

What is Implementation Science? Implications for Conducting Antimicrobial Stewardship Research

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Nothing to disclose



Objectives

- To review how implementation science can advance the goals of antimicrobial stewardship.
- To introduce a classification scheme for implementation strategies.
- To understand the rationale for and measurement of implementation outcomes.
- To apply our new understanding of implementation strategies and outcomes to a real-life example of antimicrobial stewardship across a large healthcare system.

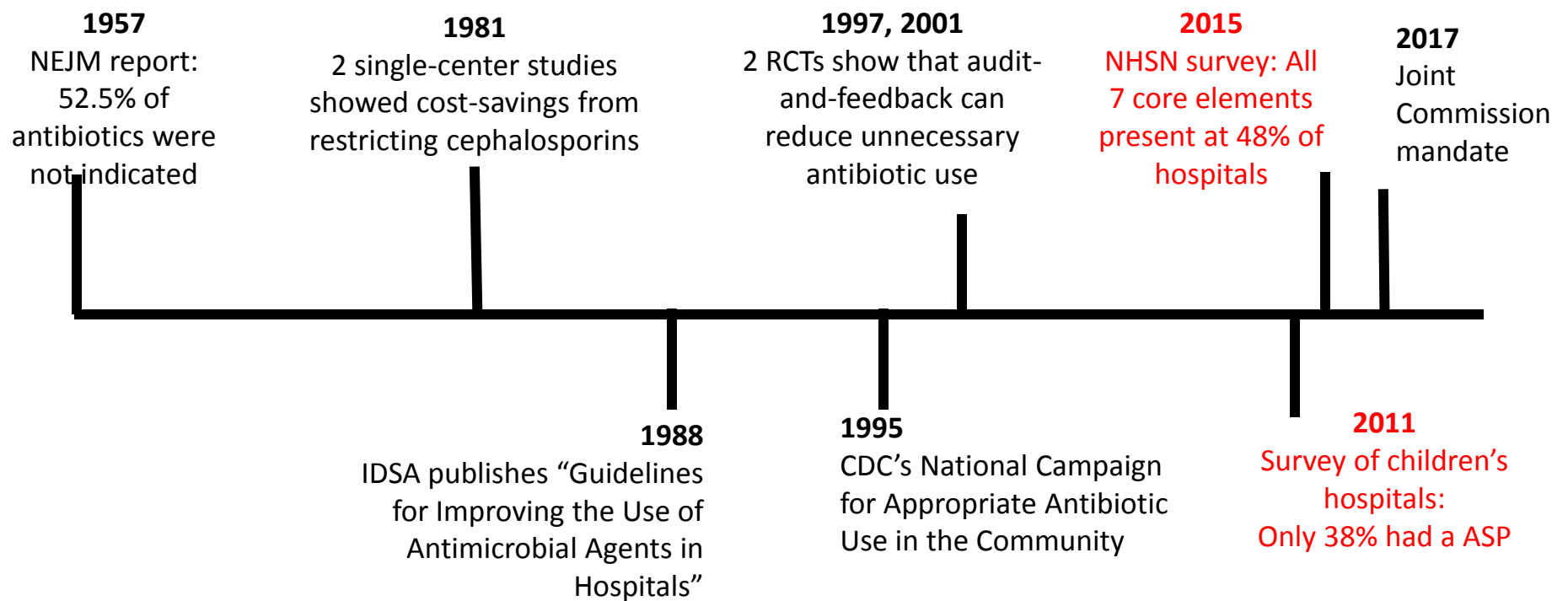
The Need to Study Implementation

On average, it takes 17 years for evidence-based practices to be incorporated into routine care.



Balas EA, Boren SA, *Yearb Med Inform* 2000, 1: 65-70; Bauer MS, et al. *BMC Psychology* 2015, 3:32

Another Example of Time-Lag: Translating Research Evidence and Public Health Priorities into Local Stewardship Practice



Strategies to promote the uptake of evidence-based practices for stewardship are needed

Newland JG, et al. ICHE 2014; 35(3):265-71.
O'Leary E, et al. Clin Infect Dis 2017; 65: 1748-40.

Defining Implementation Science

Definition: “The scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice, and, hence, to improve the quality and effectiveness of health services” (Eccles MP, Mittman BS. Implement Sci 2006; 1:1.)

Implementation scientists want to know:

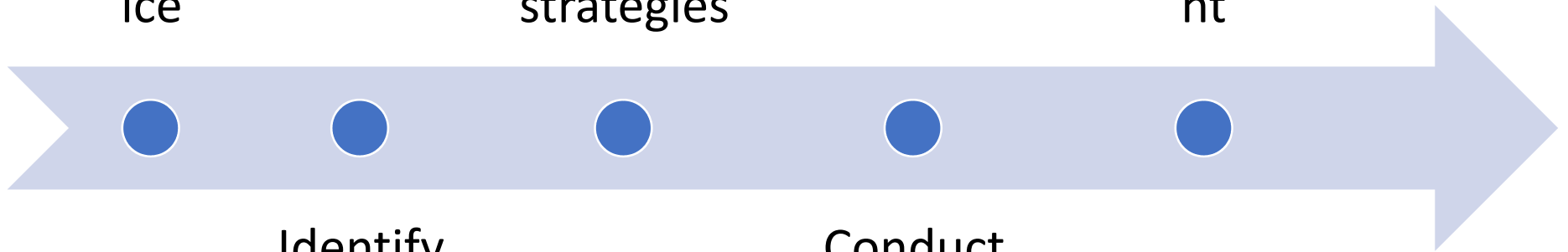
- 1) why evidence-based practices are adopted,
- 2) how they’re adapted to fit a specific context, and
- 3) how the pace of adoption can be accelerated.

Research to Practice Pipeline: Quality Enhancement Research Initiative (QUERI)

establish evidence base and practice

Identify and develop implementation strategies

large-scale implementation project and sustainment



Identify gaps in practice uptake and

Conduct trial of implementation strategies

*Watch for an upcoming ICHE paper that uses the QUERI process to identify high-priority stewardship research targets.

AT THE END, THE DIFFERENCE BETWEEN Quality Improvement and Implementation Science

	Quality Improvement	Implementation Science
Focus	A specific patient-level problem within a single healthcare system	An evidence-based practice that is under-utilized across healthcare
Goal	To fix the specific problem within a single healthcare system	To generate generalizable knowledge while also improving healthcare quality
Approach	Design and trial strategies to improve the problem	
Models	Toyota Lean Six Sigma	RE-AIM PARiHS framework

Implementing an Antibiotic Stewardship Program: Guidelines by the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America

Tamar F. Barlam,^{1,a} Sara E. Cosgrove,^{2,a} Lilian M. Abbo,³ Conan MacDougall,⁴ Audrey N. Schuetz,⁵ Edward J. Septimus,⁶ Arjun Srinivasan,⁷ Timothy H. Dellit,⁸ Yngve T. Falck-Ytter,⁹ Neil O. Fishman,¹⁰ Cindy W. Hamilton,¹¹ Timothy C. Jenkins,¹² Pamela A. Lipsett,¹³ Preeti N. Malani,¹⁴ Larissa S. May,¹⁵ Gregory J. Moran,¹⁶ Melinda M. Neuhauser,¹⁷ Jason G. Newland,¹⁸ Christopher A. Ohl,¹⁹ Matthew H. Samore,²⁰ Susan K. Seo,²¹ and Kavita K. Trivedi²²

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“Another significant [research] gap is the dearth of implementation research in this area....little effort and limited research funding have been allocated to study how best to achieve **large-scale implementation** [of ASPs].”

