Mechanics of Improvement

Evans Center for Implementation & Improvement Sciences

Quality & Patient Safety, Department of Medicine

3
Studying Improvement Initiatives

BOSTON UNIVERSITY

What Are We Talking About?

- Quality Improvement
  - A framework to systematically <u>improve healthcare</u> delivery[1]

- Implementation Science
  - Scientific study of optimal strategies to promote the systematic uptake of research into practice <u>to improve the quality or effectiveness of health</u> services

- Improvement Science
  - Rigorous measurement of outcomes associated with efforts <u>to improve care delivery</u>

Group Discussion

Improving Healthcare Delivery

1. AHRQ. Practice facilitation handbook. https://www.ahrq.gov/professionals/prevention-chronic-care/improve/system/pfhandbook/mod4.html

Upcoming Sessions

Applying results

Iterative PDSA cycles – Disseminating Results
Planning for Spread – Scaling Up, Scaling Out
Planning for sustainability – Maintenance
Implications for Future Research

Identifying the potential for improvement

- ✓ Engaging Stakeholders
- ✓ Aims Statement – Research Objectives
- ✓ Identifying Best Practices
- ✓ Process Mapping – Conceptually Modeling
- ✓ Measuring Effectiveness & Processes

Measuring results

Study Design
Measuring Effectiveness, Implementation
Lessons Learned – Measuring Barriers/Facilitators

Effecting change

Organizing Change – Implementation Strategies
Data Collection
Designing Small Scale Tests – Study Designs

Act

Plan

Study

Do

Overview
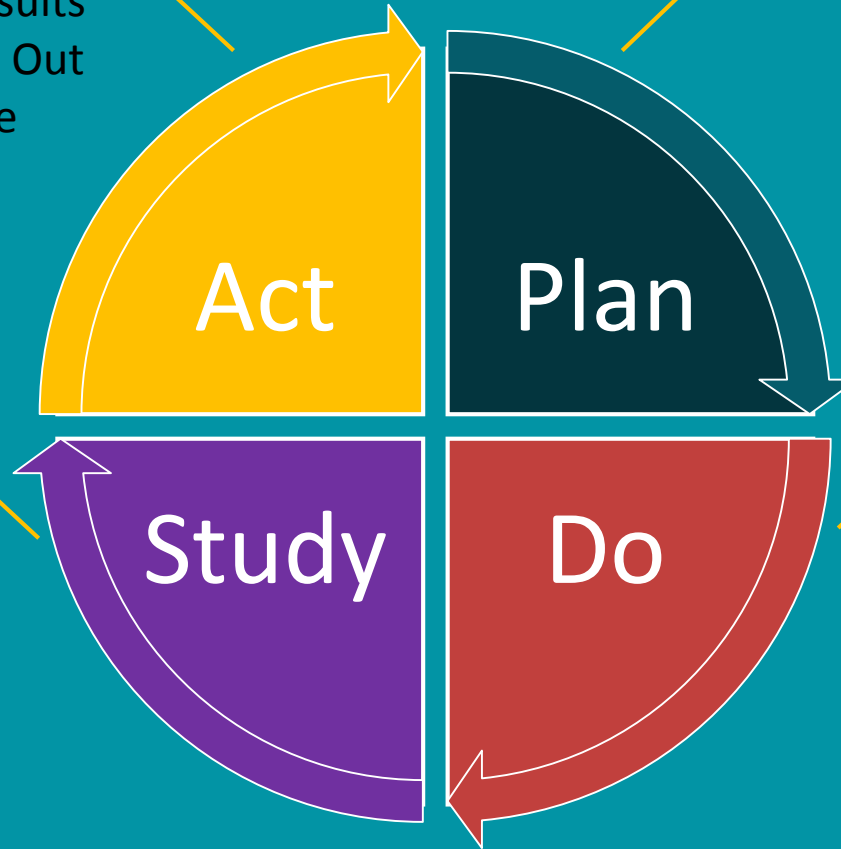
Session 3 Objectives

1. Identify measurable implementation strategies

2. Differentiate between implementation, effectiveness, balancing measures

3. Discuss how to identify appropriate study designs

Overview

Figuring out what to 'DO'…
Implementation Strategies

1. Identify the care/quality gap
2. Identify the evidence-based practice to be implemented
3. Identify stakeholders, potential barriers/facilitators to implementation
4. Design implementation strategies
   - **Activities, techniques that support the uptake of EBP into routine practice**

