

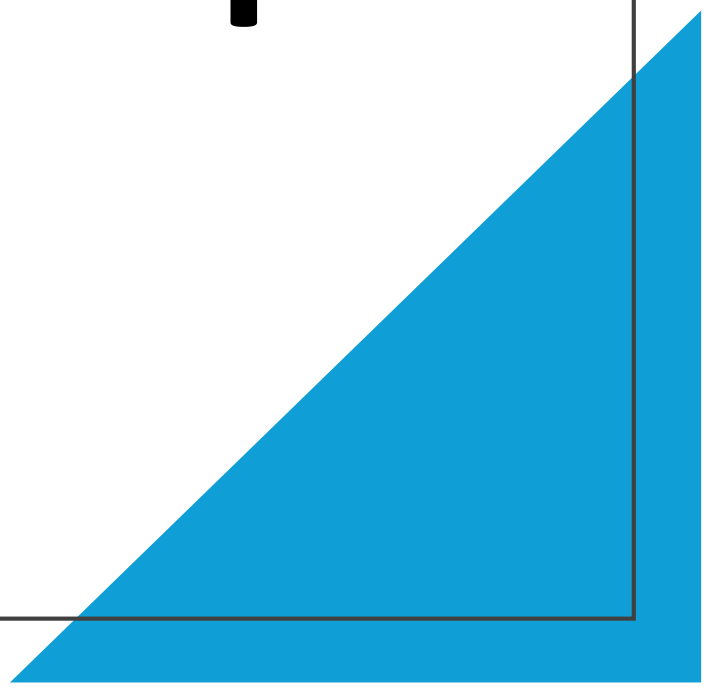
Resident Research Course QI Workshop

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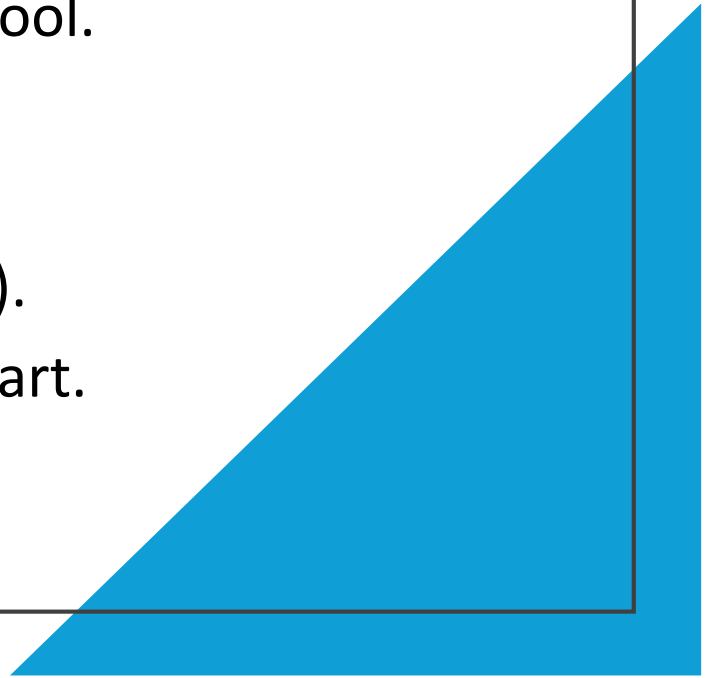
Chandan Bal, MD, MSc

October 27, 2025

A large blue triangle is positioned in the bottom right corner of the slide, pointing towards the top right.

Objectives

- By the end of the workshop, participants will be able to:
 - Identify and prioritize a problem using a structured tool.
 - Define a problem statement and SMART aim.
 - Understand a process and identify key drivers.
 - Develop and plan small tests of change (PDSA cycles).
 - Measure and display change over time with a run chart.



Sources

Resources



Asking the 5 Whys



Cause and Effect Fishbone Diagram



Guided Interview



Impact-Effort Chart



Measurement Plan Worksheet



Model for Improvement Worksheet



PDSA Worksheet



Process Mapping Guide



<https://www.albertadoctors.org/resource-centre/quality-improvement-resources/>



QI Essentials Toolkit

- [Cause and Effect Diagram](#)
- [Driver Diagram](#)
- [Failure Modes and Effects Analysis \(FMEA\)](#)
- [Flowchart](#)
- [Histogram](#)
- [Pareto Chart](#)
- [PDSA Worksheet](#)
- [Project Planning Form](#)
- [Run Charts](#)
- [Scatter Diagram](#)

