CU Institute for Healthcare Quality, Safety and Efficiency

SCHOOL OF MEDICINE

UNIVERSITY OF COLORADO **ANSCHUTZ MEDICAL CAMPUS**

Quality Improvement & Change Management

Disclosures

NONE

Agenda

1   **Intro QI**

2   **Change Management**

Session	2025-2026 Dates & Times* (All sessions are 1-4 p.m. MT)
Quality Improvement & Change Management	August 14, 2025 August 27, 2025 January 8, 2026 January 14, 2026
Applied Patient Safety	August 21, 2025 January 22, 2026
Acquiring Data to Drive Change	September 11, 2025 February 5, 2026
Designing for Change	September 25, 2025 February 12, 2026
Spreading Change Locally and Nationally	October 1, 2025 February 26, 2026
Coaching and Managing Quality Improvement	October 9, 2025 March 5, 2026

YOU ARE HERE

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ALL sessions held virtually on Zoom

Quality Improvement

QI = Quality Improvement

Systematic and continuous actions that lead to ***measurable*** improvement in health care services and the health status of targeted patient groups.
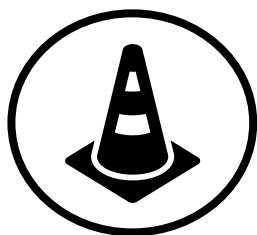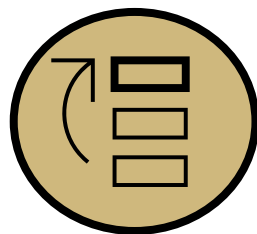
~~Value~~
QI = ~~Quality~~ Improvement

Systematic and continuous actions that lead to measurable improvement in health care services and the health status of targeted patient groups.
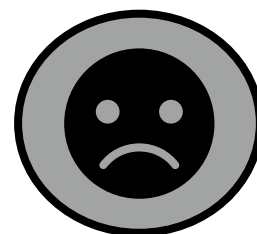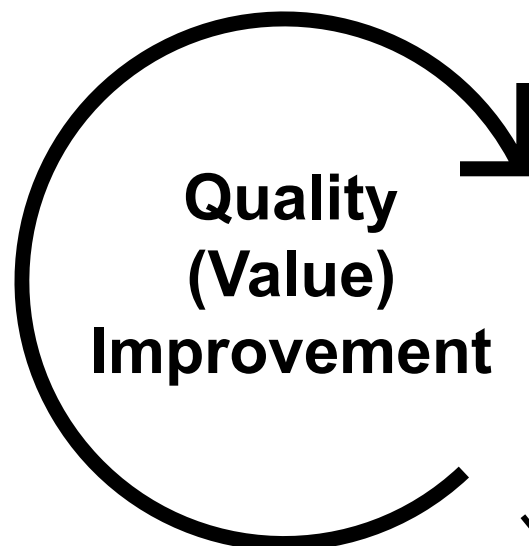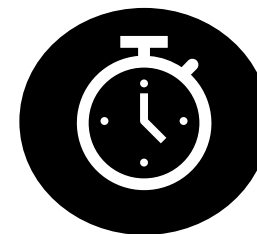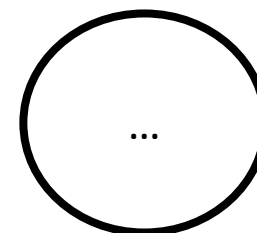
Safety Concerns

Low Ranking

Poor Experience

Quality (Value) Improvement

Waste

Inefficiency

…

VALUE $=\dfrac{\text{Quality}+\text{Safety}+\text{Experience}+\text{Equity}}{\text{Cost}}$

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Models of Quality Improvement

PDSA/Model for Improvement

Six sigma

Lean
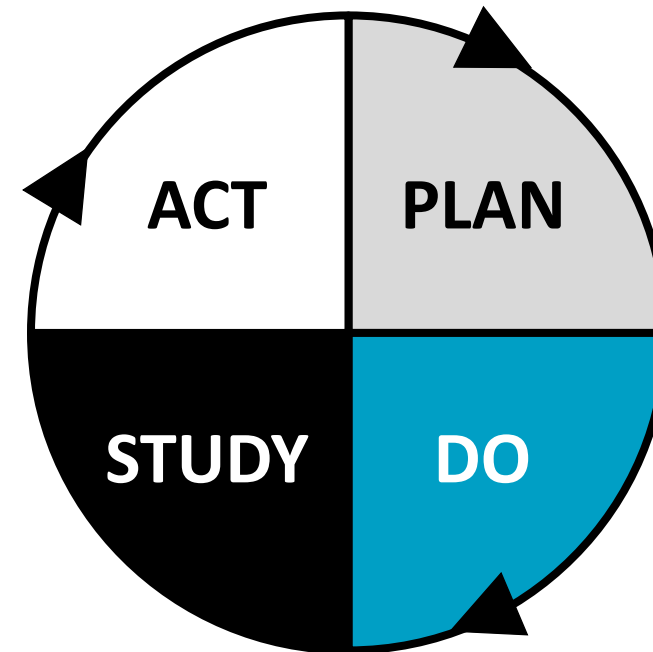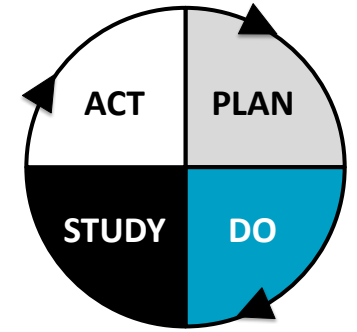
Plan: identify your problem, analyze contributing factors, and determine an intervention

Do: implement the intervention

Study: evaluate the results of the intervention

Act: determine what to do next to sustain or improve
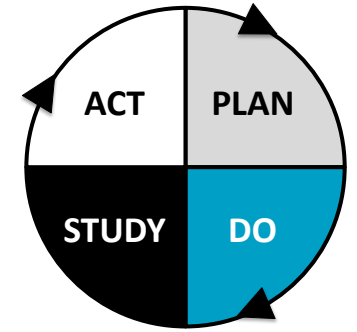
Plan: identify your problem, analyze contributing factors, and determine an intervention

UNDERSTAND YOUR PROBLEM FIRST !!!

Six Sigma

"six" standard deviations from mean
(error rate of one per 3.4 per million)

DMAIC (*də-MAY-ick*)

Define, Measure, Analyze, Improve, Control

PLAN
DO
STUDY
ACT

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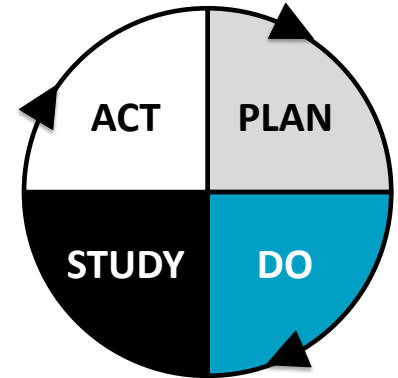
6σ

Six Sigma

"six" standard deviations from mean
(error rate of one per 3.4 per million)

UNDERSTAND YOUR PROBLEM FIRST !!!

Lean

Maximize value while *through* minimizing waste.

改善

Kaizen

'improvement' or 'change for better' (from 改 kai - change, revision; and 善 zen - virtue, goodness) with the inherent meaning of either 'continuous' or 'philosophy'

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改善

Eight Forms of Waste in Healthcare

Underutilization

Inventory

Motion

Defects

Transportation

Waiting

Extra Processing

Overproduction

6σ **+** 改善 **=**

Six Sigma Lean

Scientific method

- Observation / question
- Research topic area
- Hypothesis
- Test with experiment
- Analyze data
- Report conclusions

PLAN — DO — STUDY — ACT

UNDERSTAND YOUR PROBLEM FIRST !!!

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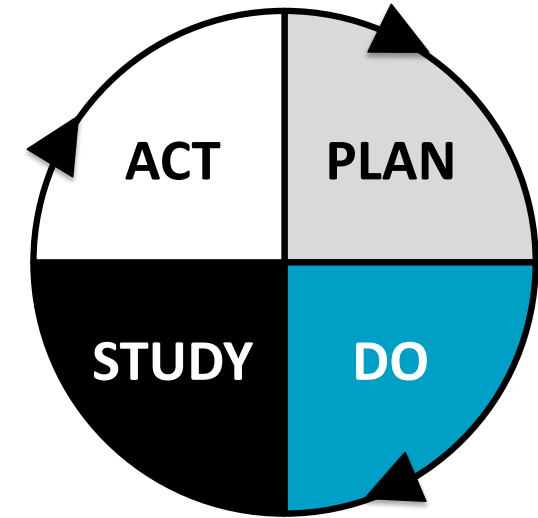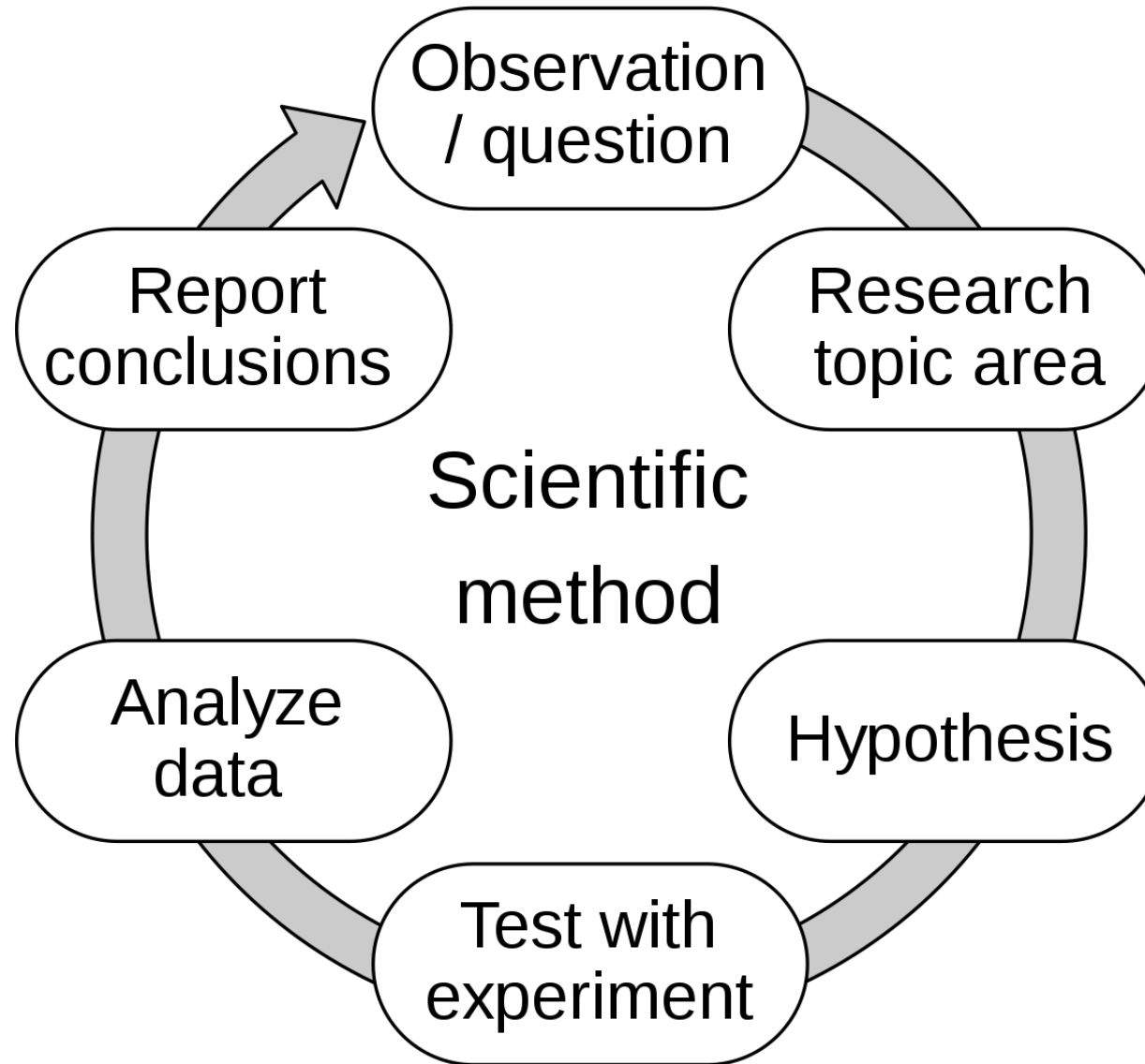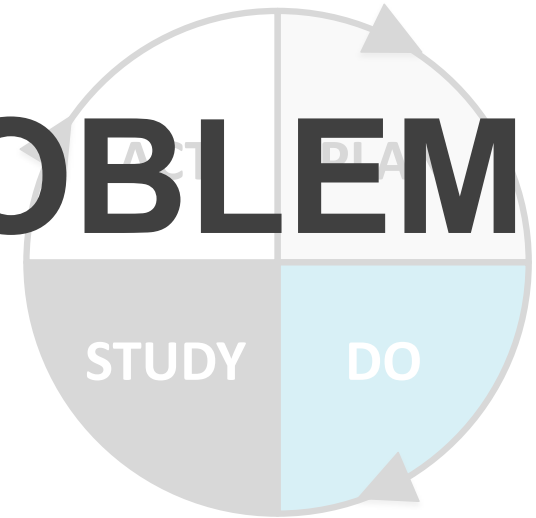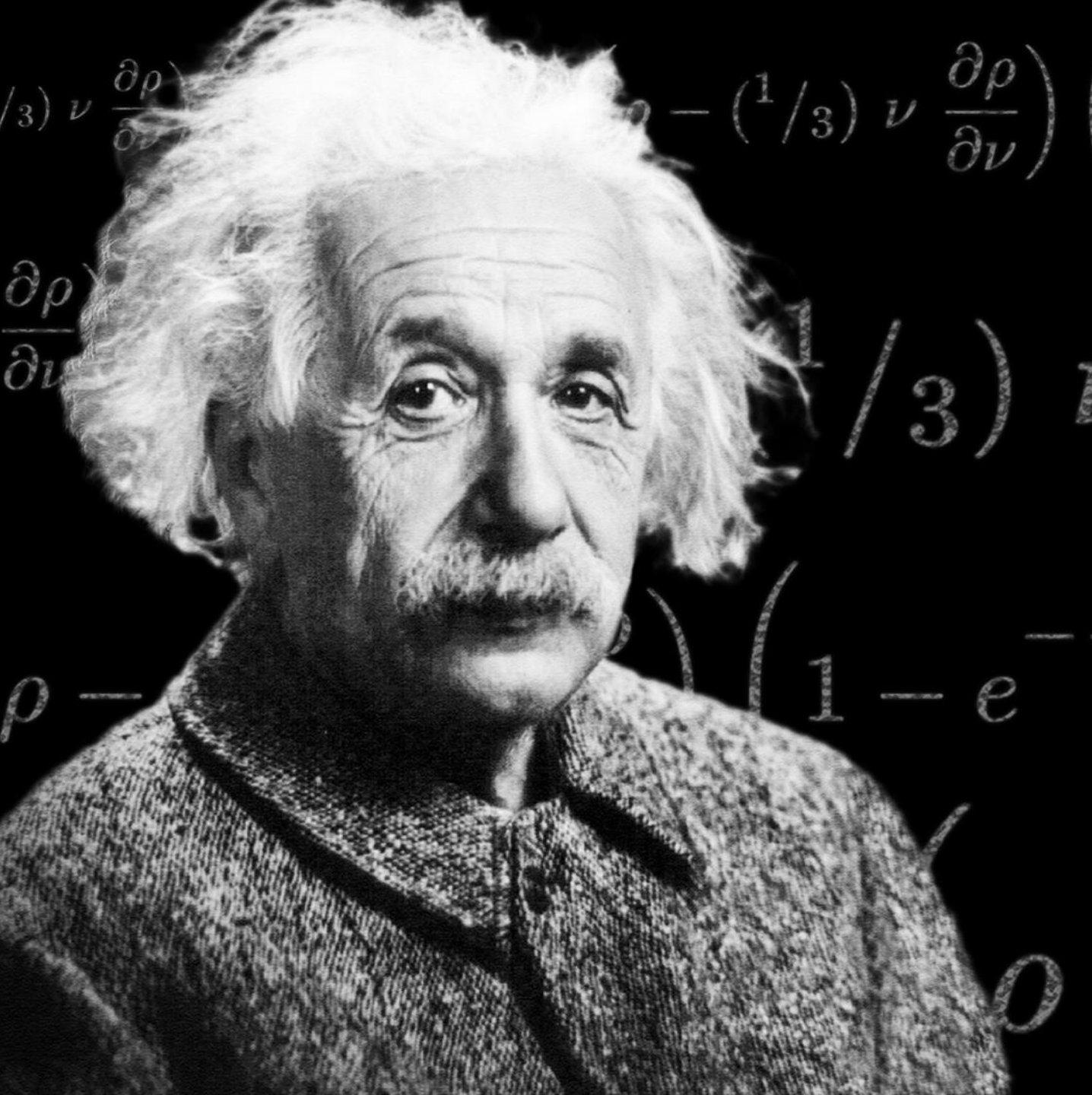
"If I had an hour to solve a problem, I'd spend 55 minutes thinking about the problem and five minutes thinking about solutions."

