



# Epidemiology of asthma in primary school children

The Obstructive Lung Disease in Northern Sweden (OLIN) Studies

Thesis VIII

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Institutionen för folkhälsa och klinisk medicin

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## ABSTRACT

**Background:** Childhood asthma has increased worldwide, although recent studies report a prevalence plateau in some western countries.

**Aims:** To investigate the prevalence of asthma and the associated risk factor patterns from ages 7-8 to 11-12 with special emphasis on the hereditary component, and further to study prevalence trends at age 7-8 from 1996 to 2006 and the possible determinants of these trends.

**Methods:** The studies involved two cohorts from Kiruna, Luleå and Piteå: one previously identified cohort of 3430 children age 7-8 followed by yearly questionnaires until age 11-12 with 97% yearly participation. Skin-prick tests for allergic sensitisation were performed at ages 7-8 and 11-12 in subsets of 2148 and 2155 children respectively (88% of invited). In 2006 a new cohort of 7-8-year-olds was identified and examined identically. 2585 (96% of invited) and 1700 (90% of invited) participated in the questionnaire and skin-prick tests, respectively. The questionnaire included questions about symptoms of asthma, allergic rhinitis and eczema, and possible risk factors.

**Results:** In the 1996 cohort, from age 7-8 to 11-12 the prevalence of physician-diagnosed asthma increased (5.7%-7.7%,  $P<0.01$ ) while current wheeze decreased (11.7%-9.4%,  $P<0.01$ ), and 34.7% reported ever wheeze at  $\geq$ one occasion. Remission was 10% of which half relapsed during the study. Remission was significantly lower among sensitised children. The strongest risk factors for current asthma at ages 7-8 and 11-12 were allergic sensitisation (OR 5) and family history of asthma (OR 3). Several other significant risk factors, e.g. respiratory infections, damp house and low birth weight, had lost importance at age 11-12. At age 7-8, parental asthma was a stronger risk factor (OR 3-4) than parental rhinitis or eczema (OR 1.5-2). Sibling asthma had no independent effect. Biparental asthma had a multiplicative effect (OR 10). Maternal and paternal asthma was equally important, regardless of the child's sex and sensitisation status.

From 1996 to 2006 the prevalence of current wheeze and asthma at age 7-8 did not increase ( $P=0.13$ ,  $P=0.18$ ), while lifetime prevalence of ever wheeze and physician-diagnosed asthma increased ( $P<0.01$ ,  $P=0.01$ ). Symptoms of rhinitis and eczema were unchanged, despite 45% increase ( $P<0.01$ ) in allergic sensitisation. For current asthma the adjusted population attributable fractions of sensitisation and parental asthma increased (35%-41%, 27%-45%). This was however balanced by decreased exposure to infections, maternal smoking and home dampness, resulting in stable asthma prevalence. Stratification by sex revealed that current wheeze increased in boys ( $P<0.01$ ) but tended to decrease in girls ( $P=0.37$ ), seemingly due to symptom persistence in males. Several asthma indices followed this pattern. The boy-to-girl ratio in exposure to all studied risk factors increased, which may explain the sex-specific prevalence trends in wheeze.

**Conclusions:** The prevalence of current asthma and wheeze did not increase statistically significantly. However, the risk factor pattern has changed considerably since 1996, which will presumably affect the clinical features of childhood wheeze in this region. Sex-specific trends in wheeze can be explained by changes in exposure, and trends in risk factors should be explored parallel to prevalence trends.

**Key words:** Asthma, wheeze, child, allergic sensitisation, prevalence, remission, risk factor, trend.