What Is Implementation Science? Implications for Conducting Antimicrobial Stewardship Research

SHEA Antimicrobial Stewardship Research Workshop

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VA Disclaimer

- The opinions expressed in this presentation are those of the author and do not necessarily reflect the views of the Department of Veterans Affairs.

Objectives

- To define implementation science and compare and contrast it to other fields of research.
- To examine how conceptual models and strategies in implementation science can be applied to antimicrobial stewardship research.
- To learn from examples of antimicrobial research conducted with an implementation science framework.

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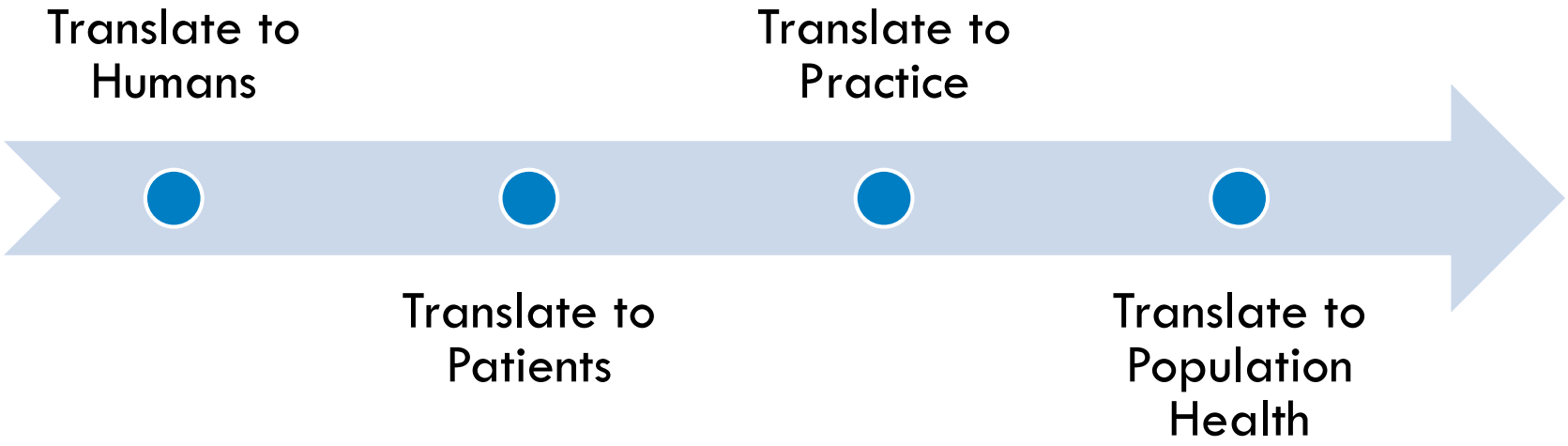
Implementation Science Defined

- *"scientific study of methods to promote the uptake of research findings into routine healthcare in clinical, organisational or policy contexts"*
  - *Implementation Science (http://implementationscience.biomedcentral.com/)*

