

Advancing Antimicrobial Stewardship Together, StAR-3

Inspiration from Implementation Science

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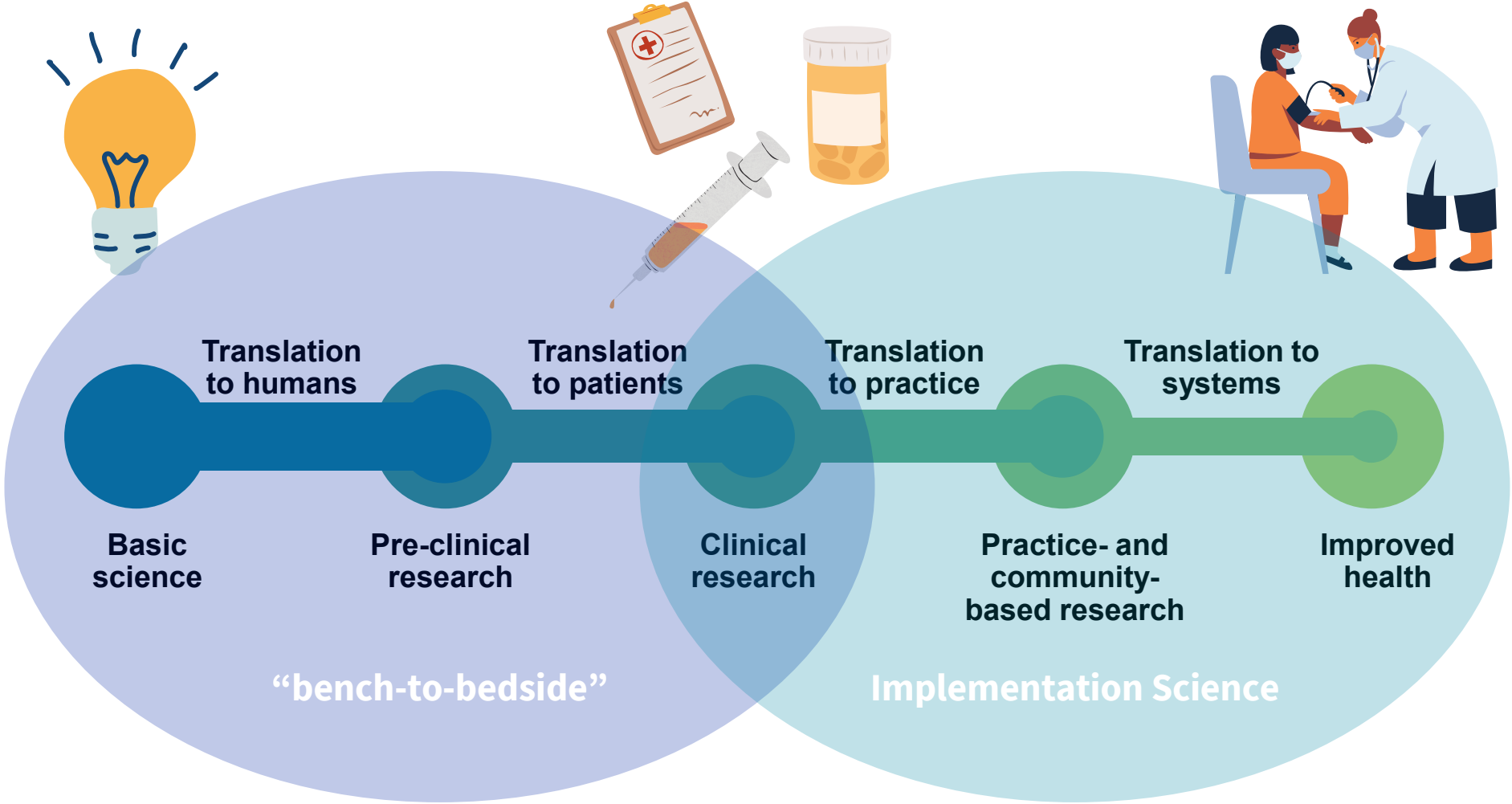
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What is implementation science?

Research pipeline



Quantifying leaks in the pipeline



Morris ZS, Wooding S, Grant J. The answer is 17 years, what is the question: understanding time lags in translational research. *Journal of the Royal Society of Medicine*. 2011 Dec;104(12):510-20. | Mosteller F. Innovation and evaluation. *Science*. 1981;211(4485):881-6.

