Shewhart and W. Edwards Deming (1939) (statistical process control and PDCA)
• Joseph Juran (1951) (adoption of the Pareto Quality Principle-80/20 rule)
• Avedis Donabedian (1980) (Defined quality in terms of efficacy, efficiency, optimality, adaptability, legitimacy, equality, and cost)(processes and structures may be proxies for outcomes)
Early Quality Thinkers, Concepts and Tools

• Total Quality Management (TQM)(1980s by the US Navy): focus on quality (customer satisfaction) throughout the organization and product/service life cycle through continuous improvement

• ISO 9001 (International Organization for Standardization): Formal guidelines to develop and maintain effective quality systems

• Malcolm Baldrige National Quality Award (1987/1999): Optimize quality/service to drive business performance through excellence in: 1. leadership, 2. strategic planning, 3. customer/market focus, 4. measurement/analysis/knowledge management, 5. HR focus, 6. process management, 7. results

1. Understand the ‘system’ and the inter-relationships within it
2. Understand variation within the ‘system’ (common and special cause) and seek to reduce or eliminate special cause variation
3. Seek knowledge rather than information (data to information to knowledge to understanding to wisdom)
4. Understand people and their need for intrinsic rather than extrinsic motivation (Herzberg’s “Hygiene Theory”)
Quality is Complicated!

Institute of Medicine’s “Crossing the Quality Chasm” (2001):

a. **Safe** (minimize inadvertent errors/harm)

b. **Timely** (reduce wait times and harmful delays)

c. **Effective** (provide services that benefit (outcomes, processes, structures) and avoid services that aren’t)

d. **Efficient** (avoid waste of all resources)

e. **Equitable** (avoid differentiating care based upon gender, ethnicity, location, socio-economic status)

f. **Patient centered** (integrate the patient’s values and beliefs)
I. Key Elements in Critical Quality Problem Solving

1. Ask the right question (ask the wrong question and get the wrong answer) (5% → 20%)
2. Gather intelligence (knowable and unknowable; avoid information that confirms biases) (45% → 35%)
3. Systematically arrive at conclusions (even while asking further questions) (40% → 25%)
4. Learn from feedback (and be willing to adjust your conclusions accordingly) (10% → 20%)
The Trap:

“Millions of dollars and working hours are wasted in finding solutions to the wrong problems. An ill-defined problem or mistaken premise can eliminate promising solutions before they can even be considered. People tend to identify convenient problems and find solutions that are familiar to them rather than looking more deeply.”

Daniel B. McLaughlin, MHA
John R. Olson, PhD
Authors of “Healthcare Operations Management 2nd Edition” (HAP, 2012)
Allina Health Improvement Model
Ten Step Quality Improvement Process

1. What do we want to accomplish?
   - Establish charter & aim statement

2. Who are the stakeholders?
   - Stakeholder identification and assessment

3. How are we doing it now?
   - Current state description

4. How do we want to do it in the future?
   - Future or desired state description
   - Gap analysis

5. What keeps us from getting there?
   - Identify root causes and barriers

6. What changes can we make to get to the future state?
   - Develop opportunities & Hypotheses

7. Do it.
   - Test changes

8. How did we do?
   - Monitor results, redesign tests

9. If it worked, can we do it every time?
   - Standardize spread

10. What did we learn?
    - Capture lessons learned
II. Once the problem is properly framed, map the appropriate process:

1. Mind mapping: a non-linear technique used to develop thoughts and ideas by placing pictures or phrases on a map to show logical connections
2. Process mapping (flowchart): a graphic depiction of a process showing its inputs, outputs, and steps
3. Service blueprinting: a process map that separates actions into onstage (visible to the customer) and backstage (not visible to the customer)
Flowchart Standard Symbols

A rectangle is used to show a task or activity.

A diamond is used to show those points in the process where a choice can be made or alternate paths can be followed.

Arrows show the direction of flow of the process.

D shapes are used to show delays.

An oval is used to show inputs/outputs to the process or start/end of the process.

Block arrows are used to show transports.

Feedback loop

Microsoft Visio® screen shots reprinted with permission from Microsoft Corporation.
Service Blueprinting

**Customer Actions**
- Customer gives prescription to clerk

**Onstage Actions**
- Clerk enters data
- Clerk gives prescription to pharmacist
- Pharmacist fills prescription
- Pharmacist gives medicine to clerk
- Clerk retrieves medicine
- Clerk gives medicine to customer
- Customer receives medicine

**Line of interaction**

**Line of visibility**
Allina Health Improvement Model
Ten Step Quality Improvement Process

1. What do we want to accomplish?
   - Establish charter & aim statement

2. Who are the stakeholders?
   - Stakeholder identification and assessment

3. How are we doing it now?
   - Current state description

4. How do we want to do it in the future?
   - Future or desired state description
   - Gap analysis

5. What keeps us from getting there?
   - Identify root causes and barriers

6. What changes can we make to get to the future state?
   - Develop opportunities & Hypotheses

7. Do it.
   - Test changes

8. How did we do?
   - Monitor results, redesign tests

9. If it worked, can we do it every time?
   - Standardize spread

10. What did we learn?
    - Capture lessons learned
III. Once the appropriate process is mapped, identify the problems:

1. Root cause analysis (RCA): a retrospective structured problem solving technique to identify root (as opposed to proximate) causes of the problem.

