

Effective Infection Prevention Change Strategies

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Disclosure

- I have no actual or potential conflicts of interest to disclose

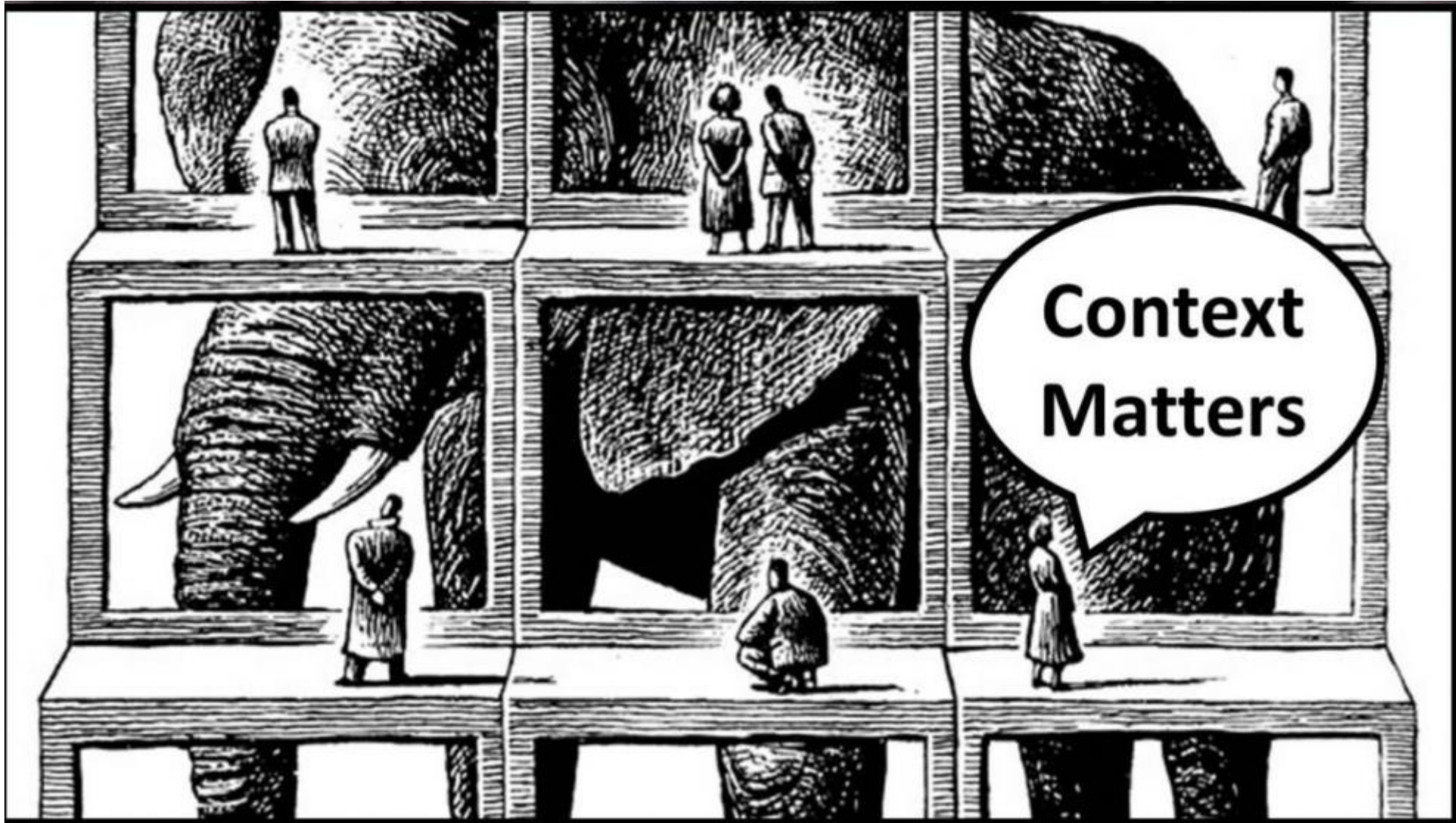
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- Implementation Chapter Writing Group
 - **Josh Schaffzin (many shared slides)**, Sean Berenholtz, Valerie Deloney
- SHEA and partners

Learning Objectives

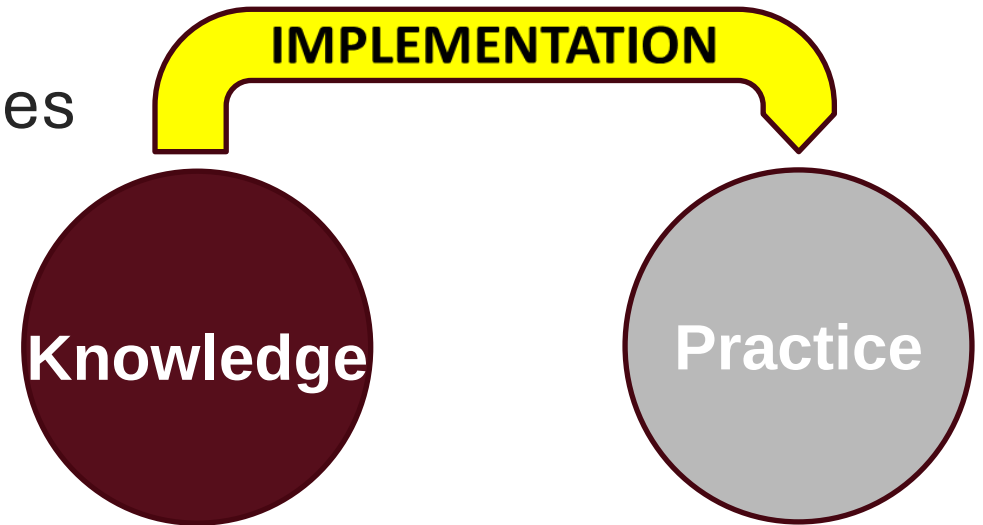
After this session, participants will be able to:

- Delineate the difference between implementation science and quality improvement
- Explain why understanding context is essential when implementing practice
- Develop and incorporate a standard approach to implementing HAI prevention interventions in healthcare institutions
- Discuss implementing a single framework across Montana acute care hospitals



Why do we Need Implementation?