The know-do gap, or evidence-to-practice gap

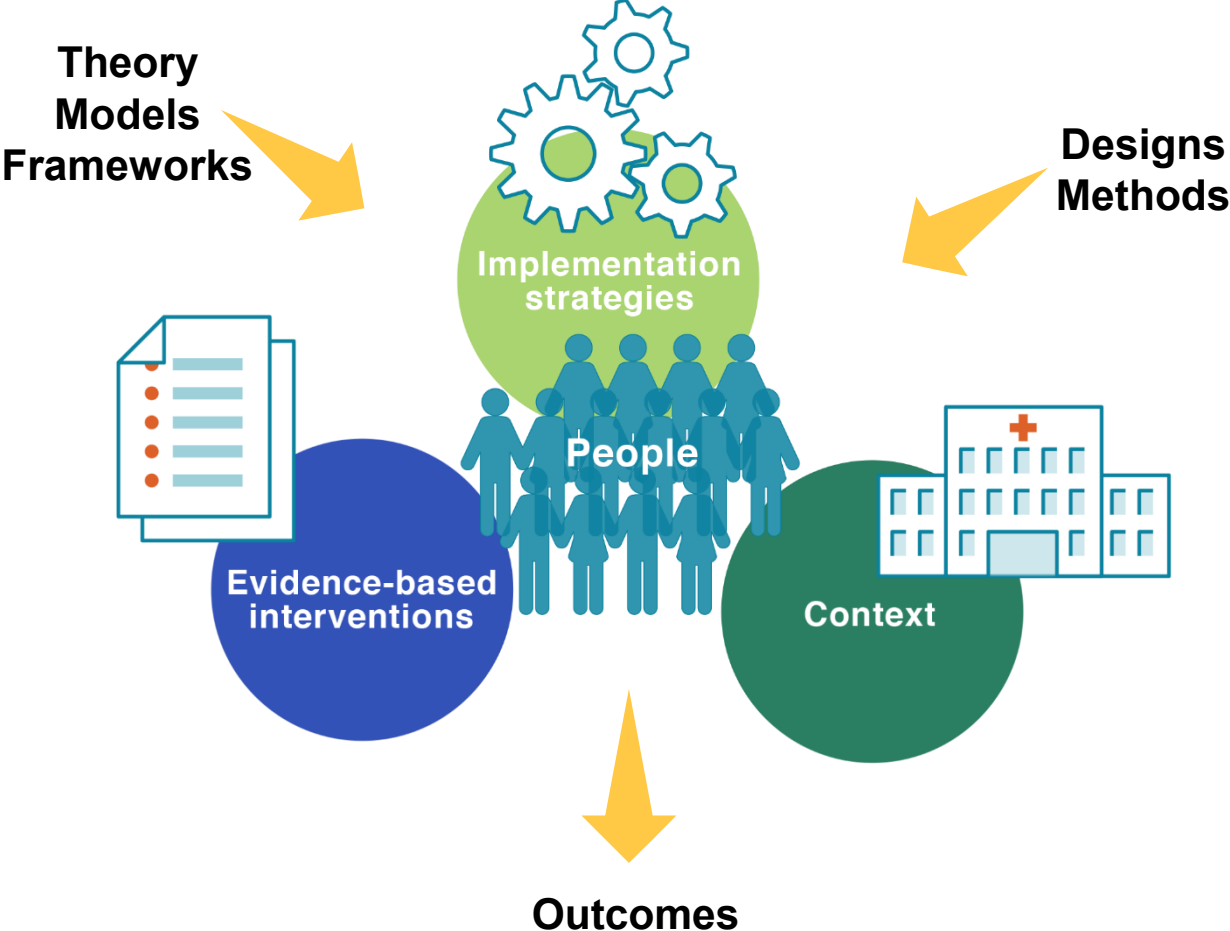


Implementation science definition

Implementation science is defined as the **scientific study of methods** to promote the **systematic integration of research findings and evidence based practices** into care delivery and the **de-integration of low value care**.