2. Failure mode and effects analysis (FMEA): a prospective problem solving technique that identifies potential failure modes in a process and prioritizes them based upon likelihood of occurrence (1-10), detectability (1-10), and severity (1-10) which multiplied together equals the risk priority number (RPN).
Once the appropriate process is mapped, identify the problems:

   a. Identify the constraint or bottleneck
   b. Exploit it
   c. Subordinate everything else to the constraint (synchronize other actions to it)
   d. Elevate the constraint until it is no longer the constraint
   e. Repeat the process for the new constraint
Allina Health Improvement Model
Ten Step Quality Improvement Process

1. What do we want to accomplish?
   Establish charter & aim statement

2. Who are the stakeholders?
   Stakeholder identification and assessment

3. How are we doing it now?
   Current state description

4. How do we want to do it in the future?
   Future or desired state description
   Gap analysis

5. What keeps us from getting there?
   Identify root causes and barriers

6. What changes can we make to get to the future state?
   Develop opportunities & Hypotheses

7. Do it.
   Test changes

8. How did we do?
   Monitor results, redesign tests

9. If it worked, can we do it every time?
   Standardize spread

10. What did we learn?
    Capture lessons learned
IV. Once the problems are identified, measure and analyze them utilizing graphic tools:

- Mind maps
- Check sheets
- Histograms and Pareto Diagrams
- Dot Plots
- Scatter Plots
Graphical Tools: Histograms and Pareto Charts

Length of Hospital Stay

- Frequency
- Length of Hospital Stay (days)

- 1-2
- 3-4
- 5-6
- 7-8
- 9-10
- 11-12
- 13-14
- 15-16
- 17-18

Diagnosis Category

- Frequency
- Diagnosis

- Heart Disease
- Delivery
- Pnuemonia
- Malignant Neoplasms
- Psychoses
- Fractures

Microsoft Excel screen shots reprinted with permission from Microsoft Corporation.
Graphical Tools: Dot Plots

Length of Hospital Stay

Produced with Minitab statistical software
Graphical Tools: Scatter Plots

Strong Negative Correlation

\[ r = -0.86 \]

Strong Positive Correlation

\[ r = 0.91 \]

Positive Correlation

\[ r = 0.70 \]

No Correlation

\[ r = 0.06 \]

Microsoft Excel screen shots reprinted with permission from Microsoft Corporation.
Utilize Lean Management Techniques to eliminate ‘waste’ and make the process more efficient

• The Toyota Production System (“The Machine that Changed the World”-1990) developed by Taiichi Ohno

• Optimizes quality and reduces costs by eliminating waste and inefficiency
Types of Waste (‘Muda’) = too much…

- Production
- Waiting
- Transportation
- Inventory
- Motion
- Processing (excessive non-value added steps/procedures)
- Defects (errors)
Key Philosophies and Approaches in “Lean”

• Kaizen and Kaizen Events: Continual improvement through-specify value (customer’s prospective), map and improve the value stream, enhance flow, enable the customer to drive flow (pull or market driven), move towards perfection

• Measure takt time (speed that customers must be served to satisfy demand), cycle time (time to accomplish a task), throughput time (time to complete the entire process)
Key Philosophies and Approaches in “Lean”

- Standardize work (clinical/functional pathways)
- Jidoka: ability to stop a process when an error occurs
- Andon: a visible signal utilized to signal an error or defect
- Kanban: a visible signal that triggers the movement of inventory/product in a system
- Rapid changeover (optimizing set ups)
- Heijunka: eliminating variations in volume and variety of production to reduce waste
Utilize Six Sigma Techniques to Eliminate Defects through Removal of Non-Value Added Variance:

- Developed by Motorola and exploited by GE (1980s)
- Philosophy of constant change management
- Team based projects that address key ("Big Q") strategic initiatives
- Utilizes Define/Measure/Analyze/Improve/Control (DMAIC) problem solving technique and quantitative measures of project success
- Visualizes problems with seven basic quality tools popularized by Kauro Ishikawa
Seven Basic Quality Tools

- Check Sheet
- Fishbone Diagram
- Run Chart
- Histogram
- Pareto Chart
- Flow Chart
- Scatter Diagram
Key Six Sigma Concepts:

• Taguchi methods: measure against an absolute standard (zero defects) rather than conformance to specifications and where variation is minimal
• Benchmark to the ‘best’
• Poka-yoke (prevent mistakes by making them immediately obvious or eliminating them)
• Measure the Process Capability: how well a process can produce output that meets desired specifications
• Measure the Rolled Throughput Yield (RTY): the probability that a unit of product/service will pass through the process free of defects
Allina Health Improvement Model
Ten Step Quality Improvement Process

1. What do we want to accomplish?
   Establish charter & aim statement

2. Who are the stakeholders?
   Stakeholder identification and assessment

3. How are we doing it now?
   Current state description

4. How do we want to do it in the future?
   Future or desired state description
   Gap analysis

5. What keeps us from getting there?
   Identify root causes and barriers

6. What changes can we make to get to the future state?
   Develop opportunities & Hypotheses

7. Do it.
   Test changes

8. How did we do?
   Monitor results, redesign tests

9. If it worked, can we do it every time?
   Standardize spread

10. What did we learn?
    Capture lessons learned
V. Once the problem is solved…

• Continue to monitor to hold the gains
• If the problem relapses, consider digging deeper into the problem
• Measure the quality/financial implications of solving the problem (Cost/Volume/Profit analysis)
• Continue the improvement process based upon strategic importance
Ancient Wisdom:

“Quality is not an act; it is a habit.”

-----Aristotle (346 BC)
Thank You for Joining Us!

Jon Burroughs, MD, MBA, FACHE, FACPE
jburroughs@burroughshealthcare.com;
603-733-8156