Presentation Type:
Poster Presentation - Poster Presentation
Subject Category: Antibiotic Stewardship
Uptake of Revised CLSI Breakpoints and Potential Impact among Hospitals Reporting to The NHSN AR Option, 2022

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Background: Antimicrobial susceptibility testing (AST) is critical for detecting antimicrobial resistance (AR) and guiding antimicrobial treatment. The Clinical and Laboratory Standards Institute (CLSI) regularly publishes and revises breakpoints to guide the interpretation of AST results. In 2010–2019, CLSI has lowered many breakpoints for Enterobacterales and Pseudomonas aeruginosa. Timely implementation of updated breakpoints can vary across hospital laboratories, leading to shifts in the interpretation of AST results. This issue is a potential threat to the estimation of national prevalence estimates for AR and limits the comparability of AR data across hospitals. Hospitals submit AST data with clinical laboratory interpretations to the AR Option of CDC's National Healthcare Safety Network (NHSN). NHSN tracks whether a hospital adopted the revised CLSI breakpoints for six organism-antimicrobial combinations involving AR phenotypes commonly associated with healthcare associated infections through hospital self-reporting status into a structured survey — 2022 NHSN Annual Hospital Survey (Table). For this analysis, we describe the uptake of revised CLSI breakpoints and compare cumulative antibiograms among hospitals that used various breakpoints. **Methods:** We included hospitals that completed the 2022 NHSN annual survey and submitted data to the NHSN AR Option for at least 9 months in 2022 by November 1, 2023. The percentage of hospitals that implemented CLSI breakpoints, published during 2010–2019, were determined for combinations of antibiotic class, organism, and CLSI revision year (Table). We calculated percent resistance (%R) as the number of isolates meeting AR phenotype definitions divided by the total number of Isolates tested for the following phenotypes: carbapenem-resistant Enterobacterales (CRE) which included E. coli, Klebsiella, and Enterobacter species; extended-spectrum cephalosporin-resistant Enterobacterales (ESC); carbapenem-non-susceptible P. aeruginosa; fluoroquinolone-resistant P. aeruginosa; and fluoroquinolone-resistant Enterobacterales. **Results:** Among the 741 hospitals included, 75%–93% implemented any of the six revised CLSI breakpoints (Table). The %R was higher among isolates from hospitals that adopted revised breakpoints compared to those that did not (p < 0 .0001). The largest difference was observed for carbapenem-non-susceptible P. aeruginosa (14.91% vs 10.11%). **Conclusions:** The uptake of revised CLSI breakpoints varied across hospitals, organism-antimicrobial combinations, and CLSI versions. This analysis indicates that the prevalence of AR for corresponding phenotypes could be underestimated if data from hospitals using higher, outdated breakpoints are included. It is important for NHSN to continue tracking breakpoints used in individual hospitals and encourage hospitals to report complete data on the original AST results, such as MIC, to optimize the accuracy of national AR surveillance.

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Blood Culture Contamination Mitigation: Sustaining Success and Stewardship Systemwide

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Background: False-positive blood cultures compromise care; extended stays, Clostridioides difficile risk increases and renal woes tagged to antibiotic alms contribute to the doubling of patient in-hospital mortality that is observed relative to true negative diagnostic results. False-positive affiliated central line-associated bloodstream infection reports can further obfuscate the quality of care provided. Between personnel performance pressures, laboratory resource losses and the risk for financial penalty

Phenotype Name	Revised Breakpoints	Revised Breakpoints (Yes)				Revised Breakpoints (No)				P-value
		Hospitals* N (%)	No. Isolates Resistant	No. Isolates Tested	% Resistant	Hospitals* N (%)	No. Isolates Resistant	No. Isolates Tested	% Resistant	
Carbapenem-resistant Enterobacterales	Carbapenem breakpoints for Enterobacterales in 2010	690 (93%)	2828	400344	0.71%	51 (7%)	86	20440	0.42%	<0.0001
Carbapenem-resistant Enterobacterales	Ertapenem breakpoints for Enterobacterales in 2012	652 (88%)	2753	386126	0.71%	89 (12%)	161	34658	0.46%	<0.0001
Extended-spectrum cephalosporin resistant Enterobacterales	Cephalosporin and monobactam breakpoints for Enterobacterales in 2010	682 (92%)	72233	468233	15.43%	59 (8%)	3517	28625	12.29%	<0.0001
Fluoroquinolone-resistant Enterobacterales	Fluroquinolone breakpoints for Enterobacterales in 2019	556 (75%)	79335	367365	21.76%	185(25%)	24891	123748	20.11%	<0.0001
Fluoroquinolone-resistant *Pseudomonas aeruginosa*	Fluroquinolone breakpoints for Pseudomonas aeruginosa in 2019	592 (80%)	8400	50020	16.79%	149(20%)	1414	10522	13.44%	<0.0001
Carbapenem-non-susceptible *Pseudomonas aeruginosa*	Carbapenem breakpoints for Pseudomonas aeruginosa in 2012	662 (89%)	7267	48743	14.91%	79 (11%)	2695	2998	10.11%	<0.0001

Table: Proportion of Isolates AR phenotypes between hospitals that implemented revised Clinical Laboratory Standard Institute breakpoints versus those that did not, NHSN AR Option, 2022.

