The Central Steward: Exploring the Role of Direct Care Nurses in Antibiotic Stewardship

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Sr. Patient Care Services Researcher
Annual Dialysis Conference
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[Nothing to Disclose]
Learning Outcomes

- Discuss the current status of antimicrobial stewardship (AS) in the United States
- Describe existing knowledge and barriers related to nursing AS integration
- Provide practical examples of how nursing leaders can build nurse collaboration in AS efforts
New CDC Antibiotic Resistant Threats

More People in the United States Dying from Antibiotic-Resistant Infections than Previously Estimated

Significant progress since 2013 could be lost without more action

Press Release

Embargoed Until: Wednesday, November 13, 2019, 1:00 p.m. ET

Every 11 seconds an antibiotic-resistant infection occurs. 1 death every 15 minutes due to an antibiotic-resistant bacteria.
Background: U.S. Annual Impact

- **Antimicrobial Resistance:**
  - >2.8 million illnesses & 35,000 deaths annually\(^1\)

- **Clostridioides difficile Infections:**
  - 223,900 hospitalizations & 12,000 deaths\(^1\)
  - >20 billion in healthcare spending\(^2\)
  - >35 billion in lost productivity\(^2\)

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1. CDC (2019). Antibiotic Resistance Threats in the United States
2. CDC (2013). Antibiotic Resistance Threats in the United States
Background: U.S. Inappropriate Use

- Over 50% of inpatient antibiotics
- At least 30% of antibiotics prescribed in outpatient settings
- More than 75% of antibiotics in long-term care settings
Antibiotic Duration is Too Long

Most adults patients need **five days** of antibiotic therapy for community-acquired pneumonia. However, **70%** of adult patients hospitalized for community-acquired pneumonia receive almost **10 days** of therapy.

Guidelines recommend **five to seven days** of antibiotic treatment for most sinus infections in adults. However, **almost 70%** of antibiotic prescriptions for sinus infections are for **10 days**.

CDC (2018) Antibiotic Use in the United States: Progress and Opportunities
Beyond Resistance: Antibiotics are **Harming Patients**

- 200,000 visits for antibiotic adverse events (AE)\(^1\)
  - 16% of all Emergency Department (ED) visits for AEs
- 70,000 children visit EDs annually for antibiotic AEs\(^2\)
  - 86% allergic reactions and 3% hospitalizations
- Implicated in permanent nerve damage, aortic aneurysms, and severe acute respiratory failure

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1. Shehab, et al. (2016). *JAMA*
United States: AS Milestones

- 1997: IDSA/SHEA Joint Committee on the Prevention of Antimicrobial Resistance
- 2007: IDSA/SHEA Guidelines for Developing an Institutional Program to Enhance Antimicrobial Stewardship
- 2014: CDC Core Elements
- 2013: CDC releases Antibiotic Resistant Threats in the United States
- 2014: National Strategy on Combating Antibiotic-Resistant Bacteria
- 2015: Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria
- 2016: IDSA/SHEA Implementing an ASP Guidelines
- 2017: The Joint Commission ASP Standards

CDC (2013). Antibiotic Resistance Threats in the United States
CDC Core Elements

- Leadership Commitment
- Accountability
- Drug Expertise
- Action
- Tracking
- Reporting
- Education

In 2018, 85% of acute care hospitals reported having all seven of the Core Elements in place, compared to only 41% in 2014. 

[Map showing the percentage of hospitals meeting all 7 core elements by state in 2018.]

More information on CDC’s Core Elements of Hospital Antibiotic Stewardship Programs can be found at: https://www.cdc.gov/antibiotic-use/core-elements/hospital.html

Source: CDC’s National Healthcare Safety Network (NHSN) Survey
Prospective Audit and Feedback

Steps involved with CMH ASP Prospective Audit and Feedback

1. Child prescribed an ASP monitored antibiotic
2. ASP monitored antibiotic remains ordered for 2 calendar days triggering an ASP review
3. ASP performs "prospective audit" of electronic medical record to determine appropriateness of antibiotic
4. If there is an opportunity to optimize antibiotic use or discontinue therapy, the ASP provides "feedback" to the prescribing clinician
5. All reviews, recommendations if indicated, type of recommendation, and compliance by prescribing team are recorded in ASP repository.
Is AS Clinically Effective?

