SHARP®

DMAIC: Measure & Analyze

Module 8

Basic Structure for Managing Process Improvements

Online or single module version

Approximate time to complete: 35 minutes

Updated: May 2016

COURSE INFORMATION

Title: DMAIC: Measure & Analyze – Module 8: Basic Structure for Managing Process Improvements

Target Audience: Sharp HealthCare affiliated physicians, pharmacists, and other healthcare providers interested in continuous process improvement

Educational Objectives: Following this activity, learners should be able to:

- Develop meaningful ways to measure your process and expected outcome
- Utilize basic tools to determine the root cause of a problem
- Discuss the need to work solutions that address the root cause of a problem
- Describe your data using both graphical and basic statistical descriptions
- Discuss how variation impacts the performance of a process

Principal Faculty: ***Kathy Summers***
Director, Six Sigma Black Belt
Sharp HealthCare

Accreditation: Sharp HealthCare is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

CME Credit: Sharp Healthcare designates this internet enduring activity for a maximum of **.75** *AMA PRA Category 1 Credits*™ after successful completion of the module with a minimum passing score of **100%**. Physicians should only claim credit commensurate with the extent of their participation in the activity.

CA Nurse Credit: The California Board of Registered Nursing recognizes the use of Category I Continuing Medical Education credit toward credit contact hours. Report "ACCME Category 1 Credit" as the BRN Number. No BRN slip will be given.

Accreditation: Sharp Healthcare is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education.

CPE Credit: Sharp HealthCare designates this live **knowledge** activity for a maximum of **.75** contact hours . Partial credit will not be awarded.
UAN: 0571-0000-016-025-H04-P or 0571-0000-016-025-H04-P

Cultural and Linguistic Competency: This activity is in compliance with California Assembly Bill 1195 which requires that all CME activities comprising a patient care element include curriculum addressing the topic of cultural and linguistic competency. The intent of this bill is to ensure that health care professionals are able to meet the cultural and linguistic concerns of diverse patient population through effective and appropriate professional development. Cultural and linguistic competency was incorporated into the planning of this activity.

Type of Activity: Internet Enduring Material with learning assessment and evaluation

Release Date: June 1, 2016 **Termination Date**: June 1, 2017

Requirements: Must pass learning assessment with 100% and complete evaluation to receive CME/CPE credit. **Estimated completion time**: 45 minutes

Hardware/Software Requirements: OS that supports modern web browser; Browser: IE 11; Google Chrome version 4 or higher; Safari version 10.8 or higher

Contact Information: Sharp HealthCare CME at cme@sharp.com

Tuition: None **Commercial Support:** None

DISCLOSURE

DISCLOSURE: As an organization accredited by the ACCME, Sharp HealthCare requires everyone who is in a position to control the content of an education activity to disclose all relevant financial relationships with any commercial interest. The ACCME defines "relevant financial relationships" as financial relationships in any amount, occurring within the past 12 months, including financial relationships of a spouse or life partner, that could create a conflict of interest. Any individual who refuses to disclose relevant financial relationships will be disqualified from being a planning committee member, a teacher, or an author of CME, and cannot have control of, or responsibility for, the development, management, presentation or evaluation of the CME activity.

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ASSEMBLY BILL 1195: As an accredited provider, Sharp HealthCare is required to comply with California Assembly Bill 1195, which states that all CME activities must address cultural or linguistic competency. At a minimum, cultural competency is recommended to include:

- Applying linguistic skills to communicate effectively with the target population.
- Utilizing cultural information to establish therapeutic relationships.
- Eliciting and incorporating pertinent cultural data in diagnosis and treatment.
- Understanding and applying cultural and ethnic data to the process of clinical care.

Interested in receiving Continuing Education Credits?

Nurses and Pharmacists – Use Learning Center

CME Portal is for Physicians **ONLY**

Nurses will be awarded credits via the Learning Center.

Pharmacist credit will be addressed by the CME Department.

Physicians– Use CME Portal

1. Complete the Test/Quiz
2. Complete the Course Evaluation
3. CME Portal will generate a certificate for you – save for your records
4. CME credits will also be noted on your transcript

QUESTIONS?

Contact Heather Clemons, CME Department
(858) 499-3518
heather.clemons@sharp.com

Leading Performance Excellence

Lean Six Sigma basics for every leader

White Belt

#1 Introduction

LSS awareness, roles and responsibilities

#2 LEAN Basics

How we eliminate waste in our work

#3 A3 Daily Problem Solving

Reporting tool for resolving daily issues / defects

#4 Team and Meeting Facilitation

How we collaborate and engage talent

Yellow Belt

#5 Change Management

Assuring acceptance and accountability

#6 Project Management

Managing time and resources for continuous improvement

#7,8,9 DMAIC

'Six Sigma' How we reduce variation and Defects

#10 LEAN Thinking and Intermediate A3 Skills

How we eliminate waste and create flow

Yellow Belt Workshop

Hands on use of the tools and concepts

Systematic Approach for Continuous Improvement

Reflection:

I'm going to make mistakes, I just have to be able to learn from them as quickly as possible. To learn faster, I watch film of myself and other good point guards, and then breaking down my mistakes and really analyzing them and seeing where I could have made better decisions.

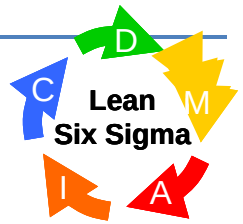
Jeremy Lin

Course Objectives

At the conclusion of this module, participants should be able to:

- Develop meaningful ways to measure your process and expected outcome
- Utilize basic tools to determine the root cause of a problem
- Discuss the need to work solutions that address the root cause of a problem
- Describe your data using both graphical and basic statistical descriptions
- Discuss how variation impacts the performance of a process

2nd Phase Measure



Measure

- Obtain data that describes the issue.
- Measure what the customer cares about.

