Pennsylvania Perinatal Quality Collaborative

An Introduction to Quality Improvement Methods

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April 24, 2019

Objectives

- To discuss the foundation of Quality Improvement

- To explain a framework for a QI project:
  - Problem Statement
  - Goal/SMART Aims
  - Understanding the current process
  - Designing interventions / ideas for improvement
  - Discuss the importance of measurement
  - Develop a project plan – 30/60/90 day

- Provide an example of a project to illustrate these points.

What is a system?

An *interdependent* group of:
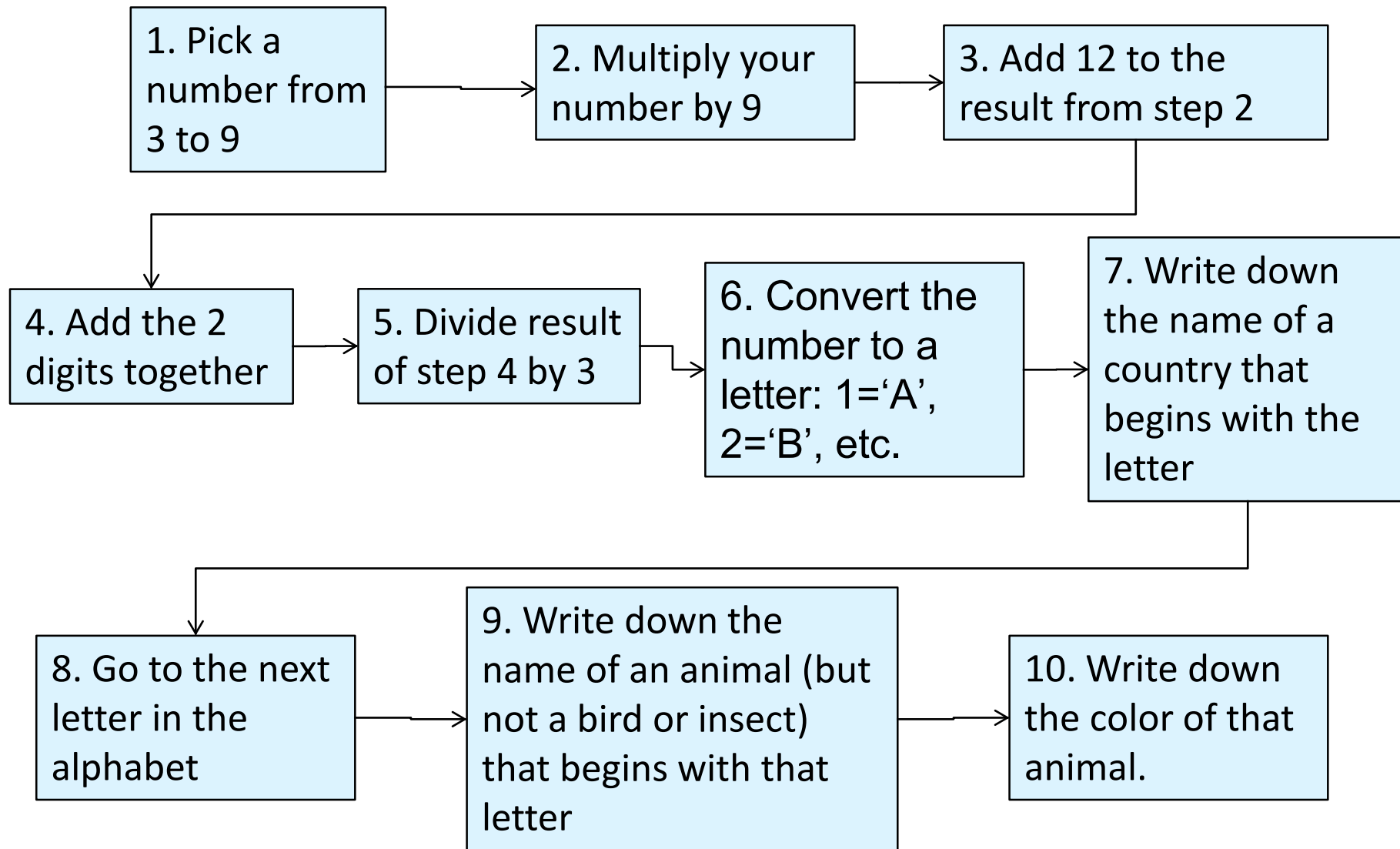- People
- Processes
- Items (tools)

…working together toward a *common purpose*.

Improving medical care requires system redesign…

"Every system is perfectly designed to get the results it gets." – Paul Batalden

The definition of insanity is doing the same thing over and over and expecting to get a different result.

1. Pick a number from 3 to 9 → 2. Multiply your number by 9 → 3. Add 12 to the result from step 2

4. Add the 2 digits together → 5. Divide result of step 4 by 3 → 6. Convert the number to a letter: 1='A', 2='B', etc. → 7. Write down the name of a country that begins with the letter

8. Go to the next letter in the alphabet → 9. Write down the name of an animal (but not a bird or insect) that begins with that letter → 10. Write down the color of that animal.

