

Antibiotic Exposure by 6 Months and Asthma and Allergy at 6 Years: Findings in a Cohort of 1,401 US Children

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This analyses of a cohort included 1,401 US children, assessed the association between antibiotic use within the first 6 months of life and asthma and allergy at 6 years of age.

KEY POINTS FROM THIS STUDY

- 1) 25% of urban children in the developed world have asthma.
- 2) "Many studies have reported that antibiotic use may be associated with increased risk of childhood asthma."
- 3) "Many studies report a positive association between antibiotic use and childhood asthma, including a large prospective cohort study with more than 5,000 cases of childhood asthma that determined early antibiotic exposure to be one of the most important predictors of childhood asthma."
- 4) "The 'hygiene hypothesis' is a frequently cited explanation for the increasing prevalence of allergic diseases," suggesting that "reduced exposure to bacteria and viruses may delay development of the immune system and promote atopic immune responses." **[including the use of antibiotics and vaccines]**
- 5) Gastrointestinal flora are important for developing a healthy immune system with resistance to allergic sensitization, and antibiotic exposure in early life might increase the risk of atopic diseases through altered microbial exposure.

RESULTS FROM THIS STUDY:

- 1) "One third of the children had been exposed to antibiotics by 6 months of age."
- 2) "Nearly 70% of children with a history of lower respiratory infections and more than 50% with otitis in the first year of life had received antibiotics."
- 3) "Children of African-American or Hispanic mothers had twice the risk of asthma compared with children of white mothers."
- 4) If one parent had a history of asthma, the increased risk of asthma was 140% compared with children with no history of parental asthma. If both parents had a history of asthma, the increased risk was 257%.

- 5) "The number of antibiotic courses before 6 months of age and asthma show a dose-response relation."
- 6) One course of antibiotic exposure increased the risk of asthma by 40%.
- 7) Two or more courses of antibiotic exposure increased the risk of asthma by 72%.
- 8) The increased risk for asthma in children who had no parental history of asthma was 89%.

DISCUSSION

- 1) "The association of antibiotics and asthma in the present study was particularly strong in children with no family history of asthma."
- 2) The hygiene hypothesis suggests that "microbial exposure [becoming infected] in early life enhances postnatal maturation of the immune system that may protect against development of allergic diseases."
- 3) "Normal postnatal development incurs a change from fetal predominantly T helper 2 (known as 'TH2') to more mature T helper 1 (known as 'TH1') immunity." This is important because "Overexpression of TH2 responses to allergens is the hallmark of allergic diseases."
- 4) "Microbial exposure, particularly in the intestinal tract, is necessary for postnatal transition to a balanced immune response in healthy children."
- 5) "The early postnatal period is particularly vulnerable to imbalances in immune response, and that delayed postnatal maturation of TH1 cell function is a key component of genetic risk for atopy."
- 6) Children with no family history of asthma are more susceptible to the effects of antibiotics than children with a genetic predisposition to asthma.
- 7) "We found a strong association between early antibiotic exposure with reported positive immunoglobulin E blood or skin test reactivity."
- 8) "We conclude that antibiotic exposure before 6 months of age is associated with asthma and allergy at 6 years of age."
- 9) "The adverse effect of antibiotics on asthma risk was particularly strong in children with no parental history of asthma, which should encourage physicians to avoid unnecessary antibiotic use in low-risk children with no genetic predisposition to asthma."
- 10) Antibiotic exposure is associated with increased risk of asthma by 52%.