Healthcare Transformation and Tools and Methods of the Quality Professional

Nebraska Quality Residency Program

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Objectives

01

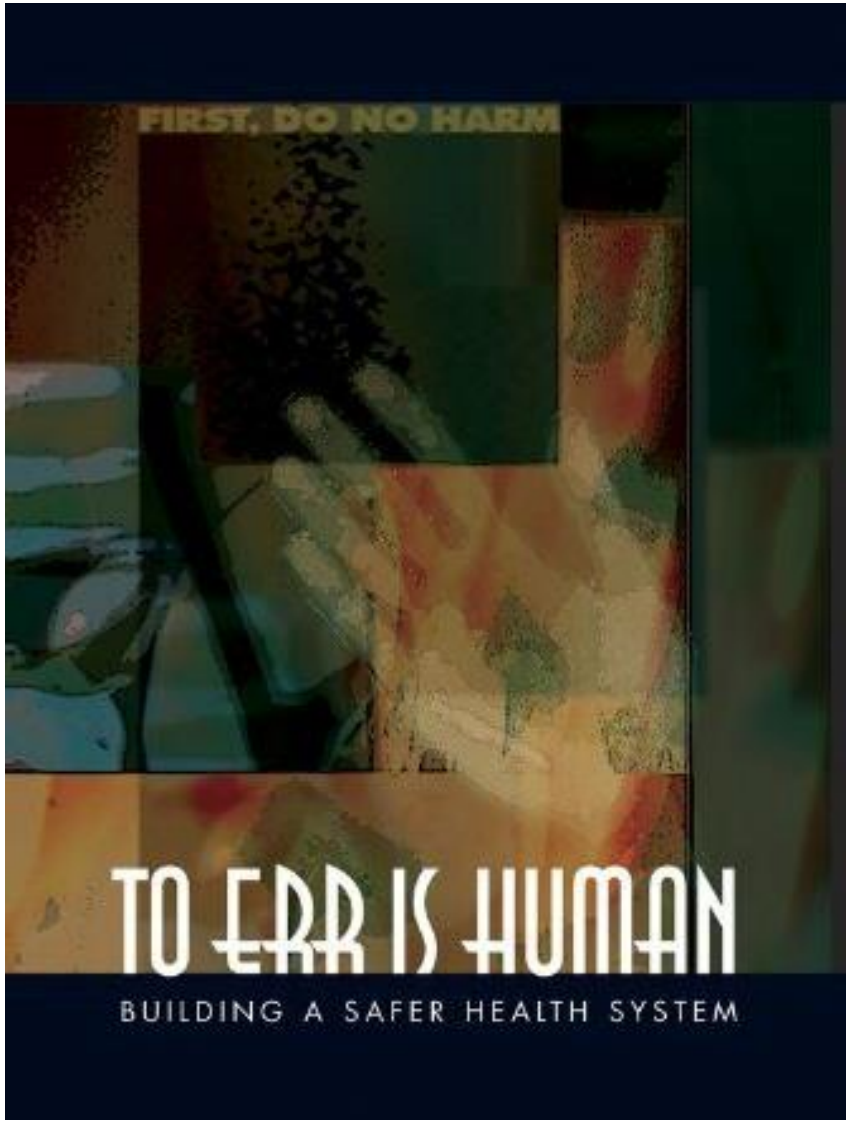
Synthesize and apply quality/safety improvement methods and tools in a clinical setting.

02

Promote sustained improvement of an identified goal through effective application of quality improvement tools and methods.

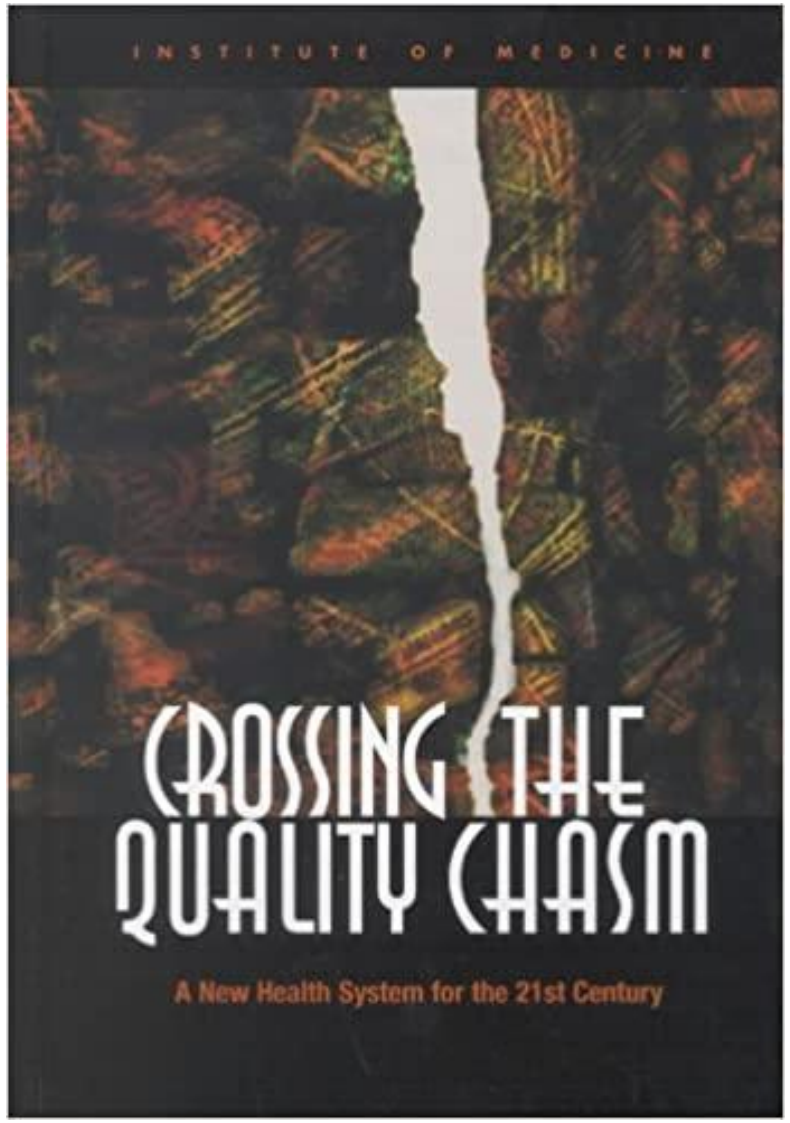
03

Integrate improvement science, complexity science, quality and safety tools and methodologies to develop systematic designs to sustain improvement in population healthcare delivery and outcomes.



To Err is Human

To Err Is Human: Building a Safer Health System is a landmark report issued in November 1999 by the U.S. Institute of Medicine that may have resulted in increased awareness of U.S. medical errors. The push for patient safety that followed its release continues.



Second in the Series

Made an urgent call for fundamental change to close the quality gap. This book recommends a sweeping redesign of the American health care system and provides overarching principles for specific direction for policymakers, health care leaders, clinicians, regulators, purchasers, and others. In this comprehensive volume the committee offers:

1. A set of performance expectations for the 21st century health care system.
2. A set of rules to guide patient-clinician relationships.
3. A suggested organizing framework to better align the incentives inherent in payment and accountability with improvements in quality.
4. Key steps to promote evidence-based practice and strengthen clinical information systems.

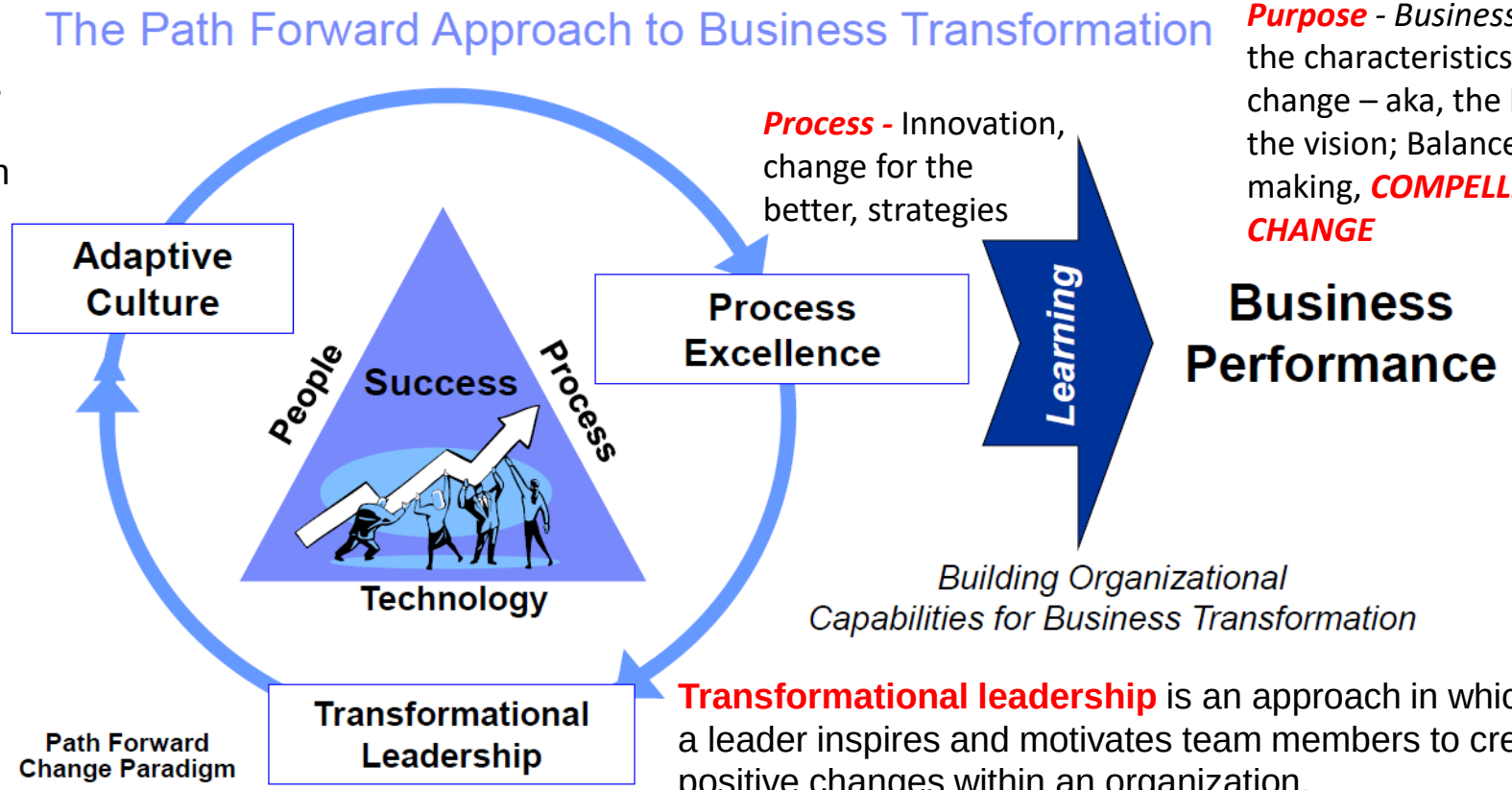
Transformation - Definition

Transformation: Means a change that involves fundamental reframing of values, beliefs, habits of behavior, along with a radical redesign of care processes and systems, to achieve dramatic levels of improvement.