What It Takes To Improve

Will to change the current system
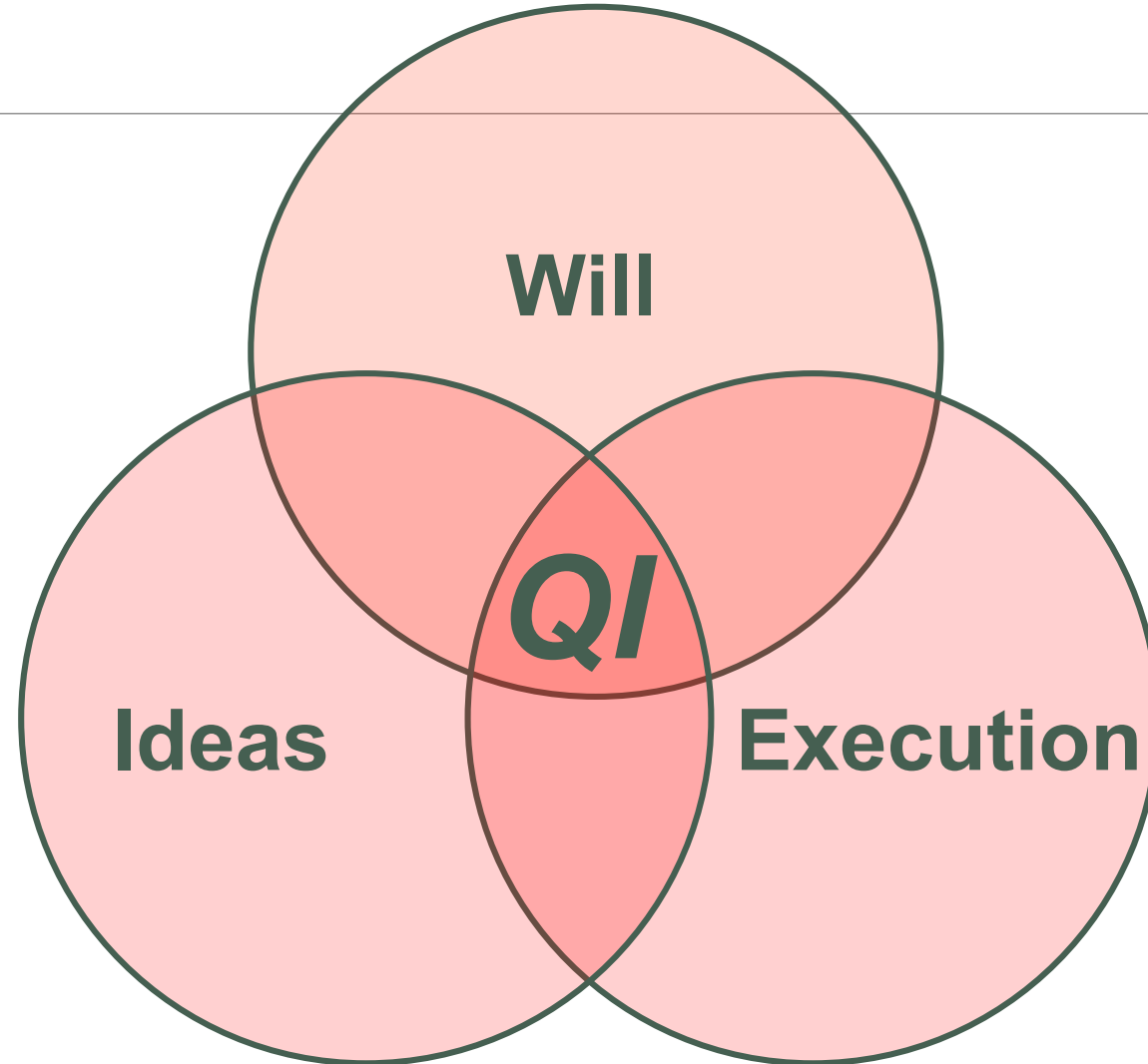- ◦ Understanding the human side of change

Ideas about changes that will improve the system
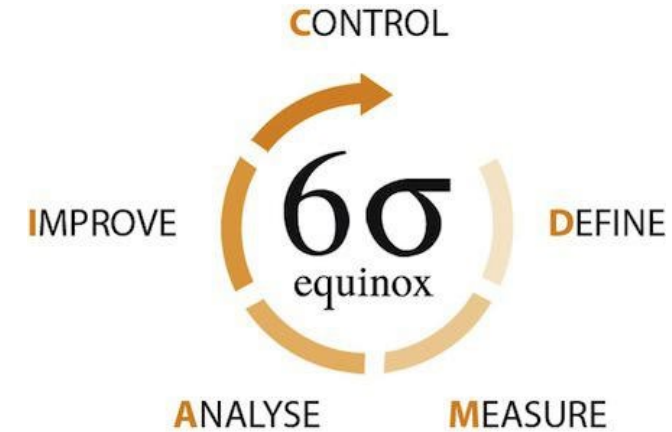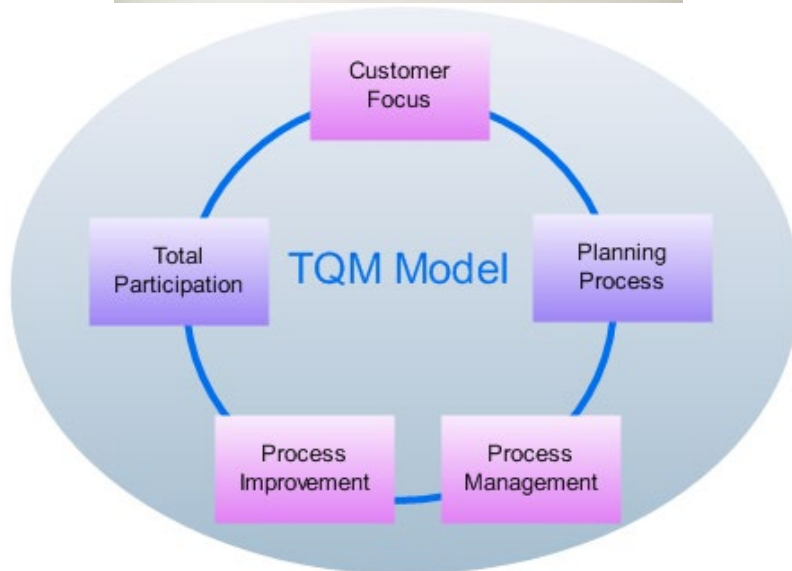- ◦ Including a theory that links changes to outcomes

