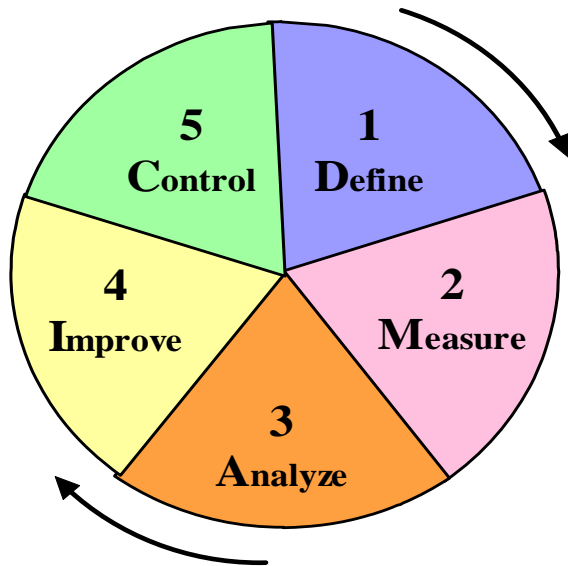


Performance Improvement Model (DMAIC)



Performance Improvement Training Session Three

Measure Step



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Objectives

- ❑ Review Measure phase and tools
- ❑ Describe the importance of data
- ❑ Provide the basic concepts of measurement

Measure: Baseline & Refining

- ❑ Key transitional step on the road to performance improvement
- ❑ Data can show us what is really happening
- ❑ Helps us to refine the problem, and begin the search for the root causes
- ❑ Saves time and effort by focusing your energies on the true problem

Importance of Data



- ❑ Data helps us during the measure stage by:
 - Separating what we *think* is happening from what is *really* happening
 - Confirm or disprove preconceived notions
 - Establish a baseline of performance

What is the “Right” Information?

- Describes the problem you are studying
- Describes related conditions that may provide clues about causes
- Can be analyzed in ways that answer your questions
- Helps us understand when the problem does or does not occur

Useful, Meaningful Data Are:

❑ Sufficient

- Enough data to confirm that patterns you see are real

❑ Relevant

- Has to be able to help you understand or pinpoint your problem

❑ Representative

- Full range of process conditions or problems are seen in the data

❑ Contextual

- To give you a complete picture of what is happening throughout the entire process

Typical Problems with Data Are:

- ❑ Insufficient data to base reliable conclusions on
- ❑ Irrelevant data that does not help you understand or solve the targeted problem
- ❑ Biased data that represents only certain views or processes of the problem
- ❑ Isolated data is when you only collect one view of the process or problem

Measure: Basic Concepts

- ❑ Important to know these basic concepts when working with data and using measures
 - Observe first, then measure
 - Know the difference between discrete and continuous measures
 - Measure for a reason
 - Have a measurement process



Observe First, Then Measure

- ❑ Watch the process or talk to those involved
- ❑ Pay particular attention to where people redo steps or correct errors
- ❑ Watch for variation in practice
- ❑ Observational experience helps us decide what and where to begin measuring

If we can observe an event...we can measure it.

If we can measure it, we can improve it!!

Types of Data

- ❑ Important to understand the difference between “**continuous**” and “**discrete**” data
- ❑ This difference influences how you will:
 - define your measures
 - collect your data
 - sample data
 - analyze data

Continuous Data

- ❑ Often obtained from use of a measuring system
- ❑ Measured on an infinitely divisible continuum or scale
- ❑ Things that occur regularly should be looked at as continuous data
 - Examples:
 - Time (hours, minutes, seconds)
 - Height (feet, inches, fractions of an inch)
 - Temperature (degrees)
 - Money (dollars, yen, euro)
 - Electrical resistance (ohms)
 - Sound Level (decibels)

Discrete Data

- ❑ Measures that can be sorted into distinct, separate, non-overlapping categories
 - Examples: different types of vehicles, types of credit cards, types of lab tests

- ❑ Includes artificial scales like ones on a survey
 - Examples: 5 point scales, likert scales

- ❑ Sometimes called attribute measures because they count items or incidences that have a particular characteristic that sets them apart from other items
 - Examples: Is the patient male or female? Was the procedure on time or late? Is LOS better or worse than our target?