Deliverables

Create a Cause and Effect Diagram

Brainstorm potential causal factors that contribute to your gap

Identify the root causes to the causal factors

Design a Measurement Plan

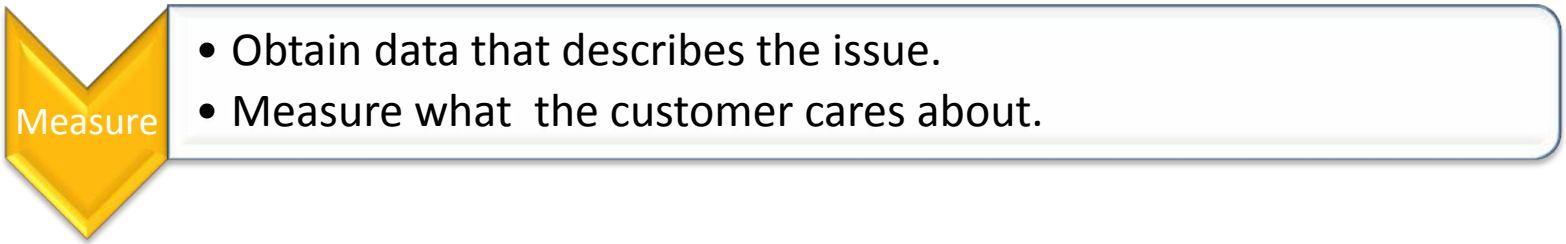
Determine how you will measure your root causes

Have a plan for collecting your data

Collect data to be analyzed to confirm significance of the root causes

SHARP

2nd Phase Measure



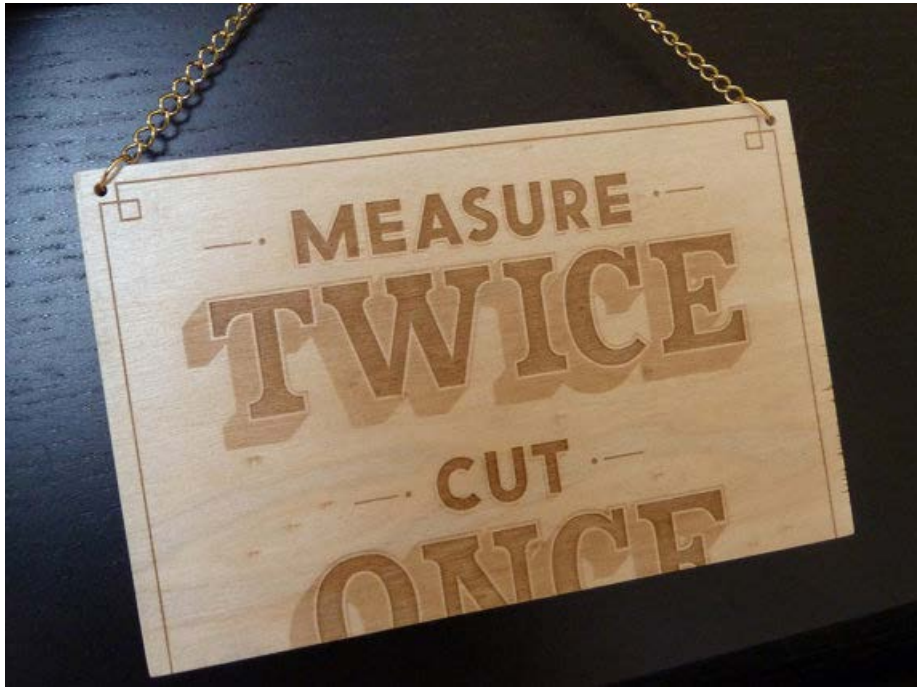
How does the process currently perform?

Measurement is critical throughout the life of the project.

As the team focuses on data collection initially they have two focuses:

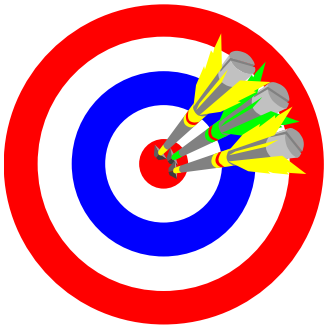
Determining the start point or baseline of the process.

Looking for clues to understand the root cause of the process



Interpretation: Get a good measure of your process in order to get to the right solution the first time.

Specify the Requirements into Measurable Criteria
Remember 'SMART'



Define metrics that are:

- Specific
- Measurable
- Attainable
- Relevant
- Time-bound

Poorly worded Goal

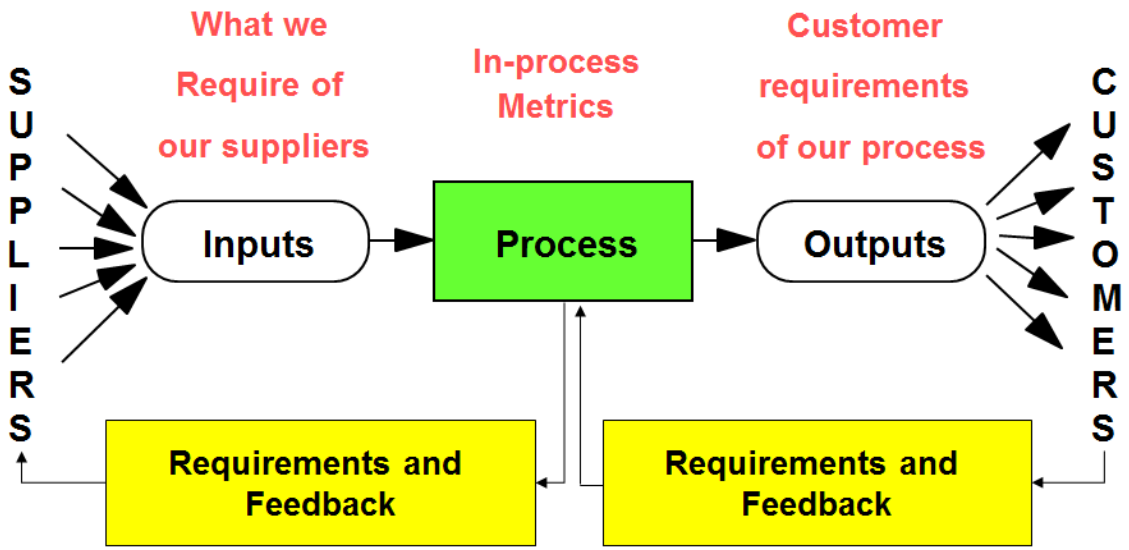
The goal is to be faster at moving patients from the ED into a inpatient bed.

'SMART' Goal

50% of ED admit patients in an inpatient bed in less than 90 minutes by August 2015

What measures will best describe your project?

Review your SIPOC for measures that reflect the purpose of the DMAIC project



	Discharge	Chest Pain	Call Center
Input	% complete Medication List	% use of standard order sets	Billing error rate
In Process	Lab TAT	% stress test cancellations due to false pre-schedule	Call to answer time
Output	Time from DC order to leave hospital	Reduced hospital stay (hours)	Patient Satisfaction

Define 'The Gap' to focus on

The difference between where you are today and want to be.

