

Towards a More “Human Stewardship”

Leveraging Social Sciences in Antimicrobial Stewardship Research

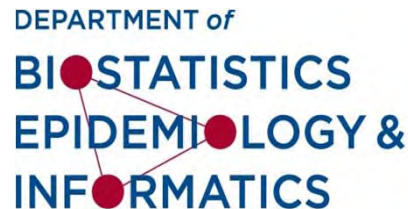
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SHEA Antimicrobial Stewardship Research Workshop

Chicago, IL

November 16, 2017

Disclosures

- I am serving as a participant in a 2017 Merck Scientific Input Engagement meeting

Objectives

- 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

Audience Polling Question #1

I believe that disseminating evidence based guidelines endorsed by a professional society is the best way to improve antimicrobial use.

- a.) Yes
- b.) No

Audience Polling Question #2

I believe that implementing healthcare information technology-based solutions is the best way to improve antimicrobial use.

- a.) Yes
- b.) No

Audience Polling Question #3

I feel comfortable telling prescribers in other specialties or those who have been in practice much longer than I have or those in leadership positions to modify their antimicrobial prescribing. (Be honest!)

- a.) Yes
- b.) No

Antimicrobial Prescribing is Socially Mediated

“We have such a fear in oncology of therapy related toxicity and infectious mortality because we are taking our patients and doing this to them. We are making them compromised. And for many of our patients, other than progression of their primary disease, infection is the biggest cause of death...Mostly the way that we think about it is that oncology patients are a small portion of antibiotic use and the risk to the individual is greater than the risk to society and that we need to focus on the individual patient and making sure that this person who’s sitting in front of us who has plastic in them and who is febrile, has no immune system, whose family is sitting there, who you’ve known for a long time, who you have a relationship with, whose victories you’ve celebrated and you just want to do everything for them. You’ve compromised them, you feel emotionally compelled to do something.”

-Interview, Oncologist

(Szymczak, Gerber & Hamilton Study in Progress)

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.** I 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



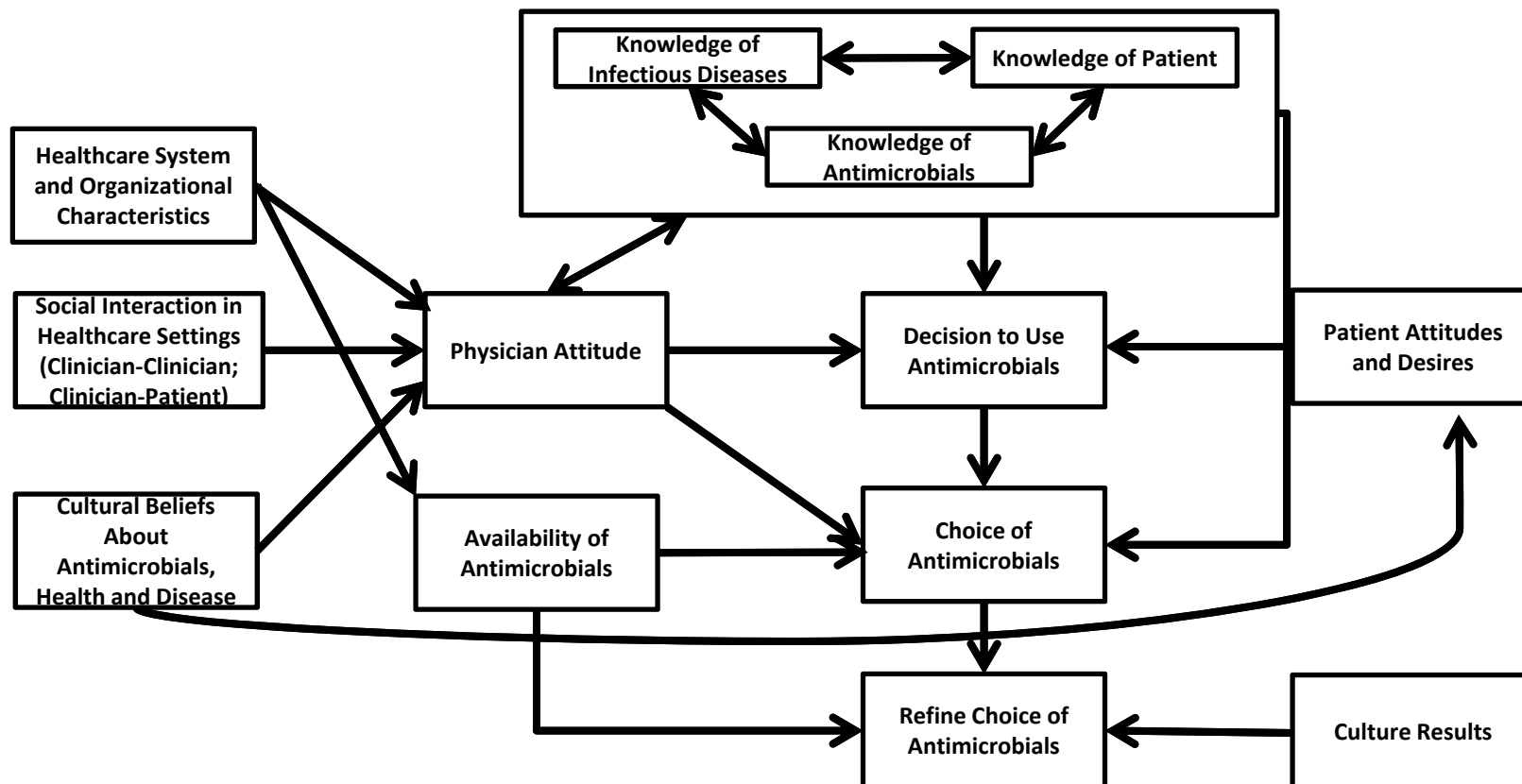
Charles Drew teaching interns and residents at Freedmen's Hospital in Washington, DC - 1947