Existing long-term care were prepared by a manuscript primary expert panel of the Infectious Diseases Society of America and the Society

Implementing an Antibiotic Stewardship Program: Guidelines by the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America

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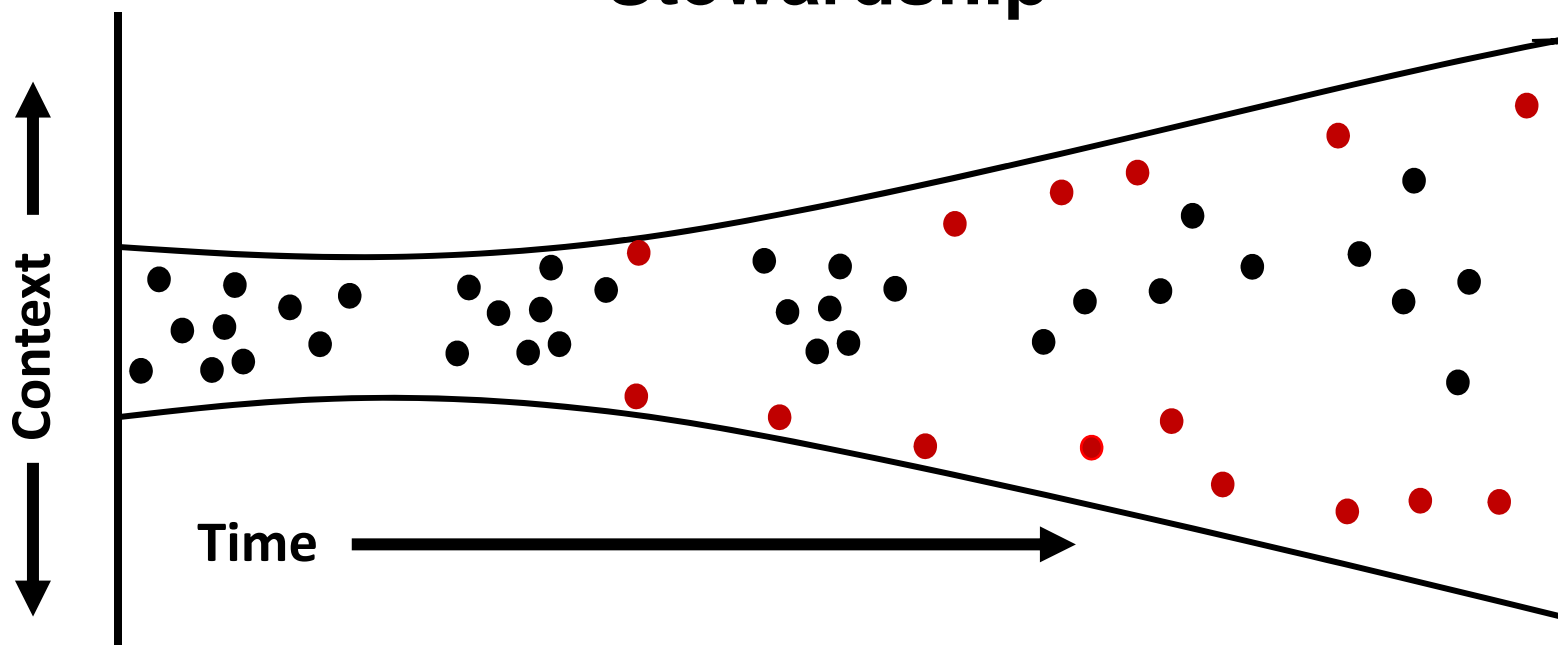
³Division of Infectious Diseases, University of Miami Miller School of Medicine, Miami, Florida; ⁴Department of Clinical Pharmacy, School of Pharmacy, University of California, San Francisco;

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“Qualitative assessments that can examine the impact of factors such as organizational culture, prescriber attitudes, and the self-efficacy of the antibiotic steward...are lacking and are important to establish **the context in which ASP implementation occurs.**”

Evidence-based guidelines for implementation and measurement of antibiotic stewardship interventions in inpatient populations including long-term care were prepared by a multidisciplinary expert panel of the Infectious Diseases Society of America and the Society

The Importance of Context in Antimicrobial Stewardship



● Protocol was effective at site

● Protocol was NOT effective at site

Using implementation outcomes, we can understand...

- If the protocol failed at a site, was it because of an inherent flaw of the protocol or a failure of implementation?
- How can the protocol be modified to fit the context?

Adapted from Don Goldman's talk, "QI Research vs. Implementation Science" 7/24/2014.
Available online (accessed 11/7/17).

Think about the last time you tried to implement an antimicrobial stewardship intervention at your practice site. What was the major barrier to the intervention being as effective as possible?

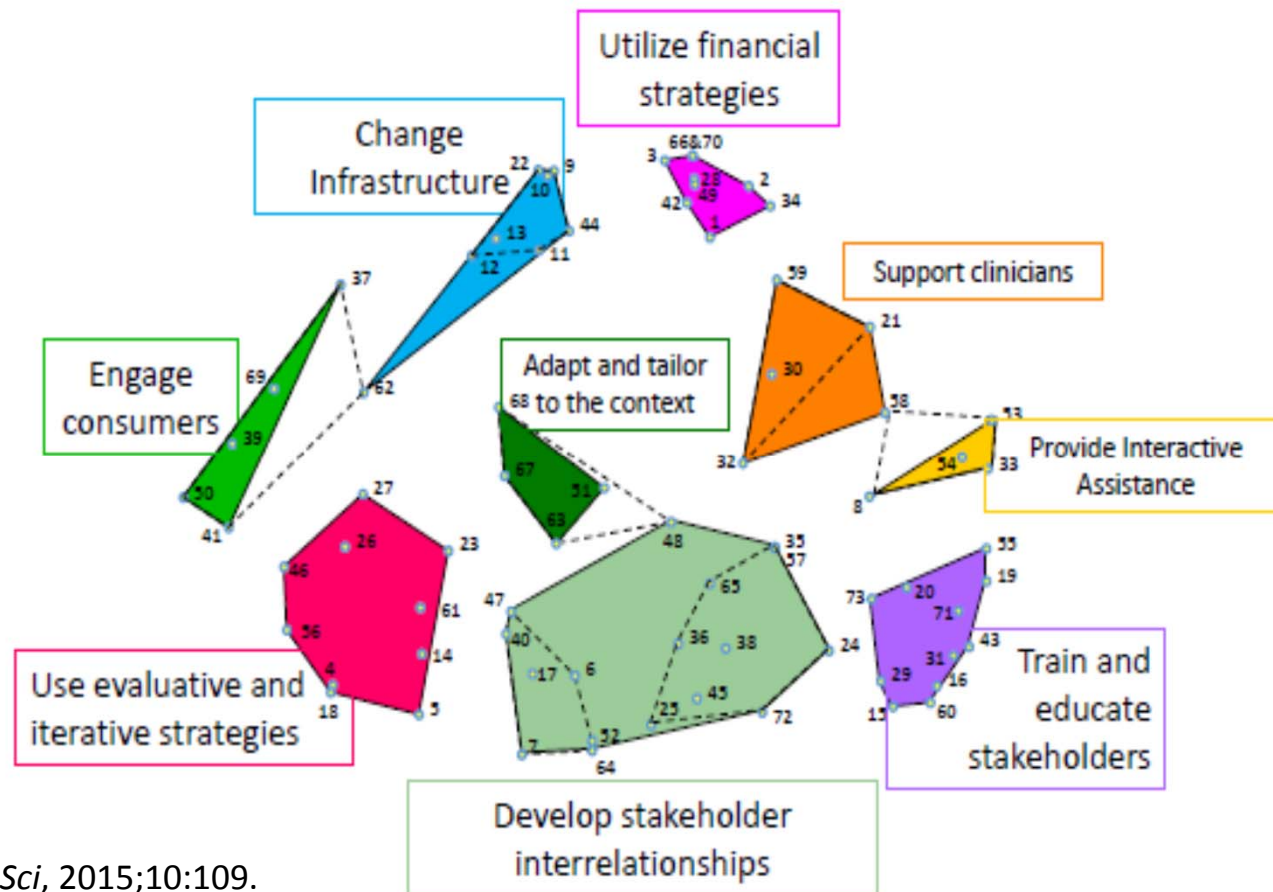
- A. The intervention lacked buy-in from key stakeholders
- B. The intervention was too time-consuming
- C. The intervention was not sustainable
- D. The intervention was not well-suited to the practice site where it was implemented
- E. All of the above
- F. None of the above