Data Comparison

CONTINUOUS

- Hold time per incoming call
- Avg temp per hour
- Minutes to board plane
- Quantity of gas in tank
- Cost per unit



DISCRETE

- % of calls on hold past 30 seconds
- Hours with temp over 85 degrees
- Delayed boarding incidents
- Tank empty/not empty
- Units exceeding target cost



How Do You Choose?

□ Discrete Data

➤ Pros

- Sometimes easier and faster to collect than continuous data
- Easier to interpret

➤ Cons

- Loss of precision
- Usually need to collect a lot of data to accurately identify the problem
- Increased likelihood of missing important information

Measure For a Reason

- ❑ Don't collect data without a clear reason
- ❑ Measure for efficiency or effectiveness
 - Volumes and costs of resources consumed
 - What our product or service looks like to our customers
 - How close are we to meeting or exceeding their requirements?
- ❑ Determine how variables (Xs or causes) in the process affects the outputs (Ys or effects) to our customers

Establish a Process for Measurement

- ❑ We need to get our measures right the first time
- ❑ Treat data collection as a process that can be:
 - Defined
 - Documented
 - Studied
 - Improved
- ❑ Remember the old carpenter's saying, “Measure twice, cut once!”

Putting it All Together

- ❑ To effectively measure, incorporate data collection guidelines with the two main components of measure:
 - **Plan and measure performance against customer requirements**
 - **Develop baseline defect measures and identify improvement opportunities**