- 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

Antimicrobial Stewardship and Behavior Change

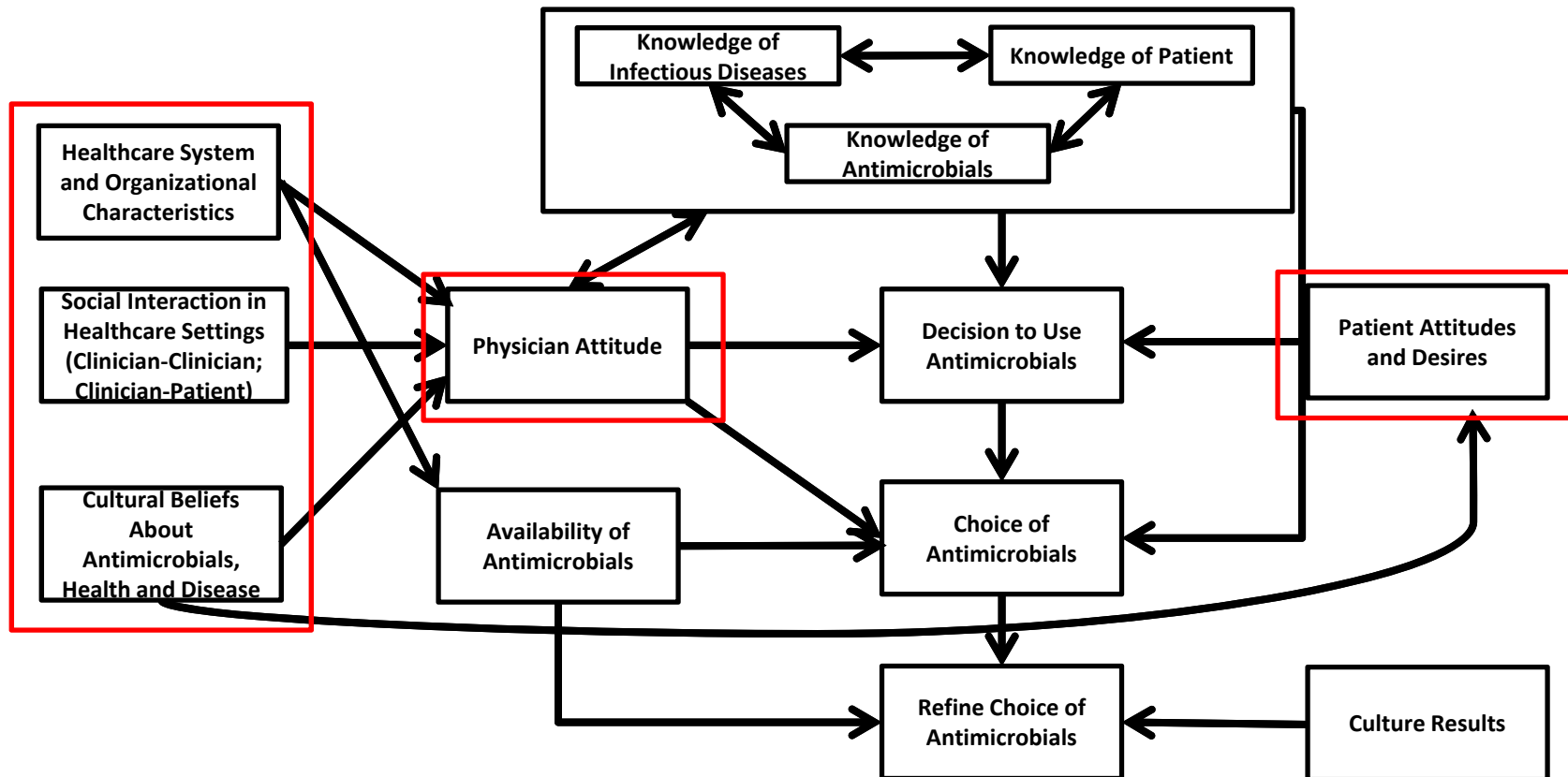
- Antimicrobial Stewardship (AS) interventions use different strategies (both persuasive and restrictive) to **change the prescribing behaviors** of frontline clinicians
 - Education
 - Audit and Feedback
 - Restricted Formularies
 - Prior Approval
- Prescribing behavior is a complex, multifactorial 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 **beyond clinician knowledge** of appropriate practice or **medical need**
- Medical sociologists and anthropologists have long-identified that prescribing a drug is **a highly social as well as clinical act**¹