"Every system is perfectly designed to get the results it gets"

Paul Batalden, MD
IHI Senior Fellow
Professor Emeritus of Pediatrics, Community and Family Medicine and The Dartmouth Institute for Health Policy and Clinical Practice
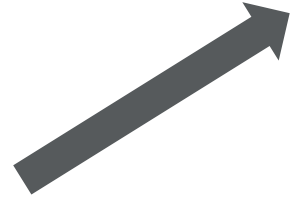
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Sense a problem

No improvement
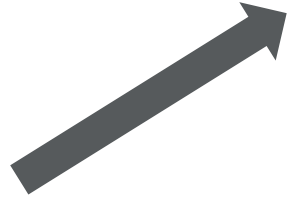
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Sense a problem

Outcomes Following Implementation of a Hospital-Wide, Multicomponent Delirium Care Pathway

TABLE 3. **Unadjusted and Adjusted Clinical Outcomes for All Patients Combined and Medicine Unit Patients**

Clinical outcome	Unadjusted model result (95% CI)	P value	Adjusted model result (95% CI)	P value
All patients				
Length of stay proportional change[a]	1.00 (0.97-1.05)	.65	0.98 (0.92-0.99)	.0087
Total direct cost proportional change[a]	0.98 (0.96-1.00)	.17	0.99 (0.97-1.01)	.12
30-Day hospital readmission odds ratio	0.93 (0.86-1.00)	.039	0.86 (0.80-0.93)	.0002
Restraint rate ratio	0.83 (0.76-0.91)	<.0001	0.91 (0.71-1.16)	.45
Safety attendant rate ratio	0.51 (0.48-0.54)	<.0001	0.63 (0.41-0.97)	.034

Sense a problem → → Sustained improvement

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Six Steps for a Successful QI Project

1. Define the problem.

2. Identify areas that can be improved.

3. Decide how you will measure progress.

4. Explicitly state your goals (SMART)

5. Implement and measure small tests of change.

6. Build upon success and sustain the process.

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Understand your problem

Fix your problem

Embed into the culture

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George: 69-Year-old man presents with acute onset chest pain.

69-Year-old man presents with acute onset chest pain.

HD 0: presents with STEMI

Taken emergently to cath lab – **stent placed to LAD**

HD 1: Echo reveals **reduced ejection fraction of 35%**

HD 2: started on **diuretics**

HD 4: doing-well, preparing for hospital discharge

HD 5: discharged home on **5 new medications**

Instructed to **"follow-up"** with Cardiology

2 weeks later: found down at home suffering **cardiac arrest.**

On admission: critical hypokalemia to 1.8

Prolonged hospitalization but eventually discharged to SNF for rehab therapy.
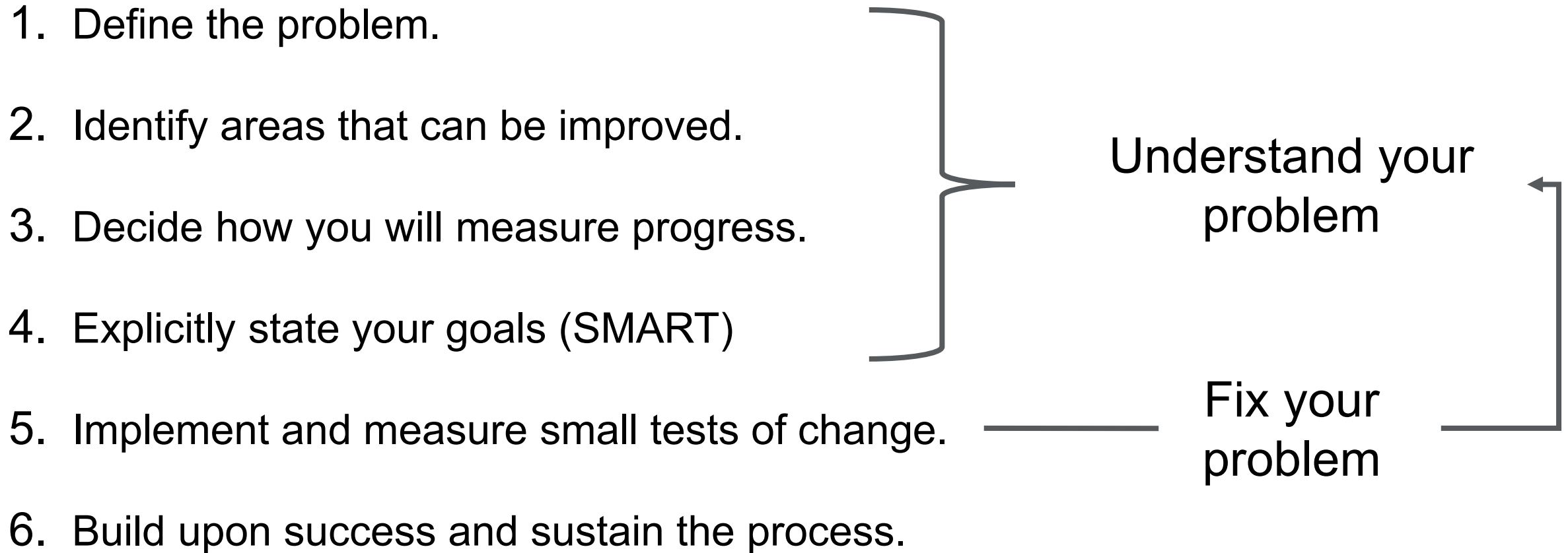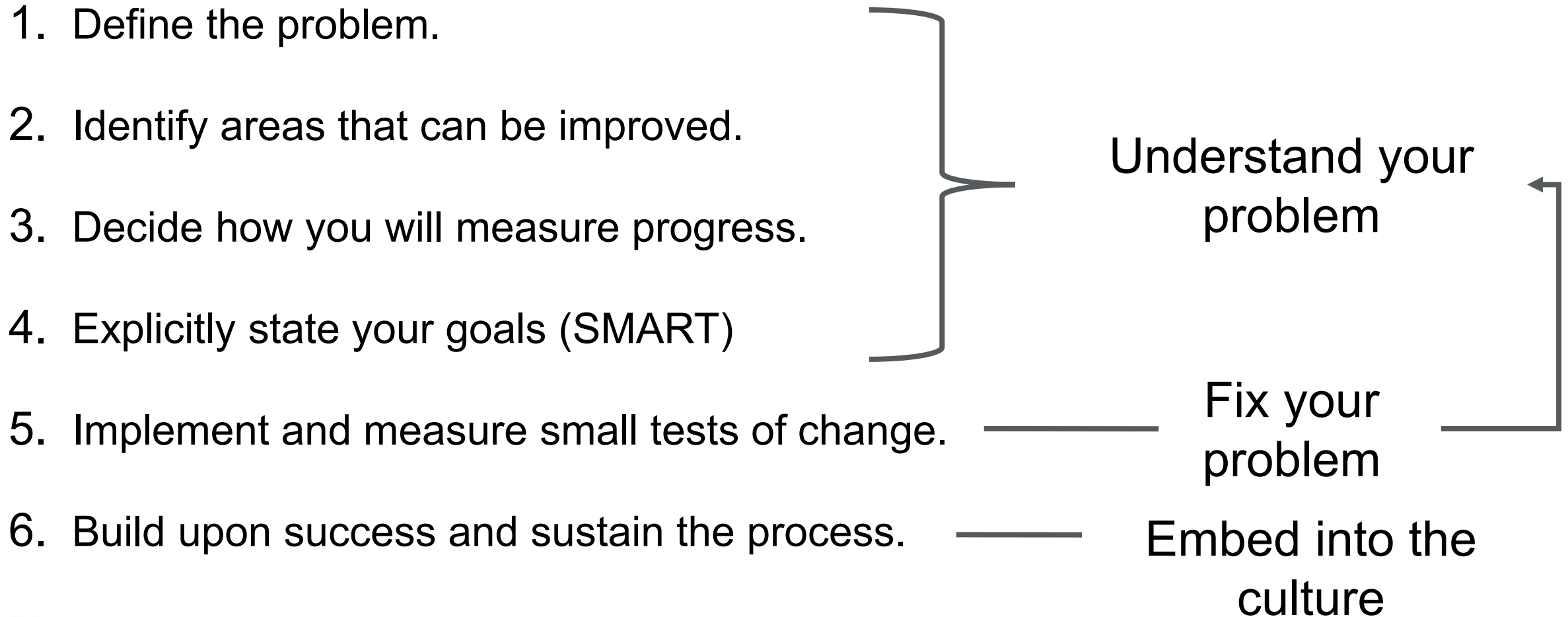
IHQSE

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1. Define the problem.

Who is affected? By how much?

Are there guidelines to refer to?

1. **Define the problem.**

   Frequency: Count, Percent, Frequency

   Vaccination rates   CAUTIs   Wrong-site surgeries

   Central Tendency: Mean, Median, and Mode

   Mean and median length-of-stay

   Dispersion/Variation: Range, Variance, Std. Deviation

   a1c measures in a clinic population, amount of blood loss after surgery

   Position: Percentile Ranks, Quartile Ranks

1. Define the problem.

Frequency: Count, Percent, Frequency

Vaccination rates   CAUTIs   Wrong-site surgeries

Central Tendency: Mean, Median, and Mode

Mean and median length-of-stay

AKA Baseline data!

Dispersion/Variation: Range, Variance, Std. Deviation

a1c measures in a clinic population, amount of blood loss after surgery

Position: Percentile Ranks, Quartile Ranks

vizient.

BEST
HOSPITALS
U.S.News
2019-20

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1. Define the problem.

Consider the heterogeneity of your population…
Are some groups affected differently than others?

Patients with HbA1c > 8% are more likely to experience complications and comorbidities. At X clinic…

35% of ALL patients with diabetes are not under glycemic control as defined by an A1c<8%.	**40% of Hispanic and Latino patients** with diabetes have not achieved glycemic control.

The American College of Cardiology (ACC) advocates patients with AMI schedule an initial outpatient cardiac rehabilitation appointment within 7 days of hospital discharge.

- In the past 4 months, 1/38 (2%) patients with MI were scheduled and seen within one week of discharge.

- The average duration of time from discharge to first appointment is 18.9 days.

Batten A, Jaeger C, Griffen D, Harwood P, Baur K. See You in 7: improving acute myocardial infarction follow-up care. BMJ Open Qual. 2018 Jun;7(2):e000296.

King M. Hospital-to-Home "See You in 7" Tools Updated for Cardiac Rehab Awareness Week. American College of Cardiology. 2013 http://blog.acc.post/h2h-seeyou-in-7-tools-updated-for-cardiac-rehab-awareness-week/

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Breakout #1   **10 minutes**

- Introductions

- Your problem/project/thing you want to fix

- How do you know it's a problem? (IE: "Define")

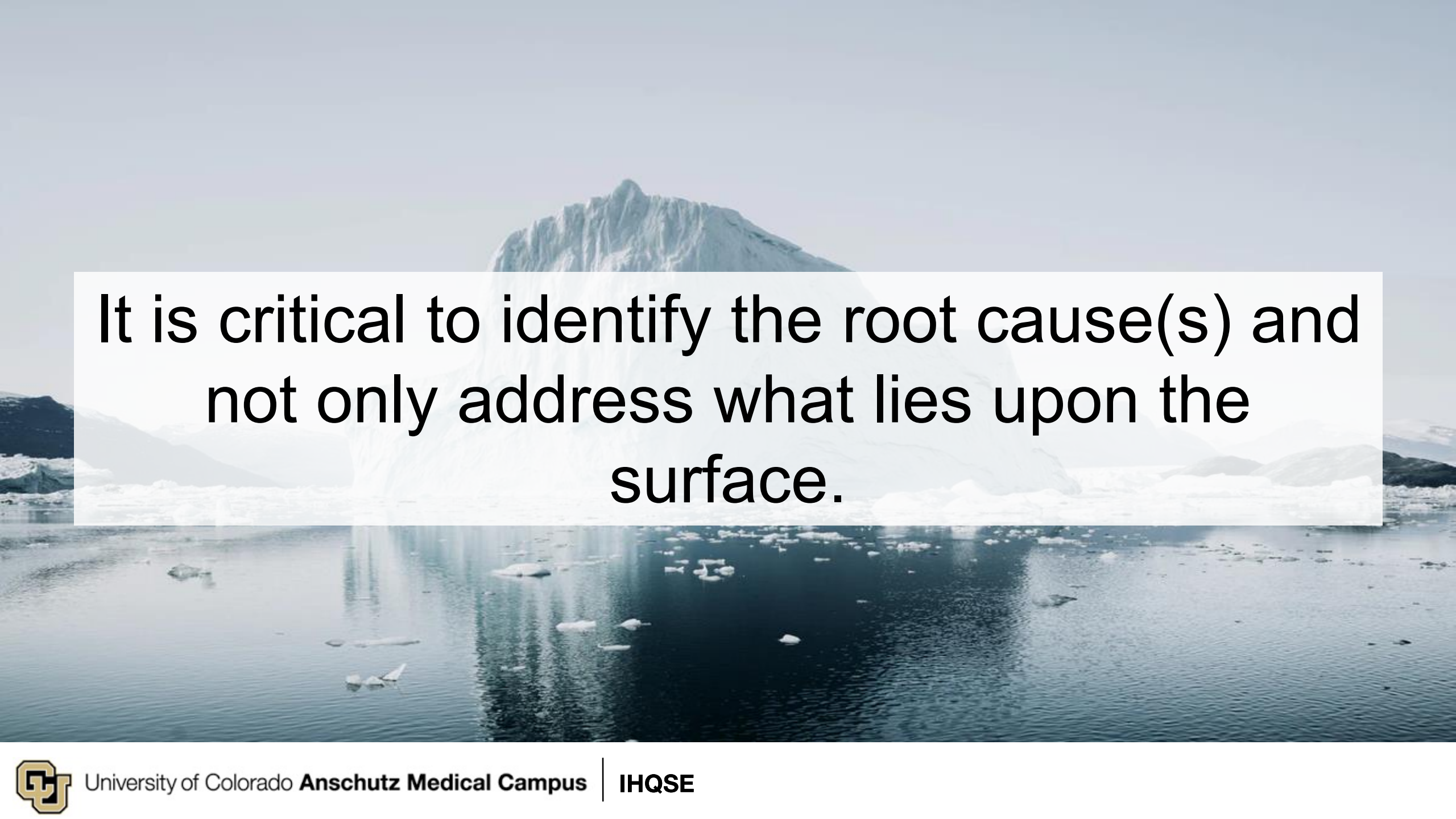University of Colorado **Anschutz Medical Campus** | **IHQSE**

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It is critical to identify the root cause(s) and not only address what lies upon the surface.