IIS Approach

Example: Implementing a new protocol for severe alcohol withdrawal in the MICU

- **Care/Quality Gap**
  - BMC currently uses a 'Benzo + Phenobarb' protocol to treat severe alcohol withdrawal in the medical intensive care unit (MICU)
  - Current protocol is difficult to use
  - Concern that benzo protocols are associated with higher rates of mechanical ventilator use

- **Evidence Informed Practice**
  - Switching from 'Benzo + Phenobarb' protocol to 'No Benzo' protocol use in MICU for severe alcohol withdrawal patients

IIS Approach

Example: Implementing a new protocol for severe alcohol withdrawal in the MICU

- Objectives
  - Determine whether patient outcomes associated with use of the non-benzo protocol are non-inferior to patient outcomes associated with use of a benzo-phenobarb protocol

  - Describe physician & nurse attitudes concerning severe alcohol withdrawal management using both protocols

IIS
Approach

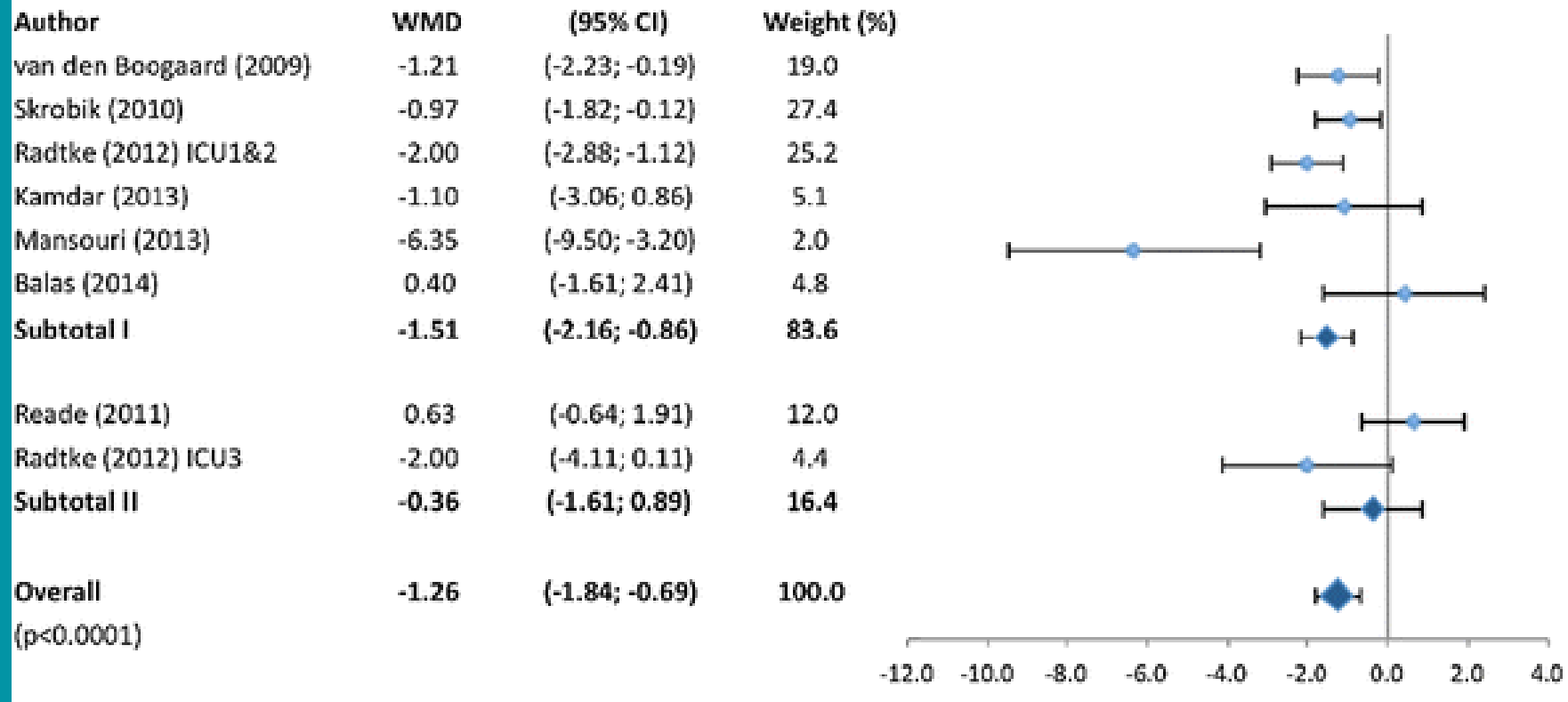# Implementation Strategies Should Be Specific

- **What** specifically do you want people to do?