Execution of the ideas
- ◦ Including a way to distinguish successful from unsuccessful changes

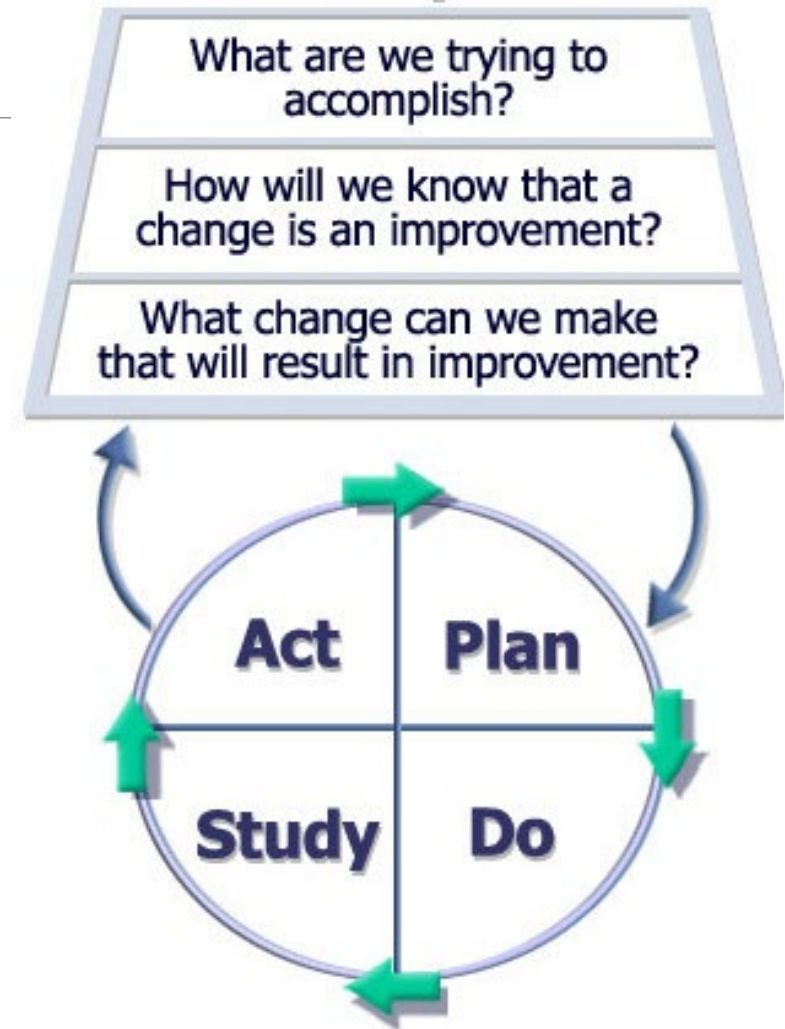# An Effective QI Program

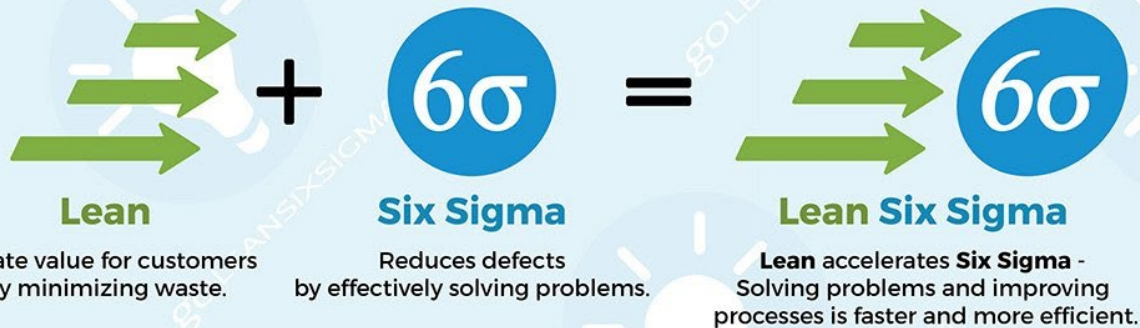# Different related approaches

Bar-be-que?

Model for Improvement

- Three questions for the basis of a project charter and anchor the work.

- Ideas from question three can be tested using PDSA cycles to make improvement as well as learn about the system of care.

INSTITUTE FOR
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Lean/Six Sigma

- Lean = Waste Reduction
- Six Sigma = Variation Reduction

- Fishbone Diagram
- 5 Whys
- Value Stream Maps
- Spaghetti Diagram
- FMEA

The 5 Key Principles for Improvement

1. Knowing why you need to improve.

2. Having a feedback mechanism to know if improvement is happening.

3. Developing an effective change that will result in improvement.

4. Testing a change before attempting to implement.

5. Knowing when and how to make the change permanent.

The Problem Statement

The Problem Statement

Problem/Opportunity statement should answer these questions:

- **What** is occurring or **What** are we missing?
- **When** did the problem start?
- **Where** is the occurrence?
- **Extent (Gap)** of the problem or opportunity