- Knowing-Doing Gap
 - Estimated 17yr to implement evidence
 - Implementation can bridge the two
- Regulatory expectation
 - To implement evidence-based policies



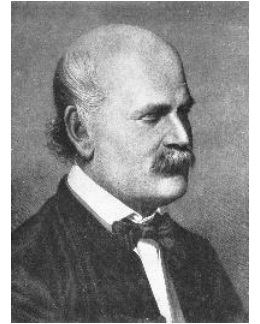
Balas and Boren (2000)
Grant et al (2003)
The Joint Commission (2021)

Terminology

- Implementation science
 - “The scientific study of **methods** to promote the systematic uptake of research findings and other evidence-based practices into routine practice.”
 - Directs us to evaluate contextual determinants of behavior to design more successful, customized interventions
- Implementation in practice (Quality Improvement)
 - “The systematic uptake of research findings and other evidence-based practices into routine practice”

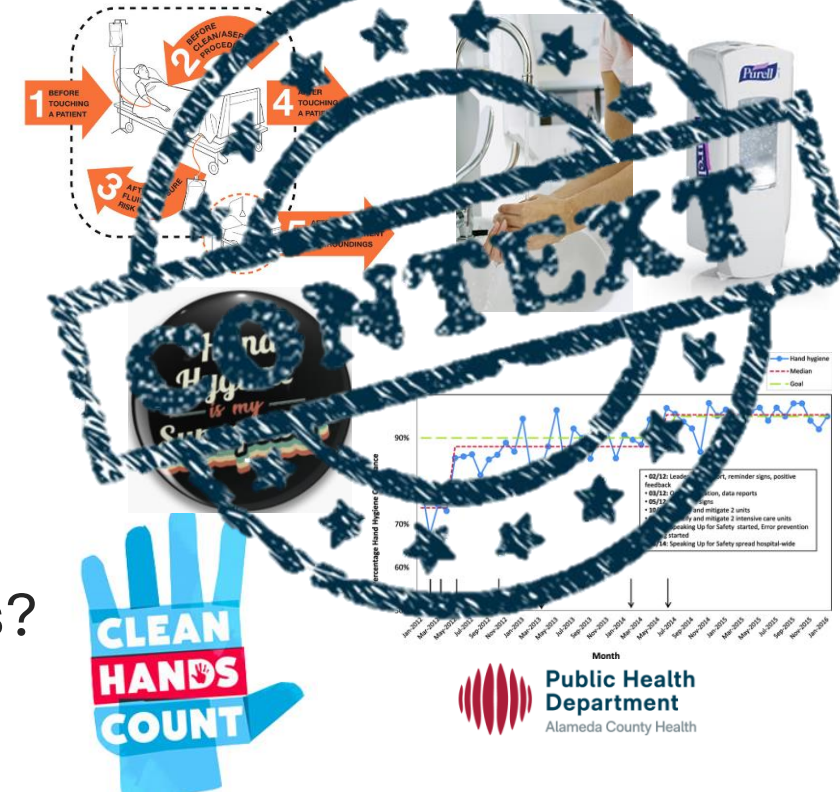
Terminology

- Example: Hand Hygiene (HH)
 - Evidence shows that hand hygiene prevents disease transmission
 - You need your providers to perform hand hygiene
 - Implementation Science
 - How should HH be performed?
 - How should adherence be measured?
 - What materials are necessary for HH?
 - What motivates people to perform HH?
 - What are facilitating factors? Barriers?
 - Quality Improvement
 - Which methods will work best for my providers?



Semmelweis
(1847)

Your 5 Moments for Hand Hygiene



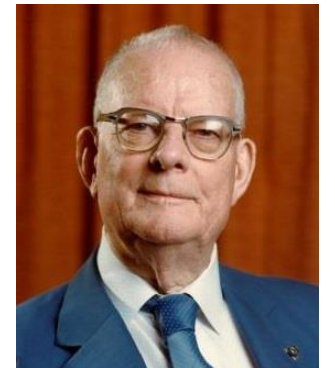
Eccles & Mittman (2006) Saint et al (2010)

Tomoaia-Cotisel et al (2013) Geerligs et al (2018) Kaplan et al (2010)

System vs Individual

- Organizational structure dictates performance
 - Systems work toward a steady state
 - “Systems operate the way they are designed to operate”
- Working harder vs working better
 - No amount of effort can change system design
 - “A bad system will beat a good person every time”
- Red bead experiment

IHI Demonstration Video – Red Bead Experiment:
https://youtu.be/oMb_UKYHvto?si=xB6mVslnjmzcZShS



W. Edwards Deming



The many lessons of the Red Bead Experiment

- It's the system, not the workers.
- Since top management owns the system and quality is the outcome of the system, quality must start with management.
- Numerical goals and production standards can be meaningless.
- By using reward and punishment, management was tampering with a stable system.

The many lessons of the Red Bead Experiment

- Extrinsic motivation is not effective.
- A process can be stable, in-control and be producing defective items 100% of the time.
- Rigid and precise procedures are not sufficient to produce the desired quality.

The many lessons of the Red Bead Experiment

- Slogans and posters are useless.
- Superstitious knowledge can affect decisions.
- People are not always the dominant source of variability.