What will create the change?

Implementation Strategies

- Powell et al. A Refined Compilation of Implementation Strategies: Results from the Expert Recommendations for Implementing Change (ERIC) Project. *Implementation Science*, 2015;10-21.
 - 73 implementation strategies labeled and defined
 - Includes:
 - Create new clinical teams
 - Audit and provide feedback
 - Identify and prepare champions
 - Use capitated payments
 - Mandate change
 - Suggests combining them based on innovation and conceptual model

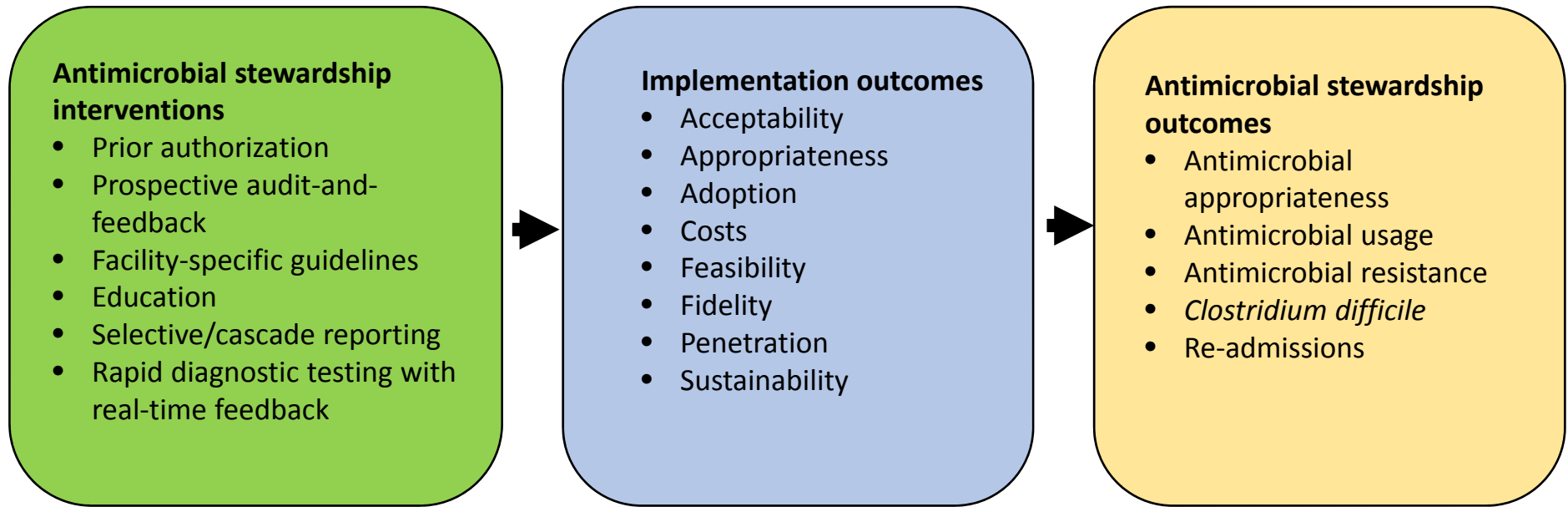
Concept Map of Implementation Strategies



Waltz et al. *Impl Sci*, 2015;10:109.

Did the change occur and
why?

How/Why Will Antimicrobial-Prescribing Change?



Multi-level framework predicting implementation outcomes, Chaudoir, Dugan, Barr, IS, 2013, 8:22.

Acceptability	Perception among implementation stakeholders that a given evidence-based practice is <i>agreeable or satisfactory</i>
Appropriateness	<i>Perceived fit, relevance, or compatibility</i> of the evidence-based practice for a given practice setting, provider, or consumer; perceived fit to address problem
Adoption	<i>Intention, initial decision, or action</i> to try to employ an evidence-based practice
Cost	<i>Cost impact</i> of an implementation effort
Feasibility	Extent to which a new evidence-based practice can be <i>successfully used or carried out</i> within a given agency or setting
Fidelity	Degree to which an evidence-based practice was <i>implemented as it was prescribed</i> in the original protocol or intended by the practice developers
Penetration	<i>Integration</i> of a practice within a service setting and its sub-systems.
Sustainability	Extent to which a newly implemented evidence-based practice is

Let's apply it.

ORIGINAL ARTICLE

A Report of the Efforts of the Veterans Health Administration National Antimicrobial Stewardship Initiative

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Stephen M. Kralovic, MD, MPH^{1,2,3} Matthew H. Samore, MD^{4,5} Matthew B. Goetz, MD^{9,10}
Karl J. Madaras-Kelly, PharmD, MPH^{11,12} Loretta A. Simbartl, MS¹ Anthony P. Morreale, MBA, PharmD, BCPS¹³
Melinda M. Neuhauser, PharmD, MPH¹⁴ Gary A. Roselle, MD^{1,2,3}

OBJECTIVE. To detail the activities of the Veterans Health Administration (VHA) Antimicrobial Stewardship Initiative and evaluate outcomes of the program.

DESIGN. Observational analysis.

SETTING. The VHA is a large integrated healthcare system serving approximately 6 million individuals annually at more than 140 medical facilities.

