Towards a More "Human Stewardship:" Leveraging Social Sciences in Antimicrobial Stewardship Research

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• I have no financial relationships to disclose in relation to this presentation



- To review the sociobehavioral factors that shape antimicrobial prescribing
- To consider the evidence for stewardship interventions informed by social science theory
- To review best practices and practical approaches to using qualitative methods to study antimicrobial use and stewardship

Antimicrobial Stewardship is a Social Endeavor

"Our hospital leaders are always looking for an IT fix, you know, let's have a pop-up box or let's make it so the patient can't be transferred out of the unit until there is a stop date for the antibiotic. They are looking for this foolproof technological system. And yes, that is important, but I think we need to start focusing more on how we communicate this information, which is not something we were trained to do or even know much about. think stewardship suffers from heavy-handed mannerisms, like 'here come the antibiotic police.' We need to change that perception...we need to become great ambassadors. We can't just be nagging, or clicking boxes to send a recommendation, or forcing a pop up box, or sending depersonalized reports. We have to empower and engage prescribers. It's not about nagging; it's about good news. "I'm giving you great skills. This will make your life easier. I'm empowering you." We need guidance on how to engage and convince better to change behavior."

-ID physician at community hospital (Szymczak, Gerber & Hamilton study in progress)

The Landscape of Social Science Relevant to Antimicrobial Stewardship

- **Psychology** individual minds/cognition
- Sociology and Anthropology behavior of groups of humans within their societies/cultures
- Behavioral Economics psychology of economic decision making
- Social Psychology behavior as influenced by presence of others

A Sociologist Sees The Hospital as a Small Society



Charles Drew teaching interns and residents at Freedmen's Hospital in Washington, DC - 1947

- Behavior in healthcare
 organizations shaped by social
 dynamics of groups
 - Conflict
 - Status inequality
 - Face-saving and emotion management
 - Identity work
 - Hierarchies
- Medical and healthcare workplaces have distinct cultures that shape decision making and behavior

"Physicians don't like being told what to do, especially by pharmacists or fellows or someone lower on the totem pole than them. And I understand where they are coming from. They are thinking 'I went to medical school. I did a residency. I am a doctor.' Yes, the structure of medicine has changed over time and we're trying to be more open-minded. But in training it is still you are a plebe, a plebe, a plebe, a plebe, and then you become a boss. And you are told what to do, told what to do, told what to do and then you tell the plebes what to do. You've earned that. So I get that accepting stewardship restrictions can be really hard for doctors to swallow."

-ID Physician, Director of Antimicrobial Stewardship

(Szymczak, Gerber & Hamilton study in progress)

Antimicrobial Stewardship and Behavior Change

- Antimicrobial Stewardship (AS) interventions use different strategies (both persuasive and restrictive) to <u>change the prescribing behaviors</u> of frontline clinicians
 - Education
 - Audit and Feedback
 - Restricted Formularies
 - Prior Approval
- Prescribing behavior is a complex, multifactorial process

Conceptual Framework for Antibiotic Use



Adapted from Fishman, N. 2006. "Antimicrobial Stewardship" American Journal of Infection Control. 34(5)S1: S55-63.

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Social Determinants of Antimicrobial Prescribing

 Emerging literature identifies factors that drive antibiotic prescribing decisions <u>beyond</u> <u>clinician knowledge</u> of appropriate practice or <u>medical need</u>

 Medical sociologists and anthropologists have long-identified that prescribing a drug is <u>a</u> <u>highly social as well as clinical act¹</u>

Social Determinants of Antimicrobial Prescribing

- Relationships between clinicians
 - "Prescribing etiquette" norm of noninterference
- Relationships between clinicians and patients

 Patient pressure, but possible prescriber
 overestimation of patient demand
- (Mis)perception of the problem
 NIMBY Not In My BackYard

For references see Szymczak & Newland, (Forthcoming) "The Social Determinants of Antimicrobial Prescribing" in SHEA textbook, *Practical Implementation of an Antimicrobial Stewardship Program*

Social Determinants of Antimicrobial Prescribing

- Time pressures and competing priorities
 - Patient satisfaction scores
- Risk, fear and emotion
 - Decision making shaped by fear of worst case scenario
 - "Pull" of social relationships and face to face interaction stronger than "push" of guidelines or restrictive policies

For references see Szymczak & Newland, (Forthcoming) "The Social Determinants of Antimicrobial Prescribing" in SHEA textbook, *Practical Implementation of an Antimicrobial Stewardship Program*

Why should we care about the social determinants of antimicrobial prescribing?