M.Joshi, E.R. Ransom, D. Nash, S.B. Ransom. *The Healthcare Quality Book.* 3rd ED, 2014 p. 359

Adaptive Culture is a way of operating where change is expected Adapting to change is smooth, routine and seamless. Change, growth, and innovation are a "given" part of the business environment.

People can quickly and effectively make good decisions, and a ***team*** (group, organization, etc.) can coordinate efficiently, and ultimately reach the targeted goal together



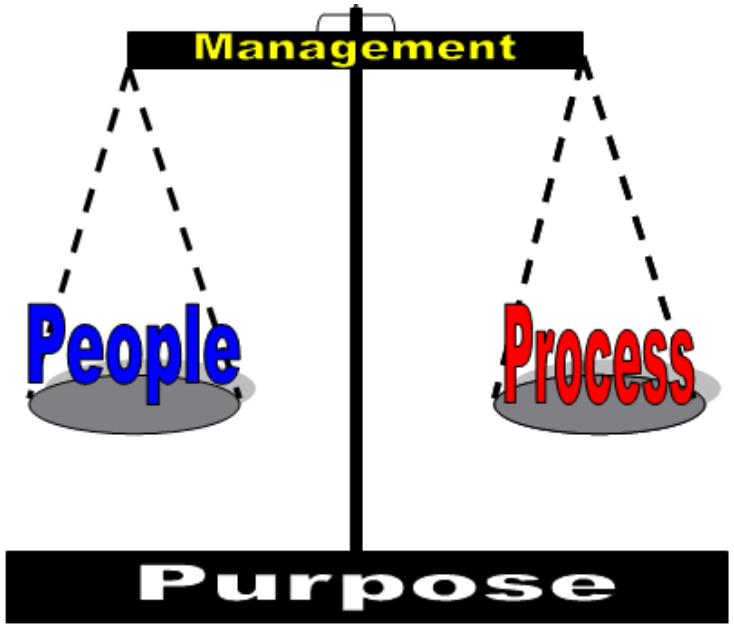
Process - Innovation, change for the better, strategies

Purpose - *Business Relevance*: Refers to the characteristics of a particular change – aka, the burning platform and the vision; Balanced scorecard decision making, ***COMPELLING REASONS FOR CHANGE***

Transformational leadership is an approach in which a leader inspires and motivates team members to create positive changes within an organization.

Innovation and continuous improvement enabled through process excellence and high performing organization culture

https://www.iise.org



It’s a balancing act!

Transforming Healthcare

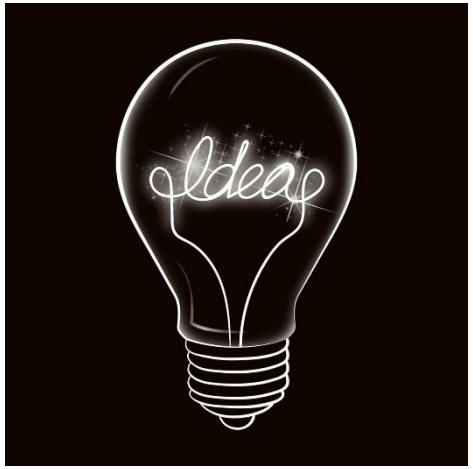
Despite serious and widespread efforts to improve the quality of health care, many patients still suffer preventable harm every day. Hospitals find improvement difficult to sustain, and they suffer "project fatigue" because so many problems need attention. No hospital or health system have achieved consistent excellence throughout their institutions. High-reliability science is the study of organizations in industries like commercial aviation and nuclear power that operate under hazardous conditions while maintaining safety levels that are far better than those of health care. Adapting and applying the lessons of this science to health care offer the promise of enabling hospitals to reach levels of quality and safety that are comparable to those of the best high-reliability organizations.

High-Reliability Health Care: Getting There from Here MARK R. CHASSIN and JEROD M. LOEB

The Joint Commission 2013

Ways Healthcare Transforms(ed)

The How	The Example
Through safety imperative	Create a just culture
Through hospital senior leadership	Rounding, huddles, ED flow, a shift from provider to patient
Through nursing leadership	Nursing councils, research, staffing
Through health care delivery	Patient satisfaction/experience, COVID
Through innovation	EMR's, robotics, medication dispenser systems, barcoding, AI
Through data	Special databases, scorecards, industry reports
Through one team at a time	Performance/Quality improvement projects



Can you think of other examples?

The Why

1. **Increase spend on primary care:** Great investment in primary care leads to lower health care costs and better health outcomes. Health care leaders must emphasize an increase in U.S. health care spend on primary care from 4–6% to the 15–25% that most high-functioning (and lower cost) health systems are spending on primary care.

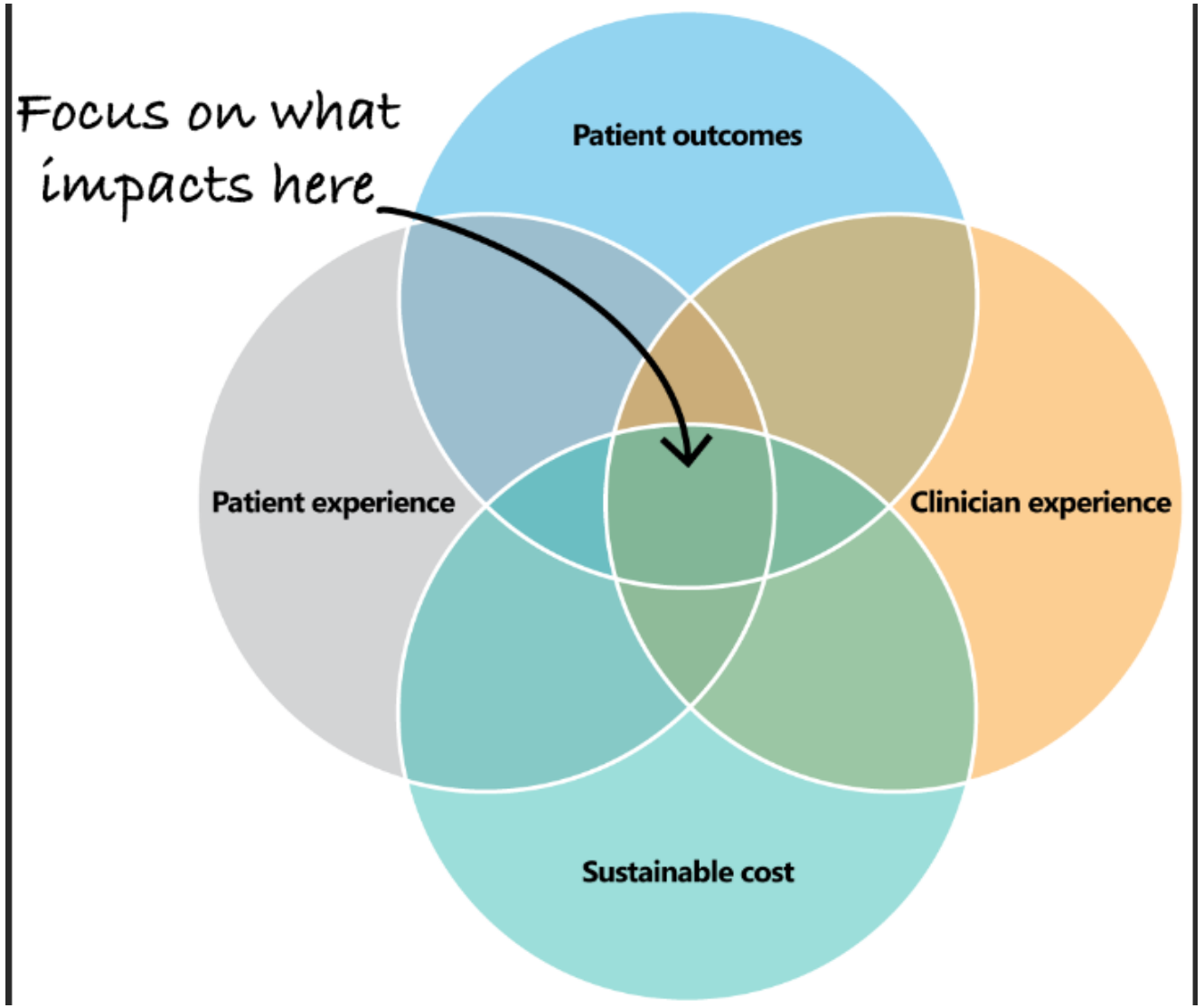
2. **Stop focusing on "sick care:"** Health care leaders must shift the nation's "sick care" approach to care that is preventative and comprehensive.

3. **Stop the bleeding in rural areas:** Some rural communities have a higher maternal mortality rate than those of Third World countries, yet they are continuing to close hospitals. Health care leaders must invest in the health care of rural communities and provide cost-effective access.