Example:
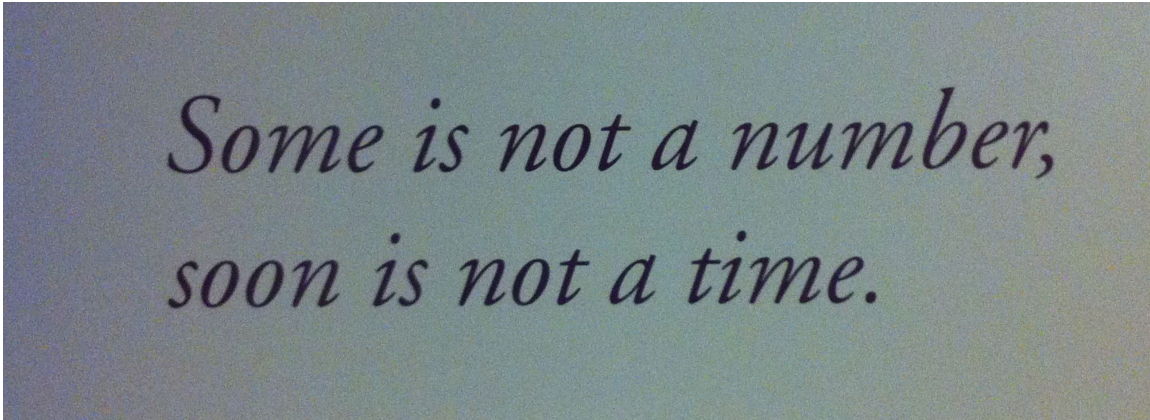
- In FY18 (When), the CLABSI rates (What) were 4 times higher than expected (Extent) in the NICU (Where).

Goals / SMART AIM

What are we trying to accomplish? A SMART Aim Statement

- Specific

- Measurable

- Actionable

- Realistic

- Time-bound

Some is not a number, soon is not a time.

"To reduce the incidence of CLABSIs to less than 2 per 1000 catheter days in NICU patients by December 2013."

Understanding the Current State

Process Mapping

Purpose
- Visually document a process
- Understand the existing process and problems
- Quickly identify improvement opportunities within the process
- Helps communicate inside and outside the organization

Key Principles
- Documentation is not substitute for observation
- A flowchart is a means not an end
- Boundaries what to map should come from your project charter
- Involve a cross-representation of those who work in the process to create the map
- Process maps are meant to be used

Current vs. Future State

Current State
- Captures the project as it works today; including waste
- Most projects should include a current state map

Future State
- The ideal process; waste eliminated
- Created by asking "What would we do if we didn't at have any of the restrictions we have today?"
- Helps see the work in a new way and generate creative ideas

Which Process Map is For You?

Process Map	Description	When to Use
High Level Process Map	•View from 30,000 Feet •Depicts major elements and their interactions •5-8 steps total	•Early in the project to identify boundaries and scope
Detailed Process Map	•A detailed version of the High Level Process Map •Fills in the all the steps within the high level steps	•To see a detailed process in a simple view •Helps to identify and follow decision points
SIPOC	Process snapshot that captures information that is critical to a project	•To come to agreement on project boundaries and scope •To verify that process inputs match the outputs of the process •Quality issue
VSM (Value Stream Map)	•Captures all key flows (of work, information, materials) in a process and important process metrics •Requires a current and future state to be done	•To identify and quantify waste •Helps visualize the improvement opportunities •Flow or time issue
Swim Lane Flowchart	Emphasizes the "who" in "who does what"	•To study handoffs between people and/or work groups in a process •Especially useful with administrative (service) processes
Spaghetti Map	Depicts the physical flow of work or material in a process	•To improve the physical layout of a workspace (unit, office, floor)

Reducing MRSA Colonization

- This diagram is called a Fishbone, Cause and Effect or Ishikawa Diagram.

- The adverse event or problem is at the "head" of the fish.

- Factors associated with this problem are listed along the "bones" of the fish.

- Each "bone" has a category label.
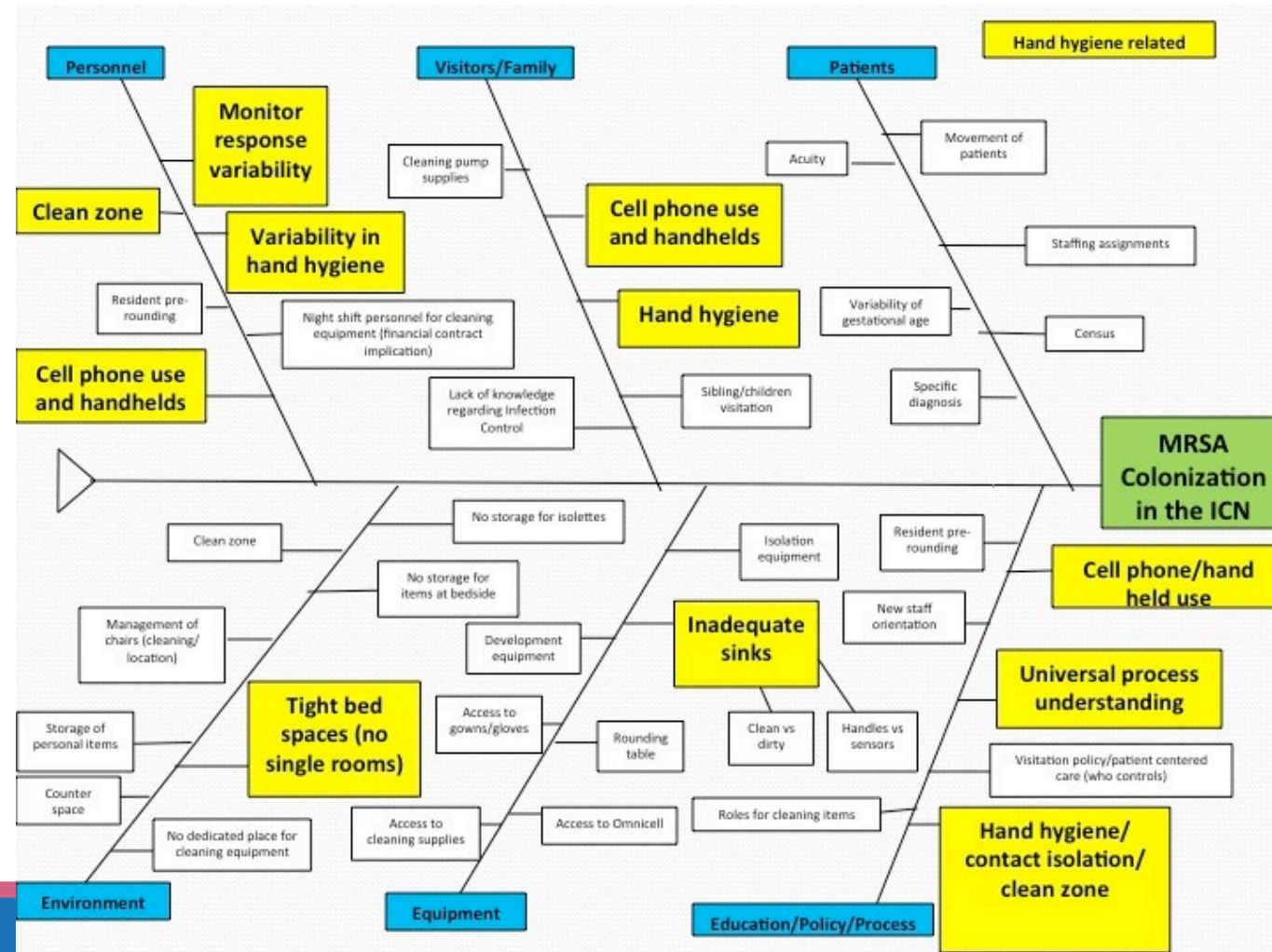
Identifying Improvement Opportunities