Compare customer requirements with current performance

The Gap now becomes your burning platform for change

Gap Project Examples:

Inpatient survey shows "promptness in responding to the call button" scores at 61% compared to target of 85%.

Gap: 24%

Patient arrival to antibiotic administration time should be within 4 hours.

Target: 90% of the time

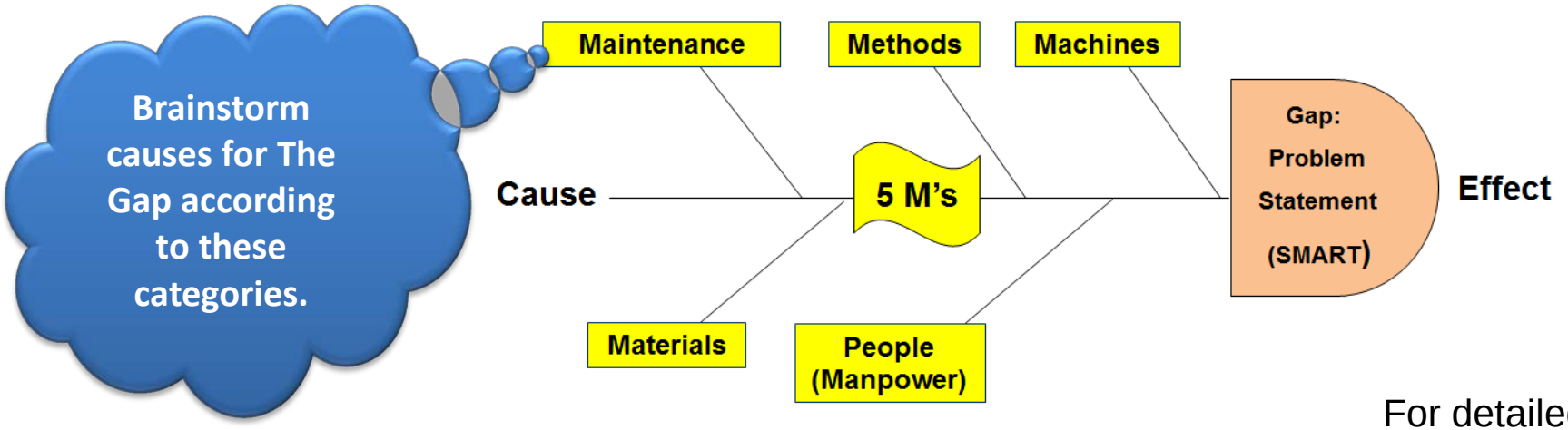
Currently at 22%

Gap: 68%

Next use your GAP to make a Cause and Effect Diagram to explore all possible causes

Also called a Fishbone Diagram or the Ishikawa Diagram

Identify relationships for potential process improvement



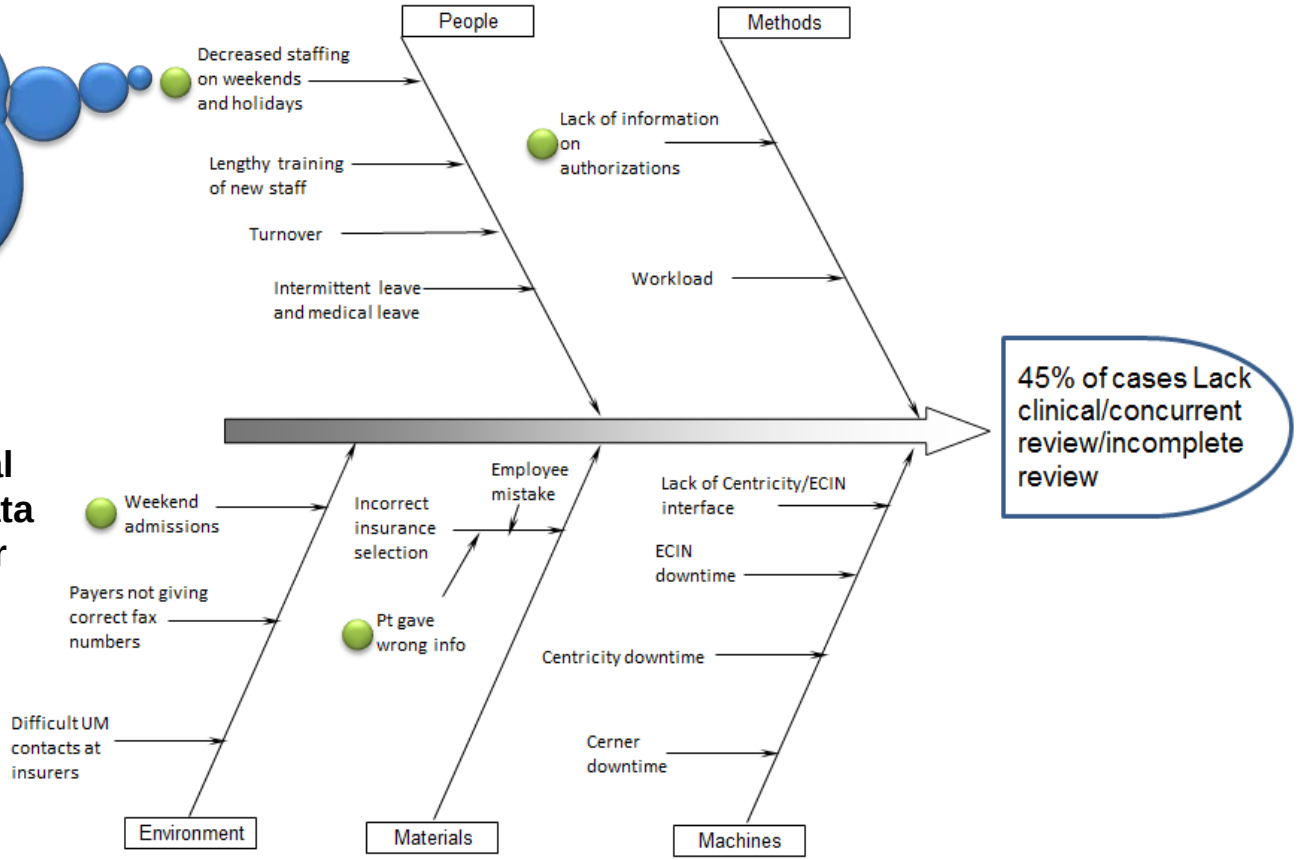
For detailed instructions Tool Kit Link HERE

Optional Categories based on your type of process:

Equipment, Process, People, Materials, Environment and Management
Surroundings, Systems, Suppliers and Skills
Measurement, Mother Nature, Management and Money

Example Fishbone Diagram

Next, have your expert team vote for suspected top causes for The Gap.



