Nurses - The Central Stewards of Antibiotic Safety: Strategies for Engagement

Elizabeth Monsees, PhD, RN, CIC, FAPIC, FSHEA

Children's Mercy: Senior Director – Infection Prevention & Stewardship Integration

UMKC School of Medicine: Assistant Professor

2024 Nebraska Antimicrobial Stewardship Summit

No disclosures

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JOY IN MEDICINE Recognized Organization 2023

BEST CHILDREN'S HOSPITALS U.S.News RANKED IN 9 SPECIALTIES

MAGNET RECOGNIZED AMERICAN NURSES CREDENTIALING CENTER

UMKC School of Medicine

KU SCHOOL OF MEDICINE The University of Kansas

2002 Community Hospital

You never know what experience/conversation will have a deep impact

2012 Clinical Safety

2015 Studying RN/ASP

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Learning Objectives:

- **Review the current science of nurse integration into antibiotic stewardship**
- Identify practical examples of how stewards and infection preventionists can build nurse collaboration into stewardship efforts
- Demonstrate the synergistic relationship between stewardship and infection prevention

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Nurses can and should make significant contributions to antibiotic safety

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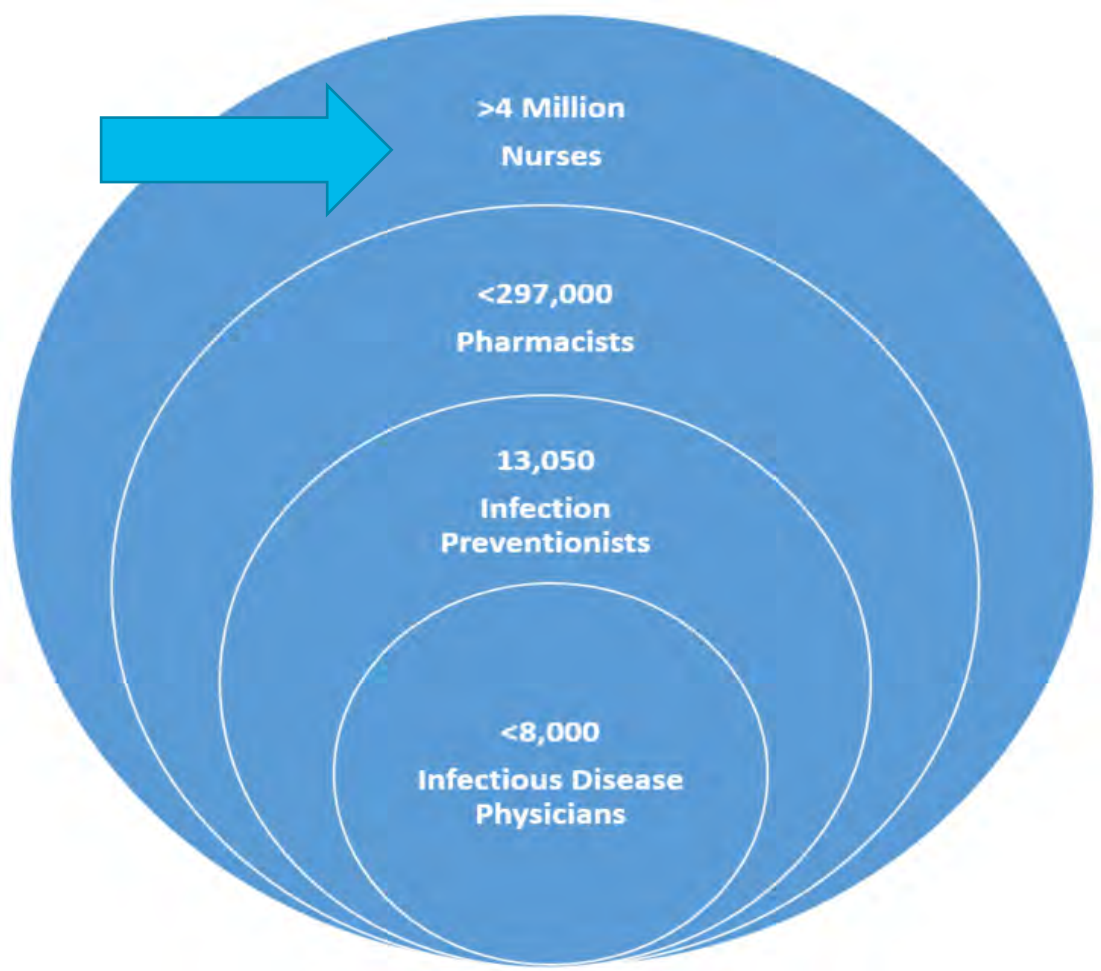
Why Nurses?



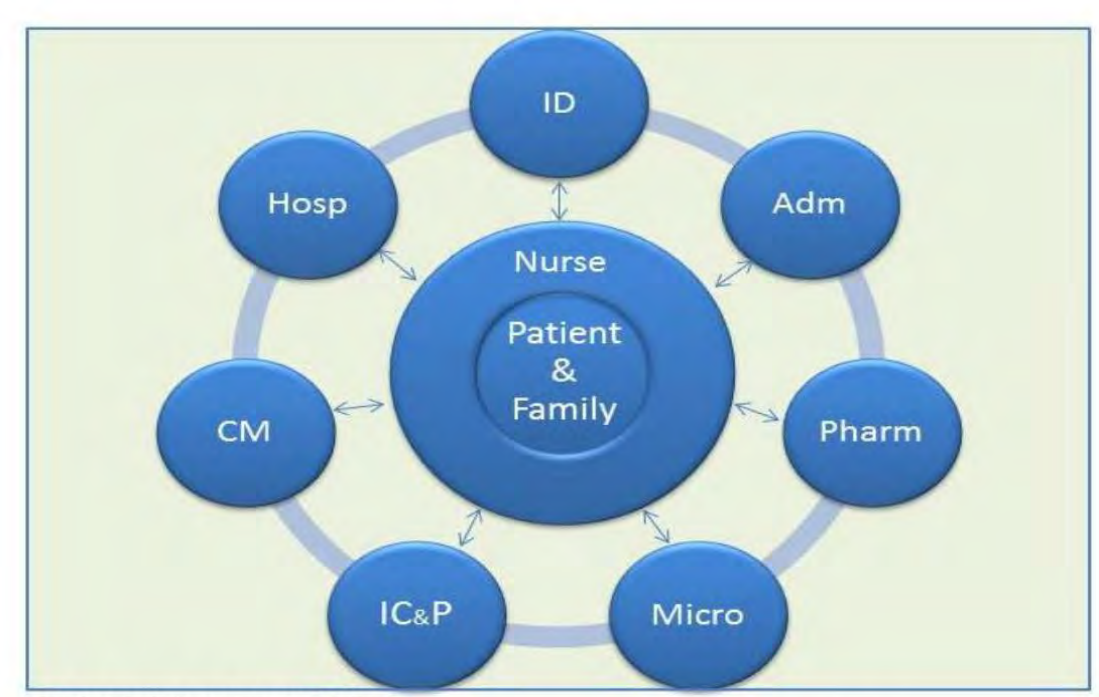


Fig 1: Workflow Communication
ID-Infectious Disease Adm-Administration Pharm-Pharmacy Micro-Microbiology
IC&P-Infection Control/Prevention CM-Case Management Hosp-Hospitalist