- **Who** will be targeted with the strategy?

- **Where** and **When** will the strategy be employed?

- **How** will you introduce the strategy, or get people to do it?

- **Why** is this strategy important?

  - Rationale linking the implementation strategy to the desired implementation outcome

Identifying Measurable Implementation Strategies

- Examples of common IS strategies
  - Workflow changes
    - Task shifting across provider types, new steps in visit, new protocols
  - Systems changes
    - Best practice alerts, automated communications
  - Educational
    - Trainings, audit & feedback
  - Motivational
    - Champion roles, (dis)incentives, public reporting

IIS
Approach

Combining strategies is generally better, but more resource intensive

Trogrlić Z, et al. A systematic review of implementation strategies for assessment, prevention, and management of ICU delirium and their effect on clinical outcomes. Crit Care. 2015
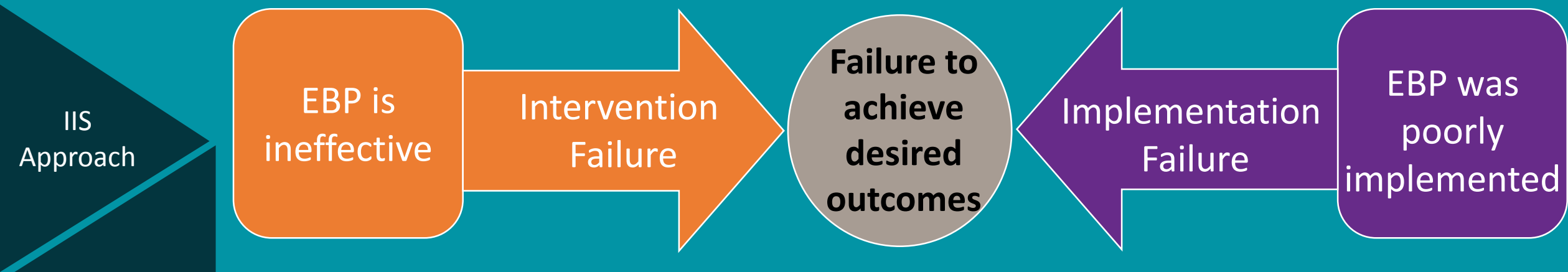
Overview

Example: Implementing a new protocol for severe alcohol withdrawal in the MICU – IS Strategies

	New Protocol Strategy	Educational Strategy
What	New medication protocol with pictorial layout, number of clinical decision points	Small group educational trainings to introduce protocol, evidence for 'No Benzo' approach
Who	Mostly nurses, attendings	Nurse educator trained nurses, fellow trained attendings, chief resident trained residents
Where	MICU	MICU
When	MICU-wide use on 10/1/2018	During MICU shift, regular meetings
How	Solicited nursing feedback on protocol layout, dosing, decision points prior to finalization	Brief presentations of new protocol, highlighting evidence for medication and dose changes, presented articles to support evidence
Why	New protocol to measure non-inferiority outcome, improve clinician attitudes toward protocol to promote use and acceptability	Needed to alert clinicians to protocol changes to promote use, measure non-inferiority outcome

'STUDYING' Improvement…
Implementation Outcomes

- <u>Implementation outcomes</u>: the extent that your implementation strategies supported uptake of the EBP

- <u>Effectiveness outcomes</u>: the extent that your EBP achieved desired outcomes

- Implementation + Effectiveness outcomes = hybrid study *(next month)*

IIS Approach

EBP is ineffective

Intervention Failure →

Failure to achieve desired outcomes

← Implementation Failure

EBP was poorly implemented

Outcomes Assessed for both protocol periods	Data Sources	Outcome Type: Effectiveness or Implementation
Acceptability of protocol	Surveys (pre/post) Interviews (post)	Implementation
Self-efficacy for protocol use	Surveys (pre/post) Interviews (post)	Implementation
Adoption/uptake of protocol use in clinical practice	EMR data Surveys (pre/post) Interviews (post)	Implementation
Fidelity (or adaptations) to protocol steps	Surveys (pre/post) Interviews (post)	Implementation
Rates of mechanical intubation	EMR data	Effectiveness
Average length of stay	EMR data	Effectiveness

