Quality Improvement Tools

Model for Health Care Improvement

These tools are generally used in conjunction with the Model for Health Care Improvement, sometimes called the IHI Model, which was developed by Associates in Process Improvement (API) . The model directs you to ask these three basic questions:

What are we trying to improve?

- Identifying areas in need of improvement, it is suggested that you develop an aim statement to identify numeric goals. After drilling down data and to specify improvement area, you can specify a timeframe for numeric goal. After drilling down data

How will we know if a change is an improvement?

- Only through measuring can you know. Consider what to measure, who is impacted, where and in what **time frame.**

What changes can lead to an improvement?

- Using a team model with process investigation tools and other quality tools for identifying and developing process changes.

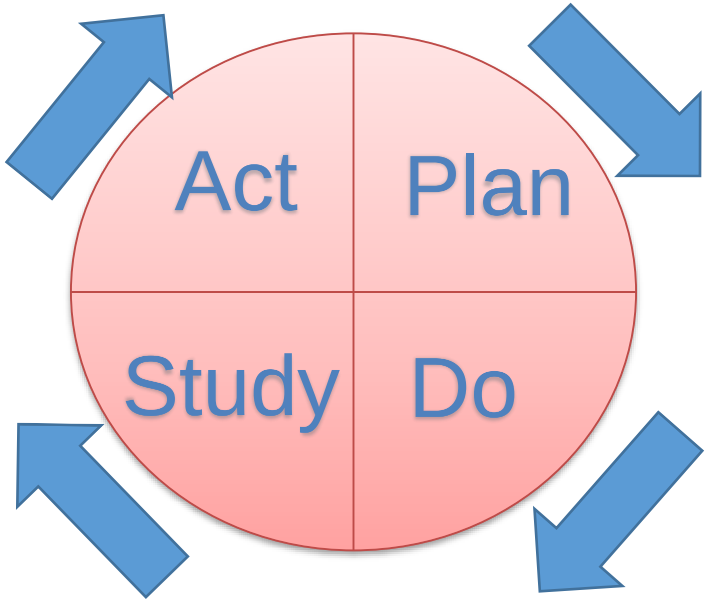
After answering these 3 questions, develop a plan using the PDSA cycle.

Method for 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?



Model
for
Health Care
Improvement

W. Edwards Deming's System of Profound Knowledge

The System of Profound Knowledge suggests that when investigating any challenge area in which you are planning an improvement activity, you consider the following four aspects of the challenge or proposed improvement:

Psychology

- Consider the psychological aspects of the challenge or improvement as it relates to all parties involved including staff, patients, community, clinical and organizational leadership. How can you successfully make the improvement needed by understanding the psychology of all parties involved?

Appreciate the System

- Consider the system or systems within which the challenge exists or wherein the improvement will occur. Consider all systems involved. These might include such systems as clinic, organization, as well as city, state, regional, and national healthcare, and public health systems. How can the improvement occur within the given system(s)?

Understand Variation

- Understand variation in the area that is being investigated. Consider variation as it relates to measuring changes in the challenge area or improvement activity. What is expected variation? What is unexpected? What variation might be linked among common or special causes? How will you know if there is there a relationship between the improvement activity and changes in the challenge or improvement area? Are other factors involved?

Theory of Knowledge

- Understand what is known about the area being investigated. What knowledge exists? What knowledge does not exist? How can what is known be used to meet challenges? What knowledge is needed to make improvements?

Deming’s System of Profound Knowledge

Appreciate the System	Understand Variation
Psychology	Theory of Knowledge

The PDSA Cycle for learning and improvement

The Plan-Do-Study-Act (PDSA) Cycle is a tool to assist with planning, testing and improving processes. Implemented on a small scale in a short cycle, the PDSA uses trial and error, the scientific method, so that a user can learn what aspects of a process change seem to be working, which do not, and where revisions can be made, and tested again. After running several PDSA cycles, the Quality Team may choose to implement the change on a more permanent basis.

Originally called the Plan-Do-**Check-**Act (PDCA) cycle by Walter Shewhart, W. Edwards Deming changed it to the Plan-Do-**Study**-Act (PDSA) cycle to underscore the importance of thoughtful analysis in change science.

The four stages of the PDSA are as follows:

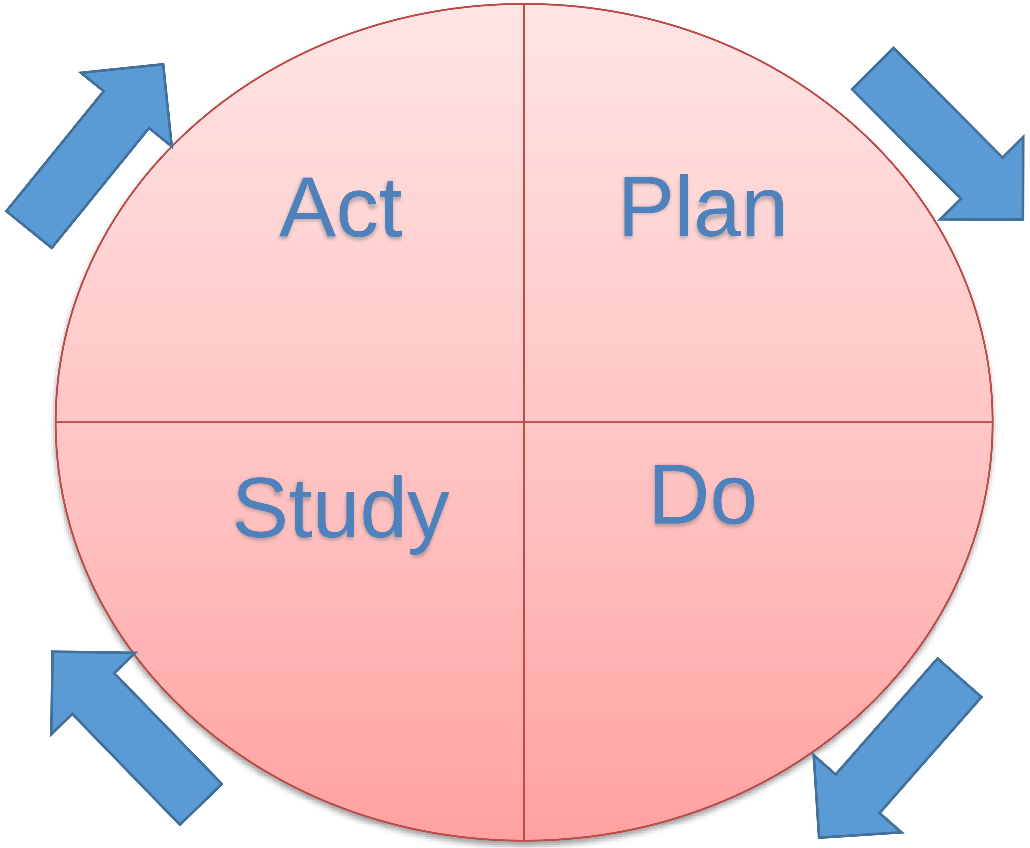
Plan: Include an objective stating what you aim to accomplish and what changes you will make to achieve this goal. Include questions that you would like to investigate with your test of change, and predictions (what you think will happen if you make the change). Include a plan to carry out the test cycle (who, what, where, when), and how you will measure the impact of the change.

Do: Test the plan on a small scale, documenting effectiveness, problems, unexpected issues

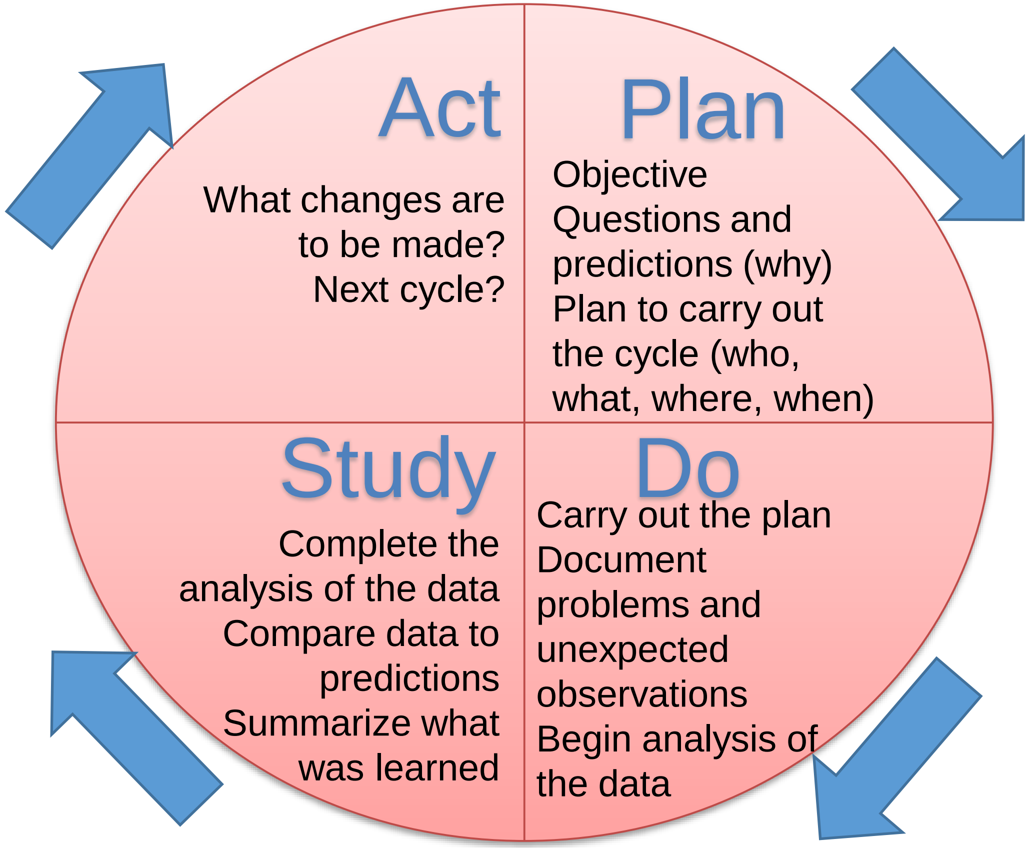
Study: Complete the analysis of data from the test of change, comparing it to the predictions that were included in the plan. Include in your documentation a summary of what was learned.

Act: Revise your process changes based on what was learned from your analysis of the test of change. Test the revised process changes in the next PDSA cycle.

