

Breastfeeding was classified as exclusive, partial, or none. Poisson regression was used to examine the relationship between breastfeeding and wheezing rates, and logistic regression was used to investigate recurrent wheezing. Models were adjusted for maternal asthma, smoking, and education. Effect modification by maternal asthma and infant sex were also examined through stratification.

RESULTS. Twenty-one percent of women in the study had asthma, and 21% of infants wheezed. In mothers with asthma, breastfeeding was inversely associated with infant wheezing. Compared with no breastfeeding at 6 months, wheezing was reduced by 62% with exclusive breastfeeding. Wheezing was reduced by 37% with partial breastfeeding supplemented with foods. Breastfeeding was not significantly protective when supplemented with formula. There was a significant protective, dose-dependent association between breastfeeding and wheezing; the rate of wheezing was 0.63 episodes per person year among those breastfed <6 months, 0.5 in those breastfed for 6 to 12 months, and 0.31 in those who breastfed for 12 months or more. These findings were not significant in the absence of maternal asthma.

CONCLUSIONS. In infants born to mothers with asthma, breastfeeding was shown to be protective against wheezing in a dose-dependent manner. This association was somewhat stronger in male infants and independent of other established risk factors for infant wheezing. This association was weakened by supplementation with formula before 6 months of age.

REVIEWER COMMENTS. The authors of this study add to the evidence that breastfeeding confers protection against wheezing in infants. The authors improved on limitations of previous studies by using a longitudinal study design with prenatal recruitment. In addition, in this study, the authors differentiated between exclusive and partial breastfeeding. The study was limited by parent-reported wheezing and only 1 year of follow-up in infants studied. Follow-up is underway in the Canadian Healthy Infant Longitudinal Development cohort and will glean important outcomes as we further our understanding of potential long-term benefits on reducing the prevalence of asthma.

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Environmental and Mucosal Microbiota and Their Role in Childhood Asthma

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PURPOSE OF THE STUDY. To analyze the relationship between farming, asthma status, and the diversity and composition

of bacterial microbiota of mattress dust and nasal swab samples in children.

STUDY POPULATION. The study included 86 school-aged children from the Austrian arm of the Genetic and Environmental Causes of Asthma in the European Community-Advanced Studies (GABRIELA) cross-sectional multidisciplinary study.

METHODS. Mattress dust and nasal samples were collected between May and July 2007. DNA from the samples were analyzed and then clustered together in operational taxonomic units (OTUs), which are defined as clusters of the respective 16S ribosomal RNA sequences with at least 97% sequence similarity. Based on the number of OTUs, bacterial diversity and composition were determined and related to farm exposure and asthma status.

RESULTS. Bacterial diversity in mattress dust was significantly greater in farm children and in those with exposure to cow and straw compared with nonfarm children. In nasal samples, an association with bacterial diversity was seen only with exposure to both cow and straw compared with those with no exposure to either. In mattress dust, *Clostridium*, *Facklamia*, an unclassified genus within the family of *Ruminococcaceae*, and 6 OTUs were significantly associated with farming. Asthma was inversely related with richness and diversity in mattress dust (adjusted odds ratio [aOR] = 0.48 [0.22-1.02]; aOR = 0.41 [0.21-0.83], respectively), and to a lesser extent in nasal samples (aOR = 0.63 [0.38-1.06]; aOR = 0.66 [0.39-1.12], respectively), even after controlling for medication and atopy status.

CONCLUSIONS. In this study, it was found that mattress dust and nasal samples in farm children had greater bacterial diversity than in non-farm children. The stronger inverse association of asthma with bacterial diversity in mattress dust as compared with nasal samples suggests microbial involvement beyond mere colonization of the upper airways.

REVIEWER COMMENTS. Researchers in numerous previous studies, many of whom are from these same authors, have convincingly shown reduced rates of allergic disease in children growing up on farms. This has been presumed to be related to effects on the microbiome, and this study takes another step forward in demonstrating these relationships. The addition of nasal sampling is especially interesting, with results opposite of those that had been hypothesized because they suggest that colonization of the airways is not the predominant mechanism for asthma protection in farm children.

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