Ap

Example: Implementing a new protocol for severe alcohol withdrawal in the MICU

- Study Design: Interrupted time series *(more next month!)*
  - Changing the protocol ~ flipping a switch
  - Multiple observations before & after intervention
  - Causal impact measured by change in level and slope of lines from serial pre- and post-intervention observations
    - Mixed Methods
      - Interrupted time series (quant)
      - Surveys (quant)
      - Semi-structured interviews (qual)

IIS Approach

Example of ITS

Change in ICU outcomes after MA nurse staffing legislation
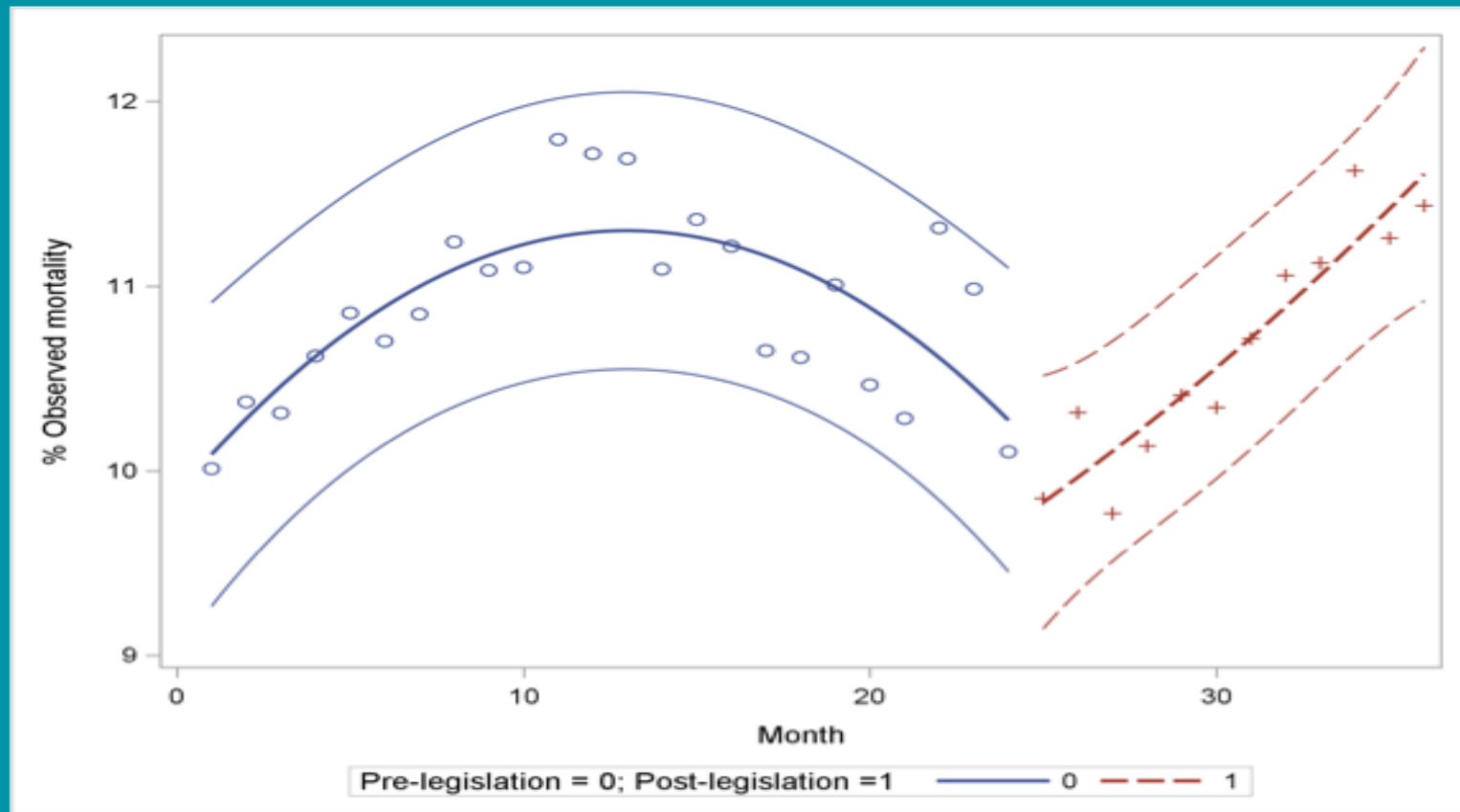
Law A, Stevens J, Walkey A. *Crit Care Med* 2018; 46:1563–15692018

IIS
Approach

Developing a change

- Making theories or hypotheses explicit helps improvement team members articulate the basis of predications that a change will result in an improvement