The PDSA Cycle



The PDSA Cycle

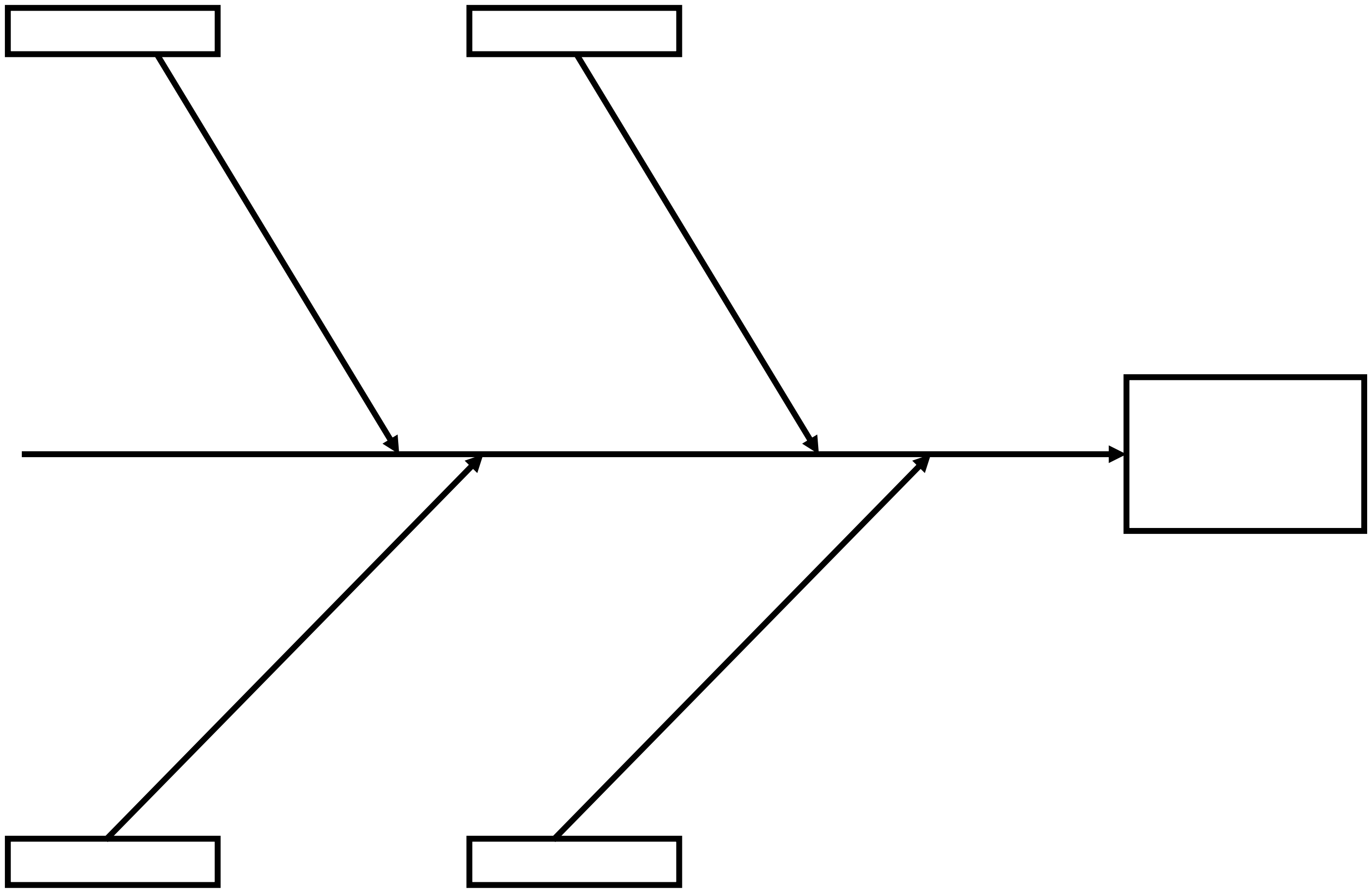


Cause and Effect Diagram

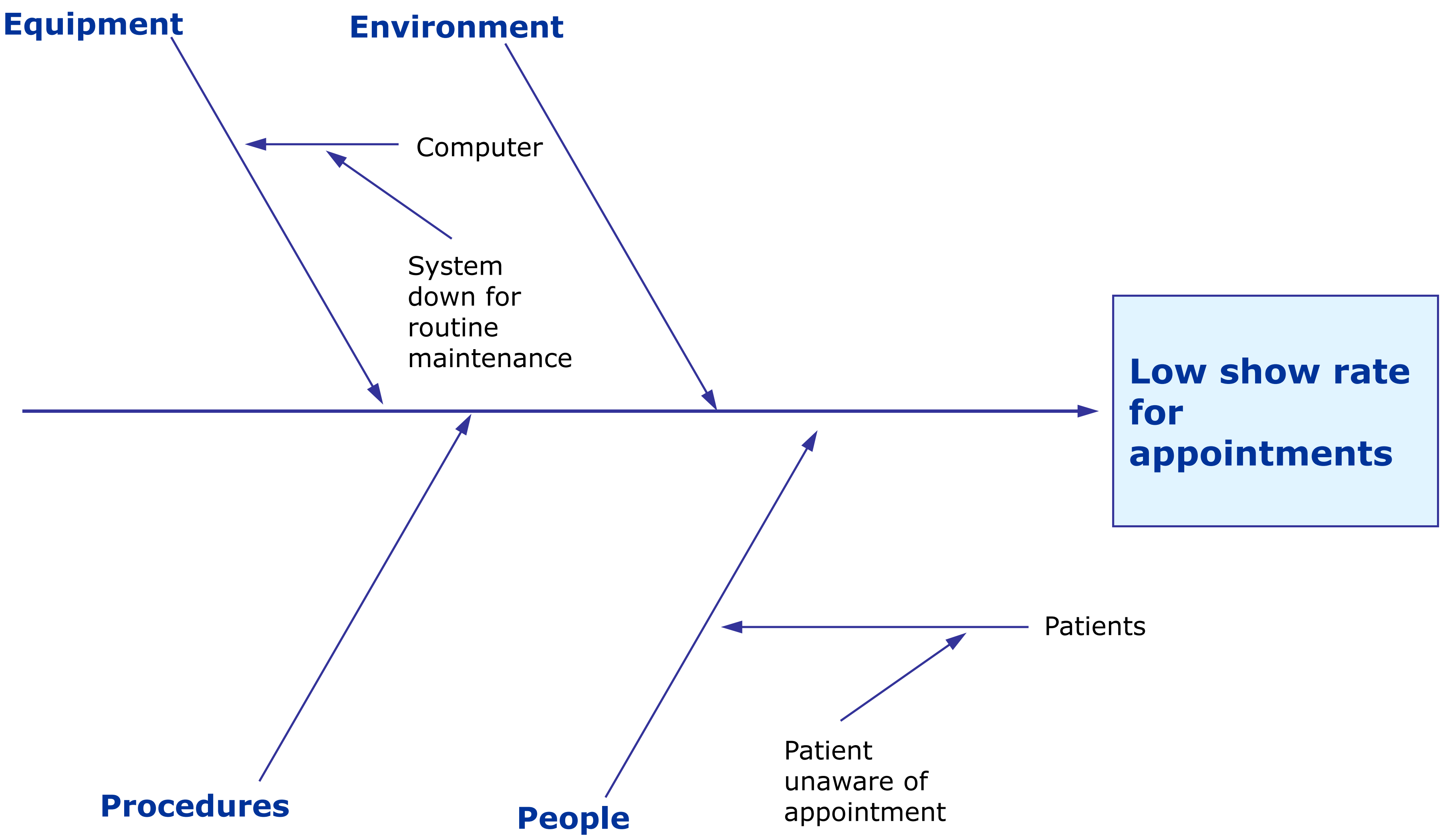
The Cause and Effect Diagram, sometimes referred to as the Fishbone Diagram, was created by Kaoru Ishikawa, an organizational theorist professor at the University of Tokyo. The cause and effect diagram:

- Organizes and displays all causes and sub-causes that may influence a problem, outcome, or effect
- Helps push people to think beyond the obvious causes, (money, time) to find some causes that they can fix/improve
- Helps organize potential solutions and make clear who should be involved in solutions
- Encourages a balanced view
- Demonstrates complexity of the problem

