

PAS Abstract 2022

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Title: Community burden of influenza, parainfluenza, respiratory syncytial virus, and rhino/enterovirus in the PREVAIL birth cohort

Introduction: Influenza (IV), parainfluenza (PIV), respiratory syncytial virus (RSV), and rhino/enterovirus (RE) are important causes of hospitalization in children less than 2 years of age. Population-level burden, especially asymptomatic cases, caused by these pathogens is incompletely characterized due to the lack of prospective community-based cohort studies. We aim to describe the epidemiology and symptomatology of these viruses in a community-based birth cohort.

Methods: The PREVAIL cohort is a CDC-sponsored birth cohort in Cincinnati, Ohio; weekly text surveys are administered to enrolled infants for up to 2 years to detect presence of fever, respiratory, and gastrointestinal symptoms. Weekly mid-turbinate nasal swabs are collected from infants and tested using the Luminex Respiratory Pathogen Panel. An acute respiratory infection (ARI) is defined as cough or fever ($\geq 38^{\circ}\text{C}$). A viral infection included all consecutive positive tests within 14 days of the previous positive. Maternal reports and medical chart abstractions identified use of primary care, emergency department, and hospital admissions.

Results: There were 245 infants enrolled with 12,241 child-weeks of follow-up and 1,905 IV, PIV, RSV, and RE infections identified. Of these infections, 64% were asymptomatic, 16% required medical care, and 0.5% required hospital admission. Of those with symptoms, fever was reported most in children with IV (84%) and least in children with RE (42%) while cough was reported in similar proportions across all viruses (90-98%). The duration of ARI across all respiratory viruses ranged from a mean of 6-11 days. The incidence rates (infections/child-year) from highest to lowest were RE (8.26), PIV (0.87), RSV (0.59), and IV (0.19). This order was reversed with the proportion of symptomatic children seeking medical care: IV (42%), RSV (41%), PIV (22%) and RE (13%). Similarly, the proportion hospitalized was highest for RSV (3%) and IV (2%) and lowest for PIV (0.5%) and RE (0.2%).

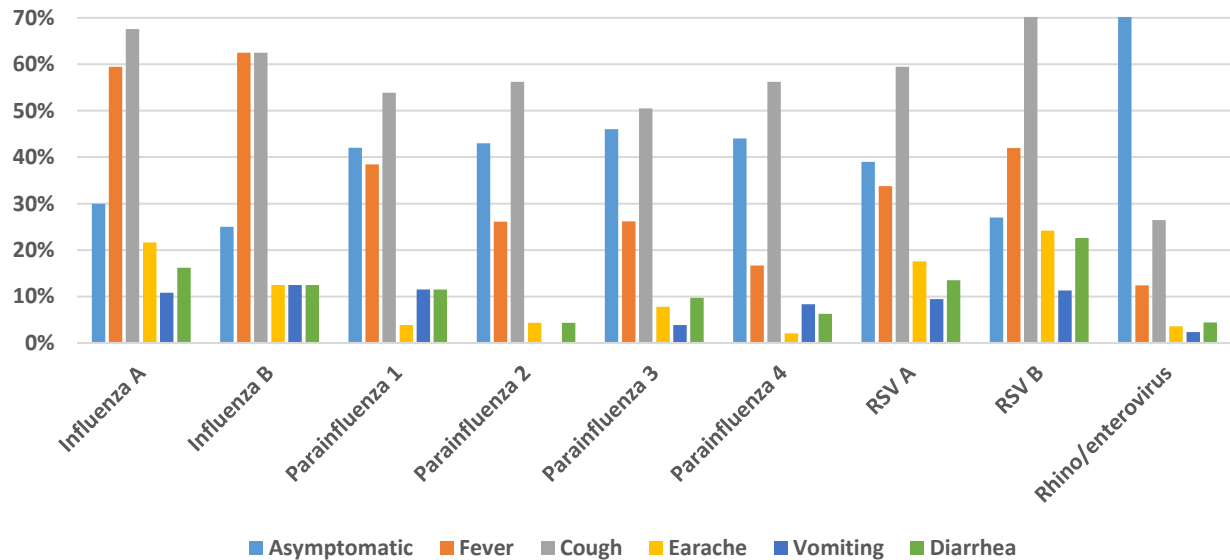
Conclusion: Asymptomatic and non-medically attended viral respiratory infections were frequent in the young children less than 2 years of age in our community cohort. While RE was most frequently detected, RSV and IV infections were more likely to receive medical attention and to be hospitalized.

The unique design of our cohort enhances our understanding of the burden and symptom spectrum of respiratory viruses in young children in the community.