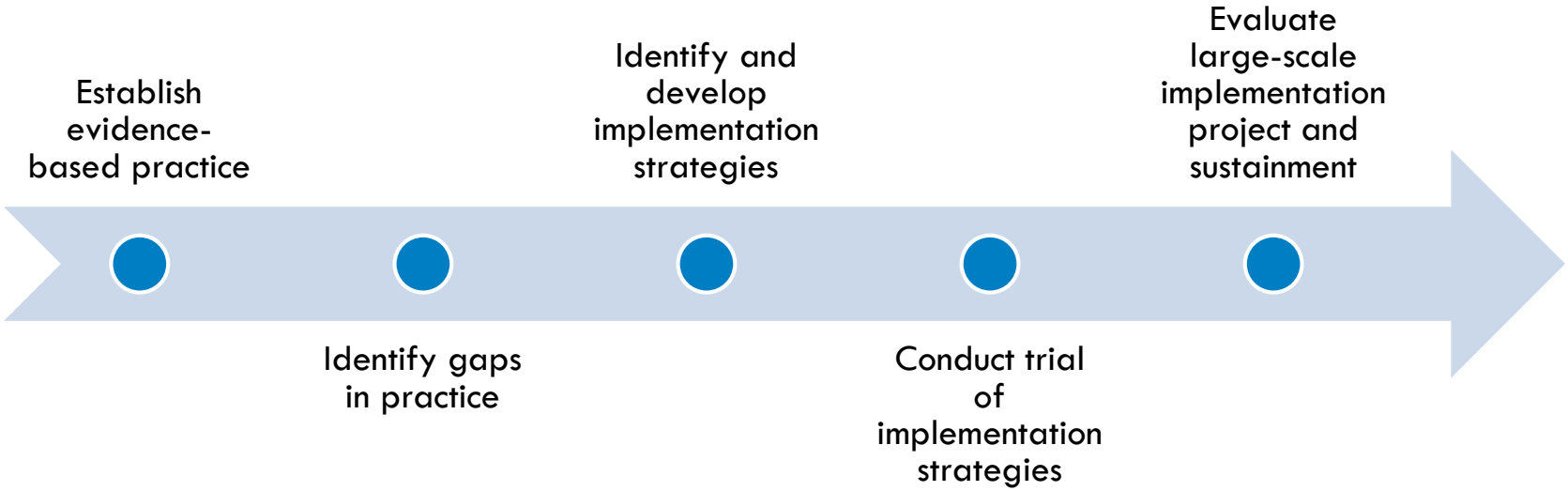
Research to Practice Pipelines

- NIH's T1-T4

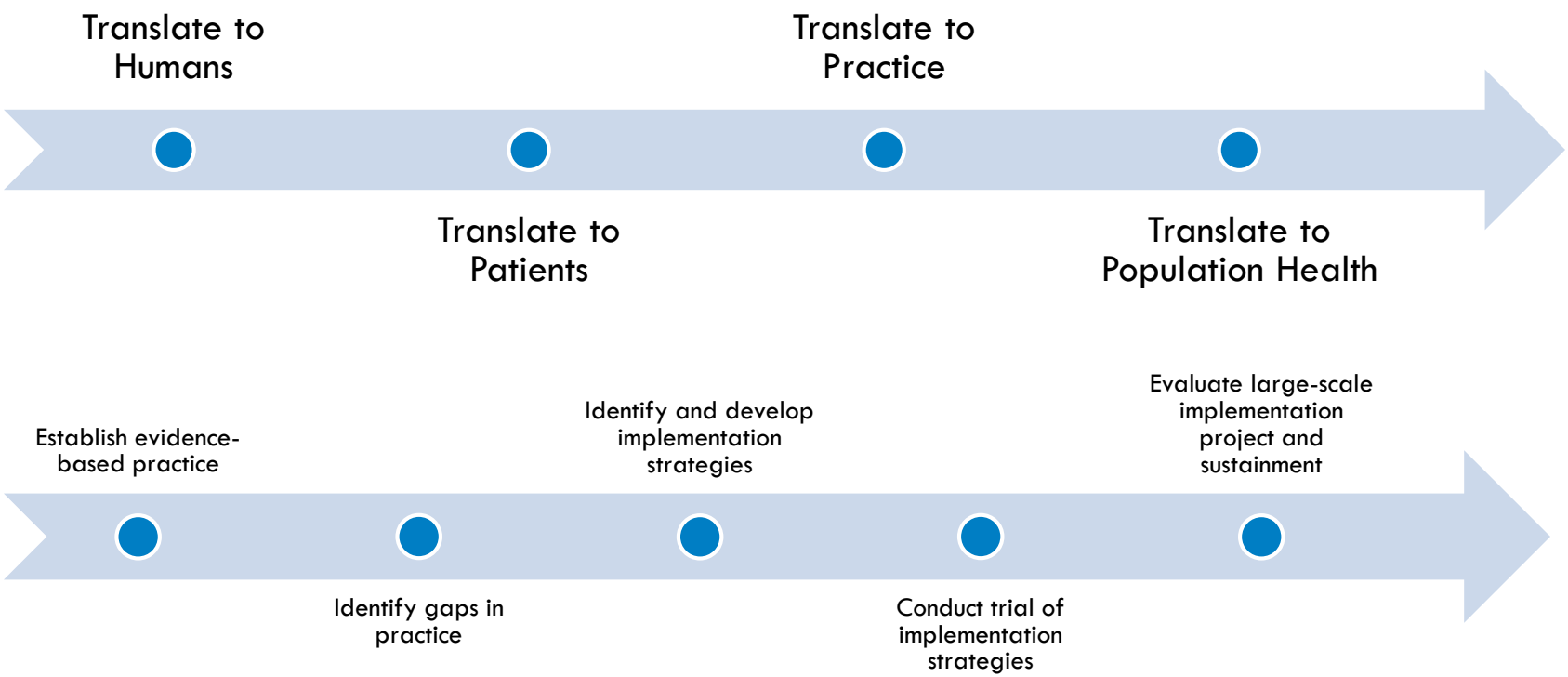


Research to Practice Pipelines

- VA's QUERI Process



Research to Practice Pipelines



- Where is antimicrobial stewardship along these pipelines?