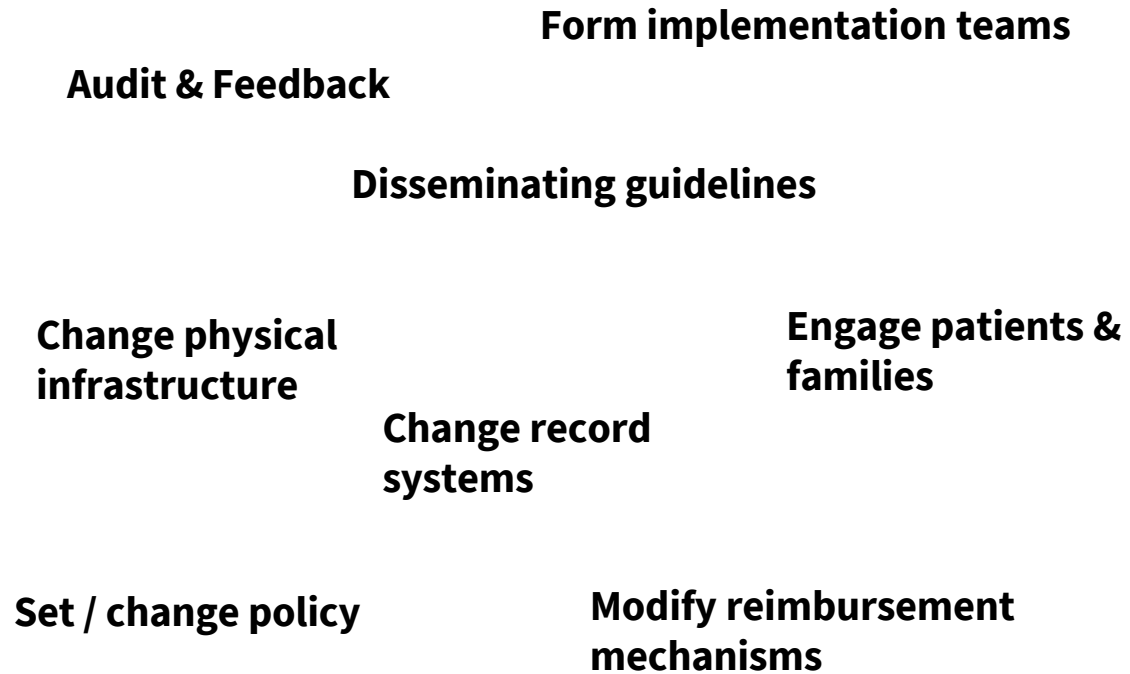


Implementation science ingredients



Implementation strategies

Definition: “methods or techniques used to enhance the adoption, implementation, and sustainability of a clinical program or practice” (Proctor et al., 2013)



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What is de-implementation ?

“**reducing** or **stopping** the use or delivery of services or practices that are **ineffective, unproven, harmful, overused, or inappropriate**”

De-implementation
De-adoption
Discontinuation
Dis-investment

Low value care



Prusaczyk, B., Swindle, T. & Curran, G. Defining and conceptualizing outcomes for de-implementation: key distinctions from implementation outcomes. *Implement Sci Commun* **1**, 43 (2020). <https://doi.org/10.1186/s43058-020-00035-3> | Braithwaite, J., Glasziou, P. & Westbrook, J. The three numbers you need to know about healthcare: the 60-30-10 Challenge. *BMC Med* **18**, 102 (2020). <https://doi.org/10.1186/s12916-020-01563-4>

De-Implementation, Choosing Wisely, Smarter Medicine (CH)

60 • 30 • 10



Illustration: <https://www.smartermedicine.ch/de/home>

Braithwaite, J., Glasziou, P. & Westbrook, J. The three numbers you need to know about healthcare: the 60-30-10 Challenge. *BMC Med* **18**, 102 (2020). <https://doi.org/10.1186/s12916-020-01563-4>

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Drivers of low-value care

TABLE 13.1 Key Drivers of Low-Value Practices in Healthcare

	INTRINSIC	EXTRINSIC
Provider/healthcare system level	Lack of knowledge of harm from overuse Belief more care is better Discomfort with uncertainty Regret for errors of omission > commission Belief action better than inaction Use of therapeutics off label	Guidelines promoting overuse Medical culture Financial incentives for provider and hospital Process measures Inadequate time Positive publication bias Lack of training in shared decision-making Advocacy groups Medicalization of non-disease
Patient/public level	Discomfort with uncertainty Belief more care is better Lack of knowledge of harm from overuse	Media misrepresentation of research Financial—third party payment shielding from costs Culture of avoiding mortality Advocacy groups Medicalization of non-disease

Source: From Morgan, D. J., Brownlee, S., Leppin, A. L., Kressin, N., Dhruva, S. S., Levin, L., Landon, B. E., Zezza, M. A., Schmidt, H., Saini, V., & Elshaug, A. G. (2015). Setting a research agenda for medical overuse. *BMJ*, 351, h354. <https://doi.org/10.1136/bmj.h4534>

