

Unsolicited Advice: Applying Behavioral Science to Antimicrobial Stewardship

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- No disclosures

Objectives

- Define and describe behavioral science and its relevance to antimicrobial stewardship
- Identify components of behavioral science relevant to antimicrobial stewardship communication strategies
- Discuss technological adaptations that utilize behavioral science to positively impact antimicrobial prescribing

What is behavioral science?

Behavioral science is a field that studies how human behaviors and decisions shape our actions.

Cortney Price

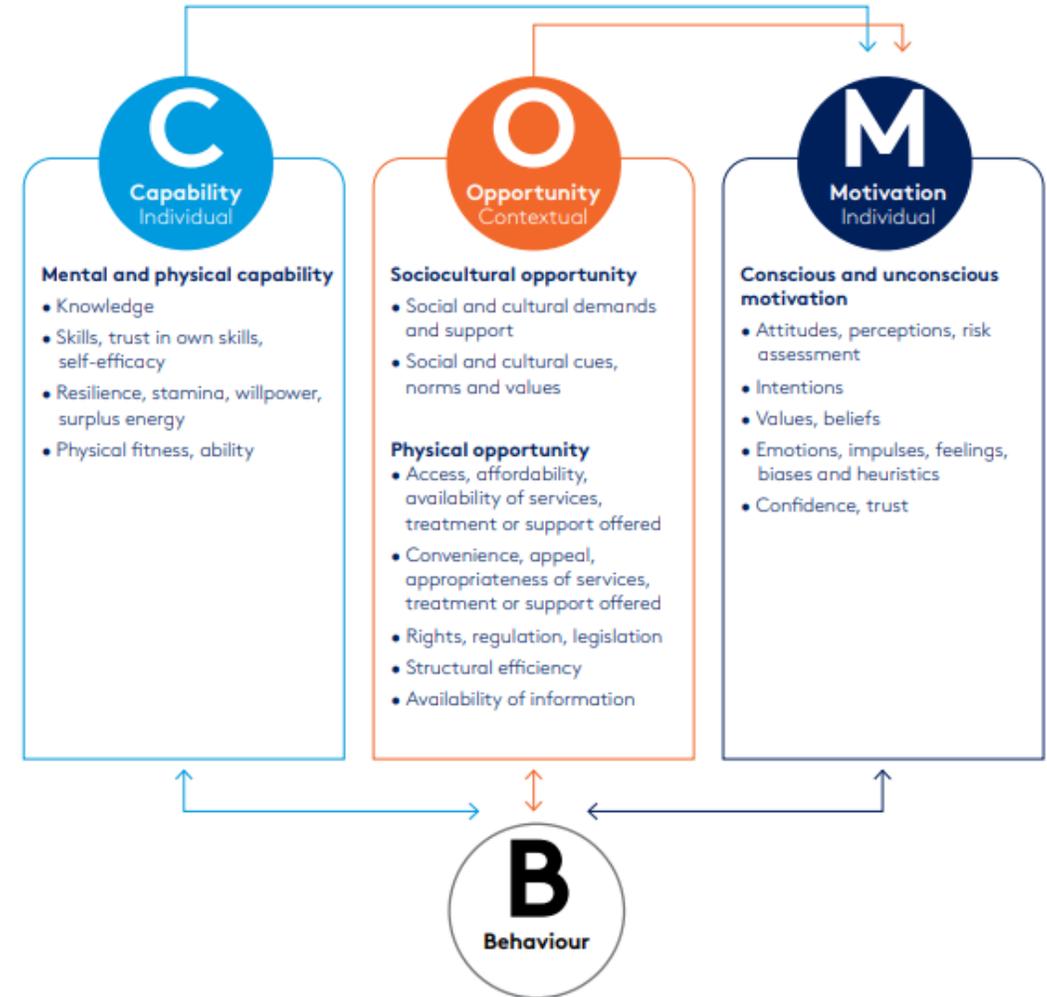
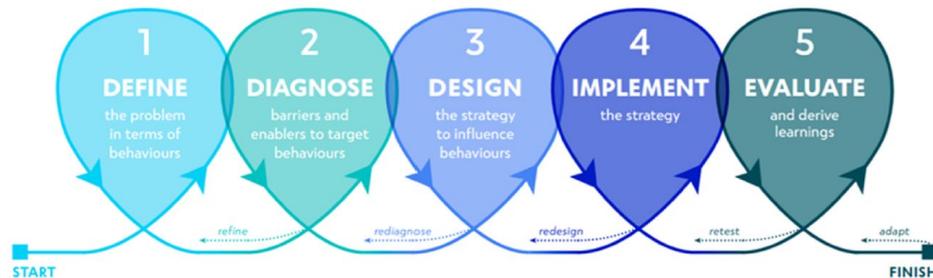


