

Stewardship in the ED – The Last Frontier



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Objectives

1. Review published literature on antimicrobial stewardship efforts in the emergency department (ED)
2. Describe novel strategies to implement antimicrobial stewardship in the ED
3. Discuss ways to leverage research related to antimicrobial stewardship efforts in the ED

POOR ANTIMICROBIAL STEWARDSHIP IN THE ED

Wrong antibiotic. Wrong patient. Wrong time. Wrong dose. Wrong duration. Every time.

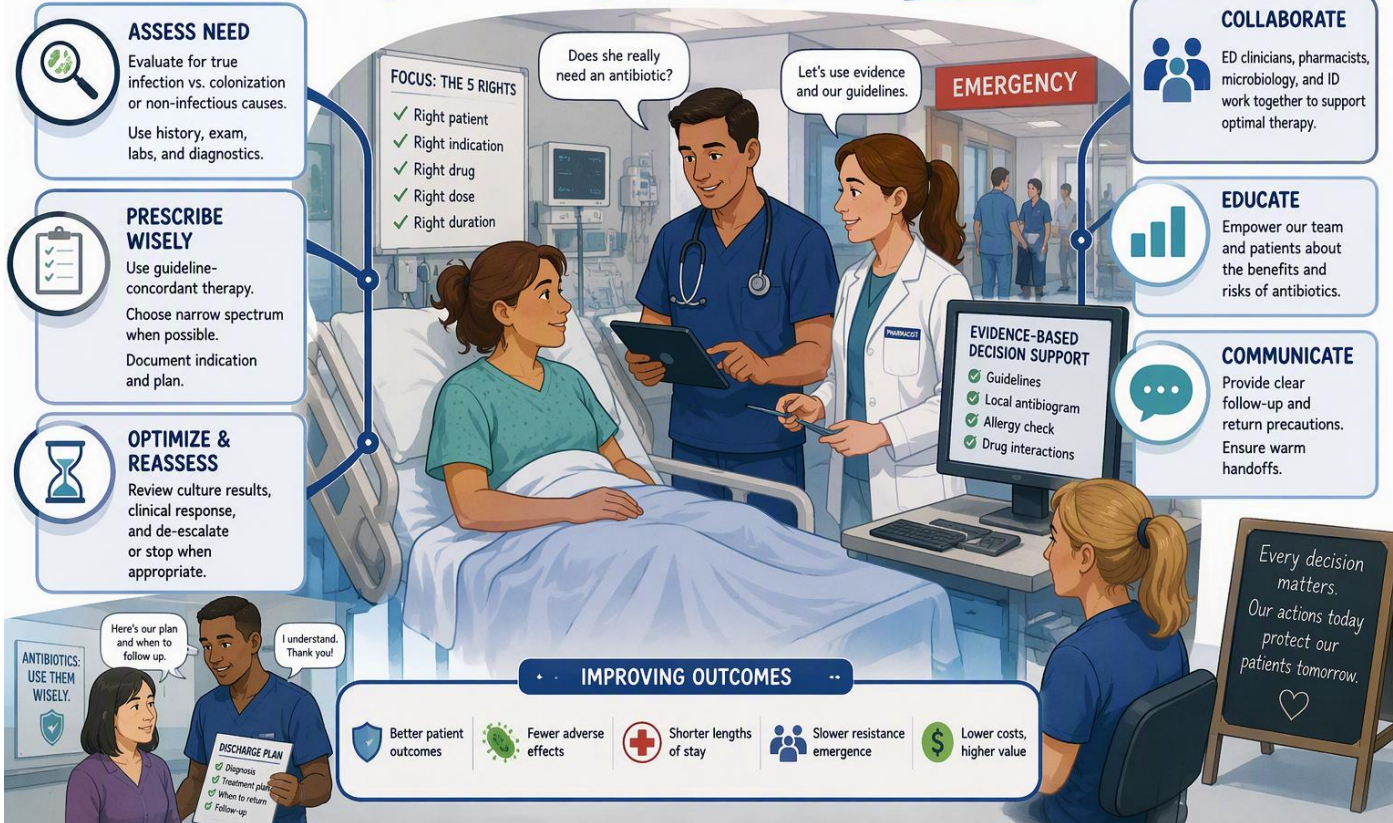


Common ED ID Pitfalls

- Elderly patient that has altered mental status -> must be a UTI -> start them on cipro
- Patient is tachycardic and tachypneic -> sepsis orderset -> vanc/zosyn
- I think it's a viral URI but the patient won't leave without an antibiotic -> azithro or augmentin
- The asymptomatic patient with a foley catheter has a dirty UA -> ceftriaxone

ANTIMICROBIAL STEWARDSHIP IN THE ED

Right antibiotic. Right patient. Right time. Every time.