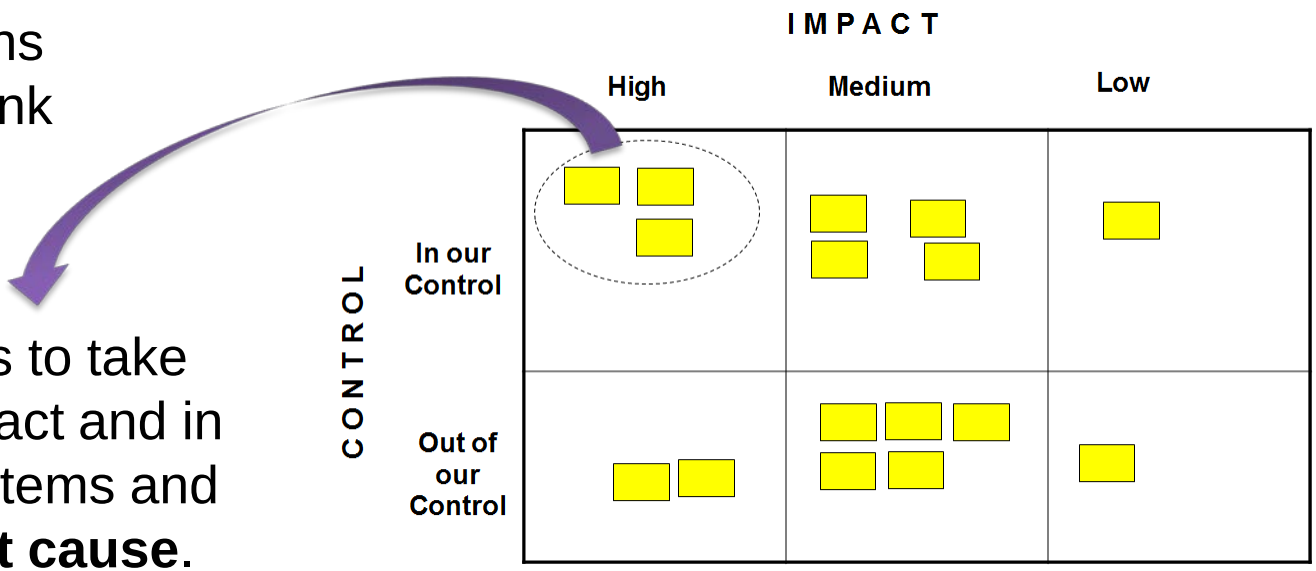
After identifying the top causal factors, you want to collect data to validate which causal factor is a significant contributor.

If you have the ability to run statistics on your data or access to a Six Sigma Green Belt or Black Belt, then select the appropriate statistical test validate the area to target your improvement strategy.

= top votes for suspected significant causal factors. Then use data to validate.

Or, when data and statistical analysis is not feasible, perform an Impact/Control matrix causes identified by the fishbone diagram with your expert team to identify what is in the teams control and is believed to have a high impact on the Gap.

For detailed instructions Tool Kit Link HERE



Next Step is to take the High Impact and in your control items and find the **root cause**.

Root Cause Analysis

Simple yet effective version!

"Five Whys"

Ask, five times, why the failure has occurred in order to get to the root cause or causes of the problem

- Simple way to get to root cause
- There can be more than one cause to a problem
- Carried out by a team of people related to the problem
- No special technique is required

5 Whys Video

View 5 Whys Video: HERE

5 Whys: Medication Administration

Why did the RN give the wrong drug?

RN inadvertently grabbed the wrong elixir

Why did RN grab the wrong elixir?

She got interrupted as she was checking 5Rs

There were several look-a-like medications bottles stored next to each other

Why was she interrupted during her task?

Medication administration is not respected as a critical activity

Why is medication administration not respected as a critical activity?

Good question!!

Why were look-a-like medications stored next to each other?

No pt-specific separate bins available in the refrigerator

Why are there no patient-specific bins in the fridge?

Space limitations

Why are there space limitations in the med room?

Good question!!

Measurement Plan

Now that you have the “Root Cause” of the top issues that you and your team believe affect your project’s goal (The Gap). Validate by measuring the magnitude of the “Root Cause”.

This can be by numeric data or by observation!

If your project warrants use of statistics to evaluate the significance of data, solicit the assistance of a SHARP Green Belt or Black Belt.

Measurement Plan

Create a list of what you want to measure. It is important that you write an 'Operational Definition' for each measure.

Operational Definition: Requirements and facts about the data that will aid in collecting the right data and understand what it represents.

Include:

- How to measure
- How to collect
- When to collect
- How much to collect
- Accuracy expected
- Who will collect
- Include any other specifications that could affect the significance of the data.

3rd Phase Analyze

Analyze

- How is the process performing…statistically?
- What are the root causes of the top defects?

Deliverables

Use data to describe performance and the ‘Gap’

A prioritized list of potential root causes

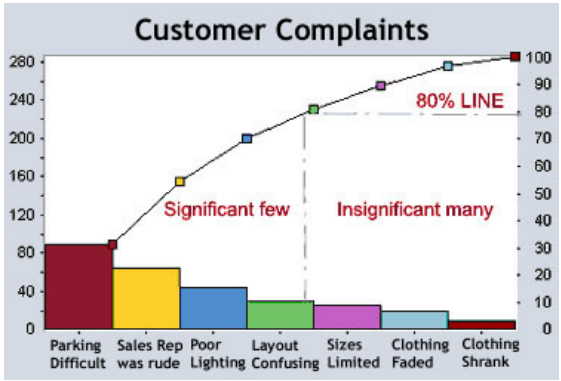
Data collection and analysis supporting conclusions

Do you need to shift the mean or reduce variation?

Identify the sources of variation

Identify the “Vital Few” vs. the “Trivial Many” using:

- Graphical tools
- Green Belts and Black Belts will use Statistical tools



3rd Phase Analyze

Analyze

- How is the process performing…statistically?
- What are the root causes of the top defects?

What does your data tell you?

This phase is often intertwined with the Measure Phase.

As the team reviews the data collected during the Measure Phase, they may decide to adjust the data collection plan to include additional information. This continues as the team analyzes both the data and the process in an effort to narrow down and verify the root causes of waste and defects.

”It requires a very unusual mind to undertake the analysis of the obvious.”

-- Alfred North Whitehead, English mathematician and philosopher

Guide for Analysis

What are the critical few causes contributing to the process performance gap?