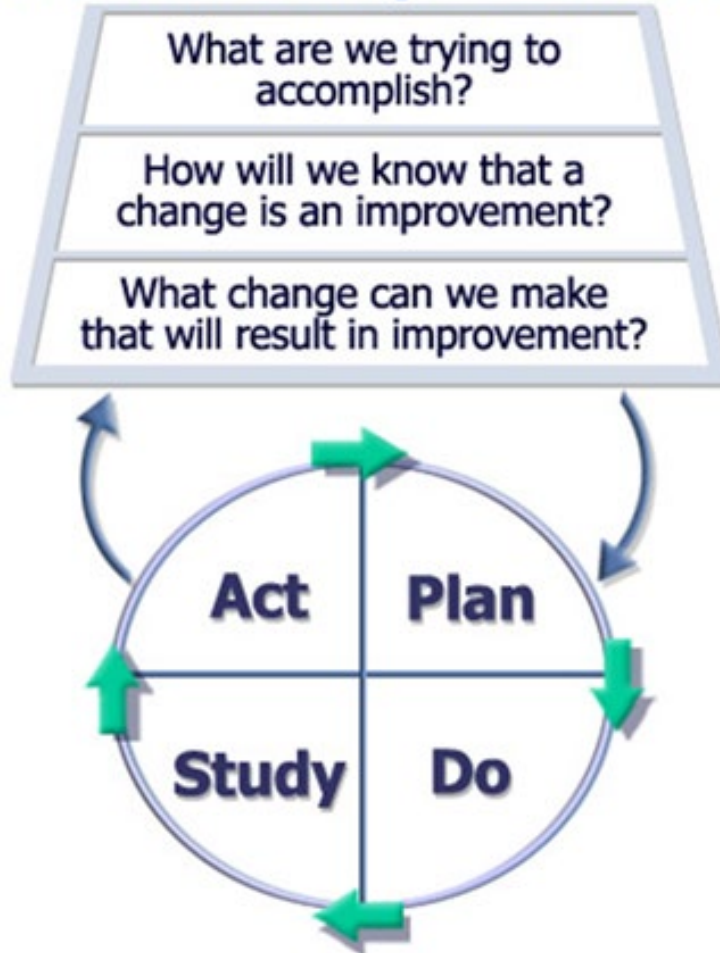
<https://www.ihl.org/library/tools/quality-improvement-essentials-toolkit>

Schedule

9:00 – 9:15	Mini-Lecture 1 — From Ideas to Improvement – Dr. Jennifer Thull-Freedman
9:15 – 9:48	Break-out 1 — Prioritizing and Defining a Problem
9:50 – 9:55	Share-out: Each group reads its aim aloud.
9:55 – 10:10	Mini-Lecture 2 — Understanding the System Before Changing It – Dr. Tania Principi
10:10 – 10:45	Break-out 2 — Understanding a System and Preparing for Change
10:45 – 10:55	Break
10:55 – 11:00	Share-out: Each group repeats their aim and names one driver and one change idea.
11:00 – 11:15	Mini-Lecture 3 — Planning a Change and Displaying Data Over Time– Dr. Chandan Bal
11:15 – 11:43	Break-out 3 — Choosing a Test of Change and Creating a Run Chart
11:45 – 11:50	Share-out: Groups show run chart, give brief interpretation.
11:50 – 12:00	Wrap-Up, Questions, and Reflection
12:00 – 12:15	Break and Opportunity for Individual Questions/Discussion with Moderators

