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The Link Between Bronchiolitis and Asthma

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Bronchiolitis is a lower respiratory tract infection of young children. Clinical features include expiratory wheezing, tachypnea, and hypoxia caused by obstruction of the small airways [1]. It has been suggested that the diagnosis of bronchiolitis would apply only to infants, but the use of the diagnosis varies greatly. In many clinical studies, all wheezing illnesses other than asthma in children younger than 3 years of age have been diagnosed as bronchiolitis. Asthma is a chronic inflammation of the airways, and clinically an acute asthma attack mimics bronchiolitis. The diagnosis of asthma should be used only after recurrent reversible wheezing episodes [2].

In the United States alone, an estimated 3% of all children are hospitalized for bronchiolitis in their first year of life, which is equivalent to more than 100,000 hospitalizations annually. Retrospective, hospital record–based studies have found that the prevalence of bronchiolitis increased in the 1980s and 1990s [3,4]. The prevalence of asthma also has increased—from 3.6% to 6.2% from 1980 to 1996. From 1997 to 2000, the prevalence of asthma attacks has remained unchanged, however, suggesting that the burden from childhood asthma may have plateaued [5].

The relationship between bronchiolitis and the development of asthma and atopy (ie, immediate-type hypersensitivity) has been studied for many years. The development of atopy is particularly interesting because the persistent form of asthma is mainly atopic. It has been estimated that 50% of children with bronchiolitis have recurrent wheezing (assessed by the parents) or asthma (diagnosed by a physician) during the following 2

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decades of life. The association between bronchiolitis and atopy defined as specific IgE antibodies or a positive skin prick test has been weak [6,7].

Genetics and environmental influences, such as respiratory viral infections and allergen exposure, are associated closely with airway hyperreactivity. Respiratory viral infections predisposing to chronic asthma occur during infancy when immunologic maturation has not yet developed fully. It is crucial to understand how these different factors may contribute to the onset of asthma (Fig. 1). It is well established that respiratory syncytial virus (RSV) bronchiolitis is associated strongly with recurrent wheezing and asthma, at least during the first decade of life [7,8]. Preliminary findings suggest that rhinovirus-induced bronchiolitis is an even stronger risk factor and may be the first sign of asthma [9].

Viral etiology of bronchiolitis and asthma

Many respiratory viruses can cause bronchiolitis (Table 1). Many studies from the 1970s and 1980s have shown that RSV is the dominant causative agent, and it is virtually the only agent inducing epidemics. RSV infection has been detected in 50% to 70% of patients with bronchiolitis [10,12,14]. RSV is a rare pathogen in older hospitalized children [10,14] because nearly

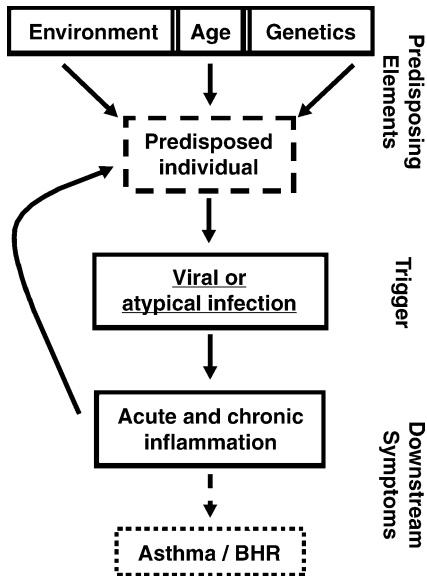

Fig. 1. Multifactorial influences on the development of asthma. BHR, bronchial hyperreactivity. (*From* Openshaw PJ, Yamaguchi Y, Tregoning JS. Childhood infections, the developing immune system, and the origins of asthma. J Allergy Clin Immunol 2004;114:1276; with permission.)