Expert opinion: When data analysis is not feasible, you may need to rely on your process experts to select the top contributors to the defect.

- As described in Measure to identify the top root causes
- Reference the tools in 'Team and Meeting Facilitation' module 2.
- Use when accuracy not needed, too costly or limited on time

Data Analysis For Yellow Belts:

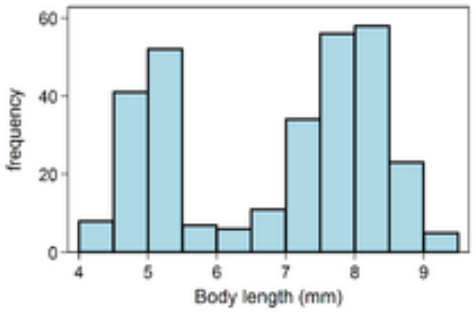
- Graphical display of data:
  Bar Charts, Pie Charts, Pareto Charts, run charts, etc.
- Calculate Descriptive statistics:
  Average, Median, Mode and Standard Deviation.

Data Analysis for Green Belts and Black Belts includes the use of hypothesis testing and statistical tests.

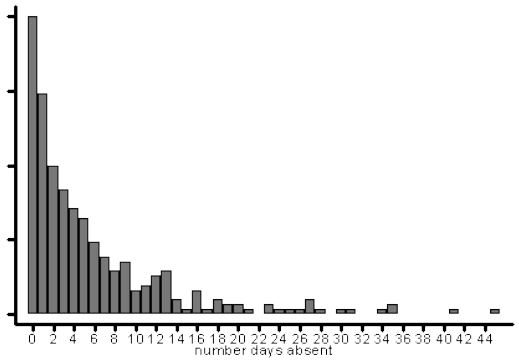
STEP 1 Graph it!

Before any calculations, graph your data. A picture is not only worth a thousand words, it provides you with valuable insight that will help you interpret your calculations.

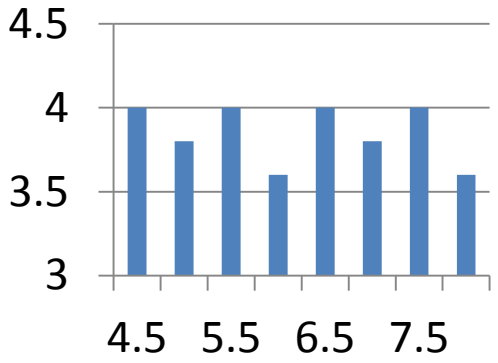
What descriptive statistics will not show you!



Bi Modal



Skewed



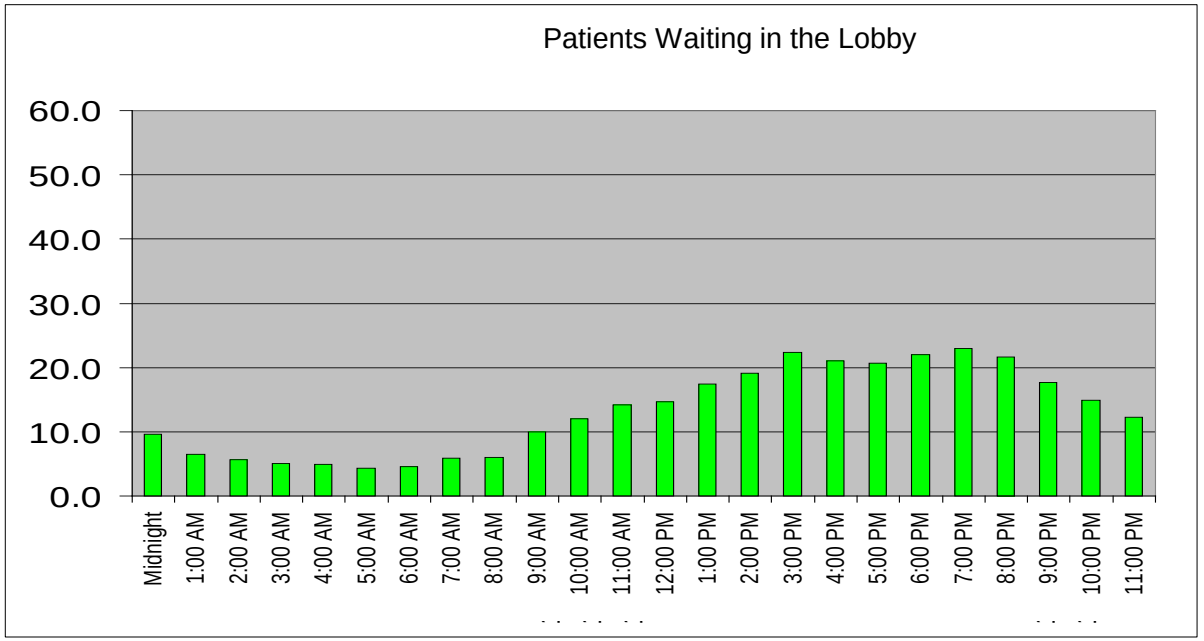
level /Alternating

A Picture is Worth a Thousand Words!

GOOD

Midnight	9.6
1:00 AM	6.5
2:00 AM	5.7
3:00 AM	5.0
4:00 AM	4.9
5:00 AM	4.4
6:00 AM	4.5
7:00 AM	5.9
8:00 AM	6.0
9:00 AM	10.0
10:00 AM	12.1
11:00 AM	14.2
12:00 PM	14.6
1:00 PM	17.5
2:00 PM	19.1
3:00 PM	22.4
4:00 PM	21.1
5:00 PM	20.6
6:00 PM	22.0
7:00 PM	23.0
8:00 PM	21.6
9:00 PM	17.6
10:00 PM	14.9
11:00 PM	12.2