Emergency Medicine (EM) Thinking

- Symptom based care centered upon a differential diagnosis
- Focus is ruling out life-threatening diagnoses
- Evaluate -> diagnostics (labs, imaging, etc.) -> review results -> treat -> disposition
- What scares us: ED bounce backs!
- Key EM takeaway- we are very regimented and protocolized in our thinking

EM Thinking

- Qualitative study of ED staff regarding antimicrobial stewardship
- Barriers: uncertainty of diagnosis, time and resource pressures, reliance on previous experience, and lack of access to expert opinion
- Emphasized a need for: routine education and feedback, adequate staffing, robust guidelines, and leadership advocacy and multidisciplinary support

Question 1

True or False: Antimicrobial stewardship is possible in the emergency department

Question 1

True!!!!: Antimicrobial stewardship is possible in the emergency department

Stewardship Efforts in the ED

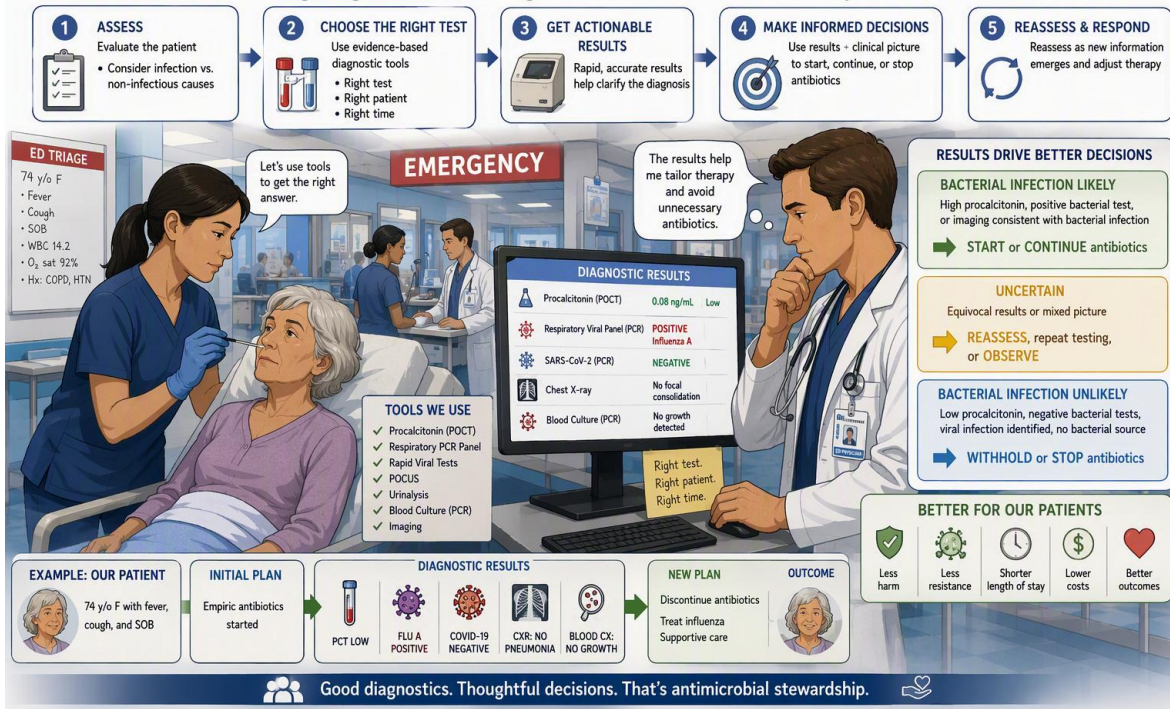
1. Diagnostic tools
2. Optimizing empiric prescribing
3. Culture callback

Key EM takeaway: EM antimicrobial stewardship is not always about just whether to treat or what to treat with but also about dosing and duration!

Diagnostics

SMART DIAGNOSTICS. BETTER DECISIONS. BETTER CARE.

Using diagnostic tools to guide antimicrobial stewardship in the ED



Diagnostic Tools

- Rapid testing (PCR, point-of care tests, etc)
- Laboratory markers and imaging
- Severity scoring (ex: pneumonia severity index) to help with disposition
- Educate on when to test
- Key EM takeaway: EM clinicians like to know about the reliability of tests they are using (sensitivity, specificity, positive predictive value, likelihood ratios, etc.)