QI Tools

Gemba
現場

Go See.
Ask Why?
Show Respect.

Causes
Effect

Why?
Why?
5W Why?
Why?
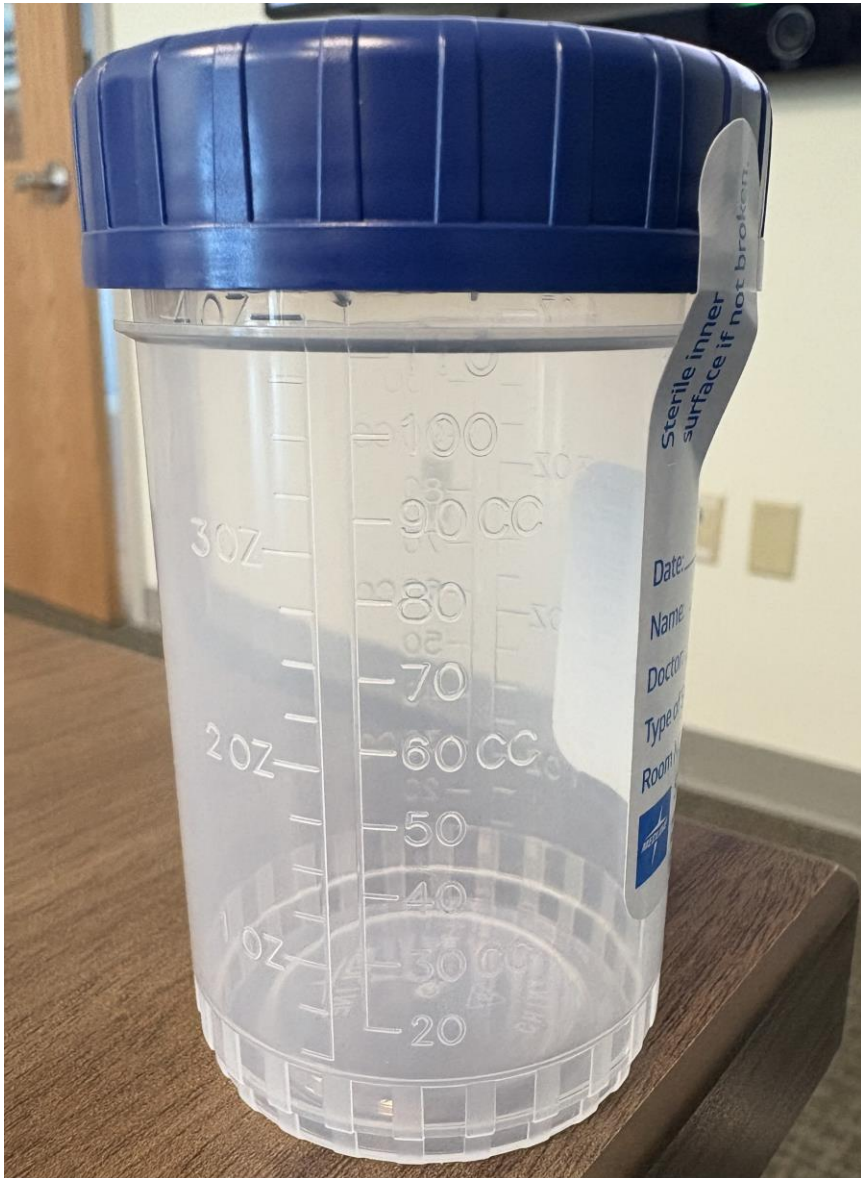Why?
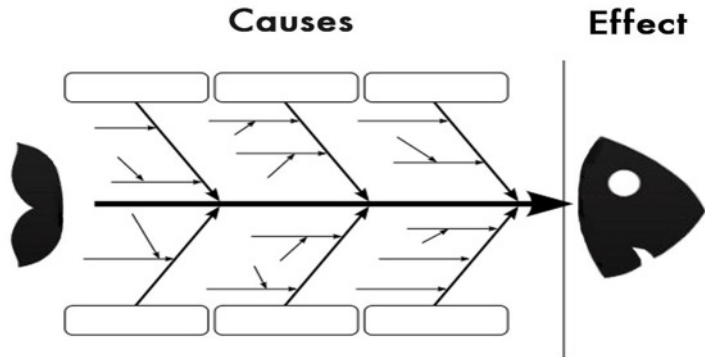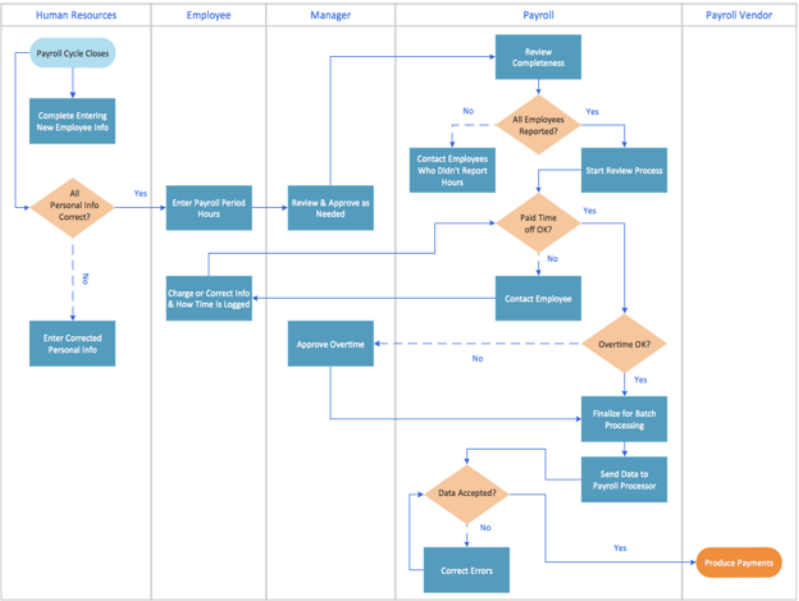
2. Identify areas that can be improved.

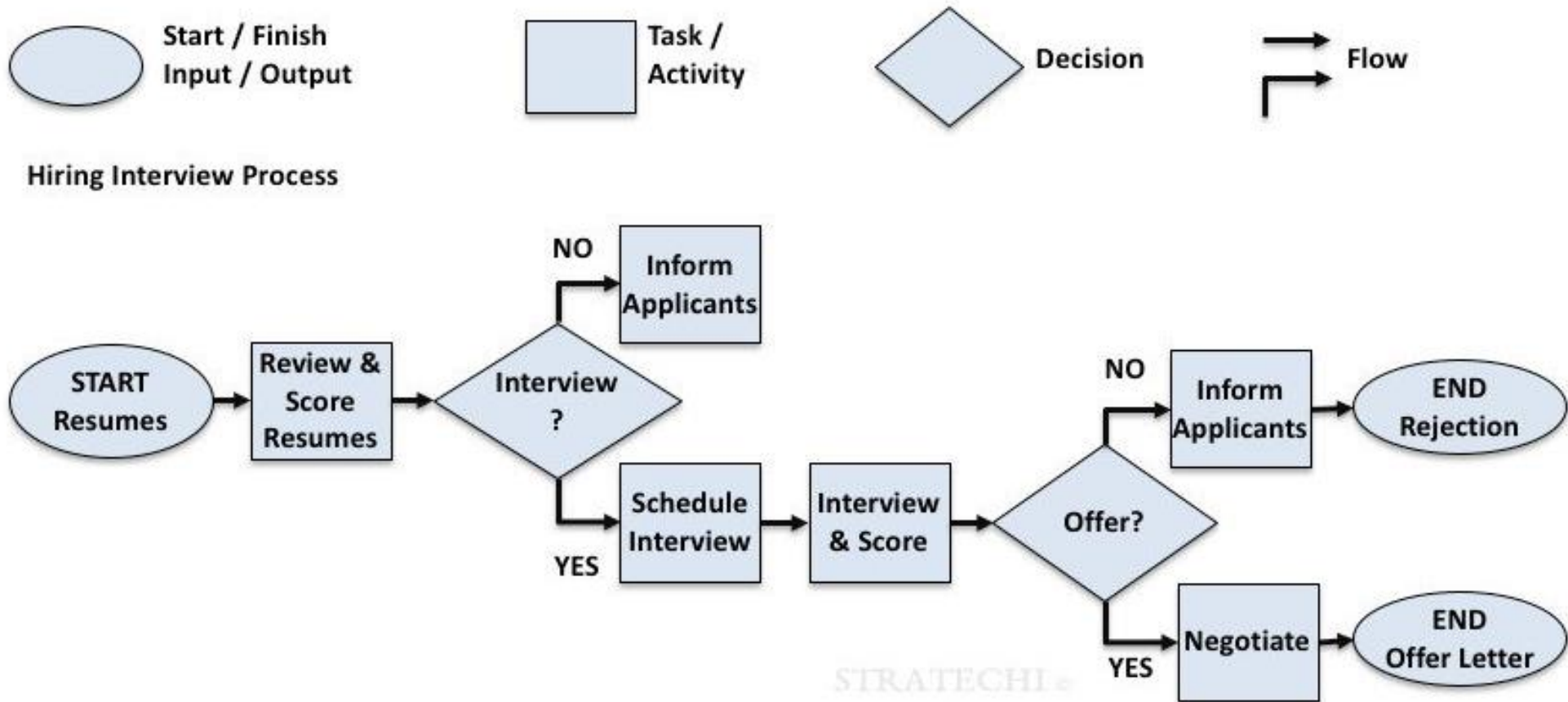# Gemba 現場 "the actual place"

Go See.
Ask Why?
Show Respect.

For TB sputum collection: collect a minimum of **5mLs**

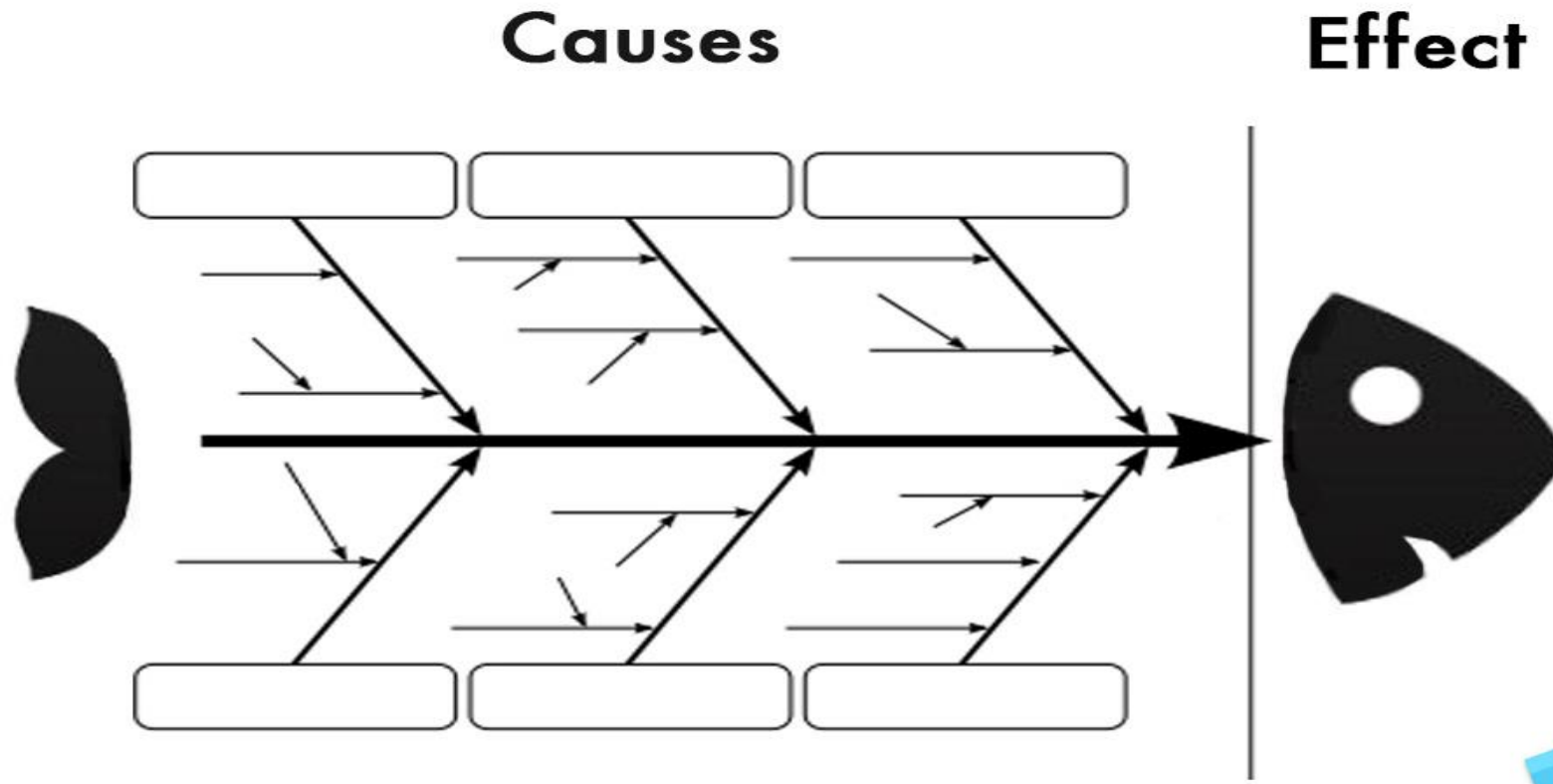## 2. Identify areas that can be improved.
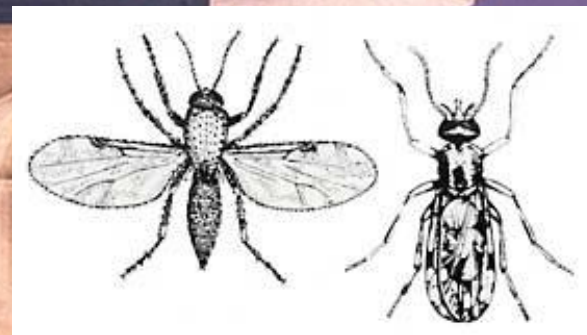
Process Map