Provost L, Bennett B. What's your theory? Driver diagram serves as tool for building and testing theories for improvement. Quality Progress. 2015 Jul:36-43.

Improving Admission Normothermia
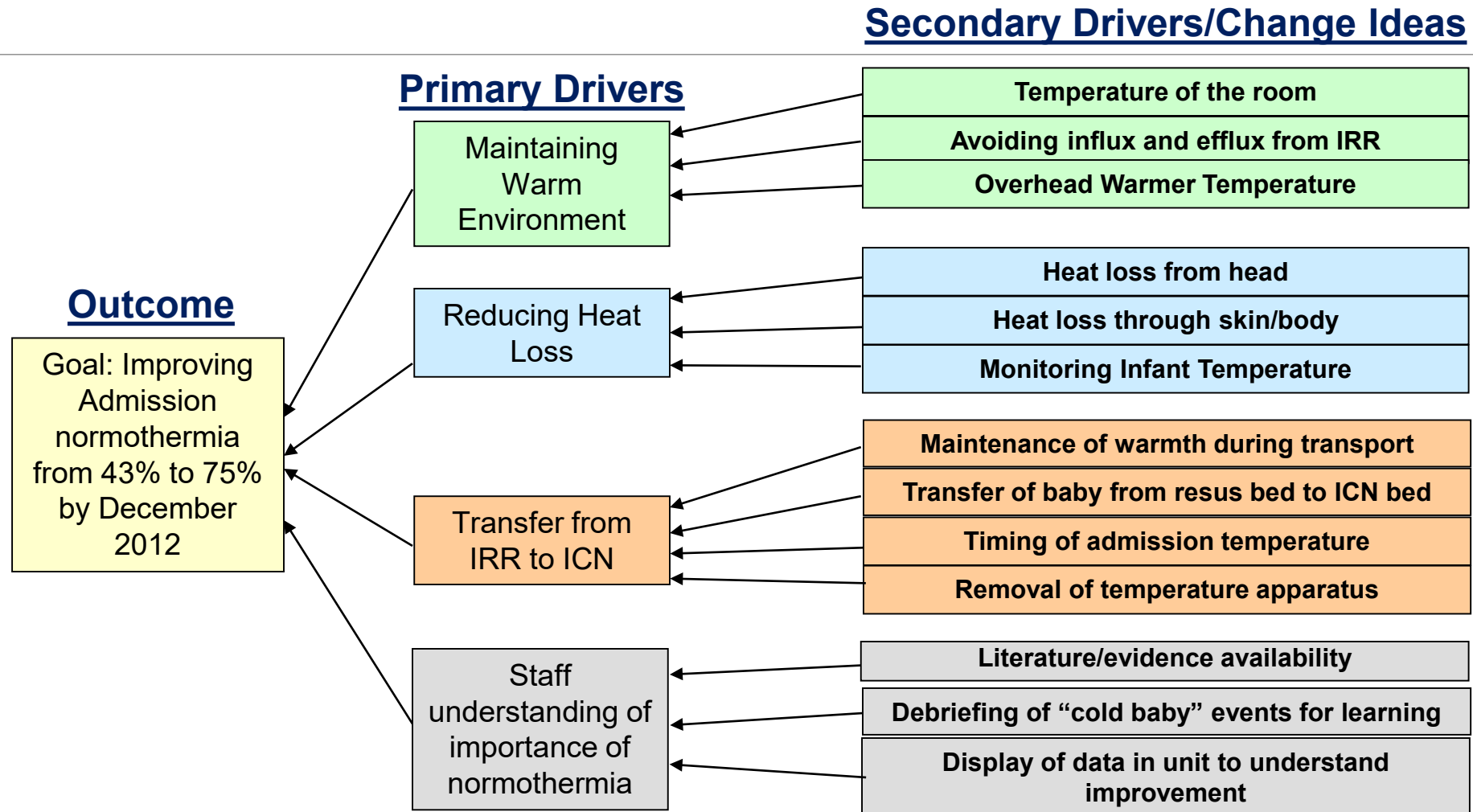
The Importance of Measurement

How will we know that change is an improvement?

Outcome Measures

- The voice of the customer or patient.

- Reflects the problem you are trying to solve.

- Describes how your overall system is performing.

Process Measures

- Steps logically linked to outcome of interest.

- Addresses how key parts of the system is performing.

Balancing Measures

- Describes what happens to the system as processes and outcomes have changed.