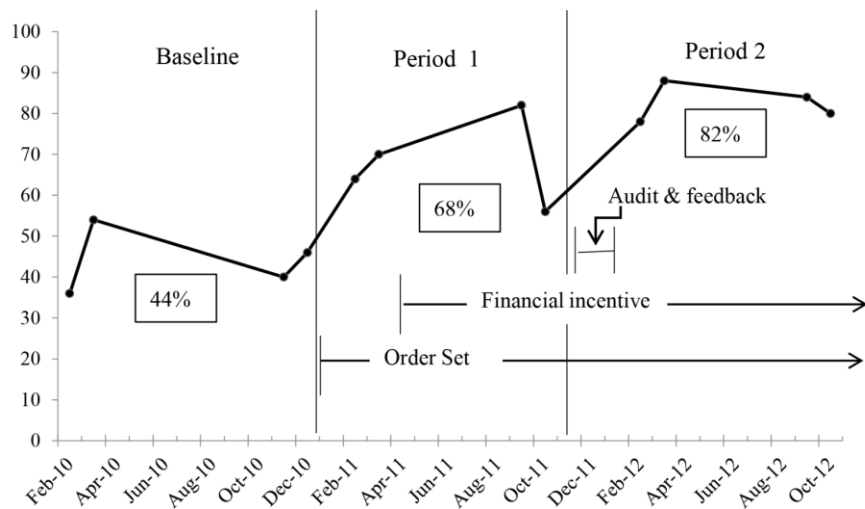
Empiric Prescribing-Technology

- Clinical decision support systems
- Build and incorporate formulary recommendations into order sets, powerplans, etc.
- Make information easily accessible
- Have a process in place to review and update on a regular basis

Effect of a Stewardship Intervention on Adherence to Uncomplicated Cystitis and Pyelonephritis Guidelines in an Emergency Department Setting

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- Adherence to UTI guidelines increased from 44% (baseline) to 68% (period 1) to 82% (period 2) ($P \leq .015$ for each successive period)
- Unnecessary antibiotic days for the 200 patients evaluated in each period decreased from 250 days to 119 days to 52 days ($P < .001$ for each successive period)

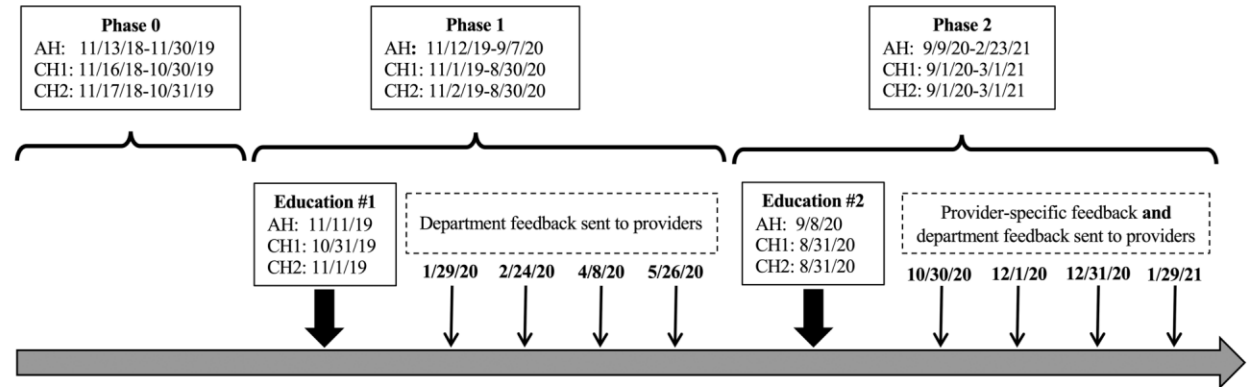
Empiric Prescribing-Education

- Presentations (grand rounds, CE's, webinars, etc.)
- Emails, flyers, pocket cards, and handouts around workstations to remind prescribers
- Department level vs. provider-specific feedback
- Key EM Takeaway – Don't just make a recommendation without an explanation. It greatly helps to convince/teach the EM prescribers when you tell them the why
Example: we use linezolid over clindamycin for toxin binding in nec fasc because...
- Department level vs. provider-specific feedback

Impact of Education and Data Feedback on Antibiotic Prescribing for Urinary Tract Infections in the Emergency Department: An Interrupted Time-Series Analysis