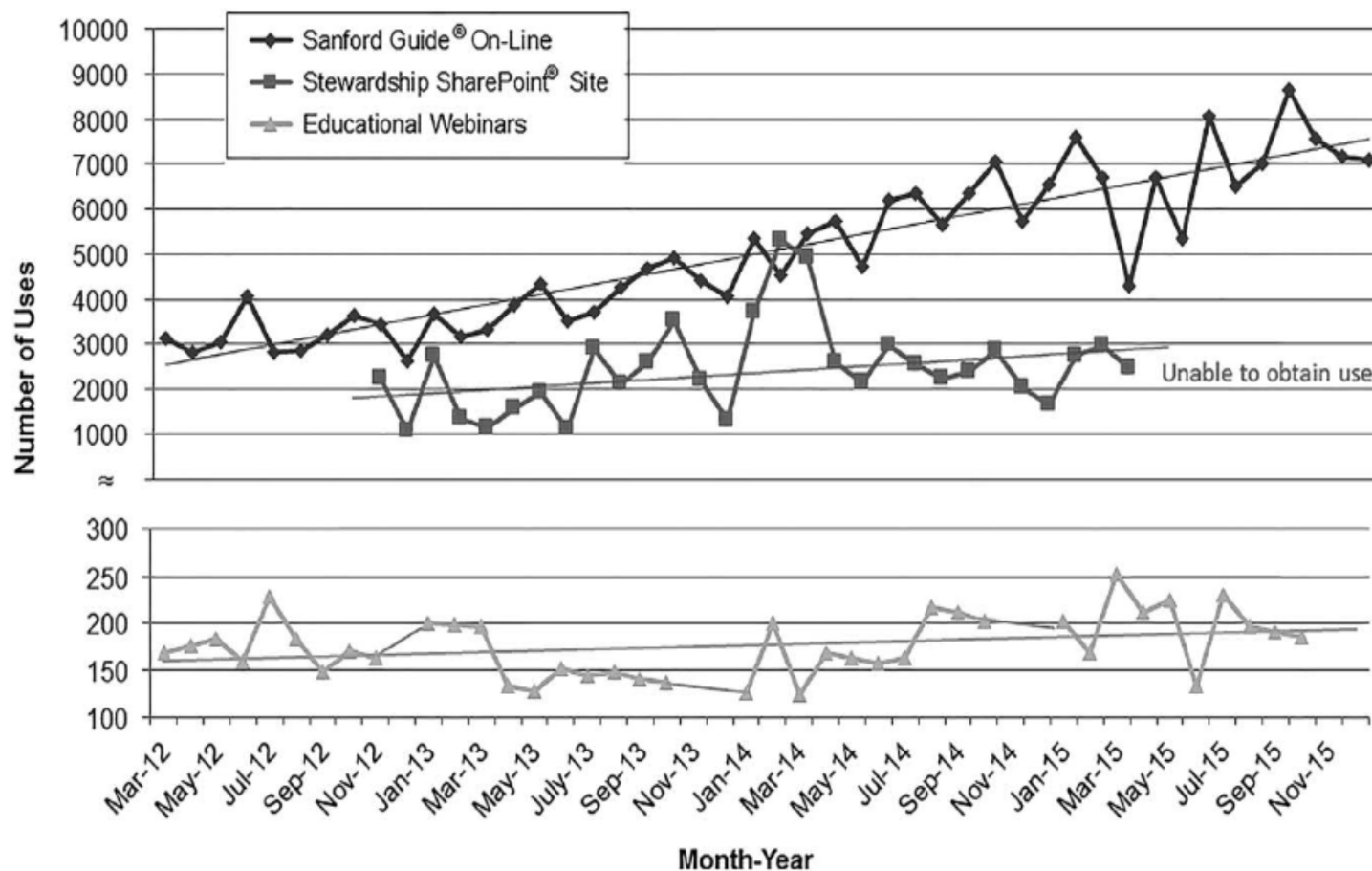
METHODS. Utilization of nationally developed resources, proportional distribution of antibiotics, changes in stewardship practices and patient safety measures were reported. In addition, inpatient antimicrobial use was evaluated before and after implementation of national stewardship activities.

RESULTS. Nationally developed stewardship resources were well utilized, and many stewardship practices significantly increased, including development of written stewardship policies at 92% of facilities by 2015 ($P < .05$). While the proportional distribution of antibiotics did not

Timeline of VHA Antimicrobial Stewardship Initiative

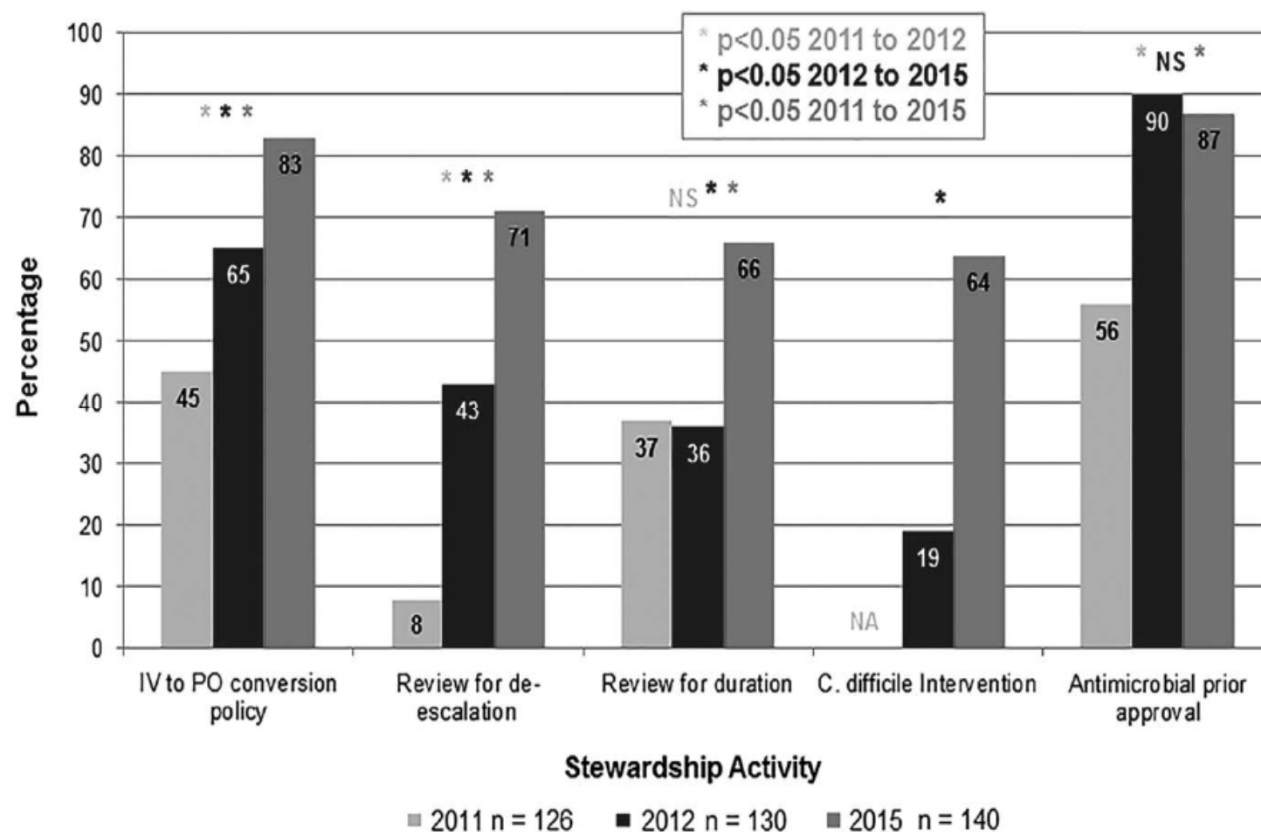


Monthly use of nationally provided stewardship resources across all VHA hospitals



