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## Association of Viral and Bacterial Respiratory Infection with Exacerbations of Wheezing in Young Asthmatic Children\*

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**W**e have investigated the relationship between exacerbations of wheezing and infection of the respiratory tract in young asthmatic children hospitalized at the National Jewish Hospital and Research Center, Denver, Colorado.

This prospective study included 32 children, one to five years of age, hospitalized for prolonged observation and treatment of severe recurrent obstructive airway disease. Twelve children were observed from October, 1967-May, 1968, and 20 (different) children from October, 1968-April, 1969. Viral and bacterial cultures were obtained at the onset of each acute respiratory illness. Routine control cultures were obtained at set intervals while the children were well. Blood samples were drawn at the onset of each illness, two weeks after each illness, and at other intervals as needed. An average of eight viral cultures and 15 blood specimens were

obtained per child during the period of study. Clinical signs and symptoms were observed and recorded by a single individual during each year of the study.

Of 139 separate episodes of wheezing 58 (42 percent) were associated with identifiable viral infections. Respiratory syncytial virus infection was clearly the most virulent. It occurred in one clear outbreak each year and was associated with 13 episodes of pneumonia and with wheezing in 24/25 infections (five of which required intravenous bronchodilator therapy). Parainfluenza type 2 infection appeared to be next most virulent, followed by Coronavirus infection. Influenza A-2 (Hong Kong) was not associated with wheezing in any of the children. Infection of either the nasopharynx or throat with "pathogenic" bacteria (group A B-Streptococcus, *D pneumoniae*, *H influenzae*, *S aureus* or Gram-negative enteric bacilli) was not statistically associated with wheezing.

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### Discussion

*Dr. Reed:* Similar studies have been conducted at our university and the results match nicely. We have also studied 15 pairs of siblings including one child with asthma and one child without. There was no correlation between bacteria cultured and asthma. Rhinovirus was the most common virus, but the frequency of isolation was the same between the asthmatic child and the nonasthmatic child. There were only a few attacks in children with viruses other than rhinovirus. We concluded that asthmatics respond differently to the same agents, but have the same frequency of infection.

*Dr. Pepys:* How about eosinophils in relation to attacks?

*Dr. Ellis:* There was no change in eosinophil counts generally. There may even be eosinopenia due to

the stress of the illness.

*Dr. Claman:* Your patients were in an institution because of their illness—were they on steroids?

*Dr. Ellis:* Really, very few were on steroids. Those that were, were generally on every other day.

*Dr. Lourenco:* We studied normal subjects with upper respiratory viral infections and found significant abnormalities in clearance although none of the patients had clinical or radiologic evidence of bronchopulmonary involvements. It was of special interest that in some patients, all adults, rhinovirus was isolated and therefore seemed to be the cause of abnormal tracheobronchial clearance.

*Dr. Chester:* We studied normal, nonsmoking adults with acute viral URI and one-third of these had frequency dependence of compliance for several weeks after the acute infection.