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### Repeat Tracheal Aspirates in Pediatric Intensive Care Patients: Understanding Clinical Application

Edward Lyon

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## Research Abstract Title

**Submitting/Presenting Author (must be a trainee):** Edward Lyon, DO  
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- Medical Student
- Resident/Psychology Intern ( $\leq 1$  month of dedicated research time)
- Resident/Ph.D/post graduate ( $> 1$  month of dedicated research time)
- Fellow

**Primary Mentor (one name only):** Elizabeth Monsees, PhD, MBA, RN, CIC, FAPIC  
**Other authors/contributors involved in project:** Jennifer Goldman MD MS-CR, Brian Lee PhD, Rangaraj Selvarangan PhD

**IRB Number:** 00001596

**Describe role of Submitting/Presenting Trainee in this project (limit 150 words):**

Edward wrote the IRB protocol, organized the data, and did the chart review of all patients included in the study. Additionally, statistical analysis was performed by Edward with guidance from Brian Lee. Finally, the abstract was written by Edward and reviewed by all contributing members to this project. The whole study was performed under the mentorship of Elizabeth Monsees.

**Background, Objectives/Goal, Methods/Design, Results, Conclusions**

**Background:** Tracheal aspirate cultures (TA) are regularly obtained in the pediatric intensive care unit (PICU) when clinical changes in intubated or tracheostomy dependent children occur. Positive TA results are often unable to distinguish infection from colonization. There is no data describing the frequency and impact of repeated TAs on patients in the PICU.

**Goal:** Our objectives were to describe the frequency of repeated TAs in PICU children and emergence of multidrug resistant organisms (MDRO), identify bacterial profile of TAs, and examine antibiotic prescribing patterns related to these cultures.

**Methods:** A retrospective chart review occurred on 15 patients in the PICU between 2018-2019 with  $\geq 2$  TAs obtained during their hospital encounter. The following was collected on each TA from the medical record: microbiologic profile with susceptibilities, antibiotic exposure, and clinical data summarizing patient condition at the time of TA collection. Descriptive statistics established the frequency and time between initial and repeat TAs, reason for collection, antibiotic exposure, and frequency an MDRO was isolated.

**Results:** Most patients were < 5 years of age (N=14; 94%), male (N=13; 87%), and were admitted to the medical ICU service (N=8, 53%). Fever (46%) was the most common reason for TA collection followed by vital sign changes, then secretion burden (34% and 32% respectively). The median length of stay was 117 days [IQR 33,210]. The median number of TAs per hospitalization was 4 [2.5, 8]. The median days between cultures was 10 [4, 26 days] (Figure 1). A total of 133 organisms were detected on these cultures, with *Pseudomonas aeruginosa* (n=32), Methicillin-susceptible *Staphylococcus aureus* (n=16), and *Klebsiella oxytoca* (n=11) comprising the top pathogens (Figure 2). Eleven of the 15 patients (73.3%) had the same organism detected on 2 or more separate cultures. A total of 616 antibiotic days were prescribed for these patients with 149 (24%) antibiotic days prescribed for the TA. Six (40%) patients had a multi-drug resistant organism isolated after a median of 14.5 antibiotic days [11.75, 37.5 days].

**Conclusion:** This study identified multiple TAs occur during a hospital stay with the same pathogen cultured often on repeat samples. Development of resistance is common and only a minority of TAs are directly treated with antibiotics. These data provide an opportunity to further explore clinical criteria to maximize the impact of TA cultures in the PICU.