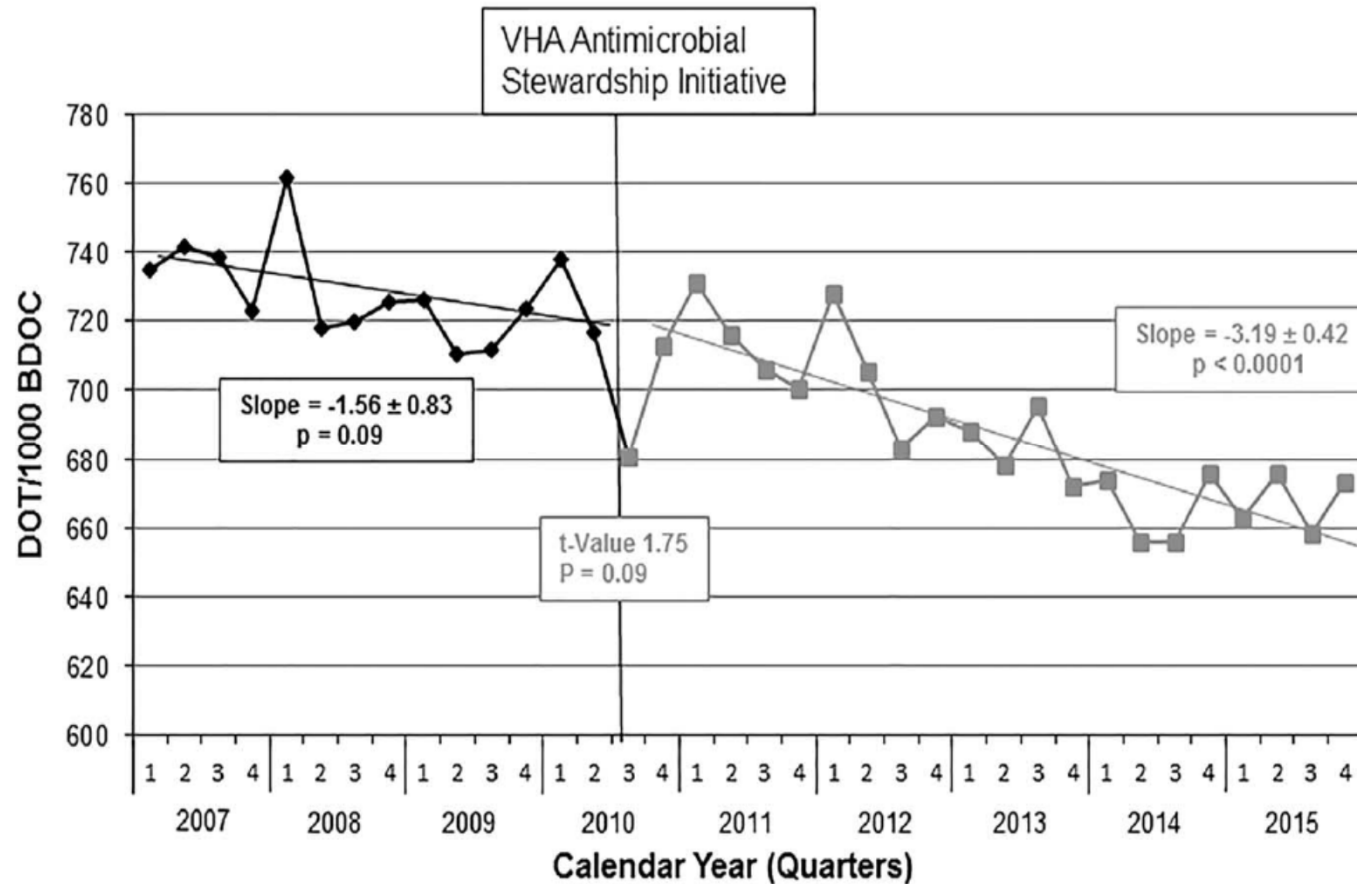
Kelly AA, et al. ICHE 2017; 38(5): 513-20.

Frequency of reported stewardship activities at VHA hospitals based on a voluntary survey in 2011 and mandatory surveys in 2012 and 2015

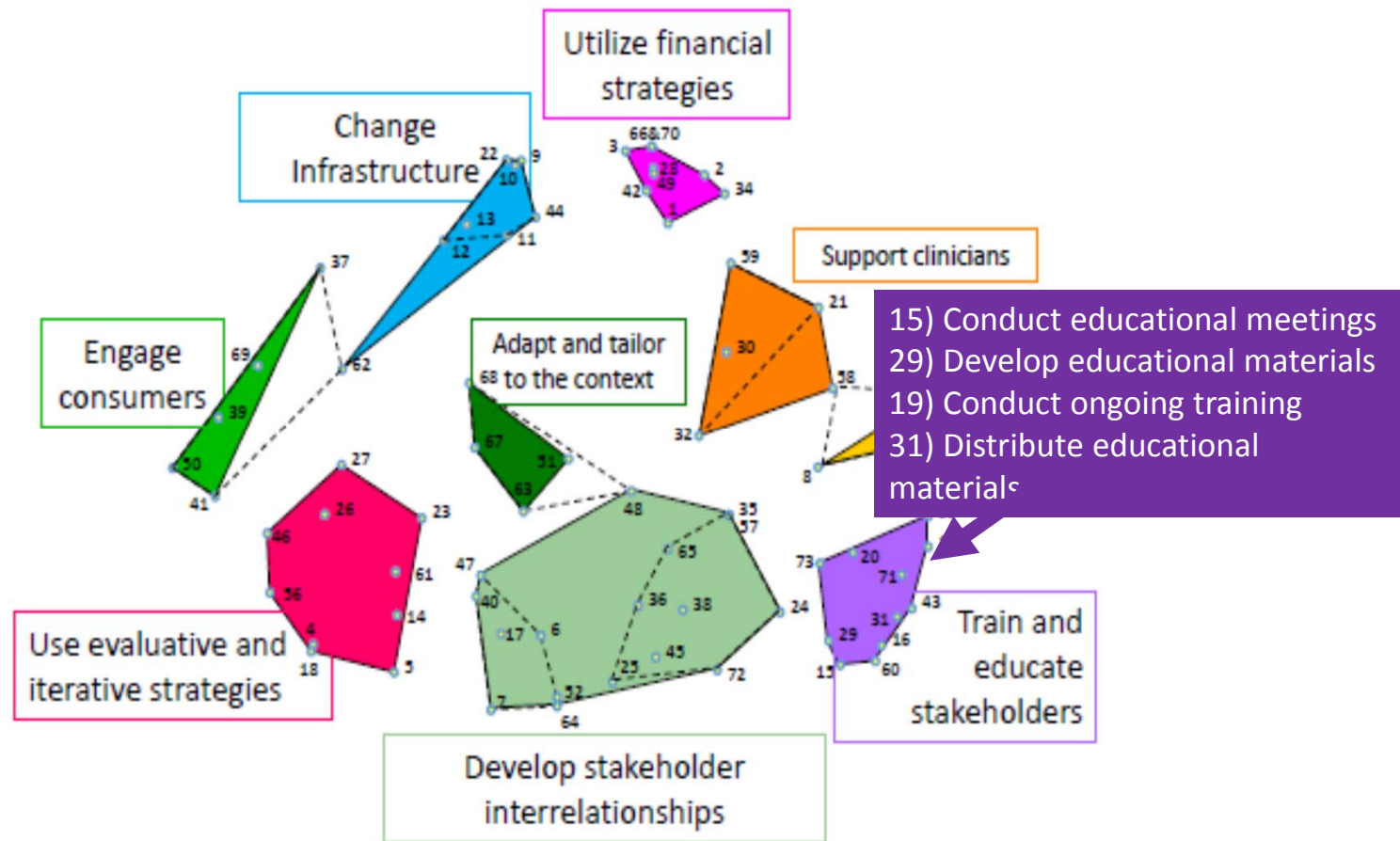


Kelly AA, et al. ICHE 2017; 38(5): 513-20.