Implications for Stewardship

- Although AS interventions have been successful to a degree, we can do better
 - Direct educational approaches generally do not result in sustained improvement¹
 - Restrictive policies can be circumvented
 - "Stealth dosing"²
 - Misrepresenting clinical information^{3, 4, 5}
 - Combining non-restricted antibiotics to get desired coverage beyond AS recommendation
 - Audits can be "gamed"⁶

(1) Arnold et al. Cochrane Database of Systematic Reviews 2005:4, (2) LaRosa et al. ICHE 2007:28, (3) Calfee et al. Jour Hosp Infec 2003:55, (4) Linkin et al. ICHE 2007:28, (5) Seemungal et al. ICHE 2012 33(4): 429-431 (6) Szymczak et al. ICHE 2014:35



Stewardship from the ground up instead of top-down?

Application of Social Science to Antimicrobial Stewardship - In Its Infancy

 Sociobehavioral determinants of prescribing are frequently overlooked in stewardship research^{1, 2}

 Majority of studies have not assessed utility of applying social science approaches to the design, implementation and evaluation of antimicrobial stewardship³

Applying Behavioral Economics and Social Psychology to Improve Prescribing: A Nudge In the Right Direction¹

(1) Gerber JAMA 2016:315(6)

Original Investigation

Effect of Behavioral Interventions on Inappropriate Antibiotic Prescribing Among Primary Care Practices A Randomized Clinical Trial

Daniella Meeker, PhD; Jeffrey A. Linder, MD, MPH; Craig R. Fox, PhD; Mark W. Friedberg, MD, MPP; Stephen D. Persell, MD, MPH; Noah J. Goldstein, PhD; Tara K. Knight, PhD; Joel W. Hay, PhD; Jason N. Doctor, PhD

JAMA. 2016:315(6):562-570.

- Test of interventions informed by social science theory
 - Suggested alternatives
 - Accountable justification
 - Peer comparison

Thinking Sociologically about Stewardship

- Investigate motivations of frontline prescribers
 - Reinterpret resistance and recalcitrance¹
 - How do those who resist define the problem and understand your solution?
 - Try to understand what is at stake surrounding behavior that is target of change and what people want to preserve²

¹Saint et al. Jt. Comm J Qual Patient Saf. 2009 35(5): 239-46; ²Pronovost BMJ Qual Saf 2011(20):560-563

Thinking Sociologically about Stewardship

 Investigate social dynamics that characterize optimal way of "doing stewardship"

Leverage the power of face to face interaction¹

- Trust accumulates over time based on repeated interactions²
- "Handshake stewardship" has shown promise without restriction or preauthorization – fostering a culture of more judicious prescribing³

(1) Pakyz et al. AJIC 2014 42: S257-S263; (2) Collins 2004 Interaction Ritual Chains Princeton University Press; (3) Hurst et al. PIDJ 2016 35(10): 1104-1110

Qualitative Methods: A Tool For Studying Culture





Two Ways of Knowing About Antimicrobial Use in Pediatric Surgery

Two Ways of Knowing About Antimicrobial Use in Pediatric Surgery

Among 151 345 surgical inpatients, 82.9% received antimicrobials for a median 2 DOT per subject (interguartile range, 1–5; range, 1–958). The most commonly received antibiotics were cefazolin (16.7% of all DOT), vancomycin (12.5%), and piperacillin/tazobactam (6.9%). The top 10 conditions contributing most to antibiotic use accounted for 51.3% of all antibiotic use. Among these, adjusted use of postoperative and perioperative vancomycin varied across hospitals among craniotomy and cardiothoracic surgery subjects (all P < .001); adjusted use of broad-spectrum antipseudomonal agents varied across hospitals among gastrointestinal surgery subjects (all P < .001).

(Kronman et al. JPIDS 2015 4(4): e100-e108)

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"I would say surgeons are very much focused on the trees and not on the forest simply because – I mean, a mom gives me her baby. She just met me. She gives me her newborn baby and says 'I trust you.' I mean, it makes me want to throw up. Really, it does. Or like a case I recently did, it was this family's only child. They had been trying for 15 years to have this kid. They did IVF six times. It's a baby. In that moment that is all that motivates me. And I know there's this big grand epidemiological scheme we should be worrying about, but I just don't see it at that moment."