4. **Increase family doctors as a specialty:** More family physicians are needed to increase access to comprehensive, preventative health care, especially in shortage areas and hospital settings. To grow this pipeline, health care leaders can support the increase of family medicine residency spots for medical students.

5. **Use technology to improve access and reduce cost:** Health care leaders can improve access and reduce costs by investing in and utilizing telemedicine, artificial intelligence (AI) and electronic health records (EHR).

5 Things We Must Do To Improve the US Health Care System
May 14, 2019 | News
https://www.calsprogram.org/blog/news/5-things-we-must-do-to-improve-the-us-health-care-system



The Why – the Quadruple Aim

Improve patient outcomes

Improve patient experience

Lower health care costs

Higher healthcare workforce satisfaction

Triple aim created by the Institute of Healthcare Improvement (IHI) 2007

We haven't finished with the triple aim – the triple aim is patient centered. We can't lose focus and we must measure what matters. (IHI)

How the pandemic transformed hospitals now and for years to come

- Quality programs and measures not designed to contend with pandemics and public health emergencies of the magnitude seen in 2020 and 2021
- Quality programs not designed to manage the degree of aberration encountered in underlying data reporting
- Staffing
- The pandemic disrupted the health care system in ways that have affected the patient, provider, hospital level decision making, behaviors and performance.
- Medicare's payment system adjusts hospital payments based on quality of care delivered, using metrics from the Value Based Purchasing (VBP) Program, Hospital Readmission Reduction Program (HRRP) and the Hospital Acquired Condition (HAC) Program. With the impact COVID had on patient care, using the 2020 data will impact hospital quality reporting.
- Centers for Medicare and Medicaid Services (CMS) faces challenges in adjustment, modifications and exceptions to ensure proper use of data in these payment programs.

- Salzberg, Claudia A., Kahn Charles COVID – 19 Will Upend Hospital Reporting and Value Based Programs for Years to Come. Online: https://www.healthaffairs.org/do/10.1377/forefront.2021520.815024/

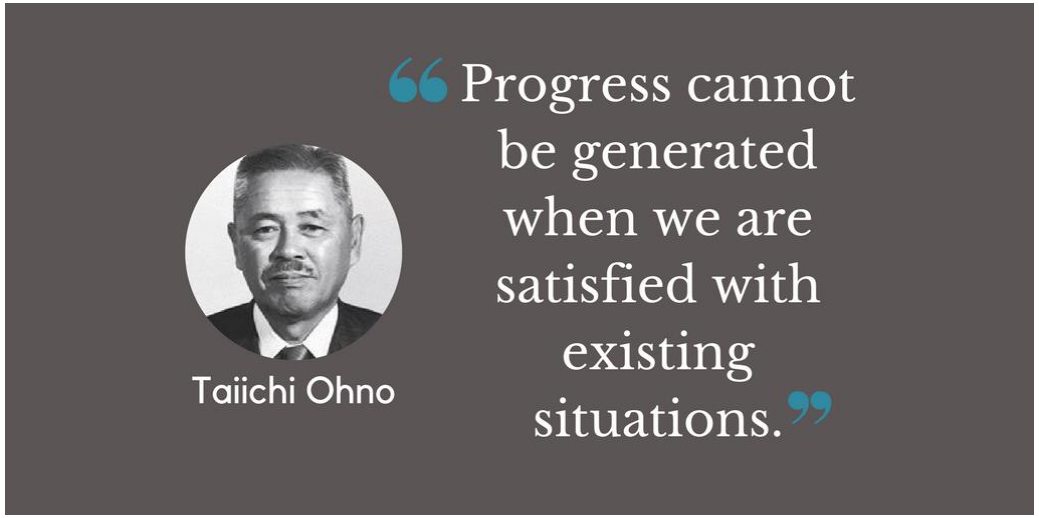
Tools and Methods

LEAN Methodology - The Developer

Taiichi Ohno was a Japanese Industrial engineer and businessman. He is considered the father of the Toyota Production System, which inspired Lean Manufacturing in the U.S. He identified seven wastes (*muda*) as part of this system.

DOWNTIME

Defects
Over production (more than demand)
Waiting
Nonvalue added tasks
Transport
Inventory (excessive) Excess products/materials
Motion
Excess processing (more work/quality than required)



What is LEAN Thinking?

At its core, Lean is a business methodology that promotes the flow of value to the customer through two guiding tenets: continuous improvement and respect for people.

Roots in Manufacturing

Lean methodology originated with the Toyota Production System, or TPS, which revolutionized the manufacture of physical goods in the 1950s, ‘60s, and beyond. Lean maintains its hold in manufacturing, but has also found new applications in knowledge work, helping businesses in all industries eliminate waste, improve processes, and boost innovation.

Lean thinking is a transformational framework that aims to provide a new way to think about how to organize human activities to deliver more benefits to society and value to individuals while eliminating waste.

LEAN Steps

1. Define value as determined by the customer, right product/service, right time and right price

2.Identify the *value stream* – actions needed to bring the product, concept to completion

3. Make value added steps flow

4. Let the customer pull the product from the supplier – Do not push

5. Set goals and strive for perfection

LEAN Projects

Flow

Hospital or unit remodeling

Emergency preparedness

Bedside instrument use

Surgical instrument use

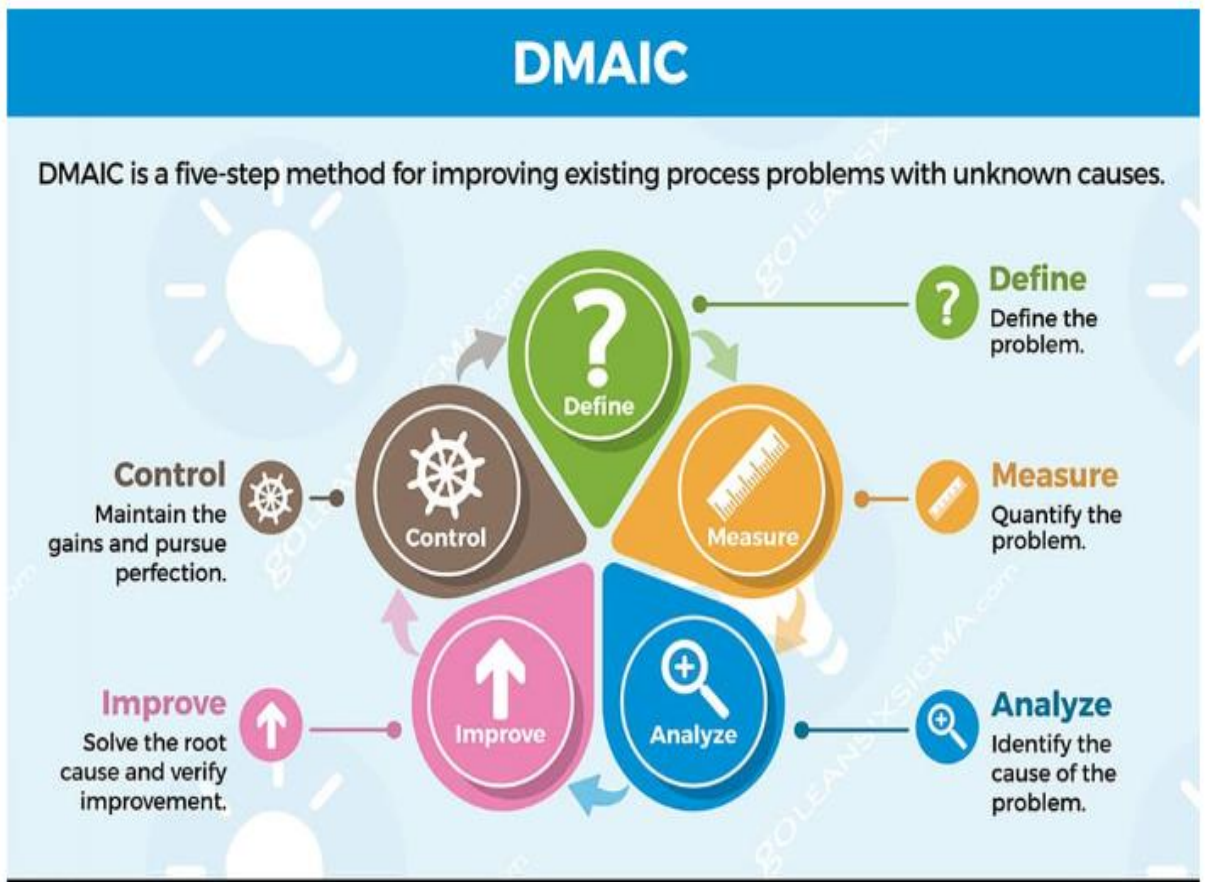
Revised dining services

Shift reporting

Medication delivery

EMR adaptations

DMAIC becomes an integral part of a Six Sigma initiative, but in general can be implemented as a standalone quality improvement procedure or as part of other process improvement initiatives such as lean.



Six Sigma

Six Sigma is a process improvement methodology that is a disciplined, data-driven approach for eliminating defects and waste from a process. To achieve Six Sigma, a process must not produce more than 3.4 defects per million opportunities. A defect is anything that falls outside of a customer's specification.

Six Sigma uses a method called DIMAC which stands for Define, Measure, Analyze, Improve, and Control. Each stage of this process is designed to help identify, measure and improve existing processes.

Primary focus is to reduce variation and create a more uniform process, while eliminating waste.

DMAIC (Define, Measure, Analyze, Improve, Control)
DMADV (Define, Measure, Analyze, Design, Verify

DMAIC - Quality strategy used to improve processes. It is an integral part of a Six Sigma initiative, but can be implemented as a standalone quality improvement procedure or as part of other process improvement initiatives such as Lean.

DMADV is a data-driven quality strategy that focuses on the development of new products or services compared to existing ones. The DMADV method or approach is often used when implementing new strategies because of its basis in data, its ability to identify success early, and its method, which requires thorough analysis. Like DMAIC, it is an integral part of a Six Sigma quality initiative.

Define – What do Customer's Value?

- What is the problem?
- Why is it important?
- Who is the customer?
- What is critical to quality?
- What is the goal?
- Who are the stakeholders?
- Who are team members?
- Do you anticipate resistance?
- What does the current state look like?
- What are you going to improve, by how much and by when (timeline)?