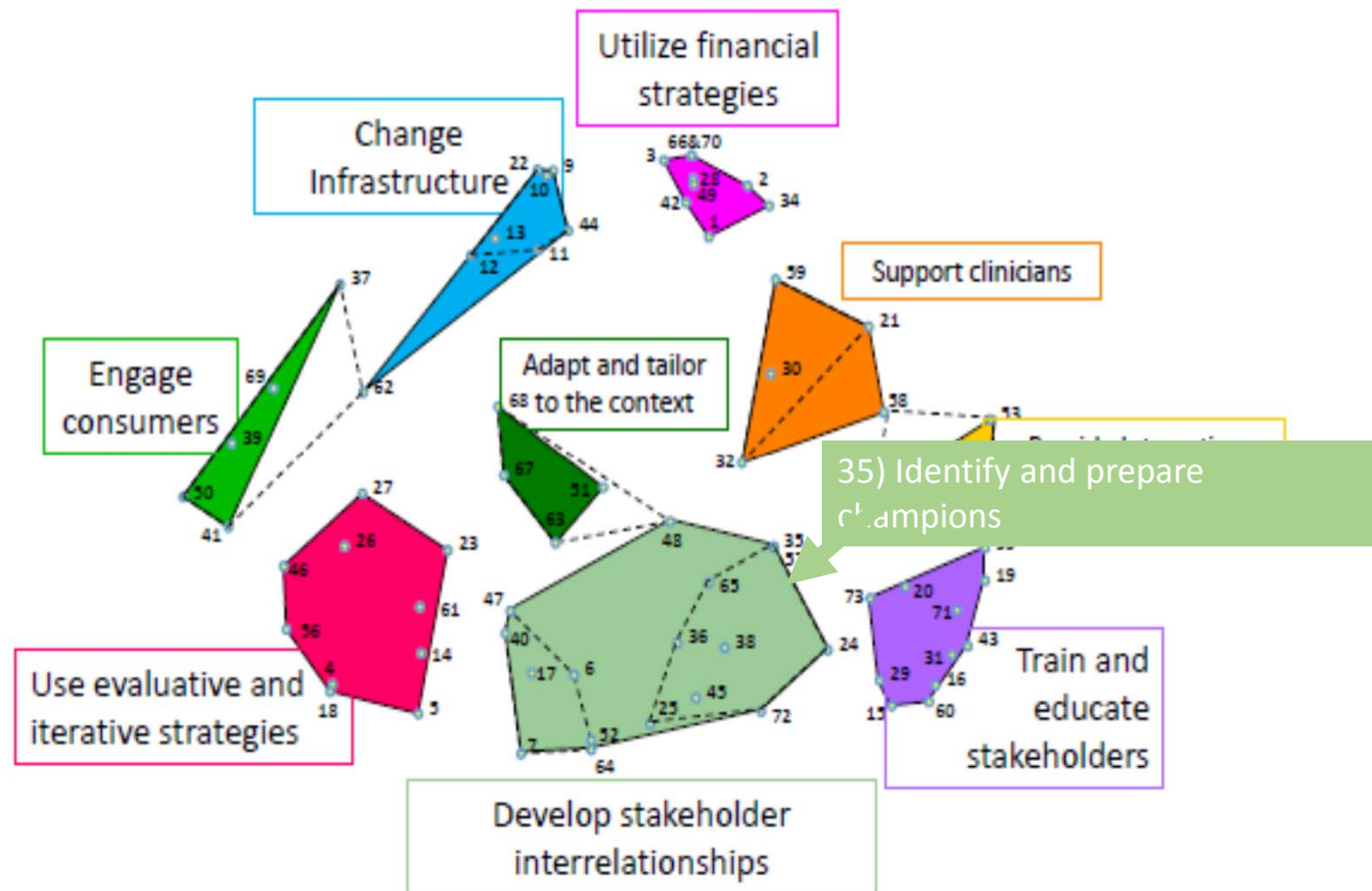
Inpatient antimicrobial use at VHA hospitals before and after the



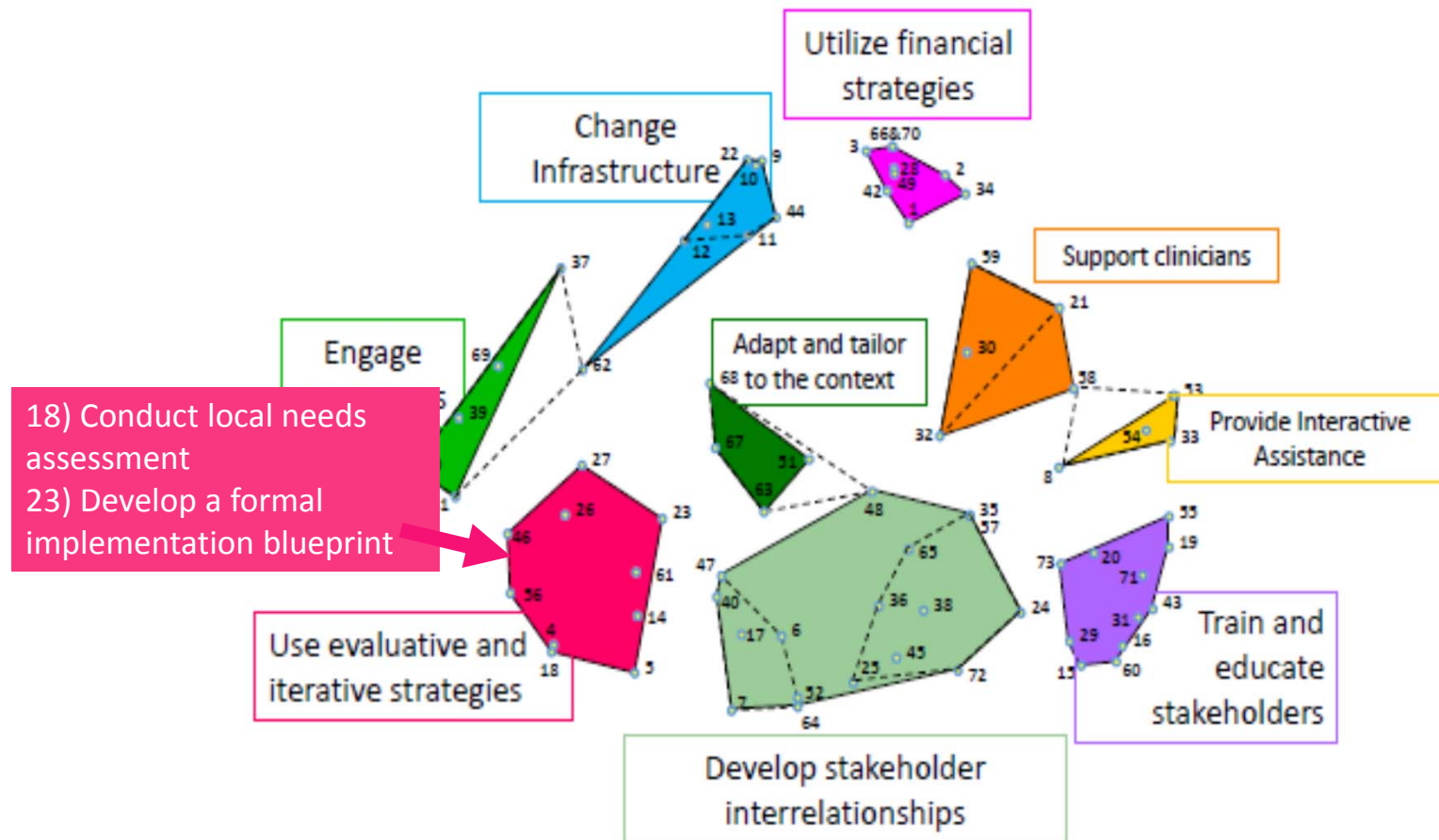
Concept Map of Implementation Strategies