- Decreased length of stay
- Reduced 30-day readmission
- Reduced financial impact

Clinical Impact of an Antibiotic Stewardship Program at a Children’s Hospital

Brian R. Lee · Jennifer L. Goldman · Diana Yu · Angela L. Myers · Leslie M. Stach · Erin Hedican · Mary Anne Jackson · Jason G. Newland

Infect Dis Ther (2017) 6:103–113
Learning Outcomes

• Discuss the current status of antimicrobial stewardship (AS) in the United States

• Describe existing knowledge and barriers related to nursing AS integration

• Provide practical examples of how nursing leaders can build nurse collaboration in AS efforts
Reimagining Stewardship

The role of the infection preventionist in a transformed healthcare system: Meeting healthcare needs in the 21st century

Katrina Crist MBA, CAE, Denise Murphy RN, BSN, MPH, CIC, FAPIC, CPPS, FAAN, Marc-Oliver Wright MT (ASCP), MS, CIC, FAPIC, Elizabeth Wallace MPH, CIC, FAPIC, Mary Lou Manning PhD, CRNP, CIC, FAPIC, FAAN


Hospital-wide restriction of clindamycin: effect on the incidence of Clostridium difficile-associated diarrhea and cost.

Climo MW, Israel DS, Wong ES, Williams D, Coudron P, Markowitz SM.

Fluoroquinolone Use and Clostridium difficile–associated Diarrhea

Margaret E. McCusker, Anthony D. Harris, Eli Perencevich, and Mary-Claire Roghmann
Why Nurses?

- >4 Million Nurses
- <297,000 Pharmacists
- 13,050 Infection Preventionists
- <8,000 Infectious Disease Physicians

Modified image: RD. Olans, DNP, CPNP, APRN-BC
The Critical Role of the Staff Nurse in Antimicrobial Stewardship—Unrecognized, but Already There

Richard N. Olans,1 Rita D. Olans,2 and Alfred DeMaria Jr3

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

Vaughn, et al. (2019) ICHE
ANA – CDC Partnership: White Paper 2017
Role of nurses in AS has been poorly understood, but nurse involvement is gaining national attention.
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
Barriers and Opportunities to Integrating Nurses in Antibiotic Stewardship

**On-line Survey**

**Results**

Nurses want to be involved with stewardship

**Areas of Strength:**
- Assess drug reactions
- Culture before antibiotics
- Family education

**Pediatric Staff Nurses**

**Barriers**

- Practice
  - Organizational variation

- Education
  - Microbiology knowledge

**Hospital Culture**

- Collaboration & communication

**Single Children’s Hospital**

**Opportunities**

- Define role
- Develop education
- Build collaborations
- Work flow design
- Foster innovation

Monsees, E., Popejoy, L., Jackson, MA., Lee, B., & Goldman, J. AJIC
DOI: https://doi.org/10.1016/j.ajic.2018.03.028
@eamonsees

APIC
Association for Professionals in Infection Control and Epidemiology

American Journal of Infection Control
9 Hospital Study 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

Monsees, et al. (in press) AJIC
Nurse-Driven Activities at Children’s Mercy
Children’s Mercy (CM) Hospital

- Free-standing, pediatrics
- Academic medical center
  - 2 inpatient locations
- >7,200 employees
- 15,198 admissions
- 20,144 surgery cases
- >22 specialty clinics across Missouri & Kansas = 413,629 visits
CM AS Team

• 5 infectious diseases physicians
  • 1 Medical Director for Inpatient ASP = 0.2 FTE
  • 1 Medical Director for Ambulatory ASP = 0.1 FTE
• 1 infectious diseases nurse practitioner
• 2 pharmacists = 1 FTE
• 1 data analyst = 0.4 FTE
• 1 nurse/program manager = 0.4 FTE
  • Administrative operations, regulatory readiness, and scholarship
CM Nursing Program

- Chief Nursing Officer since 2004
- 12 Nursing Senior Directors
- 3000 nurses
- 1900 clinical, direct care nurses
- >85% baccalaureate-prepared nurses
- 67% eligible nurses hold specialty certification
- 4-time recipients of Magnet designation

Cheri Hunt, MHA, BSN, RN, NEA-BC
Senior Vice President for Patient Care Services, Chief Nursing Officer
## ADIOS Antibiotic Engagement Tool