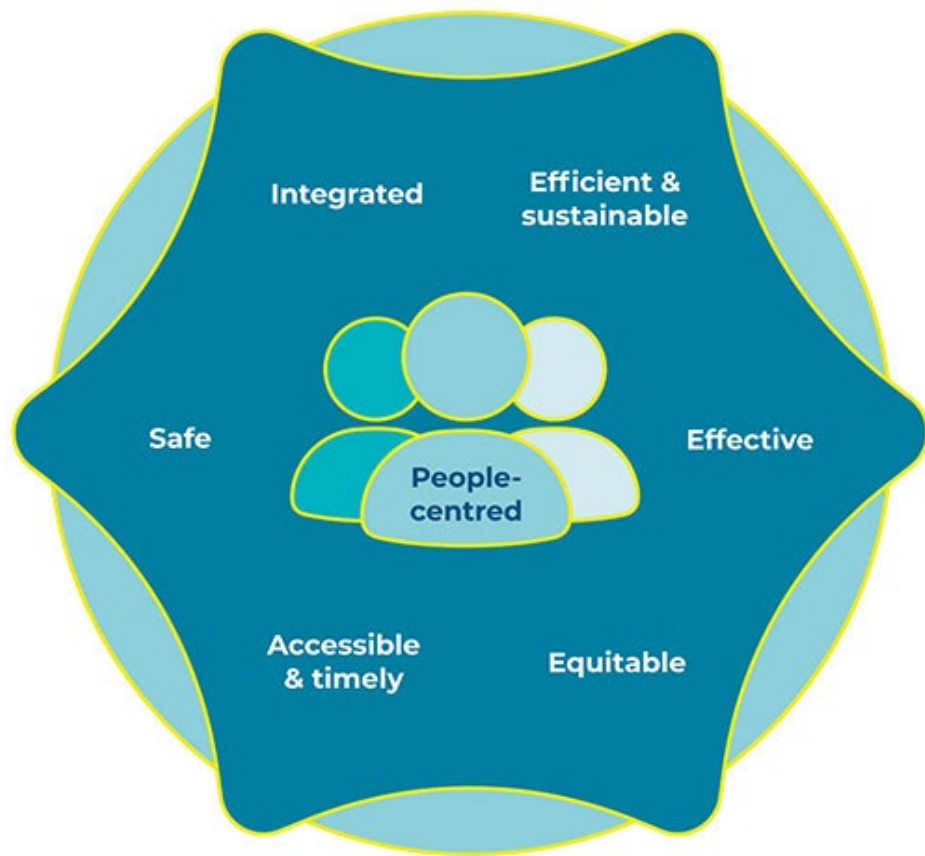
Section 1: From Ideas to Improvement

Model for Improvement



QI Steps Refresher

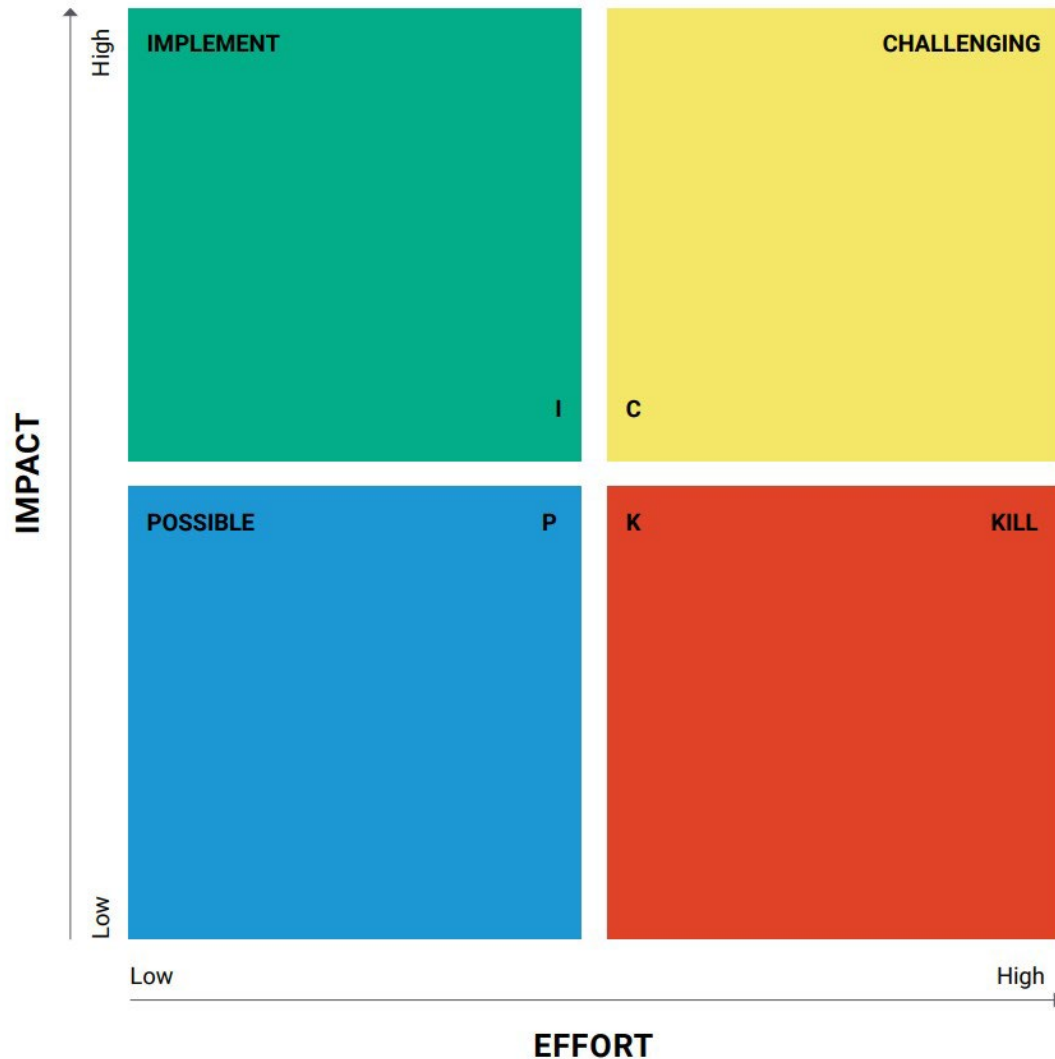
1. Identify the Problem
2. Form a Team
3. Consider Ethics
4. Understand the Problem
5. Set the Aim
6. Plan the Change
7. Measure the Change
8. Repeat Cycle as Needed
9. Sustain Success
10. Share



