

## **Exposure to Environmental Microorganisms and Childhood Asthma**

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### FROM ABSTRACT:

Children who grow up in environments that afford them a wide range of microbial exposures, such as traditional farms, are protected from childhood asthma and atopy. In previous studies, markers of microbial exposure have been inversely related to these conditions.

### Results

In both studies, children who lived on farms had lower prevalences of asthma and atopy and were exposed to a greater variety of environmental microorganisms than the children in the reference group.

Increased microbial exposure was inversely related to the risk of asthma: Reduced by 38% in one study and 14% in the other study, for an average reduction by 24%.

### Conclusions

Children living on farms were exposed to a wider range of microbes than were children in the reference group, and this exposure explains a substantial fraction of the inverse relation between asthma and growing up on a farm.

### KEY POINTS FROM THIS STUDY:

- 1) This study looked at two groups of children whose exposure to microorganisms was evaluated differently. Each group involved children who grew up on rural farms and a group of controls who were not farm raised children. Combined, the study group consisted of 16,511 children between ages 6-13 years.
- 2) One study analyzed children's mattress dust collected with a vacuum cleaner. One study analyzed children's room dust collected with electrostatic dust collectors.
- 3) After collection, the dust was incubated for 7 days. The colonies were microscopically counted and identified and treated with Gram's stain.
- 4) "Environmental exposure to microorganisms has repeatedly been found to be inversely related to the manifestation of atopic diseases such as asthma and hay fever."

- 5) "In the population with higher bacterial exposures, the prevalence of asthma and atopy was substantially lower."
- 6) Children living on farms had a lower prevalence of asthma than children in the reference groups in both studies by a combined 25%.
- 7) "Indoor microbial exposure is much more common and diverse in the farming environment than in the nonfarming environment."
- 8) The risk of asthma decreased significantly with the increase in the number of detectable bacteria and fungi.
- 9) "Children growing up on farms were protected from asthma and atopy. These children were exposed to a greater variety of environmental fungi and bacteria as compared with children in the reference group who lived in the same regions."
- 10) "These data support the idea that the greater diversity of microbial exposure among children who live on farms is associated with protection from the development of asthma."
- 11) The transport of environmental microorganisms from animal sheds and barns to the indoor environment has been documented. "Even when indoors, children living on farms were exposed to a greater variety of microbes than children who did not live on farms."
- 12) Microorganisms may be protective against asthma by triggering the innate immune system for a prominent Type 1 helper T cell response; predominance of type 2 helper T cells is characteristic of asthma. **["Innate Immune Response"]**
- 13) The results of both studied groups "showed that children living on farms had a wider range of microbial exposures than children in the reference groups, which largely explained the protective effect of the farming environment on the development of asthma in children."

#### A COMMENT FROM DAN MURPHY

Recall Article Review 9-12 indicated that early life exposure to antibiotics (which kill these microbes) was associated with a 52% increase in asthma.

The book by immunologist Mary Ruebush, PhD, Why Dirt Is Good further details why innately children are meant to come into contact with microbes; when they don't or when the microbes are killed with antibiotics, the immune system does not develop properly, there is a switch to a predominant Th2 response, and atopic disorders (asthma, hay fever, eczema, etc.) develop.