Here is a cause and effect diagram template



Here is an example of how to use a cause and effect diagram



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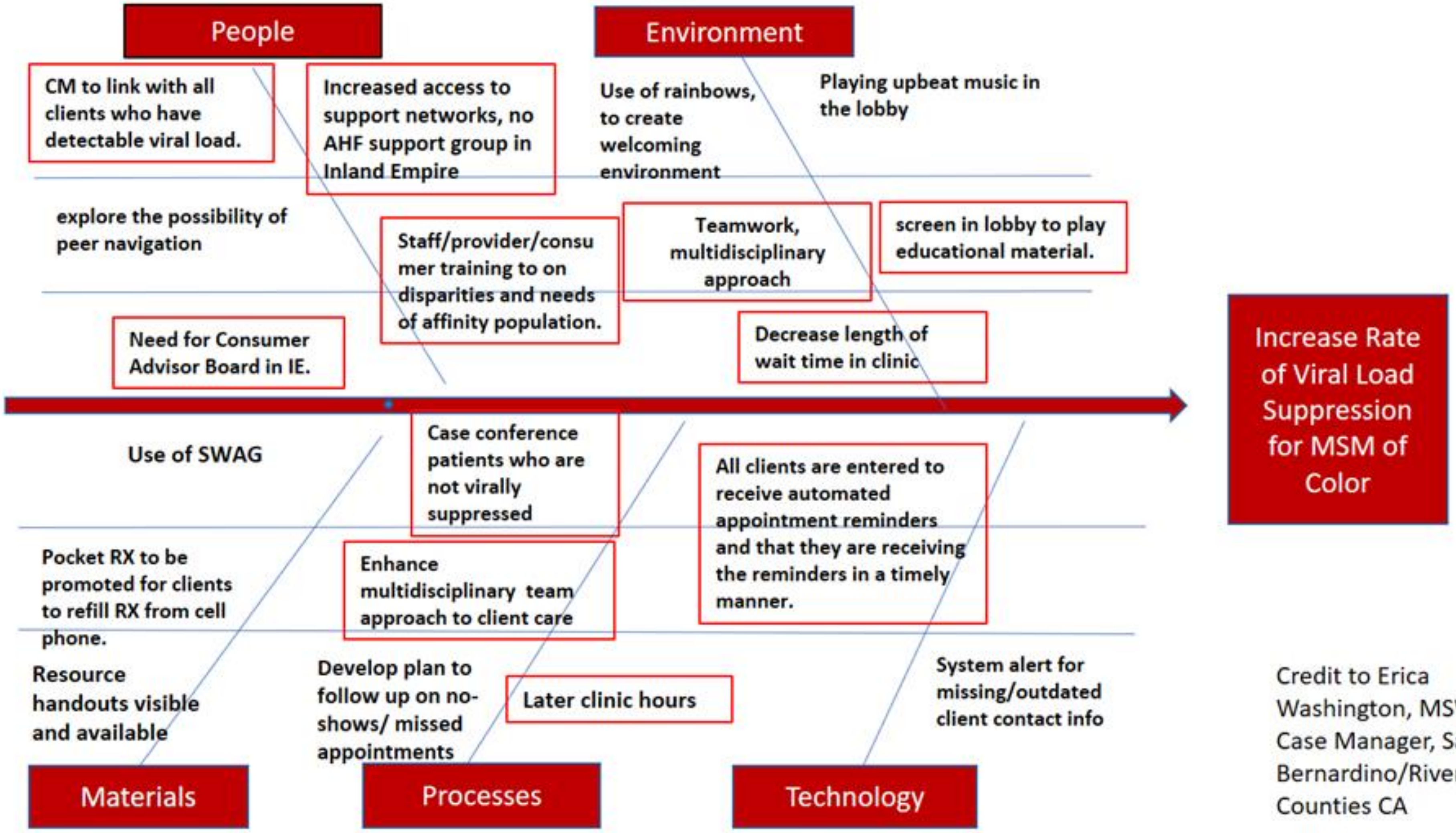
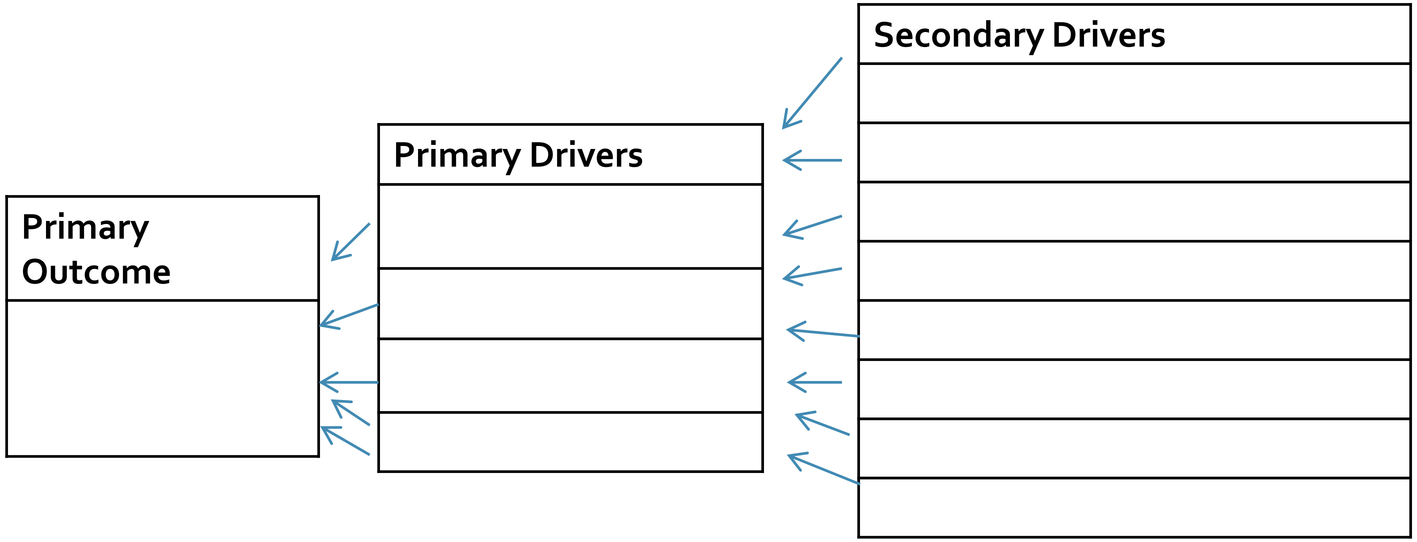


Credit to Erica Washington, MSW Case Manager, San Bernardino/Riverside Counties CA

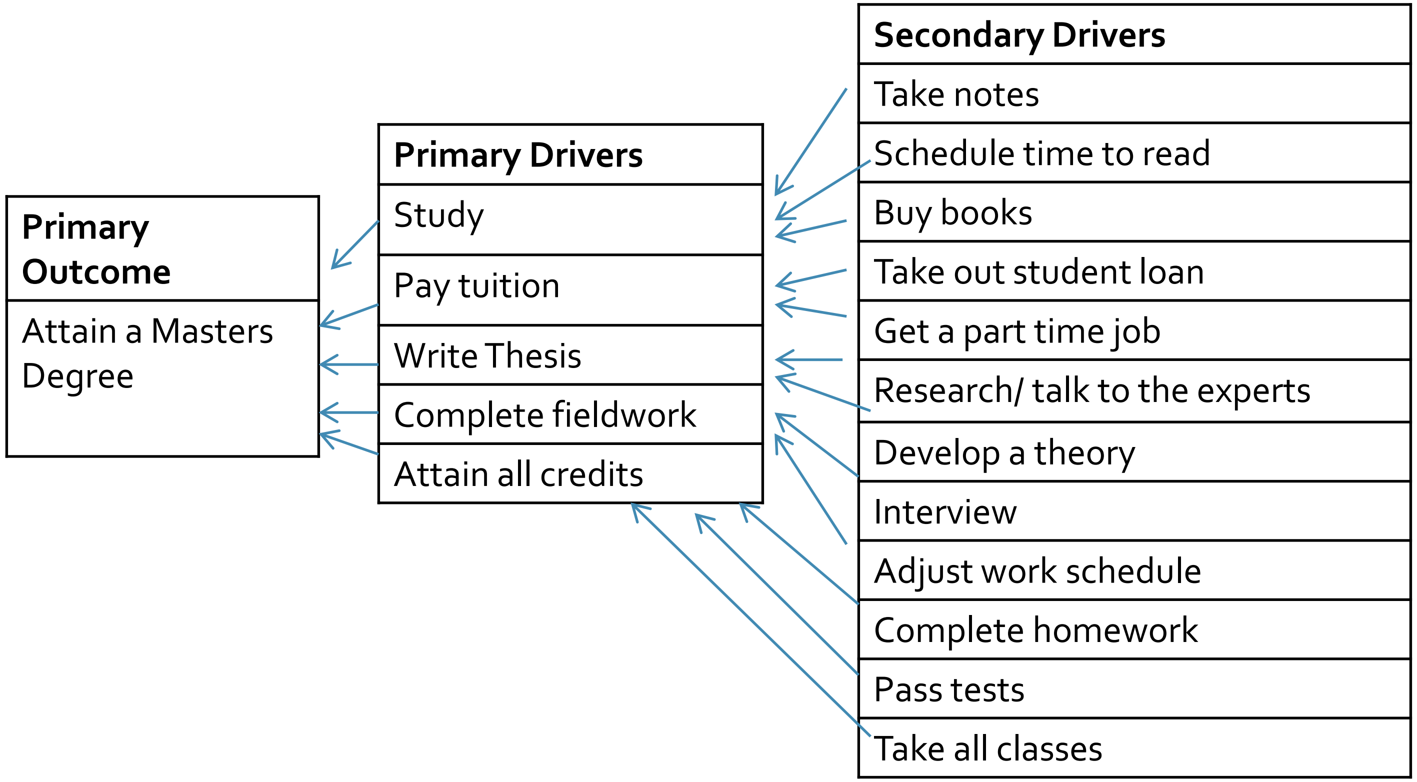
Driver Diagram

A driver diagram is a visual tool to help understand and prioritize factors within a system that drives desired outcomes called the primary outcome. Primary drivers are the main factors that drive the primary outcome. Secondary factors are subsets of the primary factors and drive the primary drivers. The driver diagram can help you to think strategically about what changes you can make to your current system to achieve your improvement goal. Focusing on secondary drivers can help to bring into focus specific areas for process improvements. Improving these processes strengthens secondary drivers, which, in turn, strengthen primary drivers, driving to the primary outcome.