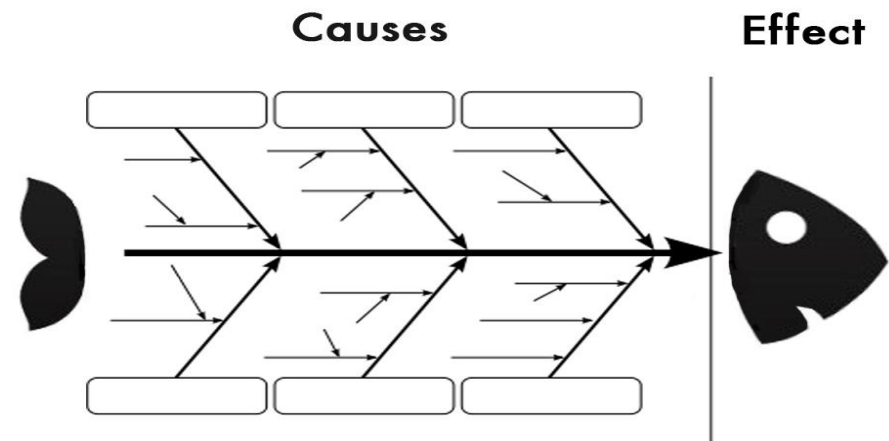## 2. Identify areas that can be improved.

Fishbone "Ishikawa" Diagram

Five Why's

5 Why's
(Linear)

Fishbone
(Branched)

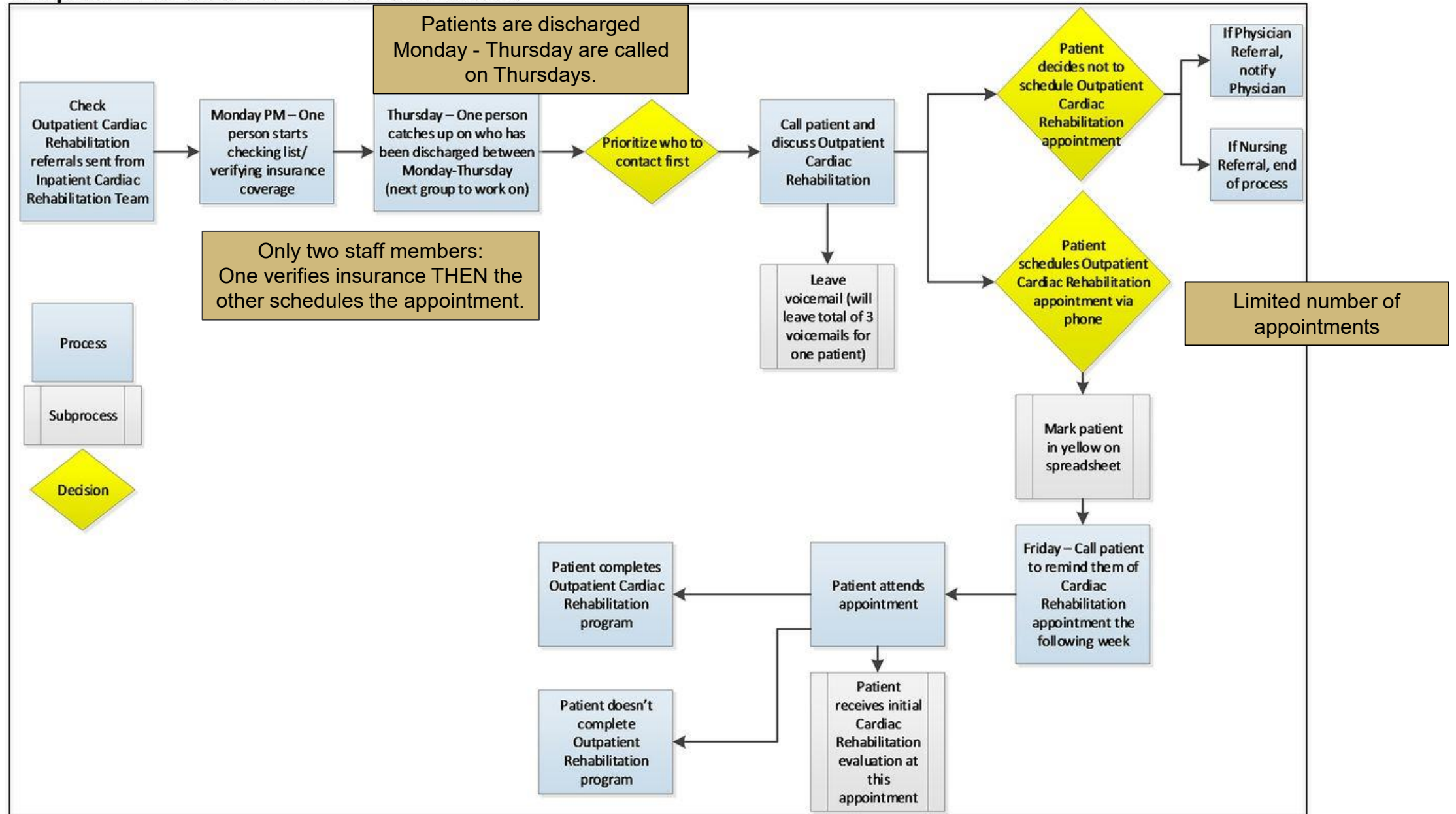# Outpatient Cardiac Rehabilitation Process

Legend:
- Process
- Subprocess
- Decision

Process flow:

Check Outpatient Cardiac Rehabilitation referrals sent from Inpatient Cardiac Rehabilitation Team → Monday PM – One person starts checking list/ verifying insurance coverage → Thursday – One person catches up on who has been discharged between Monday-Thursday (next group to work on) → Prioritize who to contact first → Call patient and discuss Outpatient Cardiac Rehabilitation

Call patient and discuss Outpatient Cardiac Rehabilitation → Leave voicemail (will leave total of 3 voicemails for one patient)

Call patient and discuss Outpatient Cardiac Rehabilitation → Patient decides not to schedule Outpatient Cardiac Rehabilitation appointment → If Physician Referral, notify Physician / If Nursing Referral, end of process

Call patient and discuss Outpatient Cardiac Rehabilitation → Patient schedules Outpatient Cardiac Rehabilitation appointment via phone → Mark patient in yellow on spreadsheet → Friday – Call patient to remind them of Cardiac Rehabilitation appointment the following week → Patient attends appointment

Patient attends appointment → Patient completes Outpatient Cardiac Rehabilitation program

Patient attends appointment → Patient receives initial Cardiac Rehabilitation evaluation at this appointment → Patient doesn't complete Outpatient Rehabilitation program

Outpatient Cardiac Rehabilitation Process

Process/Methods
- Not aware of when patients are discharged
- Patients not always properly ID'd for AMI
- Physician doesn't order Inpatient CR
- Physician doesn't order Outpatient CR until follow-up appointment (appt)
- Patient goes to Extended Care Facility (ECF), attends Outpatient CR ECF discharge

Machines
- Limited exercise and telemetry equipment to facilitate larger Outpatient CR classes

Other Factors
- Patient has other illnesses/complications that may hinder scheduling of Outpatient CR appt
- Patient doesn't see value of Outpatient CR
- Patient has too many other appts
- Patient doesn't have transportation to appt
- Patient doesn't have family support
- Patient doesn't have insurance coverage
- Patient feels overwhelmed/is in denial
- Patient's class time preferences vary

Problem Statement
Outpatient CR >7 days after discharge

Environment
- Limited space to complete Outpatient CR initial evaluations
- Limited space to hold Outpatient CR classes

People
- Limited # of Outpatient initial eval appts each week due to staffing
- Limited opening of Outpatient CR classes--16 per class is max
- Limited # of staff to contact patients to schedule Outpatient CR
- Limited # of staff hours to complete Outpatient initial evaluations
- Limited # of staff familiar with insurance verification process

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Batten A, Jaeger C, Griffen D, Harwood P, Baur K. See You in 7: improving acute myocardial infarction follow-up care. BMJ Open Qual. 2018 Jun;7(2):e000296.

Breakout #2

7 minutes

Ask "WHY?" 5x for your problem

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3. Decide how you will measure progress.

4. Explicitly state your goals (SMART)

Understand your problem

5. Implement and measure small tests of change.

6. Build upon success and sustain the process.

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2. Identify areas that <u>can be</u> improved.

Action Priority Matrix

Impact

Quick Wins

Major Projects

Epic

Fill-in Jobs

Thankless Tasks

Effort

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QI Metrics

OUTCOME   PROCESS   STRUCTURAL   BALANCE

Matter to Patients (or stakeholders)

OUTCOME
- Patient Satisfaction
- LOS
- Readmission Rate
- Adverse Events

Can act as proxy for outcomes

PROCESS
- Use of checklists
- Lab orders

STRUCTURAL
- PPE
- Medications
- Hand sanitizer

INTERVENTIONS

BALANCE

INTERVENTIONS

BALANCE

Dependent on intervention

Consider health equity.

Experience shows that traditional QI methods can maintain or worsen health inequities across subpopulations.

↓

Look at disparities and solutions upfront among commonly disadvantaged subgroups such as wealth, race, and location.

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Hirschhorn LR, Magge H, Kiflie A. Aiming beyond equality to reach equity: the promise and challenge of quality improvement. *BMJ*. Published online July 20, 2021:n939.

Consider the heterogeneity of your population....
Are some groups affected differently than others?

FIGURE 1
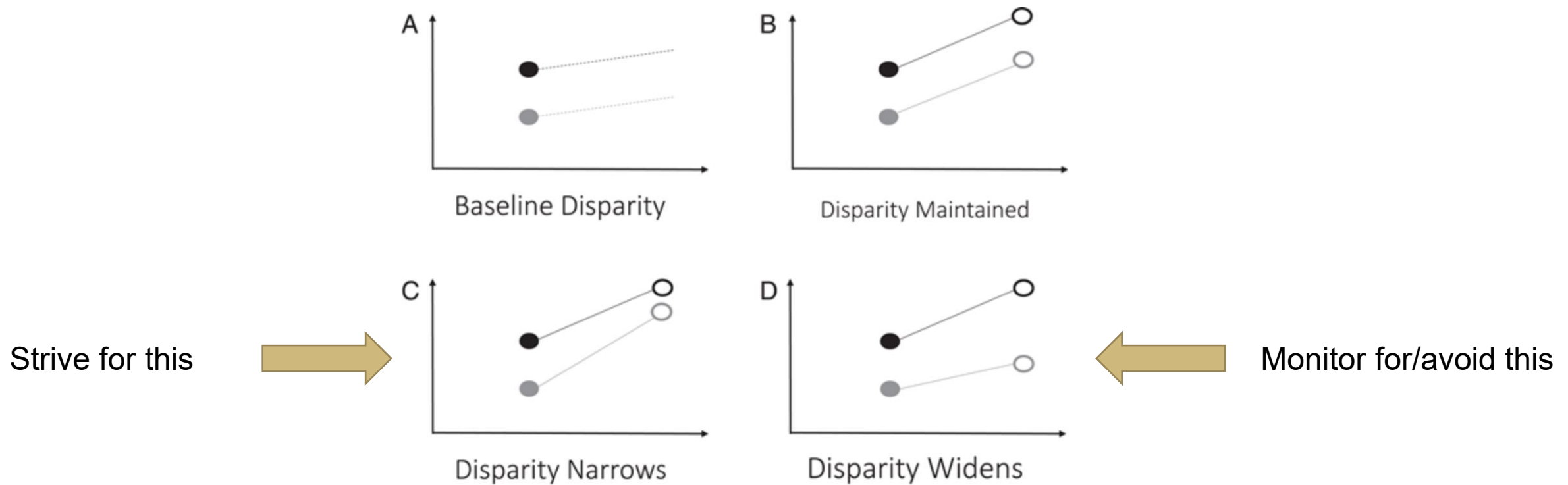
Strive for this

Monitor for/avoid this

Inpatient DVT Prophylaxis

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OUTCOME
- DVT rates
- PE rates
- Mortality

PROCESS
- Use of SCDs
- Use of Rx prophylaxis
- Risk scoring

STRUCTURAL
- Anti-coagulant stock
- RNs to administer

INTERVENTIONS

BALANCE

Bleeding rate

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OUTCOME
- Readmission rate
- 30/60/90-day mortality

PROCESS
- Outpatient appt. w/in 7 days of discharge
- Number of patients contacted
- Referrals placed before d/c

STRUCTURAL
- Number of appointments
- Number of staff trained to verify insurance