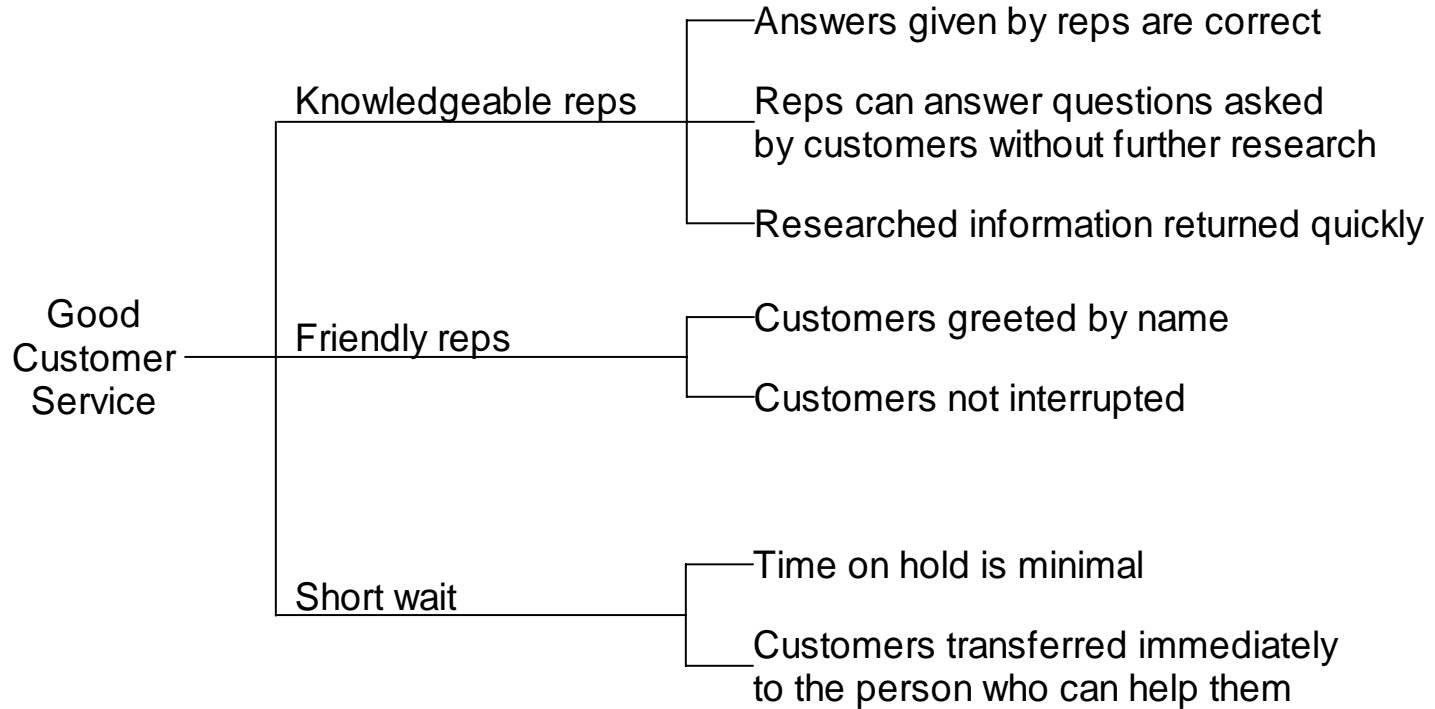


Voice of the Customer

- Plan and measure performance against customer requirements (5 Steps)
 1. Select what to measure
 - Refine or validate your problem
 - Stratify potentially related factors
 - What's valuable for analyzing the problem, and what's feasible to collect
 - **Tool Review:** CTQ (critical to quality)

A Sample CTQ Tree

Need → **Drivers** → **CTQs**



General ← → **Specific**

Hard to measure ← → **Easy to measure**

Operational Definition

2. Develop operational definitions

- A clear, understandable description of what's to be observed and measured, such that different people collecting or interpreting the data will do so consistently
 - Example: Patients' arrival time to the operating room is measured in minutes and seconds, from the point at which the patient is moved onto their operating room bed in their assigned operating room. Any arrival time past 0715 on Monday and Tuesdays, or past 0800 Wednesday thru Friday is considered a defect.

Remember Your Types of Data

3. Identify data sources

- Historical - data that has already been collected in your organization
- New - data your team needs to collect
- Make sure data will meet the needs of your operational definition