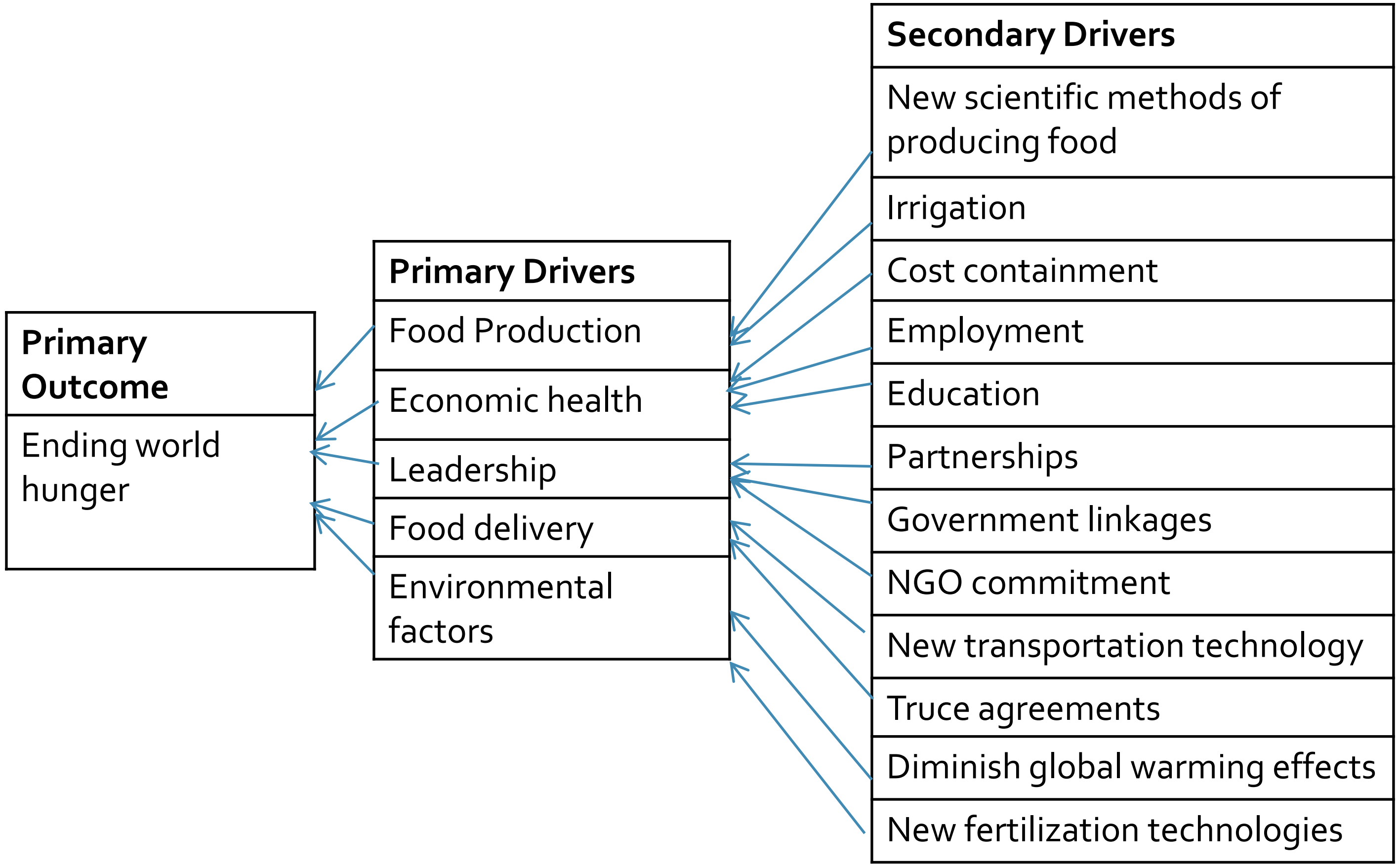
Driver Diagram Components



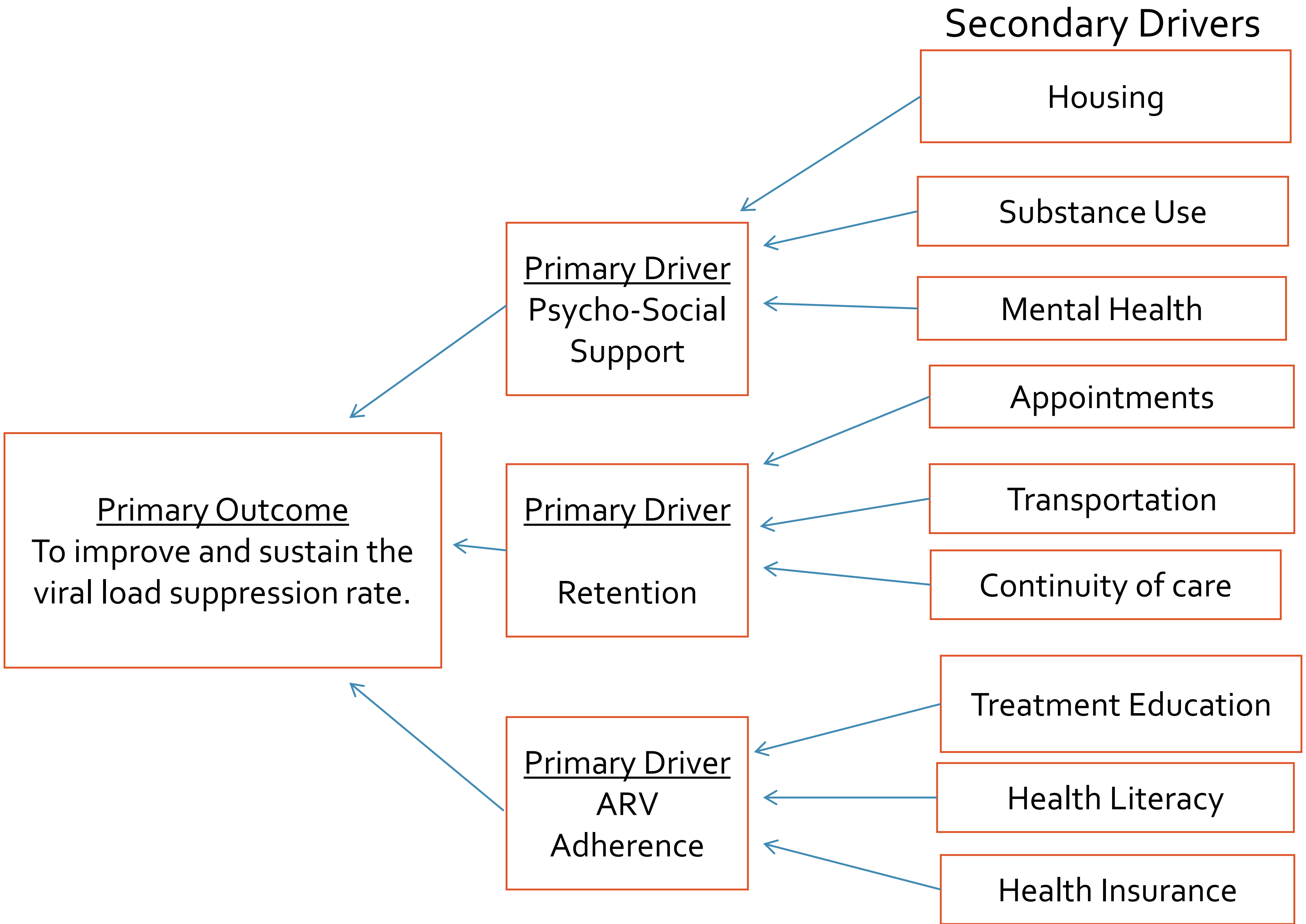
Driver Diagram Example: Attaining a Masters Degree



Driver Diagram Example: End World Hunger



Driver Diagram Example: Viral Load Suppression

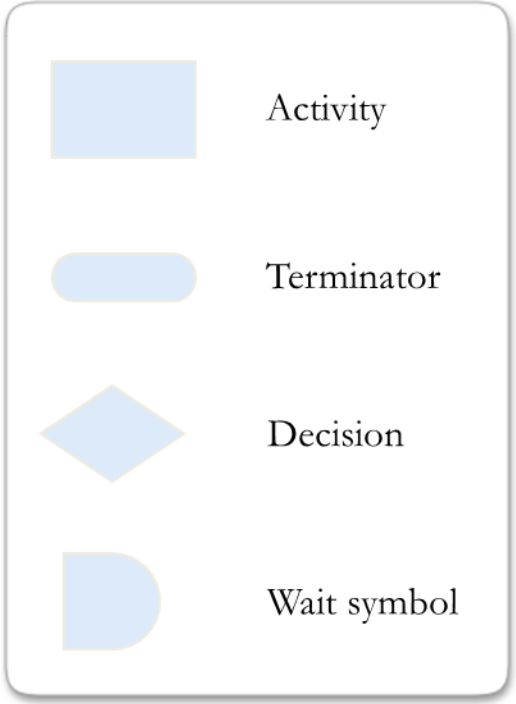


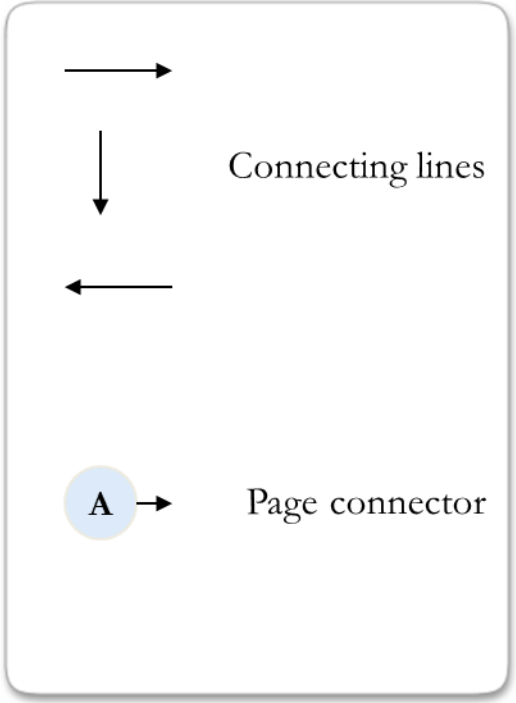
Flow Chart

A flow chart is a pictorial representation of a process, whether the process involves a sequence of events, steps, activities, or tasks. Flow charts are easy to understand diagrams that show how steps in a process fit together. This makes them useful tools for communicating how processes work and for clearly documenting how a particular job is done. The act of mapping a process out in flow chart format helps to clarify understanding of the process and fosters thoughtful discussion about where the process can be improved.

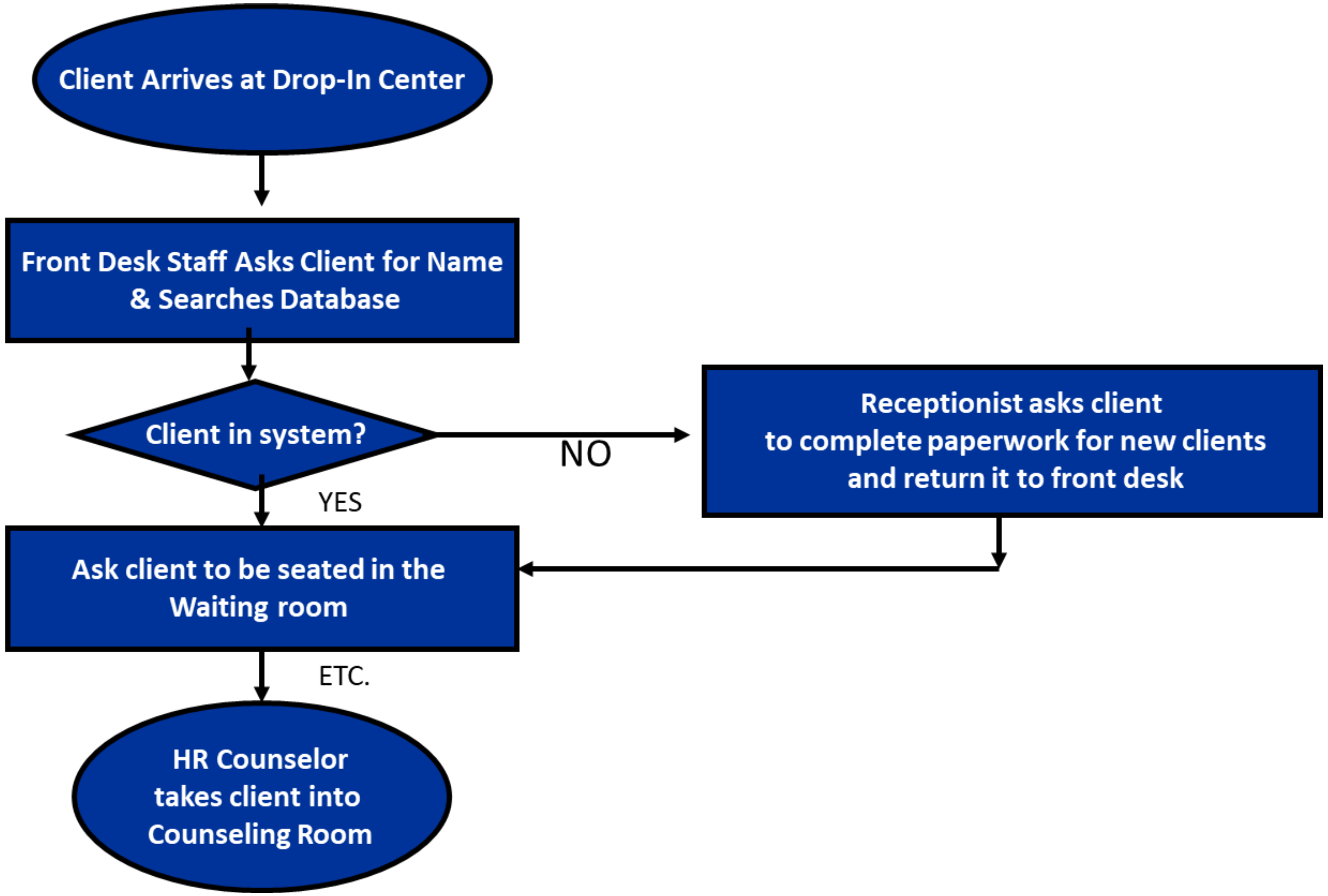
The flow chart enables team members to visualize a process, so that it can be understood and improved. It helps team members to recognize unnecessary or redundant steps, missing steps or steps that can be improved. It also helps members to identify who will be involved in in or affected by changes made to a process.