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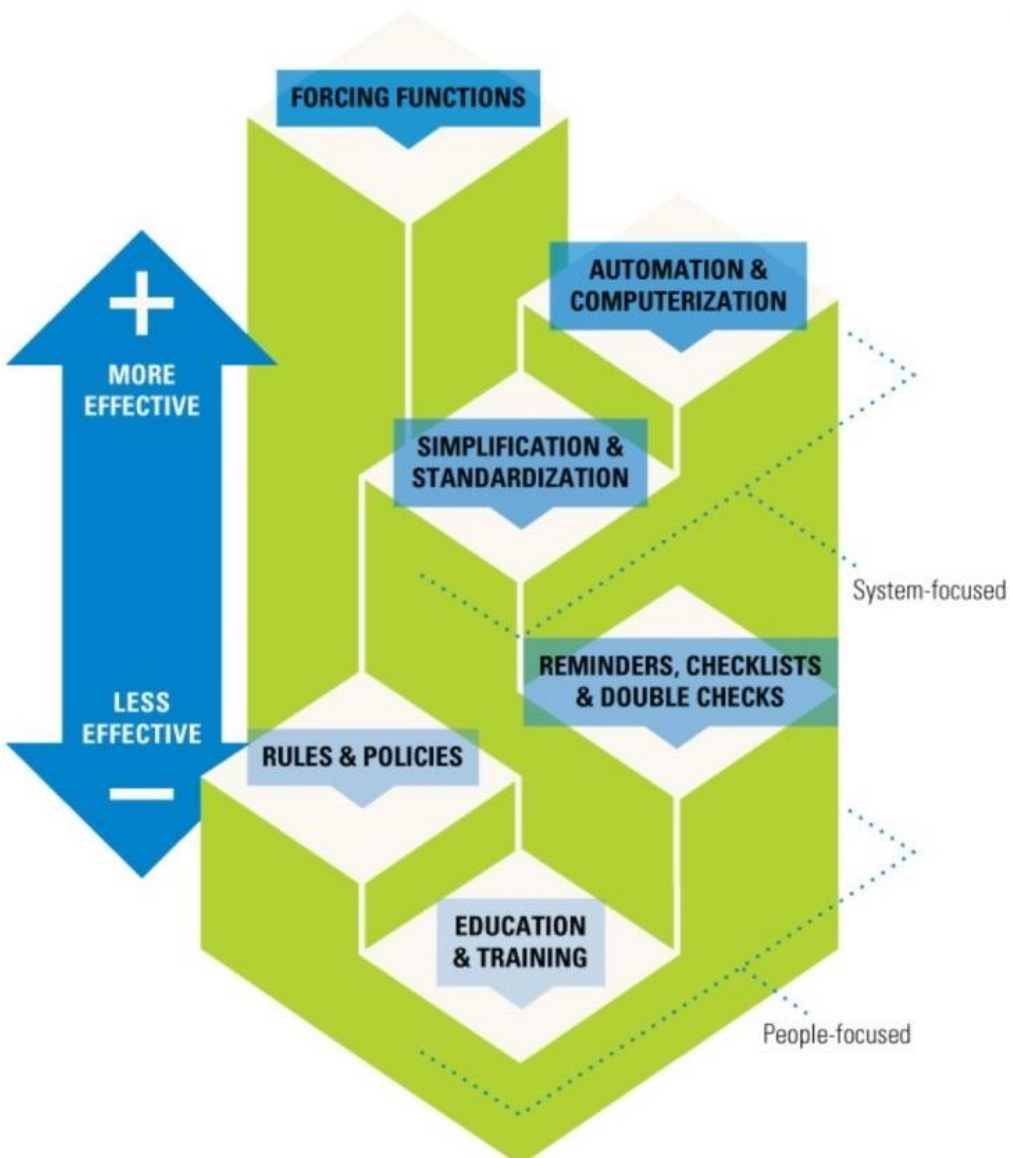
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4. **Explicitly state your goals (SMART)**

Understand your problem

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4. Explicitly state your goals

Aim Statement

S	Specific
M	Measurable
A	Attainable
R	Relevant
T	Timely
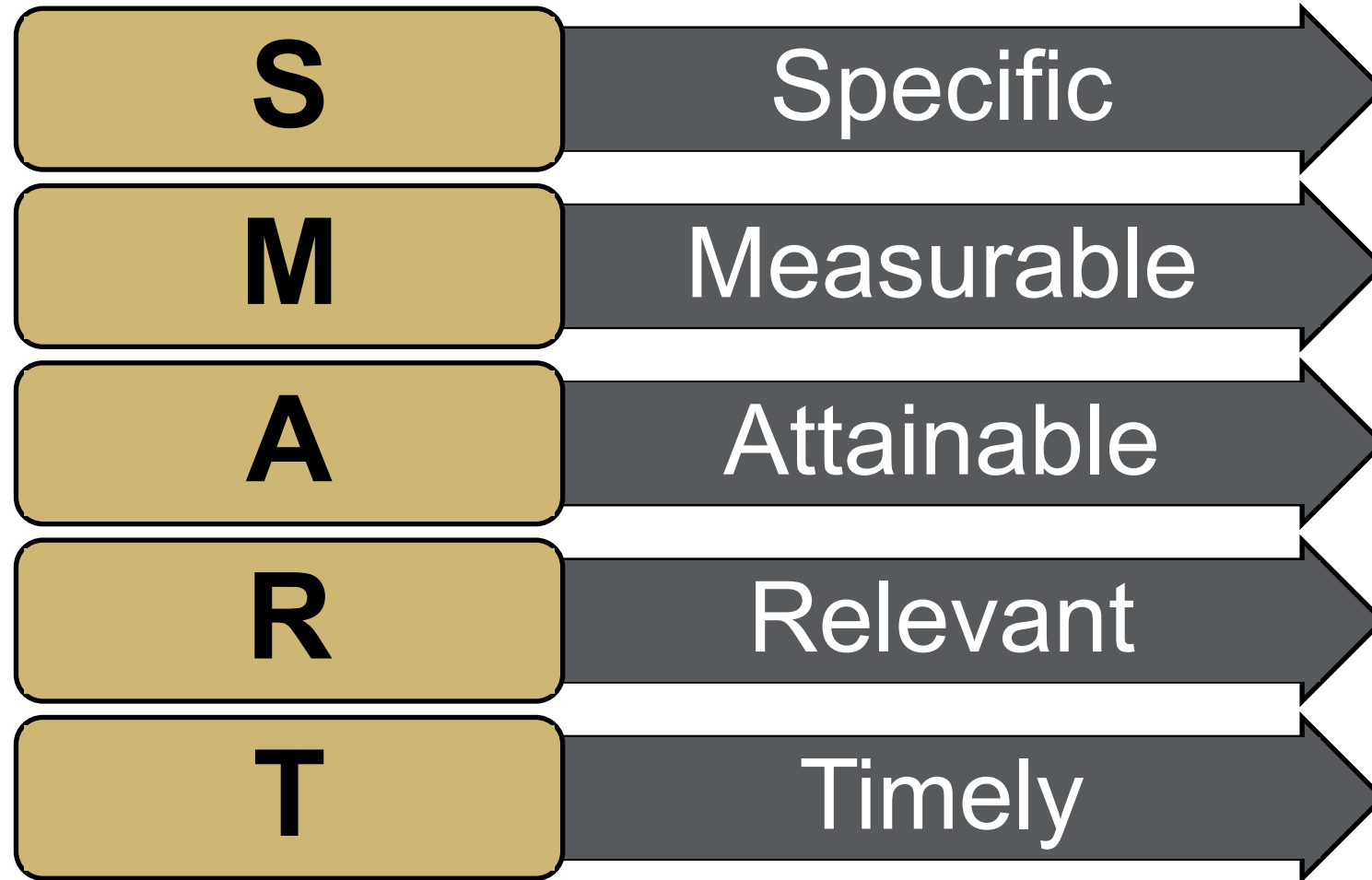
"I want to be a better skier."

"By the end of the 24/25 season, I will be able to make it down a double-black diamond slope without falling."

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S — Specific

M — Measurable

A — Attainable
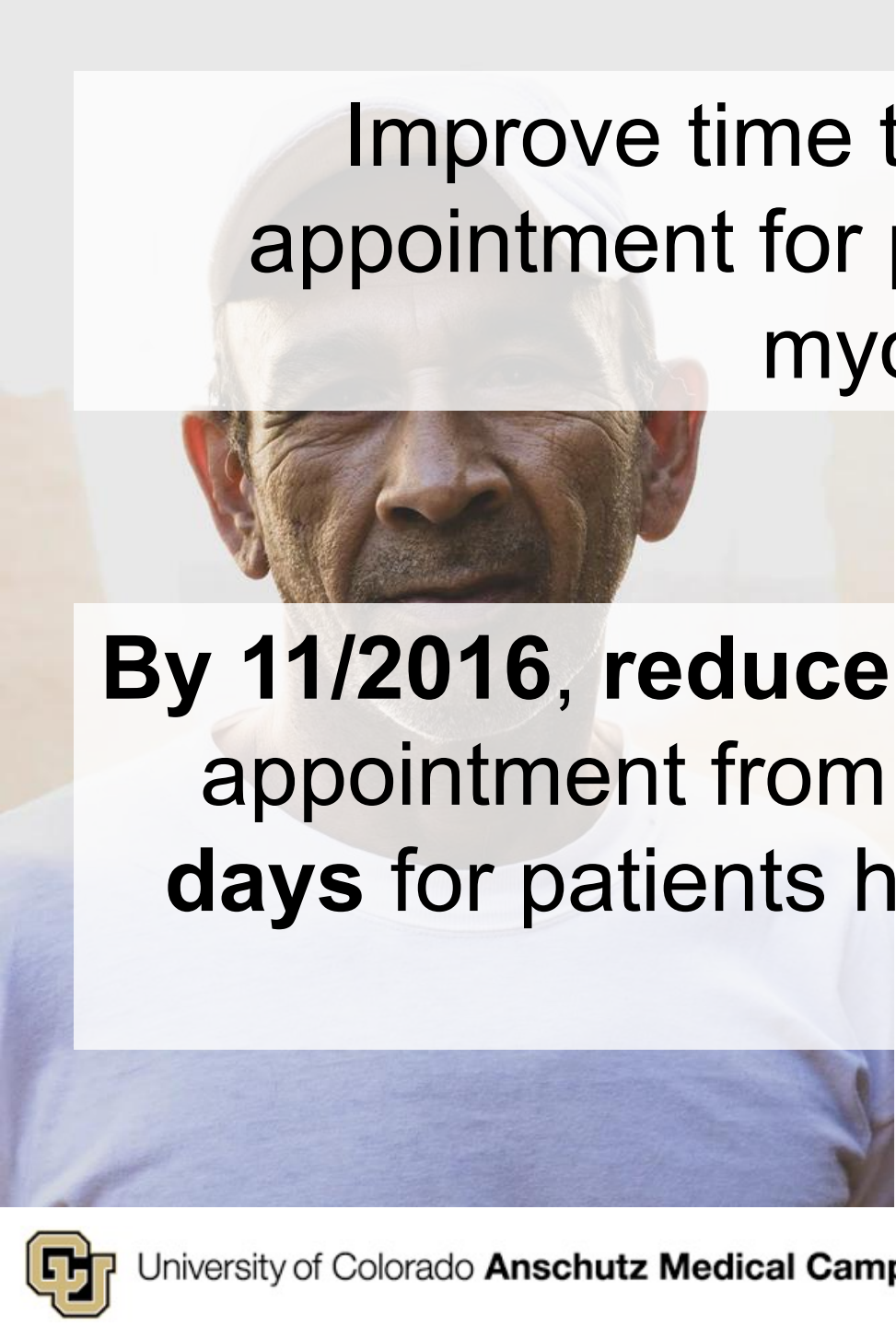
R — Relevant

T — Timely

Improve time to initial cardiac rehabilitation appointment for patients hospitalized with acute myocardial infarction.

By 11/2016, **reduce time** to initial cardiac rehabilitation appointment from an **average of 18.9 days to < 7 days** for patients hospitalized with acute myocardial infarction.

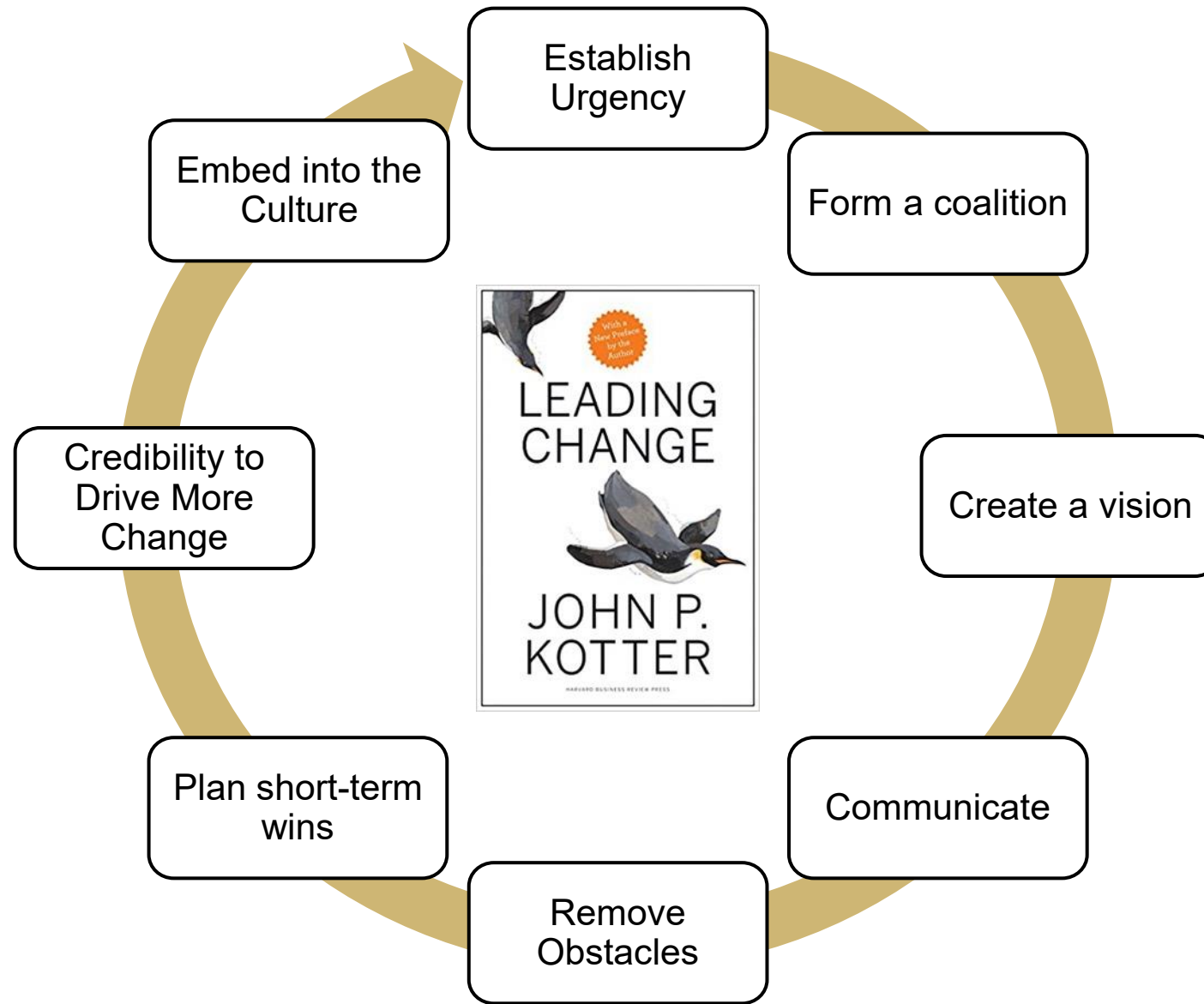University of Colorado **Anschutz Medical Campus** | **IHQSE**

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The Hierarchy of Intervention Effectiveness

MORE EFFECTIVE +

LESS EFFECTIVE −

- FORCING FUNCTIONS
- AUTOMATION & COMPUTERIZATION
- SIMPLIFICATION & STANDARDIZATION
- REMINDERS, CHECKLISTS & DOUBLE CHECKS
- RULES & POLICIES
- EDUCATION & TRAINING

System-focused

People-focused

WHO Surgical Safety Checklist
(adapted for England and Wales)

BMJ Quality & Safety

EDITORIAL

Education as a low-value improvement intervention: often necessary but rarely sufficient

Christine Soong,[1] Kaveh G Shojania[2]

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Soong C, Shojania KG Education as a low-value improvement intervention: often necessary but rarely sufficient BMJ Quality & Safety 2020;29:353-357.