- What are the unintended consequences or alternate explanations?

Example NICU Family of Measures

Outcome Measure:	• Number of CLABSI per 1000 catheter days
Process Measure:	• Hand hygiene compliance • Hub Scrub compliance • Insertion Checklist compliance • Tubing Change compliance • Removal checklist compliance
Balancing Measure:	• Need to replace central line • Increased cost of hand hygiene supplies • Infiltrates from peripheral IV use

The Importance of Operational Definitions

If data collected **differently by different people**, or **differently each time collected**, it makes it hard to know whether **changes in the data are due to the changes tested** or from **inconsistencies in data collection**.

What is a goal?

The whole ball or half the ball?

Courtesy of Bob Lloyd, IHI

Run Chart

Graphical display of data plotted in some type of order, usually over time. Also has been called a time series or a trend chart.

Minimum requirements:

- Line graph of data points
- Median line
- Indication of goal
- Annotations
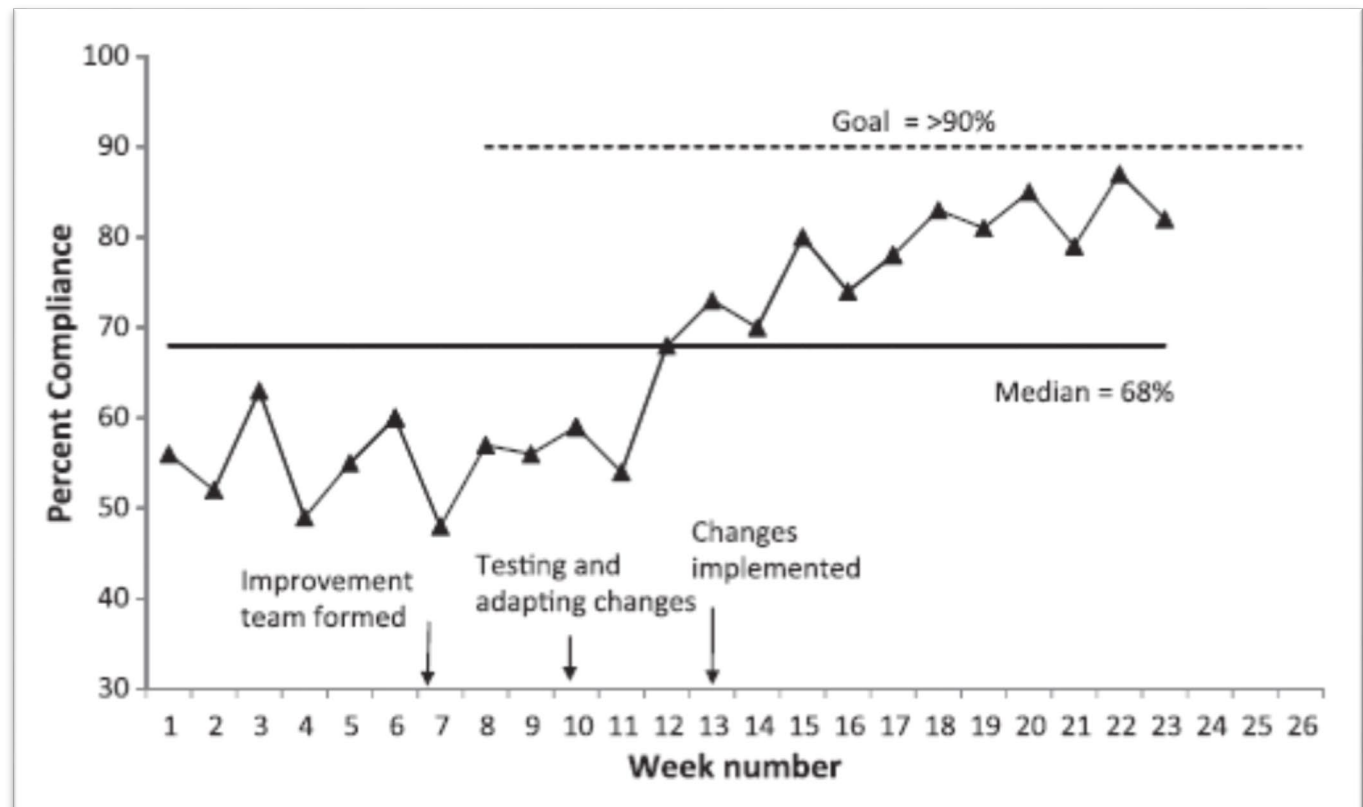
Why Use A Run Chart?