Implementation Strategies for reducing low-value care (De-Implementation Strategies)

1) Client-facing de-implementation strategies

- Shared decision making
- Trial period
- Expectation management

2) Practitioner-directed strategies

- Unlearning (e.g., audit and feedback)
- Substitution (e.g., changing order defaults, incentive strategies, watchful waiting)

3) Systems- and organization-directed strategies

- Awareness campaigns
- Leveraging information systems (e.g., decision support, prompts, alerts)

**What does this mean for
antimicrobial
stewardship practice?**

Tackling antimicrobial resistance: an implementation challenge

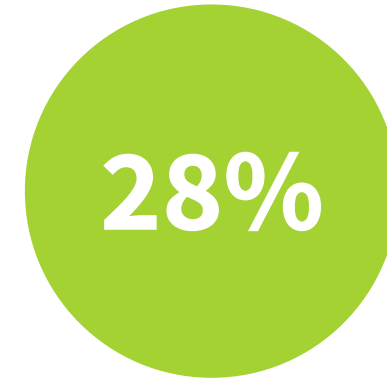
Antimicrobial resistance is spreading rapidly & globally
Antimicrobial stewardship programs (ASPs*):



reduction in antibiotic
prescribing



reduction in antibiotic consumption



reduction in WHO watch
group antibiotics

* Most ASPs were multicomponent, preventing assessment of individual components, except training and guidelines and decision support tools

Ya, K. Z., Win, P. T. N., Bielicki, J., Lambiris, M., and Fink, G. (2023). Association Between Antimicrobial Stewardship Programs and Antibiotic Use Globally. *JAMA Network Open*, 6(2), e2253806. <https://doi.org/10.1001/jamanetworkopen.2022.53806>