- Tools
  - Cause and effect diagram-used at the beginning of an improvement method to brainstorm
  - Driver diagram-illustrates current theories and can connect measures and specific ideas for change to begin PDSA cycles

QI Approach

Developing a change

Outcome measure

Process measure

Balance measure
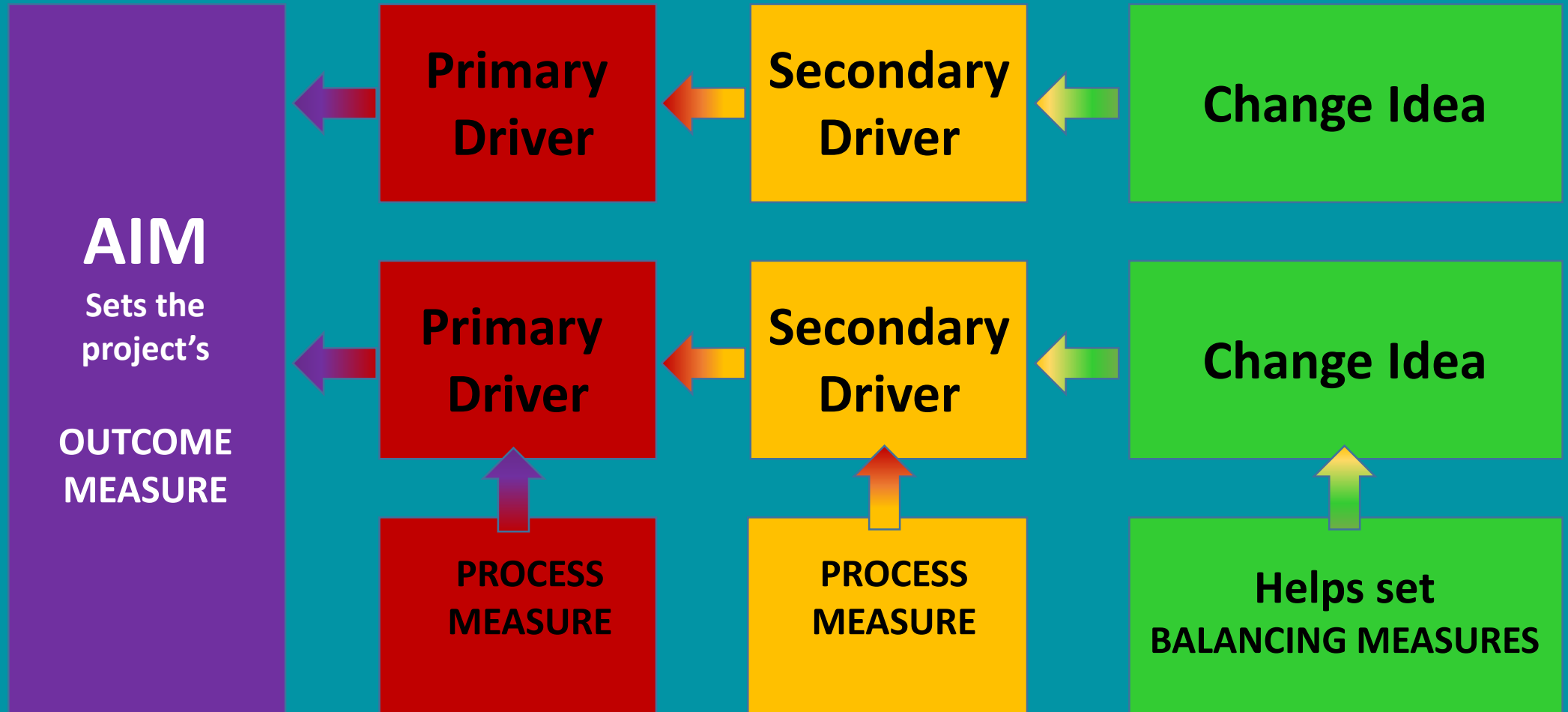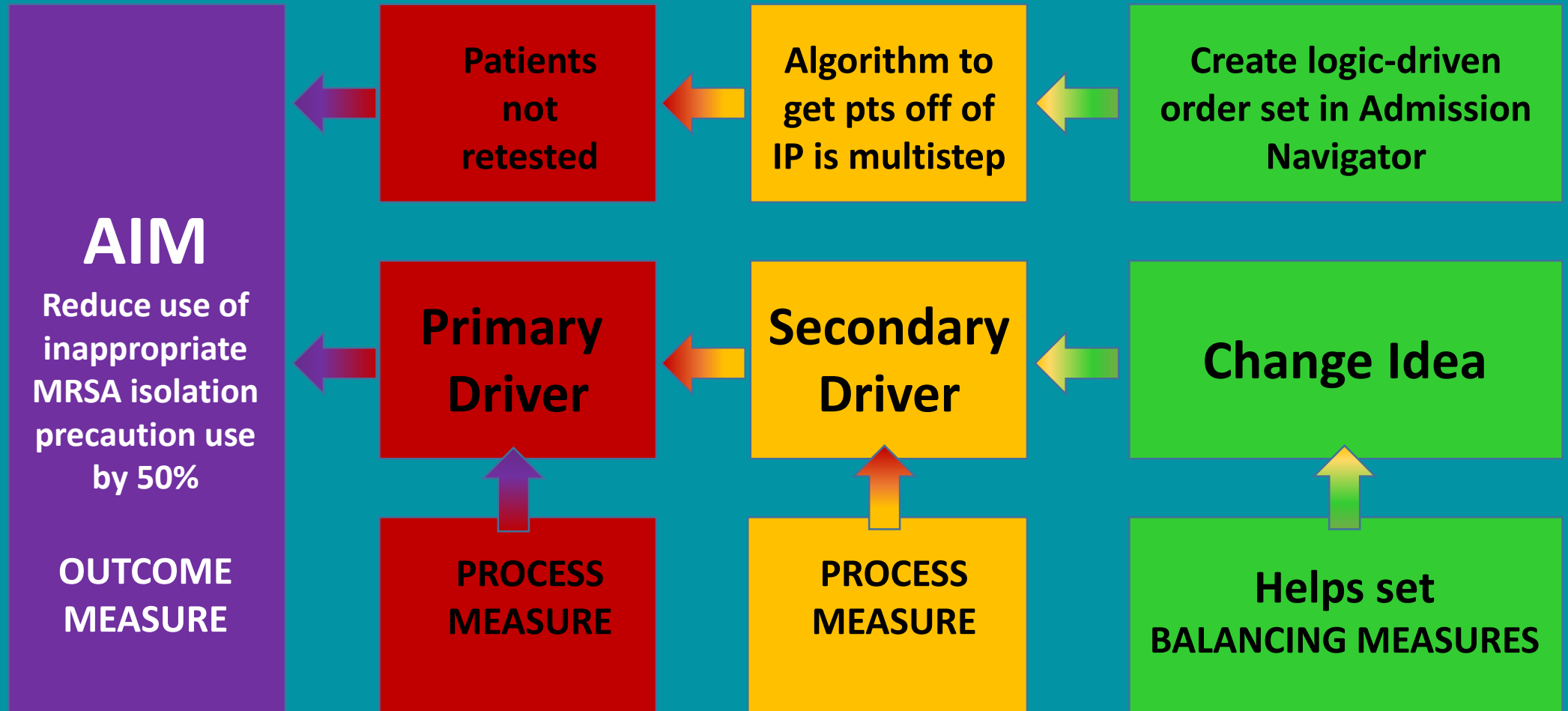
Testing a change