CDC – ANA (2017) White Paper: Redefining the Antibiotic Stewardship Team

American Journal of Infection Control 45 (2017) 917-22

Contents lists available at ScienceDirect

American Journal of Infection Control

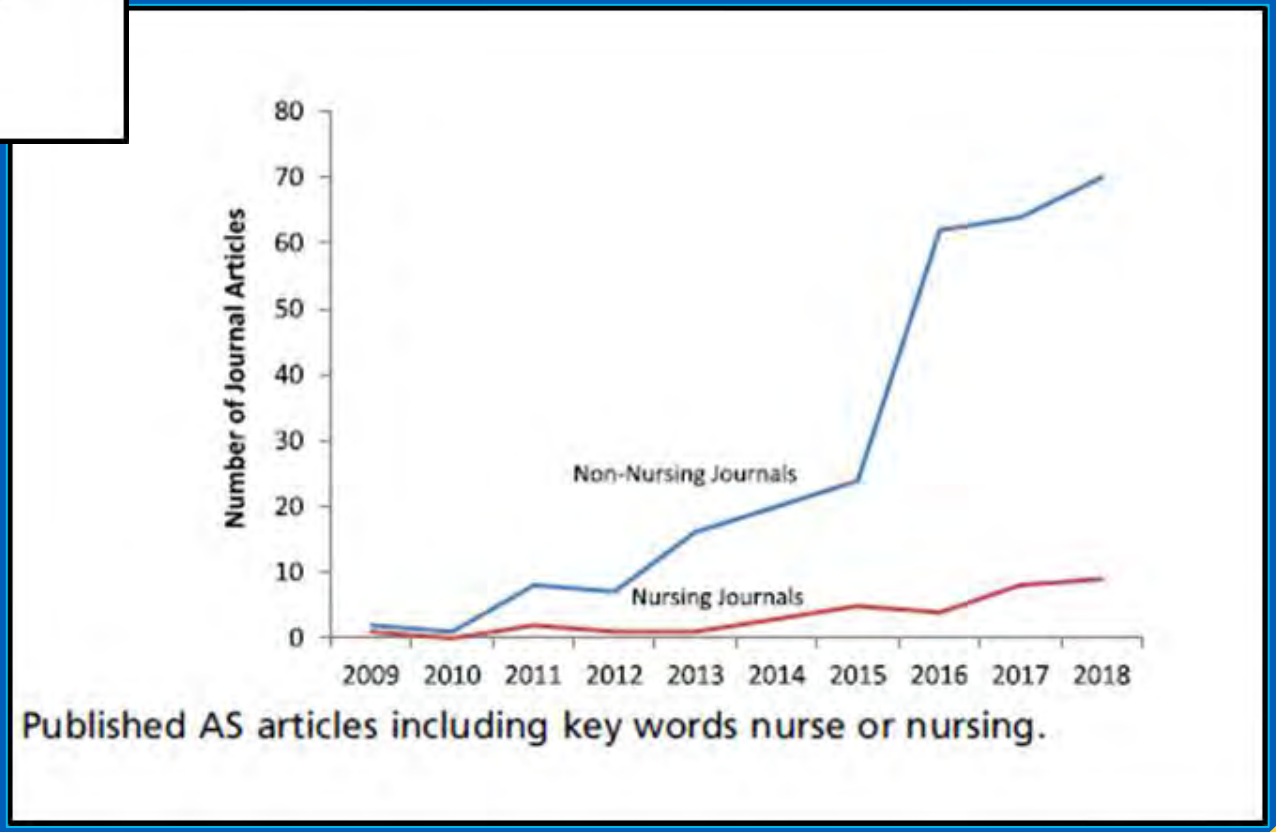
journal homepage: www.ajicjournal.org

State of the Science Review

Staff nurses as antimicrobial stewards: An integrative literature review

Elizabeth Monsees MSN, MBA, RN, CIC [a,*], Jennifer Goldman MD, MS [b,c], Lori Popejoy PhD, APRN, GCNS-BC [d]

- Nurses do not have access to ASP education
- Patient safety culture influences participation



Published AS articles including key words nurse or nursing.

Olans (2020) Infect Dis Clin N Am

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Drug Therapy in Infectious Diseases

There are today about six hundred antimicrobial preparations available in this country. Yet severe infectious diseases persist as a major medical hazard.

James Whitney Hall, III

On December 9, 1938, a young housewife experienced the sudden onset of severe chills, fever, and chest pain leading to collapse and emergency admission to the hospital. She was cyanotic, barely conscious, and coughing gray sputum flecked with blood. Type IV pneumococci grew abundantly in her sputum and blood cultures. Despite oxygen, antipneumococcal serum, and detailed care, toxicity persisted and she died of the pneumonia—two days later.

This tragic course to death was characteristic of 30 to 60 percent of persons afflicted with pneumococcal pneumonia—and the grim pattern existed with many other systemic bacterial infections. Most of us who have trained and practiced within the last two decades have rarely seen death due to uncomplicated acute pneumonia. This is primarily because of the development of potent antibiotics—beginning with the sulfonamides (1939) and penicillin (1941). Subsequently, streptomycin (1945), the tetracyclines (1948), chloramphenicol (1948), antituberculous drugs (para-aminosalicylic acid in 1948 and isoniazid in 1952), and more recently an array of polypeptide derivatives (vancomycin, polymyxin, and others) have appeared.

With the increasing administration of these antibiotics, such infections as pneumonia, meningitis, osteomyelitis, tuberculosis, and syphilis were actively treated and prevented, leading to an optimism that extended to such speculations as those of Huxley, who popularized the notion of a "germ-free world." (1)

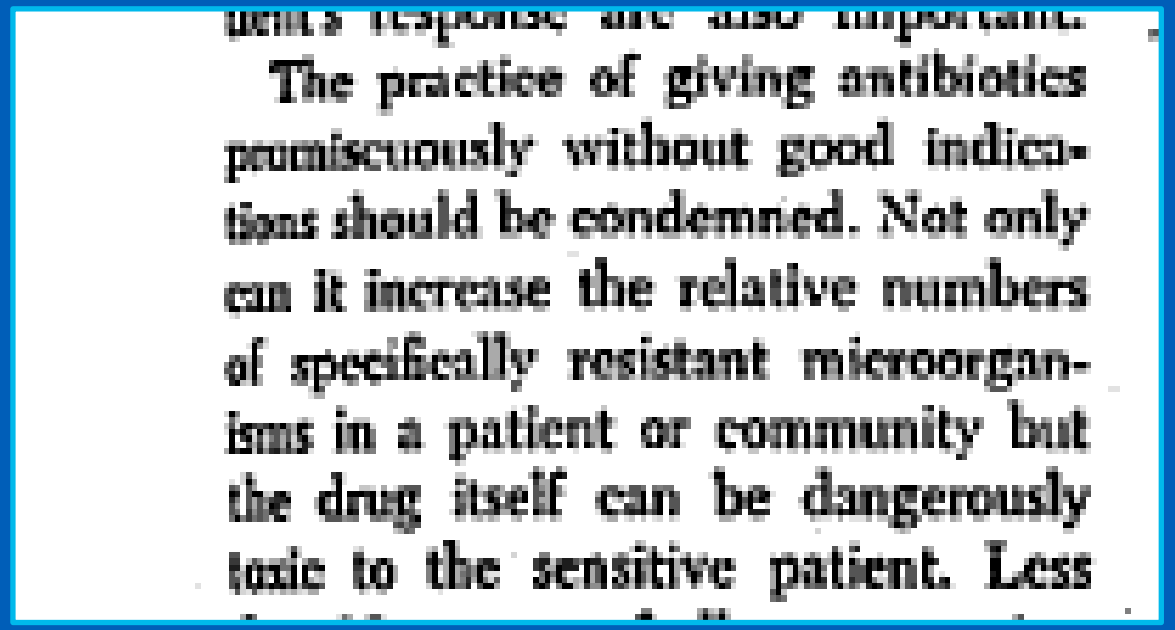
Today approximately 600 antimicrobial preparations are available in this country, yet in striking contrast to the early hopes, severe infectious diseases persist as a major medical hazard. Why? What types of microorganisms have successfully resisted the onslaught of antibiotics to produce continuing critical problems?

Physicians in the brief span of 20 years of the antibiotic era have been forcibly reminded of the biologic principle crystallized by Charles Darwin: that man exists in a mutually interdependent relationship with other living forms, including microorganisms as well as other animals and plants. Many bacteria are obviously beneficial, even crucial, while others are capable of producing disease. When certain groups are destroyed, others appear in their place, frequently by "survival-of-the-fittest" mechanisms, resulting in increased resistance to noxious agents.

Thus the profound impact of widespread antibiotic usage and public health measures, which unquestionably have been responsible for saving many thousands of lives, have not achieved the obliteration of harmful bacteria as was once naïvely hoped. At the same time dynamic changes in man himself—attaining increased longevity, for example, and thus increasing the hazards of malignant and degenerative diseases—have provided in many instances fertile soil for the development of sepsis. Today, then, we are facing a spectrum of infectious diseases which in many respects is very different than that of a decade or two ago—a spectrum that will perhaps become even more challenging and complex as our increasing knowledge of microbiology uncovers more of the vital processes which govern the delicate balance between man and his parasites.

Principles of Treatment

As in all medical practice, sound treatment depends inherently on accurate diagnosis. Hence the exact focus and extent of a given infection, knowledge of any complicating factors, and a precise culture to identify the bacteria are prerequisites to planning care. It is not always practical to get cultures for all common uncom-



...host's response are also important.

The practice of giving antibiotics promiscuously without good indications should be condemned. Not only can it increase the relative numbers of specifically resistant microorganisms in a patient or community but the drug itself can be dangerously toxic to the sensitive patient. Less

American Journal of Nursing 1961

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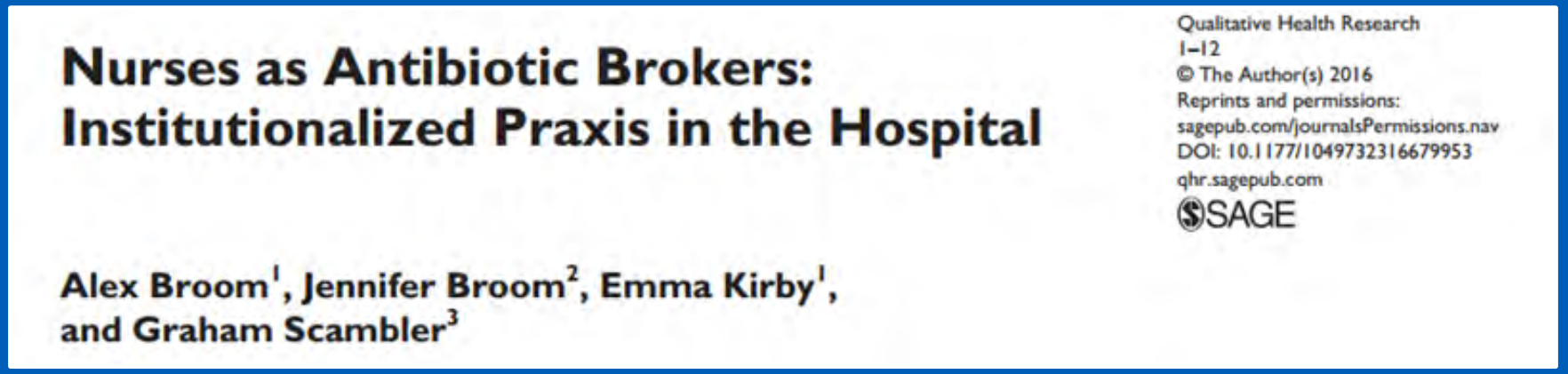
Slide used with permission: Dr. Mary Lou Manning

1. Initiating the Conversation



Nurses as Antibiotic Brokers: Institutionalized Praxis in the Hospital

Alex Broom[1], Jennifer Broom[2], Emma Kirby[1], and Graham Scambler[3]

Qualitative Health Research
1–12

DOI: 10.1177/1049732316679953
qhr.sagepub.com
SAGE

Nurse: "…well, for me personally, it's always the patient's side. If they're unwell I'm going to push for whatever they need… for that time it's all about them."