**Unit:** ___________  
**Date:** ___________  
**Type of Transition:**  
- [ ] Shift to Shift  
- [ ] Patient Transfer

### Antimicrobial?

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibiotic-Antifungal/viral ordered?</td>
<td></td>
</tr>
<tr>
<td>Yes, antibiotic/fungal/viral(s)</td>
<td></td>
</tr>
<tr>
<td>is/are __________________________________________________________________</td>
<td></td>
</tr>
<tr>
<td>If Vanc or aminoglycosides, levels due ___________</td>
<td></td>
</tr>
<tr>
<td>Couldn’t easily find information in MAR</td>
<td></td>
</tr>
</tbody>
</table>

### Duration?

- Planned “stop” date reflects the duration of what is ordered on MAR?  
- [ ] Yes  
- [ ] No, stop date is unclear/unknown or mismatch exists between planned ordered stop dates → CONSIDER contacting MD/PharmD

### 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  
- [ ] don’t know

- Able to take oral medications?  
- [ ] Yes  
- [ ] No → CONSIDER Child Life

### Suggestions?

- Do you have any concerns about antimicrobial therapy?  
- e.g. line issues, pt. developing rash or ADR  
- [ ] Yes → CONSIDER contacting MD/PharmD  
- [ ] No

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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
- don’t know

- No – Able to take oral medications?
- Yes
- No – CONSIDER Child Life

Suggestions?

Do you have any concerns about antimicrobial therapy?

- Yes – CONSIDER contacting MD/PharmD
- No

Thank you for participating!

Questions? Elizabeth Monsees 44591

Is there anything you would like to share?
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
don’t know
- No → CONSIDER Child Life

Able to take oral medications?
- Yes
- No
- No → CONSIDER Child Life

Monsees 2019 APIC Heroes Implementation Science Research Scholar Award is supported by a grant from BD
Suggestions?

Do you have any concerns about antimicrobial therapy?
(e.g. line issues, pt. developing rash or ADR)

☐ Yes → CONSIDER contacting MD/PharmD

☐ No

Monsees 2019 APIC Heroes Implementation Science Research Scholar Award
is supported by a grant from BD
What is an Antimicrobial?
- Antimicrobials = antibiotics, antifungals, antivirals
- Antibiotics treat bacteria
- Antifungals treat fungi
- Antivirals treat viruses
- Where to find this? Order on MAR

What is the planned duration?
- Being aware of the planned duration is important to prevent patients from missing necessary doses or receiving unnecessary doses.
- Length of treatment is often selected from guidelines or chosen specifically for a patient.
- Common Durations (ranges may vary per patient – consider discussing with MD/pharmacist)
- Where to find this? Progress notes, MAR stop date

What are Indications for Antimicrobials?
- Considering the indication is useful when selecting treatment and reassessing once cultures result.
- Including indications helps communicate complete treatment plans with patients/families.
- Prophylaxis = prevent infection
- Treatment = treat active infection
- Non-Infectious = used for other indications besides infection
- Where to find this? Progress notes, order on MAR

Why is it important to transition to oral therapy?
- IV to PO transitions minimize line entries, complications & reduce cost
- RNs can evaluate if patients are improving or tolerating PO to help determine treatment while collaborating with MDs/Pharmacists on the route
- IV antibiotics are required for endocarditis, meningitis, CLABSI, or other serious infections
- For patients able to take oral medications, Pharmacists can help identify potential formulary options

Suggestions for future education?
Key Findings

- Participants: 71 pre-survey and 50 post-survey
- Nurses reported the tool helped to:
  - Ask questions about antibiotic therapy when something didn’t seem right
  - Develop a better understanding of where to find antibiotic information
  - Increase confidence and involvement in antibiotic discussions
- Nurses were not always clear on intended antimicrobial duration
Nurse Residency Program (NRP): Newly Licensed Nurses (NLN) Embed AS

**Cardiology**
- Increase nurse AS awareness and improve access to educational resources
- Collaborate with leaders to augment education on facility’s intranet

**Pediatric Intensive Care Unit**
- Enhance nurse-nurse communication and integrate antimicrobial use information into nurse handoffs/patient transfer