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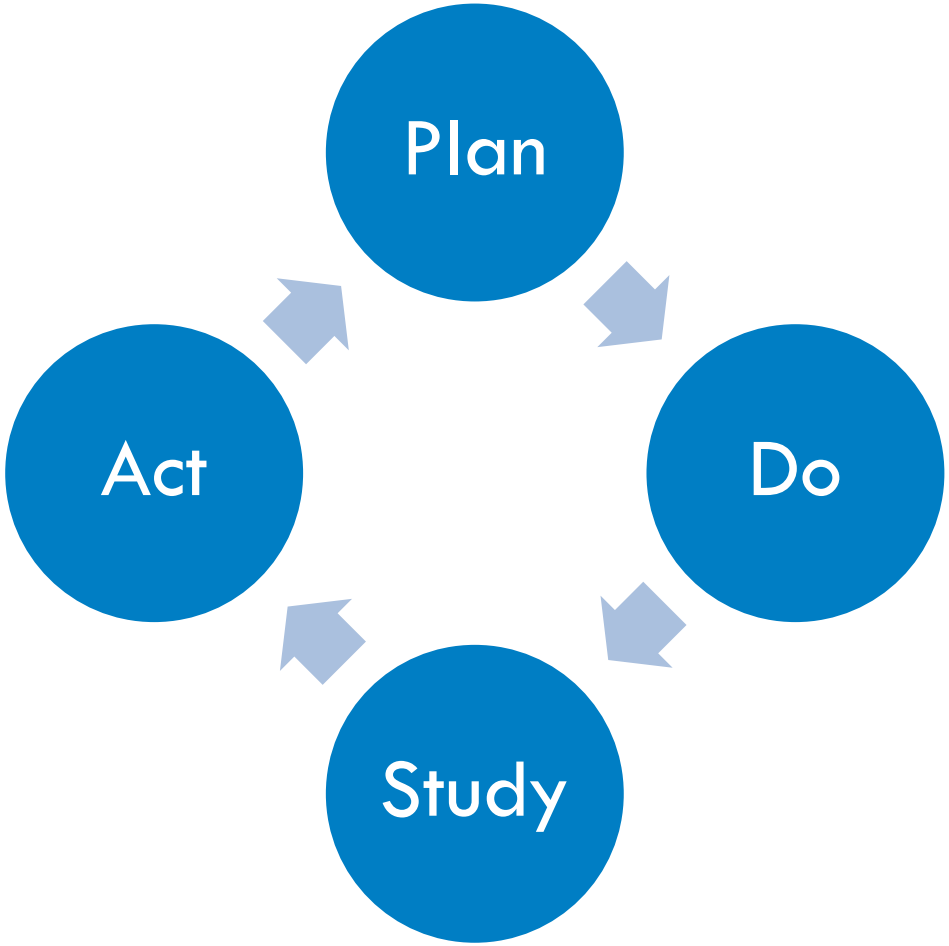
One Other "Pipeline"



Implementation Science

"scientific study of methods to promote the uptake of research findings into routine healthcare in clinical, organisational or policy contexts"

From definition	Translation to IS	Applied to ASP
Research findings	Innovation	Appropriate antibiotic use improves patient outcomes and population health
Scientific study	Conceptual model	PARiHS, RE-AIM, CFIR, etc.
Methods	Strategies	Audit feedback, education, champions, etc.
Scientific study	Outcomes	-Implementation: adoption, fidelity, etc. -ASP Outcomes: # of antibiotics, etc.

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Four Essentials Questions

1) What is the gap between **evidence-based practice** and clinical practice?
2) What **conceptual model** best describes how you hypothesize change will occur?
3) What **implementation strategies** will facilitate that change?
4) What **outcomes** do we need to measure to evaluate whether the changed occurred in practice and clinical outcomes?