2. Reframing “Stewardship”

- Perceived as a prescriber-to-prescriber work process[1]
  - AS not routinely addressed nursing curriculums[2]

- Consider crafting messages in language familiar to nurses[3]
  - Nurses view patient safety as an essential work function
  - Stewardship as optimization of therapies through:
    - antimicrobial management, antibiotic safety, medication safety

1 Monsees, et al. (2018) AJIC
2 Carter, et al. (2018) AJIC
3 Hou, et al. (2018) AJIC

Melanoma Associated With Long-term Voriconazole Therapy

A New Manifestation of Chronic Photosensitivity

FDA Drug Safety Communication: FDA requires label changes to warn of risk for possibly permanent nerve damage from antibacterial fluoroquinolone drugs taken by mouth or by injection

[8/15/2013]

FDA News Release

FDA updates warnings for fluoroquinolone antibiotics on risks of mental health and low blood sugar adverse reactions

For Immediate Release July 10, 2018

Severe Acute Respiratory Failure in Healthy Adolescents Exposed to Trimethoprim-Sulfamethoxazole

Jenna O. Miller, MD, FAAP,[a] Jane Taylor, MD, MS,[b] Jennifer L. Goldman, MD, MS[c,d]

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JAMA Internal Medicine | Original Investigation

Association of Adverse Events With Antibiotic Use in Hospitalized Patients

Pranita D. Tamma, MD, MHS; Edina Avdic, PharmD, MBA; David X. Li, BS; Kathryn Dzintars, PharmD; Sara E. Cosgrove, MD, MS


Journal of the Pediatric Infectious Diseases Society

ORIGINAL ARTICLE

Antibiotic-Associated Adverse Events in Hospitalized Children

Rebecca G. Same,[1,0] Alice J. Hsu,[2] Sara E. Cosgrove,[3,0] Eili Y. Klein,[4] Joe Amoah,[1] Adam L. Hersh,[5] Matthew P. Kronman,[6] and Pranita D. Tamma[1,0]

- 20% AE in adults and pediatrics
- Hematologic, renal and GI most prevalent
- Adults: every additional 10 days of antibiotic therapy = 3% increased risk
- Children: 1 day of antibiotics = increased risk (7%)
- Children underrepresented in safety data
- Comprehensive AE data are lacking
  - Rely on voluntary reporting
  - Specific AEs not linked with specific antibiotics
- **Clinicians may not be aware of the concrete dangers of antibiotics**

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Stewardship Recommendation Spotlight

Antimicrobial Stewardship Program (ASP) reviewed the chart of an infant receiving IV antibiotics for a urinary tract infection and bacteremia. The primary **team was planning to place a PICC line** and treat with **IV antibiotics for 14 days in the hospital**. ASP provided the team with **updated literature** which suggests positive outcomes with **use of oral antibiotics** in this situation.

Because of this intervention, the patient was able to **avoid a PICC line**, **associated complications**, and **prolonged hospital stay** during the pandemic.

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- Allergy History
- Culture Acquisition
- Microbiology Results
- Antibiotic "Time Outs"
- Adverse Events
- Medication Reconciliation
- Drug Therapeutics
- IV to PO Transition
- Patient Education
- Provider Communication
- Device Management
- Preventing *C. difficile*

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3. Clarifying Role

"Some of these questions are confusing to me because in a lot of situations **it is not my place to question a physician's antibiotic orders.** I do not have the amount of education they do in this area. I find it unfair to expect RNs to do this.

Educating patients and other tasks regarding administration of antibiotics is within our scope. Perhaps it is the pharmacists who need to be involved more than RNs in checking physician antibiotic orders (although I believe they already do and do a good job in my experience). Thanks!"

-Surgical/Telemetry Nurse (6-10 years experience)

Monsees, et al. (2020) AJIC

9 Hospital Survey of Nurse AS Perspectives

- Recognized nurse practices supporting AS processes
- Reported limited education
  - Trust the system to ensure medication appropriateness
  - Disconnect between antibiotic management & medication safety
- Identified sociobehavioral influencers
  - Improve communication & team relationships

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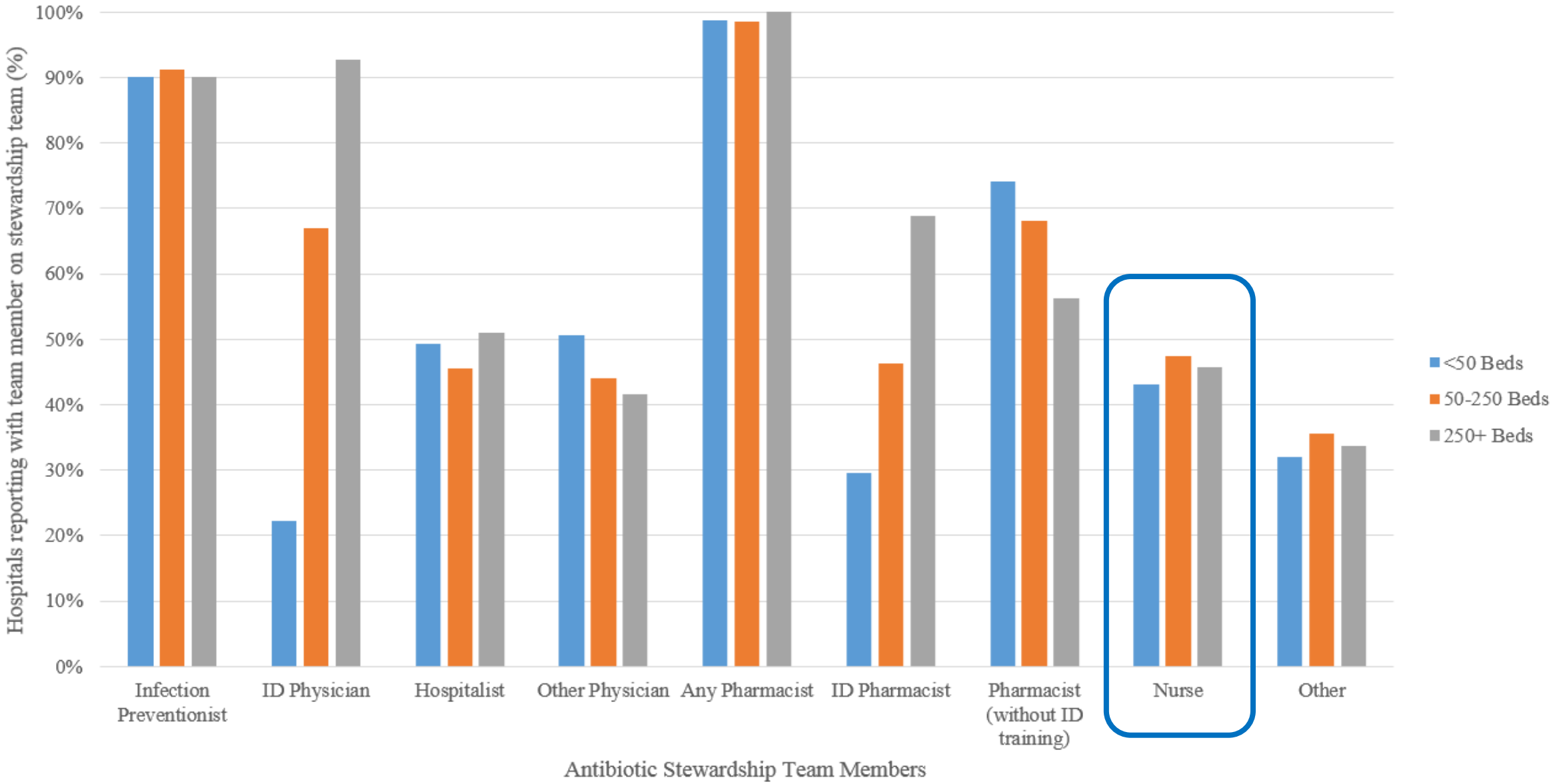
Monsees, et al. (2020) AJIC

Figure 1. Composition of Antibiotic Stewardship Teams, by Bed Size; N=493 Hospitals