Tools

Project Charter

15 Words – what is most important?

5 Whys (5 W's)

Voice of the customer

SMART Goals (specific, measurable, achievable, relevant, timebound)

ARMI Analysis: Approval, R = Resource, M = Member, I = Interested Party

Stakeholder Analysis

Barriers to Success Analysis

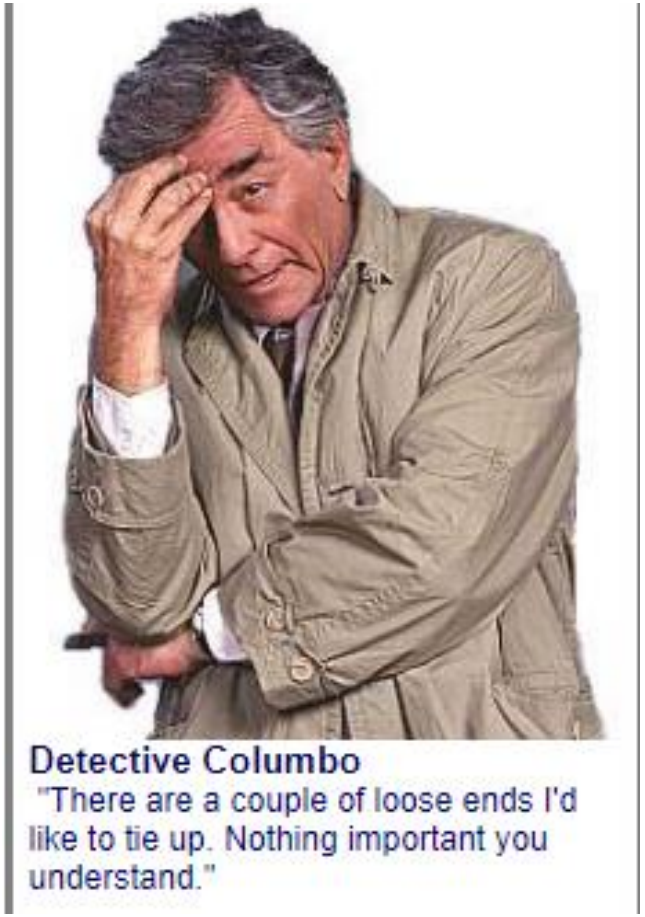
Process mapping – define what you are changing

Value Stream Mapping

WWW

Columbo Approach

Detective Columbo always scratched his head and asked a lot of questions. A good performance improvement facilitator does the same. Good facilitators often suspect critical issues lie underneath the surface and direct questions accordingly.



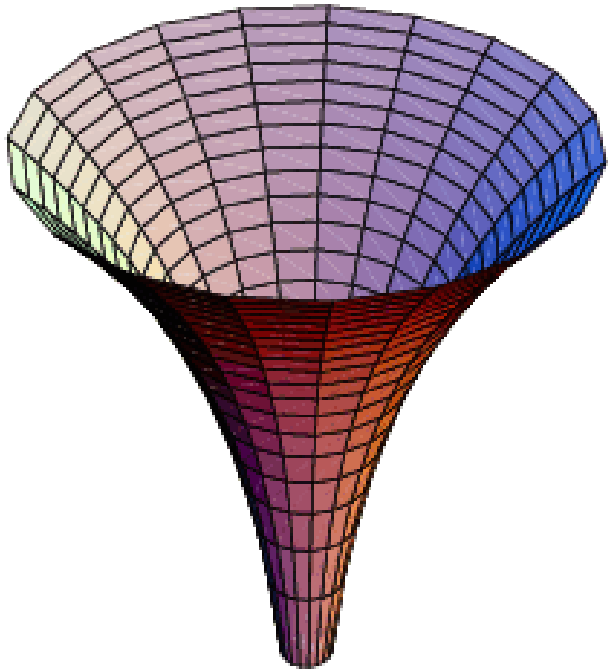
Project Examples

- Reducing Falls
- Patient Flow (ED, Clinic, Surgery, Procedures)
- Patient Experience
- Readmissions
- Reducing infections
- Reducing length of stay
- Admission and discharge process
- Care transitions
- Reduce billing cycle time
- Reduce purchasing costs and par levels
- Achieving National Patient Safety Goals

What are the projects in your facility?

Summary - Define

- Drill down - keep questioning until you have the problem, issue or project clearly defined, measurable and relevant and workable.
- Don’t boil the ocean
- Team consensus for understanding
- Use tools to define the problem



Measure – Identify all steps in the process

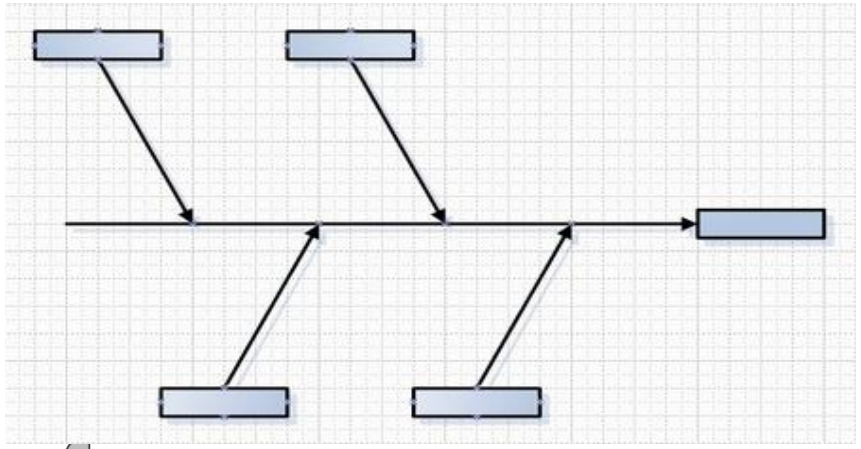
- What steps have the biggest impact on the customer?
- Do you have baseline data?
- Develop a data collection plan
- What could go wrong within the key steps?
- What are probable causes?
- What are you going to measure?
- How reliable and accurate are your data?
- How can a new process meet the customer's demand?

Tools

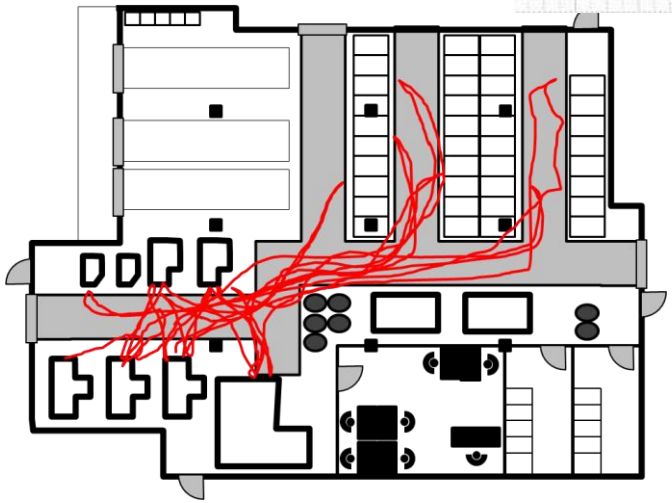
Cause and Effect Diagram
RCA
Data Collection Plan
Spaghetti Diagram
Value Stream Map
Failure Mode Effects Analysis (FMEA)