Cycle Time Results for Units 1, 2 and 3

Avg. Before Change: 70, SD = 11.36
Avg. After Change: 30, SD = 13.15

$t(22) = 7.88, p < .001$

Perla, BMJ Qual Saf, 2011
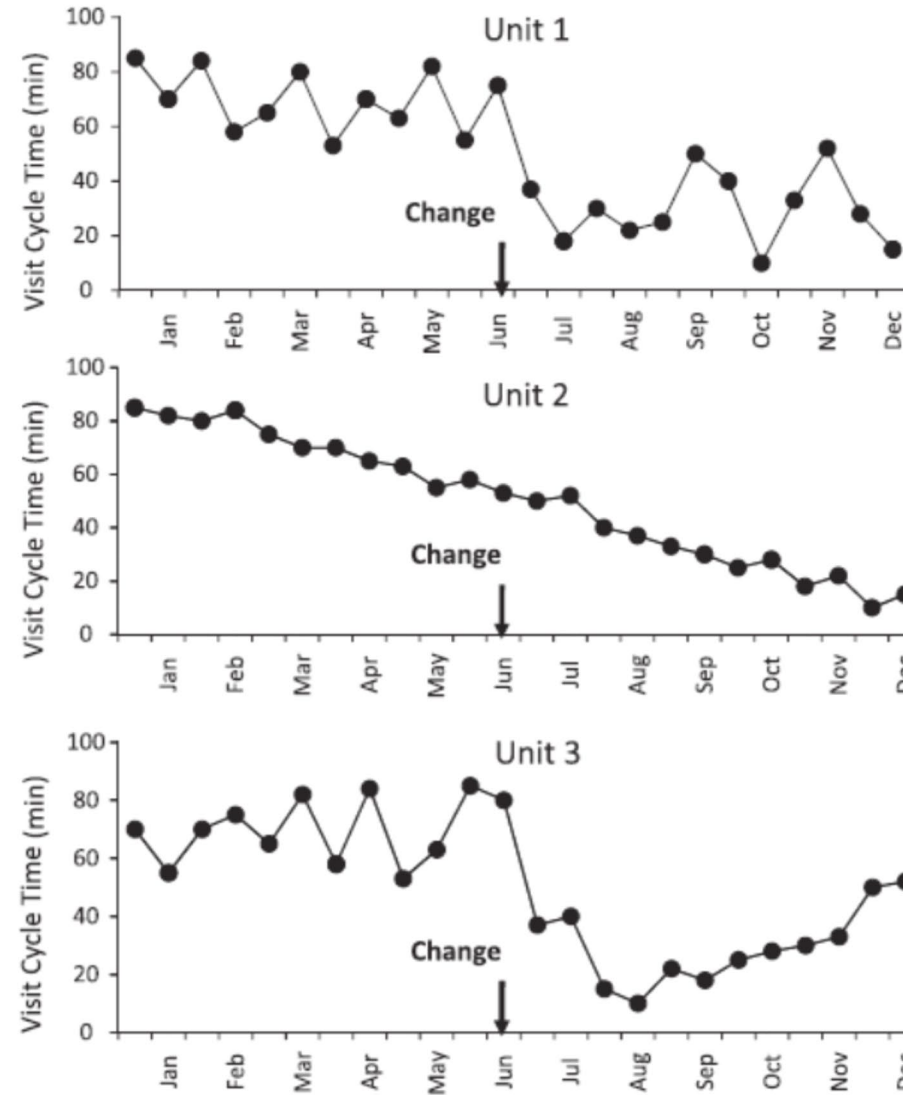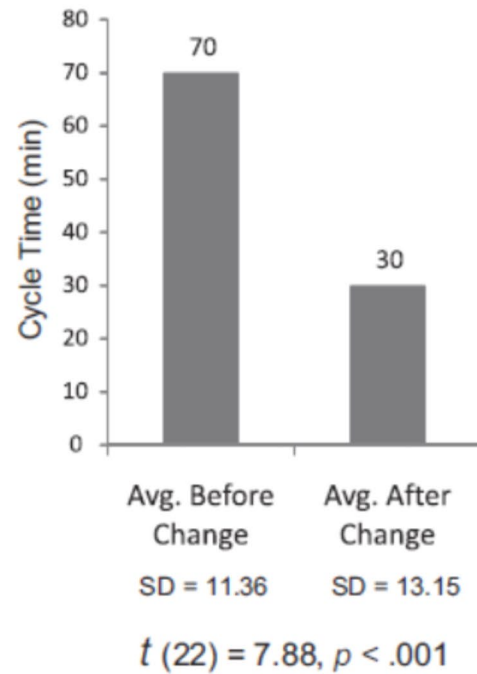
Project Management – 30/60/90 Day Plan

Project Management Plan - WWW

How do you use Project Management tools?

◦ Monitor, record progress on all tasks, at least weekly – use "WWW" or "Tracking Gantt Chart"

◦ Pay particular attention to those that are critical to implementation

◦ Revise plan as needed to take into account changes, adapt to meet milestones

Who	What	When	Update

30/60/90 Day Template

Horizon Goal:			
180 Day Goal:			

In the first 30 days, we will know we are successful when:			
The measures/evidence we will use are:			
First 30 days action strategies:	**Who is on point?**	**By When?**	**How Communicated?**
•			
•			
•			
•			
•			
•			
•			
•			
•			
If we are not successful, we will:			

Courtesy of Education.ky.gov

An Example Project – Antenatal Steroids

The Problem Statement

At the Hospital of the University of Pennsylvania, only 55% of our infants born between 24 and 34 weeks gestation were exposed to antenatal corticosteroids (ANCS) in calendar year 2017. This is far below the average steroid utilization rate (85%) of units who submit their data to the Vermont Oxford Network. This is important to our patients because ANCS have been shown to reduce mortality, RDS, IVH, and NEC.

What?   When?   Where?   Extent (Gap)?   Why?

Our SMART Aim

To increase the percentage of infants born between 24 and 34 weeks gestation at the Hospital of the University of Pennsylvania receiving antenatal corticosteroids from 55% to 85% by December 2020.

Specific?   Measurable?   Actionable?   Realistic?   Time-Bound?

ANCS Administration Process Map

Mother arrives in triage area → Gestational age of pregnancy is determined → If 24-34 weeks, order for ANCS is placed in EMR → ANCS are prepared by pharmacy → ANCS are delivered to Labor and Delivery → Medications are verified → ANCS are administered to patient

Driver Diagram

Secondary Drivers/Change Ideas

Primary Drivers

Outcome

Goal: Improving ANCS administration from 55% to 85% by December 2019

Patient Identification
- Accuracy of gestational age assessment
- Availability of gestational age information
- Delay from arrival in triage to assessment

Ordering and Pharmacy preparation
- Availability of computer to place order
- Alerting ANCS as a STAT mediation
- Delivery of ANCS to Labor and Delivery

Administration of ANCS
- Nurse awareness of availability of medication
- Prioritization of ANCS administration
- Documentation of administration time in EMR

Staff understanding of importance of ANCS
- Literature/evidence availability
- Debriefing of missed opportunities for learning
- Display of data in unit to understand improvement

Family of Measures

Outcome Measure	Process Measures	Balancing Measures
Antenatal Corticosteroid Administration Rate	Time from admission to ANCS order being placed.	Administration of ANCS before 24 weeks or after 34 weeks.
	Time from order to pharmacy delivery of ANCS.	Incidence of hypoglycemia in infants in first 48 hours.
	Time from admission to ANCS administration.	
	Percent accuracy of gestational age documentation on triage form.	