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Vaughn, et al. (2020) ICHE

Contents lists available at ScienceDirect

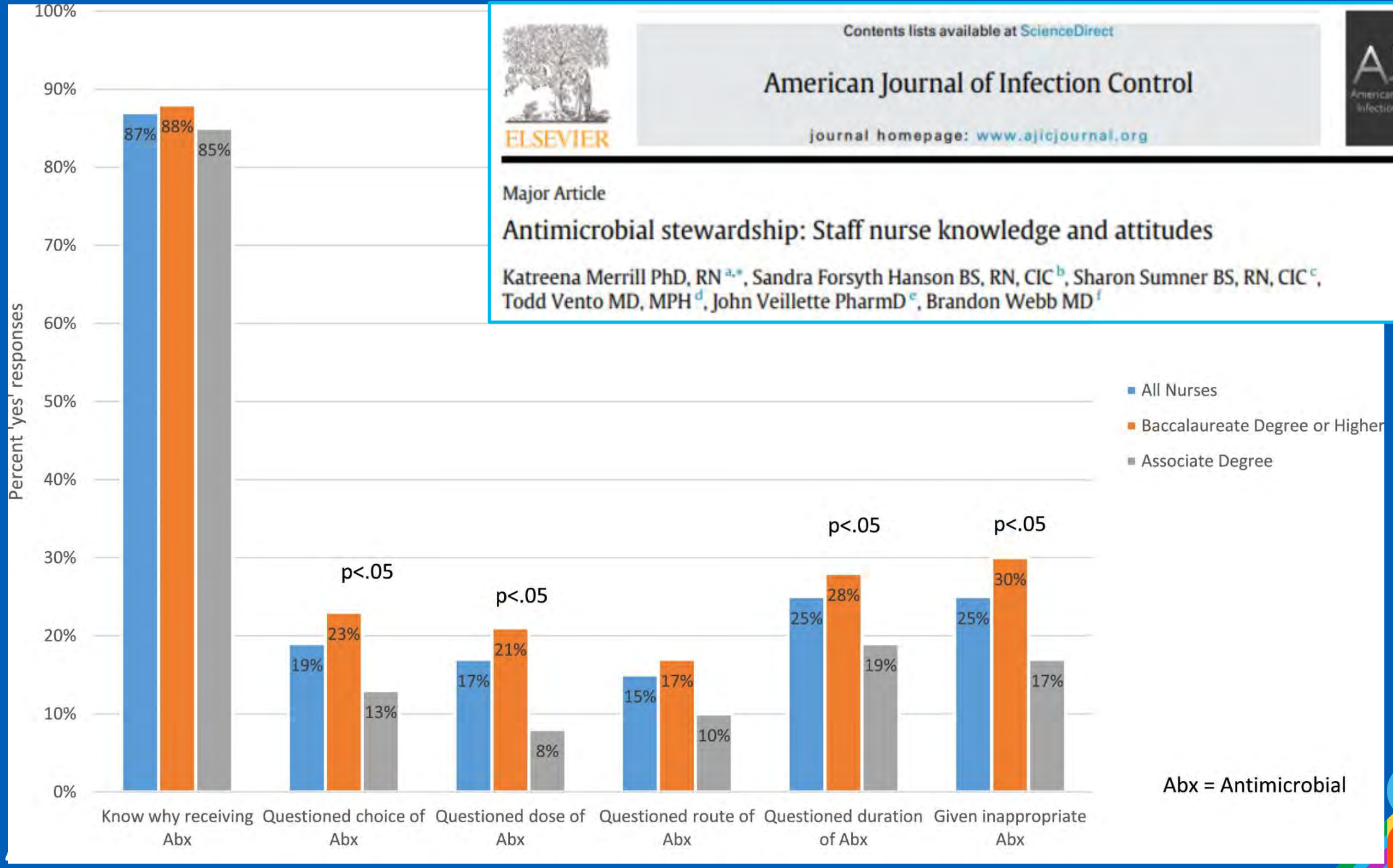
American Journal of Infection Control

journal homepage: www.ajicjournal.org

Major Article

Antimicrobial stewardship: Staff nurse knowledge and attitudes

Katreena Merrill PhD, RN [a,*], Sandra Forsyth Hanson BS, RN, CIC [b], Sharon Sumner BS, RN, CIC [c], Todd Vento MD, MPH [d], John Veillette PharmD [e], Brandon Webb MD [f]



Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Major Article

Knowledge, attitudes, and practices of bedside nursing staff regarding antibiotic stewardship: A cross-sectional study

Salma Abbas MBBS, MPH [a], Kimberly Lee PharmD [b], Amy Pakyz PharmD, PhD [c], Daniel Markley DO, MPH [d], Kaila Cooper MSN, RN, CIC [e], Ginger Vanhoozer BSN, RN [e], Michelle Doll MD, MPH [a,e], Gonzalo Bearman MD, MPH [a,e], Michael P. Stevens MD, MPH [a,*]

Barriers to nursing participation in ASPs

Potential barriers to nursing participation in ASPs	Responses n = 159(%)
Time constraints	135 (84.9)
Physician pushback	111 (69.8)
Scope of practice concerns	107 (67.3)
Knowledge of microbiology	103 (64.8)
Knowledge of antibiotics	101 (63.5)

ASPs, antibiotic stewardship programs.

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Learning Objectives:

Review the current science of nurse integration into antibiotic stewardship

Identify practical examples of how stewards and infection preventionists can build nurse collaboration into stewardship efforts

Demonstrate the synergistic relationship between stewardship and infection prevention

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American Journal of Infection Control 46 (2018) 364-8

Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

APIC/SHEA/SIDP Antimicrobial Stewardship Position Paper

Antimicrobial stewardship and infection prevention—leveraging the synergy: A position paper update

Mary Lou Manning PhD, CRNP, CIC, FSHEA, FAPIC [a,*], Edward J. Septimus MD, FIDSA, FACP, FSHEA [b], Elizabeth S. Dodds Ashley PharmD, MHS, BCPS [c], Sara E. Cosgrove MD, MS, FSHEA [d], Mohamad G. Fakih MD, MPH, FIDSA, FSHEA [e], Steve J. Schweon MPH, MSN, RN, CIC, HEM, FSHEA, FAPIC [f], Frank E. Myers MA, CIC, FAPIC [g], Julia A. Moody SM-ASCP [h]

"IPs have substantial contact with bedside nurses, often together reviewing patients who develop HAIs as part of routine daily activities. They can **leverage these strong collegial relationships to influence and facilitate nursing's supporting role** in initiating antibiotic timeouts, performing antibiotic reconciliation during patient transitions of care, and educating patients and families about safe and appropriate antibiotic use."

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Clinical Infectious Diseases

MAJOR ARTICLE

The Differences in Antibiotic Decision-making Between Acute Surgical and Acute Medical Teams: An Ethnographic Study of Culture and Team Dynamics

E. Charani,[1] R. Ahmad,[1] T. M. Rawson,[1] E. Castro-Sanchèz,[1] C. Tarrant,[2] and A. H. Holmes[1]

Clinical Infectious Diseases

EDITORIAL COMMENTARY

Are Surgeons Different? The Case for Bespoke Antimicrobial Stewardship

Julia E. Szymczak[1,2]

[1]Department of Biostatistics, Epidemiology and Informatics, Perelman School of Medicine, University of Pennsylvania, and [2]Division of Infectious Diseases, Hospital of the University of Pennsylvania, Philadelphia

4. Fostering Meaningful Unit-Specific Activities

"I feel like I have a big role in nursing tasks, such as properly obtaining cultures, good Foley and central line care etc.

But I feel like in **our unit** **nursing does not have any input on antibiotics prescribed, effectiveness, evaluation, start and stop times or any thing else**. In **my unit** **prescribing information is left to providers**."

-ICU Nurse (6-10 years experience)

Monsees, et al. (2020) AJIC

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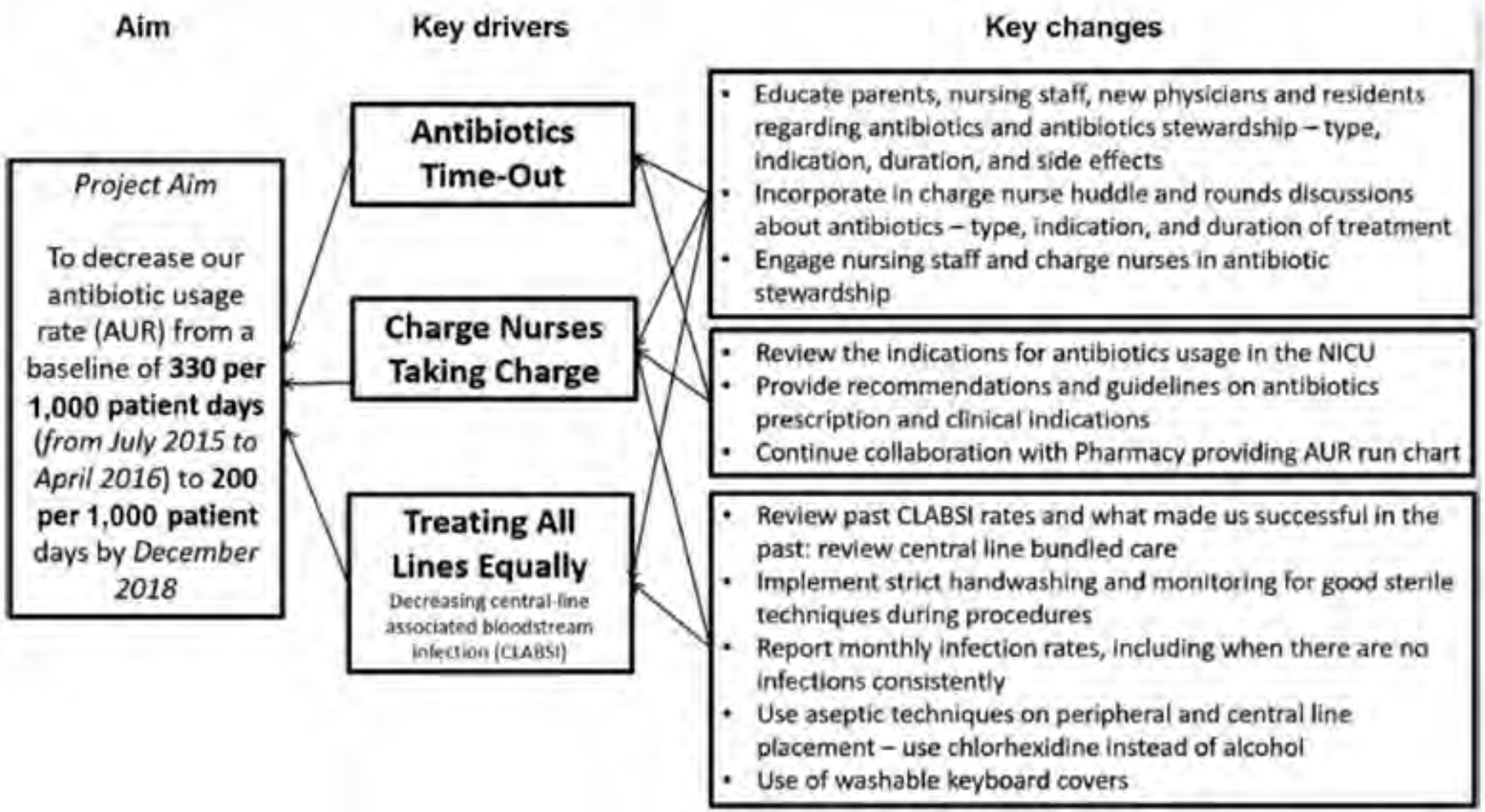
Effective Elements to Reduce Antibiotic Usage in NICU Shukla et al.