(Szymczak, Hamilton and Gerber Study in Progress)

Features of Qualitative Research

- A focus on:
 - Experiences
 - Knowledge and understanding
 - Meaning that people attach to things, events, relationships and the world at large
 - Explanations people give for why they do what they do
 - How social norms and rules dictate expectations
 - Social processes and mechanisms that underlie observed associations
 - Explore phenomena in natural settings and the way they are experienced by the participant and not in categories predetermined by the researcher

A Constructivist Approach

- The Thomas theorem
 - "If men define situations as real, they are real in their consequences." (1928)
 - Interpretation of a situation shapes action
 - Crucial to take perceptions seriously, regardless of accuracy



W.I. Thomas (1863-1947)

The Pros and Cons of A Qualitative Approach

Pros

- Allows investigation of topics that are difficult to operationalize quantitatively
- Allows for discovery of unanticipated phenomena
- Generates nuanced information that can inform subsequent investigations and intervention design
- Data are compelling to multiple audiences
- Can uncover mechanisms to explain why an intervention worked or not

Cons

- Takes a tremendous amount of time (doesn't fit neatly into production pressures of academic medicine)
- Limited generalizability/small samples
- Very labor intensive (requires lots of manpower)
- Hard to publish in medical literature
- Skepticism about scientific worthiness and validity of approach (although this is changing)

Types of Methods

- Ethnography/Participant
 Observation
- Interviewing
 - Unstructured
 - Semi-structured
 - Free association
 - Life histories
 - Vignette triggers
- Focus Groups



Fieldnotes from my 2-year ethnographic study of infection prevention implementation

Sampling in Qualitative Research

- Select cases to best help investigator understand issue under study – not randomly selected; chosen because information rich and analytically useful
 - We want enough data from individuals or groups to capture variation in informants' perspectives and experiences related to our research question
- Adequacy of sample determined by variation and depth
 - Attempt to achieve "thematic or theoretical saturation"
 a moving target and requires analysis to begin before data collection is complete¹

(1) Strauss & Corbin (1998) *Basics of Qualitative Research Techniques and Procedures for Developing Grounded Theory* 2nd Edition.

Sampling in Quantitative vs. Qualitative Research

Quantitative

- Large probability samples
- Randomly selected
- Statistically representative
- Purpose: generalization and statistical comparison

Qualitative

- Relatively small samples
- Purposefully selected
- Representative (but not statistically) of the broad types of informants relevant to the research topic
- **Purpose:** selection of information-rich cases

Data Analysis

| | | | Adherence to Contact Precautions Study SP nyp - NVivo Pro | | ? |
|---|--|--------------------------|---|---|---|
| FILE HOME CREATE | DATA ANALYZE QUERY EXPLORE LA | AYOUT VIEW | | | |
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| Cases | Name / Sources Referen | | | Click to edit | |
| Relationships | Impact on Hospital Syst 2 2 | | | | |
| Minimizer Node Matrices | - importance of reducing 9 25 | Interviewee: | Yeah. And honestly I think that the masks are not as much of a problem as the gowns. Like the masks people will throw on and | arsson SPE SPE SPE Sistal Sist | ral ilin |
| | isolation garb 4 4 | | they're fine. It's the gown that is annoying. | a a a a a a a a a a a a a a a a a a a | e and / / / ed ti ti / / ed ti / |
| | gloves 3 3 | | | sity of real and real of parts of real and real of parts of real and real a | aler na se |
| | gown 9 29 | Interviewer: | Especially for people when you're wearing like a fleece or | mphi cini gativ cymention | head sto |
| | masks 4 9 | | sometning underneath. | nce litra es of stat | the an utic |
| | knowledge of infection 1 1 | Interviewee: | Yeah especially – it's just another step if you're wearing a fleece. | is man is is in tack | e sp ution |
| | Normalizing PPE 2 2 | | Like it's I think it's the same like psychological like this is annoying | Sin Pre | Direc |
| | nurse 7 15 | | for me to put this gown on happens no matter what. But then if | e e e e e e e e e e e e e e e e e e e | t pati. |
| | pathogen 2 2 | | is probably a vulnerable time because you're tried. Usually if you're | Real Provide American State | ent c |
| | C. difficile 6 12 | | going in to see a patient it's for specific one reason or specific | kiio kiio | ontac |
| | CRE 2 6 | | reason that may be very quick. You're usually wearing your jacket. | | t vs. |
| | MRSA 6 21 | | I ou can thit your arms in the thing with your jacket on and then so I think all of those the fatigue component the practical | | <u>6</u> |
| | resistant gram nega 4 5 | | component, the why you're going in the room component all sort of | | |
| | Viral illnesses 1 4 | | intersect at night time and make it I think, I would imagine a more | | àir a |
| | VRE 4 6 | | challenging time than during the day. | | avi. |
| | perception of efficacy o 7 14 | Interviewer: | Ok. That's interesting. | | 0 |
| | Performance Monitorin 3 5 | | | | 12 I I I I I |
| | Personal devices 4 5 | Interviewee: | Yeah. And I guess the other thing that I haven't mentioned that I | | comp |
| | Personal role and respo 4 9 | | should mention as an ICU person is that sometimes when patients | | gent |
| | physical layout of healt 6 14 | | people don't put on the contact precautions because that minute | | prio or ur |
| | - physician 3 4 | | then becomes really important. Which I think that probably | | ities gent |
| | Rationale for precautio 4 11 | | everyone would acknowledge that those situations are going to | | stra |
| E Sources | - Reduced patient interac 5 7 | | to be less than perfect but kind of in terms of weighing things it's | | Ē |
| Nadar | Repetition or Practice 1 3 | | probably better if you get into the room more quickly. | | |
| INDUCS | - risk 6 31 | | | | |
| Classifications | Role of leadership in pr 1 2 | Interviewer: | Right. | | |
| Collections | self protection 4 9 | Interviewee | But I think that that situation is pretty rare compared to all of the | | |
| | Signage and alerts to pr 4 9 | | other things that I mentioned. | | |
| Queries | speaking up 2 3 | | | | 545 BB |
| Reports | statting 1 1 | Interviewer: | 1 guess for patients and families them selves do you think they play any role in being a barrier or facilitating contact precautions? | mily | |
| X Maps | Drag selection here to code to a new node | | any toto in being a barrer or racintating contact precatitons? | | |
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Demonstrating Rigor in Qualitative Research