¹van der Geest et al. Ann Rev Anthropology 1996 (25): 153-178.

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

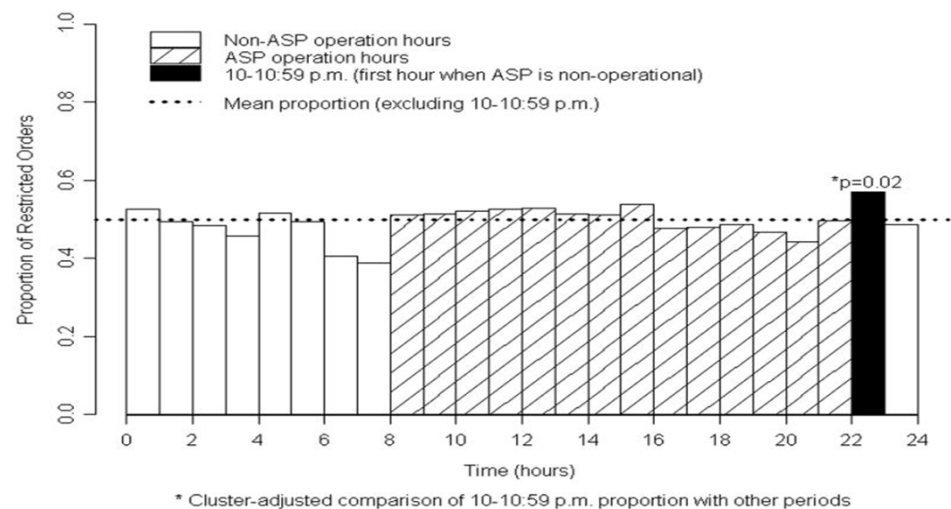
- Time pressures and competing priorities
 - Patient satisfaction scores
- Risk, fear and emotion
 - Decision making shaped by fear of worst case scenario
 - “Pull” of social relationships and face to face interaction stronger than “push” of guidelines or restrictive policies

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



Linkin et al. ICHE 2007:28

(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
 - Notable exceptions: behavioral economics^{4, 5} and participatory action research⁶

(1) Charani et al. Clin Infect Dis 2011;53, (2) Charani et al. Infect Dis Clin N Am 2014;28, (3) Davey et al. Cochrane Database Syst Rev 2013: 4, (4) Meeker et al. JAMA Intern Med 2014;174(3):425-431, (5) Meeker et al. JAMA 2016;315(6):562-570, (6) Sikkens et al. JAMA Intern Med 2017: 177(8): 1130-1138.