- Study of **what drives behavior** to better understand how to influence it
- **Multidisciplinary approach** involving psychology, economics, anthropology, sociology, etc.
- **Scientific methodology** to inform evidence-based practice



Behavioral and Culture Insights (BCIs)

- WHO/Europe new roadmap on AMR
 - BCI “high-impact intervention”
- Drivers of antibiotic use vary widely
- Evidence and framework



Behavioral science in antimicrobial stewardship communication

Address why they did what they did in any unsolicited advice

Patient Case - Ethel

- 87-year-old female admitted for “community acquired pneumonia”
- No history of MDR organisms
- Resident of an assisted living facility
- No recent hospital admissions
- No recent antibiotic use
- Clinically stable and admitted to the medical-surgical floor
- No drug allergies
- Started on cefepime/vancomycin/azithromycin
- SC, BCX2 and MRSA PCR pending



Assessment Question

Which of the following written antimicrobial stewardship recommendations would be the LEAST likely to elicit a NEGATIVE response?

- A. Can we switch antibiotics to ceftriaxone + azithromycin? It appears we are treating for CAP, and ceftriaxone + azithromycin is recommended per the IDSA CAP guidelines.
- B. I recommend you switch antibiotics to ceftriaxone + azithromycin as recommended by the IDSA CAP guidelines.
- C. Please switch antibiotics to ceftriaxone + azithromycin. Broad spectrum antibiotics are not necessary nor recommended by IDSA CAP guidelines, and they contribute to antimicrobial resistance.



Julia E. Szymczak, PhD

Social Determinants of Antibiotic Prescribing

Relationships between Clinicians

- Culture

Relationships between Clinicians and Patients

- Pressure

Risk, Fear, Uncertainty, Identity, and Emotion

- Risk of poor outcomes
- Haunted by bad decisions

(Mis)perception of the problem

- Lack of motivation
- “Perceptions of exceptionalism”

Culture: prescribing etiquette and unwritten rules

Key determinants of antimicrobial prescribing behavior



Noninterference with the prescribing decisions of colleagues

Decision-making autonomy
Reluctance to interfere by medical and non-medical professionals



Accepted noncompliance

Context of prescriber's experience and expertise
Limitations of evidence-based policies
Anecdotal evidence



Hierarchy of prescribing

Junior prescribers but senior decision-makers
Senior practice and not policy is emulated
Consultants/specialists

Social norms of decision-making

Internal Medicine



Consensus of the group



Team participation, input from others is obtained and considered



Rationalized decision-making, often policy-driven



Communication via progress notes and verbal face-to-face discussions

Surgery



Promotes individualism in decision-making and in outcomes



Rushed and focused decision-making



Non-surgical decisions delegated



Technology heavy communication (e.g. text, page)

3Ps, 3Ds, and 3Cs

Antibiotic Stewardship Framework

Place	Pathogen	Patient
Drug	Dose	Duration
Context	Communication	Collaboration

JOURNAL ARTICLE

Development of a Multifaceted Antimicrobial Stewardship Curriculum for Undergraduate Medical Education: The Antibiotic Stewardship, Safety, Utilization, Resistance, and Evaluation (ASSURE) Elective

Rebecca Wang , Kathleen O Degnan, Vera P Luther, Julia E Szymczak, Eric N Goren, Ashleigh Logan, Rachel Shnekendorf, Keith W Hamilton

Open Forum Infectious Diseases, Volume 8, Issue 6, June 2021, ofab231,
<https://doi.org/10.1093/ofid/ofab231>

Context

Antibiotic Stewardship, Safety, Utilization, Resistance, and Evaluation (ASSURE) Elective

Place	Pathogen	Patient
Drug	Dose	Duration
Context	Communication	Collaboration

- What professional or cultural factors may be motivating the provider or team in making antibiotic decisions?
- What questions need to be asked to better determine the motivations and context of the provider or team?