- What needs to change?
- How/why will this change occur?
- What will create the change?
- What changed?

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Conceptual Models

- Tabak et al. Bridging Research and Practice: Models for Dissemination and Implementation Research. *American Journal of Preventive Medicine*, 2012;43(3):337-350.
  - 61 models reviewed
  - Guidance on:
    - Flexibility of model
    - Dissemination and/or implementation focus
    - Socioecologic level (system, community, organization, individual, or policy)
  - Includes:
    - Diffusion of innovation
    - PARiHS
    - RE-AIM
    - CFIR

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Considerations

- Target setting
  - Health system wide implementation or single hospital?
- Target clinicians
  - Hospitalists, specialists, etc.
- Scope of innovation
  - All antibiotics?
- Outcomes…and how you will measure them
  - Implementation outcomes
  - ASP-specific outcomes

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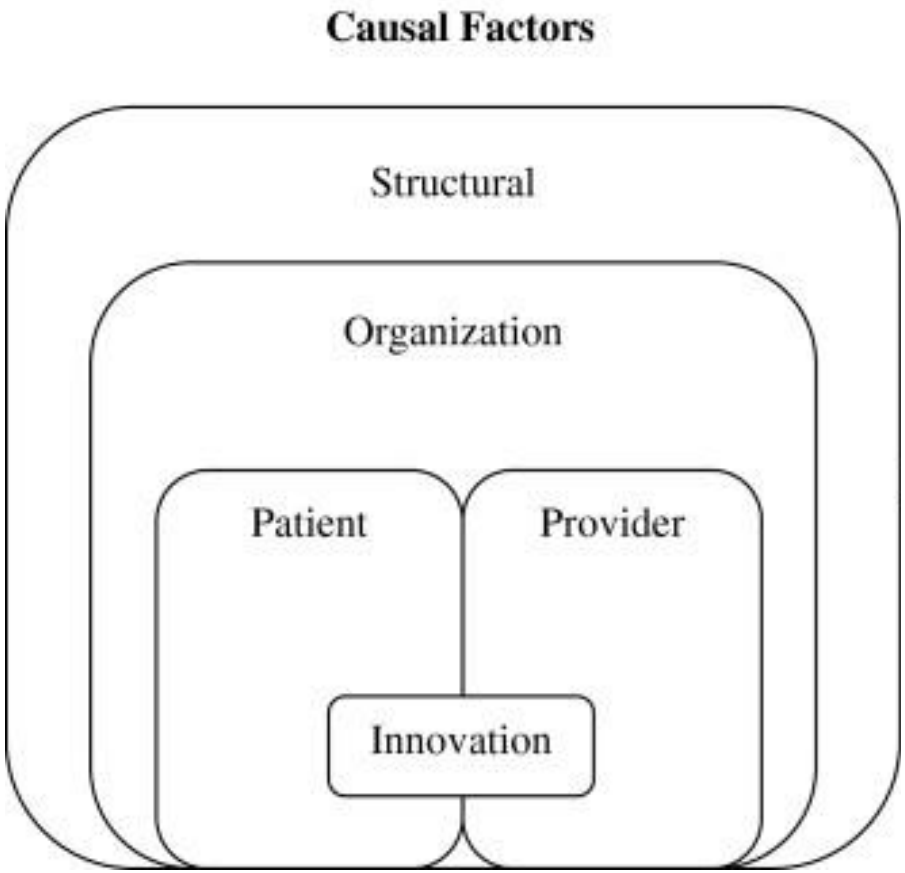
How/Why Will Prescribing Change?