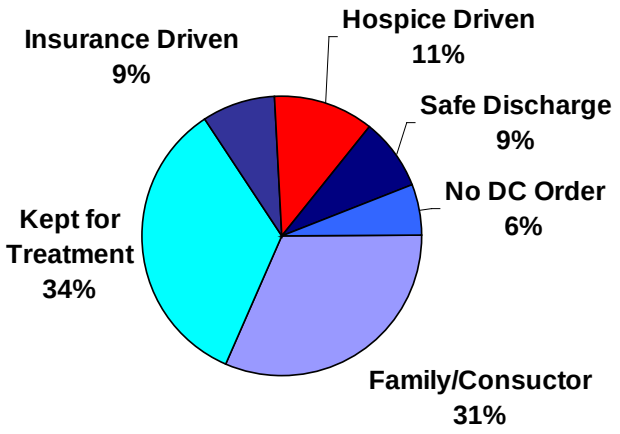
BETTER

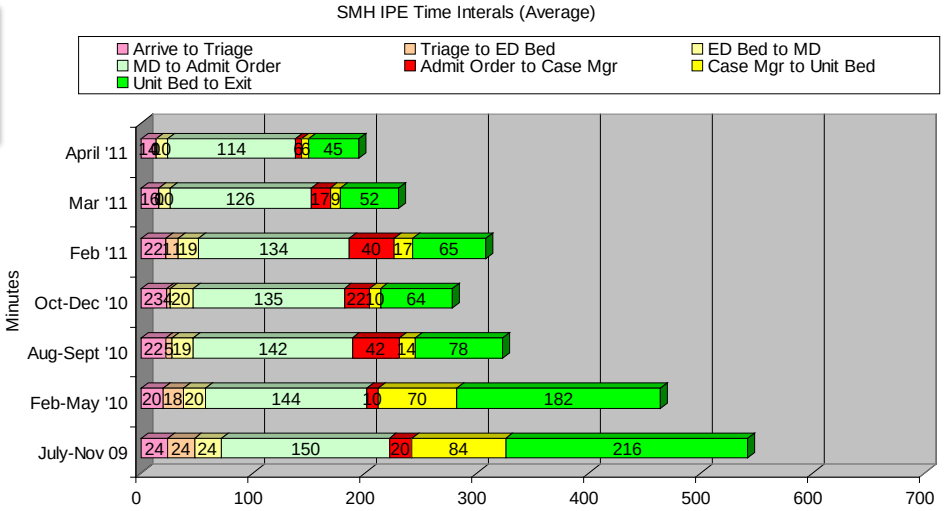


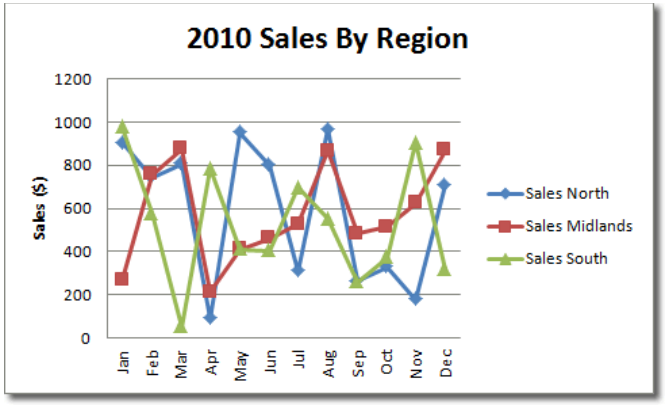
- **Make graphs from columns of data**
- **Display means, variation, trends, and relationships**
- **Communicate with team members and sponsors**

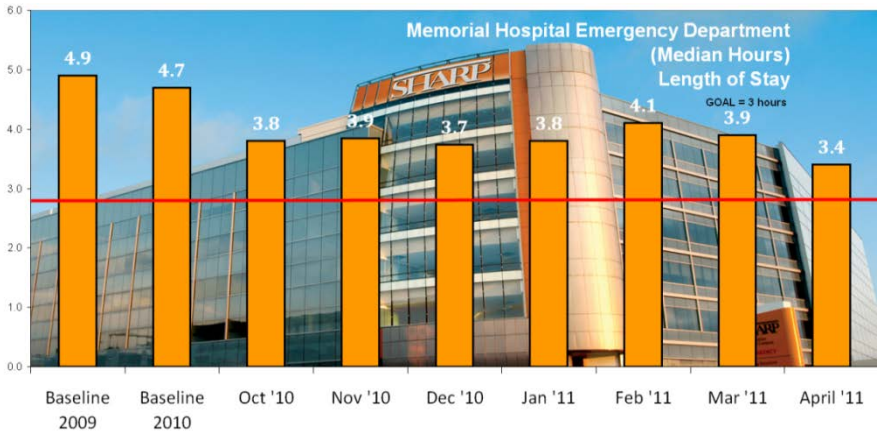
Types of graphs in Excel

Look for the right graph to help the story your data has to tell.









Understanding Variation

Follow this example: We have a process that takes 22 minutes, so we graphed on a ‘Histogram’ by placing the one event in the 20 minute bucket.

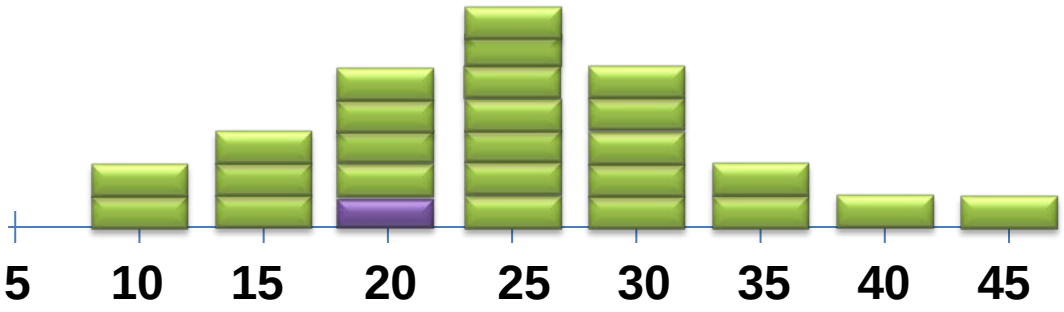
Understanding Variation

Follow this example: We have a process that takes 22 minutes, so we graphed on a 'Histogram' by placing the one event in the 20 minute bucket.

We took 25 more samples and graphed them below.

The Average = 25

We have variation measured as Standard Deviation σ=9



Understanding Variation

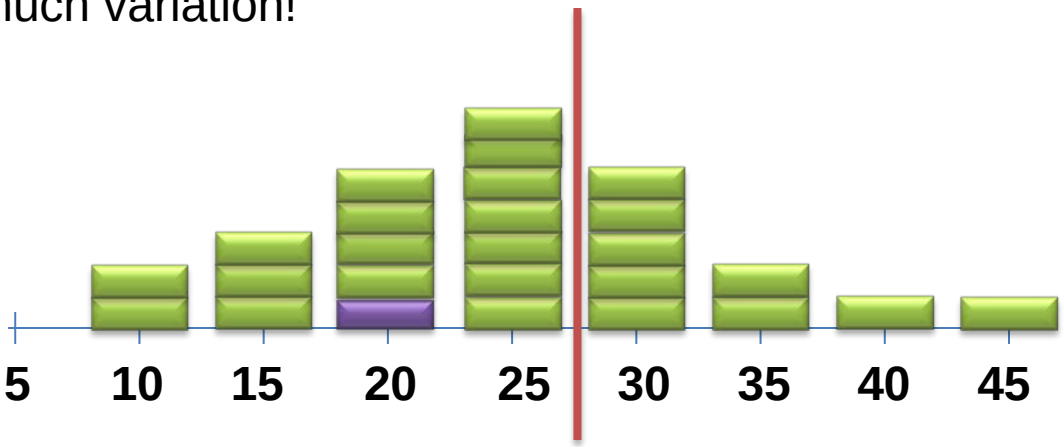
Follow this example: We have a process that takes 22 minutes, so we graphed on a 'Histogram' by placing the one event in the 20 minute bucket.