Working Harder vs Working Better

- Optimizing tomato production
 - You want market-ready product from seed to fruit in 2 weeks
- Existing System Constraint
 - It is biologically impossible to produce a tomato in <30 days
- Strategies to improve production
 - Positive – Incentives, swag, competition
 - Negative – Pay cuts, lay-offs
- The goal cannot be achieved unless you modify the system
 - Genetic intervention (cross-breeding)
 - Invent equipment (soil, environment)



Small Group Discussion

Discussion

- Imagine your workplace. Are there times you feel that you have no control over the outcomes?
- Do you take time to discuss issues in your system that leave you feeling as though outcomes are beyond your control?
- In which situations do you feel that management has “tampered” with the system rather than fixed the problem

Observation and Qualitative Evaluation

- ‘Going to the Gemba’
 - Real-world, real-time observation
 - Direct engagement with people and process
 - Collect data, not solutions

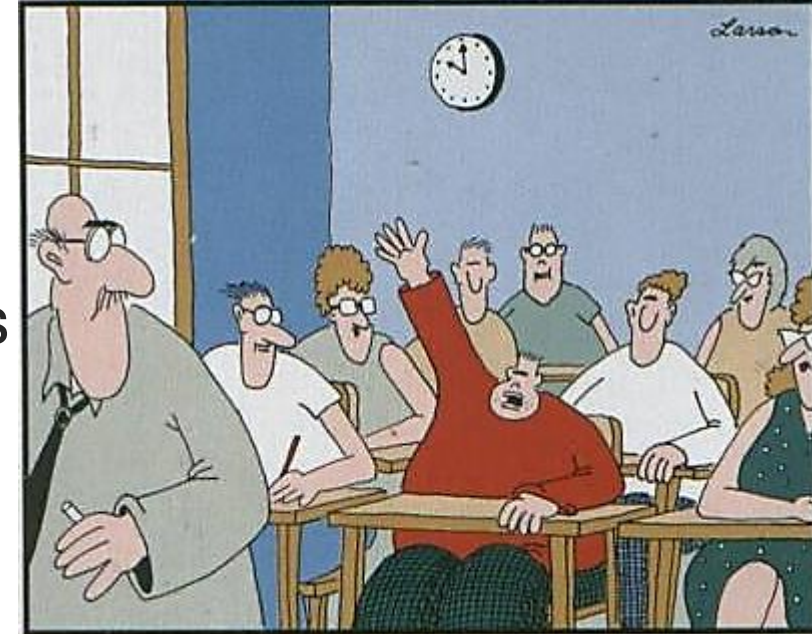


Reliability

- How often a process happens as it is supposed to
 - Percent success or failure
- Systems can be highly reliable but humans cannot
 - Person-Dependent systems are unreliable
- Creating reliability requires purposeful design and maintenance
 - Forced-function
 - Automation
 - Standardization
 - Constant evaluation/observation

Education is a Low-Reliability Intervention

- **Necessary but insufficient**
 - Relies on memory and vigilance
 - Requires repetition and practice
 - May not account for different learning styles
- Prone to failure
 - Cannot fix lapses in concentration
 - Does not change habits
 - May not affect external pressures



Mr. Osborne, may I be excused? My brain is full.

Education has Low-Reliability - Examples

- Driving, Skidding, and Breaking
 - Taught – pump breaks, turn into skid
 - Reliable fix – Anti-Lock Brakes
 - Mandatory on all cars



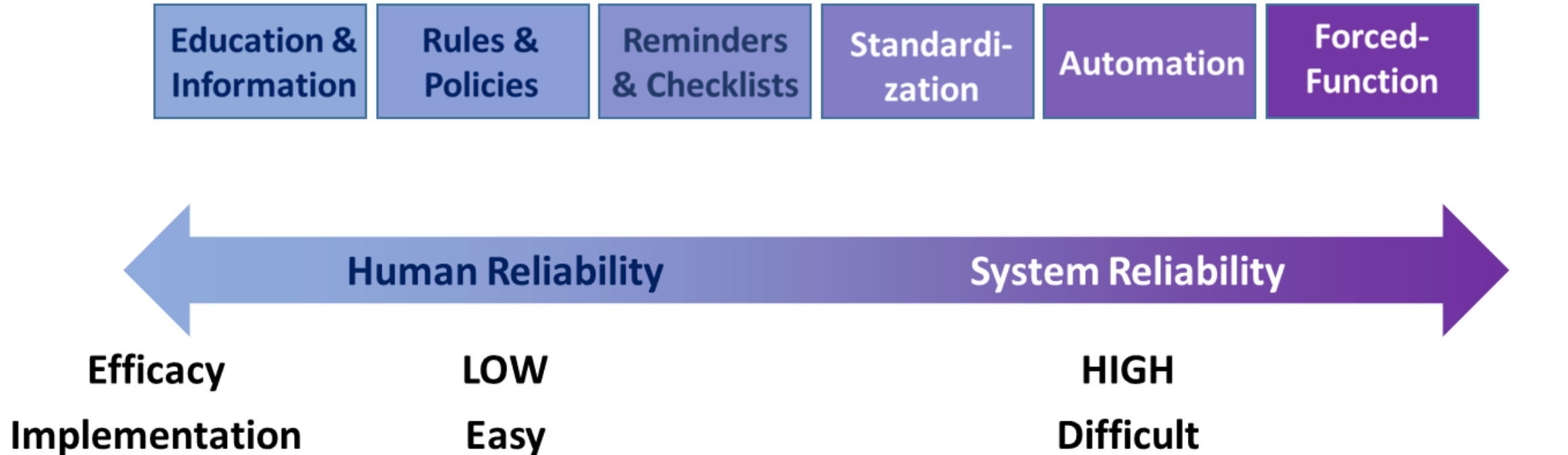
Education has Low-Reliability - Examples

- Hand hygiene
 - No lack of data
 - No lack of education
 - Why do we see lack of adherence?