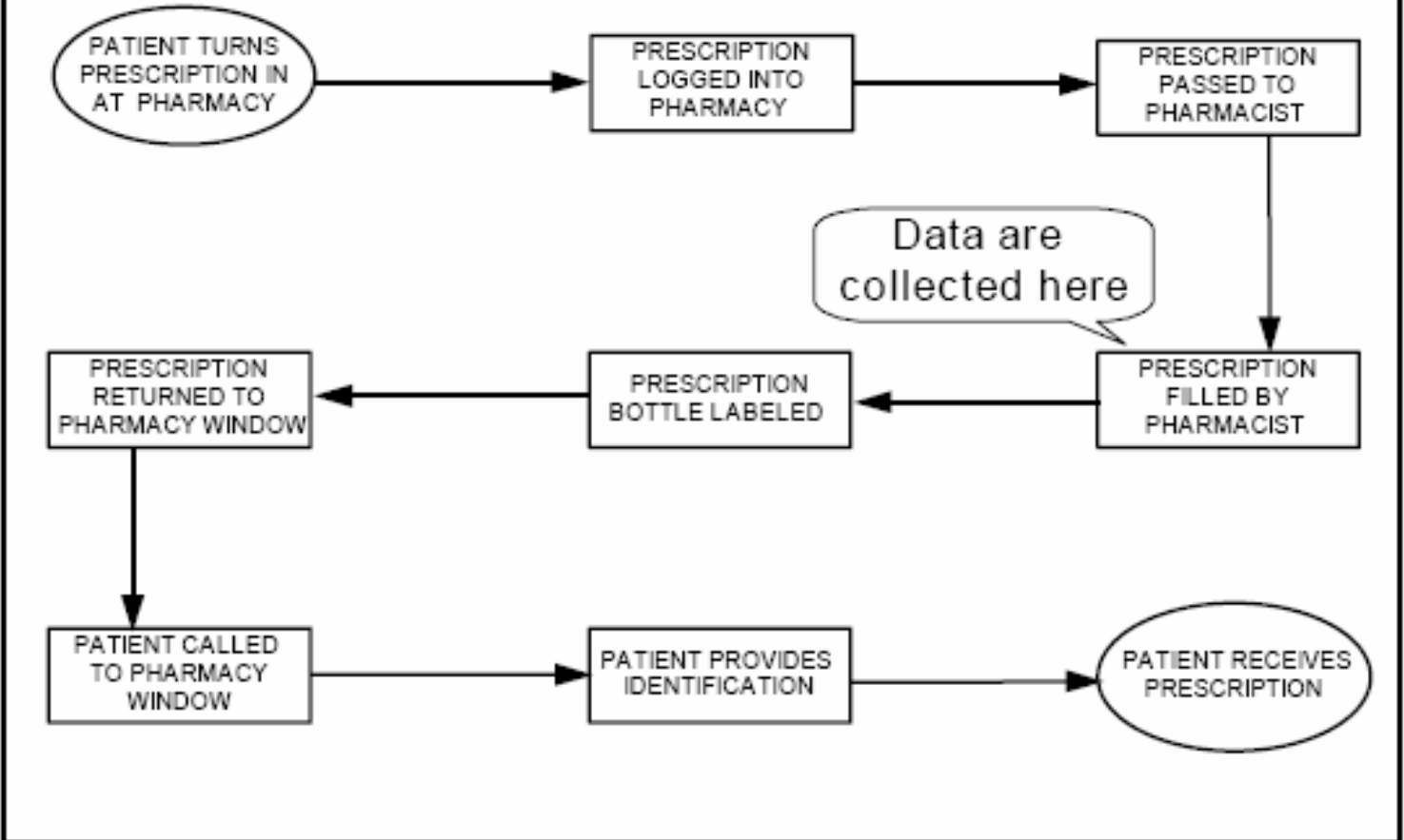
How Are You Going to Do it?