The Joint Commission Journal on Quality and Patient Safety 2019; 45:600–605

A Multidisciplinary Approach to Incorporate Bedside Nurses into Antimicrobial Stewardship and Infection Prevention

David R. Ha, PharmD, BCIDP; Mary Bette Forte, MSN-Ed, RN; Rita D. Olans, DNP, CPNP-PC, APRN-BC; Kelsey OYong, MPH; Richard N. Olans, MD, FIDSA; Daniel P. Gluckstein, MD; Ravina Kullar, PharmD, MPH, FIDSA; Mamta Desai, BS, CLS, MBA, CIC; Nora Catipon, RN, MSN, GNP-BC; Vickie Ancheta, RN; Donna Lira, RN, CIC; Yesenia Khattak, CIC; Jessica Legge, RN; Kim B. Nguyen, PharmD; Sarah Chan, PharmD; John Mourani, MD; James A. McKinnell, MD

- Step-down telemetry unit – twice weekly rounds
- Structured around nurse workflow and institutional goals
- Statistically significant reductions: antimicrobial use, especially community-acquired infections; acid suppressant medication and urinary catheters

Review

Antimicrobial stewardship in the outpatient setting: A review and proposed framework

Jasmine R. Marcelin MD, FACP[1], Philip Chung PharmD, MS, BCIDP[2] and Trevor C. Van Schooneveld MD, FACP[1]

[1]Division of Infectious Diseases, University of Nebraska Medical Center, Omaha, Nebraska and [2]Department of Pharmacy, Nebraska Medicine, Omaha, Nebraska

Discusses role of nurses & pharmacists in outpatient ASP

Fig. 1. C-DIFF (Collaboration/Communication, Data, Interventions, Feedback, and Follow-up): a proposed framework for an outpatient antimicrobial stewardship program.

Watchful Waiting
Testing
Quality Improvement

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5. Building Confidence

"Education. **If we feel confident to suggest antibiotics changes to doctors, we will do so**!

The only thing I can think of that would make us not want to participate is because we **feel we could suggest the wrong thing**. Also, **Dr. to nurse communication needs improvement**."

-Intermediate Care Nurse (1-5 years experience)

Monsees, et al. (2020) AJIC

Antimicrobial Reviews by Nurses:
Importance of Prescriber Response

- Engaged critical care nurses to prompt antimicrobial reviews
- Used standardized script for interdisciplinary rounds
- Primed providers to respond with:
  - **“affirmation, rationale, and clinical decisions”**
- Resulted in a reduction of days of therapy

Raybardhan, et al. (2017) Open Forum Infect. Dis.

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American Journal of Infection Control 000 (2020) 1–7

Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Major Article

Implementation of a nurse-driven antibiotic engagement tool in 3 hospitals

Elizabeth Monsees PhD, MBA, RN, CIC, FAPIC [a,*], Brian Lee PhD, MPH [b], Anne Wirtz PharmD, BCPPS [c], Jennifer Goldman MD, MSCR [d]

Nurses reported the tool helped to:

- Ask questions about antibiotic therapy
- Improve access to antibiotic information
- Increase confidence and involvement in discussions

Nurses were not always clear on intended duration

ADIOS Antibiotic Engagement Tool

Unit: _____ Date: _____

Type of Transition:

☐ Shift to Shift ☐ Patient Transfer

Antimicrobial?

Antibiotic-Antifungal/viral ordered?

☐ Yes, antibiotic/fungal/viral(s) is/are_____

☐ If Vanc or aminoglycosides, levels due _____

☐ Couldn't easily find information in MAR

Duration?

Planned "stop" date reflects the duration of what is ordered on MAR?

☐ Yes

Patient is on day __ of __ course

☐ **No** – stop date is **unclear/unknown or mismatch exists** between planned or ordered stop dates → **CONSIDER contacting MD/PharmD**

☐ Couldn't easily find information in MAR

Indication?

Is it clear to you why the patient is actively receiving this antimicrobial therapy?

☐ Yes

☐ **No → CONSIDER contacting MD/PharmD**

☐ Couldn't easily find information in MAR

Oral?

Consistently eating/drinking?

☐ Yes ☐ No ☐ I don't know

Able to take oral medications?

☐ Yes ☐ **No→CONTACT Pharmacist**

Suggestions?

Do you have any concerns about antimicrobial therapy?

(e.g. line issues, pt. developing rash or ADR)

☐ **Yes → CONSIDER contacting MD/PharmD**

☐ No

Thank you for participating!

Questions?

Is there anything you would like to share?

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Infection Control & Hospital Epidemiology (2019), 1–6
doi:10.1017/ice.2018.362

SHEA
The Society for Healthcare Epidemiology of America

Review

Integrating bedside nurses into antibiotic stewardship: A practical approach

Elizabeth A. Monsees PhD, MBA, RN, CIC[1], Pranita D. Tamma MD, MHS[2], Sara E. Cosgrove MD, MS[3], Melissa A. Miller BSN, MD, MS[4] and Valeria Fabre MD[3]

Box 2: Nurse-to-Patient Script on Clarifying Allergies to Penicillin

- "What exactly happened when you took penicillin? How old were you when you experienced this reaction? What antibiotics have you taken after that? Have you seen an Allergy specialist?
- I'm going to review your health information with the healthcare team. Sometimes your health care team may decide to give you an antibiotic even though you reported an allergy. This is because while many people report a history of being allergic to penicillin, most people who report an allergy to penicillin are not truly allergic. Also, a person with a true allergy may outgrow the allergy and can safely receive penicillin. It's important to us that you receive the best therapy to treat your illness so we will work with you to address your concerns." (Modified from Summer et al.[19])

Box 4: Effective Communication Using the SBAR Tool

Situation: "Mrs. Flint is currently experiencing abdominal discomfort and watery stools."
Background: "She is a 69 year-old woman with hypercholesterolemia and mild anemia who was admitted last night after a syncopal episode at her local grocery store. She was treated for a UTI 2 months ago with ciprofloxacin."
Assessment: "Mrs. Flint reports taking laxatives at home because she is chronically on iron supplements. Her home bowel regimen has been continued in the hospital."
Recommendation: "Even though she has a risk factor for *C. difficile*, I wanted to make sure you knew she is on laxatives. Should we stop the laxatives and reassess the need for *C. difficile* testing at a later time?"

JAMDA xxx (2021) 1–6

ELSEVIER

JAMDA

journal homepage: www.jamda.com

Original Study

Feasibility of a Nursing Home Antibiotic Stewardship Intervention

Rosa R. Baier MPH [a,b,*], Robin L.P. Jump MD, PhD [c,d], Tingting Zhang PhD [b,e], Sarah Kabbani MD, MSc [f], David R. Gifford MD, MPH [g], Stefan Gravenstein MD, MPH [a,b,e,h,i,*]

- 21 facilities total (8 matched-controls)
- 3 tools → acceptability and feasibility of bundled electronic intervention
- Standardized digital documentation to track changes in resident condition, infections, antibiotic prescribing, and follow-up
- Difference in antibiotic discontinuation: +10.5% (intervention) & -10.8% (control)
- Nurse adoption = feasible

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6. Creating Space for Heedful Interactions

"**Providers should be asking staff that work at night to have input into antibiotic treatment and therapy**. In addition, often night nurses are not provided the tools to have proper IV access such as with midlines to keep patients free from phlebitis when high strength antibiotics are started. This often **delays antibiotic treatment** in timely manner (i.e., after loading dose, maintenance [sic] dose is received late.)