69% of failures not related to education

Domain	Count (%) N=207	Themes/Examples
Memory/Attention/ Decision Making	87 (42%)	Forgot Preoccupied/distracted In a rush
Knowledge	55 (26%)	- Gloves are adequate - Unaware of need
Other	31 (15%)	Don't know why 'Oh!' Apologized
Environment/ Resources	18 (9%)	Too busy Not within reach
Consequence Beliefs	6 (3%)	- Alcohol dries hands
Nature of Behaviour	5 (2%)	Habit
Skills	2 (1%)	- Out of practice
Emotions	2 (1%)	Bad morning
Social Norms	1 (<1%)	- Different from what peers say

Interventions and Reliability



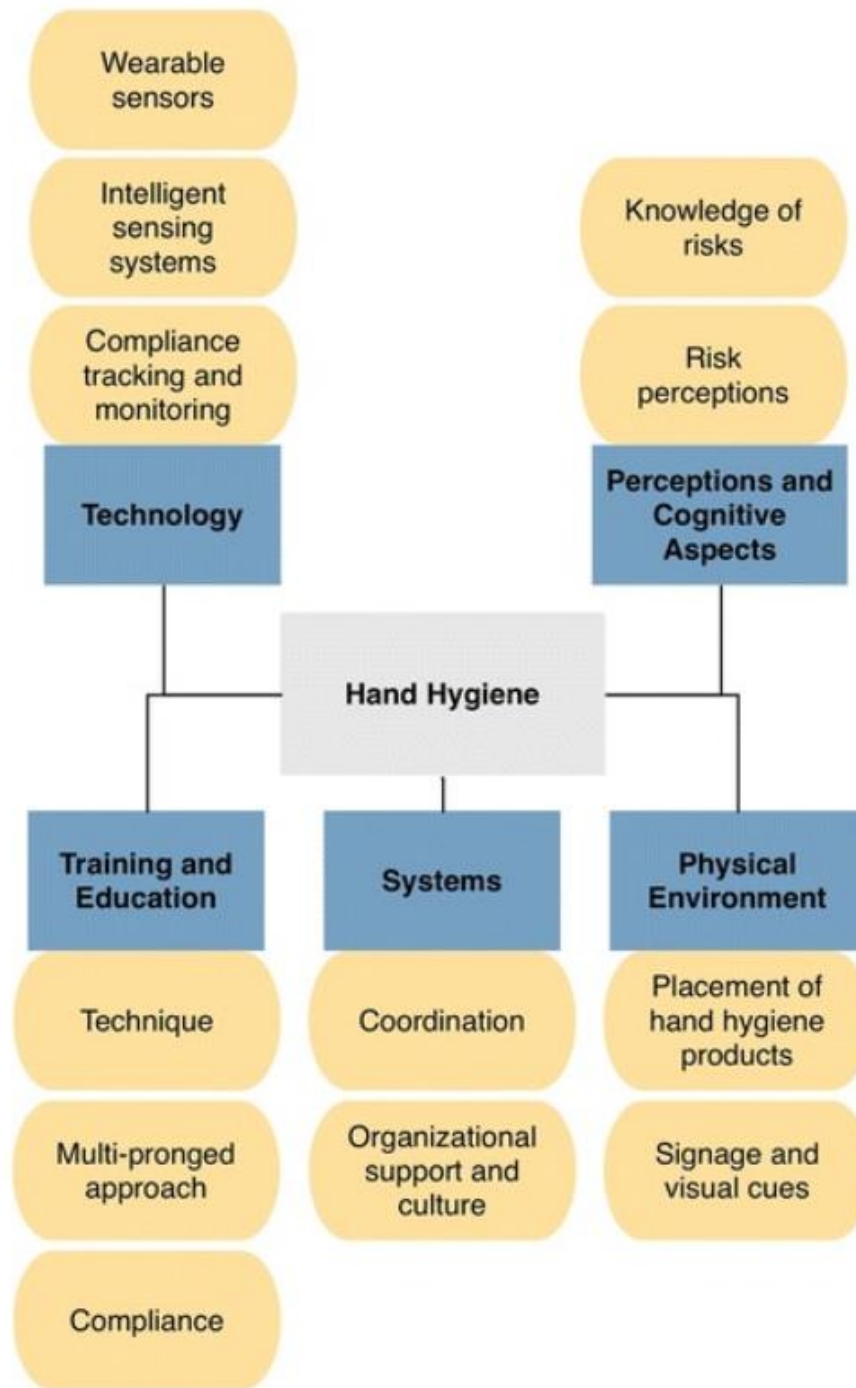
Adapted from ISMP Hierarchy of Effectiveness



<https://www.ismp.org>

Human Factors E

- What it IS
 - The interaction
 - Includes techn
 - Supports work limitations of w
 - Standardizing p behaviors”
- What it IS NOT
 - How humans t
 - Humans makin



