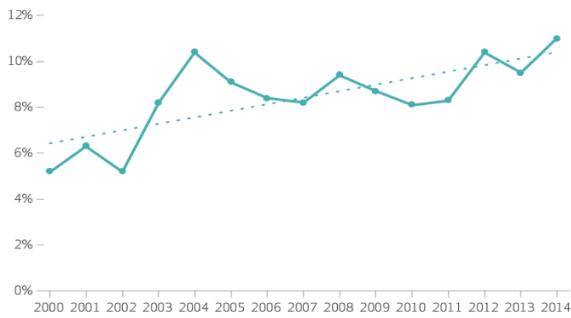


The Scope of the Opportunity

Percentages of bacterial infections with antibiotic resistance, actual and linear trend, 2000-14



- Context:** Over 20% of patients treated with antibiotics experience an adverse drug event.¹
- Current:** Current estimates of cost related to treated multi-drug resistant organisms is \$1,383 per patient and \$2.2 billion annually in the US.² This is now a focus of 2023 Joint Commission requirements for hospitals.
- Cutting Edge:** Stewardship of both diagnostic (testing for possible infection) and antibiotic (treating suspected infections) resources can help patients and society.

Asymptomatic Bacteruria

- Context:** Asymptomatic bacteruria is common, particularly among elderly, and differs from symptomatic UTI.
- Current:** Clinical practice guidelines recommend withholding antibiotics in the absence of symptoms suggestive of UTI (localizing genitourinary symptoms or systemic signs of infection such as fever or hemodynamic instability) even if the patients are confused.³ Antibiotics for asymptomatic bacteruria leads to increased cost and length of stay without changing clinical outcomes.⁴

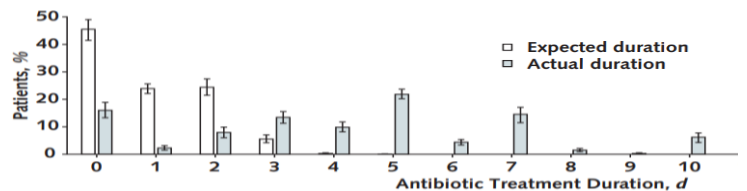
Outcome ^a	No. (%)		Unadjusted Odds Ratio (95% CI)	Unadjusted P Value	Adjusted Odds Ratio (95% CI)	Adjusted P Value
	Antibiotics (n = 2259)	No Antibiotics (n = 474)				
30-d Postdischarge mortality ^b	63 (2.8)	11 (2.3)	1.22 (0.66-2.26)	.53	1.34 (0.72-2.49)	.35
30-d Postdischarge readmission ^b	362 (16.0)	66 (13.9)	1.16 (0.87-1.56)	.31	1.29 (0.92-1.81)	.14
30-d Postdischarge ED visit ^b	272 (12.0)	62 (13.1)	0.91 (0.70-1.18)	.48	0.90 (0.66-1.24)	.52
Discharge to post-acute care facility ^{b,c}	811 (35.9)	102 (21.5)	1.98 (1.58-2.48)	<.001	1.19 (0.90-1.57)	.22
<i>Clostridioides difficile</i> infection ^d	14 (0.6)	2 (0.4)	1.39 (0.41-4.68)	.59	0.88 (0.20-3.86)	.86
Duration of hospitalization, median (IQR), d ^e	4 (3-6)	3 (2-5)	1.37 (1.28-1.47) ^f	<.001	1.37 (1.28-1.47) ^f	<.001

- Cutting edge:** Patients with altered mental status with a urinalysis suggestive of infection but without symptoms of UTI can be safely monitored off antibiotics for 48 hours. Routine urinalysis and culture in such patients is likely to be wasteful.

Overprescribing at Discharge

- Context:** Many patients receive treatment for dubious infections. Nearly 40% of heart failure patients receive antibiotics, leading to increased volume, sodium, length of stay, and readmissions.⁵

- Current:** Excessive antibiotics are often prescribed at discharge. Each day of excessive antibiotics for pneumonia has been linked to a 5% increased risk for antibiotic-associated adverse events.⁶



- Cutting edge:** Counting inpatient days of treatment and using the shortest acceptable duration for patients who respond favorably are concrete ways to reduce antibiotic prescribing.

References:

- Tamma PD, et al. Association of Adverse Events With Antibiotic Use in Hospitalized Patients. *JAMA Intern Med.* 2017 Sep 1;177(9):1308-1315.
- Thorpe KE, et al. Antibiotic-Resistant Infection Treatment Costs Have Doubled Since 2002, Now Exceeding \$2 Billion Annually. *Health Aff (Millwood).* 2018 Apr;37(4):662-669
- Nicolle LE, et al. Clinical Practice Guideline for the Management of Asymptomatic Bacteriuria: 2019 Update by the Infectious Diseases Society of America. *Clin Infect Dis.* 2019 May 2;68(10):e83-e110
- Petty LA, et al. Risk Factors and Outcomes Associated With Treatment of Asymptomatic Bacteriuria in Hospitalized Patients. *JAMA Intern Med.* 2019 Nov 1;179(11):1519-1527
- Frisbee J, et al. Adverse Outcomes Associated With Potentially Inappropriate Antibiotic Use in Heart Failure Admissions. *Open Forum Infect Dis.* 2019 May 8;6(6):ofz220
- Vaughn VM, et al. Excess Antibiotic Treatment Duration and Adverse Events in Patients Hospitalized With Pneumonia: A Multihospital Cohort Study. *Ann Intern Med.* 2019 Aug 6;171(3):153-163