-Medical/Surgical Nurse (1-5 years experience)

Monsees, et al. (2020) AJIC

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American Journal of Infection Control 50 (2022) 99–104

Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Major Article

A novel framework to guide antibiotic stewardship nursing practice

Mary Lou Manning PhD, CRNP, CIC, FAPIC, FAAN [a,*], Monika Pogorzelska-Maziarz PhD, MPH, CIC, FAPIC [b], Cindy Hou DO, MA, MBA, FACOI, FACP, FIDSA [c], Nikunj Vyas PharmD, BCPS [d], Marianne Kraemer RN, MPA, Ed.M, CENP, CCRN-K [e], Eileen Carter PhD, RN [f], Elizabeth Monsees PhD, MBA, RN, CIC, FAPIC [g]

Advancing Antibiotic Stewardship Nursing Practice Through Standardized Education: A Pilot Study

Mary Lou Manning, PhD, RN, CRNP, CIC, FAPIC, FSHEA, FAAN; Eleanor Fitzpatrick, DNP, RN, AG-CNS, ACNP, CCRN, CCCTM; Anne M. Delengowski, RN, MSN, AOCN, CCCTM; Cindy M. Hou, DO, MA, MBA, CIC, CPHQ, FACOI, FACP, FIDSA; Nikunj Vyas, PharmD, BCPS; and Monika Pogorzelska-Maziarz, PhD, MPH, CIC, FAPIC, FSHEA

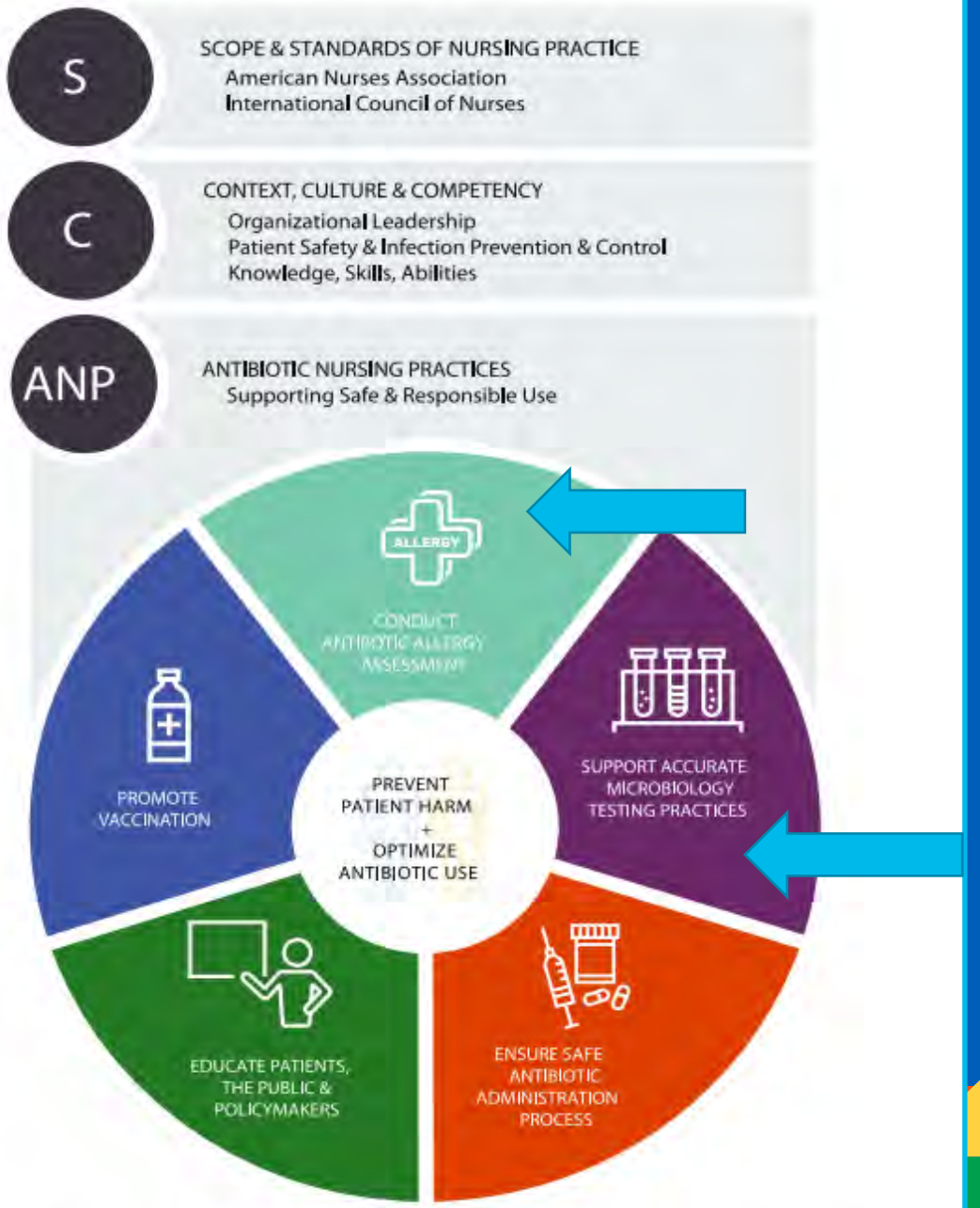

Fig 1. Antibiotic stewardship nursing practice SCAN-P framework.

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Nurse Engagement in Antibiotic Stewardship Programs: A Scoping Review of the Literature

Cara Thurman Johnson • Laura J. Ridge • Amanda J. Hessels

- Studies published in the last 10 years
- 195 articles
- 10 detailed nurse engagement

Research on culturing/testing and penicillin allergy evaluation

Johnson, et al. (2022) J Healthcare Quality

CDC Core Elements: Nurses

Hospital Leadership

- Optimizing testing or **diagnostic stewardship**
- Assuring cultures are performed correctly
- Prompting discussions of antibiotic treatment
- **Improving the evaluation of penicillin allergies**

Action

- **Optimizing microbiology cultures**
- Intravenous to oral transitions
- Prompting antibiotic reviews

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Children's Mercy:
Penicillin Allergy Improvement Project

- **Nurse identified problem**
- Commissioned team: Nurses, Prescribers, & Pharmacists
- Quantify and reduce the number of antibiotic allergy labels – e.g., unknown
- Administer a quiz to assess comfort and understanding of allergies*
- Develop and provide self-paced modules
- Introduce allergy algorithm with scripts

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*Poster provided in slide deck

American Journal of Infection Control 48 (2020) 584–586

Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Brief Report

Infection preventionists role in antimicrobial stewardship: Survey of APIC members

Monika Pogorzelska-Maziarz PhD, MPH, CIC, FAPIC [a,*], Eileen J. Carter PhD, RN [b,c], Elizabeth Monsees PhD, MBA, RN, CIC, FAPIC [d], Mary Lou Manning PhD, CRNP, CIC, FAPIC, FAAN [a]

Table 1
ISPC department time spent on ASP activities per month

	>5 hours %	<5 hours %	None %
HAI data analysis	84	14	2
MDRO infection surveillance	72	27	2
Generating and submitting HAI data for public reporting	71	23	5
Interpreting microbiology lab results (eg, cultures, rapid molecular testing)	69	25	6
Auditing unit-based infection prevention policies	67	31	3
Prevention of multidrug-resistant organism transmission	64	34	3
Clostridioides difficile surveillance	63	34	3
Disseminating HAI data to stakeholders	60	44	7
Providing HAI data driven feedback to individuals and groups	53	42	5
Antibiotic stewardship policy development, implementation and evaluation	21	54	24
Educating nurses on appropriate collection of microbiology specimens (eg, cultures, rapid molecular testing)	19	54	26
Implementing the joint commission antimicrobial standard	18	42	40
Data entry in the NHSN AU module	17	15	68
Working with ASP leaders to align the ASP ISPC programs	16	65	18
Data analysis for AS related activities (eg, frequency of antibiotic timeout)	11	20	69
Educating patients on appropriate antibiotic use	10	31	59
Participating in antibiotic timeouts during patient care transitions	4	19	77

ASP, antimicrobial stewardship program; *AU*, antibiotic utilization; *HAI*, health care-associated infection; *MDRO*, multidrug-resistant organisms; *NHSN*, National Healthcare Safety Network.

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Examples in Practice

Great examples in LTC

The Joint Commission Journal on Quality and Patient Safety 2020; 46:650–655

IMPROVEMENT BRIEF

A Pilot Study to Evaluate the Impact of a Nurse-Driven Urine Culture Diagnostic Stewardship Intervention on Urine Cultures in the Acute Care Setting

Valeria Fabre, MD; Ashley Pleiss, RN; Eili Klein, PhD; Zoe Demko, BA; Alejandra Salinas, BS; George Jones, BS; Avinash Gadala, BPharm, MS; Lauri A. Hicks, DO; Melinda M. Neuhauser, PharmD, MPH; Arjun Srinivasan, MD; Sara E. Cosgrove, MD, MS

- Algorithms to decide appropriate indications for urine cultures in adults[1-2]
- Group A streptococcus pharyngitis practice guidelines to minimize broad testing of children[3]

1 Naik et al. (2008). AJIC
2 Trautner et al. (2015). JAMA Intern Med
3 Norton et al. (2018). Pediatrics

JAMA Pediatrics | Original Investigation

Association of a Clinical Practice Guideline With Blood Culture Use in Critically Ill Children

Charlotte Z. Woods-Hill, MD; James Fackler, MD; Kristen Nelson McMillan, MD; Judith Ascenzi, DNP, RN; Diego A. Martinez, PhD; Matthew F. Toerper, BS; Annie Voskertchian, MPH; Elizabeth Colantuoni, PhD; Sybil Ann Klaus, MD, MPH; Scott Levin, PhD; Aaron M. Milstone, MD, MHS

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Figure 1. Fever/Sepsis Screening Checklist

Fever/Sepsis Screening Checklist - Pre Culture Review

Instructions: Please complete this form ***before*** ordering a blood culture. Bedside RN and frontline provider complete this together, ideally at bedside.