Table 1. Incidence and symptomatology of respiratory viral infections in PREVAIL cohort

Pathogen	Viral Infections Detected	Incidence (per child-year)	Symptomatic Infections	Mean Duration of ARI (days)
Influenza viruses	45	0.19	32 (71%)	6.97
Influenza A	37	0.16	26 (70%)	7.27
Influenza B	8	0.03	6 (75%)	5.67
Parainfluenza viruses	200	0.87	111 (56%)	9.83
Parainfluenza 1	26	0.11	15 (58%)	8.13
Parainfluenza 2	23	0.10	13 (57%)	5.69
Parainfluenza 3	103	0.44	56 (54%)	10.93
Parainfluenza 4	48	0.20	27 (56%)	10.48
Respiratory syncytial viruses	136	0.59	90 (66%)	9.59
RSV A	74	0.32	45 (61%)	8.93
RSV B	62	0.27	45 (73%)	10.24
Rhino/Enteroviruses	1,524	8.26	449 (29%)	9.67

Figure 1. Proportion of respiratory viral infections with fever, respiratory, and gastrointestinal symptoms



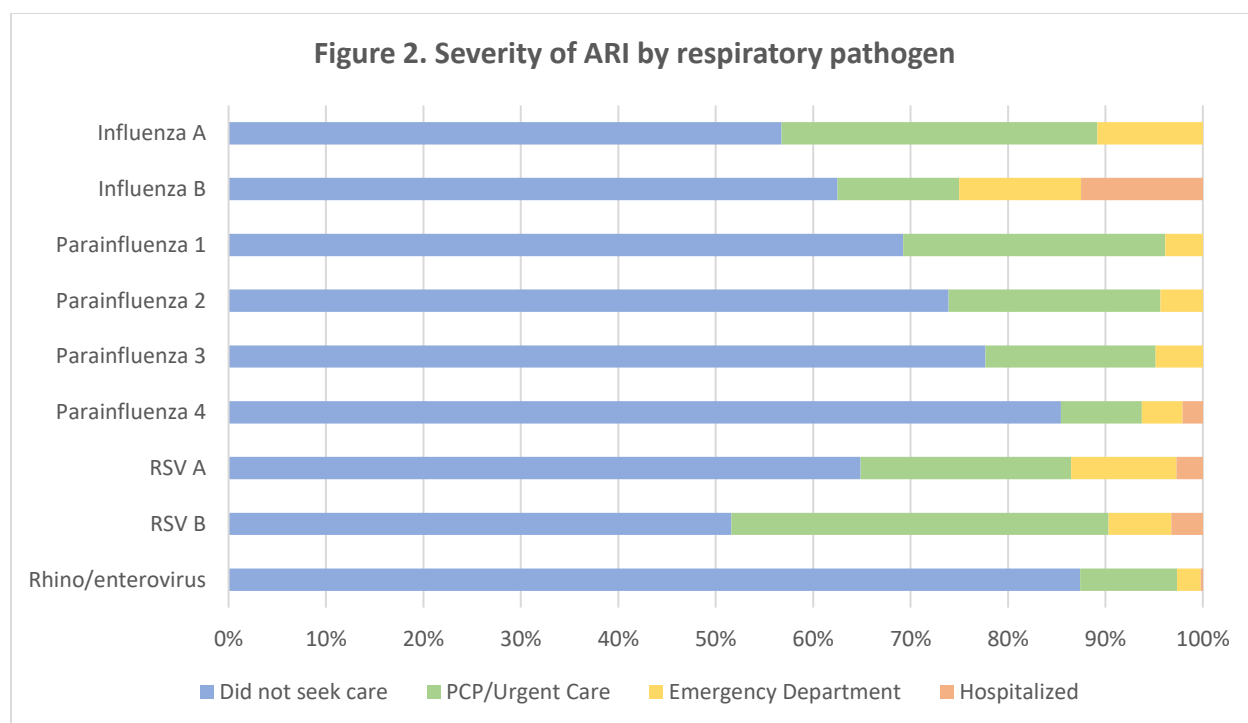


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Pathogen	Viral Infections Detected	Viral Infections Incidence (per child-year)	ARIs Detected	ARIs Incidence (per child-year)
Influenza viruses	45	0.19	32	0.14
Influenza A	37	0.16	26	0.11
Influenza B	8	0.03	6	0.03
Parainfluenza viruses	200	0.87	111	0.48
Parainfluenza 1	26	0.11	15	0.06
Parainfluenza 2	23	0.10	13	0.06
Parainfluenza 3	103	0.44	56	0.24
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Respiratory syncytial viruses	136	0.59	90	0.39
RSV A	74	0.32	45	0.19
RSV B	62	0.27	45	0.19
Rhino/Enteroviruses	1,524	8.26	449	4.07