surroundings
al structure
ties, needs, and
as as “normal

Human Factors Engineering

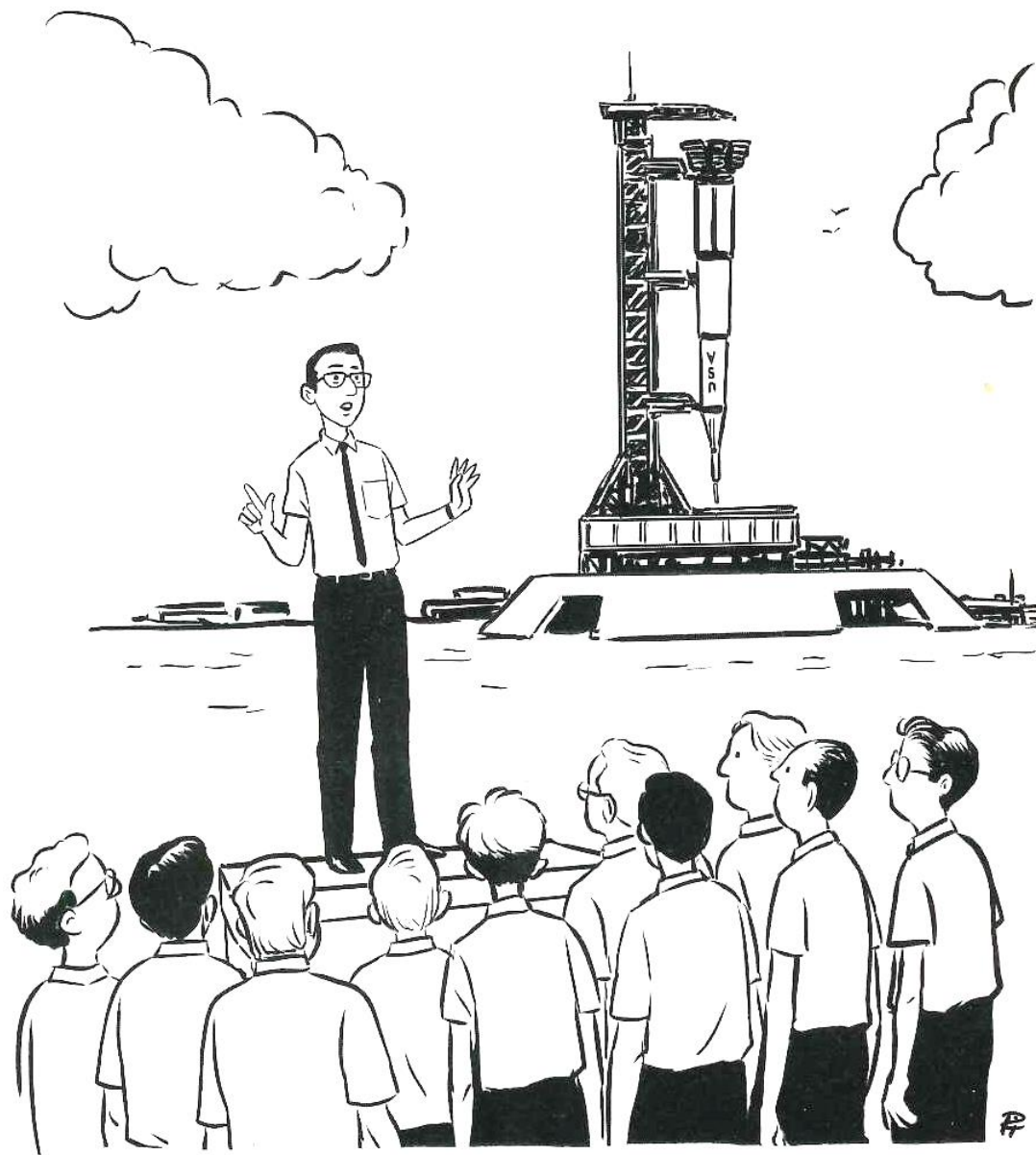
- Color matters
- Color as a signal of content/product



Discussion

Describe your previous/ongoing QI projects

- 1) What was the project and who was the audience you were helping?
- 2) Describe something that worked
- 3) Describe something that didn't work
- 4) Describe the team that was assisting to implement the change strategy
- 5) What could you have done differently?



"Now, we're not going to use the word 'blame.'"

Implementation Science in Practice

Implementation Science

Key pieces needed to succeed

- Team
- Context and Determinants
- Measures
- Framework

QI in Practice

Key pieces needed to succeed

- Team
 - Can form at any time
 - Frontline stakeholders, influencers and leaders, technical support
 - Team membership is fluid
- Context and Determinants
- Measures
- Framework

The Importance of Context

- Context is:
 - Operational support
 - Informatics resources
 - Familiarity and experience
 - Willingness to change
 - Safety culture
 - Healthcare workforce
 - Patient population
 - Existing efforts
 - And more...
- Directly influences implementation plan
 - Choice of what and how to implement
 - Interventions need to match context
- Understanding context can be tricky
 - Experience vs Clean slate
 - External appearance vs Internal reality



Implementation Science in Practice (QI)