Operational Definition of ANCS Administration

The Antenatal Corticosteroid Administration rate is the number of infants whose mothers were administered corticosteroids IM or IV during pregnancy at any time prior to delivery divided by the number of infants born between 24 weeks and 34 weeks.

ANCS Rate   =   Infants whose mothers received any corticosteroids

All infants born between 24 and 34 weeks gestation

Displaying Data on a Run Chart

ANCS Rate
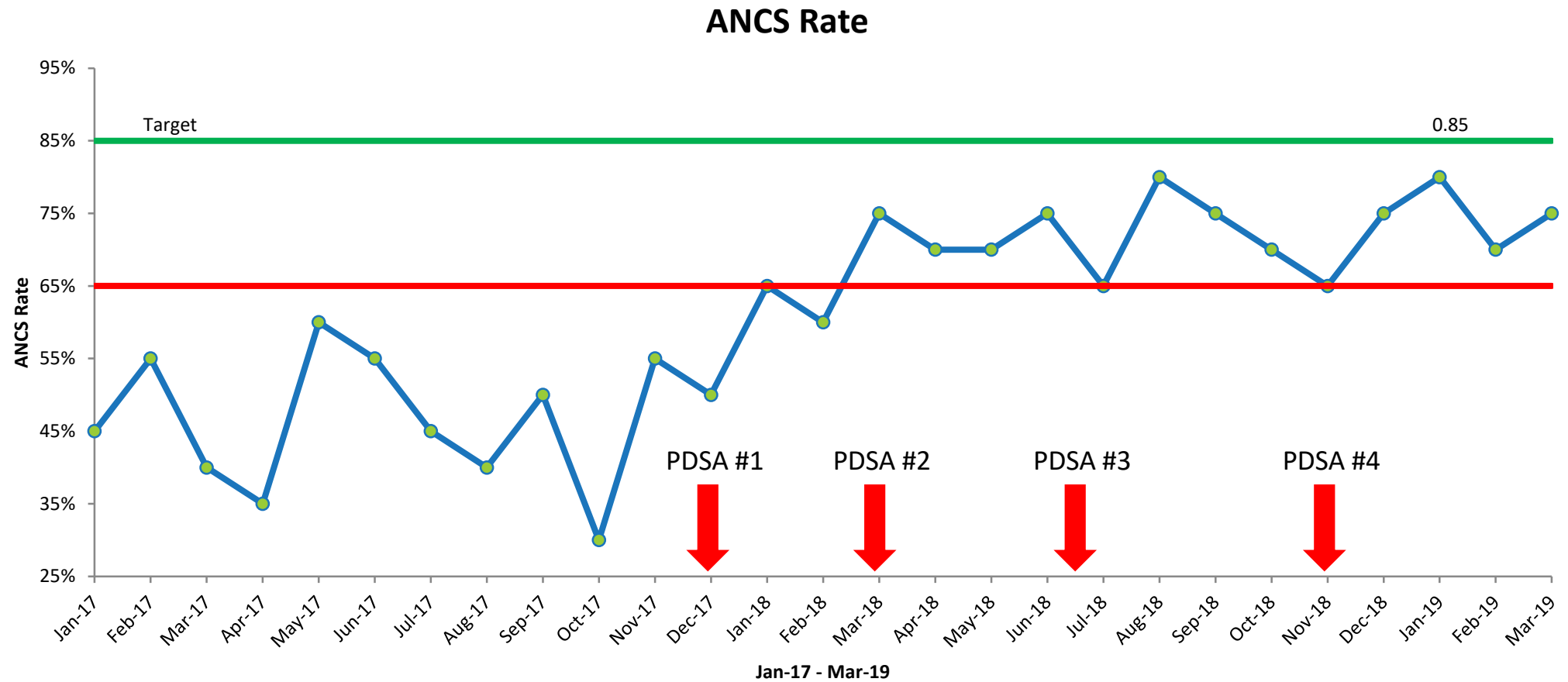
Project Management Plan - WWW

Who	What	When	Update
Jennifer	Obtain baseline data for ANCS administration rates	April 30, 2019	Identified source of data.
John	Observe process of ANCS ordering by provider in triage area.	May 15, 2019	Plan to shadow provider each afternoon next week.
Julie	Submit request to EMR for report for time between ANCS ordering and administration.	May 20, 2019	Request submitted – delay due to implementation freeze.
Joe	Chart audit – accuracy of gestational age documentation	May, 30, 2019	Recruited 3 medical students to assist.

What is your QI capacity?

1. How familiar were the concepts described here today?
   a. I knew it all.
   b. Some new concepts.
   c. It could have been written/explained in ancient Egyptian and I would have understood the same amount.

2. What QI methodology do you use for local project?
   a. Lean/Six Sigma?
   b. Model for Improvement?
   c. A blended approach?
   d. Other?

3. Do you have QI facilitation skills on your team or available in your hospital?
   a. Yes
   b. No

Summary

- Outcomes in healthcare are produced by systems.
  - You must fundamentally change your system to get a different outcome.

- Choose a QI methodology to use on your local project.
  - Assess your team's capacity for QI work.

- The key elements of any QI project have been presented here.
  - Please use these a guidance in getting your project launched.

- Use the fictitious example provided as a way to understand these elements.

Any questions?