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

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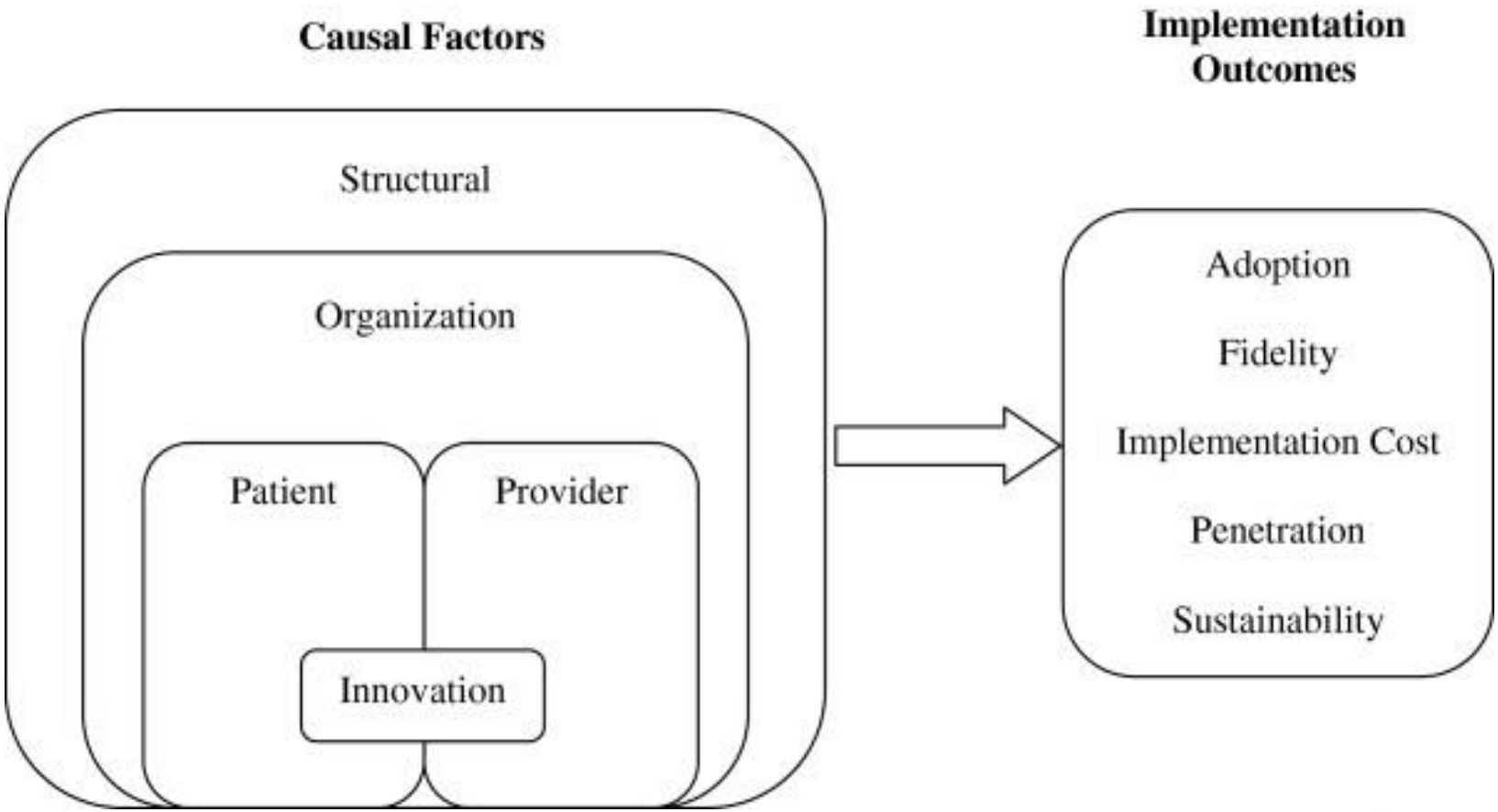

