Impact of real-time antimicrobial stewardship team intervention versus conventional microbiology reporting on time to appropriate antimicrobial therapy in patients with Enterobacterales bacteremia

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### Background
- Blood stream infections remain a major cause of mortality in the United States and the world.
- Previous literature has established that rapid diagnostics with real time interventions lead to superior outcomes vs passive notification.
- The Providence Oregon region conducts direct from blood culture (DFB) matrix-assisted laser desorption/ionization time of flight (MALDI-TOF) identification, which results in decreased time to organism identification.
- In February 2019, the antimicrobial stewardship team (AMT) established a real-time alert and clinical intervention for positive blood cultures identified by DFB MALDI-TOF.

### Purpose
- Assess the impact of MALDI-TOF identification, combined with real time notification and AMT intervention, has on clinical outcomes in patients with *Enterobacterales* blood stream infections (BSI).

### Objectives
- Identify and match patient pairs with *Enterobacterales* BSI from the study time frame.
- Evaluate the time to de-escalation therapy, length of hospitalization, and total length of antibiotic therapy.
- Assess the effect the AMT has on clinical outcomes in the post-intervention group.

### Methodology

#### Study Design
- Retrospective, multi-center, matched, pre- and post-quasi-experimental study conducted at eight acute care hospitals in the Providence Health & Services Oregon region between August 2018 and June 2019.

#### Inclusion criteria
- Adults (>18 yo), non-pregnant
- *Enterobacterales* BSI
- On broad spectrum therapy (IV anti-pseudomonal therapy)
- Source control achieved within 5 days of positive culture result.
- Taking other enteral meds or feed by day 5
- Pitt bacteremia score of <1 by day 5
- Availability of an in vitro active oral agent

#### Exclusion criteria
- Patients transferred from an outside hospital
- Polymicrobial bacteremia
- Patients who expire before blood cultures results were reported
- Patients on hospice/comfort care
- Patients who transfer to a non-Providence hospital

### Conclusions
- With the rapid real time results and AMT interventions there was a decrease in time to de-escalation.
- This reinforces conclusions from previous studies.
- There was also a decrease in length of hospital stay between the two groups.
- No difference was found between the two groups in regards to total length on antibiotic therapy.
- There was no noted significance in the difference in time to PO between the groups. A larger study could help to identify if this is true.
- This study helps to highlight the significant impact of an AMT can have on patient outcomes, and the cost savings that can be achieved through antimicrobial stewardship.

### Discussion

#### Patient Population
- A total of 60 patients were included in this study: 30 patients in the pre-intervention group and 30 patients in the post-intervention group.
- The most common age group was patients 60-69 years of age (43% vs 43%).
- The most common causative organism for the BSI was found to be Escherichia coli (76.7% vs 50%).

#### Clinical Outcomes
- During the intervention period a decrease was noted in median time to de-escalation of therapy in the non-ICU groups (2.7 days vs 1.8 days, p=0.0221).
- A decrease in length of stay was also noted in the length of stay in the non-ICU groups (5 days vs 4.1 days, p=0.047).
- There was no statistical difference in the total length of therapy (combined inpatient and outpatient duration) between the Non-ICU groups (10 days vs 9 days, p=0.8379).

### Study Limitations
- Non-randomized
  - Different time periods and providers in pre-post-intervention groups
- Small sample size
- Did not match by organism
- Did not analyze percentage of interventions accepted

### Disclosure
- None of the investigators have anything to disclose.

### References