Antimicrobial Stewardship in Pediatric Viral Respiratory Infections: A Retrospective Analysis of Antibiotic Prescribing Following Upper Respiratory BioFire® Panel Results

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Abstract:

Background: Rapid molecular diagnostics such as the BioFire® Respiratory Panel are widely used to identify viral respiratory pathogens in pediatric patients; however, their impact on antibiotic prescribing remains variable. Despite confirmed viral infections, antibiotics are frequently continued due to diagnostic uncertainty and concern for secondary bacterial infection.

Objective: To evaluate the impact of BioFire® Respiratory Panel testing on antibiotic prescribing practices and antimicrobial stewardship interventions in hospitalized pediatric patients with viral respiratory infections.

Methods: This retrospective chart review included pediatric patients hospitalized with a positive BioFire® Respiratory Panel during the study period. Patients with confirmed bacterial infections or immunocompromising conditions were excluded. Data collected included demographics, viral pathogens detected, antibiotic utilization, microbiologic testing, radiographic findings, oxygen requirements, ICU admission, and hospital length of stay. Outcomes were compared between patients who received antibiotics and those who did not.

Results: Seventy-six patients met inclusion criteria. Overall, 29% received systemic antibiotics despite confirmed viral respiratory infections. Patients receiving antibiotics had a significantly longer hospital length of stay compared with those who did not (3.3 vs 2.0 days; $p = 0.02$) and were more likely to undergo additional microbiologic testing (41% vs 9%; $p = 0.004$). Chest radiographs suggestive of pneumonia were strongly associated with antibiotic use (68% vs 0%; $p < 0.0001$). No significant differences were observed between groups in ICU admission, ventilator use, fever, oxygen requirement, or detection of multiple viral pathogens. Only one antibiotic de-escalation was documented as a direct result of BioFire® testing.

Conclusion: Antibiotic prescribing remained common among pediatric patients with confirmed viral respiratory infections despite rapid molecular diagnostic testing. Radiographic findings were the primary driver of antibiotic use, while BioFire® results infrequently led to stewardship-driven de-escalation. These findings highlight an opportunity for targeted antimicrobial stewardship interventions, including pharmacist-led review and clinical pathways, to better integrate viral diagnostic results into antibiotic decision-making and reduce unnecessary antibiotic exposure in pediatric populations.