Cara L. Nys,^{1,2} Kristen Fischer,¹ Jason Funaro,¹ Christopher J. Shoff,² Rebecca G. Theophanous,¹ Rachel Toler,¹ Jenny Shroba,³ Nicholas A. Turner,² Beiyu Liu,⁴ Hui-Jie Lee,⁵ Rebekah W. Moehri

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- There was an initial 15% increase in guideline-concordant antibiotic prescribing in phase 1 compared with the preintervention period (incidence rate ratio [IRR], 1.15; 95% confidence interval [CI], 1.03–1.29)
- A significant increase in guideline-concordant prescriptions was seen with every 2-week interval during phase 2 (IRR, 1.03; 95% CI, 1.01–1.04).



A Multifaceted Intervention Improves Prescribing for Acute Respiratory Infection for Adults and Children in Emergency Department and Urgent Care Settings

Kabir Yadav, MDCM, MS, MSHS , Daniella Meeker, PhD, Rakesh D. Mistry, MD, MS, Jason N. Doctor, PhD, Katherine E. Fleming-Dutra, MD, Ross J. Fleischman, MD, MCR, Samuel D. Gaona, Aubyn Stahmer, PhD, and Larissa May, MD, MSPH, MSHS

- Abx prescribing for ARI decreased from 6.2% to 2.4% (absolute difference 2.4%; 95% CI 1.3-3.4%)
- Significant reduction in inappropriate prescribing OR 0.67 (95% CI 0.54-0.82)

Table 1
Intervention Components by Intervention Package

Component	Definition	Adapted	Enhanced
Provider education	Educational presentations, electronic reminders of ARI guidelines, Get Smart brochures	X	X
Patient education	CDC Get Smart posters in waiting rooms, discharge handouts	X	X
Provider commitment-enhanced patient education	Personalized posters in examination rooms including modified Get Smart content directed at patients, enhanced with clinicians' photos and signed public commitment to antibiotic stewardship		X
Physician champion	Designated physician at each site who will lead provider education and be an advocate for antibiotic stewardship	X	X
Departmental feedback	Monthly aggregate of antibiotic prescribing practices for ARI from EHR data provided to departmental leadership	X	X
Peer comparison	Personalized monthly performance ranking delivered by e-mail with each physician receiving designation of being a "top performer" (top decile) or "not a top performer" for avoiding antibiotics for ARI.		X

ARI = acute respiratory infection; EHR = electronic health record.

Key Areas That I Tend to Focus On

- Minimizing duration of treatment (cystitis, pyelo, pneumonia)
- Verifying “allergies” and the actual reaction (if it even exists)
- Ordering a beta-lactam -> assessing renal function
- Previous cultures and resistance (or lack thereof) and treatment courses (within and at outside health-systems)

Culture Callback

- Process can vary from ED to ED (physician, nursing, pharmacist, or APP led...)
- Generally, we are just ensuring that if there is a positive culture, that any empiric treatments are susceptible
- Person performing the callback is generally not the one that managed the patient in the ED
- What about patients that were admitted?

Culture Callback

- Important to train the callback individual on inquiring how the patient is doing (improvement in symptoms, fevers, etc.) and if treatment can be discontinued early
- Ensure individual(s) performing call-backs have resources or individuals to contact if they have questions

Question 2

Which of the following are stewardship efforts that can be implemented in the ED

- A. Diagnostic tools
- B. Optimizing empiric prescribing
- C. Culture callback
- D. All of the above

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Which of the following are stewardship efforts that can be implemented in the ED

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- C. Culture callback
- D. **All of the above**

Leveraging Research

- Pre-post analysis of any new intervention
- Provides real-life data on the intervention and the impact
- Things don't always go as planned -> make adjustments based upon findings



Prescribing trends and revisit rates following a pharmacist-driven protocol change for community-acquired pneumonia in an emergency department

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EM PHARM-NET

- Group of EM pharmacists from across the US with the goal of conducting high-quality, transformative, multidisciplinary research founded in 2020
- Completed six-sponsored research projects with four currently on-going
- Infectious Disease Related Projects:
 - UriNary Tract Infections in the Emergency Department (UNTRIED) Study
 - Hepatitis B Immune Globulin Utilization in Patients Presenting to the Emergency Department following sexual Assault
 - Cephalosporins for Outpatient PYelonephritis in the Emergency Department COPY-ED Study



Hepatitis B vaccination and immune globulin administration in patients presenting to the emergency department following sexual assault