Symbols Commonly Used in Flow Charts





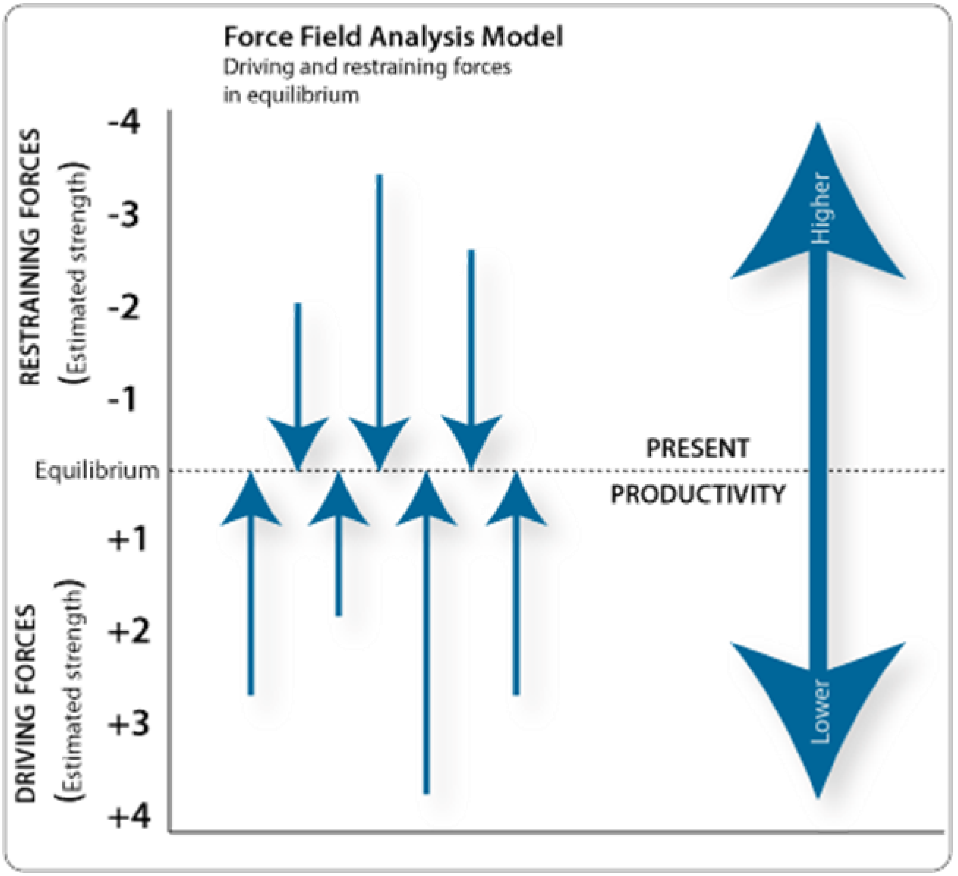
Flow Chart Example



Force-Field Analysis

A Force-Field Analysis is a tool that is used to examine driving forces and restraining forces in a system that might either hinder or support planned quality improvement activities. The team brainstorms driving forces that they think will help to successfully make process changes to achieve the quality goal, and restraining forces that hinder progress towards achieving the goal. The team then considers the restraining forces, developing ideas as to how they can overcome them, and how they can use the driving forces to strengthen the change and its chances for success.

Here is a model of Force-Field Analysis



Here is a Force-Field Analysis Template

1.) Define the desired change or action (agree on a simple statement).
2.) Brainstorm the driving forces & restraining forces
3.) Prioritize the driving forces & restraining forces (identify the critical few- rank order the top 3)
4.) List actions to be taken (focusing on the critical few driving & restraining forces)

Desired Change:	
Driving Forces (Those which currently exist & support or drive the desired change)	**Restraining Forces** (Forces that may inhibit the implementation of the desired change.)
Actions to Be Taken:	

Histogram

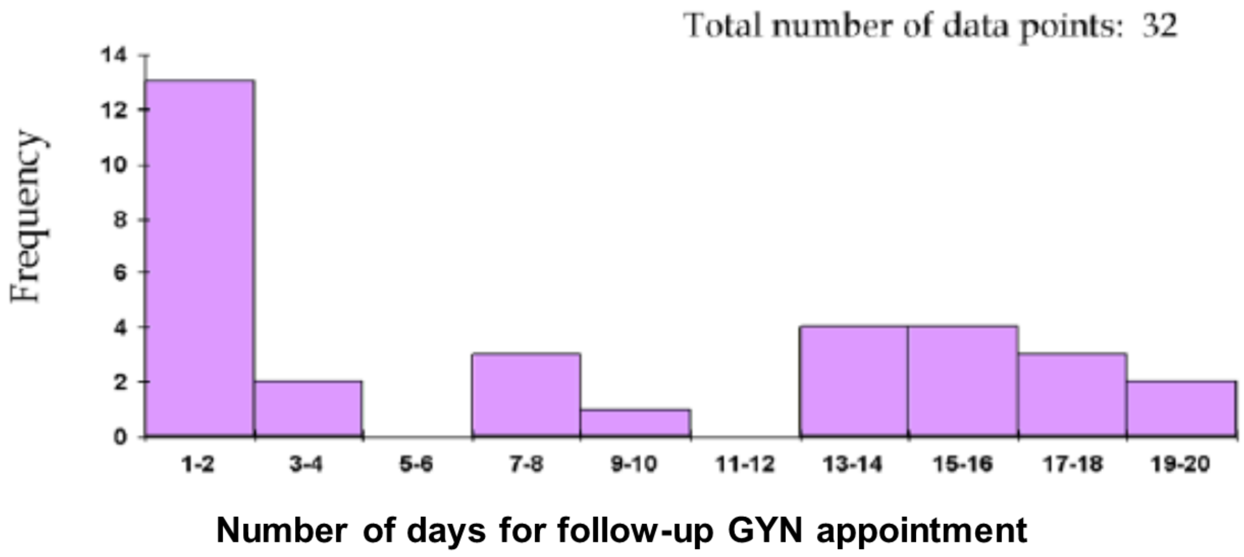
A histogram is used to display variation in continuous data, such as, time, weight, size or temperature. It plots the frequency of different values of a given variable. Histograms help teams recognize and analyze patterns in data that are not apparent simply by looking at a table of data or by finding the average or median.

Here is an example of a histogram

What's our Pattern Here?

Group Discussion

(10 Minutes)



Source: Institute for Healthcare Improvement

Pareto Chart

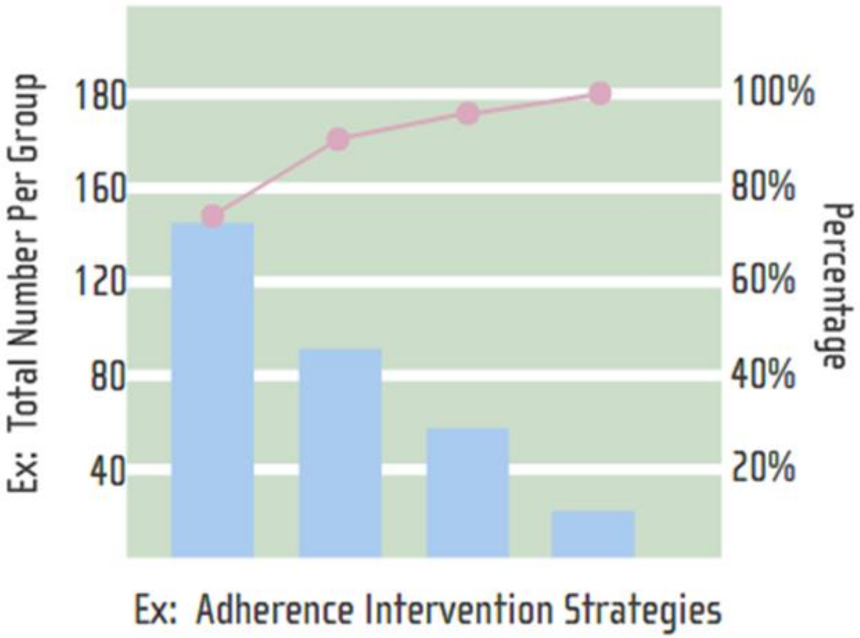
The Pareto Chart is a visual tool that displays values of causes that contribute to an effect. Causes are ordered in bars of decreasing magnitude from left to right. Ordering of the causes in this fashion helps to understand the few factors that are most vital to focus on for improvement. The Pareto Chart is based on the Pareto Principle, sometimes called the 80-20 rule, which states that 80% of outcomes can be attributed to 20% of all causes.