Tools

Examples

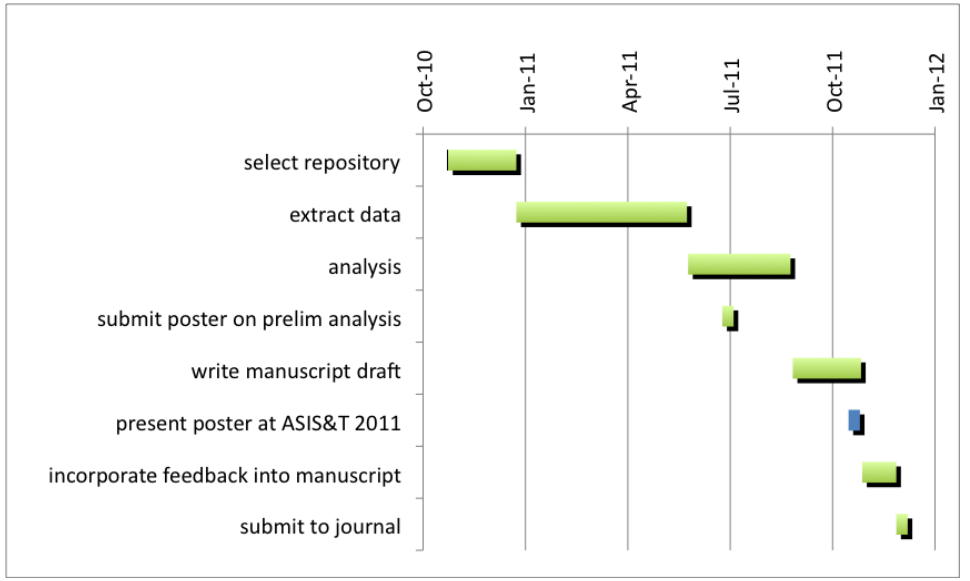


Ishikawa – Fishbone Diagram



Spaghetti Diagram

Project Timeline

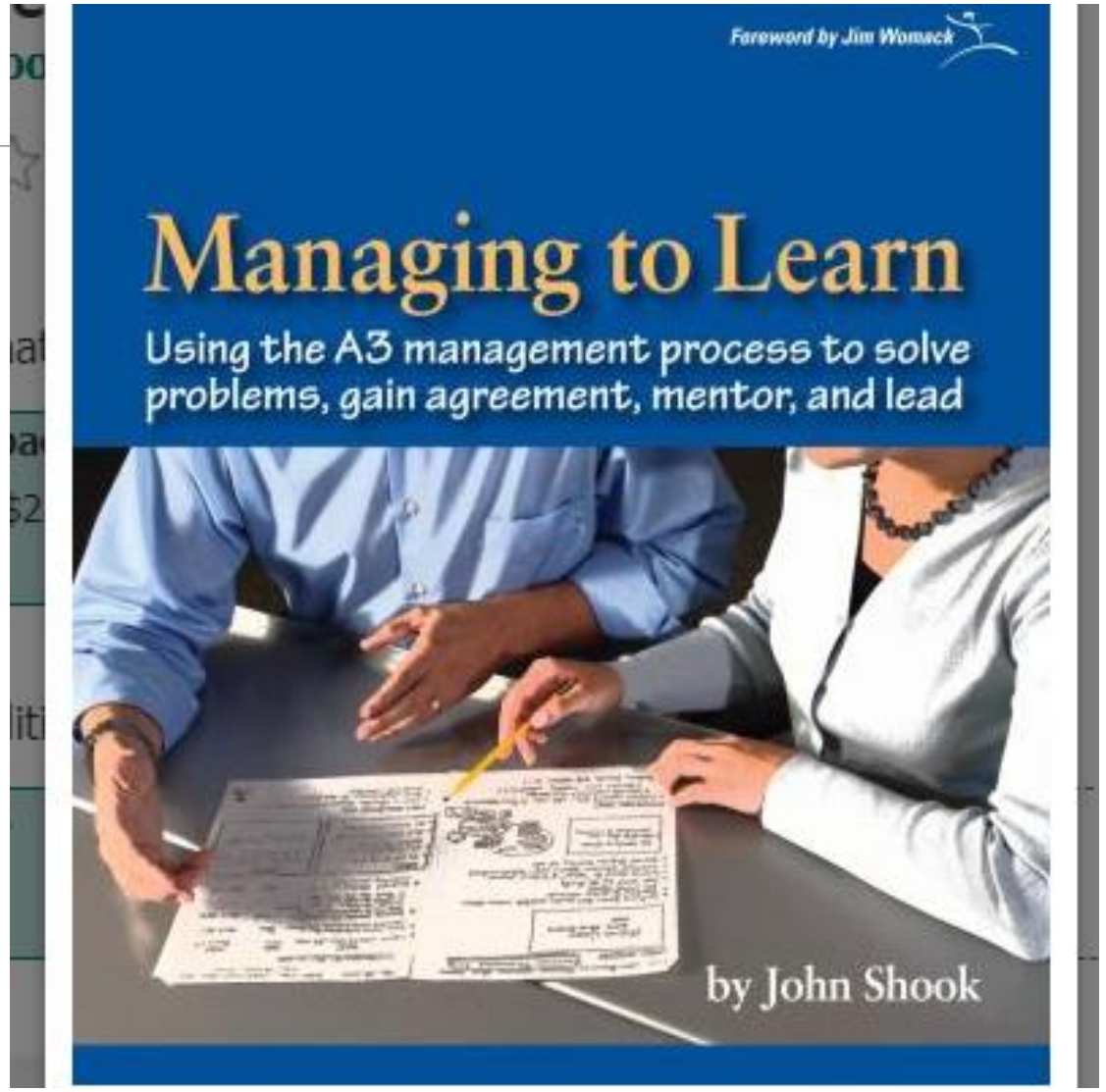


Value Stream Mapping

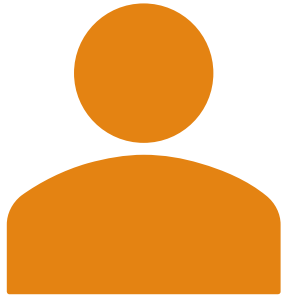
"Whenever there is a product (or service) for a customer

There is a value stream. The challenge lies in seeing it!.... John Shook

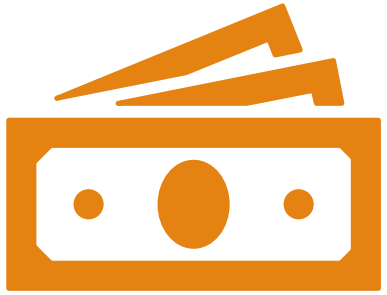
A Value Stream Map (VSM) is a graphic map of all steps that occur from the specific request for a product (or service) to the actual delivery. A VSM provides a simple means to see the request.



Value Added



Product or service transformed into a state required by the customer



If asked the customer is willing to pay for the product or service

Non-Value Added

Needed	True Non-Value Added
Activities causing no value or created value but cannot be eliminated	Activities consume resources but create no value in the eyes of the customer
• Required/Regulatory, customer mandate	Pure Waste
• Necessary due to non-robustness of the process	

Uses of a VSM

UNDERSTAND PROCESS STEPS

VISUALIZE LOCATION OF PROBLEMS

LAUNCH PROBLEM SOLVING EFFORTS

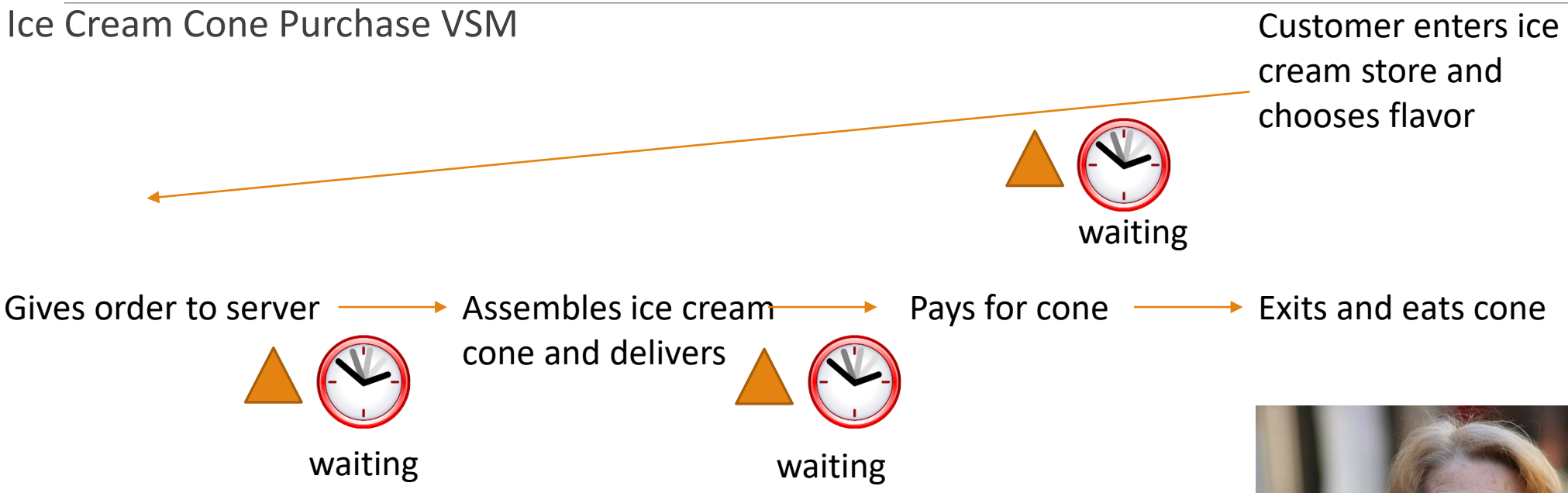
EDUCATE STAFF ON THE PROCESS

DESCRIBE THE PROCESS TO OTHERS (LEADERS)

SPRINGBOARD FOR FUTURE STATE PROCESSES

Value Stream Map

Ice Cream Cone Purchase VSM



Viewed from what the customer expects, and different from a conventional flow chart because the VSM indicates waste.

= delay

What flows through a Value Stream

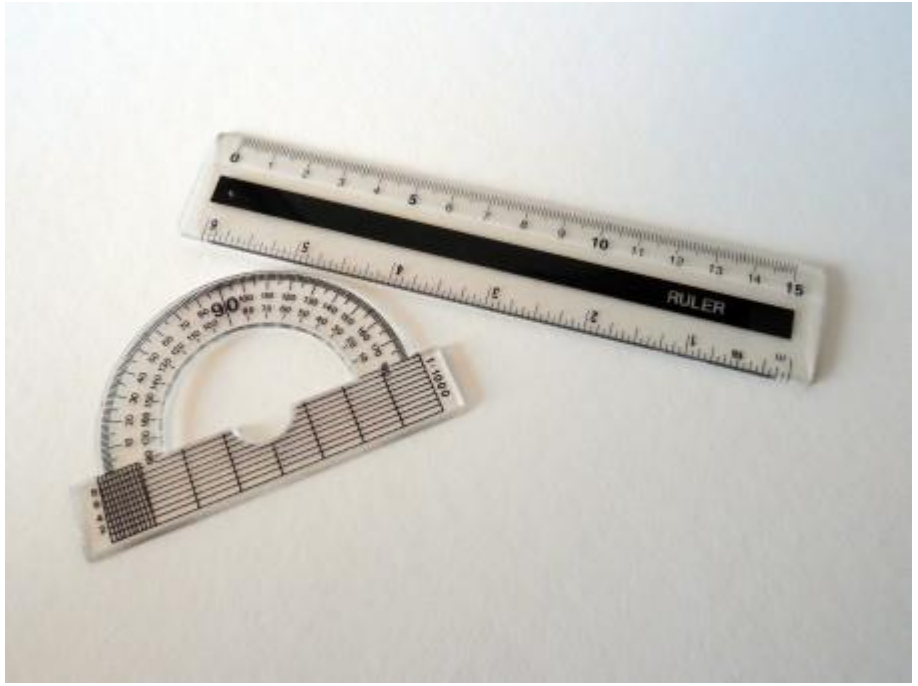
In Manufacturing: Materials

In Services: External needs of the customer and information

In Healthcare: Patients and family members, also materials (objects) and information (handoffs)