Screen initiated: Date _____ Time _____ Patient name _____
Nurse name _____ Provider Name _____

Blood culture may be warranted:

1. Signs of systemic infection
   a. Temperature: max min source?
      (*Rectal temp is contraindicated in neutropenic pt)
   b. Rigors
   c. Unexplained tachycardia
   d. Hypotension
   e. Poor perfusion
   f. Metabolic acidosis
   g. Elevated WBC from baseline
   h. Elevated or uptrending CRP
   i. Already on antibiotics but persistent fever or clinical symptoms?
2. Risk Factors
   a. Host Immune Status
      i. Neutropenic
      ii. Congenital immune deficiency
      iii. <6 mos after autologous BMT
      iv. <12 mos after allogeneic BMT
      v. Active GVHD
      vi. Steroids (>= 1mg/kg/day PDN equiv)?
      vii. Other therapy for GVHD
      viii. Lymphopenic (eg after ATG, alemtuzumab/ Campath, rituximab)
      ix. Asplenic (s/p splenectomy or functionally asplenic)
      x. Neonate?
   b. Central Line present AND concern for:
      i. Symptoms (eg hypotension) when infusing through the line
      ii. Line site inflamed, tender, purulent?
      iii. Line repaired?
      iv. Cuff exposed
      v. Consider duration of line - abx-coated PICC>56 days or abx-coated Cook >28 days?
      vi. Concern for line contamination? (eg hub in diaper, cap removed accidentally)
   c. Patient has these possible portals of infection:
      i. Mucositis
      ii. Skin ulcers/bullae/wounds
      iii. Active GVHD

Blood culture may not be warranted:

1. Consider other sources of infection on exam/history:
   a. Conjunctivitis
   b. Otitis media
   c. Pharyngitis
   d. Respiratory symptoms
   e. Increased trach or ETT secretions
   f. Urine color/consistency change/dysuria
   g. Diarrhea (>3 stools/24 hours)
   h. Superficial wound erythema/drainage/cellulitis without any of symptoms in item 1
2. Patient has non-infectious cause of symptoms
   a. Withdrawal - recent sedation weans? Elevated WAT score?
   b. Feeding intolerance causing tachycardia, emesis, diarrhea
   c. Surgery within last 24 hours
3. Negative blood cultures drawn within last 24-48 hours, and no clinical change in the patient other than fever

After completion of this tool, is a blood culture indicated?
_____

If yes, please now refer to Blood Culture Algorithm for source (peripheral vs central or both)

Provider signature _____

Please give to project coordinator

Table 2. Primary and Secondary Outcomes Before and After Implementation of the Bright STAR Collaborative in 14 PICUs

Outcome	Mean monthly rate (95% CI)[a]		Postimplementation vs preimplementation		
	Preimplementation	Postimplementation	Relative rate (95% CI)[a]	Absolute rate difference (95% CI)[a]	*P* value[a]
Primary outcome					
Blood cultures[b]	149.37 (119.33 to 186.97)	100.50 (78.00 to 129.51)	0.67 (0.61 to 0.74)	−48.86 (−62.76 to −34.97)	<.001
Secondary outcomes: clinical metrics					
Central line-associated bloodstream infection[c]	1.79 (1.35 to 2.38)	1.14 (0.76 to 1.70)	0.64 (0.51 to 0.80)	−0.65 (−0.94 to −0.36)	<.001
Clostridioides difficile infection	0.38 (0.27 to 0.55)	0.36 (0.22 to 0.61)	0.94 (0.59 to 1.49)	−0.02 (−0.19 to 0.15)	.80
Broad-spectrum antibiotic use[d,e]	505.97 (446.94 to 572.80)	440.35 (386.65 to 501.51)	0.87 (0.81 to 0.93)	−65.62 (−97.23 to −34.01)	<.001
New initiation of broad-spectrum antibiotics[f,e]	58.14 (53.49 to 63.20)	53.59 (49.32 to 58.24)	0.92 (0.89 to 0.96)	−4.55 (−6.62 to −2.48)	<.001
Secondary outcomes: balancing measures					
Mortality[g,h]	1.79 (1.56 to 2.06)	1.88 (1.58 to 2.24)	1.05 (0.97 to 1.14)	0.09 (−0.07 to 0.25)	.25
PICU length of stay, d[g,i]	4.37 (3.90 to 4.90)	4.46 (3.97 to 5.00)	1.02 (0.99 to 1.04)	0.09 (−0.01 to 0.19)	.07
PICU readmission[g,h]	3.09 (2.31 to 4.13)	3.33 (2.50 to 4.44)	1.08 (0.99 to 1.17)	0.25 (−0.02 to 0.52)	.07
Hospital readmission[g,h]	2.12 (1.68 to 2.67)	2.06 (1.61 to 2.64)	0.97 (0.89 to 1.07)	−0.06 (−0.25 to 0.14)	.56
Sepsis[g,h]	6.64 (5.57 to 7.91)	7.07 (5.48 to 9.12)	1.06 (0.89 to 1.28)	0.43 (−0.87 to 1.73)	.50
Severe sepsis/septic shock[g,h]	4.79 (3.96 to 5.79)	4.99 (4.08 to 6.11)	1.04 (0.86 to 1.27)	0.20 (−0.75 to 1.16)	.67

Woods-Hill et al. (2022). JAMA Pediatrics

Supporting Nurse-Driven Diagnostic Stewardship:
Nurse Perceptions of Blood Culture Utilization in a Pediatric Intensive Care Unit

Kathlyn Baharaeen MSN, RN, CCRN; Tiffany Mullen MSN, RN, ACCNS-P, CCRN; Josephine Baker BSN, RN; Ashley Bramel BSN, RN; Hannah Ewy BSN, RN; Lauren Hudson BSN, RN; Tia Jones BSN, RN; Sarah Brunner MD; Elizabeth Monsees PhD, RN, CIC, FAPIC, FSHEA

INTRODUCTION

- The BrighT STAR collaborative has successfully engaged nurses in appropriate blood culture utilization
- Centers for Disease Control and Prevention call for nurse engagement in diagnostic stewardship (DS)
- Obtaining cultures is a critical function of the nursing role

OBJECTIVE

Survey direct care pediatric and cardiac intensive care nurses regarding:

- Blood culturing practices
- Barriers to reducing blood cultures
- Prioritization of practice improvements

METHOD

- Recruited direct care nurses to refine the survey
- Adapted the BrighT STAR work system assessment to develop:
  - 32-question survey
  - 3 free text options
  - 3 and 5-point Likert scales
  - Topics included: general practice, indications, barriers, & preferred tools
- Used descriptive statistics

Nursing Survey Key Findings

Current Practice

- **AGREED** that patients with a new fever, new fever & central line and provider variance reflected current practice

Reasons for Culture

- **FREQUENTLY** occurred for persistent fever, fever and CVL, and previous positive culture

Decreasing Blood Cultures

- Practice variance and concern for sepsis were **LIKELY** barriers

Barriers to Peripheral Blood Cultures

- Timely and/or difficult stick, pain, maximum daily blood draw volume limits, and parent refusal were **LIKELY** barriers

RESULTS

- 46 nurses completed survey (20% response rate)
  - 41% >8 years of practice
  - 56% - day shift
- Most respondents
  - **DISAGREED** that providers performed a physical exam prior to blood culture (83%)
  - **AGREED** that blood culturing practices vary by provider (68%)
- 11 free text comments

Survey comments regarding barriers to reducing cultures:

"Residents are usually who we turn to for questions and they don't always want to consult the physician and tend to want to culture out of caution."
-Nurse with >8 years experience

"Lack of investigation towards other causes for fevers or other labs."
-Nurse with 4-7 years experience

CONCLUSION

- Nurses can and should make significant contributions to DS
- Nurses are highly engaged to participate in blood culture refinement
- Future drivers include addressing practice variations & developing clinical decision tools

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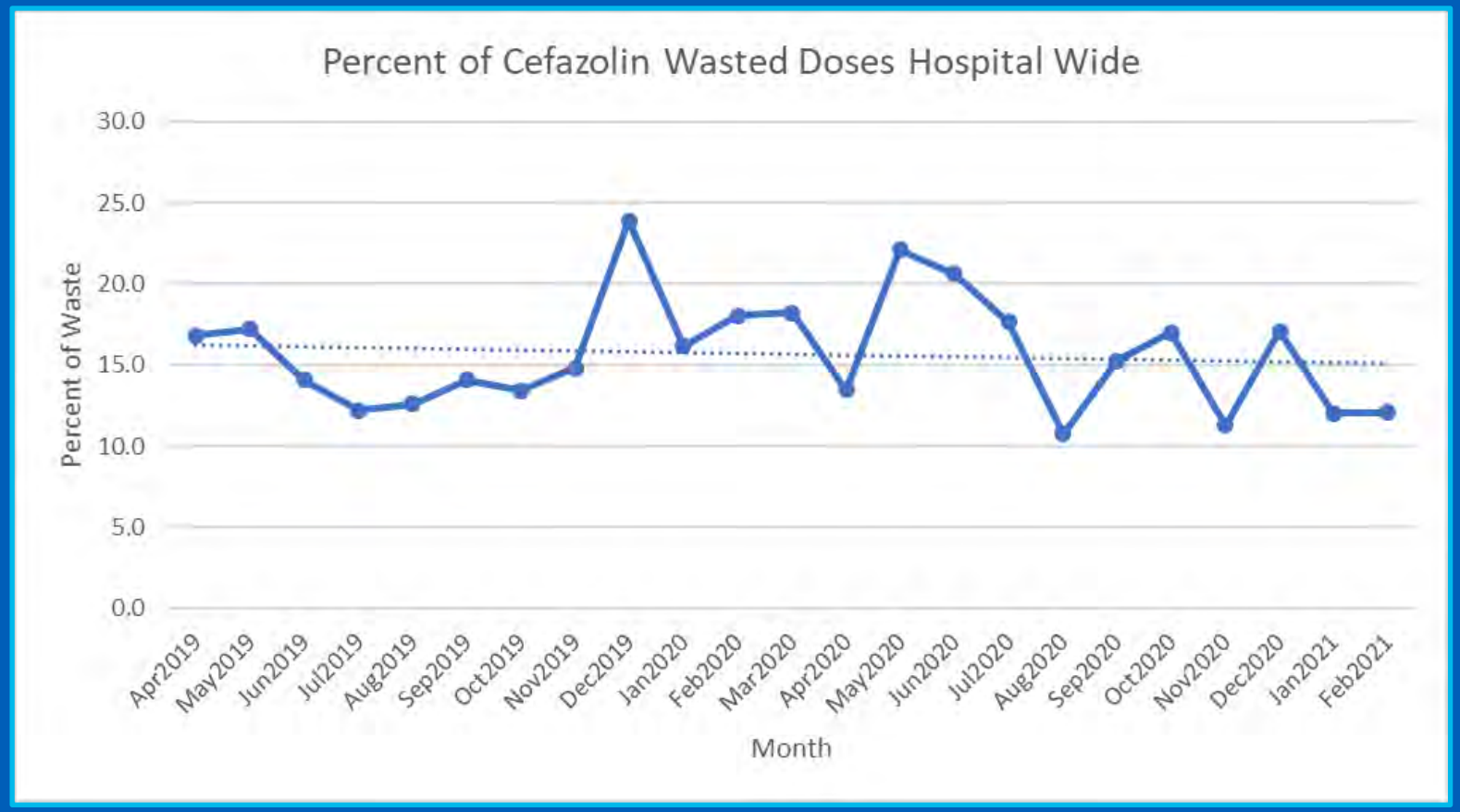
Reducing Antimicrobial Waste