- Meticulous record keeping; demonstrating a clear decision trail
- Awareness and mitigation (where possible) of bias across lifecycle of research project
- Including rich verbatim descriptions of participants' accounts
- Analyzing data in a team
- Member checking and respondent validation
- Data triangulation
- Negative case analysis

Summary

- Use of antibiotics shaped by social, behavioral and contextual factors
- More attention needs to be paid to these factors in design and implementation of stewardship
- Interventions informed by sociobehavioral theory have shown promise in improving prescribing
 - More research needed on sociobehavioral interventions and social "best practices" for doing stewardship
- Qualitative research methods can generate valuable knowledge that can inform the design and implementation of stewardship

Questions? Interest in Collaboration?

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Getting unnecessary antibiotics while conducting an ethnographic study of infection prevention in a Zambian hospital, July 2016

Appendix: Planning an Interview Study - Practical Considerations

How do prescribing clinicians in the neonatal intensive care unit (NICU) perceive antimicrobial stewardship interventions?

- Review literature to see what is known on topic aim to build, refine, expand.
- Determine sampling strategy what axes of variation do you want to examine? Estimate sample size for each cell.
 - Level of neonatal care (I-IV)
 - Prescriber type (Attending physician, Fellow Physician, Resident Physician, Nurse Practitioner, Physician Assistant)
 - Presence, absence and/or maturity of antimicrobial stewardship program at the hospital
 - Geographic location
- Think about triangulation other types of data you might gather?
 - Documents relating to stewardship
 - Observations of meetings where stewardship is discussed
 - Survey following interviews to determine distribution of perceptions
- Identify data collection sites and find a key informant to help you gain access.
- Obtain IRB approval.

How do prescribing clinicians in the neonatal intensive care unit (NICU) perceive antimicrobial stewardship interventions?

- Create interview guides based on literature review and feedback from key stakeholders.
- Pilot interview guides with small sample of respondents from each sample subpopulation. Revise interview guides.
- Determine who will be conducting the interviews (1 person? 2?), ensure they are trained in interview technique (probing, redirection, etc.) and are very familiar with the interview guide.
- Recruit respondents with help from key informant. Schedule interviews. Be patient.
- Conduct interviews. Record interviews with permission of respondent.
- Review interviewer notes and audio within 1 week of completion of interview to identify issues, emergent patterns and begin monitoring for saturation.
- Have interview audio transcribed verbatim.
- Assemble analytic team, define analytic plan, determine which QDA software package you'll use for coding and data management.

How do prescribing clinicians in the neonatal intensive care unit (NICU) perceive antimicrobial stewardship interventions?

- > Begin analysis. Example analytic strategy:
 - Generate code list
 - Apply codes to data
 - Have periodic meetings with team to discuss emerging findings, test interpretations and clarify issues.
 - Assess intercoder reliability periodically. Ensure codes are being applied to the data consistently.
 - Explore variation in themes by NICU type, prescriber type, presence/absence of stewardship intervention.
 - Create visual models to represent themes and interconnections between them.
 - Prepare tables with exemplar quotes to support key themes
- If member checking, present preliminary analyses to key stakeholders and respondents.
- Prepare scholarly manuscripts.