TRY HARDER

DO MORE

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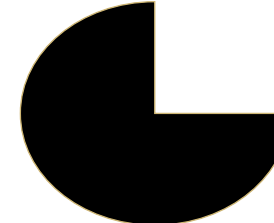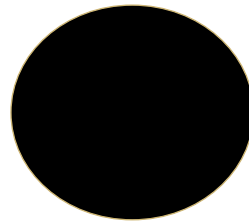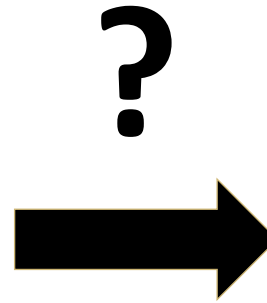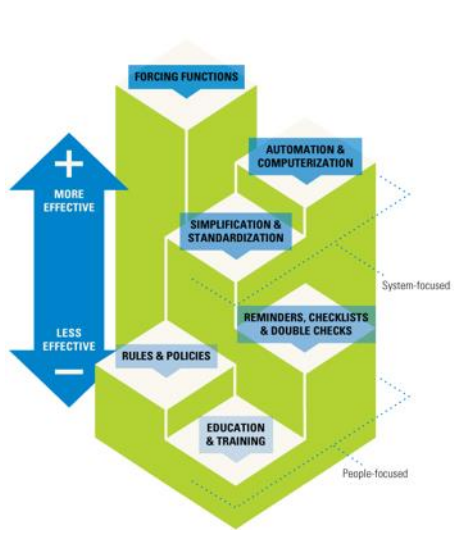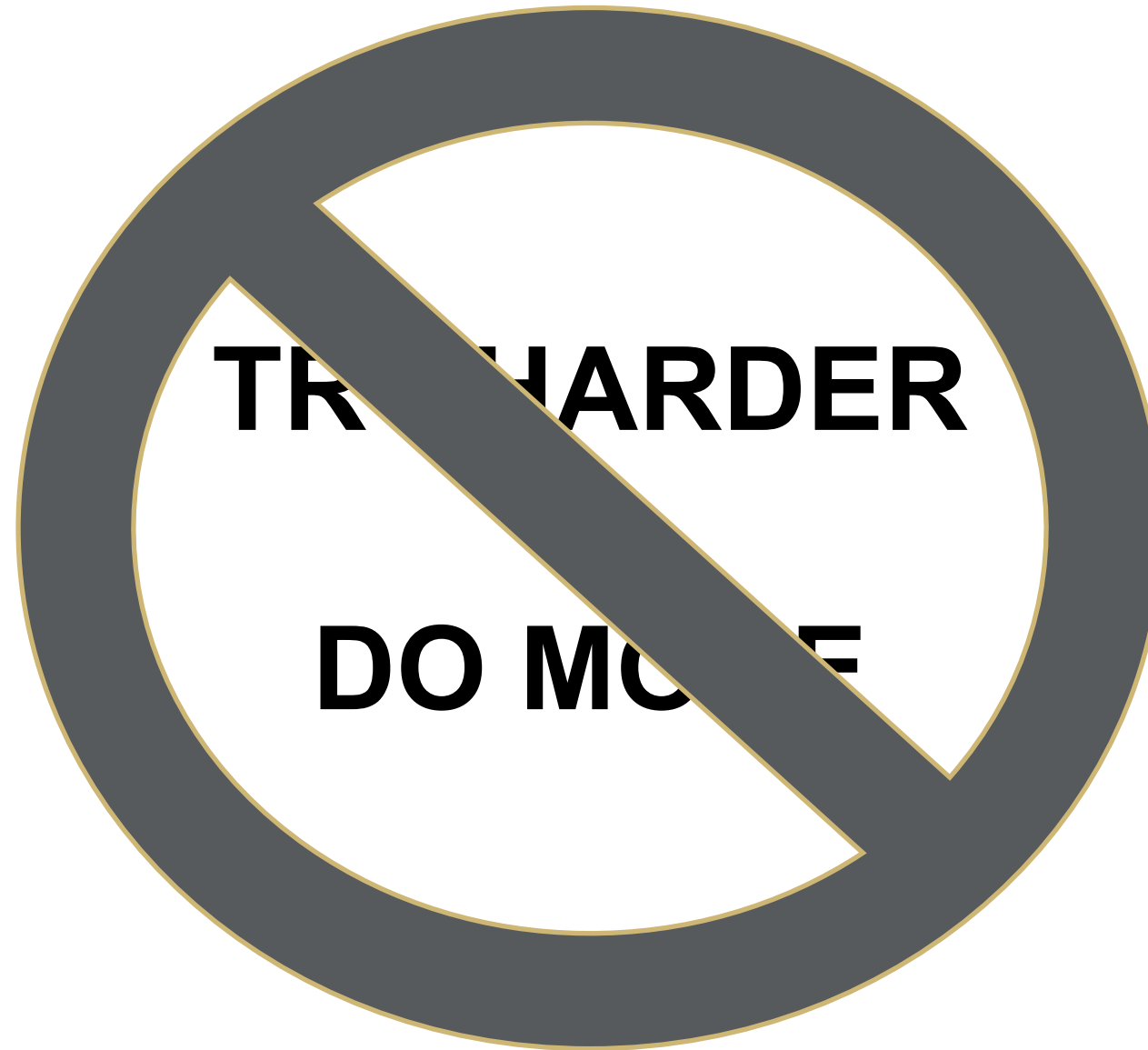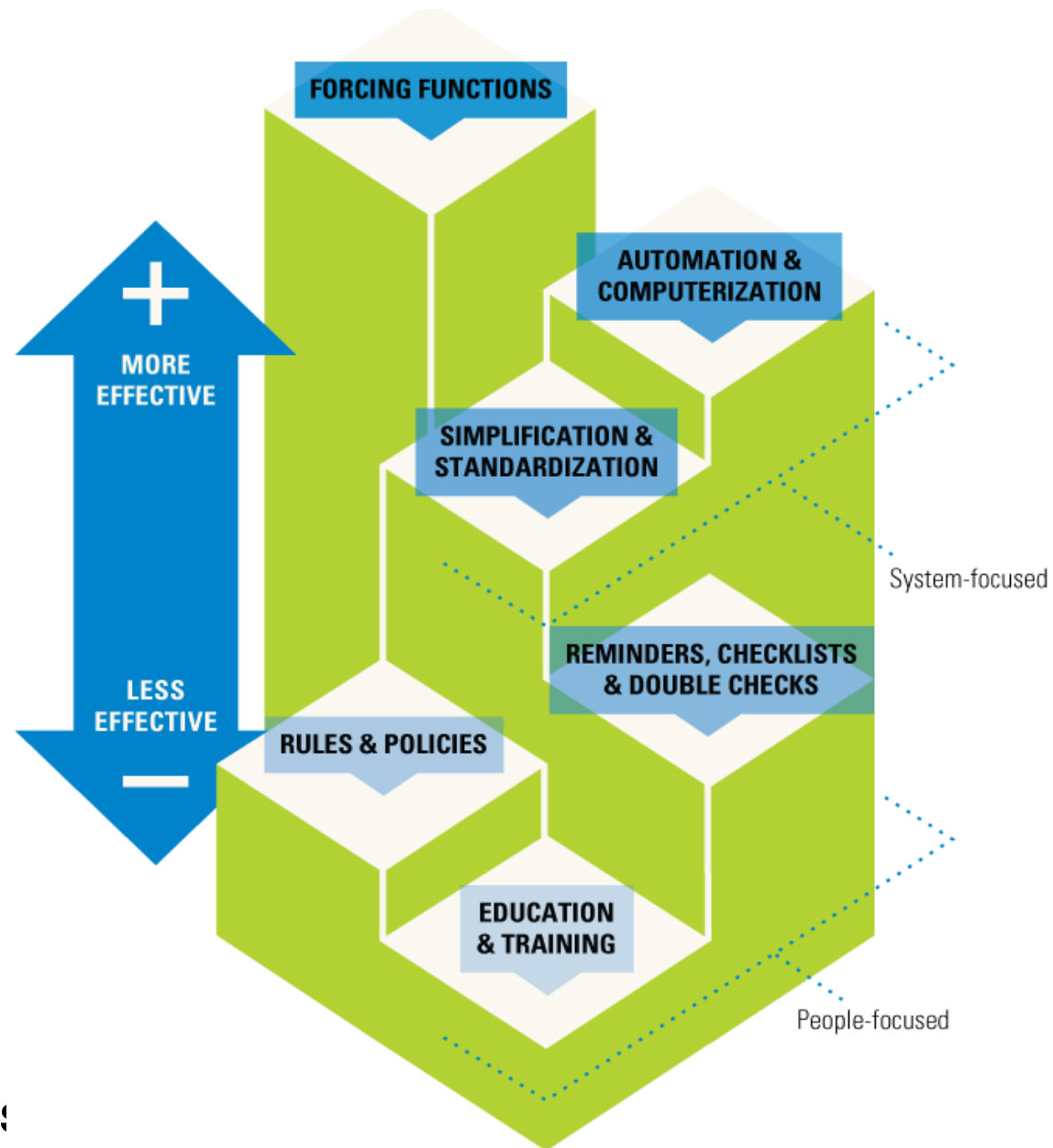
1) Add additional appointment slots.

2) Cross-train schedulers.

3) Cross-train insurance verification.

4) Schedule appointment prior to hospital discharge.

Days from Hospital Discharge to First Scheduled Outpatient Cardiac Rehabilitation Appointment

Batten A, Jaeger C, Griffen D, Harwood P, Baur K. See You in 7: improving acute myocardial infarction follow-up care. BMJ Open Qual. 2018 Jun;7(2):e000296.

Six Steps for a Successful QI Project

1. Define the problem.

2. Identify areas that can be improved.

3. Decide how you will measure progress.

4. Explicitly state your goals (SMART)

} Understand your problem

5. Implement and measure small tests of change.

6. **Build upon success and sustain the process.**

BREAK-TIME

Come back at 2:50 MT!

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Change Management

AGENDA

Change Case
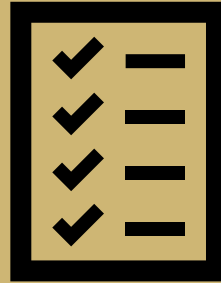
Kotter's 8-Steps

?

Questions

A Local Story, 2008

Vancomycin Use in the ICU

Problem: Only **50%** of 1st vancomycin troughs within desired range of 10-20 mcg/mL

Solution: QI project to develop simple weight- and creatinine-based guide to dosing

- ICU and Pharmacy leadership buy-in
- Rolled out nomogram for the ICU
- Email sent to residents/faculty every month

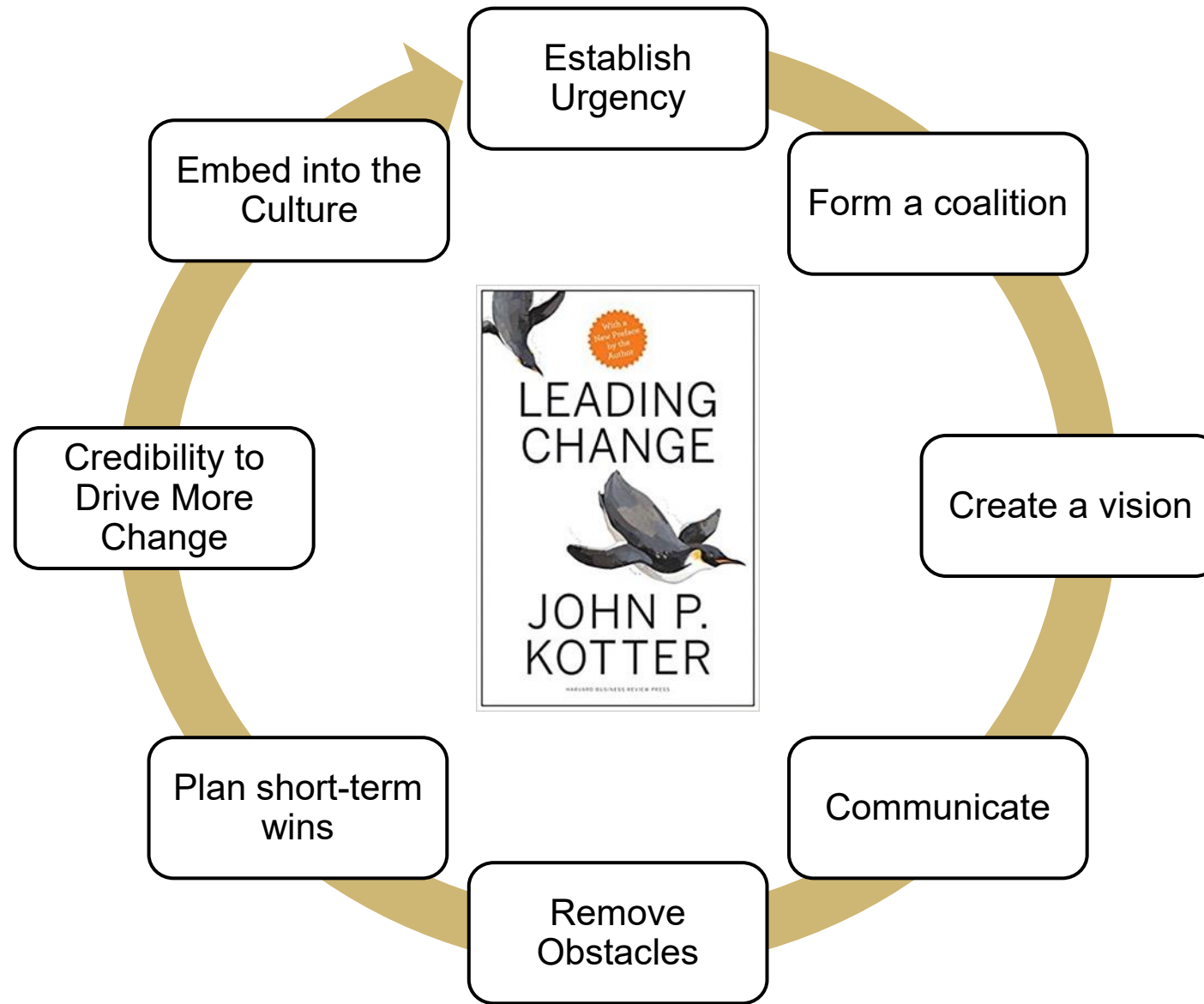University of Colorado **Anschutz Medical Campus** | **IHQSE**

I wanted to make everyone aware of the ongoing QI initiative in the MICU addressing initial vancomycin dosing. The standard 1 gram every 12 hours is not appropriate for many ICU patients and the first troughs have been in the therapeutic range of 10-20 mcg/mL only about 50% of the time. We have developed a very simple dosing nomogram (attached) that also includes guidelines on dosing for HD and CVVH, and when the troughs should be checked. Based on the existing data, we expect this nomogram to eliminate about 75% of subtherapeutic troughs and 50% of supratherapeutic troughs.