- Test a change before it is implemented
  - "All improvement requires change, but not all change results in improvement."
  - Testing=evaluates change on a temporary bases
  - Implementation=making the change part of the every day operation of the system. Expect very few failures.
- Testing change builds knowledge
  - Process of building knowledge requires rational prediction
  - If during testing, the prediction is incorrect, then the theory behind the prediction must be modified.

QI Approach

Testing a change: Degree of belief

- There must be a "degree of belief" to develop a rational prediction about testing a change (W.A. Shewhart). One's degree of belief depends on:
  - The extent to which the prediction can be supported by evidence, and
  - The similarity between the conditions under which the evidence was obtained and the conditions to which the prediction applies.
- Not a calculation, but a concept that is increased as tests of change are conducted and predictions agree with results of testing

QI Approach

Testing a change: Degree of belief

- Removal of MRSA isolation precautions required a complicated retesting algorithm so it was rarely done.

- If a patient on MRSA IP was eligible for retesting, technology existed to insert orders into the Admission Navigator.

- Complex IT design project that was estimated to take over 40hrs of work, so not approved when first requested.

- Despite cost/benefit analysis based on estimates of $6.4 million per year in savings, if 15% of patients cleared, and the need for fewer private rooms and enhanced patient experience, degree of belief was low.

QI Approach

Testing a change: #1 Test on a small scale and build knowledge sequentially

- Knowledge is built iteratively

- Test using small numbers; just enough to strengthen the degree of belief and if cost of failure is high

- Implement when:
  - Degree of belief that change will make improvement is high
 - Cost of failure is small
  - Organization is ready to make the change

QI Approach

Testing a change: #1 Test on a small scale and build knowledge sequentially

Courtesy of Kristin Hlebowitsh, MD

QI Approach
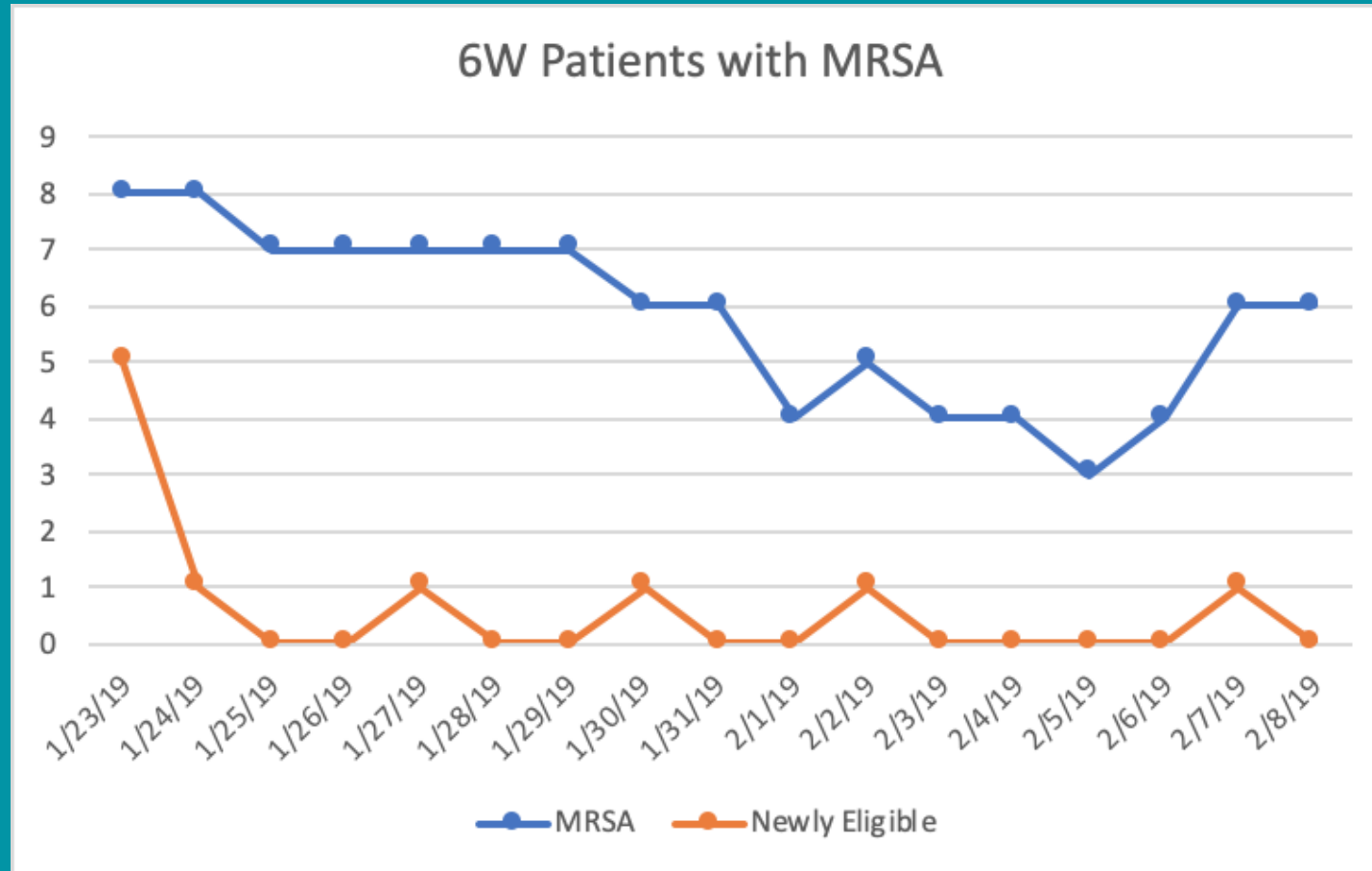
Testing a change: #2 Collect data over time

- Document what is learned in **<u>narrative</u>** form

- Create run charts **<u>over time</u>** to measure variation in the system, not just <u>before and after</u>