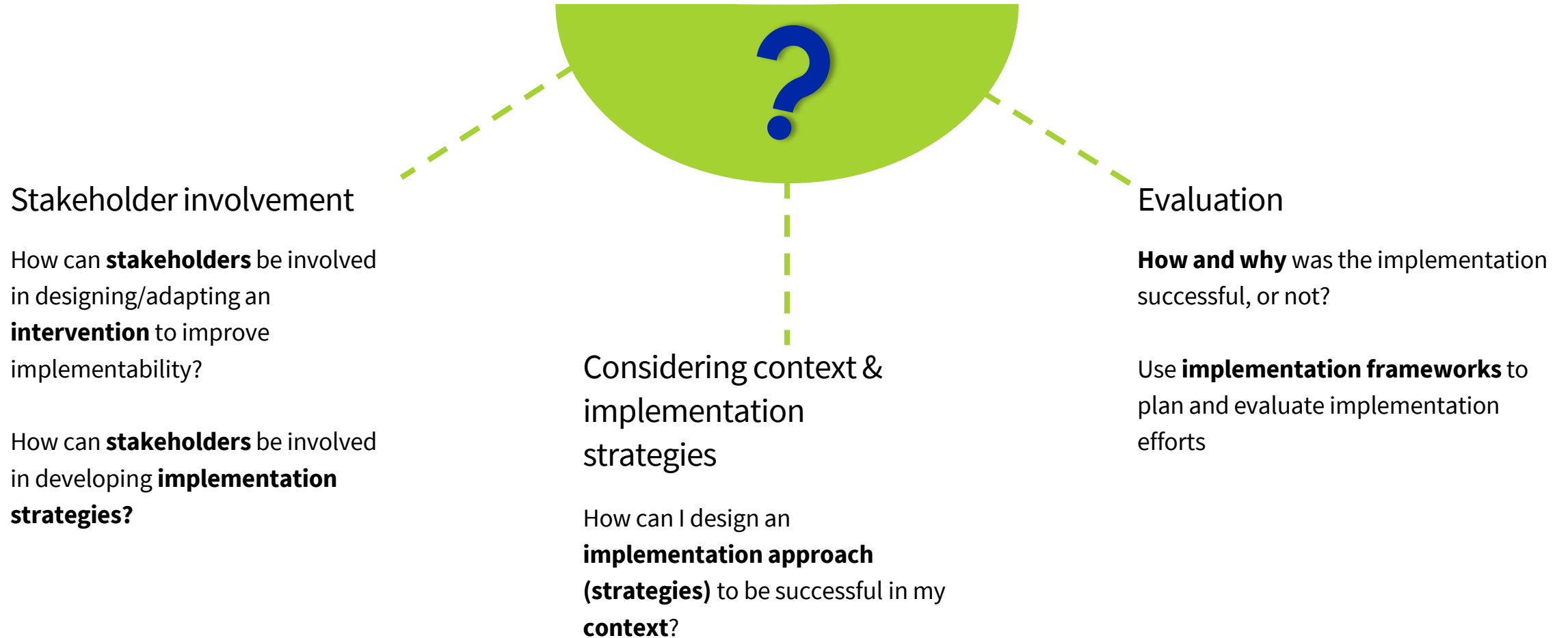
HH



WW

“ Arguably, the aim of all the interventions in antimicrobial stewardship programs is to **change behaviors** of health care professionals to conserve the efficacy of existing antimicrobial agents while decreasing avoidable harm, including the emergence and transmission of resistance. ”

Typical implementation science questions



Many Stewardship Activities == Implementation Strategies

The evidence-based practice == the optimal use of antibiotics (for different types of infections)

Core Elements of Hospital Antibiotic Stewardship Programs



Hospital Leadership Commitment

Dedicate necessary human, financial, and information technology resources.



Accountability

Appoint a leader or co-leaders, such as a physician and pharmacist, responsible for program management and outcomes.



Pharmacy Expertise (previously “Drug Expertise”):

Appoint a pharmacist, ideally as the co-leader of the stewardship program, to help lead implementation efforts to improve antibiotic use.



Action

Implement interventions, such as prospective audit and feedback or preauthorization, to improve antibiotic use.



Tracking

Monitor antibiotic prescribing, impact of interventions, and other important outcomes, like *C. difficile* infections and resistance patterns.



Reporting

Regularly report information on antibiotic use and resistance to prescribers, pharmacists, nurses, and hospital leadership.



Education

Educate prescribers, pharmacists, nurses, and patients about adverse reactions from antibiotics, antibiotic resistance, and optimal prescribing.

CDC. Core Elements of Hospital Antibiotic Stewardship Programs. Atlanta, GA: US Department of Health and Human Services, CDC; 2019. Available at <https://www.cdc.gov/antibiotic-use/core-elements/hospital.html>

Livorsi DJ, Drainoni M-L, Reisinger HS, et al. Leveraging implementation science to advance antibiotic stewardship practice and research. *Infection Control & Hospital Epidemiology*. 2022;43(2):139-146. doi:10.1017/ice.2021.480

Selecting stewardship interventions

Restrictive

- Formulary restrictions
- Preapproval by ID physicians
- Automatic stop orders

Enabling

- Education of prescribers
- Implementation of treatment guidelines
- De-escalation
- Prospective audit & feedback

Structural

- Improved & faster diagnostics
- Antimicrobial resistance surveillance
- Computerized decision support