- **Identified by nurses**
- Led by AS pharmacist
- >18,000 antimicrobial doses
- Amounting to >$250,000
- 50 doses per day



Dramatically influenced AS programming

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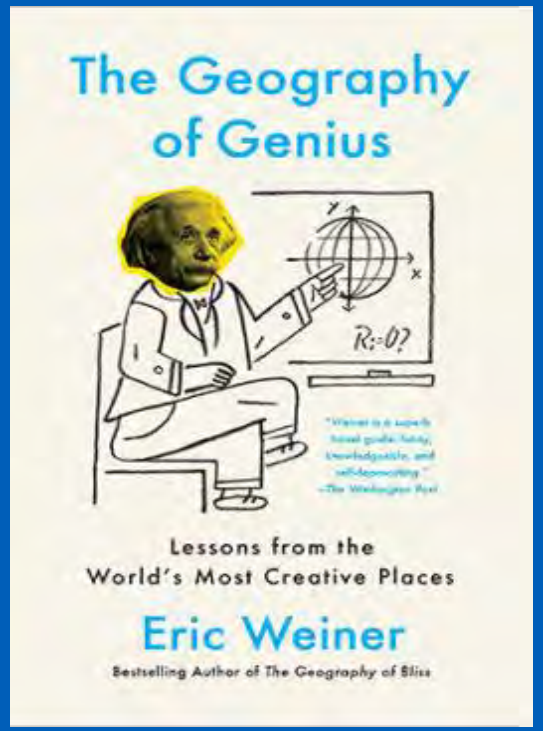
Closing Thoughts

- **Nurses can and should make significant contributions to antibiotic safety**

- Opportunities abound:
  - culturing/testing and penicillin allergy evaluation

- Seek approaches that:
  - create space for heedful interactions
  - leverage existing work processes **and** nurse experiences to identify AS opportunities



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Perceptions on penicillin (PCN) allergy labels among nurses and prescribers in three Pediatric Urgent Care sites

Elizabeth Monsees, PhD, RN, CIC, FAPIC, FSHEA; Amanda Nedved, MD; Sarah Suppes, PharmD; Megan Whitt, MSN, RN, CPN; Brian Lee, MPH, PhD; Diane Petrie, FNP-BC, AAHIVS, CPN; Adrienne Olney, MS; Rana El Feghaly, MD, MSCI

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Background

- PCN is the first-line treatment for many outpatient pediatric infections
- 10% adults in the US are labeled as penicillin allergic, although rate of true allergy is <1 %
- Due to the transient relationship in urgent care, nurses and prescribers may be hesitant to question allergy accuracy or reclassify parent response to side effect

Objective

Explore frontline nurses' + prescribers' confidence in assessing, documenting, & responding to PCN-allergy labels

Method

- Convened nurses, prescribers, and pharmacists to form a quality improvement group from 3 urgent care sites
- Developed a 14-question survey on 5-point Likert scale
  - "1" strongly disagree → "5" strongly agree
  - 4 PCN/safety; 3 allergy types; 4 allergy documentation; 3 treatment options
  - 4 demographic; 1 free-text option
- Targeted nurses & prescribers – evaluated differences
- Deployed for 2 weeks with reminder emails

Result

- 87 participants (nurses + prescribers [advance practice providers & physicians])
- 35% response rate
- 41.4% in practice >15 years & 40.2% worked >15 years at Children's Mercy
- 13 (15%) free text comments on their experiences with PCN allergy processes:
  - Nurses are hesitant to change parent reports
  - Nurses & prescribers expressed role concerns (e.g., setting, discipline)
  - Nurses & prescribers want streamlined PCN-allergy challenge information

Table 2

Agreement related to PCN allergy and safety	Prescribers (n=40)		Nurses (n=47)		
	Answered *	Median [IQR]	Answered *	Median [IQR]	Significance P value
I am confident in my ability to identify delayed reactions to antibiotics based on timing of symptoms after ingestion of the antibiotic.	40	4 [3, 4]	46	3 [3, 4]	0.416
Many patients who think they are allergic to PCN can safely take PCN.	39	5 [4, 5]	46	4 [4, 4]	0.003
I am knowledgeable about the risks of avoiding PCN in patients that have a documented PCN allergy.	39	4 [4, 5]	45	4 [3, 4]	0.036
I can distinguish between common pediatric conditions that are often misinterpreted as a PCN allergy (i.e., viral rash, vomiting/diarrhea).	40	4 [3, 4]	47	4 [3, 4]	0.880
I am aware that PCN allergy sensitivities can change over time.	40	4 [3.75, 4]	47	4 [4, 4.5]	0.160
I can identify factors associated with true allergic reactions.	40	4 [4, 4]	45	4 [4, 4]	0.980
I am aware of the types of PCN antibiotic allergy challenges that Children's Mercy offers.	40	3 [2, 4]	45	3 [2, 4]	0.887
I feel confident in my ability to appropriately document an adverse drug reaction (ADR) in the EMR, even when a parent describes side effects.	40	4 [3, 4]	46	4 [3.25, 5]	0.010
My documentation of ADRs influences future antibiotic prescribing.	40	4 [4, 5]	44	4 [4, 5]	0.356
Time pressures (e.g., patient flow) influence my ability to reconcile between allergy and side effect.	39	4 [3, 4]	45	3 [2, 4]	0.001
Perceived parent expectations influence my ability to reconcile between allergy and side effect.	40	4 [3.75, 4]	44	4 [3, 4]	0.529
I feel confident continuing to administer or prescribe an antibiotic in the setting of a reported ADR.	40	3 [2, 4]	44	3 [2, 4]	0.409
I feel confident in my ability to talk with families about antibiotic side effects and reactions.	40	4 [3, 4]	46	4 [3, 4]	0.013
Additional education would be beneficial in helping me talk with families on the relationship between PCN allergies and treatment.	39	5 [4, 5]	47	4 [4, 5]	0.487

Note: 1-Strongly disagree; 2-Disagree; 3-Neutral; 4-Agree; 5-Strong agree

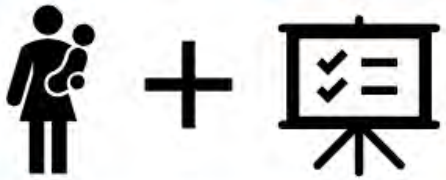
** Selected a response other than "I don't know"*

Table 1

Respondent characteristics	Prescribers (n=40) Respondents	Prescribers (n=40) Percent	Nurses (n=47) Respondents	Nurses (n=47) Percent
Urgent Care				
BV	13	32.50%	14	29.80%
North	11	27.50%	11	23.40%
East	14	35.00%	22	46.80%
Missing	2	5.00%	0	0.00%
Graduated with my last clinical degree				
Less than 1 year ago	0	0.00%	1	2.20%
1-5 years ago	5	12.50%	8	17.40%
6-10 years ago	10	25.00%	10	21.70%
11-15 years ago	9	22.50%	7	15.20%
More than 15 years ago	16	40.00%	20	43.50%
Worked at Children's Mercy				
Less than 5 years	9	22.50%	10	21.70%
5-10 years	10	25.00%	12	26.10%
11-15 years	7	17.50%	3	6.50%
More than 15 years	14	35.00%	21	45.60%

Nurses & Prescribers want:

Family Education + Practice Guidance on PCN Allergy referrals



Discussion

- Perceived knowledge on PCN-allergies and safety was favorable
- Prescribers more than nurses perceived that patients who believe they are allergic to PCN can safely take PCN
- Nurses were more confident to document an adverse drug reaction
- Prescribers perceived time influenced allergy and side effect reconciliation

Next Steps

- Based on our survey, barriers to accurate PCN-allergy labels include:
  - Documentation knowledge
  - Time pressure
  - Hesitancy to challenge parent reports
  - Uncertainty on referral process
  - Role clarity
- Improvement work includes:
  - Refining electronic medical records
  - Improving PCN-allergy referrals to de-labeling clinics
  - Scripted language to guide family discussions
  - Web-based interdisciplinary education

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