

POPULATION-BASED STUDIES ON ATOPY IN GREENLAND



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Allergic diseases are reported to be increasing in the Western world, although few studies have used objective measurements of allergy to document the increase. Reasons for the increase are largely unknown, but factors related to the Western lifestyle are considered to be of importance. In particular, attention has been drawn to the possible role of a reduced microbial stimulation of our immune system with infections and vaccinations. During the last decades, Inuit populations have undergone dramatic changes regarding occupation, housing and living conditions, and the composition of their diet. These changes have already led to an increase in certain diseases believed to be associated with a Western lifestyle e.g. diabetes, cardiovascular diseases, and certain types of cancers. However, little is known about the development of allergic diseases in Inuit populations.

In the year 1998, we examined 1,031 6-18-year-old schoolchildren living in Sisimiut, Greenland, in order to determine the prevalence of atopy and to provide spirometric reference values for Inuit children. Furthermore, we analysed stored serum samples from 849 15-80-year-old Greenlanders who took part in two screening campaigns for venereal diseases in 1987 and 1998 for specific IgEs, to investigate whether the prevalence of atopy had increased in Greenland during the last decade. Finally, we examined 1,139 8-12-year-old schoolchildren living in Sisimiut, Maniitsoq, Aasiaat and Ilulissat in the year 2001. These children were all born just before, or after, the withdrawal of the BCG vaccination in 1990 in Greenland. We could therefore investigate whether BCG vaccination administered at birth protects against the development of atopy, and whether the age at vaccination was associated with the development of atopy, as has been suggested previously. In all studies, atopy was defined as the presence of specific IgEs in serum towards at least one inhalant allergen (grass, mugwort, birch, house-dust mite, cat, dog, horse, *Cladosporium herbarum*), determined as a positive test result with the Phadiatop® test.

Schoolchildren living in Greenland had a two-fold lower prevalence of atopy compared with Danish children living in Denmark (15% vs 30%). Atopy in Greenland was associated with the children's ethnic background, as children with two parents born outside

Greenland had a significantly higher risk of atopy than children with two parents born in Greenland. Greenlandic children who had travelled outside Greenland had a higher risk of being sensitized to pollen and animal dander than children who had never been abroad. The low prevalence of atopy among Greenlandic schoolchildren may be due to a possible low genetic susceptibility to atopy, to less allergen exposure, as well as to other living conditions in the Arctic.

The prevalence of atopy doubled in the period from 1987 to 1998 among Greenlanders aged 15-80 years. This is the highest increase of atopy ever reported, and the finding supports the hypothesis that factors in the Western lifestyle may be of importance for the increasing trend in allergy. The increase was observed throughout all age groups, indicating that risk factors responsible for the increase in atopy operate not only during childhood, but also throughout adulthood.

Greenlandic children had higher lung function levels compared with Danes, and the difference increased with height. The fact that Inuit generally have shorter limb lengths in relation to trunk height may explain the different lung function levels. However, the finding that Greenlanders living in settlements had the highest lung function level may also indicate a potential role of factors in the traditional Greenlandic lifestyle.

Finally, in contrast to previous findings, we found no evidence that BCG vaccination administered to infants protects against the development of atopy, nor that the age at which the BCG vaccination was administered was associated with the risk of atopy.

Allergic diseases have previously been considered to be rare in Greenland. We found that the increased westernization of Greenland has been followed by an almost two-fold increase in atopy among both children and adults within the last decade. The health care system in Greenland must be prepared for an imminent higher burden of patients with allergy-related conditions. Thus, an increased awareness of the diagnosis and treatment of allergic diseases is required, and additional research into specific risk factors responsible for the increase in atopy is needed.

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