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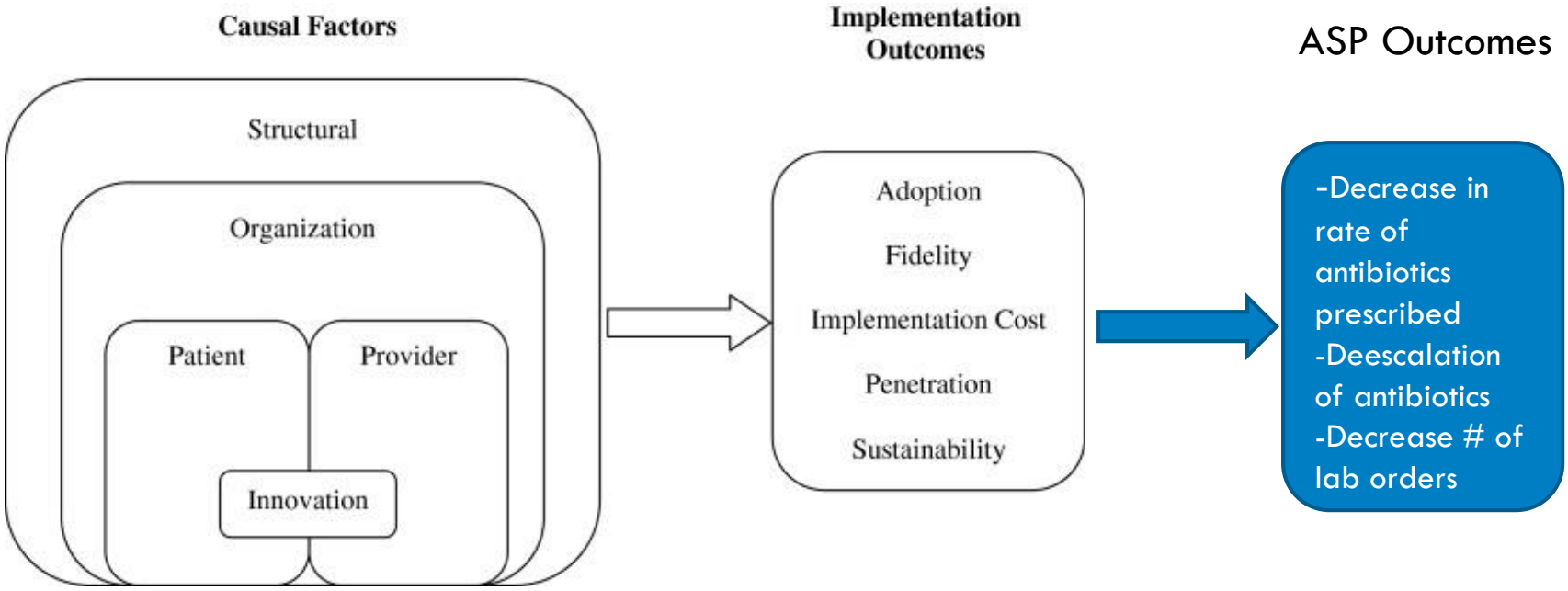

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Implementation Strategies

- 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

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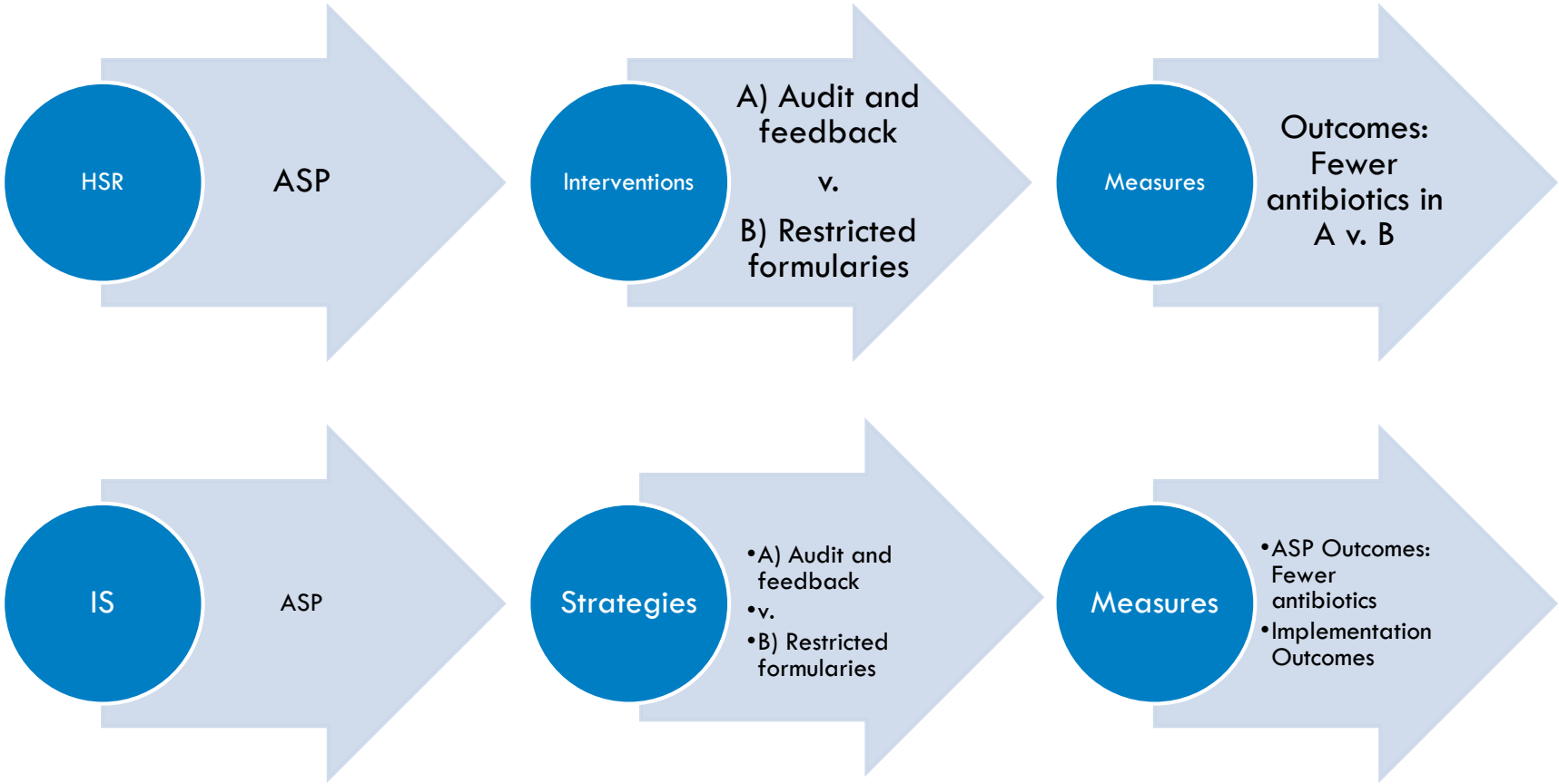
Compare and Contrast



