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Epidemiology of human respiratory viruses in children with acute respiratory tract infections in Parma area, northern Italy

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Background: Viruses are a leading cause of acute respiratory tract infections (ARTI), especially in children. Respiratory viruses are also the major cause of hospitalization and mortality in childhood worldwide. Recent epidemiological data are scanty globally and absent in Italy. The purpose of this study was to determine the prevalence of viral respiratory infections in children with ARTI in the area of Parma, Northern Italy, and the seasonal distribution of viral etiological agents.

Material/methods: Data were obtained from outcomes of clinical samples collected from respiratory tract of children during three consecutive seasons (October 2012 - September 2015) and tested for detection of respiratory viruses by different diagnostic methods (RSV antigen detection by IFI, Real-Time RT-PCR/PCR for AdV, IFV A and B, PIV 1-2-3, RSV, HCoV and hMPV and rapid and conventional cell culture).

Results: Viral pathogens were detected in 48.69% (1408/2892) specimens from 49.50% (1344/2715) children. The highest number of positive children was 6 months-3 years old (42.31%). The incidence of viral coinfections was 19.89%, where AdV was the most commonly detected virus (51.07%). Of single infections, RSV was the most frequent (30.14%), followed by AdV (23.23%). Of 1717 total viruses detected, after RSV (27.14%), the viruses most frequently revealed were AdV (23.59%), CoV (15.26%), IFV (11.47%), HBoV (9.38%), PIV (6.64%), hMPV (4.43%) and EV (2.10%), which was isolated in cell culture. RSV was detected significantly in ≤ 6 months old children (47.96%); all the other viruses were mostly detected in 6 months-3 years old children, but EV which was detected in 6 months-3 years as well as in 3-6 years old children. The seasonality of viral respiratory infections was 5-6 months long, with peak in January or February. RSV was found throughout the year

with seasonality in autumn-spring when AdV infection had small and high peaks. IFV had a steady autumn-early spring season. HBoV, HCoV, hMPV and PIV infections had a variable trend with high and small peaks in different periods. The seasonality of EV infections was both in spring-summer and autumn winter.

Conclusions: Virus detection rates were related to age, season and detection methods. RSV remains the most frequently detected in children with ARTI, especially ≤ 6 months old. Coinfections accounted for a significant percentage (19.89%), with AdV in the highest frequency. RSV and IFV confirm their strong seasonal patterns. It is necessary to monitor respiratory viruses over long times to deepen the epidemiology of the emerging viruses.