Key pieces needed to succeed

- Team
- Context and Determinants
- Measures
- Framework

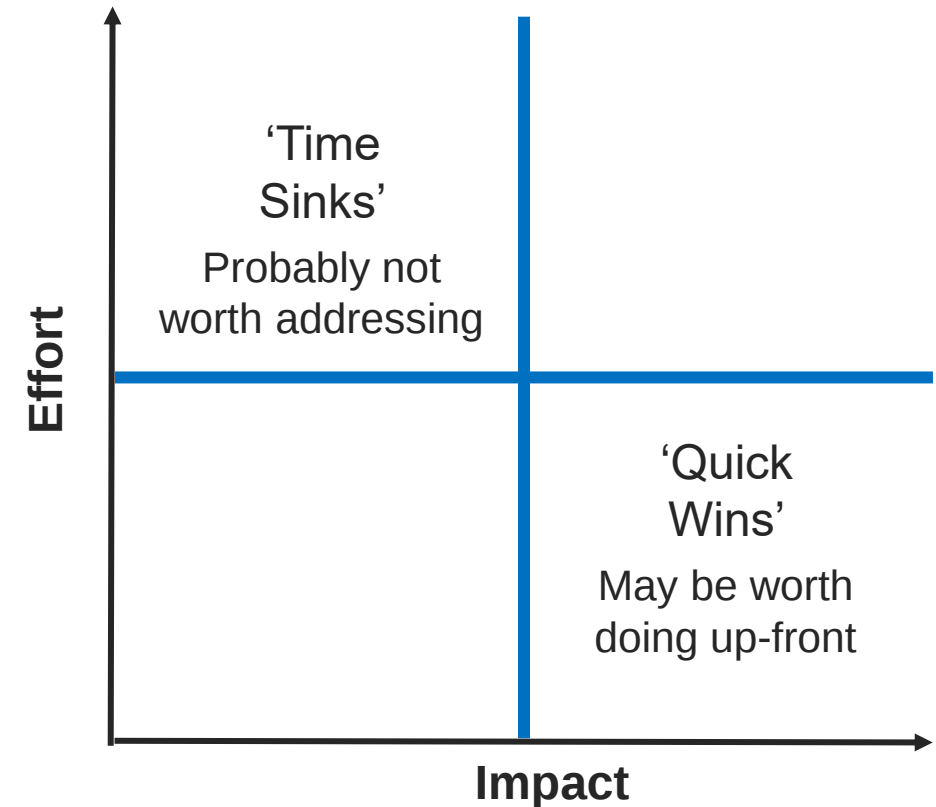
Determinants

- Factors influencing a practice or change
 - Facilitators – promote a practice or change
 - Barriers – hinder practice or change
- Levels to assess
 - Individual – Preferences, needs, attitudes, knowledge
 - Facility – Team composition, communication, culture, resources
 - Partners – Degree of support and buy-in
- How to identify
 - Literature
 - Direct observation
 - Conversations



Determinants - Prioritization

- May be helpful to address by stratifying:
- Feasibility
 - Team vs Unit vs System level
 - Precedent vs none
 - Funding
- Timeline
 - Quick vs prolonged to affect
- Urgency
 - Align with strategic plan
 - Safety or regulatory issue



Determinants Example – SSI Prevention

- Project: Implement SSI prevention bundle for all surgeries
- Facilitators
 - Surgical and perioperative champion(s)
 - External collaboration – SPS, NSQIP
- Barriers
 - Large set of complex micro-systems
 - Who makes final decisions?
 - Resistance to change
 - Long time to show impact
 - Other competing projects

Implementation Science in Practice (QI)

Key pieces needed to succeed

- Team
- Context and Determinants
- Measures
- Framework

Measures

- Data to show progress (or lack thereof)
- Measures should be appropriate
 - To address the question being asked
 - For implementation method used
- Rapid turnaround
 - Automation of any or all steps
- Impactful
 - Data that matters to your context



Aims and Measures

Two types of aims

1. Global Aim – Very big picture
2. SMART Aim - Project-directed

Three types of measures

1. Outcome – ultimate goal
 - What you are trying to prevent or improve
2. Process – action reliability
 - What you have put in place to achieve the outcome
3. Balancing – undesired outcome of change
 - Unintended harm, the cost of your project (safety, stress, etc)

Specific
Measurable
Actionable
Realistic
Time-based

Aims & Measures Example – VAP Prevention

- Global aim: Eliminate all VAPs
 - SMART Aim: To reduce the VAP rate from 3.0% to 2.4% by December 31
- A**ctionable **M**easurable **R**ealistic
20% reduction **T**ime-based
- Project: Implement VAP prevention bundle for all intubated patients

Measures

- Outcome – VAPs
- Process – Bundle reliability
- Balancing – Reintubation
 - Early extubation is a bundle component
 - Do not want to do too soon (leads to reintubation)

Framework

Methodology to help organize efforts and interpret results

- Choosing a framework
 - Practical:
 - What is local expertise/experience? Available resources? Timeline?
 - Methodologic:
 - What is the outcome you are trying to achieve?
- Many published frameworks
 - Some have books and materials ('How To')
 - All require some expertise (qualitative research/coding, survey development and analysis)

Standard Approach - Framework

- Principles and evidence summarized for 9 published frameworks
 - More exist
 - Hybrid approach
- Resources to help choose
 - Context – local expertise, consultant help
 - Included with each described framework
 - Online databases
 - **ERIC** Expert Recommendations for Implementing Change
 - **CFIR** Consolidated Framework for Implementation Research
 - **RE-AIM and PRISM** Practical Implementation Sustainability Model