From: **Behavioral Approach to Appropriate Antimicrobial Prescribing in Hospitals** **The Dutch Unique Method for Antimicrobial Stewardship (DUMAS) Participatory Intervention Study**

JAMA Intern Med. 2017;177(8):1130-1138. doi:10.1001/jamainternmed.2017.0946

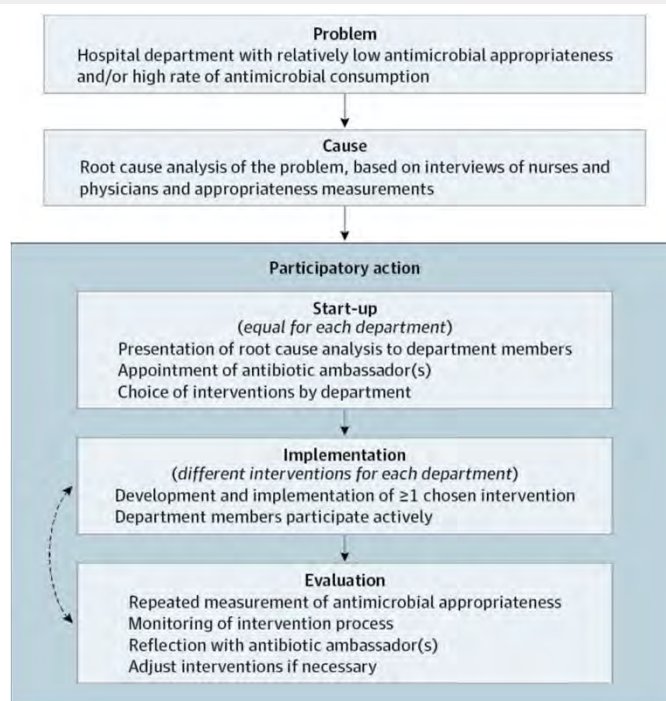
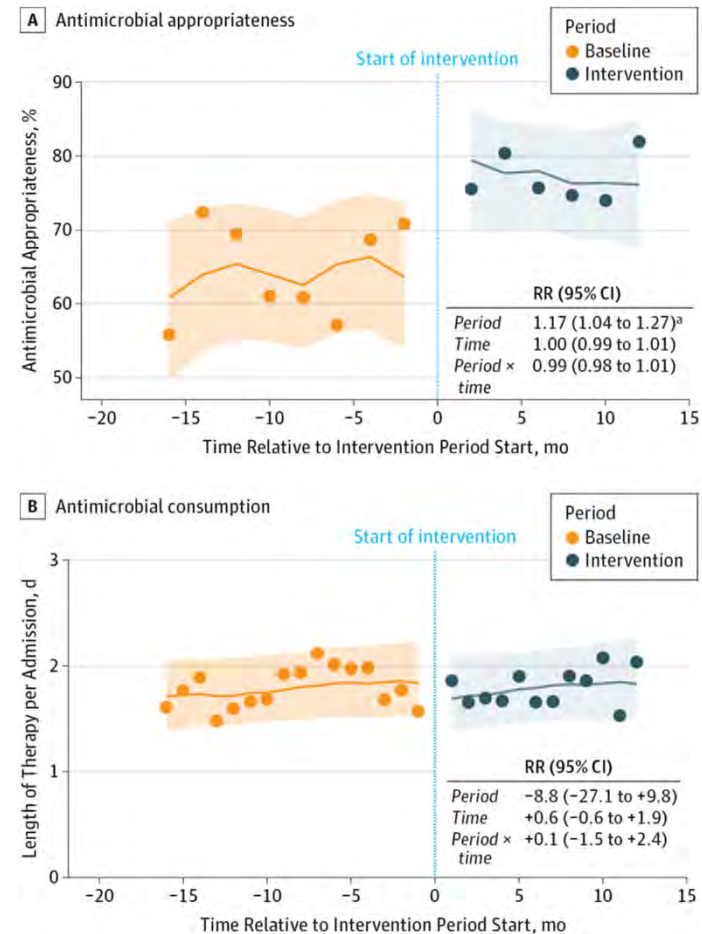


Figure Legend:

Intervention Approach Used in the Current Study

- Intervention draws on 3 behavioral principles
 - Respect for prescriber autonomy to avoid resistance
 - Inclination of people to value a product higher and feel more ownership if they made it themselves (“Ikea effect”)
 - Tendency for people to follow up on an active and public commitment



Thinking Sociologically about Stewardship

- Investigate motivations of frontline prescribers
 - How do those who resist define the problem and understand your solution?¹
 - 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

**Qualitative Methods:
A Tool For Studying Meaning and 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 (interquartile 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.”