Summary - Measure

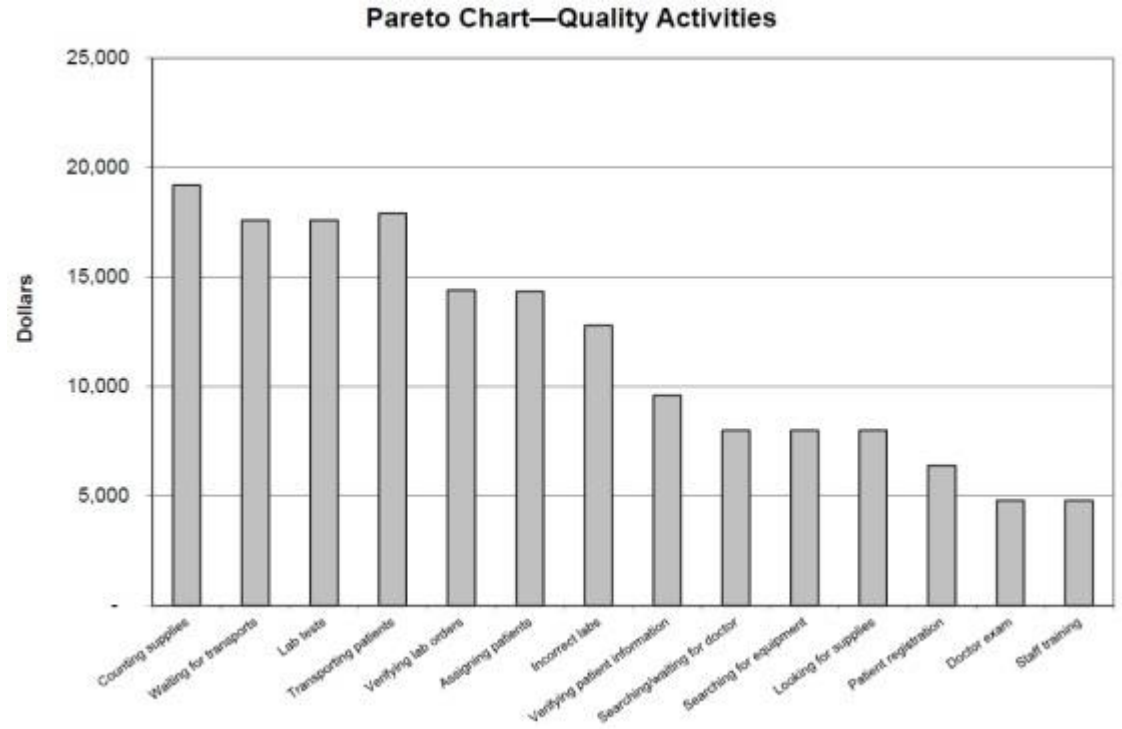
- Know your process – observe
- Flow the process to identify value added and nonvalue added steps (from the customer's perspective
- Identify the areas of waste, delay and measure.
- Identify and prioritize the steps in the process that require improvement



Analyze – Validate the root cause, waste and defects

What does your data show (statistical or practical significance)?

How are you going to communicate your results to stakeholders



Tools

Pareto charts

Histograms

Dashboard

Communication Plan

Analyze

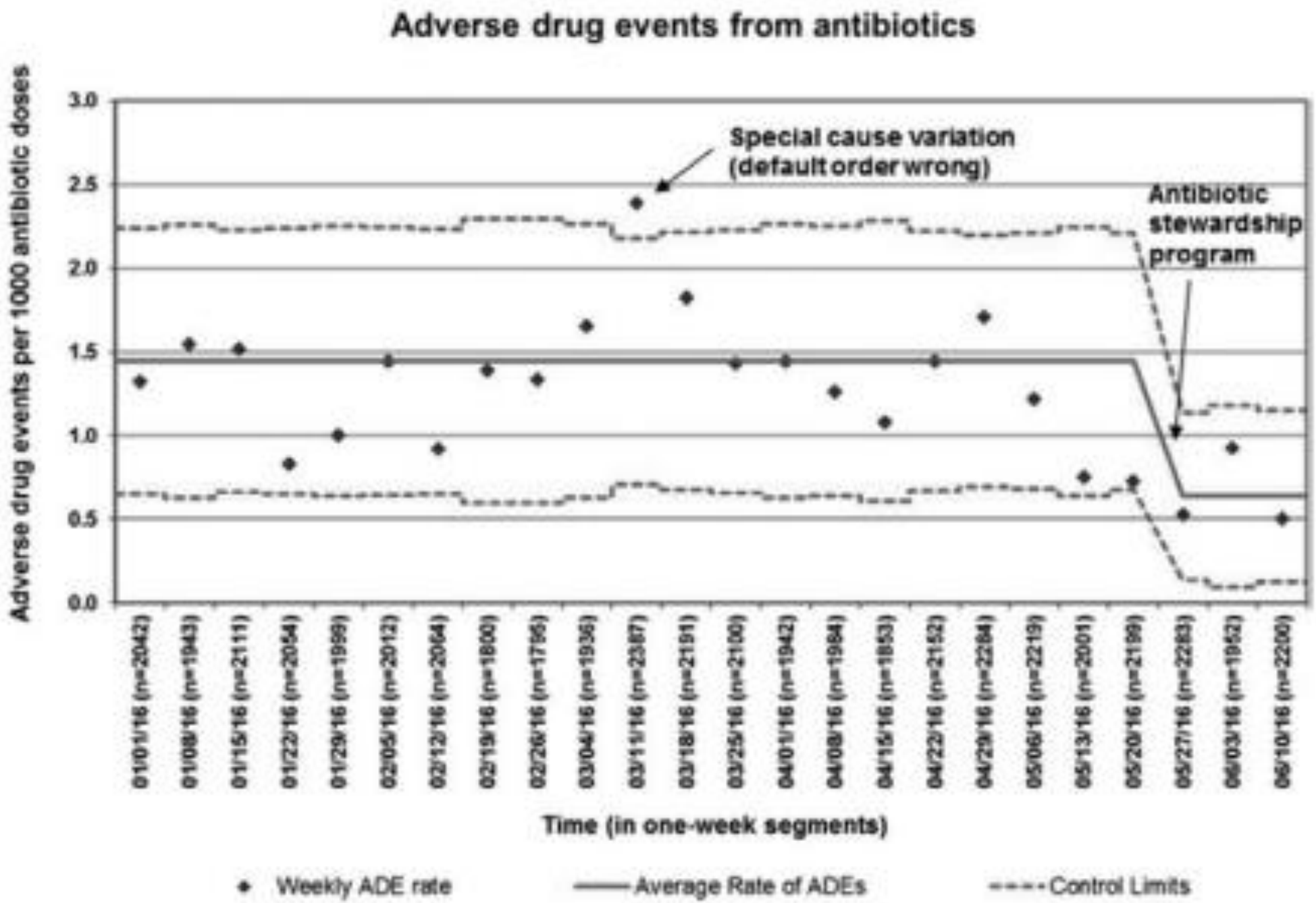
- Goal is to get as much information and measurements on the current process as possible
- Identify and spot problem areas
- Identify defects
- Use statistical tools, correlations, comparisons, etc. to report the data