Reach
Effectiveness

Adoption
Implementation

Maintenance

Framework Examples

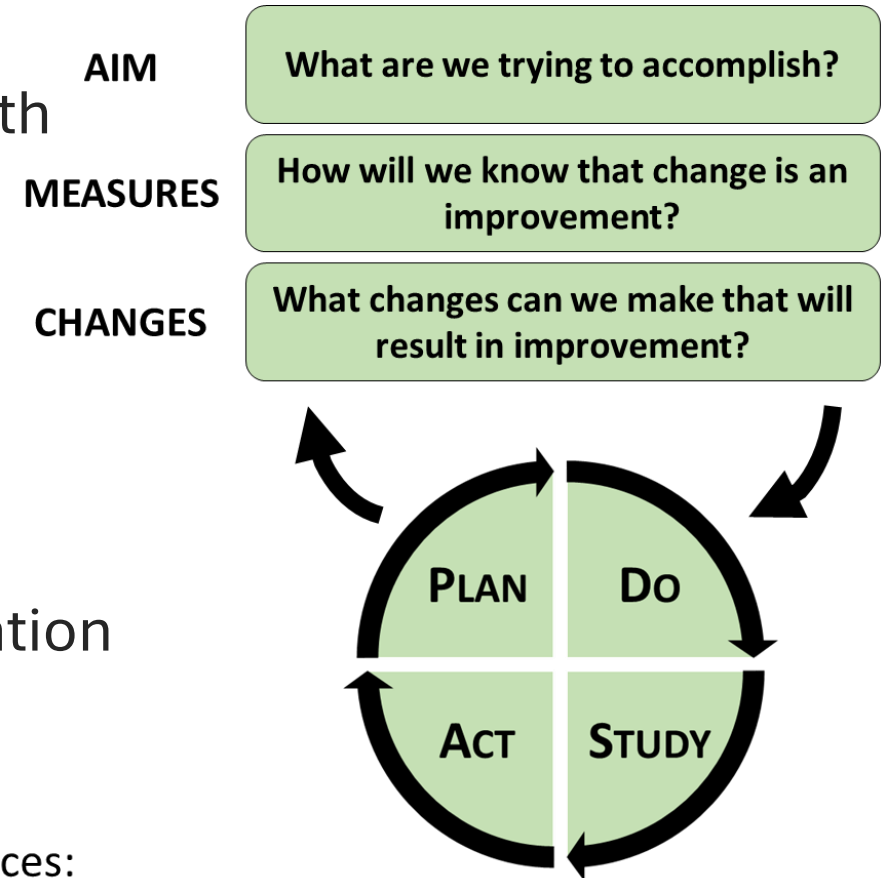
- SHEA Compendium Chapter

Table 3. Implementation Frameworks

Framework	Published Experience	Resources
4Es	Settings - Healthcare facilities - Large-scale projects including multiple sites Infection prevention and control - HAI Prevention (including mortality reduction and cost savings)	4Es framework³⁰ - HAI reduction^{32–34} - Mortality reduction³⁵ - Cost savings³⁶
Behavior Change Wheel	Settings - Community-based practice - Healthcare facilities Healthy behaviors - Smoking cessation - Obesity prevention - Increased physical activity Infection prevention and control - Hand hygiene adherence - Antibiotic prescribing¹⁷⁹	- Behavior Change Wheel: A Guide to Designing Interventions - Stand More at Work (SMART Work)⁴¹
CUSP	Settings - Intensive care units - Ambulatory centers Improvements	- CUSP Implementation Toolkit - AHA/HRET: Eliminating CAUTI (Stop CAUTI) - AHRQ Toolkit to Improve Safety in Ambulatory Surgery Centers

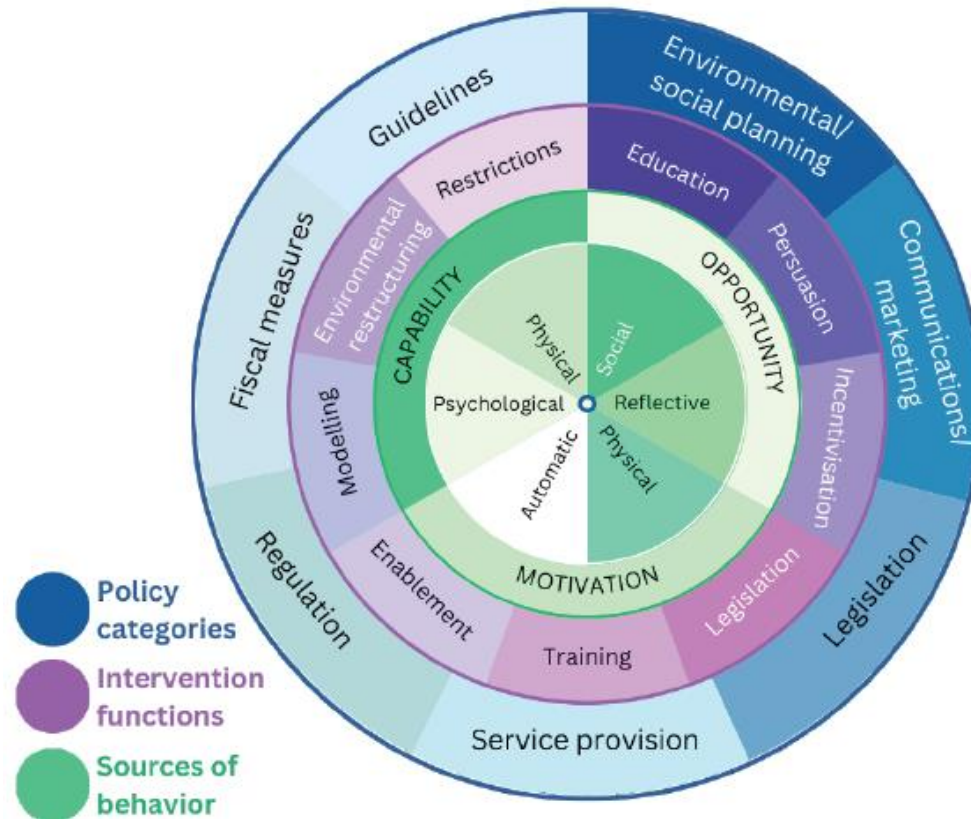
Framework Example – Model for Improvement

- Used widely in healthcare, IP&C, Public Health
- Change vs change resulting in improvement
- 3 questions to develop hypothesis
- PDSA cycles to experiment and modify
- Designed for team-driven projects
- Relies heavily on data analysis and interpretation
 - Statistical process control



- Act has 3 choices:
 - Adopt – Incorporate into system as-is
 - Adapt – Modify and retest
 - Abandon – Move on to other interventions

Framework Example – Behavior Change Wheel



Been used successfully in health promotion efforts such as smoking cessation; COM-B used to investigate HH adherence and antibiotic prescribing

- Links interventions with targeted behaviors
- Michie et al. evaluated 19 existing behavior change frameworks for comprehensiveness (i.e., applicability to any intervention), coherence, and link to a behavioral model to create a 3-layered tool.
- Components:
 - COM-B (Capability, Opportunity, and Motivation to change Behavior)
 - Nine intervention functions that can be used to affect behavioral change
 - Seven policy categories that enable or support interventions to enact the desired behavior change