We took 25 more samples and graphed it below.

The Average = 25

We have variation measured as Standard Deviation σ=9

Our Customer wants it in less than 30 minutes, which is 65% of the time. The average meets the customer's expectations, however 35% did not meet the customer's expectation. We have too much variation!



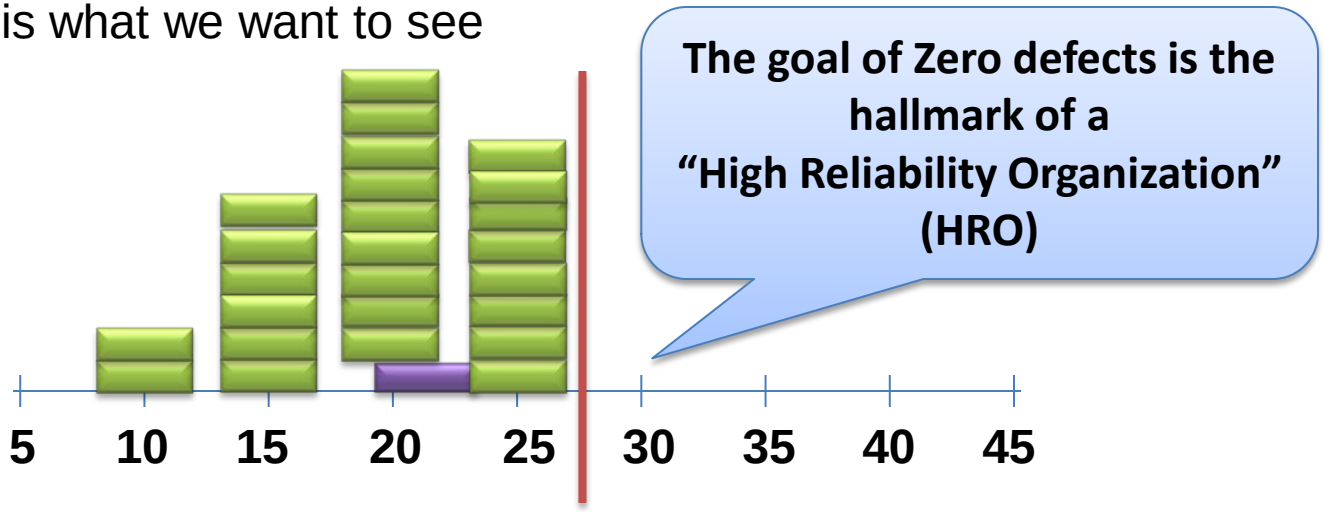
Understanding Variation

What we really want to see in this case is less variation and fewer extreme cases.

Our task is to find out:

- What is causing the variation?
- What is the root cause?
- How can we control it?
- Are there specific reasons for the extreme measures?

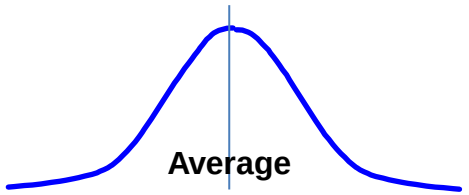
This is what we want to see



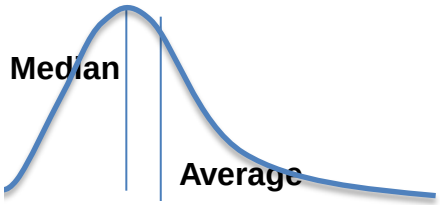
Descriptive Statistics

Calculating the Mean Median or Mode will help you describe the "central tendency" of your measure.

- **Mean** (average) (8+4+5+6+4)/5=5.4
  Use when the data tends to be equally distributed above and below the mean.



- **Median** (midway point) 4,4,5,6,8=5
  Use when the data is skewed. Length of Stay measure is a prime example.



3
4 x x
5 x
6 x
7
8 x

- **Mode** (most frequent) 8,4,5,6,4=4
  Use when the frequency of a particular measure is of most interest.

Descriptive Statistics

Describing the center of the process only tells part of the story. You also need to describe how much variation you have or 'spread':

Standard Deviation

- Measure of variation (average deviation from the mean for a set of data)
- Example: The wait to see a physician at an office visit takes an average of 8 minutes and Standard Deviation of 2 minutes

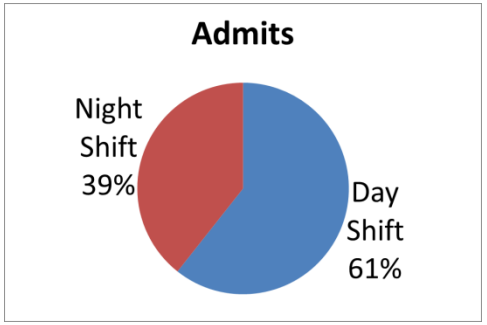
Range

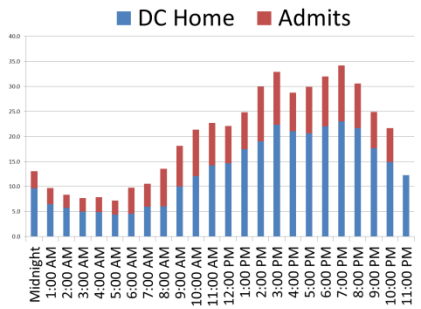
- Lowest number to highest number.
- Shortest wait time is 0 minutes and longest is 52 minutes

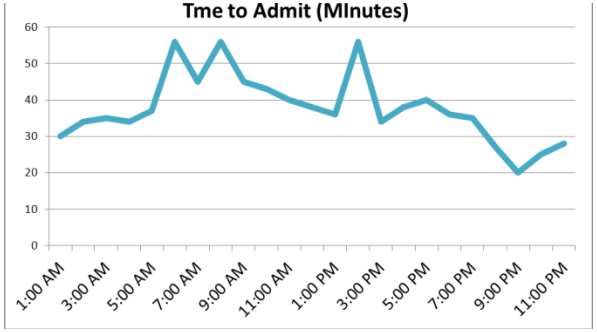
Descriptive Statistics Tips

Note that you need to graph the data first to see if it fits the model for using mean verses median.