4. Prepare a data collection plan

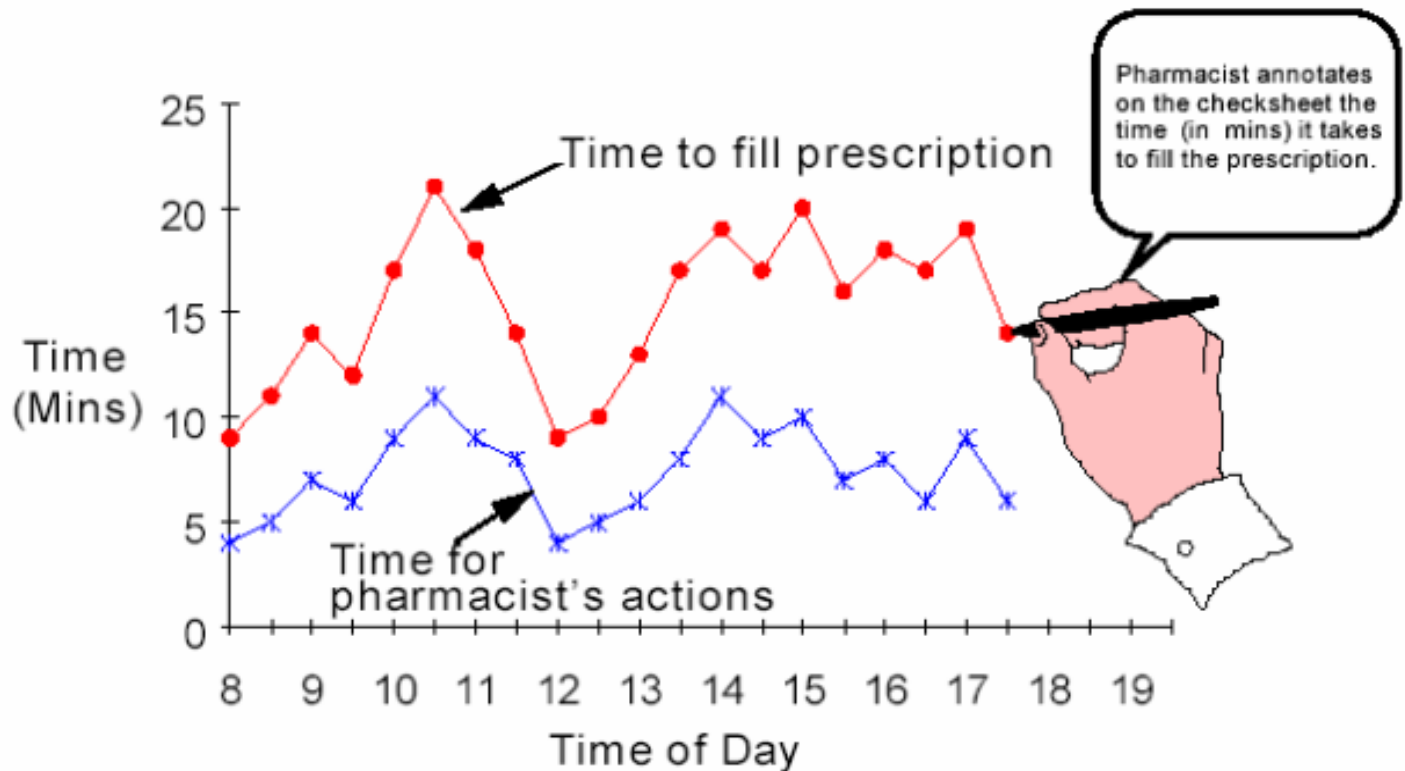
- **Identify or confirm stratification factors**
 - Who, what, when, where
- **Develop sampling scheme to ensure a valid sample**
 - Avoid biased data by not convenience sampling or judgment sampling
 - Better to sample systematically, randomly, or in a stratified way
- **Create data collection forms**
 - Use spreadsheets or check sheets to document what you want to collect
 - Records data for further analysis
 - Provides historical record
 - Keep them simple, well labeled, and organized
- **Tool Review: Check sheet**



Pharmacy Example Flowchart



Pharmacy Example Checksheet



LEGEND: MAKALAPA NAVMEDCLINIC - 16 July 94 - Elapsed time to fill prescription - 1 every 30 mins

Check Sheet

Title: Time to fill the prescription

Data Collector: Mary Kay

Data Collection Time Period: Wednesday 9/21/05

Total Time (Min)	Counts	Comments
0-5 min		
6-10 min		
11-15 min	 	
16-20 min		
21-25 min		
> 25 min		

Getting Ready to Move Forward

5. Implement and refine measurement process
 - Review and finalize data collection plans
 - Prepare the workplace
 - Test your data collectors and procedures
 - Collect the data
 - Monitor for accuracy and refine as needed