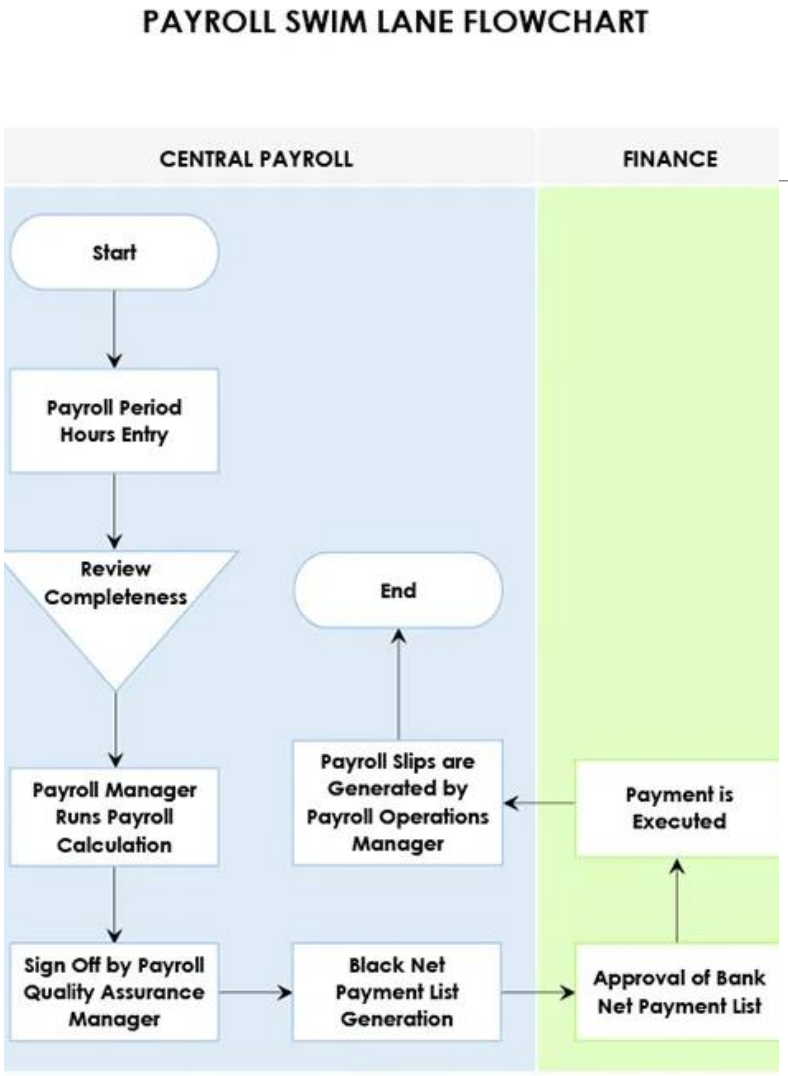
Run Charts and Control Charts

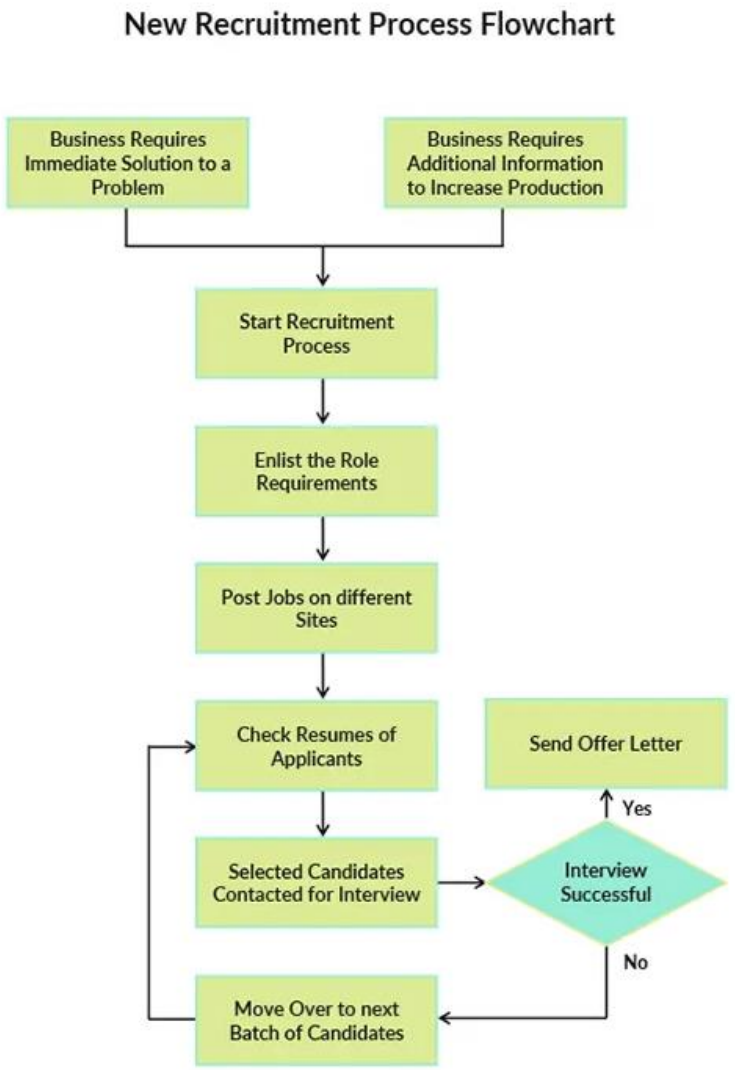
Run charts and other statistical process control (SPC) charts present data over time and enable the improvement team to identify quickly when variation that is unlikely due to chance (special-cause variation) has occurred. Run charts are simple displays of data over time with a median line that indicates the central tendency.

SPC charts (also called Shewhart charts) were developed by Walter Shewhart, a young engineer, physicist, and statistician working at Western Electric Company in the early 20th century

Control charts have advantages over run charts in that they define expected variation in a process. The first goal of many QI interventions is to reduce this variation. The centerline in SPC charts is most commonly the mean of the data points (versus a median used in run charts). The upper and lower control limits (usually shown visually as dotted lines) are defined based on the distribution of the data with each approximately 3 standard deviations, or σ, above and below the centerline.


Adverse drug events from antibiotics
Adverse drug events per 1000 antibiotic doses
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Special cause variation
(default order wrong)
Antibiotic
stewardship
program
01/01/16 (n=2042)
01/08/16 (n=1943)
01/15/16 (n=2111)
01/22/16 (n=2054)
01/29/16 (n=1999)
02/05/16 (n=2012)
02/12/16 (n=2064)
02/19/16 (n=1800)
02/26/16 (n=1795)
03/04/16 (n=1936)
03/11/16 (n=2387)
03/18/16 (n=2191)
03/25/16 (n=2100)
04/01/16 (n=1942)
04/08/16 (n=1984)
04/15/16 (n=1853)
04/22/16 (n=2152)
04/29/16 (n=2284)
05/06/16 (n=2219)
05/13/16 (n=2001)
05/20/16 (n=2199)
05/27/16 (n=2283)
06/03/16 (n=1952)
06/10/16 (n=2200)
Time (in one-week segments)
Weekly ADE rate
Average Rate of ADEs
Control Limits





Typical Flow Charts

(shows step by step)

Summary - Analyze

- Use these data to make a business case for change, set realistic and achievable goals and drive improvements.
- Identify interventions and changes in the process and display with the data
- Specify measurements and timeframes
- Keep data simple
- Avoid red and green
- Make sure YOU understand the data

Patrick W. Brady, Michael J. Tchou, Lilliam Ambroggio, Amanda C. Schondelmeyer, and Erin E. Shaughnessy; Displaying and Analyzing Quality Improvement Data; Division of Hospital Medicine, Department of Pediatrics, James M. Anderson Center for Health Systems Excellence, Department of Pediatrics, and Division of Biostatistics and Epidemiology, Department of Pediatrics, Cincinnati Children's Hospital Medical Center, Ohio. Journal of the Pediatric Infectious Diseases Society, 2017.

Improve – stabilize the process, reduce or eliminate waste, variation and defects

- What are possible solutions targeted to improve the validated root causes?
- What is the best solution?
- How are you going to test the solution?
- Where should you focus change management efforts?

Tools

Brainstorming
Facilitated meetings
Mistake proofing
Plan Do Study Act (PDSA) cycles

Brainstorming

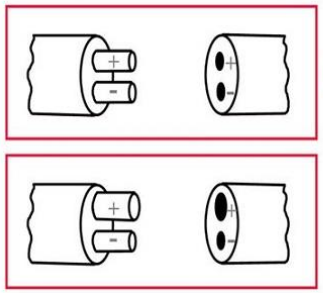
Group discussion to produce ideas or solve problems: Brainstorming can generate some wonderful ideas, spot gaps and identify opportunities for improvement

Tools and approaches:

- Mind maps/idea maps (generates good and bad ideas
- Flow charts
- Thinking out loud
- Sticky paper maps
- Facilitated meetings

Visual Controls for Mistake Proofing

Example of Mistake proofing



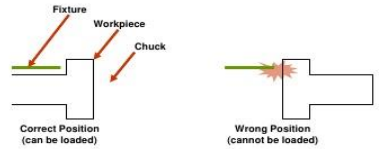
Without mistake proofing, we can have a mistake with irreversible damages

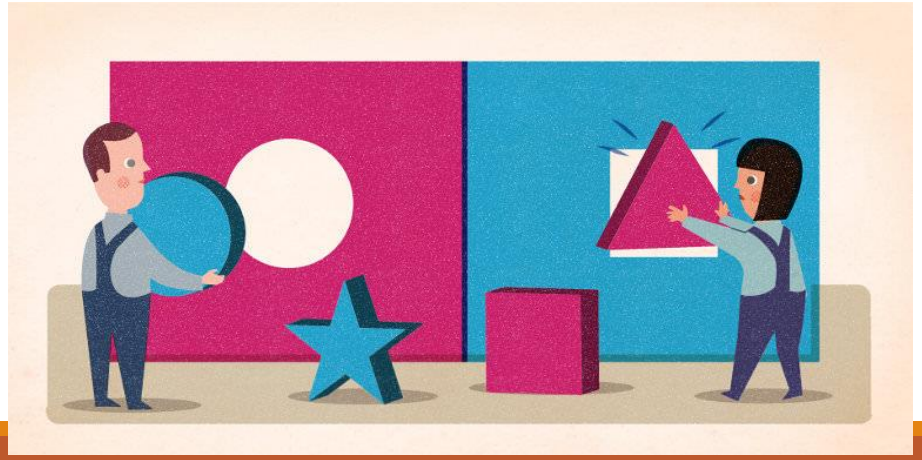
With mistake proofing, error is not possible

Mistake-Proofing Examples

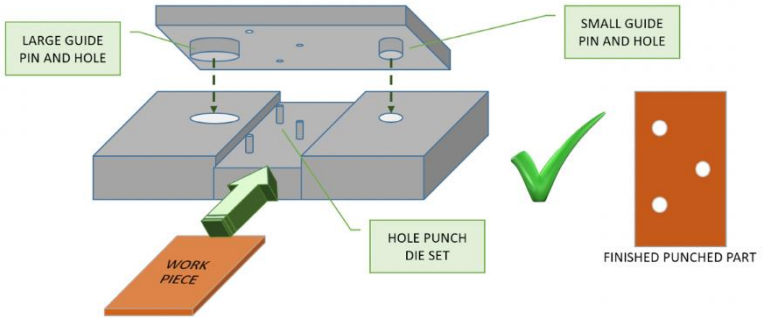
- Redesign the process to eliminate or reduce the possibility of a particular failure mode
- A way to avoid mistakes
- Make the error impossible
- If you cannot prevent the error, modify the process to make the error obvious (detection)

Mistake-Proofing Illustrated





MODIFICATION TO DIE SET, INTRODUCING POKA-YOKE (ERROR PROOFING)



With this small modification to the die set it is impossible to fit the top die onto the bottom die incorrectly. The large diameter guide pin can not fit into the small guide hole, therefore the part will always be punched correctly and the die set will not get damaged as a result of the top die being placed the wrong way round.

Other Types of Mistake Proofing Strategies

Barcoding

Arm Bands

Sensors

Checklists

Templates

Electronic order entry systems

Medication scanners

Plan–Do–Study–Act (PDSA) “Tests of Change”

A systematic approach to learning about a process that leads to continuous quality improvement.