Reduce the number of opportunities for inappropriate prescription

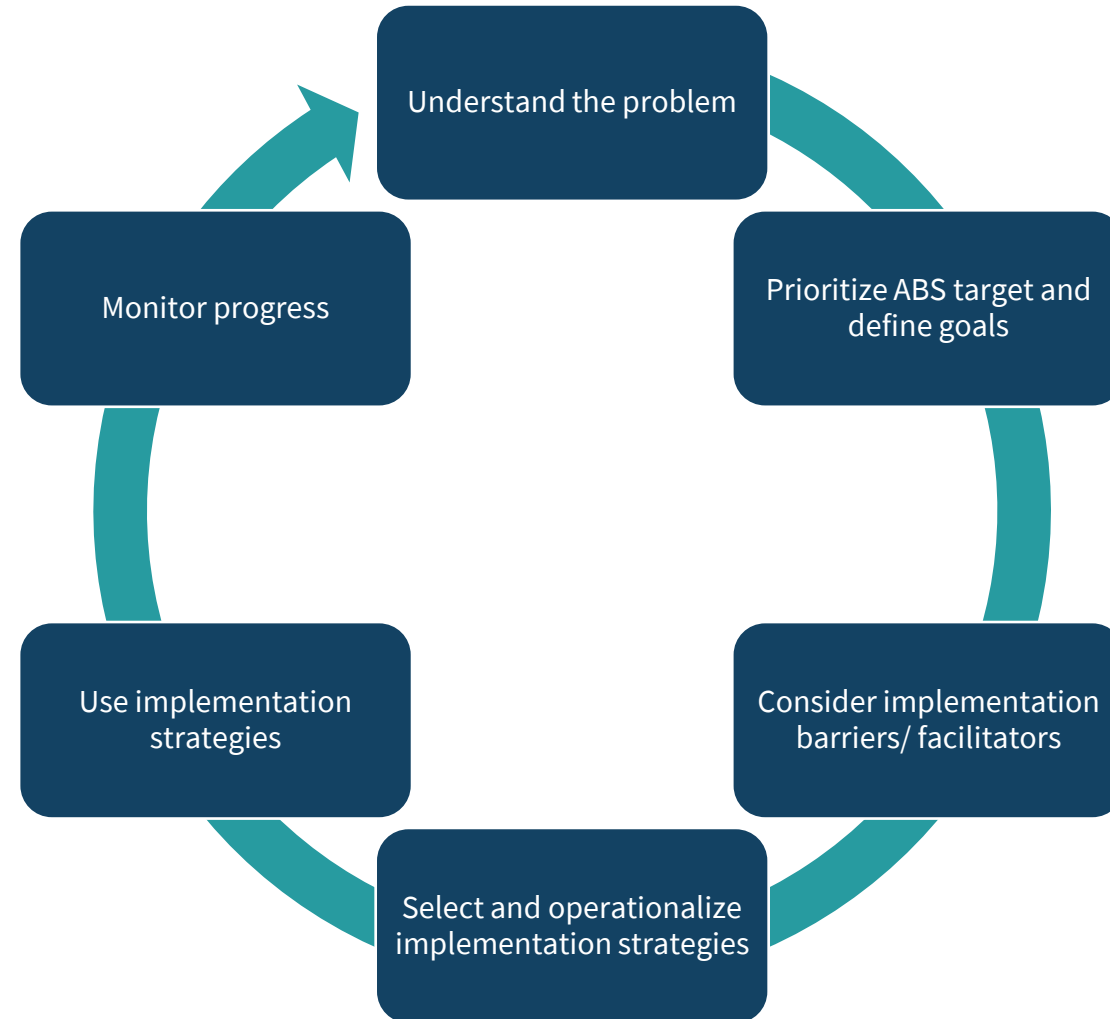
Both enabling & restrictive interventions were independently associated with **15% increase in compliance** with desired practice, **1.95-day reduction in duration** of AB treatment, **1.12-day decrease in inpatient length of stay**

BUT!

Restrictive interventions may be risky, have lower acceptance, may jeopardize communication & relationships

Enabling interventions are more acceptable and likely to be sustained

The REVERSE Improvement Cycle: An example of Implementation Science applied to ABS



www.reverseproject.eu

Albers B, Caci L, Blum K, Boland G, Carrara E, Gentil PR, Nguyen A, Pollard J, Schechner V, Sonpar A, Yanagida T, Zingg W, Clack L, Consortium LCOBOTR. Examining tailoring as an implementation strategy for reducing healthcare-associated infections across European acute care hospitals (REVERSE): study protocol for a hybrid type 2 effectiveness-implementation trial. *Trials*. 2025 Oct 16;26(1):418. doi: 10.1186/s13063-025-09132-x. PMID: 41102820; PMCID: PMC12532843.

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Key messages

Key messages

Why is implementation science important?

Offers rigorous research methods, theories, models and frameworks to accelerate and improve research translation

Implementation science is a growing field with an extensive methodological toolbox

Optimal care is a combination of **implementation** + **de-implementation**

Implementation science implications for antimicrobial stewardship

Engage stakeholders, consider context, enhance evaluation

Purposeful design and selection of effective interventions & **implementation strategies**

Thank you for your attention!

The screenshot shows the website for the Institute for Implementation Science in Health Care at the University of Zurich. The header includes the university logo and name, the institute's name, and navigation links for Home, Contact, Deutsch, and a search bar. A secondary navigation bar lists: About us, Implementation Science, Teaching and Research, Training and Consulting, Publications, Network & Partner, Events, and News. The main content area features a large heading: "Welcome to the Institute for Implementation Science in Health Care". Below this is a paragraph describing the institute's mission: "The Institute for Implementation Science in Health Care (IfIS) contributes to the optimization of health care, digital innovation, and improved translation of evidence into practice. Our implementation science teaching, research and training aims to accelerate the integration of research findings into health care and embed them in a sustainable way, as well as removing low-value practices from health care. Our digital health teaching, research and training aims to optimize digital innovation in clinics and create digital interventions to improve community health and well-being." To the right of this text is a large QR code. At the bottom of the page are three navigation buttons with icons: "About Us" with an information icon, "Teaching & Research" with a flask and microscope icon, and "Training & Consulting" with a graduation cap icon.