

O1005 2018 Enterovirus D68 outbreak detection through a syndromic disease epidemiology network

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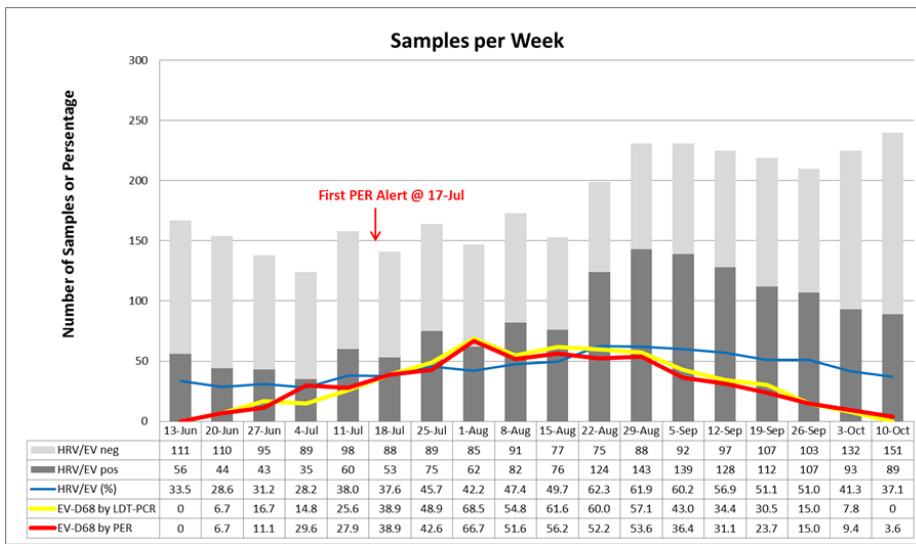
Background: Since August 2014, Enterovirus D68 (EV-D68) has (re)emerged associated with mild to severe lower respiratory tract infections. The BioFire® FilmArray® Respiratory Panel (RP) can detect 20 respiratory pathogens including rhinovirus/enterovirus (HRV/EV). An algorithm, Pathogen Extended Resolution (PER), was developed for detecting EV-D68 through examination of the patterns within the six real-time PCR data from the BioFire RP HRV/EV assay collected through the BioFire® Syndromic Trends (Trend) epidemiology system, a worldwide, cloud-based epidemiology system that track institution's BioFire RP tests. PER detected an increase in potential EV-D68 activity starting in July of 2018 and continued to monitor activity throughout the fall. As a member of the Trend working group, Nationwide Children's Hospital, Microbiology Laboratory was the first site predicted to have an increasing number of EV-D68 samples. The objective of this study was to verify the outbreak detected by the PER algorithm in our pediatric population and compared it with an in-house EV-D68 PCR test.

Materials/methods: From Jun 13th to Oct 16th 2018, 3638 nasopharyngeal (NP) samples were tested using BioFire RP. Among the HRV/EV positives, a subset of 1017 samples were tested for EV-D68 using a laboratory-developed (LD) RT-PCR. All BioFire® FilmArray run files from these samples were analyzed using the PER algorithm. We compared the PER test results to our EV-D68 PCR directly and evaluated the time to alerting using the PER algorithm.

Results: During the study period, 1652 of 3638 (45.5%) NP samples were positive for HRV/EV by BioFire RP. Among the 1017 HRV/EV positive specimens evaluated, 399 (39.2%) were positive for EV-D68 by our LD-PCR while 370 (36.4%) were positive for EV-D68 using PER. During the 18-week period HRV/EV positivity rate peaked in August along with EV-D68 with a peak of 66.7% (Figure 1). The concordance between the PER algorithm and EV-D68 PCR was 91.1%; PER had a sensitivity and specificity of 85.0% and 95.0% respectively.

Conclusions: The PER algorithm accurately predicted an on-going EV-D68 outbreak in our patient population. The confirmed outbreak at our site correlated with the PER algorithm's regional predictions.

Figure 1: Identification of Enterovirus D68 using the Pathogen Extended Resolution (PER) in comparison to Lab-Developed PCR- June 13– Oct 10, 2018



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