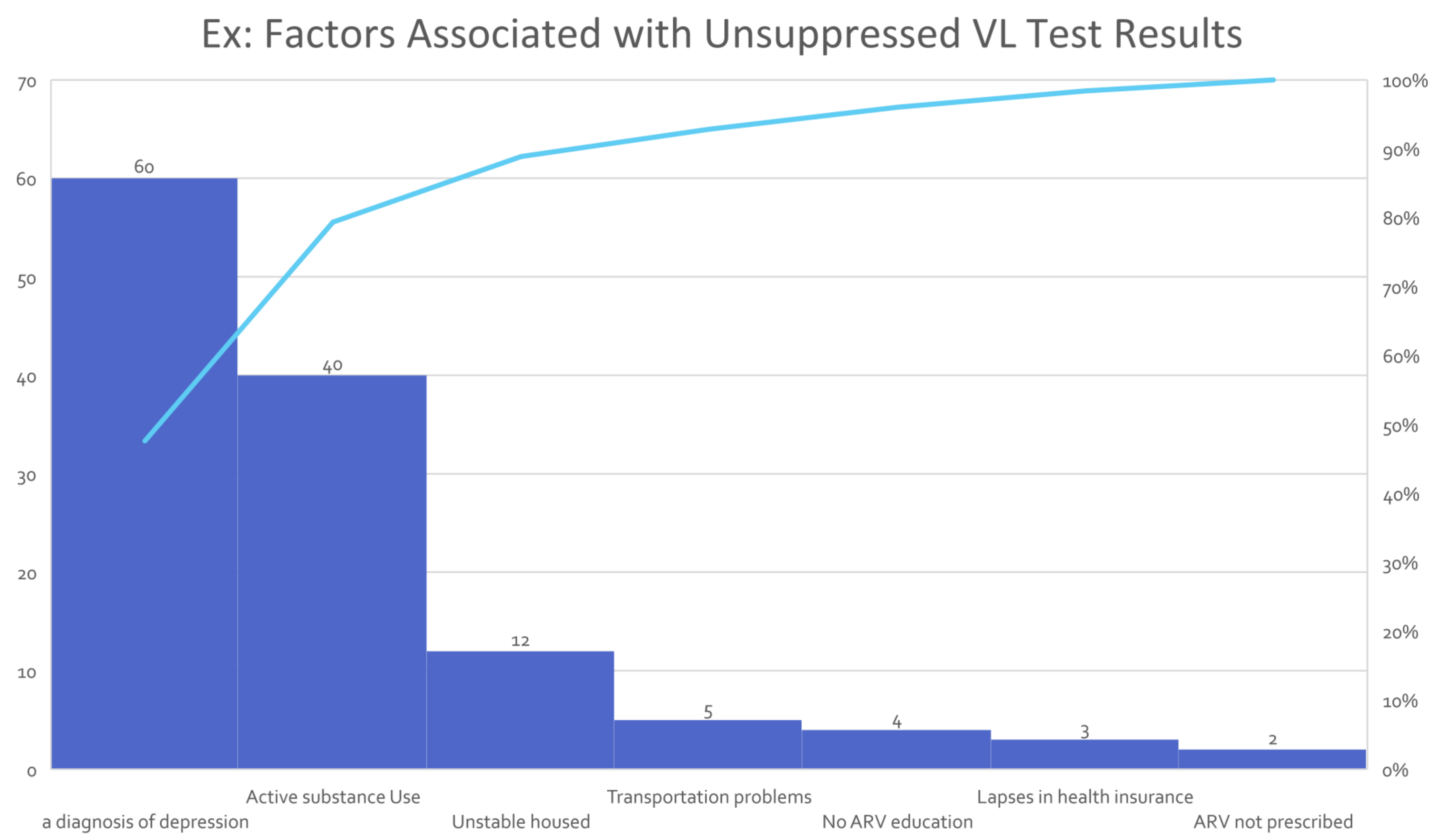
A point to point graph or Pareto Line is sometimes placed over the bar graph to show the cumulative relative impact.

A Pareto Chart can be easily generated using data entered into software programs such as Microsoft Excel.

The Pareto Chart is a powerful tool for analyzing causes and understanding which causes to prioritize for quality improvement.

Pareto Chart Examples





Ex: Factors Associated with Unsuppressed VL Test Results
70
60
50
40
30
20
10
0
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
60
40
12
5
4
3
2
a diagnosis of depression
Active substance Use
Unstable housed
Transportation problems
No ARV education
Lapses in health insurance
ARV not prescribed

Run Chart

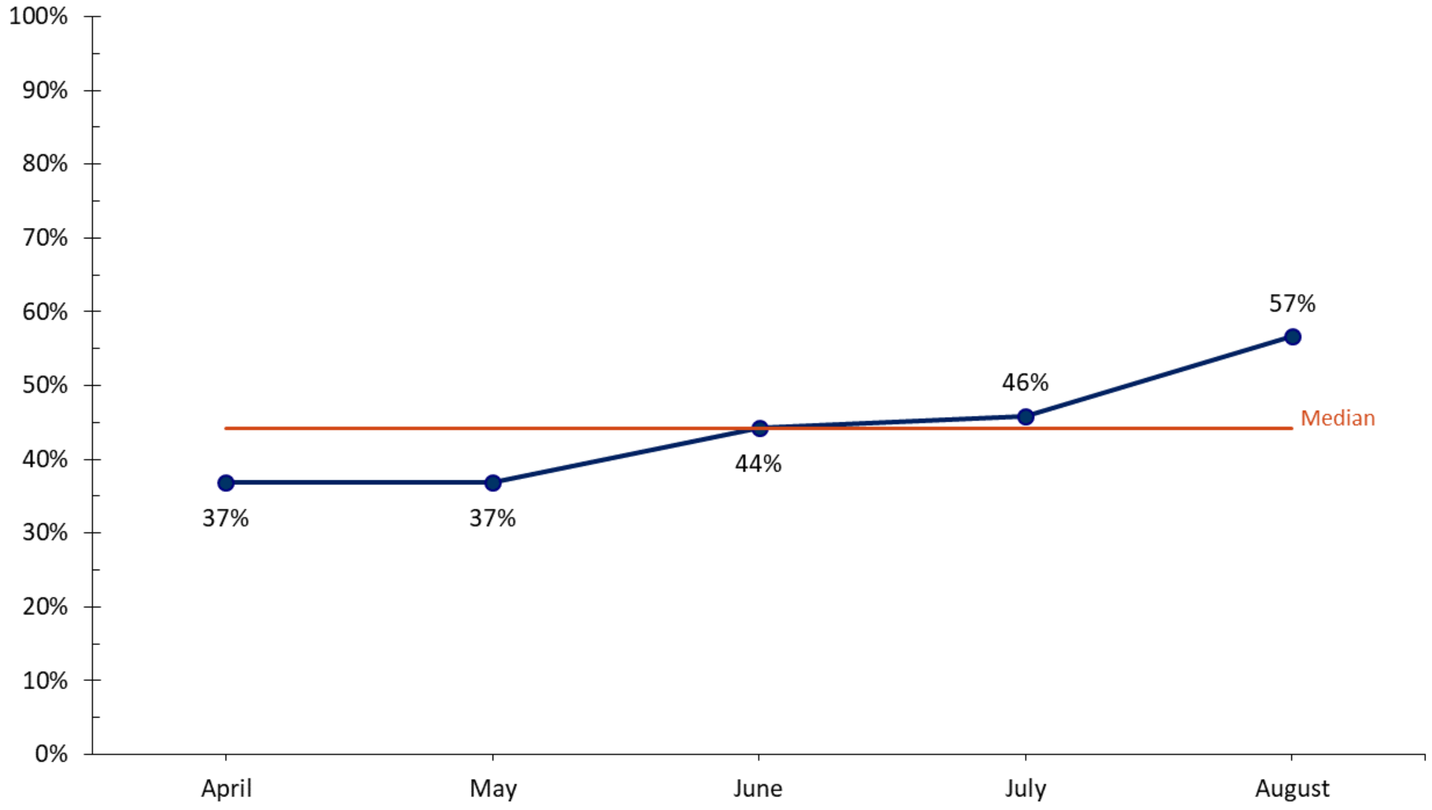
A run chart shows variation of data points over time and performance against an established goal. A run chart has a vertical line or y axis with scale relative to the variable and a horizontal line or x axis with time sequence. A line is drawn at either the mean or median depending on which is appropriate for the data set.

It is a highly effective tool for measuring and analyzing changes in data over time. A run chart can illustrate improvements and set backs as well as trends over time. The longer the timeframe, the more powerful the data will be in identifying significant changes in the variable being studied.

When used for quality improvement, a run chart can help your QI team understand if process changes are having the desired effect or if additional changes are needed to achieve the goal of the project. It is also useful to monitor changes once they are implemented to increase the likelihood of sustainability.

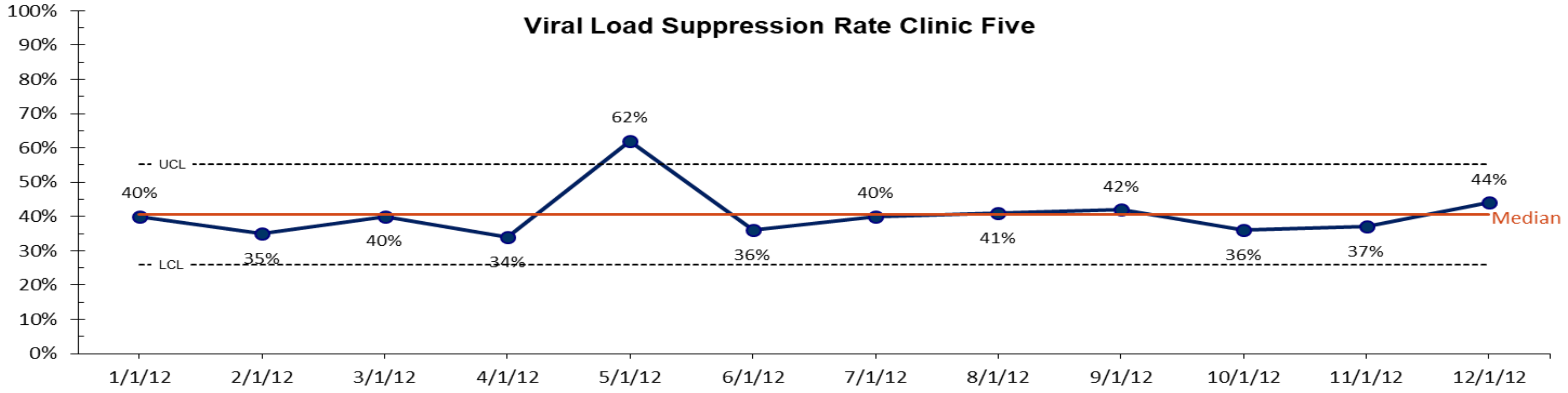
Run Chart Example

% of unsuppressed patients who received a QI intervention before 4/1/12 and a most recent viral load test since with a suppressed viral load test result



Control Chart

A Control Chart has 3 lines: a center (average) line, an upper limit line and a lower limit line. A mathematical equation is used to calculate the upper and lower limits of changes to be expected within the existing system. The upper limit line is three standard deviations above the average, while the lower limit line is three standard deviations below the average. Data is collected after repeated samples and charted



Common Cause vs. Special Cause and Stable systems vs. Unstable systems

Common Causes – Inherent in the process over time and affect all outcomes of the system.

