Evaluation of Drug-Bug Mismatch Alerts and Their Value in an Antimicrobial Stewardship Program

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Introduction

- Antimicrobial stewardship is a priority for hospitals, and utilizing a variety of generated reports can enhance stewardship activities.
- At AtlantiCare Regional Medical Center (ARMC), a software program was used to help optimize antimicrobial therapy by providing a drug-bug mismatch (DBM) alert which identifies patients with culture susceptibilities not covered by their current antimicrobial therapy. This feature should provide pharmacists with information to make beneficial clinical interventions.

Purpose

- **The purpose of this study was to evaluate the utility of the DBM alert and determine whether or not an intervention was truly needed for patients identified as having a mismatch.**

Methods

- From August 2019 to March 2020 the results of our DBM were reviewed by a pharmacist and interventions were pursued when appropriate. Data collection included the patient's culture results and source, indication for current antibiotics, and potential for intervention.
- For the purposes of analyzing results, alerts were into different groups based on the type of culture including urine, blood, sputum, bone or body fluid, wound or tissues and stool. Those mismatches not resulting in an intervention were categorized as contamination, colonization or inappropriate.
- The pharmacists were responsible for assessing each case, following up with the physician, and then determining if there was a true DBM. With a true DBM, the investigator intervened to ensure the appropriate antibiotics were initiated for treatment of the patient's infection.
- This study was approved by the institutional review board.

Figure 1: Number of Alerts Resulting in Pharmacist and Provider Interventions (n=48)

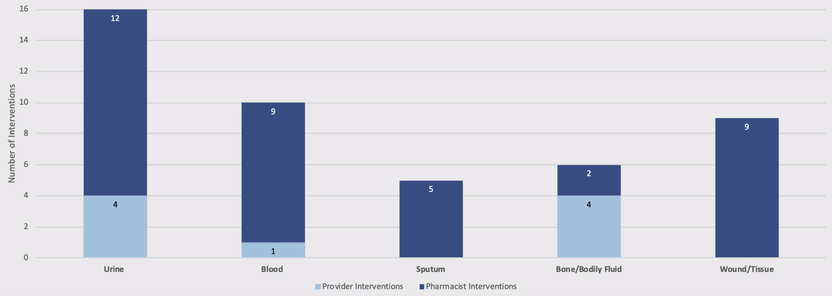

Figure 2: Example of Drug-bug Mismatch Alert

Alert organism(s):
C Urine: >=100,000 CFU/ML Proteus mirabilis isolated ***This isolate is carbapenem resistant (CRE).***

Current antimicrobial therapy:

Drug	Dose	Start	End	Status	Pat Class
CEFAZOLIN IN D5W, 1 GM/50 ML (DUPLEX)	1 GM IVPB Q8H	11/06/2019 14:00	11/13/2019 13:59	ACTIVE	I

Table 1: Breakdown of Alert Results

Culture	Alerts	Contaminants / Colonization	Provider Interventions	Pharmacist Interventions
Urine	51	10	4	12
Blood	14	0	1	9
Sputum	17	5	0	5
Bone/Bodily fluid	6	0	4	2
Wound/Tissue	16	3	0	9
Stool	1	0	0	1
Total	**105**	**18**	**10**	**38**

Results & Discussion

- A total of 105 DBM alerts were analyzed from various sources, including 51 (47.6%) urine, 14 (13.3%) blood, 17 (16.2%) sputum, 6 (5.7%) bone or bodily fluid, 16 (15.2%) wound or tissue, and 1 stool culture. **(Table 1)**
- Overall, 48 of 105 (45.7%) alerts were associated with an intervention by the provider (10 of 48; 20.8%) or pharmacist (38 of 48; 79.2%). Urine and sputum culture alerts required interventions at a lower rate with resultant treatment interventions in 16 of 51 (31.4%) and 5 of 17 (29.4%) of those cases respectively. **(Figures 1 & 2)**
- Blood culture alerts were among the most successful as 10 of 14 (71.4%) alerts identified a patient requiring intervention. Alerts associated with wound or tissue cultures identified gaps in therapy as 9 of 16 (56.3%) cases required an intervention. Alerts due to positive bone or bodily fluid cultures resulted in interventions in all 6 cases.
- Colonization or contamination appeared to be a major cause of alerts that did not result in an intervention according to provider documentation. Of the 105 alerts, 18 (17.1%) were the result of a contamination or colonization.

Conclusion

- **The drug-bug mismatch alert software can be a beneficial tool for pharmacists participating in antimicrobial stewardship activities. However, the alerts had varying value depending on the culture source at ARMC. If used appropriately, the DBM can be a valuable asset for an antimicrobial stewardship program.**
- **Further modifications to our process in utilizing the DBM are warranted to enhance value and allocate time accordingly.**

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