Ideal Conditions for QI Success

- Solid evidence to inform a standard of care
- Accessible data
- Gap between current and desired practice
- Motivation to change/improve
- Resources to match scope of project

The Alberta Quality Dimensions for Health



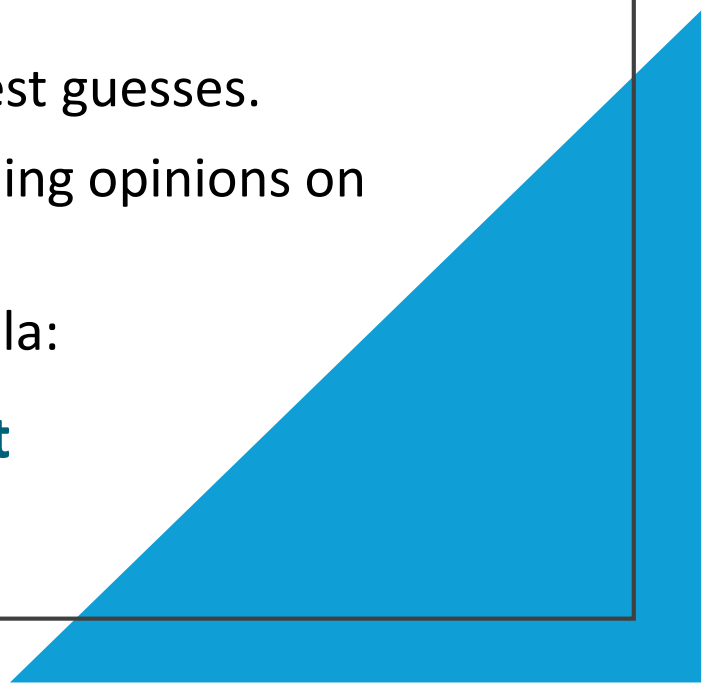
Activity 1: Prioritizing with an Impact–Effort Grid

- An **Impact-Effort Grid** or **PICK Chart** is a prioritization matrix
- Helps teams prioritize problems to address or changes to test
- High impact, low effort ideas get highest priority
- In your small group, you will draw a PICK chart
 - Each of you will write your QI project idea on a sticky note and place it where you think it best fits on the chart
 - Together you will decide whether to move some of the sticky notes
 - Next select a project idea to focus on for the remainder of the workshop

Activity 2: Writing a Problem Statement

- A problem statement is a concise description of the problem that will be addressed.
- Generally written in one sentence and includes *what* is wrong, *where* it's happening, and *for whom*.
- For this exercise, you can make up numbers based on your best guesses.
- Statement should be specific, quantitative, and neutral, avoiding opinions on causes or possible solutions.
- Write one sentence describing your problem using this formula:

For [population], [what problem] + [occurs how often/ at what rate], which leads to [undesired outcome].



Measure Type	Measure	Data source	Frequency	Collection Process
Outcome measure The main thing you want to achieve. Measures whether the problem is improving.				
Process measure Measures whether a process driving the outcome is working appropriately.				
Balancing measure Captures whether fixing one thing worsens another.				