Note: * represents the number of hospitals that reported AR Option data; % Resistant denotes number of isolates resistant divided by the number of isolates tested.

under Value-Based Purchasing and Hospital-Acquired Condition Reduction Programs (Centers for Medicare & Medicaid Services), it becomes difficult to brush aside the burden of a non-zero blood culture contamination rate. Following unsuccessful and unsustainable endeavors that included educational exercise and waste tube employment, initial-specimen diversion devices designed to shift performance burdens from technicians to technology were co-opted in an effort to secure reliable blood culture contamination rate reductions. **Methods:** A 3.6% blood culture contamination rate was observed systemwide prior to intervention, which began in 2020. Among seventeen facilities that share a data system, twelve co-opted initial-specimen diversion device technology as the evidence-based anchor to a trifurcate intervention strategy that included value analysis and cultural curation. **Results:** The 2023 systemwide blood culture contamination rate was 1.95%; down from 2.8% in 2022 and 3.2% in 2021. The average cost per false-positive event was $2,111, with intervention amounting to systemwide savings of $4.1 million in 2023 as approximately 1,920 patients avoided false-positive incidents. Critical to year-over-year systemwide uptick in adoption of interventive technology was consistent and near real-time communication to caretakers regarding outcomes. **Conclusion:** The sustained success of the multifactorial solution showcased herein stems from the coupling of an evidence-based action with an ongoing assessment of value and communication channels carefully constructed to celebrate and perpetuate value observed. Layered uncertainties often cloud the crux of a multifactorial solution to a complex conundrum; for many decades the literature-supported solution to high blood culture contamination rates was to educate every person involved in every possible way. Only recently, following recommended practice revisions endorsed by the Clinical and Laboratory Standards Institute and Centers for Disease Control and Prevention, did it become apparent nationwide that education alone was insufficient; some contaminant pathways persist without meticulously mechanical closure. Antimicrobial stewardship requires the respectful removal of adaptable pressures from microorganisms, but the inverse is equally important; by setting an ambitious systemwide blood culture contamination rate target of 1% or less, it is hoped that all facilities involved herein respond to this pressure with optimism, introspection and innovation.

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Risk Factors Predicting Complication of OPAT in an Academic Center: A Retrospective Cohort Study

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Background: While Outpatient Parenteral Antibiotic Therapy (OPAT) offers patient convenience and reduced healthcare costs, its increasing utilization has brought various complications to light, including antibiotics-related and line-related OPAT complications. In a large prospective study, 18% of the patients experienced adverse drug events. Another study showed 8.45% of patients had vascular complications. Our study aims to identify clinical predictors associated with OPAT complications. Identifying predictors for suboptimal OPAT outcomes provides an opportunity to intervene, thereby minimizing the risk of OPAT-related complications. **Method:** We conducted a retrospective cohort study at Tufts Medical Center of all adult patients aged ≥18 years discharged on OPAT from April 2022 to October 2022. Demographic, treatment, outcome, and complications data were extracted through chart review. The

Figure 1. Types of OPAT complications

Antibiotic-related	
• Rash	10
• Leukopenia	4
• Transaminitis	3
• Acute kidney injury	2
Line-related	
• Catheter occlusion	9
• Line displacement	6
• Local reaction (redness)	5
• Leaking line	4
• DVT	2
• Bloodstream infection	1