Communication

Antibiotic Stewardship, Safety, Utilization, Resistance, and Evaluation (ASSURE) Elective

Place	Pathogen	Patient
Drug	Dose	Duration
Context	Communication	Collaboration

- How should the recommendations be framed to the provider or team considering the context of antibiotic prescribing?
- What team member should be contacted to have effective discussion (eg, intern, resident, advanced practice provider, attending, consultant)?

Collaboration

Antibiotic Stewardship, Safety, Utilization, Resistance, and Evaluation (ASSURE) Elective

Place	Pathogen	Patient
Drug	Dose	Duration
Context	Communication	Collaboration

- How can you work together with the provider or team to increase trust and decrease future conflict?
- Is follow-up with the team needed?
- Should an infectious disease or other consultation be suggested?

Behavioral science in antimicrobial stewardship technology

Impact what they will do by making the right choice as easy as possible

Assessment Question One

Which of the following would be considered an antimicrobial stewardship “behavioral nudge”?

- A. Restricting broad spectrum antimicrobials to infectious diseases providers
- B. Financial incentives for providers if they meet metrics surrounding antimicrobial prescribing
- C. Antimicrobial stewardship commitment posters displayed in waiting rooms
- D. All of the above

What is a “behavioral nudge”?

- Any aspect of choice architecture/design that alters people’s behavior in a predictable way WITHOUT forbidding any options or significantly changing incentives

Cannot forbid
any options

Cannot change
economic
incentives

Must be easy
and cheap to
avoid

Commitment poster nudge

- Decreased inappropriate antibiotics prescribing for acute respiratory infections by ~20% ($P = 0.02$)*

	Poster		No Poster	
	Baseline	Final	Baseline	Final
Inappropriate prescribing rate, % (95% CI)	43.5 (38.5 – 49.0)	33.7 (25.1 – 43.1)	42.8 (38.1 to 48.1)	52.7 (44.2 – 61.9)
Absolute % change (95% CI)	-9.8 (0.0 to -19.3)		9.9 (0.0 to 20.2)	
Difference (95% CI)	-19.7 (-5.8 to -33.04)*			

Interventions Using Behavioral Science

Sociobehavioral Principle	Strategy
Give providers tools to mitigate patient pressure	Pop up in the EHR when a provider orders an antibiotic for an inappropriate diagnosis which provides: <ul style="list-style-type: none">• List of alternatives (symptomatic relief)• Tools to address patient concerns
Holding providers publicly accountable for their prescribing behavior	Free text pop up box requiring the provider to include justification for antibiotics with an inappropriate diagnosis
Leveraging peer competition	Emails with performance relative to peers

Other published antimicrobial stewardship “nudges”

- Newsletters reporting antimicrobial use and targets
- Cascade reporting of antimicrobial susceptibility

Pre-Selective and Cascade Reporting		Post-Selective and Cascade Reporting	
Ampicillin	R	Ampicillin	R
Ampicillin-Sulbactam	R	Ampicillin-Sulbactam	R
Cefazolin	R	Cefazolin	R
Ceftriaxone	S	Ceftriaxone	S
Trimethoprim-sulfamethoxazole	S	Trimethoprim-sulfamethoxazole	S
Ciprofloxacin	R	Gentamicin	S
Gentamicin	S	Nitrofurantoin	S
Nitrofurantoin	S		
Ceftazidime	S		
Cefepime	S		
Piperacillin-tazobactam	R		
Tobramycin	S		
Imipenem	S		

Meeker D, et al. *JAMA*. 2016;315(6):562-570.

Cummings PL, et al. *Open Forum Infect Dis*. 2020 Jul; 7(7): ofaa174.

Vissichelli NC et al. *Infect Control Hosp Epidemiol*. 2022 Feb;43(2):199 – 204

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Shishido A et al. *Eur J Pediatr*. 2021 Jun;180(6):1933-1940.

Assessment Question Two

Which of the following technological interventions would positively impact antimicrobial prescribing for Ethel?