Activity 3: Selecting Measures

Activity 4: Writing an Aim Statement



- Describe what improvement in your outcome you want to achieve, by how much, and by when.
- Defines success for your QI project and guides how long you need to keep testing changes.
- Make it SMART: Specific, Measurable, Achievable, Relevant, and Time-bound
- **Formula: We aim to [improve what] for [whom] from [baseline] to [target] by [timeframe].**

First Breakout!



You will be busy!

Activities:

Impact-Effort Chart – List possible issues and plot on matrix; pick one topic. *(10 min)*

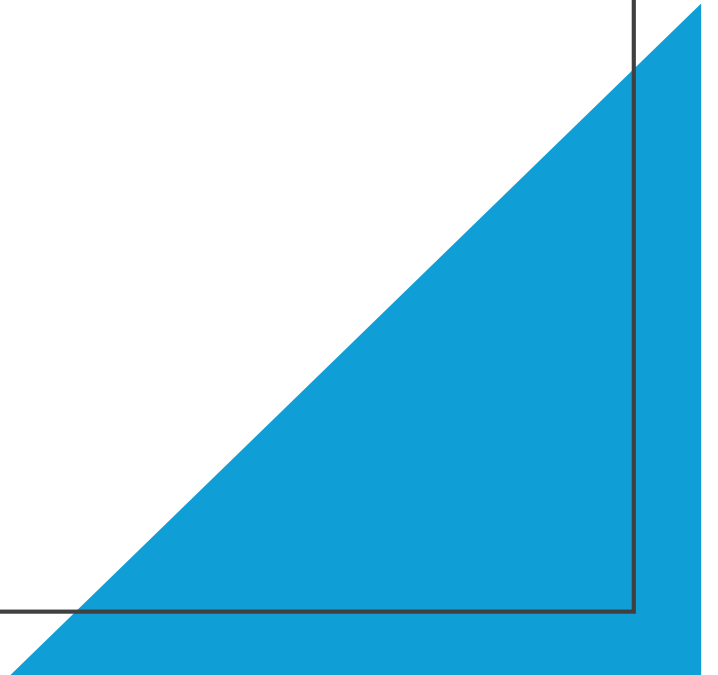
Problem Statement Formula – Define the gap between current and desired performance. *(8 min)*

Measurement Plan Worksheet – Choose primary outcome measure (just primary outcome for sake of time, but note that a complete project would likely have outcome, process, and balancing measures) *(8 min)*

SMART Aim Formula – Draft an aim statement. *(7 min)*

Section 2:

Understanding a System & Planning Change



Why Understand a System Before Intervening?

1. Identify Root Causes

- Interventions based on assumptions often address symptoms rather than root causes.
- Examining the process reveals where breakdowns truly occur.

2. Incorporate Front-Line Perspectives

- Those closest to the work understand the real workflow and barriers.
- Engaging them exposes factors not visible from a distance.

3. Anticipate System-Level Effects

- Healthcare processes are interdependent; changes in one step can affect others.
- Understanding linkages helps prevent unintended consequences.