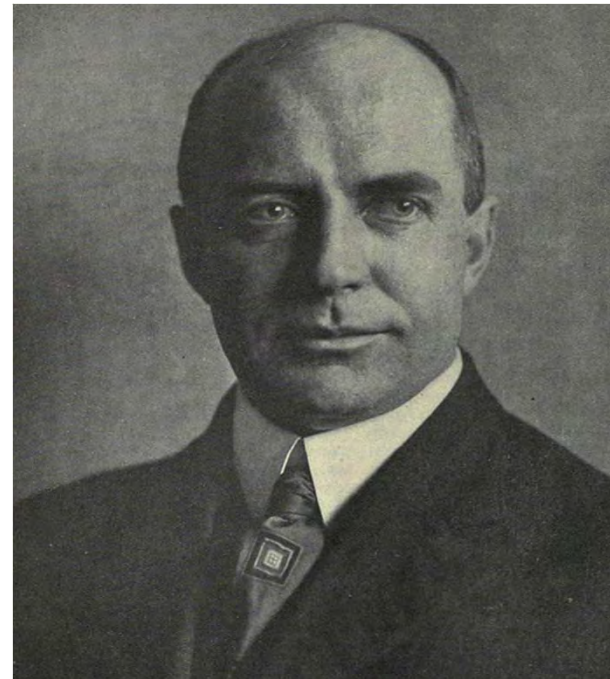
(Szymczak, Hamilton and Gerber Study in Progress)

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

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

Kielmann, Cataldo and Seely (2012) *Introduction to Qualitative Research Methodology*

Data Analysis

The screenshot displays the JES (Knowledge Studio) software interface, which is used for building and analyzing knowledge graphs. The interface is divided into several main sections:

- Top Menu Bar:** Includes FILE, HOME, CREATE, DATA, ANALYZE, QUERY, EXPLORE, LAYOUT, and VIEW.
- Left Sidebar:** Contains navigation options like Navigation View, Find, Quick Coding, and a list of Nodes, Cases, Relationships, and Node Matrices.
- Central Workspace:** Displays a list of nodes on the left and a large text area in the center showing interview transcripts. The nodes list includes items like "Impact on Hospital Syst", "importance of reducing", "isolation garb", "gloves", "gown", "masks", "knowledge of infection", "Normalizing PPE", "nurse", "pathogen", "C. difficile", "CRE", "MRSA", "resistant gram nega", "Viral illnesses", "VRE", "perception of efficacy o", "Performance Monitorin", "Personal devices", "Personal role and respo", "physical layout of heal", "physician", "Rationale for precautio", "Reduced patient interac", "Repetition or Practice", "risk", "Role of leadership in pr", "self protection", "Signage and alerts to pr", "speaking up", "staffing", and "supply of PPE".
- Right Panel:** A visualization area showing a network graph with nodes and edges, color-coded by category.
- Bottom Bar:** Shows the current project name (JES), item count (69 items), node count (53), reference count (226), and a status bar indicating "Read-Only" and "Line: 12, Column: 0".

The interview transcripts in the central workspace show a conversation between an interviewer and an interviewee, discussing topics related to hospital safety and infection control. The interviewee mentions that masks are not as much of a problem as the gowns, and that the masks people will throw on and they're fine. The interviewer asks about the situation when wearing a fleece or something underneath. The interviewee responds that it's just another step if you're wearing a fleece, and that it's the same like psychological like this is annoying for me to put this gown on happens no matter what. But then if you're like in the middle of the night because I think the night time is probably a vulnerable time because you're tired. Usually if you're going in to see a patient it's for specific one reason or specific reason that may be very quick. You're usually wearing your jacket. You can't fit your arms in the thing with your jacket on and then so I think all of those, the fatigue component, the practical component, the why you're going in the room component all sort of intersect at night time and make it I think, I would imagine a more challenging time than during the day. The interviewer asks if that's interesting. The interviewee responds that they should mention as an ICU person is that sometimes when patients are acutely deteriorating and you need to get in the room quickly people don't put on the contact precautions because that minute then becomes really important. Which I think that probably everyone would acknowledge that those situations are going to happen and that's a time where we can not accept that we're going to be less than perfect but kind of in terms of weighing things it's probably better if you get into the room more quickly. The interviewer asks if that's right. The interviewee responds that they think that that situation is pretty rare compared to all of the other things that I mentioned. The interviewer asks if they guess for patients and families themselves do you think they play any role in being a barrier or facilitating contact precautions? The interviewee responds that they think that's a good question. I think of line one that makes

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
- Qualitative research methods can generate valuable knowledge that can inform the design and implementation of stewardship

Questions?

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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?

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 - Level of neonatal care (I-IV)
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- Identify data collection sites and find a key informant to help you gain access.
- Obtain IRB approval.

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- Assemble analytic team, define analytic plan, determine which QDA software package you'll use for coding and data management.

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- 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

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 - Prepare tables with exemplar quotes to support key themes
- If member checking, present preliminary analyses to key stakeholders and respondents.
- Prepare scholarly manuscripts.