- A. An alert that fires to the antimicrobial stewardship team any time an anti-pseudomonal antibiotic is ordered to facility timely review
- B. An alert that pops up for the prescriber when an anti-pseudomonal antibiotic is ordered for a patient with a diagnosis of community acquired pneumonia
- C. A decision tree within the pneumonia order set that walks the prescriber through risk factors for Pseudomonas and directs them to ceftriaxone + azithromycin unless risk factors are met
- D. All of the above



Clinical Decision Support System

Provides users (prescribers, pharmacists, patients, etc.) with knowledge and person-specific information that is “intelligently filtered and presented at appropriate times”



Keys to success:

Best knowledge
needed

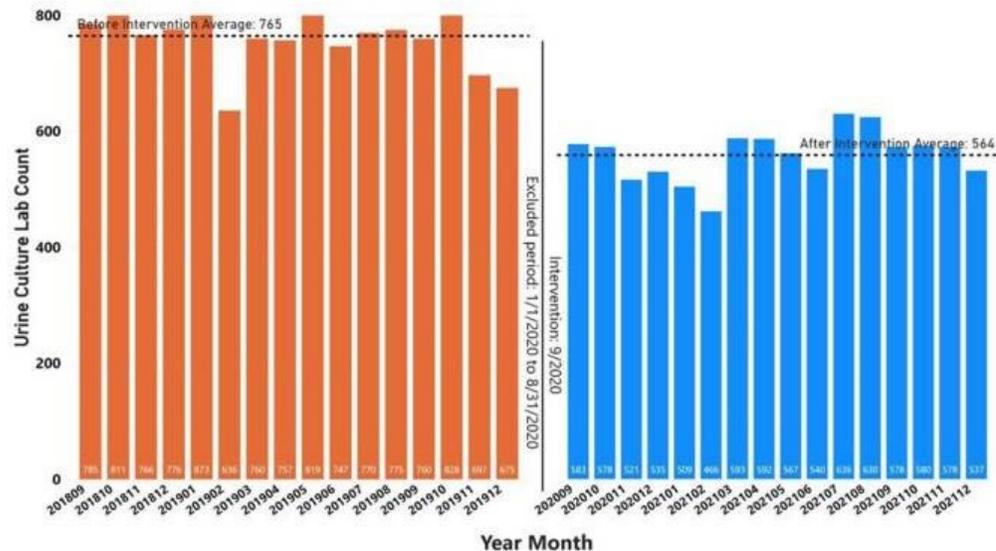
High adoption
and effective
use

Continuous
improvement

Behavioral Science

Reducing inappropriate lab ordering

- 26.3% reduction in UC orders ($P < 0.001$)
- 89.8% ordered from CDS menu
- Patient bed days remained stable pre- and post-



URINE CULTURE MAIN ORDER MENU

02 Minneapolis Clinical On-Call Schedule (Infectious Disease)

Urine Culture is NOT indicated for the following conditions alone:

- Cloudy urine
- Malodorous urine
- Discolored urine
- When a urinary catheter is placed
- Automatic on admission
- End of therapy re-testing

Urine cultures should be ordered in patients with symptoms of a urinary tract infection, during pregnancy at appropriate screening intervals, and prior to an invasive urologic procedure.

Select indication for urine culture your patient has to place lab order:

- ← 10 Fever or sepsis with no other identifiable cause
- ← 12 Dysuria, frequency, or urgency
- ← 14 Flank, suprapubic, or pelvic pain
- ← 16 CVA tenderness
- ← 18 Acute hematuria
- ← 20 Pre-operative screening for urologic procedure
- ← 22 Pregnant and due for screening
- ← 24 Increased bladder spasticity or autonomic dysreflexia in patients with spinal cord injury or neurologic deficit
- ← 26 Altered mental status with no other identifiable cause (note that UC not usually indicated, call ID with questions)

CDSS barriers: building it does not mean it will work

- Systematic review: 42 quantitative and 17 qualitative studies
- Primary care
- Human factors engineering
- CDSS worked EXCEPT when:

Nonintuitive
tools

Need for
additional
software

Barriers in
accessing

Slow
internet

Summary: Applying behavioral science to antimicrobial stewardship (AMS)



Julia Szymczak

Behavioral science:
Describes how human behaviors and decisions shape actions



Cortney Price

AMS Communication:
Address why they did what they did in any unsolicited advice

AMS Technology:
Impact what they will do by making the right choice as easy as possible

Thank you!

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