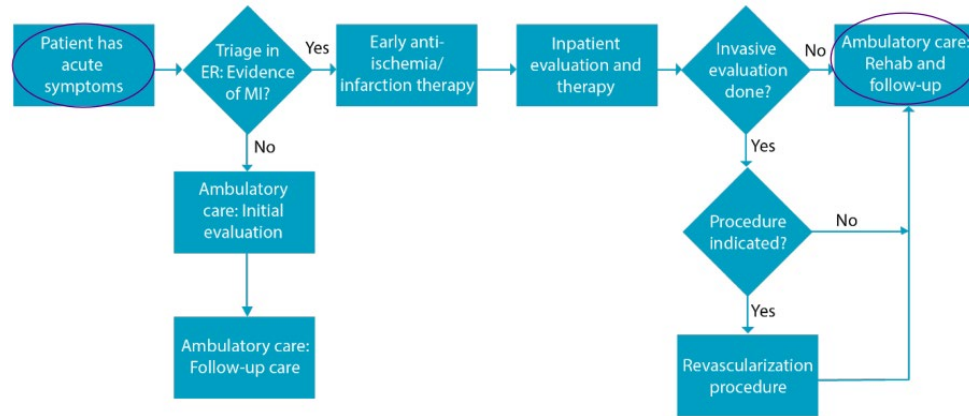


Alberta Improvement Way

Alternative Activity 5: Process Map

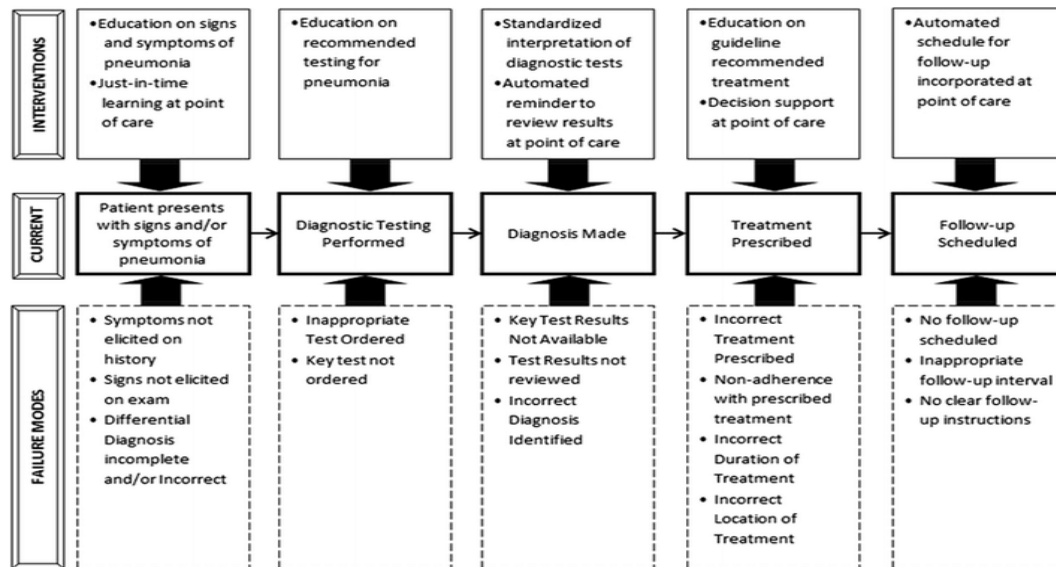
Shape	Name	Use
	Activity	Represents the action/activity of a process
	Decision	Represents a decision that is required to be made
	Start/End	The start and end of the process
	Arrow	Represents the direction of the flow and connects steps together

- Also called a flow chart
- Shows steps of a process in the order they happen
- Goals is to understand how the system currently works
- Useful to build a shared understanding of the process, identify unnecessary steps and delays



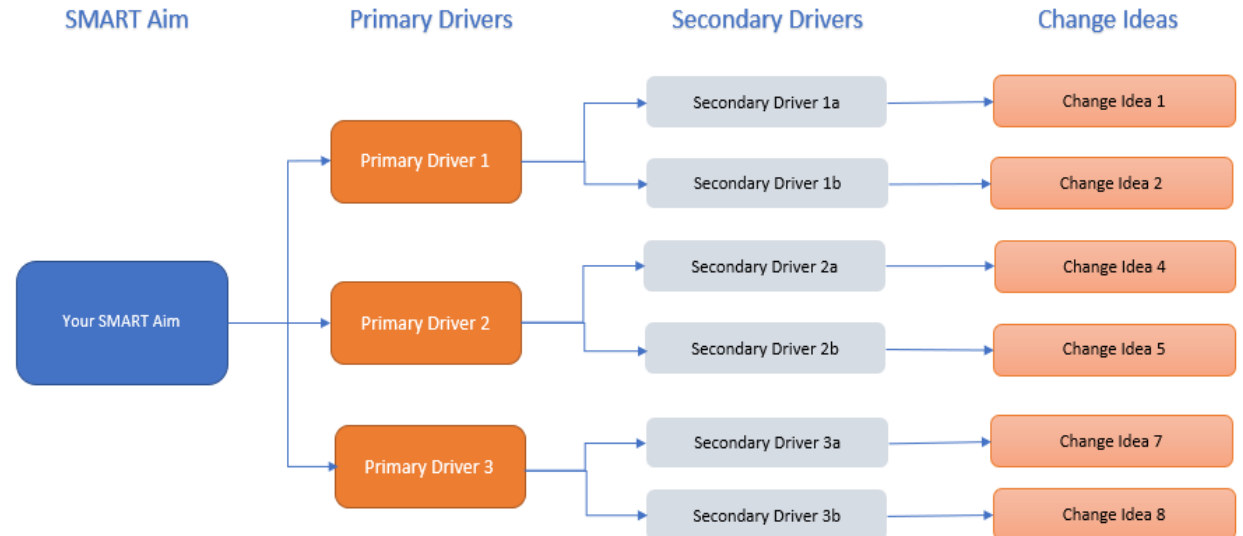
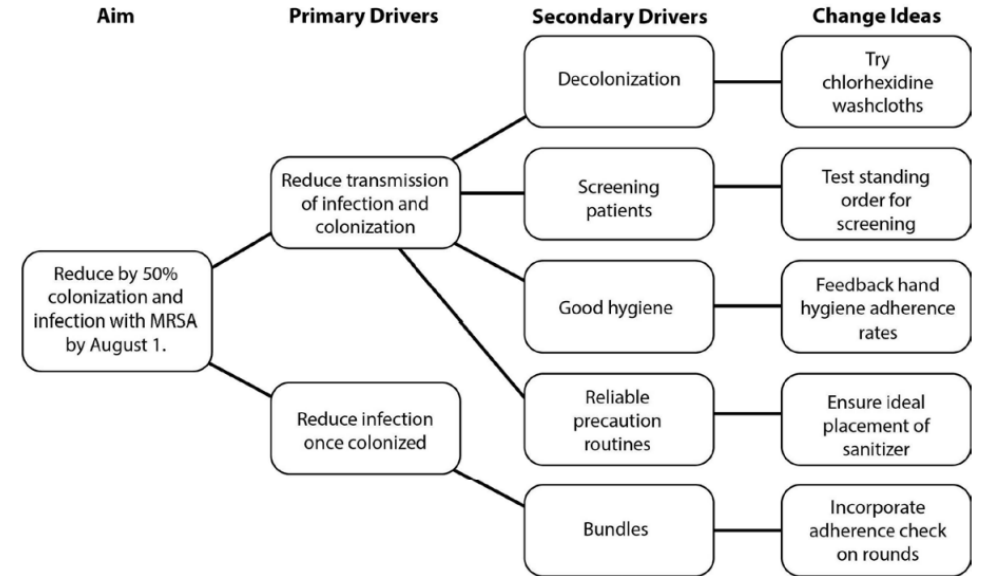
Process Map and Simplified FMEA (Failure Mode and Effect Analysis)