Implementation Outcomes

- Number of audits
- Number of restricted prescriptions requests
- Measure of physician acceptance
- Interviews with clinicians about their perceptions of the program and barriers and facilitators
- …etc., etc.

Methodological Considerations

- 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.
  - Hybrid Type II Design: Trial of the effectiveness of the innovation and implementation strategies (i.e., both ASP and implementation outcomes)

Methodological Considerations

- Majority of IS research is mixed methods
  - Needs assessment
    - What characterizes this site and how can we tailor the implementation strategies to be most effective?
  - Formative evaluation
    - What are stakeholders perceptions of the strategies and what are the facilitators and barriers to their success?
    - How do we use this information to change or improve the strategies during the study?
  - Process evaluation
    - What are stakeholders perceptions of the strategies and what are the facilitators and barriers to their success?
  - Summative evaluation
    - What are stakeholders perceptions of the strategies and what are the facilitators and barriers to their success?

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A Case: ERASE C. *Diff*

- Ostrowsky et al. Lessons Learned from Implementing Clostridium difficile-Focused Antibiotic Stewardship Interventions. *ICHE*, 2014;35(S3).
- Van Deusen Lukas et al. Developing the Capacity to Implement Antimicrobial Stewardship: Opportunities for the Future. http://www.ahrq.gov/professionals/quality-patient-safety/patient-safety-resources/resources/advances-in-hai/hai-article10.html.