The nomogram requires only the patient's actual body weight and MDRD-estimated GFR with age, gender, race, and serum creatinine (online at www.mdrd.com).

We rely primarily on you as treating physicians to follow the nomogram and correctly order the antibiotics, decreasing the risk of under- or over-dosing your critically ill patients in the crucial initial 24-72 hours of therapy until the first trough is obtained. The MICU pharmacists will be helping you with the nomogram as well.

Thank you in advance for your help and your hard work. We welcome all questions and feedback on this quality improvement initiative.

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Vancomycin use in the ICU: **Outcomes**

Pre-intervention trough (10-20)	50%
Post-intervention trough (10-20)	50%
Protocol adherence rate	20%!

Why didn't the providers change their behavior?

What was wrong with this approach to leading change?

I wanted to make everyone aware of the ongoing QI initiative in the MICU addressing initial vancomycin dosing. The standard 1 gram every 12 hours is not appropriate for many ICU patients and the first troughs have been in the therapeutic range of 10-20 mcg/mL only about 50% of the time. We have developed a very simple dosing nomogram (attached) that also includes guidelines on dosing for HD and CVVH, and when the troughs should be checked. Based on the existing data, we expect this nomogram to eliminate about 75% of subtherapeutic troughs and 50% of supratherapeutic troughs.

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Establish Urgency

Form a coalition

Create a vision

Communicate

Remove Obstacles

Plan short-term wins

Credibility to Drive More Change

Embed into the Culture

LEADING CHANGE

JOHN P. KOTTER

University of Colorado **Anschutz Medical Campus** | **IHQSE**

Establish Urgency

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"Burning Platform"

Establish Urgency

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Establish Urgency

1.0 - Survival

2.0 - Extrinsic Motivation: reward, punishment

3.0 - Intrinsic Motivation

Burning Aspiration

Establish
Urgency

NEW YORK TIMES BESTSELLER

"Provocative and fascinating." —MALCOLM GLADWELL

Daniel H. Pink

author of *A Whole New Mind*

DRiVE

The Surprising Truth
About What Motivates Us
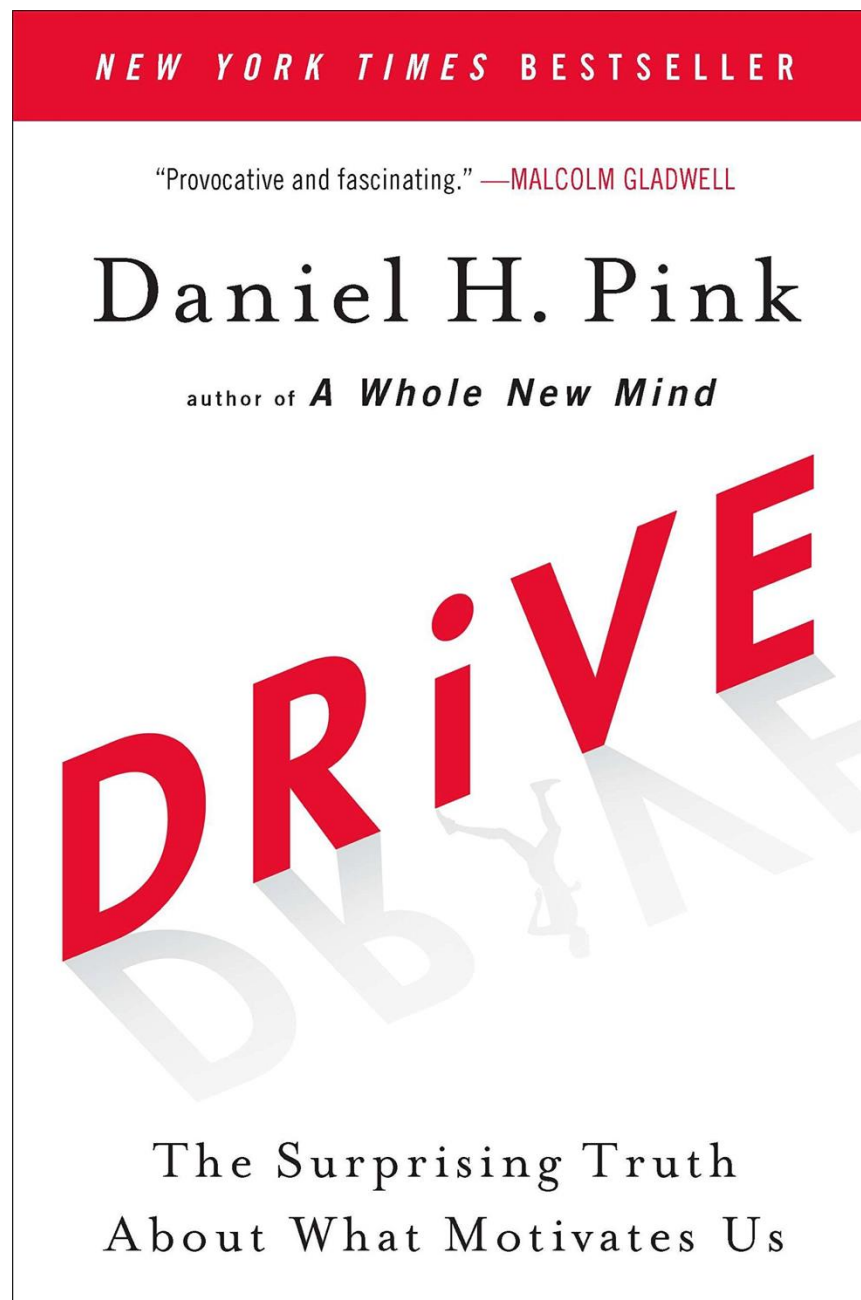
AUTONOMY

MASTERY

PURPOSE

PLAY

CONNECTION

Breakout

7 minutes

- What is your burning platform? (IE: SO WHAT?)

Form a Guiding Coalition

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Who - *Anyone* impacted by your work

Key Partner Engagement

To Gain Trust, Expertise, Insight:

- Interprofessional
- Patients
- The Cool Kids

To Gain Resources:

- Various levels of organization
- The Bosses

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Stakeholder/**Partner Map**

Step 1: Identify
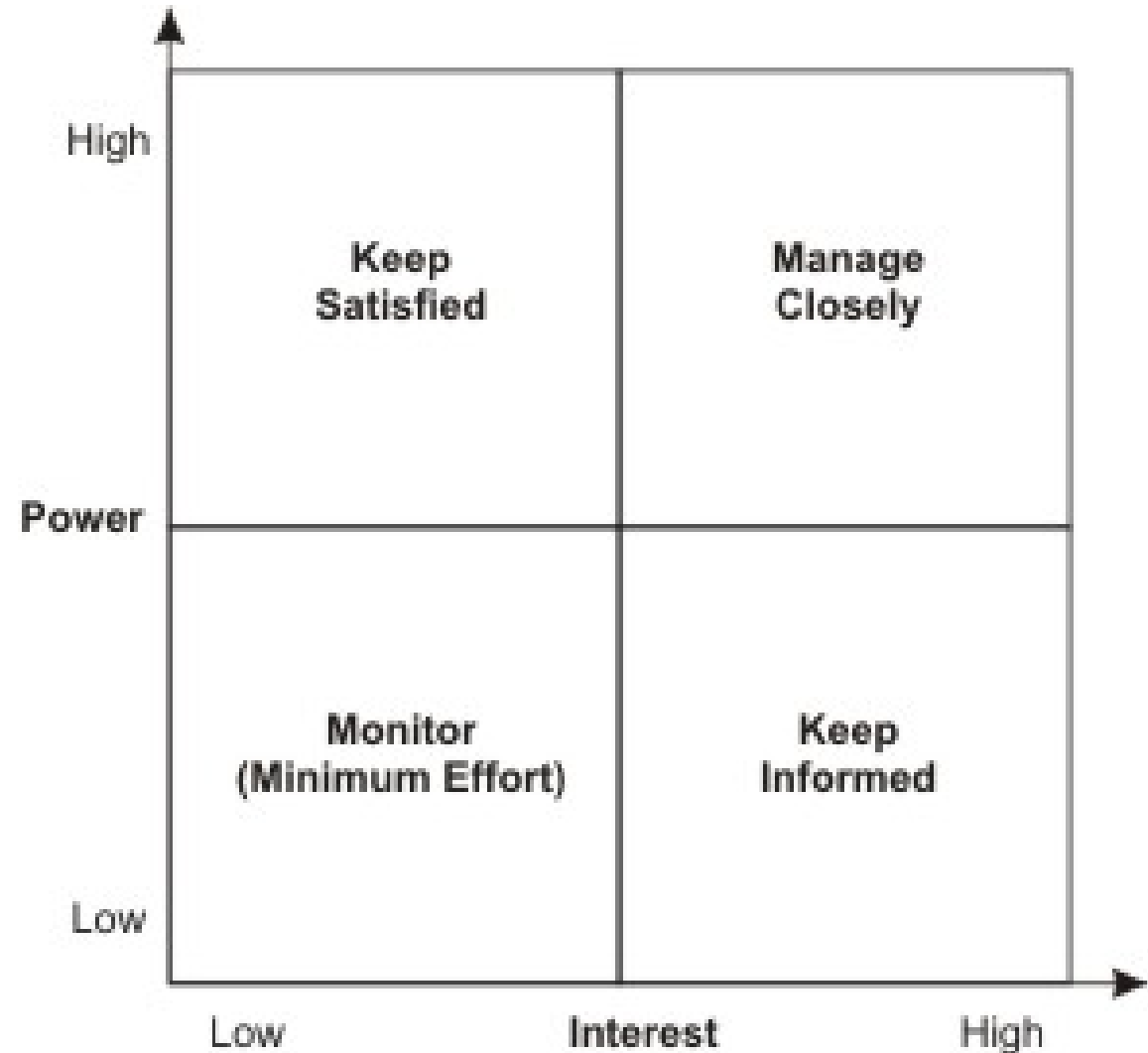
Step 2: Prioritize

Step 3: Understand

Stakeholder Map

Step 1: Identify

Step 2: Prioritize

Step 3: Understand
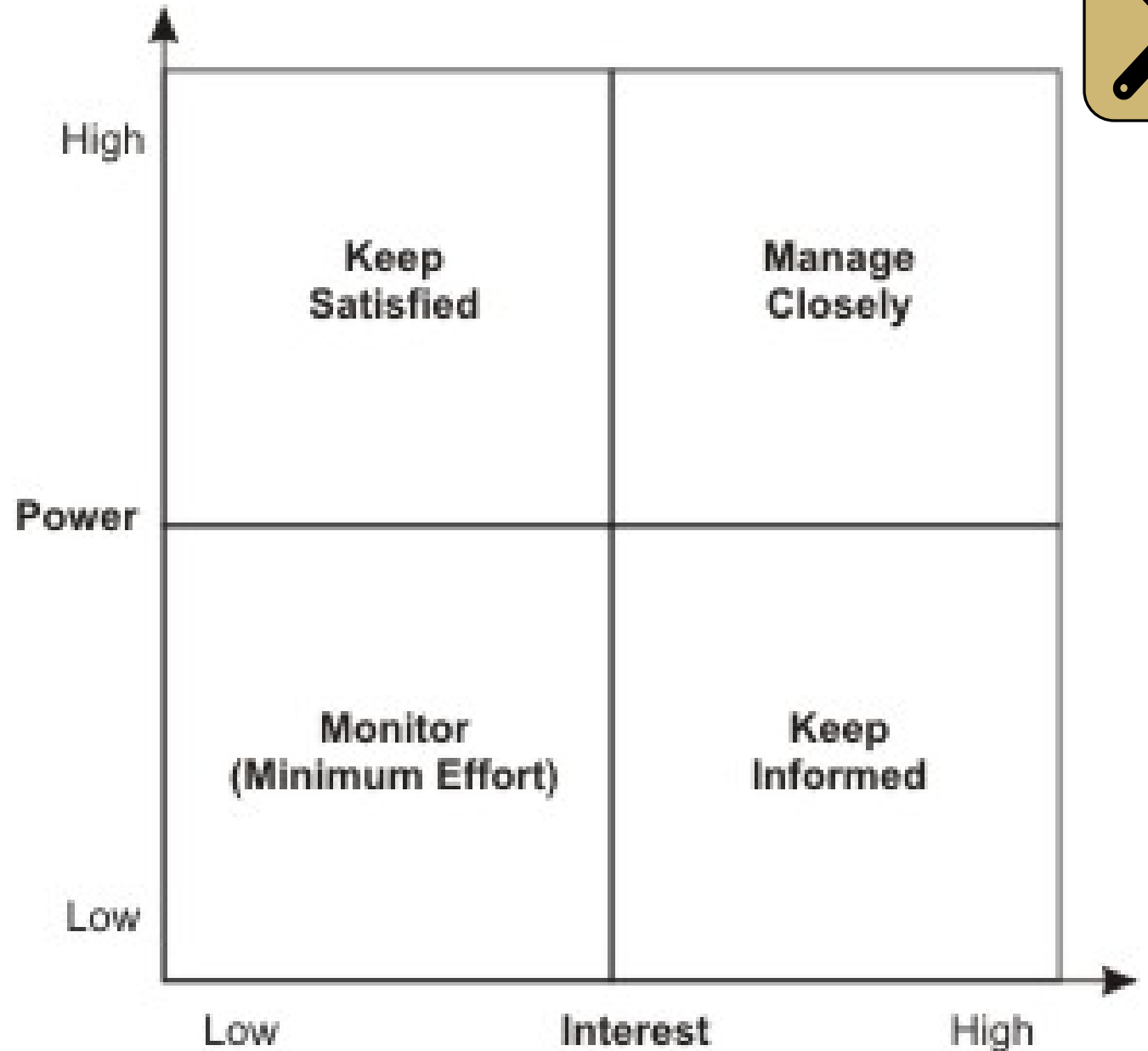
Guiding Coalition
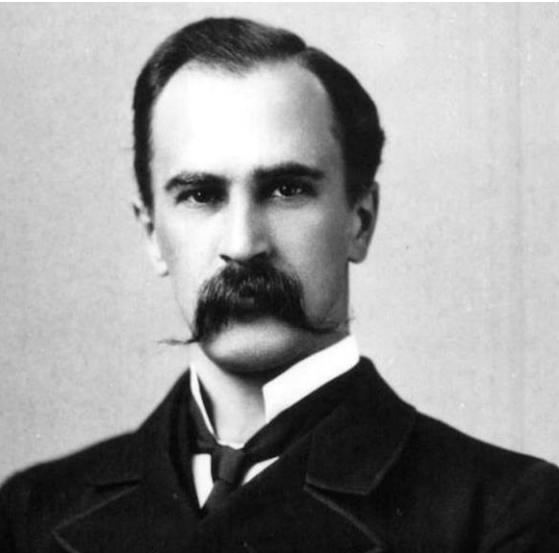
Guiding Coalition
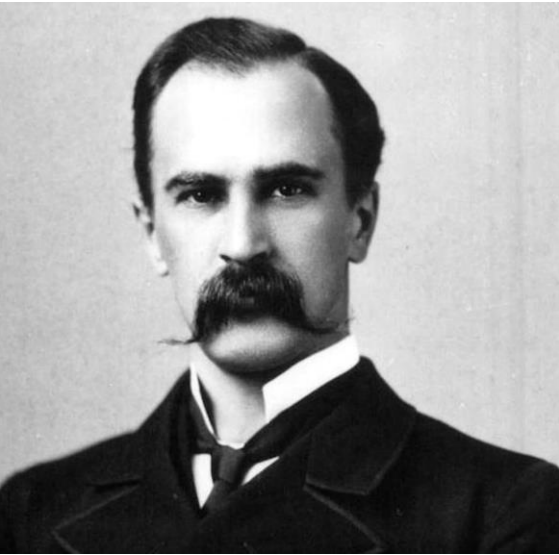
Experts

Naysayers

Cool Kids

Breakout

- Who are your: experts? naysayers? cool kids?
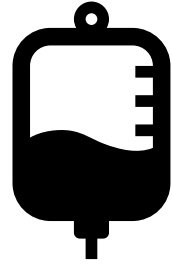
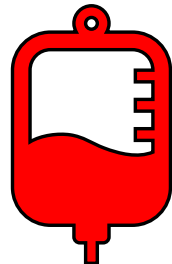University of Colorado **Anschutz Medical Campus** | **IHQSE**

Create a Vision

Communicate

Communicate

The Elevator Pitch

Communicate

Introduction: Who are you?

