Journal Club

BACKGROUND AND OVERVIEW	
Article Title	Stewardship Prompts to Improve Antibiotic Selection for Pneumonia: The INSPIRE Randomized Clinical Trial Gohil et al (2025) JAMA; DOI: 10.1001/jama.2024.6248
Purpose	To address the overuse of extended-spectrum antibiotics for pneumonia. Specifically, they aimed to evaluate whether **computerized provider order entry (CPOE) prompts** providing patient- and pathogen-specific MDRO infection risk estimates could reduce empiric extended-spectrum antibiotics for non−critically ill patients admitted with pneumonia
Background	- Pneumonia is the most common reason for infection leading to hospitalization, but providers often default to (unnecessary) use of broad-spectrum antibiotics due in low risk patients - HCA developed a **classification algorithm using AI to predict a patient's risk** of **various MRDOs** (MRSA, pseudomonas, ESBL) based on over 50 variables (including demographics, healthcare exposures, prior antibiotic use, Hx of MDROs, comorbidities, & hospital-specific MDRO prevalence), which they **incorporated into their CPOE for pneumonia**

METHODS	
Design & methods	**Cluster-randomized trial conducted** in 59 US community hospitals within the HCA Healthcare system - Hospitals paired based on baseline era data → randomized hospitals (1:1) **Phases of study** 18-month baseline (4/2017 - 9/2018) 6-month phase in (10/2018 - 3/2019) 15-mo intervention (4/2019 - 6/2020)

Study arms	**Stewardship alone group** (n=30 hospitals)	**Stewardship + CPOE group** (n=29 hospitals)
	- Received standard educational materials - Quarterly coaching calls for stewardship - Prospective deescalation based on micro results (MRSA screen, sputum cultures)	If starting broad spectrum ABX, the CPOE **prompted antimicrobial change** (tailored to the specific extended spectrum antimicrobial that was ordered) if patient-pathogen risk <10% → **single click option** to change ABX - Pseud risk <10% → click to "change *Zosyn* to *ceftriaxone*" - MRSA risk <10% → click to "stop *vancomycin*"

Selection & enrollment	Non−critically ill adults hospitalized with pneumonia on admission (based on billing codes w/ present on admission) Exclusion: Incarceration or transferred to ICU within 48h of admission
Outcome measures	Primary outcome: (1) Days of **extended-spectrum antibiotics in first 72 hours** (e.g. vanc + Zosyn x3 days = 6 total days) Secondary outcomes: (2) Days of emperic vanco, (3) days of emperic antipseudomonal, (4) safety outcomes below Safety outcomes: (4a) Days to ICU transfer, (4b) hospital length of stay, (4c) days to antibiotic escalation Used rate ratios for outcomes (1-3), hazard ratios for safety (4)

RESULTS							
Summary of study results, focusing on outcomes *** = p < 0.05**	**Outcome**	**CPOE group**			**Control group**			**Rate/Hazard Ratio** of difference-in-differences
		Before	After	RR/HR	Before	After	RR/HR	
	(1) Extended spec days	614	429	**0.68***	633	615	0.94	**0.72*** (0.66-0.78)
	(2) Vanco days	235	161	**0.68***	241	219	**0.89***	**0.77*** (0.71-0.83)
	(3) Anti-pseud days	342	240	**0.67***	357	361	0.98	**0.68*** (0.61-0.75)
	Length of stay (days)	6.9	7.1	1.00	6.9	6.8	1.04	0.96 (0.91-1.01)
	Days to ICU transfer	6.6	7.1	1.06	6.7	6.5	1.02	1.04 (0.89-1.21)
	Days to ABX escalation	5.5	6.1	**0.81***	5.4	5.3	0.99	**0.82*** (0.69-0.97)

Brief summary of main discussion points & study limitations	
Overview	- CPOE bundle group experienced a **28.4% reduction** in empiric extended-spectrum days of therapy 12.5% of prompts resulted in extended → standard-spectrum antibiotic **No negative impact on safety**: Similar LOS & time to ICU transfer - CPOE group had delayed time to ABX escalation (18% longer), but didn't affect other safety outcomes **Low MDRO prevalence**: Algorithm classified 96% as low risk of MDRO; < 2% of them grew MDROs
Limitations	**COVID**: Intervention period occurred during COVID **Hawthorne effect:** Getting prompts may have contributed to stewardship (irrespective of patient risk). But does it matter why providers changed behavior? **Is 10% the right cut off?** Is a 5% risk of MRSA the same in a COPD patient vs neutropenic fever?

CONCLUSIONS	
Conclusions	AI assisted computerized provider order entry prompts seems to be an effective (and likely safe) intervention to improve antibiotic stewardship in pneumonia treatment