A system that only has common causes affecting outcomes is called a **stable** system.

When a process is considered to be stable action should be taken to understand the common causes of variation

Special Causes - not part of the system all the time but arise because of specific circumstances.

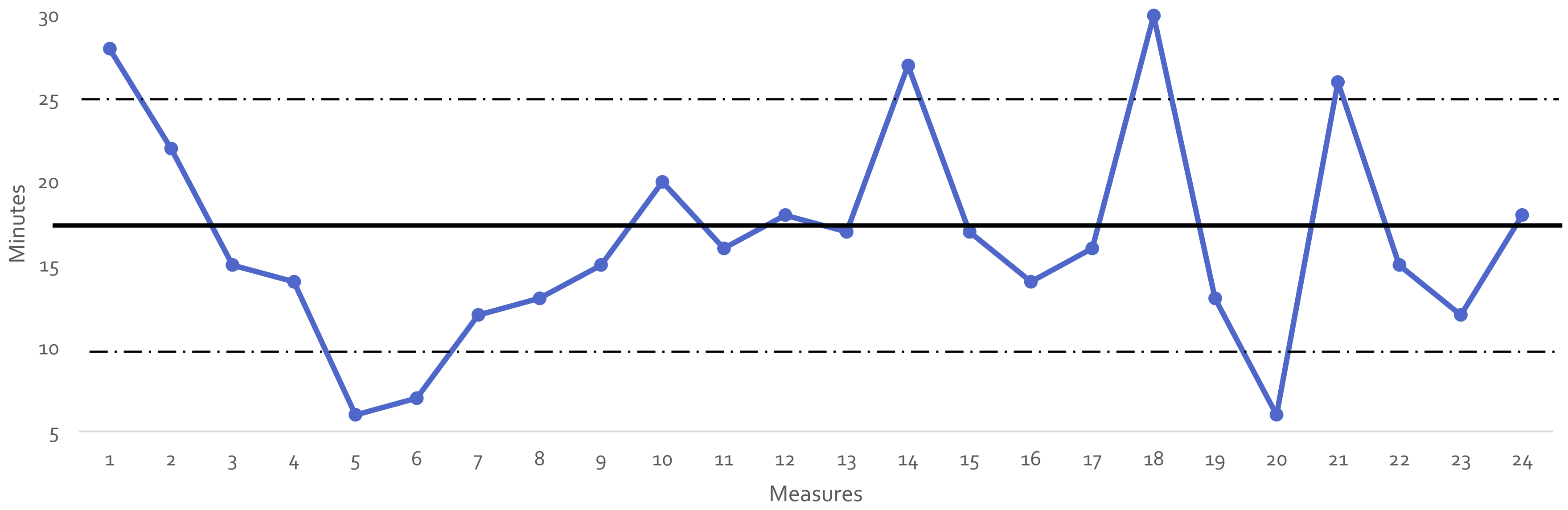
A special cause can be either positive or negative and can be evidence for an intended or unintended change. An **unstable** system that is affected by both common and special causes.

When a process is considered to be unstable action should be taken to learn about the special cause of variation

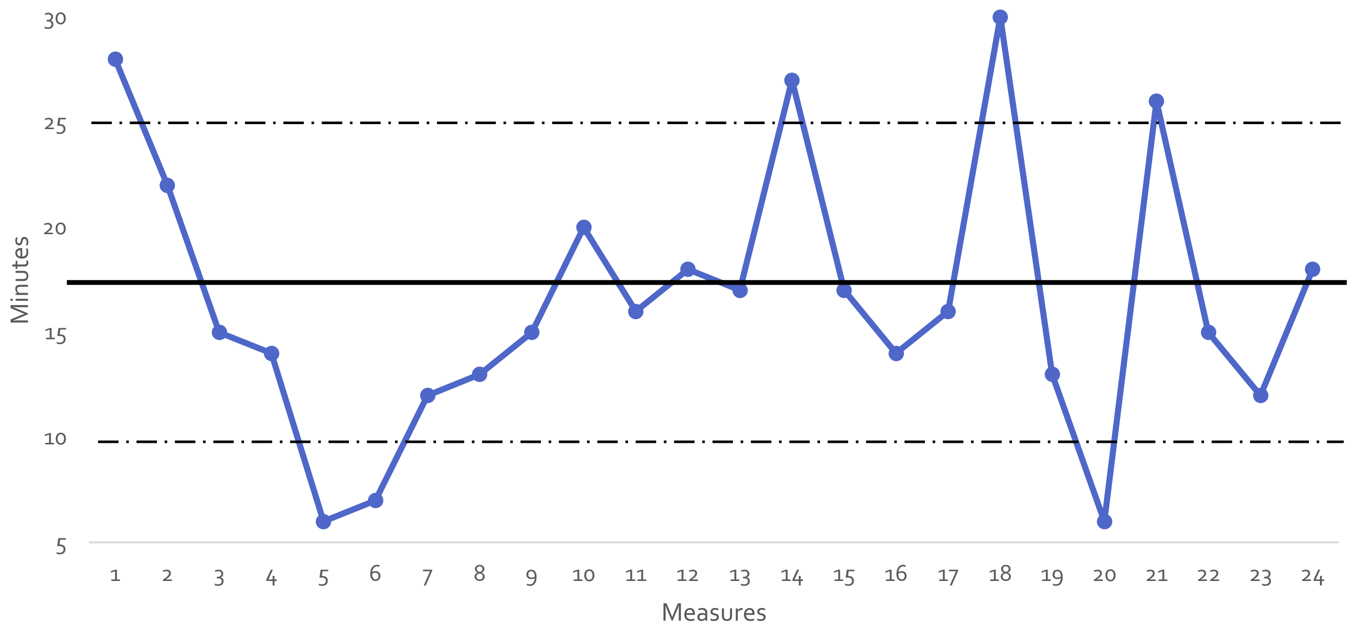
Interpretation of a Control Chart

The Control Chart provides the basis for taking action to improve a process (or system)

- A process is considered to be stable when there is a random distribution of plotted points within the limits.



A process is considered to be unstable when the distribution of plotted points reveals a special cause