Dr. Edwards Deming popularized the PDSA approach in 1950”s

Plan – Define the project and risk factors and what will happen (intervention)

Do - collect data and carry out the planned strategy

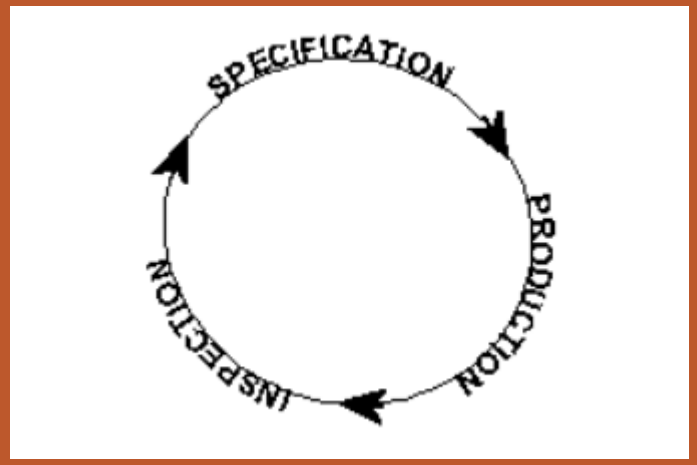
Study – analyze outcomes; what part of the strategy worked or failed to meet the desire goal

Act – Identify and adopt new strategies, tweak the current strategies, repeat the

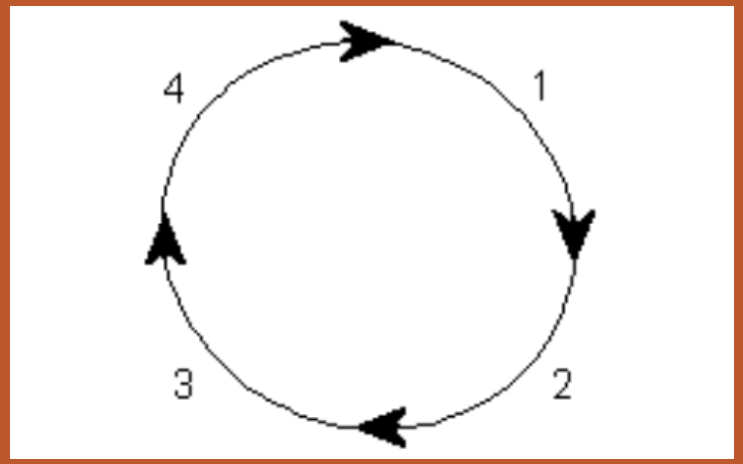
When completing a PDSA consider ……..

1) What are you trying to accomplish?
2) How will you know when the change is an improvement?
3) What changes will result in the improvement?
4) How many are needed to assure the right process outcome
4) What did you /your team learn – key takeaways

www.ihi.org.



Dr. Walter Shewhart Wheel
(father of statistical quality)



Dr. W. Edwards Deming Wheel
(advocate for quality control methods)

Summary - Improve

- Select strategies based on best practice, safety, simple, not burdensome to the department, staff, organization.
- Test the strategy, tweak, measure and reimplement
- Use multiple PDSA cycles in PI activities
- Make sure improvement strategies are controllable, sustainable and spreadable

Control – Standardize and Sustain Improvement

- How will you know your improvements are sustained?
- What if anything could go wrong with the improvements
- How are you going to make these improvements routine?
- How will you celebrate success
- Can the improvements be applied to other areas (spread)
- How will you hand off the project and communicate to stakeholders?

Tools

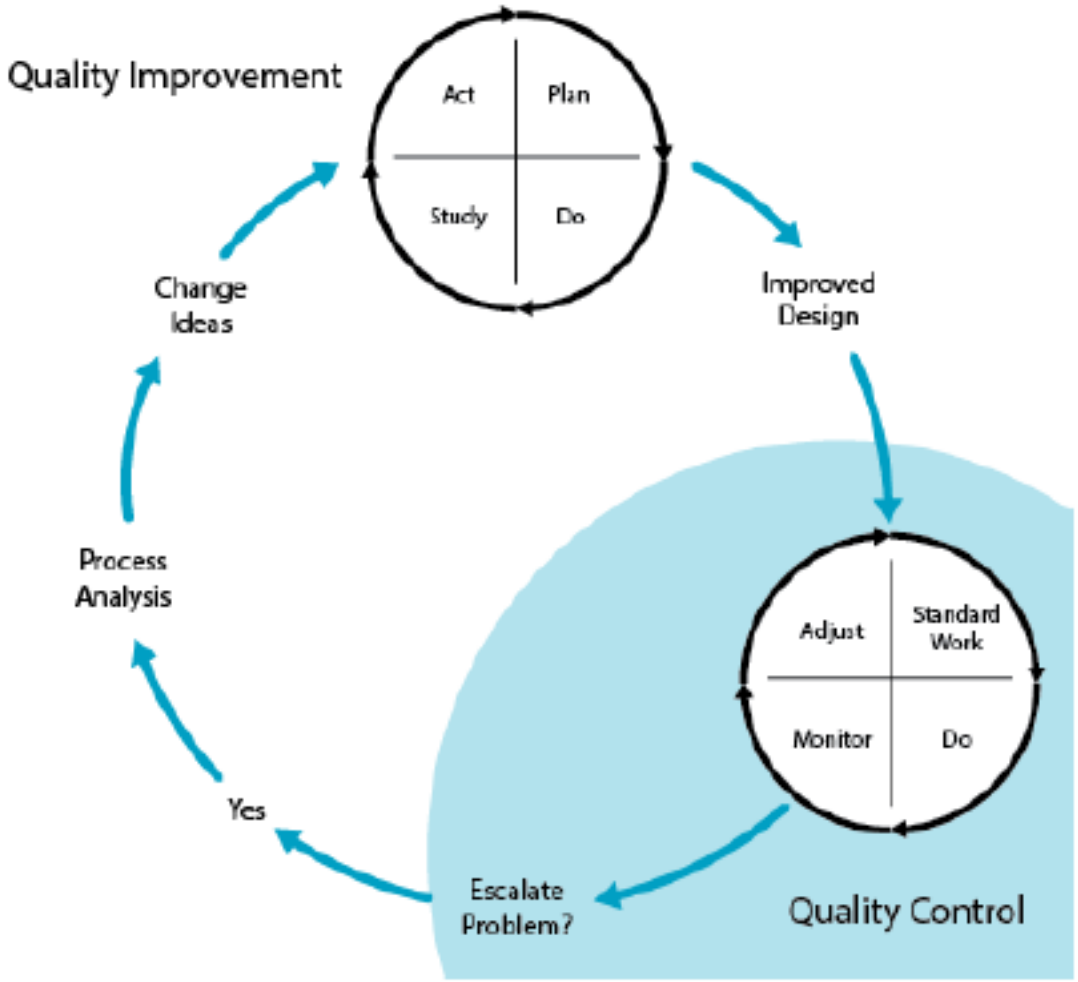
Data charts

Visual Management System

Rewards and Recognition

Control Plan

WWW



Quality Control Model

Scoville R, Little K, Rakover J, Luther K, Mate K. *Sustaining Improvement*. IHI White Paper. Cambridge, Massachusetts: Institute for Healthcare Improvement; 2016. (Available at ihi.org)

Summary - Control Phase/Sustainability

Sustainability occurs when processes or improved outcomes last within an organization after implementation has occurred. An improvement that has become part of the organizational culture and has been maintained regardless of workforce turnover is an example of a sustained improvement.

- Sustainability is also related to successful culture change within an organization. Maintaining the ideas, beliefs, principles, or values underlying an initiative and having the new ways of working become the norm show that the change has positively influenced the culture.
- CELEBRATE

Lean Tools Learned

- Waste walks
- Gemba walks
- Spaghetti Diagrams
- Standard Work
- Mistake Proofing
- Six Sigma
- PDSA
- Value Stream Maps
- Current State Maps
- Future State Maps
- Leadership
- Coaching
- Cultural Transformation
- Change Management
- WWW
- Control Plan
- Communication Plan
- Stakeholder Analysis
- Data charts
- FMEA
- ARMI Analysis
- Rewards and Recognition
- Visual Management Systems
- Cause and Effect Diagrams
- SMART Goals
- Barriers to success
- Voice of the Customer
- Project Charter

Tools for DMAIC

1. **Define** the problem, improvement activity, opportunity for improvement, the project goals, and customer (internal and external) requirements.
    1. Project charter to define the focus, scope, direction, and motivation for the improvement team
    2. Voice of the customer to understand feedback from current and future customers indicating offerings that satisfy, delight, and dissatisfy them
    3. Value stream map to provide an overview of an entire process, starting and finishing at the customer, and analyzing what is required to meet customer needs

2. **Measure** process performance.
    1. Process map for recording the activities performed as part of a process, includes a capability analysis.
    2. Pareto chart to analyze the frequency of problems or causes

3. **Analyze** the process to determine root causes of variation, poor performance (defects).
    1. Root cause analysis (RCA) to uncover causes
    2. Failure mode and effects analysis (FMEA) for identifying possible product, service, and process failures

4. **Improve** process performance by addressing and eliminating the root causes.
    1. Design of experiments (DOE) Experimental processes or systems - many factors influence outcomes and impossible to isolate one factor or variable from the others
    2. Kaizen event to introduce rapid change by focusing on a narrow project and using the ideas and motivation of the people who do the work - brainstorming

5. **Control** the improved process and future process performance.
    1. Control plan to document what is needed to keep an improved process at its current level
    2. Statistical process control (SPC) for monitoring process behavior
    3. Mistake proofing (poka-yoke) to make errors impossible or immediately detectable

https://asq.org/quality-resources/dmaic.

Objectives

01

Synthesize and apply quality/safety improvement methods and tools in a clinical setting.

02

Promote sustained improvement of an identified goal through effective application of quality improvement tools and methods.

03

Integrate improvement science, complexity science, quality and safety tools and methodologies to develop systematic designs to sustain improvement in population healthcare delivery and outcomes.

“Every great organization in the world does two things everyday: makes a product, and makes the product better”

David Lawrence,
Chairman Emeritus
Kaiser Permanente

Resources

Institute for Healthcare Improvement (IHI) www.ihi.org

Crossing the Quality Chasm: A New Health System for the 21st Century Institute of Medicine (US) Committee on Quality of Health Care in America Washington (DC): National Academies Press (US); 2001.PMID: 25057539 Bookshelf ID: NBK222274 DOI: 10.17226/10027

https://www.nap.edu/resource/9728/To-Err-is-Human-1999--report-brief.pdf

Scoville R, Little K, Rakover J, Luther K, Mate K. *Sustaining Improvement*. IHI White Paper. Cambridge, Massachusetts: Institute for Healthcare Improvement; 2016. (Available at ihi.org)

Agency for Healthcare Research and Quality www.ahrq.gov.

The Joint Commission www.jointcommission.org.

Becker Hospital Review CMS' proposed inpatient payment rule for 2022: 8 things to know
Alia Paavola - Wednesday, April 28th, 2021

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https://www.lean.org.

https://asq.org/quality-resources/dmaic.