- The top figure is a typical process map
- In the bottom figure, a simplified process map has been drawn in a horizontal row.
 - A row below lists possible ways the process could fail, AKA “failure modes”
 - A row above suggestions possible interventions to mitigate failure risks
- Try either a fishbone diagram or process map in your breakout group, depending on which seems more useful for your problem.



Activity 6: Driver Diagram

- What is a driver diagram?
 - Visual display of theories of what will contribute to achieving the aim
 - Shows relationships between the following:
 - Aim
 - Primary drivers that contribute directly to achieving the aim
 - Secondary drivers that are components of the primary drivers
 - Change ideas or possible interventions



The next breakout will also be busy!

-
- Goal is to quickly practice using the tools, not to be perfect!
 - Choose Fishbone or Process Map.
 - Build Driver Diagram.
 - Quick break at 10:45.
 - Share one driver and change idea at 10:55 am.



Section 3:

Planning a Change and Displaying Data Over Time



Project Title:	
What question do we want to answer on this PDSA cycle?	Is this cycle used to: ☐ Develop a change idea, or ☐ Test a change idea, or ☐ Implement a change idea
Plan	
Plan to answer the question 'who will do what, when and where?'	
Plan for collection of data: who, what when, where.	
Prediction of results of this cycle:	
Do	
Carry out the PDSA cycle, collect data and begin analysis.	
Study	
Compare data to predictions:	
Summarize what was learned:	
Act	
Do we want to: ☐ Adopt this change, or ☐ Adapt this change, or ☐ Abandon this change.	Plan for the next cycle:

From Planning to Action

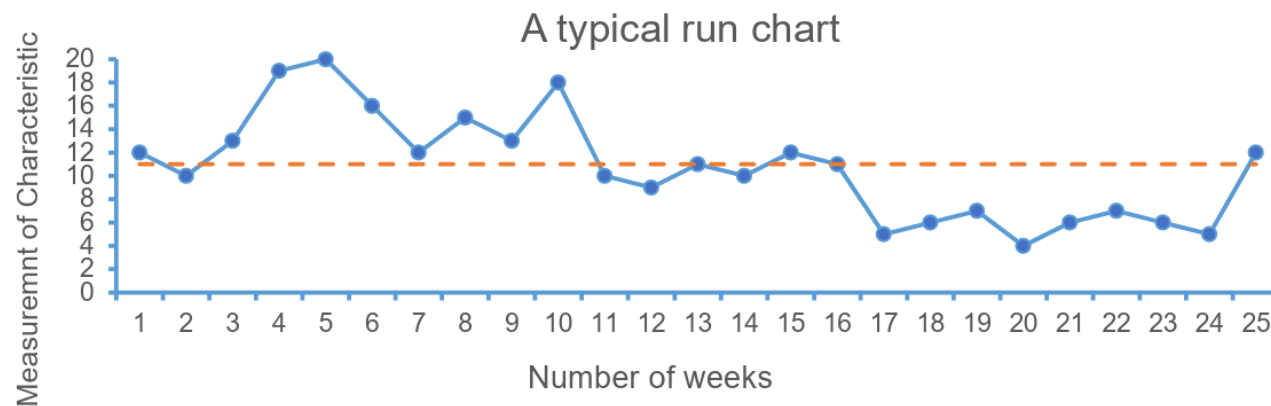
Activity 7: PDSA Worksheet

- You've done a lot of prep work and are ready to test your first change.
- PDSA Cycles (Plan, Do, Study, Act) help teams learn from tests of small changes rather than expending time and resources implementing untested interventions.
- Ideas are tested before they are "implemented".
- PDSA Worksheets are useful organizing tools when planning a PDSA cycle.

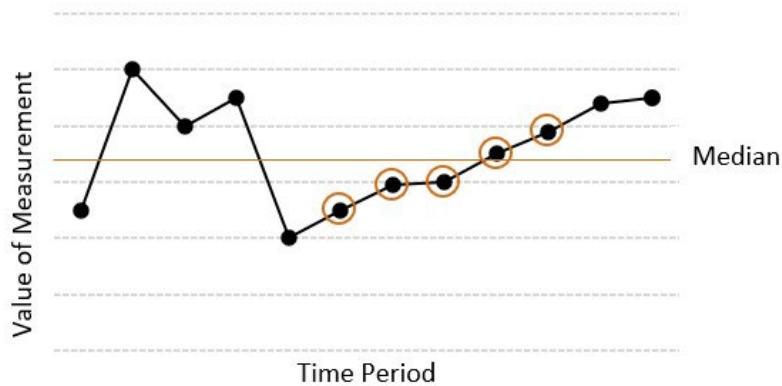
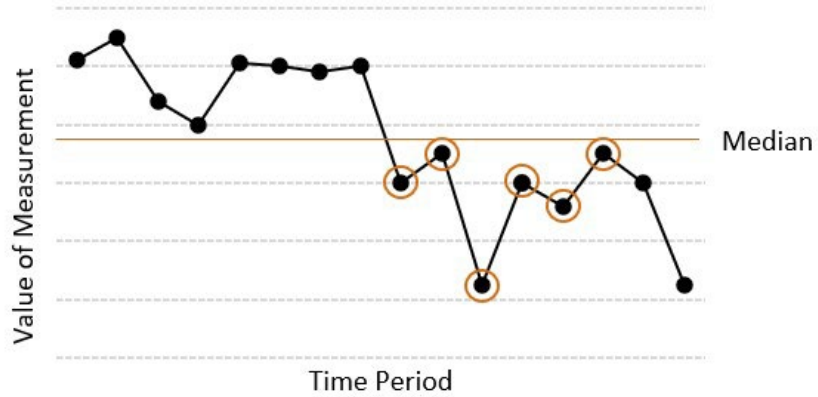
Source: AMA QI Tools

Run Charts

- Run Charts allow us to look at our data in real time, as we are testing interventions, and determine whether or not changes are random
- Data is displayed over time with a median line to depict central tendency
- Based on probability and detecting patterns that would be unlikely to occur if change were random



Run Chart Rules



Shift

- 6 or more consecutive points either *all* above or below the median

Trend

- 5 or more consecutive points all going up or all going down

Run

- A series of points in a row on one side of the median
- May have too many or too few for number of data points

Astronomical

- Not a statistical observation
- Visually apparent that a data point is very different from others



Activity 8: Make a Run Chart for Your Successful Project!

- Imagine you have collected baseline data and tested two changes using PDSA cycles
- Your data shows a shift, and you achieved your aim!
- Following the instructions in your workbook, draw the run chart that shows this success.
- Return at 11:45 to show your run chart to the large group.

Wrap-Up and Discussion

- QI begins with the problem, not the solution
- Simple planning tools enhance efficiency and likelihood of success
- Always measure change over time so you know when you're improving
- If your primary purpose is to solve a problem, take a QI approach!