Try different ways to graph the data and summarize it.







You may want to "Stratify" the data to find the source of the variation. For example:

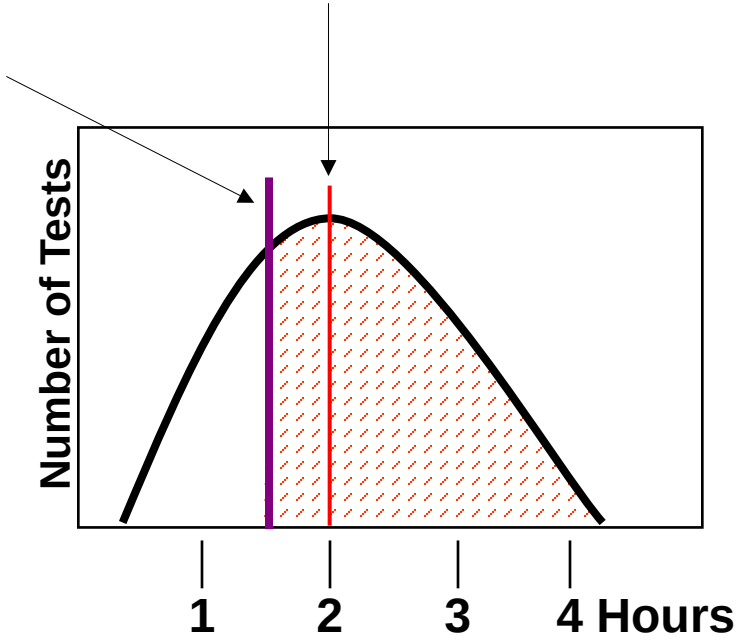
By Nursing Unit	By age group	Payer Type
By Hospital	AM verses PM	Day of the week
By time of day	By Disease Type	Zip Code

Customers don't feel averages, they feel variation
Consider converting your measure to a percentage

Ask what is the best way to get the attention of your stakeholders?

Current results are 2 hours (30 minutes above our target)
Goal LAB TAT is 1.5 hours (Average)

Is there a better metric?
For example, what <u>percent</u> of the time does it need to be at or under 1.5 hrs?



70% feel a longer wait

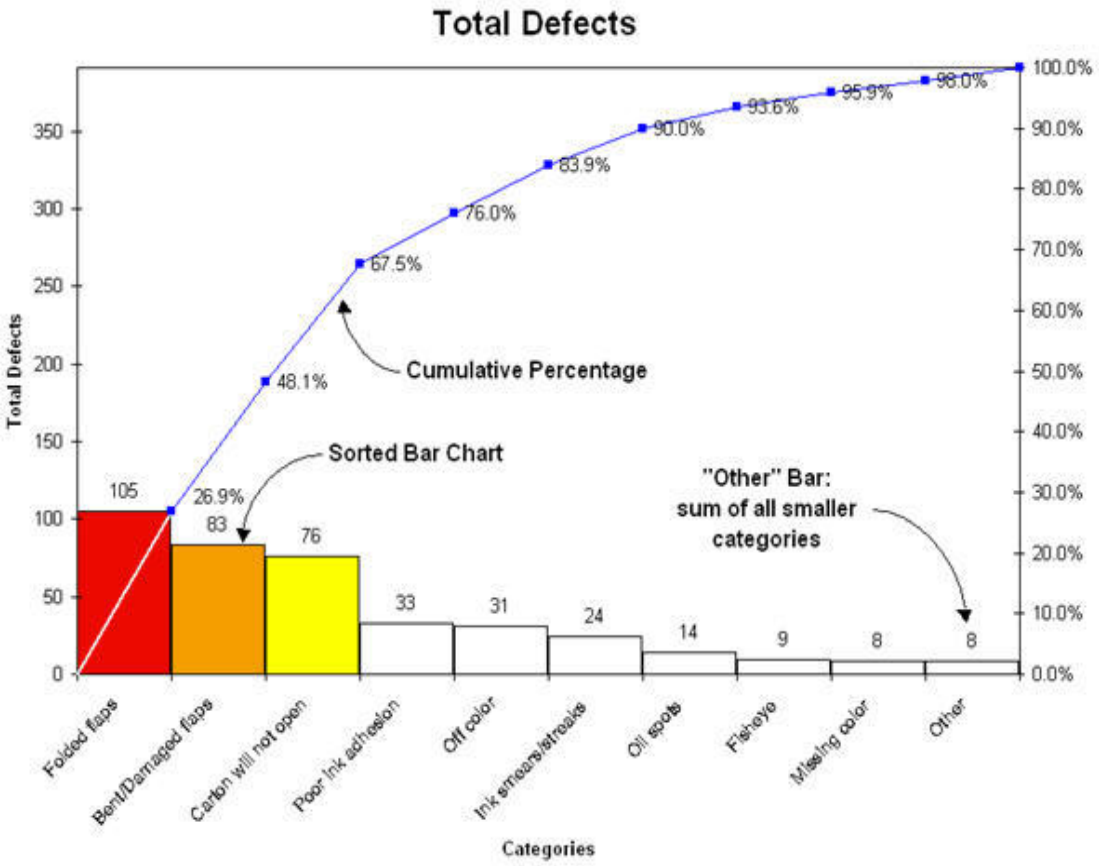
Better to use:
30% of our patients experience at TAT <1.5 hours
Our Goal is to move this to >90%

Prioritizing Defects

For measures that involve counting defects or issues, use the **Pareto** method for justifying and prioritizing what to work on.

20/80 rule: 20% of the sources cause 80% of the problems or defects.

Use the Pareto method to demonstrate the top issues to address.



For detailed instructions -Tool Kit Link HERE

Pareto Video

View Pareto Video: HERE

Next Steps:

- Complete the Module 8 Quiz.
- However large or small (best to start small) pick a project or help with a project to start using DMAIC and supporting tools.

For Yellow Belt certification: 1) Select a process measure in your work area and practice calculating the average, standard deviation and median from the data. 2)Create a graph using any data. You can do it by hand or use a computer. What do the statistics versus the graph tell you differently? Include with your certification worksheet. Discuss with your leader the use of the tool.

Certification Worksheet Link HERE