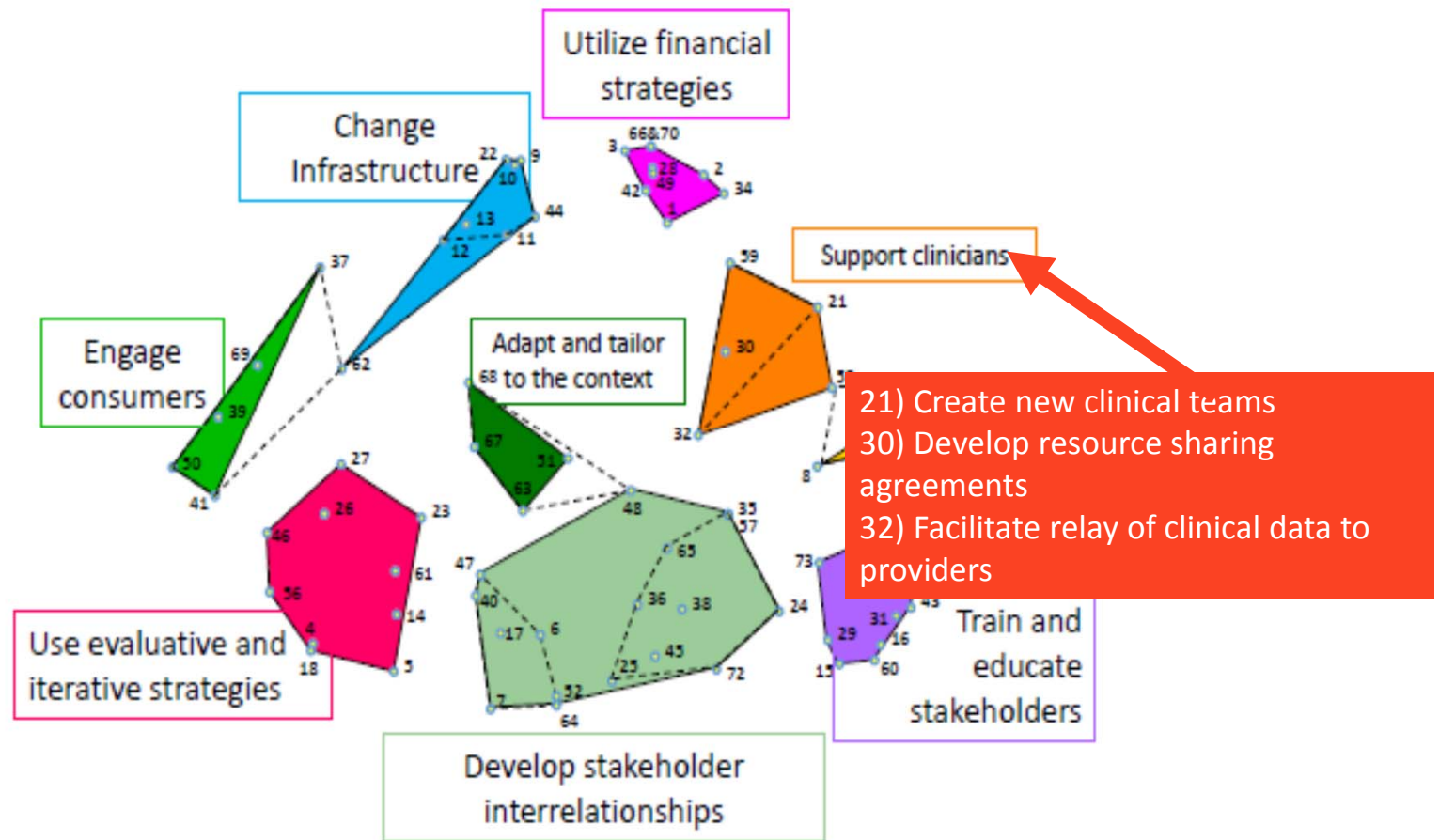
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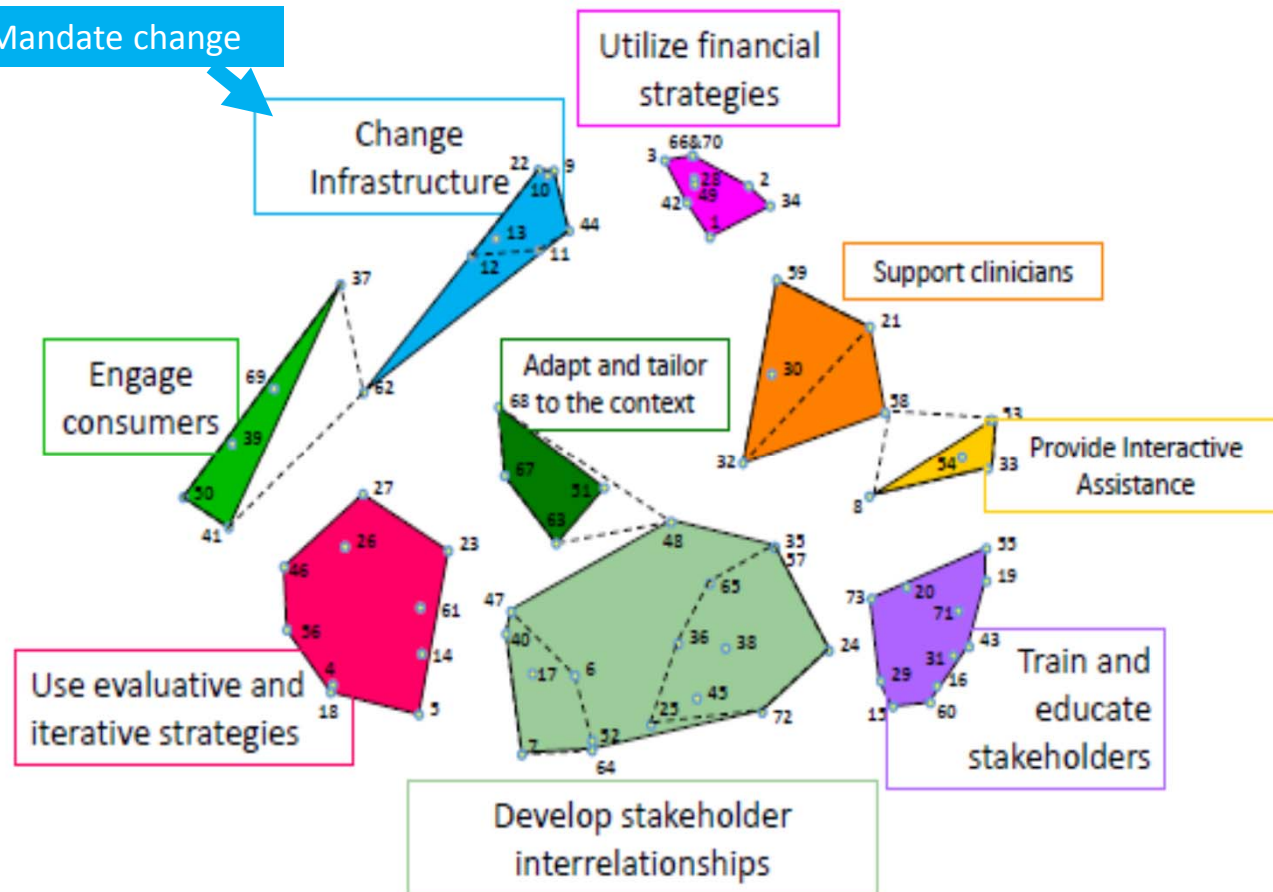