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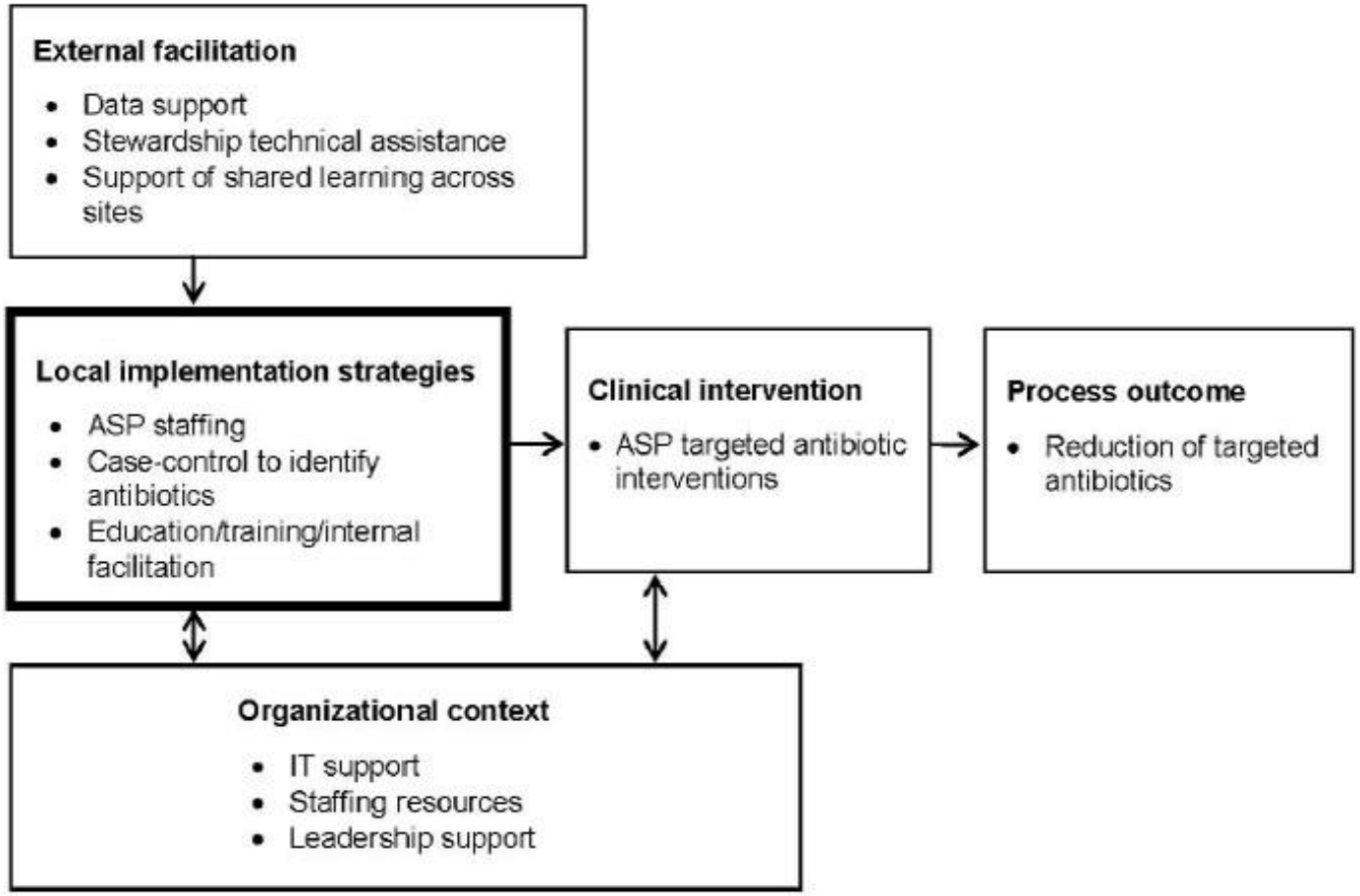
A Case

From definition	Translation to IS	Applied to ASP	ERASE *C. Diff*
Research findings	Evidence-based practice	Appropriate antibiotic use improves patient outcomes and population health	Focus on C. *Diff*
Scientific study	Conceptual Model	CFIR, PARiHS, RE-AIM, etc.	Van Deusen Lukas
Methods	Strategies	Audit feedback, education, champions, etc.	Facilitation, Audit and provide feedback, etc.
Scientific study	Outcomes	-Implementation: adoption, fidelity, etc. -ASP Outcomes: # of antibiotics, etc.	-Implementation: lessons learned -ASP Outcome: Reduction in C. Diff

ERASE C. *Diff* Conceptual Model



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What Implementation Science Has Brought Us

- More rigor to quality improvement
- Experience doing science in the real world
- Forced us to better define our terms and articulate how we think change happens
- Better understanding of mediating and moderating variables that are themselves modifiable
- More examples of the benefits of integrating quantitative and qualitive research

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Thank you!

- Program Planning Committee
- VA QUERI Sub-Groups
  - Adaptation and Fidelity
  - Facilitation
- Many, many colleagues

Questions?

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…or two

From definition	Translation to IS	Applied to ASP	Your Research
Research findings	Evidence-based practice/ medicine	Appropriate antibiotic use improves patient outcomes and population health	Vancomycin and Cefazolin for MRSA positive patients getting a hip or knee replacement
Scientific study	Conceptual Model	CFIR, PARiHS, RE-AIM, etc.	CFIR (particularly inner setting)
Methods	Strategies	Audit feedback, education, champions, etc.	Regular meeting, implementation plan, templates for EHR
Scientific study	Outcomes	-Implementation: adoption, fidelity, etc. -ASP Outcomes: # of antibiotics, etc.	-Implementation: # of facilities that adopt bundle -ASP Outcomes: SSI rates