COM-B Model for Behavior Change

- Capability – can this behavior be accomplished in principle
 - Individual's physical and psychological ability to participate
- Opportunity – is there sufficient opportunity for the behavior to occur
 - External factors that make the behavior possible - social and physical
- Motivation – is there sufficient motivation for the behavior to occur
 - Conscious and unconscious cognitive processes that direct and inspire behavior to occur - automatic and reflective

BCW: Motivate LTCF Providers to Improve Antibiotic Prescribing

- Behavior Change: Improve Antibiotic Stewardship Programs in LTCFs
- Who: all LTCF providers including RNs
- What: Optimize use of antibiotics
- When: During LTCF stay
- Where: in LTCF
- How: Initiate antibiotics only if clinical criteria for infection is met and not just when there is a positive test result

Use COM-B Construct to Assess Individual-level Barriers

- Physical capability – none
- Psychological capability – Do providers and RNs have the knowledge of which symptoms indicate bacterial vs. non-bacterial infection, colonization vs. infection?
- Physical opportunity – Do providers have opportunity to assess residents themselves when there is a change in condition?
- Social opportunity – culture of antibiotic prescribing in LTCF
- Reflective motivation – Providers are concerned about missing bacterial infection and consequence
- Automatic motivation – reflex response with good intention (prescribe so that they don't get infected)

COM-B/BCW

- Select interventions to address each key barrier:
 1. Educate RNs to utilize Minimum Criteria for Antibiotics Toolkit so they develop their own assessment and plan when d/w providers (physical opportunity)
 2. Inform families and residents upon admission that LTCF practices antibiotic stewardship (social opportunity)
 3. Ensure ASP well-defined and specific programmatic goals (e.g. ordering less urine cx) (reflective motivation)

The most dangerous phrase in
the language is
"We've always done
it this way."

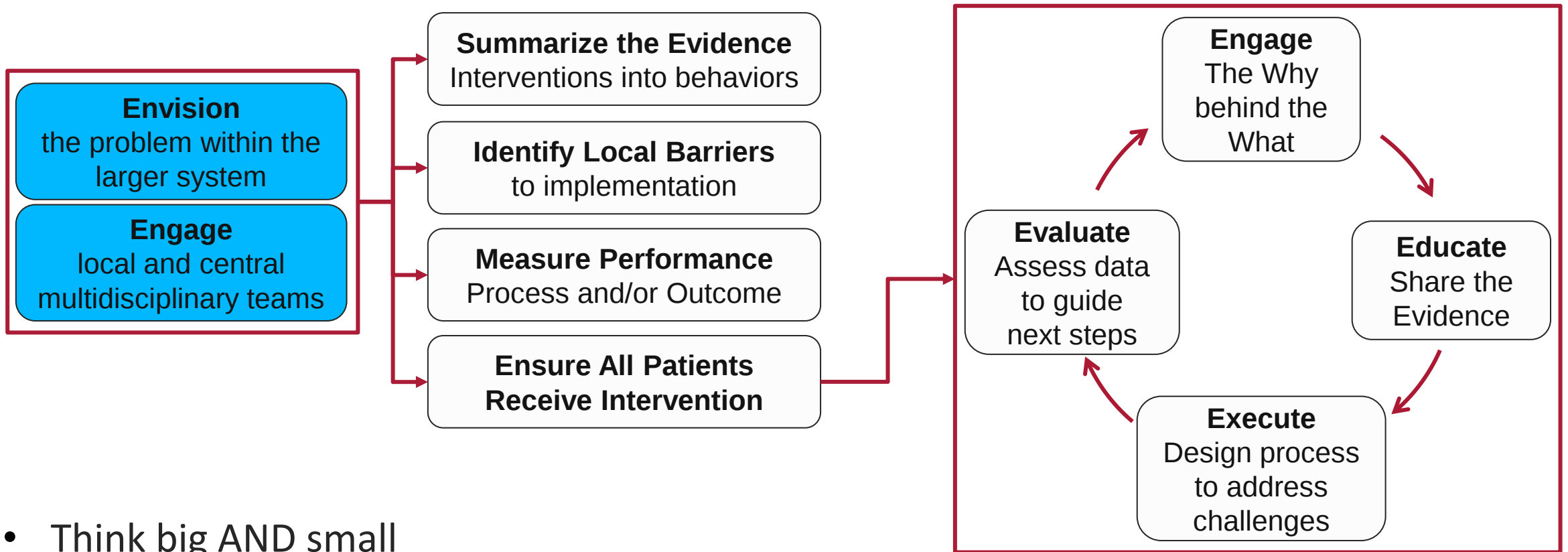
Adm(Ret) Grace Hopper, PhD



somee cards
user card

4Es

Framework Example – 4Es



- Think big AND small
- Identify barriers and facilitators (roadmap)
- Measure and report

Pronovost et al (2008)
Cabana et al (1999)

Examples of 4Es

- Well-suited for large-scale projects and projects that include multiple sites
- Helps teams to partner in the implementation process (hospital leaders, improvement team leaders, frontline staff)
- Cyclical nature allows for feedback to drive modifications and adaptations
- Provides a guide for resolving knowledge gaps through education
- Does not include targeted strategies to address multilevel barriers that may hinder implementation

Settings and Improvement with 4Es

- Settings:
 - Healthcare facilities
 - Large-scale projects with multiple sites
- Improvements:
 - CLABSI prevention
 - CAUTI prevention
 - Mortality reduction
 - Cost savings

Summary

- Implementation Science vs Quality Improvement
 - Implementation Science – How and why interventions may work
 - Quality Improvement – Making interventions work in a specific context
- Be systematic and scientific
 - No assumptions (Don't start with interventions)
 - Direct observations ('Go to the Gemba') - Understand your context
- Education is a low reliability intervention
 - Necessary but not sufficient



Essentials for Success

- Team
- Knowing context and determinants (Barriers/Facilitators)
- Proper measures (Process, Outcome, Balancing) and framework

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