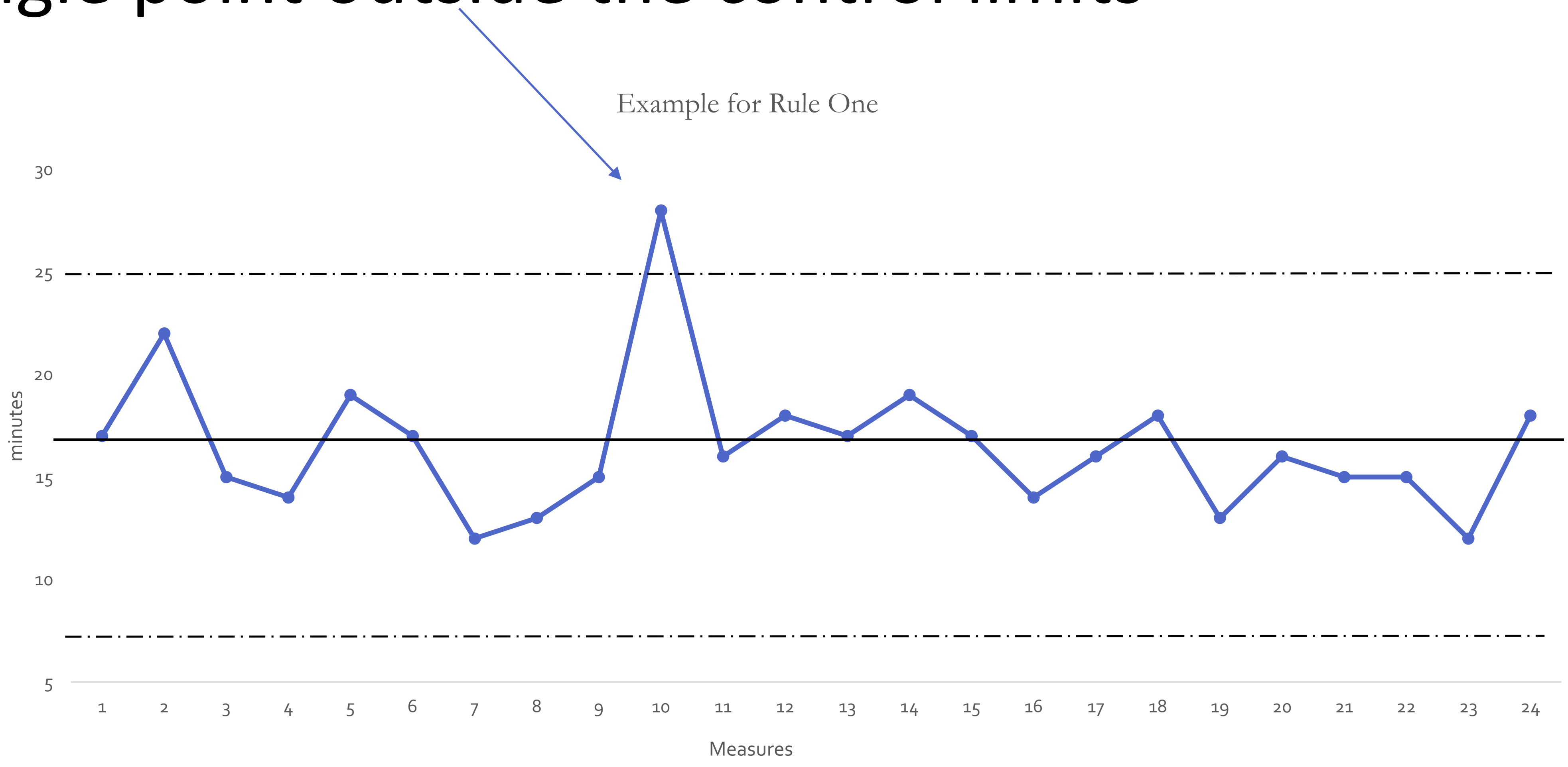


There are five rules for determining special causes on a control chart

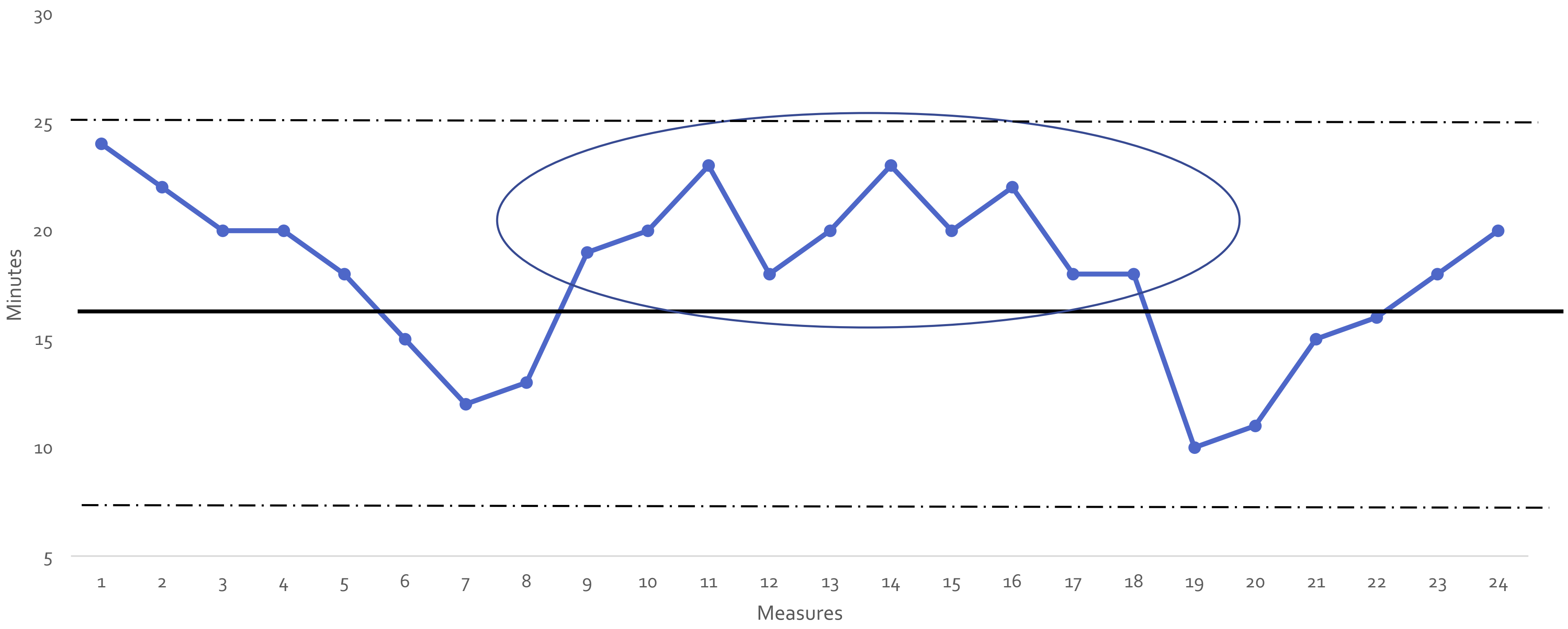
5 Rules for Determining a Special Cause

1. A single point outside the control limits
2. A run of eight or more points in a row above or below the center line
3. Six consecutive points in a row increasing (trend up) or decreasing (trend down)
4. Two out of three consecutive points near a control limit (outer one third of chart)
5. Fifteen consecutive points in a row near the center line (inner one third of the chart)

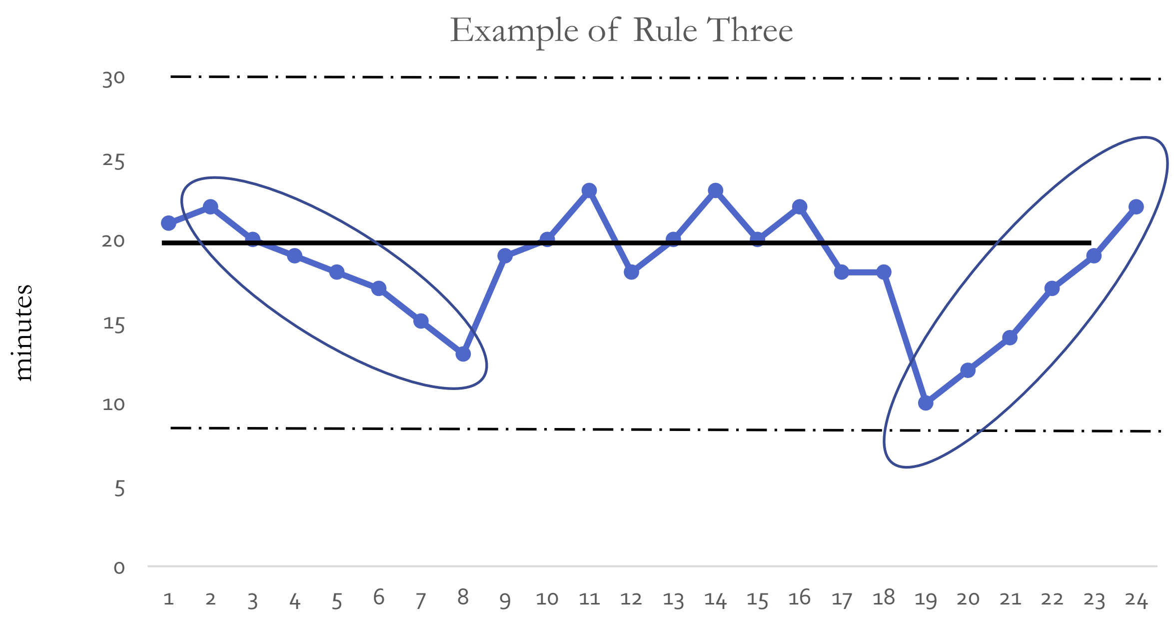
Rule 1:
A single point outside the control limits



Rule 2:
A run of eight or more points in a row above or below the center line



Rule 3:
Six consecutive points in a row increasing (trend up) or decreasing (trend down)



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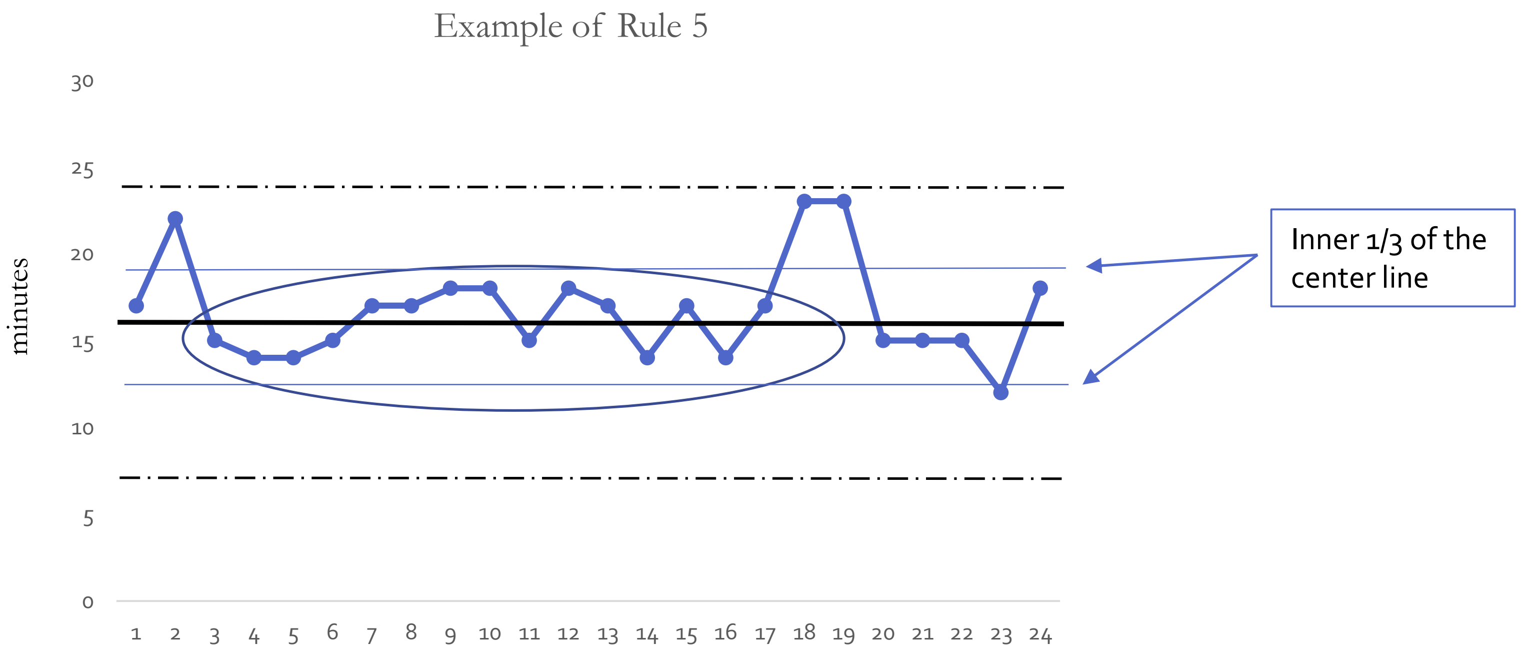
Rule 4:

Two out of three consecutive points near a control lmit (outer one third of chart)

Continue

Rule 5:
Fifteen consecutive points in a row near the center line (inner one third of the chart)



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Aim Statement

An Aim Statement is an important tool for clearly stating your project goal so that all quality team members understand the purpose of the project and associated process steps.

In developing your Quality Improvement Project AIM Statement, ask the following questions:

- What will you improve?
    - Be specific, clear and detailed
- When will it improve?
    - Month/year
- How much will it improve?
    - Consider how you will measure improvement
- For whom will it improve?
    - Identify patient groups or subgroups

Aim Statement Example

Improve the rate of viral load suppression by 10% by December 31, 2019 through increased case management visits for young MSM PLWH.

References

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