Hook: What is the problem or opportunity?

Solution: What are you doing about it?

Value proposition: How does this create value for him/her?

Call to action: What next?

Remove Obstacles

Remove Obstacles

Remove Obstacles

Variceal UGIB

(Standard) designates default software selections

Recommendation
- ☑ *Culprit Lesion
- ☑ Return Patient
  - Return area - *(Standard){hospital ward, ICU}*
  - Reason - *(Standard){for observation, for ongoing care, for possible D/C same day etc.}*
- ☐ Transfer Patient
- ☑ Diet, Sequential
  - Initial Diet - *(Standard){Keep NPO, Start a clear liquid diet, Resume previous diet}*
  - Initial Duration - Today, Then Advance
  - Diet Recommendation - *(Standard){clear liquid diet, regular diet...}*
  - *Duration - if stable
- ☐ Diet
- ☑ *Cirrhotic UGIB Octreotide
- ☑ *Cirrhotic UGIB Antibiotics
- ☑ Proton Pump Inhibitor
  - Route - *(Standard){PO, IV}*
  - Frequency - *(Standard){Daily, BID, TID}*
  - *Duration - Post-banding
- ☐ *PPI Cessation (Stop PPI)
- ☑ *Cirrhotic UGIB Post-banding General
- ☐ Resume Anticoags / Antiplatelets - Single
- ☑ *Rebleed General
- ☐ *Rebleed Varices Blakemore/Minnesota
- ☐ *Rebleed Specific
- ☑ Repeat UGI endoscopy
  - Repeat Reason - *(Standard){Check Healing, Evaluate Response to Therapy, Retreatment...}*
  - *Repeat day - 8w GI to order

Post Op Orders

Patient Profile: This is a 30 year old male. Refer to note in patient chart for documentation of history and physical.
Medications:
Moderate Sedation:
Procedure: After obtaining informed consent, the endoscope was passed under direct vision. Throughout the procedure, the patient's blood pressure, pulse, and oxygen saturations were monitored continuously. The Olympus GIF H190 was introduced through the and advanced to the.

Findings: [Varix grade] varices were found [Site]. [Size].
(Standard){Grade I/II/III} *(Standard){Upper/Middle/Lower Esophagus...}* *(Standard){Dimunitive, Small, Medium, Large...}*

Complications:
Estimated Blood Loss:
Impression: *(Free Text)*
Recommendation:
- Source of blood loss likely due to [Lesion].
- Return patient to [Return area] [Reason].
- [Initial Diet] today, then advance as tolerated [Diet Recommendation] if stable.
- Complete octreotide drip for 72h then stop.
- Complete antibiotic course for total 7 days for upper GI bleed in cirrhosis.
- Use a proton pump inhibitor [Route] [Frequency] for post-banding bleeding prophylaxis, until varices eradicated, then stop unless otherwise indicated.
- Avoid instrumentation of esophagus this hospitalization including NG and OG tubes given risk of dislodging bands.
- If hemodynamically significant rebleeding, please notify GI service.
- Repeat upper endoscopy in 8 weeks (GI to order) [Reason].

Additional Images:
Procedure Code(s):
Diagnosis Code(s):

Post Op Orders:

Patient Instructions:

CC Letter to:

Attending Dr. Participation:

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Yen T, et al. Optimizing Endoscopy Procedure Documentation Improves Guideline-Adherent Care in Upper Gastrointestinal Bleeding. *Dig Dis Sci*. 2023;68(6):2264-2275.

Remove Obstacles

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Short Term Wins

Celebrating Wins: Wea-ner of the Month

Credibility
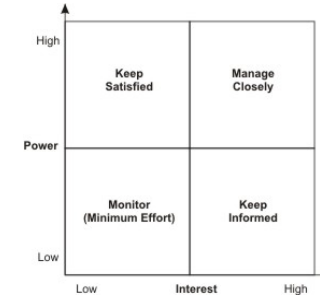Momentum

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Embed it in the Culture

Culture Change
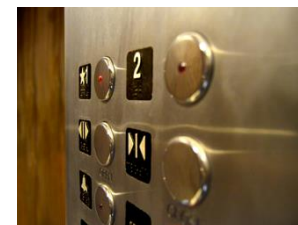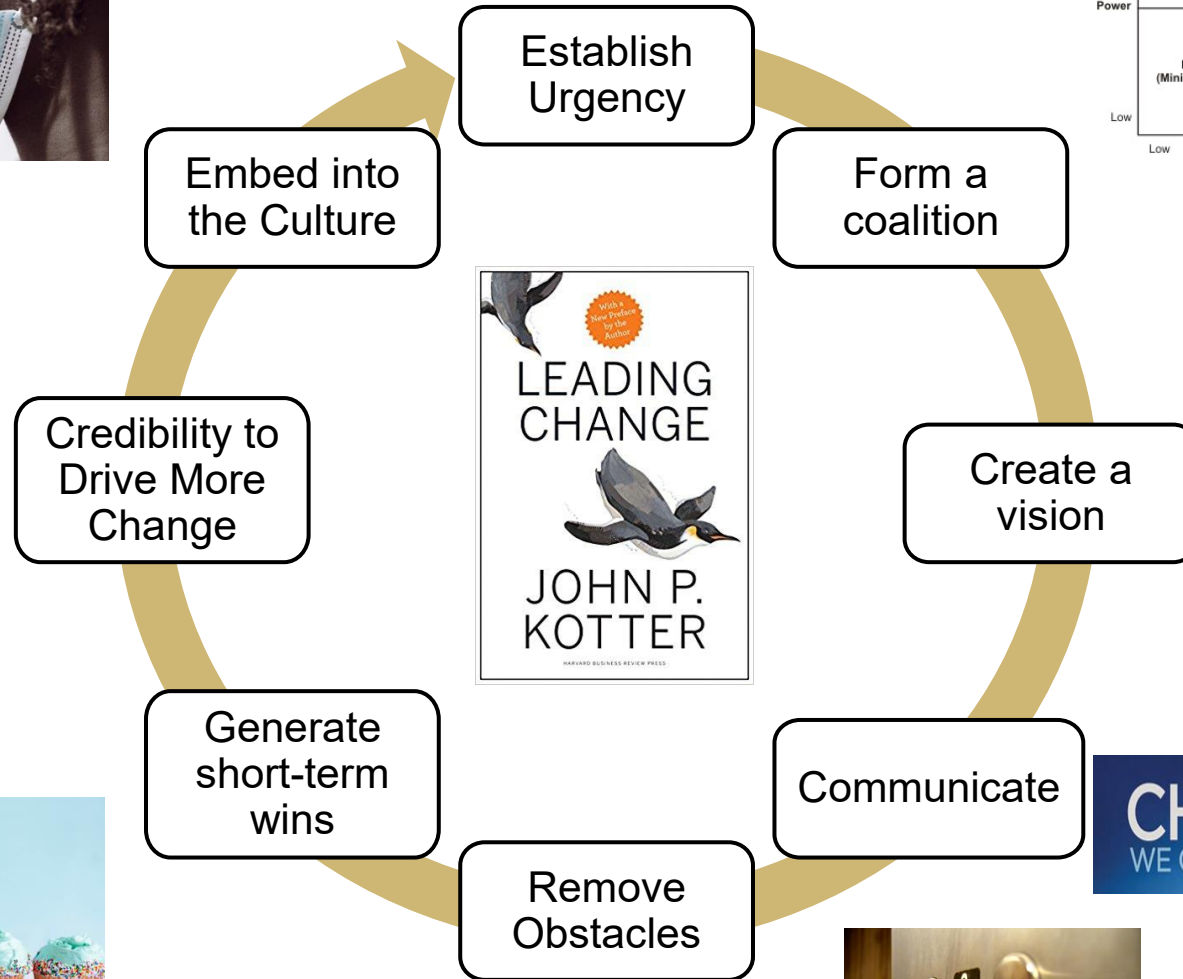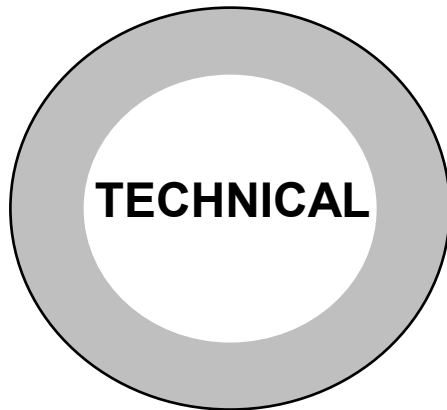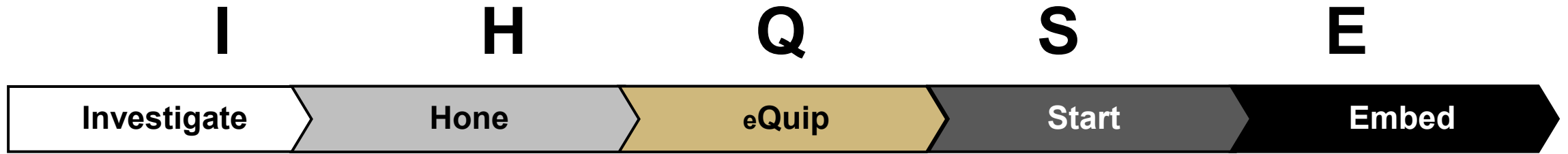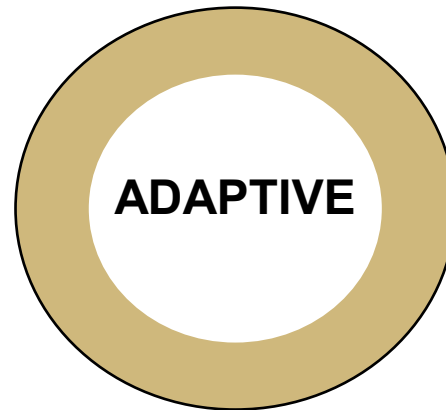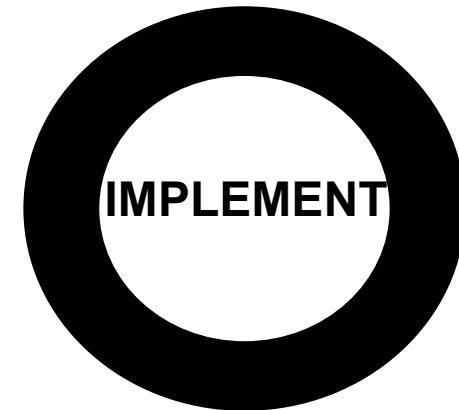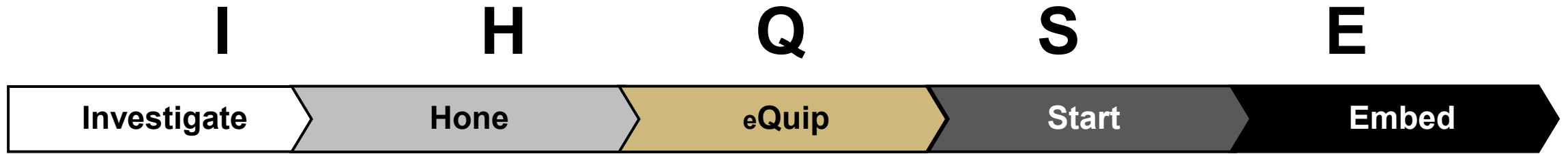
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Embed into the Culture

LEADING CHANGE
JOHN P. KOTTER

TARGET ZERO
ELIMINATING PREVENTABLE HARM

CHANGE
WE CAN BELIEVE IN

"Model for Change"

I H Q S E

Investigate	Hone	eQuip	Start	Embed
❑ Search literature	❑ Apply Pareto Principle	❑ Create Sense of Urgency	❑ Pilot Intervention	❑ Track Run Charts, SPC
❑ Acquire Baseline Data	❑ Assess Positive Deviants	❑ Align with the Vision	❑ Ignite Awareness	❑ Remove New Barriers
❑ Capture Voice of Customer	❑ Use Hierarchy of Interventions	❑ Build Motivation Plan	❑ Launch Intervention	❑ Celebrate More Wins
❑ Capture Voice of Business	❑ Perform Design Thinking	❑ Apply Diffusion of Innovation	❑ Apply Motivation & Diffusion	❑ Reconcile Business Case
❑ Create Problem Statement	❑ Identify 2 - 3 interventions	❑ Identify & Remove Barriers	❑ Track Data and Refine	❑ Present to Stakeholders
❑ Analyze stakeholders	❑ Determine Research or QI	❑ Address Resistance	❑ Recognize New Resistance	❑ Disseminate Project Work
❑ Complete Process Map	❑ Create Effort/Impact matrix	❑ Craft Awareness Campaign	❑ Celebrate Short-term Wins	❑ Create sustainment plan
❑ Create Affinity Diagram	❑ Complete Equity Analysis	❑ Create Logo	❑ Credibility for More Change	
❑ Identify Key Metrics	❑ Craft Well-Being Analysis	❑ Create Short-term Wins		
❑ Build a Business Case	❑ Create Data Plan			
❑ Create Aim Statement	❑ Complete Pre-mortem			
	❑ Finalize Implementation Plan			

"Survival is optional. No one has to change."

W. Edwards Deming