- **July-Aug 2018**
  - NLNs began NRP

- **Feb 2019**
  - Reviewed literature & discussed with hospital AS experts

- **Mar 2019**
  - Identified unit goals & completed A3

- **April-Aug 2019**
  - Initiated projects & will share findings

Reducing Antimicrobial Waste

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

Dramatically influenced AS programming
Learning Outcomes

- Discuss the current status of antimicrobial stewardship (AS) in the United States
- Describe existing knowledge and barriers related to nursing AS integration
- Provide practical examples of how nursing leaders can build nurse collaboration in AS efforts
How did we get antimicrobial “stewardship” to rise to the top of our attention space?
Elements to Consider Before Intervening

- Assess organizational culture
- Address organizational barriers
- Tailor education based on observed practice deficits
- Develop a usable intervention
- Solicit feedback from nurses and identify a nurse champion to develop education on proposed intervention
- Consider train the trainer or other team-based modalities
- Secure nursing and physician stakeholder support

Monsees, et al. (2019) ICHE
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
Nurses Understand the Medication Process

Examples of Nursing Involvement:
- Identifying penicillin allergy
- Obtaining appropriate microbiology cultures
- Reassessing antibiotic need
- Educating for discharge

- Prescribing: Physician, NP, PA, Pharmacist
- Transcribing: Physician, PA, NP, Nurse, Unit clerk, Pharmacist
- Dispensing: Pharmacist, Pharmacy intern, Pharmacy technician
- Administering: Nurse, Pharmacist
- Monitoring: Physician, PA, NP, Nurse, Pharmacist
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)
Major Article

Antimicrobial stewardship: Staff nurse knowledge and attitudes

Katreena Merrill PhD, RN, Sandra Forsyth Hanson BS, RN, CIC, Sharon Sumner BS, RN, CIC, Todd Vento MD, MPH, John Veillette PharmD, Brandon Webb MD

Percent 'yes' responses

- All Nurses
- Baccalaureate Degree or Higher
- Associate Degree

Know why receiving Abx: 87% vs. 88%
P<.05

Questioned choice of Abx: 19% vs. 23%
P<.05

Questioned dose of Abx: 17% vs. 21%
P<.05

Questioned route of Abx: 15% vs. 17%
P<.05

Questioned duration of Abx: 25% vs. 28%
P<.05

Given inappropriate Abx: 25% vs. 30%
P<.05

Abx = Antimicrobial
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 anything else. In my unit prescribing information is left to providers.”

-ICU Nurse (6-10 years experience)
The Differences in Antibiotic Decision-making Between Acute Surgical and Acute Medical Teams: An Ethnographic Study of Culture and Team Dynamics

E. Charani, R. Ahmad, T. M. Rawson, E. Castro-Sanchêz, C. Tarrant, and A. H. Holmes

Are Surgeons Different? The Case for Bespoke Antimicrobial Stewardship

Julia E. Szmyczak

1Department of Biostatistics, Epidemiology and Informatics, Perelman School of Medicine, University of Pennsylvania, and 2Division of Infectious Diseases, Hospital of the University of Pennsylvania, Philadelphia
Antimicrobial Reviews by Nurses: Importance of Provider 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
• 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
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. (in press) AJIC
Practice Guidelines = Conversational Tools

- Algorithms to decide appropriate indications for urine cultures\textsuperscript{1,2}
- Group A streptococcus pharyngitis practice guidelines to minimize broad testing of children\textsuperscript{3}
- Nurse-driven practices to decrease central-line associated bloodstream infections and catheter-associated urinary tract infections

\textsuperscript{1} Naik et al. (2008). AJIC
\textsuperscript{2} Trautner et al. (2015). JAMA Intern Med
\textsuperscript{3} Norton et al. (2018). Pediatrics
Review

Integrating bedside nurses into antibiotic stewardship: A practical approach

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

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?”
“Nurse executives play a central role in spearheading strategic nursing engagement in institutional programs that keep patients safe.”
Closing Thoughts

• Strengthen AS message as a collective mindset

• Leverage existing work processes and nurse experiences to identify AS opportunities

• Seek interdisciplinary approaches that:
  • boost cognitive diversity
  • create space for heedful interactions
  • nurture creativity to reimagine AS
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- Brian Lee, PhD, MPH

Questions?

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