



Continued biennial circulation of enterovirus D68 in Colorado



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In 2014, the largest reported outbreak of enterovirus D68 (EV-D68) associated severe respiratory disease occurred in the USA and Canada [1,2]. Importantly, circulation of EV-D68 in 2014 coincided with an outbreak of acute flaccid myelitis (AFM) [3,4], with accumulating evidence suggesting a causal link between EV-D68 and AFM [5,6]. We previously reported that surveillance for enterovirus D68 amongst respiratory specimens at a children's hospital in Colorado demonstrated a seasonal pattern of circulation in the late summer to early fall of 2014 and 2016 with no circulation in 2015. Here we extend our data through 2018.

Children's Hospital Colorado (CHCO) is an academic, quaternary care hospital with a catchment of approximately 2.5 million children, primarily in the Denver metropolitan area. The CHCO Clinical Microbiology Laboratory tests respiratory specimens by the FilmArray® Respiratory Panel (RP) (BioFire Diagnostics, Salt Lake City, UT), a multiplex PCR that detects RVs and EVs but cannot discriminate between the two [7]. The methodology used for testing for EV-D68 in 2014–2016 was described previously [8]. In 2017 and 2018 an EV-D68 specific PCR was used to detect the virus in the first 20 samples positive for RV/EV each week by RP from August – October [9].

In 2017 and 2018, 500 and 323 RV/EV positive specimens were detected, respectively. Similar to the pattern seen in 2015, EV-D68 was not detected in any of the 272 RV/EV positive respiratory specimens tested in 2017. EV-D68 was first detected in samples the week starting August 5, 2018 and remained positive for 8 weeks until the end of September (Fig. 1). Fourteen percent of EV/RV positive samples (23 of 162 samples tested) were positive for EV-D68 in 2018 and EV-D68 activity peaked at 26% during the week starting September 9. The percent of RV/EV positive specimens for EV-D68 in 2018 was slightly higher than in 2016 (peak of 18%), but was notably lower than in 2014 (peak of 63%). Two cases of AFM tested positive for EV-D68 in respiratory specimens in 2018, compared to one in 2016, and five in 2014.

EV-D68 surveillance at Children's Hospital Colorado for the past 5

years demonstrates a continued biennial pattern of circulation in the late summer to early fall with peak circulation in August and September. Although the reason for this pattern is uncertain and requires further investigation, this biennial pattern of circulation has been described for other picornaviruses, including parechoviruses and non-polio EVs, primarily driven by serotype specific immunity requiring growth of a susceptible birth cohort [10]. Circulation of enteroviruses is difficult to predict, but this pattern suggests that since its emergence in 2014, EV-D68 might be establishing endemicity in North America with biennial epidemics similar to patterns established by enterovirus A71 which causes cyclic epidemics every 2–3 years in Southeast Asia [11]. Interestingly, the seasonal biennial surges in AFM cases noted in the United States since 2014 directly coincide with patterns of EV-D68 circulation [12], strengthening their association and suggesting that EV-D68 is likely a driving factor for the increase in AFM cases since 2014. This is further supported by correlation of EV-D68 circulation with increases in AFM cases seen in Europe and Japan [13,14].

In summary, local surveillance in Colorado demonstrates that EV-D68 has established a pattern of biennial circulation. Enhanced surveillance and research efforts are needed to fully define the disease associations and burden of disease due to EV-D68.

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Conflicts of interest

None of the authors have any conflicts of interest to disclose.