Concept Map of Implementation Strategies



Concept Map of Implementation Strategies

44) Mandate change

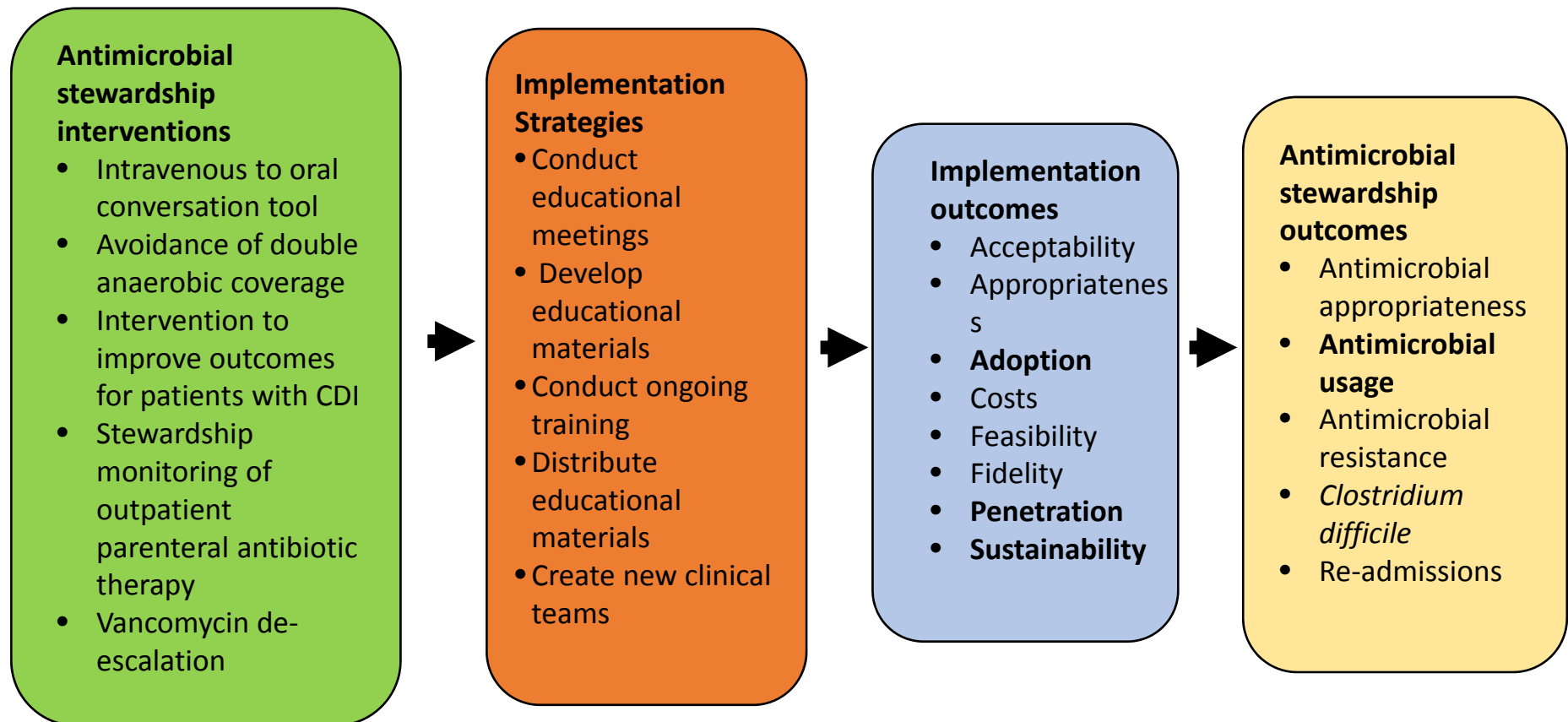


Which implementation outcomes did Kelly et al. report regarding the VHA National Antimicrobial Stewardship Initiative?

- A. Acceptability
- B. Adoption
- C. Cost
- D. Penetration
- E. B and D
- F. All of the above
- G. None of the above

Acceptability	Conduct qualitative interviews with physicians; Survey of physician satisfaction with antimicrobial stewardship activities	
Appropriateness	Conduct qualitative interviews with ASP pharmacists and physicians re: fit of program to culture of hospital	
Adoption	Survey of number of policies/tools that were implemented; tracking utilization of resources (e.g., webinar attendance)	✗
Cost	Tracking ASP staff time and salaries	
Feasibility	Qualitative interviews regarding barriers and facilitators to implementation; Survey + antimicrobial outcomes	?
Fidelity	Observation of how stewardship practices were implemented; utilization measures	✗
Penetration	Survey documenting number of sites implementing certain interventions; utilization measures	✗
Sustainability	Tracking both implementation and outcome measures	

VA Antimicrobial Stewardship Initiative



Study Design Considerations

	Hybrid Type I	Hybrid Type II	Hybrid Type III
Research Questions	<u>Primary Question:</u> Will a clinical treatment work in this setting/these patients? <u>Secondary Question:</u> How was the clinical treatment implemented?	<u>Primary Questions:</u> Will a clinical treatment work in this setting/these patients? Does the implementation strategy show promise?	<u>Primary Question:</u> Which implementation strategy works better in the implementation of the clinical treatment? <u>Secondary Question:</u> Was the clinical treatment effective?

Curran et al, Effectiveness-Implementation Hybrid Designs: Combining Elements of Clinical Effectiveness and Implementation Research to Enhance Public Health Impact. *Medical Care*, 2012;50(3):217–226.

Conclusions

- Large-scale implementation of antimicrobial stewardship will require tailoring stewardship processes to a wide variety of unique practice settings on the local level.
- Understanding gaps in practice and the reasons for these gaps is a key prerequisite for developing a successful implementation strategy.
- The measurement of implementation outcomes can help explain why and how a clinical intervention works. This can help distinguish intervention failures from implementation failures.
- Hybrid study designs facilitate the measurement of both clinical effectiveness and implementation outcomes.