Figure 2. Characteristics and comparison of risk factors of OPAT complications

Characteristics	OPAT Complications		Univariable		Multivariable	
	Yes (n=44)	No (n=187)	OR (95% CI)	p value	aOR (95% CI)	p value
Age, years (IQR)	56 (46, 69)	64 (54, 74)	0.974 (0.953 – 0.996)	0.019	0.980 (0.947 – 1.015)	0.266
Gender						
• Male	29 (65.9)	116 (62.0)	Reference			
• Female	15 (34.1)	71 (38.0)	1.183 (0.594 – 2.359)	0.632	-	-
Race						
• White	36 (81.8)	142 (75.9)	Reference			
• Others	8 (18.2)	45 (24.1)	0.701 (0.304 – 1.618)	0.406	-	-
Ethnicity						
• Non-Hispanic	39 (88.6%)	172 (92.0)	Reference			
• Hispanic	5 (11.4)	15 (8.0)	1.470 (0.504 – 4.287)	0.480	-	-
Charlson comorbidity index						
• 0	9 (20.5)	17 (9.1)	Reference			
• 1-2	14 (31.8)	43 (23.0)	0.615 (0.224 – 1.686)	0.345	0.740 (0.231 – 2.368)	0.612
• 3-4	10 (22.7)	53 (28.3)	0.356 (0.124 – 1.022)	0.055	0.646 (0.159 – 2.619)	0.541
• >5	11 (25.0)	74 (39.6)	0.281 (0.101 – 0.784)	0.015	0.508 (0.105 – 2.465)	0.401
SUD	3 (6.8)	15 (8.0)	0.839 (0.232 – 3.034)	0.789	-	-
IVDU	2 (4.5)	7 (2.7)	1.224 (0.246 – 6.107)	0.805	-	-
Insurance						
• Commercial	15 (34.1)	64 (34.2)	Reference	Reference		
• Medicare	18 (40.9)	97 (51.9)	0.792 (0.372 – 1.684)	0.544		
• Medicaid	10 (22.7)	22 (11.8)	1.939 (0.761 – 4.942)	0.165		
• Others	1 (2.3)		1.067 (0.111 – 10.245)	0.955		
Primary language						
• English	39 (88.6)	172 (92.0)	Reference			
• Non-English	5 (11.4)	15 (8.0)	1.470 (0.504 – 4.287)	0.480		
Penicillin allergy	8 (18.2)	31 (16.6)	1.118 (0.474 – 3 636)	0.798	-	-
Discharge location						
• Home	33 (75.0)	119 (63.6)	Reference			
• SNF	11 (25.0)	68 (36.4)	0.583 (0.277 – 1.228)	0.156		
Access						
• Central	32 (72.7)	139 (74.3)	Reference			
• Peripheral	12 (27.3)	48 (25.7)	1.086 (0.518 – 2.276)	0.827		
Antibiotic class						
• Penicillin	7 (15.9)	41 (21.9)	0.674 (0.280 – 1.623)	0.378	-	-
• Cephalosporin	27 (61.4)	88 (47.1)	1.787 (0.913 – 3.496)	0.090	1.761 (0.810 – 3.826)	0.153
• Carbapenems	4 (9.1)	27 (14.4)	0.593 (0.196 – 1.791)	0.354	-	-
• Glycopeptides	14 (31.8)	37 (19.8)	1.892 (0.912 – 3.923)	0.087	1.752 (0.768 – 3.998)	0.183
• Dalbavancin	1 (2.3)	8 (4.3)	0.520 (0.063 – 4.272)	0.543	-	-
• Metronidazole	6 (13.6)	14 (7.5)	1.951 (0.704 – 5.404)	0.198	-	-
• Others	6 (13.6)	26 (13.9)	0.978 (0.376 – 2.542)	0.963	-	-
Number of Antibiotics						
• 1	23 (52.3)	129 (69.0)	Reference	Reference		
• 2	21 (47.7)	52 (27.8)	2.265 (1.155 – 4.442)	0.017	1.826 (0.818 – 4.079)	0.142
• 3	0 (0)	6 (3.2)	0	0.999	-	-
Frequency						
• <=2 /day	20 (45.5)	105 (56.1)	Reference			
• >2 /day	24 (54.5)	82 (43.9)	1.537 (0.794 – 2.973)	0.202		
Duration of OPAT in days, median (IQR)	42 (21, 42)	42 (23, 42)	0.990 (0.965 – 1.015)	0.423	-	-
Type of OPAT follow up						
• Office visit	38 (86.4)	151 (80.7)	1.510 (0.593 – 3.845)	0.388	-	-
• Telehealth	18 (40.9)	52 (27.8)	1.797 (0.910 – 3.551)	0.091	1.879 (0.899 – 3.927)	0.094
Time from hospital discharge to first OPAT follow up in days, median (IQR)	9 (7, 14)	10 (7, 13)	1.006 (0.965 – 1.049)	0.779	-	-
Missed appointment						
• 0	37 (84.1)	150 (80.2)	Reference	Reference		
• 1	3 (6.8)	24 (12.8)	0.507 (0.145 – 1.774)	0.288		
• >1	4 (9.1)	13 (7.0)	1.247 (0.384 – 4.407)	0.713		
Missing OPAT labs	9 (20.9)	27 (14.4)	1.569 (0.677 – 3.635)	0.294		