Ethical approval

Research was approved by the Colorado Multiple Institutional Review Board

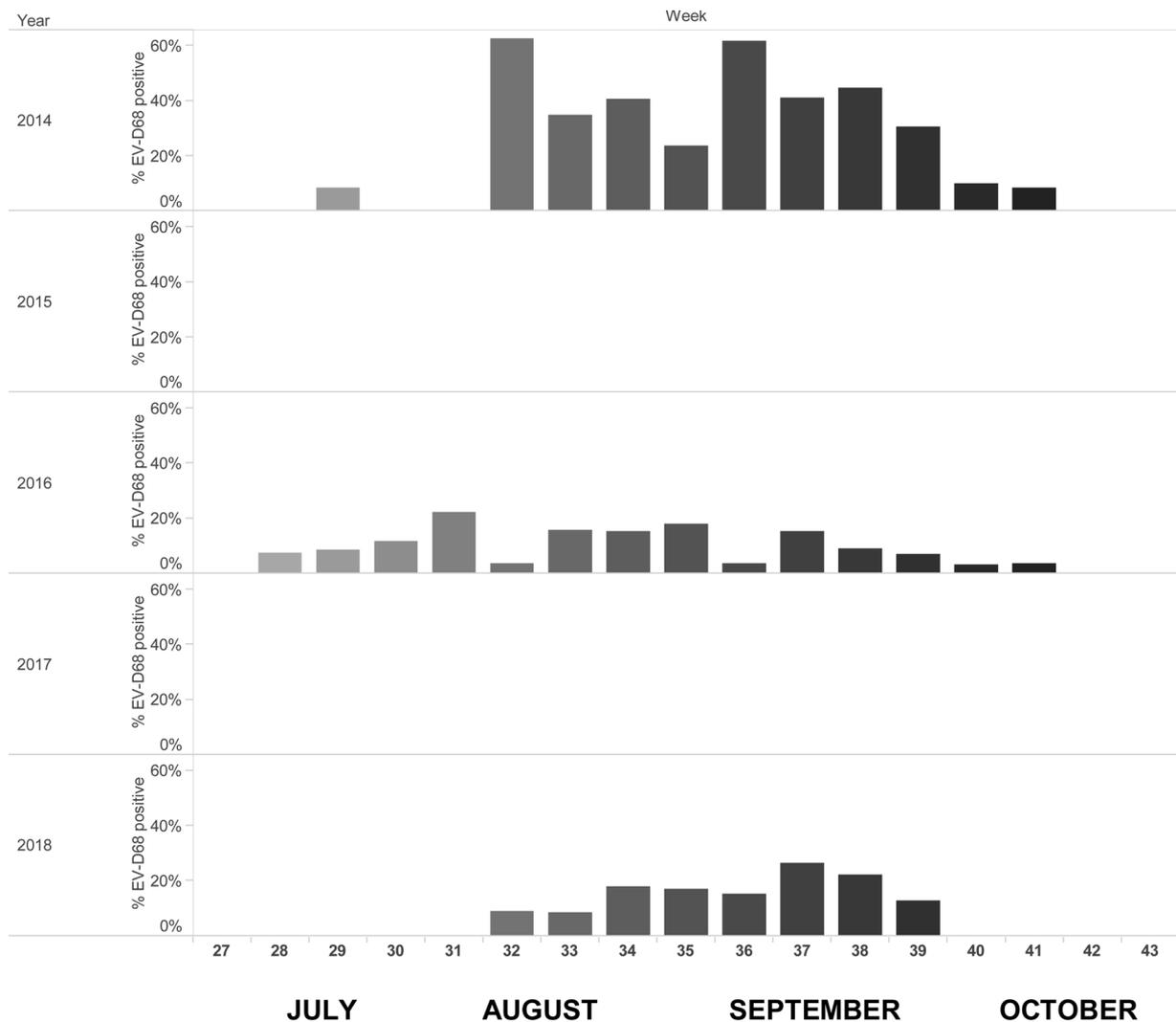


Fig. 1. Percent of RV/EV positive samples tested at Children's Hospital Colorado positive for EV-D68 by year and week.

Credit author statement

Kevin Messacar: conceptualization, methodology, writing – review and editing

Kristin Pretty: investigation, resources, data curation

Samantha Reno: investigation, resources, data curation

Samuel Dominguez: conceptualization, methodology, formal analysis, writing – original draft, reviewing and editing, supervision

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Kevin Messacar^{a,b}

^a *Children’s Hospital Colorado, Aurora, CO, USA*

^b *University of Colorado Denver, Aurora, CO, USA*

Kristin Pretty, Samantha Reno

Children’s Hospital Colorado, Aurora, CO, USA

Samuel R. Dominguez^{a,b,*}

^a *Children’s Hospital Colorado, Aurora, CO, USA*

^b *University of Colorado Denver, Aurora, CO, USA*

E-mail address: Samuel.dominguez@childrenscolorado.org.

* Corresponding author at: Children's Hospital Colorado, Section of Pediatric Infectious Diseases, 13123 E 16th Ave, B055, Aurora, CO, 80045, USA.