### Antibiotic use for children in the PICU with severe viral bronchiolitis

**A Quality Improvement Project**

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**Children with severe bronchiolitis are admitted to the PICU, and often receive empiric antibiotics. However, viral bronchiolitis is not treated with antibiotics, but with supportive care. Antibiotics may be used for secondary bacterial pneumonia, which is difficult to diagnose in small children. The initiation of antibiotics for this viral illness lacks evidence of consistency amongst physicians.**

### SETTING AND TEAM

This QI project is being conducted in the UNMH PICU. The QI team consists of one attending physician and one research advisor. Funding for preliminary data collection was provided through an internal RAC grant through the Dept of Pediatrics.

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### QI Framework

IHI Model for Improvement:  
http://www.ihi.org/resources/Pages/HowtoImprove/default.aspx

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### OBJECTIVES

**To examine clinical factors associated with systemic antibiotic use in severe bronchiolitis based on retrospective chart review of PICU patients.**

**METHODS:** We identified children discharged from the UNMH PICU from January 2017-January 2019 diagnosed with severe viral bronchiolitis. Variables extracted included demographics, treatments, lab values and outcomes. Stata/SE 15.1 was used to calculate descriptive statistics and to examine relationships between clinical factors and antibiotic administration using a t-test, Pearson’s chi-square test or Fisher’s exact test.

**RESULTS:** Children (n=208) were on average 11.3 ± 8.6 (SD) months old with a length of stay of 10.8 ± 6.4 days. Seventy children (34%) received antibiotics. Fifteen children (7%) had a definitive diagnosis of bacterial pneumonia (positive tracheal culture). Children who received antibiotics were slightly younger than those who did not (average age 10.3 vs. 11.9 months; p = 0.09). Fifty-four percent of children on a ventilator (n=26) received antibiotics versus 31% of children who were not ventilated (p=0.02). Forty-one percent of children with elevated temperature (≥38°C; n=115) received antibiotics vs 24% of children with normal temperature (n=89; p=0.009). Seventy-two percent of children with high CRP (>2 mg/L; n=18) received antibiotics versus 56% of children with normal CRP (n=18; p=0.24).

**CONCLUSIONS:** In the UNMH PICU, a substantial proportion of children with severe viral bronchiolitis receive antibiotics without a definitive diagnosis of bacterial pneumonia. These children were younger and sicker, with fever, elevated CRP and mechanical ventilation. An evidence-based, expert opinion supported, clinical decision-making algorithm is needed to better identify children that require systemic antibiotics in the setting of severe viral bronchiolitis.

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### QI PROJECT AIM

To standardize the initiation of systemic antibiotics for the diagnosis of viral bronchiolitis by demonstrating a 60% adherence to a clinical decision Making algorithm informed by the results of the chart review done in the planning phase of this study, in one bronchiolitis season (Jan – April).

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### QI Project Measures

Adherence to clinical decision making algorithm for eligible patients with the diagnosis of viral bronchiolitis in the UNMH PICU, during the next bronchiolitis season (Jan to April 2022)

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### NEXT STEPS

1. Create a consensus based clinical decision making algorithm with all PICU attendings  
2. Educate PICU residents on QI project and encourage asking to use algorithm on eligible patients with viral bronchiolitis  
3. In Jan 2022, prospectively apply the guideline as the first DO portion of the PDSA format.

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### REFERENCES

Clinical Practice Guideline: The Diagnosis, Management, and Prevention of Bronchiolitis.  
Pediatrics November 2014, 134 (5) e1474-e1502