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ORIGINAL CONTRIBUTION



High prevalence of fluoroquinolone-resistant UTI among US emergency department patients diagnosed with urinary tract infection, 2018–2020

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Journal of Antimicrobial Chemotherapy

Empirical antimicrobial prescribing for pyelonephritis in patients discharged from 15 US Emergency Departments: an opportunity for improvement

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INFECTIOUS DISEASE/ORIGINAL RESEARCH

Cephalosporins for Outpatient Pyelonephritis in the Emergency Department: COPY-ED Study

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DOGMA Study

Antibiotic		n (%)	Length of Therapy	Length of Therapy
			Mean (SD)	Median (IQR)
Cephalosporin	Combined (n = 1147)	1147 (100%)	8.9 (2.3)	10 [7, 10]
	1 st Generation			
	Cephalexin	525 (45.8%)	8.5 (2.2)	8 [7, 10]
	Cefadroxil	93 (8.1%)	9.4 (1.5)	10 [10, 10]
	2 nd Generation			
	Cefuroxime	91 (7.9%)	8.8 (1.7)	10 [7, 10]
	3 rd Generation			
	Cefdinir	346 (30.2%)	8.9 (2.3)	10 [7, 10]
	Cefpodoxime	90 (7.8%)	11 (2.2)	10 [10, 14]
	Cefixime	2 (0.2%)	8.5 (2.1)	8.5 [7.8, 9.2]

	1 st Generation (n=618)	2 nd Generation (n=91)	3 rd Generation (n=438)	Difference in Proportion (95% CI)
Treatment Failure within 14 days, n (%)	121 (19.6%)	-	79 (18.0%)	1.5% (-3.4%, 6.5%)
	121 (19.6%)	16 (17.6%)	-	2.0% (-7.1%, 11.1%)
	-	16 (17.6%)	79 (18.0%)	-0.5% (-9.5%, 8.6%)
Reason for treatment failure within 14 days, n (%)				
ED or urgent care visit for UTI	64 (10.4%)	-	47 (10.7%)	-0.4% (-4.3%, 3.6%)
	64 (10.4%)	10 (11.0%)	-	-0.6% (-8.1%, 6.9%)
	-	10 (11.0%)	47 (10.7%)	0.3% (-7.0%, 7.6%)
Receipt of a new antibiotic prescription for UTI	64 (10.4%)	-	54 (12.3%)	-2.0% (-6.1%, 2.1%)
	64 (10.4%)	8 (8.8%)	-	1.6% (-5.4%, 8.5%)
	-	8 (8.8%)	54 (12.3%)	-3.5% (-10.8%, 3.7%)
Recurrence of symptoms	53 (8.6%)	-	42 (9.6%)	-1.0% (-4.7%, 2.7%)
	53 (8.6%)	13 (14.3%)	-	-5.7% (-13.9%, 2.4%)
	-	13 (14.3%)	42 (9.6%)	4.7% (-3.7%, 13.1%)
Hospital admission for UTI	12 (1.9%)	-	13 (3.0%)	-1.0% (-3.1%, 1.1%)
	12 (1.9%)	2 (2.2%)	-	-0.3% (-3.7%, 3.2%)*
	-	2 (2.2%)	13 (3.0%)	-0.8% (-4.8%, 3.3%)*

EM PHARM-NET-Our Process

- We face similar challenges and problems, we just don't always realize it
- Quarterly calls to discuss on-going and future projects, provide updates
- A member takes the lead, drafts a project proposal, reviewed/discussed
- Project proposal is finalized and used for IRB approvals, central DUA through University of Iowa and Redcap for data collection
- Lead researcher takes responsibility on providing updates, trouble shooting any issues

EM PHARM-NET- Lessons Learned

- Institutions vary (disease states, diagnostic capabilities, treatment recommendations, EHR's used)
- Research is generally an addition to our required responsibilities (i.e. we are volunteering our time and effort)
- Multidisciplinary with physicians and statisticians
- Utilize a central DUA and create a FAQ document to help standardize data collection
- Sponsored research and funding support

Question 3

True or False: you can leverage antimicrobial stewardship efforts into research opportunities

Question 3

True!!!!: you can leverage antimicrobial
stewardship efforts into research
opportunities

Summary

- Optimizing antimicrobial stewardship in the ED is a multidisciplinary effort
- Educate & continue to educate EM clinicians on diagnostic and treatment updates and changes to practice
- Utilize technology in the EHR to incorporate empiric treatment protocols
- Evaluate initiatives with pre-post analysis and make adjustments as necessary

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