



**Karolinska  
Institutet**

**Institutionen för klinisk vetenskap, intervention och teknik  
(CLINTEC), Enheten för öron- näs- och halssjukdomar**

## **“Hay fever” in children – the real story**

**AKADEMISK AVHANDLING**

som för avläggande av medicine doktorexamen vid Karolinska  
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av

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## Abstract

Rhinitis, allergic (AR) and non-allergic (NAR), and chronic rhinosinusitis (CRS) are different expressions of upper airway inflammation. Chronic upper airway symptoms are common in childhood and adolescence. There is a need for more epidemiologic data of these different entities of upper airway symptoms in the aspects of prevalence, natural course, co-morbidity and risk factors.

The aim of this thesis was to provide epidemiologic data from a pediatric general population for a better understanding of the different phenotypes of upper airway inflammation from childhood to adolescence. To do this, we used the BAMSE birth cohort with 4089 children followed from birth up to 16 years of age with repeated questionnaires and clinical follow-ups.

We found that AR was already common at 4 years (5.4%) and that the prevalence increased to 14% at 8 years. 87% of the 4-year-olds with AR had persistent disease up to 8 years. In contrast, among the 8.1% with NAR at 4 years, 74% had no rhinitis symptoms at 8 years. We also found that co-morbidity with asthma and eczema was common, not only for AR, but also for NAR. Oral allergy syndrome (OAS) was found among 31% of 8-year-olds and 63% of the 16-year-olds with allergic rhinitis to birch pollen.

Parental allergic disease increased the risk of the child of developing AR as well as NAR at 8 years of age. There was an increased risk of AR in particular if the parents had hay fever or if both parents were allergic. An increased risk of NAR was seen if one parent had two or more allergy-related diseases. We found no difference in risk between maternal and paternal heredity.

The prevalence of reported symptoms of allergic rhinitis to birch pollen (AR<sub>bp</sub>) increased from 2.5% at 4 years to 10.6% at 8 years and 17.8% at 16 years. Bet v 1-specific IgE was the most prevalent specific IgE against PR-10 allergen molecules and had the highest median levels. We found an increased probability for the onset of AR<sub>bp</sub> at 16 years with increasing levels of Bet v 1-specific IgE or increasing number of other IgE-reactive PR-10 proteins at 4 years. In addition we found that the levels of Bet v 1 at 4 years were associated with severity of AR<sub>bp</sub> at 16 years.

The prevalence of CRS at 16 years of age was estimated to be between 0.3% and 1.5%. Adolescents with CRS more often reported symptoms of allergic rhinitis and asthma and had a lower health-related quality of life than those without CRS.

In conclusion, the results from this thesis show that both AR and NAR in children are common, are associated with asthma and eczema and affected by parental allergy-related diseases. There are differences between AR and NAR regarding the prognosis and the pattern of heredity for allergic diseases. AR may possibly be predicted by the levels of Bet v 1-specific IgE or number of IgE-reactive PR-10 proteins in early childhood and by parental hay fever. The prevalence of OAS among individuals with birch pollen allergy seems to increase during childhood. The prevalence of CRS in adolescence seems to be low but for those affected, the symptoms may be bothersome.