QI Approach

Testing a change: #2 Collect data over time

QI
Approach
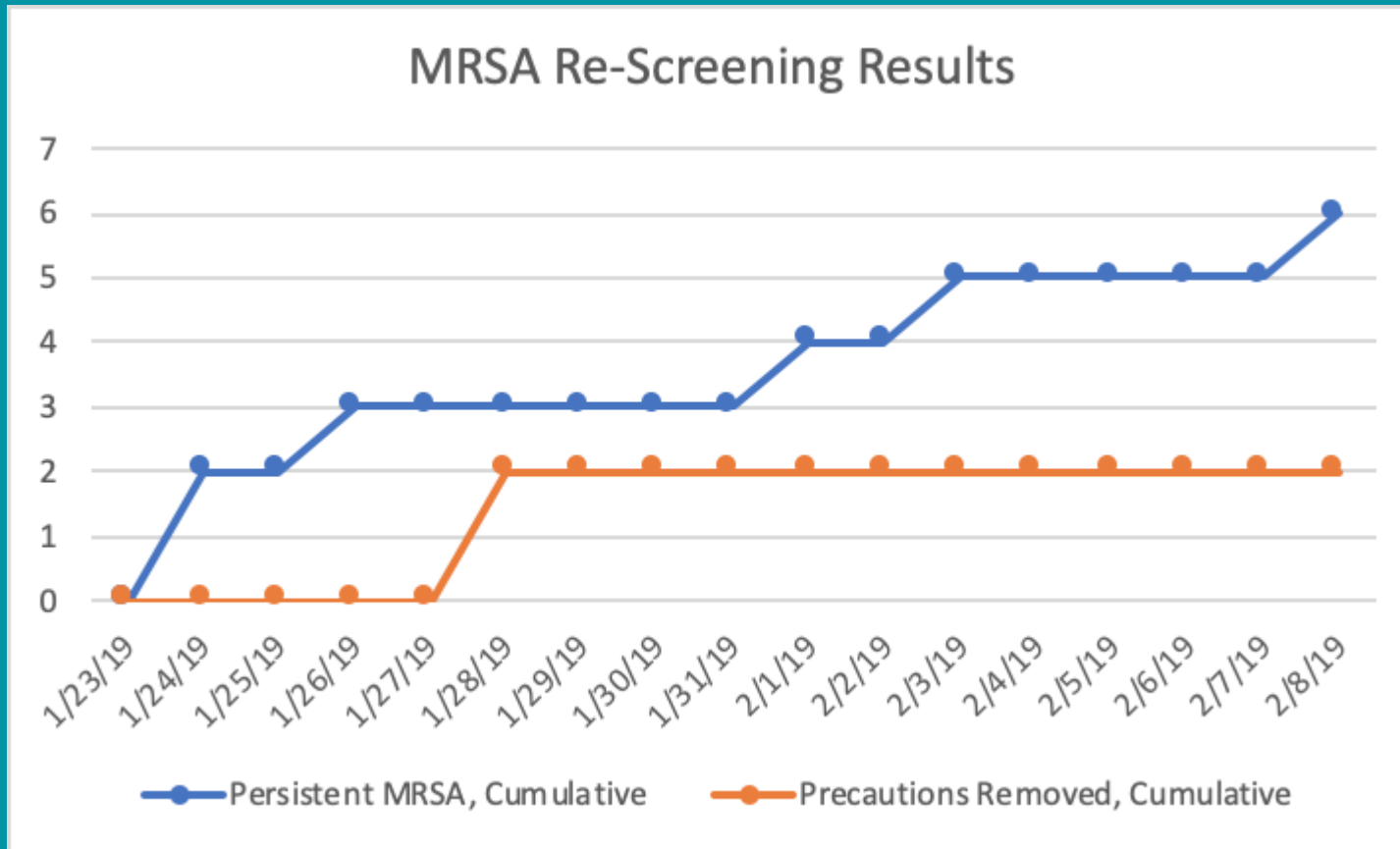
Testing a change: #3 Include a wide range of conditions in the sequence of tests

- Increases degree of belief that a change will be effective in the future
- Similar results with different patients or different units increases degree of belief

QI Approach

Testing a change: #3 Include a wide range of conditions in the sequence of tests

QI Approach

Your Experience Planning for Improvement

Think of a time you wanted to improve healthcare delivery...

- What were your primary outcomes?
  - Process, effectiveness, balancing measures

- Biggest data collection/analysis challenges?

- What do you wish you knew/did to prepare before you started implementing change?

Group Discussion