Establish a Firm Foundation

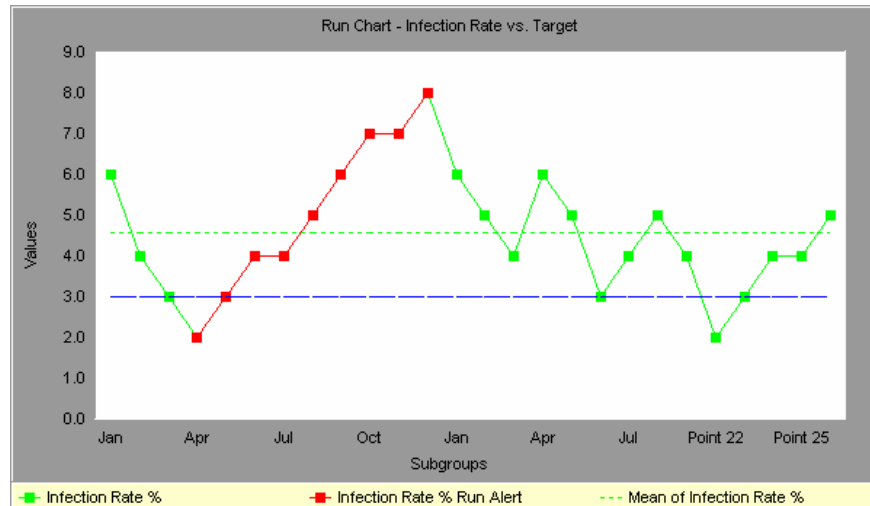
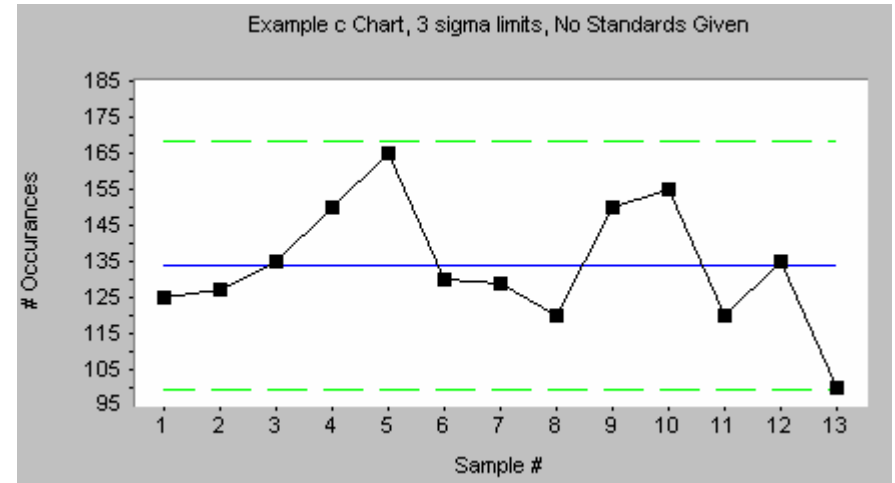
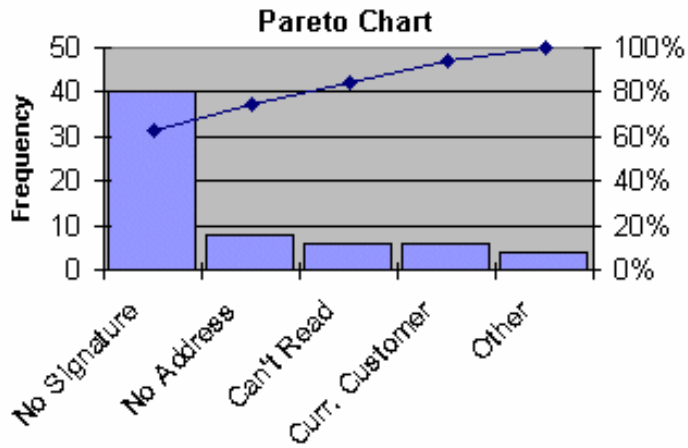
- ❑ Develop Baseline Defect Measures and Identify Improvement Opportunities
 - Vital to know where you are today before any improvements are made
 - Need to have collected data that will inform your improvement decisions

Measure: Power Tools



- ❑ Data Collection Plan
 - Captures team's plan for collecting useful, meaningful data
- ❑ Pareto Chart
 - Focus efforts on problems that offer greatest chance for improvement (80/20 principle)
- ❑ Run Charts
 - Useful to study data from a check sheet to analyze trends or patterns over time
- ❑ Control Charts
 - Focuses attention on detecting and monitoring process variation over time, distinguishes special from common cause variation

Examples



Measure: Check Your Specs!

- Have you identified the key metrics for your process or problem?
- Are the metrics valid and reliable?
- Do you have adequate data on the process?
- How will you measure your progress?
- How will you measure project success?



Questions?