

TOP PAPERS OF THE MONTH

# What Role Do Viruses Play in Pediatric Asthma Exacerbations?

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**Merckx J, Ducharme FM, Martineau C, et al; Pediatric Emergency Research Canada (PERC) DOORWAY team. Respiratory viruses and treatment failure in children with asthma exacerbation. *Pediatrics*. 2018;142(1):e20174105. doi:10.1542/peds.2017-4105.**

Respiratory viruses are a known trigger of pediatric asthma exacerbations, but it is not clear how their presence affects the severity of exacerbation or the response to treatment. Prior studies have shown that the detection of a respiratory virus is associated with treatment failure in the emergency department (ED), without pathogen-specific analysis.

Ducharme and colleagues previously had investigated the determinants of treatment failure in children with moderate or severe exacerbations presenting to the ED in the Determinants of Oral Corticosteroid Responsiveness in Wheezing Asthmatic Youth (DOORWAY) study, a prospective cohort study of children aged 1 to 17 years with a diagnosis of asthma (*Lancet Respir Med*. 2016;4[12]:990-998). All children in the DOORWAY study received a standard dose of oral corticosteroids and bronchodilators. Treatment failure was defined as hospital admission or return to the ED. Several covariates were examined, including age, child atopy, asthma control, and signs of illness at presentation.

In a newly published paper by Merckx and colleagues, based on an ancillary study from the original DOORWAY study, the specific infectious etiologies were analyzed in relation to exacerbation severity and treatment failure. Infectious targets were identified via reverse-

transcriptase polymerase chain reaction. Data were analyzed with logistic multivariate regressions.

Of 958 participants with asthma, 61.7% were positive for at least 1 pathogen (virus or atypical bacteria). When a respiratory target was found, 16.9% experienced treatment failure. The presence of a pathogen itself was not associated with higher asthma severity on presentation, but it was associated with a higher risk of asthma treatment failure (20.7% vs 12.5%; risk difference, 8.2%; 95% CI, 3.3%-13.1%). Rhinovirus was the most commonly identified pathogen, but it was not associated with asthma treatment failure. The researchers also noted that specific viral targets were associated with an increased absolute risk of treatment failure, including respiratory syncytial virus (8.8%), influenza virus (24.9%), and parainfluenza virus (34.1%).

Compared with children without an identified pathogen, those with an identified target were generally younger, had higher tobacco exposure, and were slightly more likely to present with fever. Comparing rhinovirus-positive participants with those with a different respiratory pathogen, children with rhinovirus were less often febrile (16.2% vs 41.2%) and less frequently received a pneumonia diagnosis.

Although this study featured the largest cohort of its kind, the limitations of the study included the exclusion of children with a mild asthma exacerbation, which made it difficult for the researchers to fully assess the role of respiratory pathogens across the entire spectrum of asthma exacerbation severity.

Respiratory pathogens were not associated with higher severity on presentation but were associated with a higher likelihood of treatment failure in the ED. This treatment failure was magnified in the presence of specific viruses such as respiratory syncytial virus, influenza, and parainfluenza. This finding supports further research into customizing treatment plans with respect to identified viral targets. The results of the study also reinforce the importance of influenza vaccination for patients with asthma.