

Cat and dog allergens - dispersal, exposure and health effects in childhood

Catarina Almqvist

ABSTRACT

The association between pet ownership in childhood and subsequent asthma and sensitisation is very controversial. Intriguing but contradictory reports have caused considerable uncertainty in families who wish to avoid asthma and allergic disease in their children. At the same time, many children with asthma experience a worsening of their disease when they come in contact with furred pets. The aim of this thesis is to elucidate how allergen exposure affects development and worsening of asthma and sensitisation in childhood.

The first study examined dispersal of cat allergen borne on clothing from homes with cats to schools and further to homes without cats. Airborne cat allergen was collected with personal pumps in six classes with many (>25%) and six classes with few (<10%) cat owners, and in homes of children with and without cats. Dust samples were collected from clothes and mattresses. Airborne cat allergen levels in classrooms were higher than in homes of non-cat-owners, but lower than in homes with cats. There was a five-fold difference in the levels of airborne cat allergen between classes with many and few cat owners. Allergen levels in non-cat-owners' clothes increased after a school day. Non-cat-owners in classes with many cat owners had higher levels of cat allergen at home. This indicates that allergen is spread via clothing from homes with cats to classrooms, and further to homes without cats.

The second study was designed and performed in order to evaluate how this indirect cat exposure at school affects asthmatic children with cat allergy. 410 children, 6-12 years of age, who were being treated for asthma, were allergic to cats and had no cat at home were identified. Peak expiratory flow (PEF), asthma symptoms, medication and contact with pets were recorded twice daily during the last week of summer holiday and the second and third weeks of school. Children in classes with many (>18%) cat owners reported significantly decreased PEF, more days with asthma symptoms, and increased use of medication after school started. Those in classes with few cat owners did not report any change. This suggests a worsening of asthma in children allergic to cats, after indirect exposure to cat at school.

The third and fourth studies are based on a large prospective birth-cohort study, BAMSE. Parents of 4,089 children born 1994-96 answered a questionnaire at birth on allergic heredity and exposure to cat or dog. Symptoms of allergic disease were reported at one, two and four years of age. At four years, 2,614 children agreed to blood samples for allergen-specific IgE to common inhalant allergens. Early cat exposure increased the risk of cat sensitisation, OR 1.44 (95% CI 1.03-2.01), without any effect on asthma. Early dog ownership was associated with a reduced risk of sensitisation to airborne allergens other than dog, OR 0.36 (0.15-0.83) and a trend towards lower risk of asthma, OR 0.50 (0.24-1.03). However, there was a selection of pet ownership into the study. Cats were less frequently kept in families with parental asthma, rhinoconjunctivitis, pet or pollen allergy (3.5-5.8%) than in families without any parental allergic disease (10.8-11.8%). Dogs were less common in families with (3.3%) than without (5.9%) parental atopic eczema. What effect this selection may have on the associations between pet exposure and allergic disease is discussed in the thesis.

Thus, cat and dog allergens are ubiquitous and difficult to avoid. This, in combination with selection mechanisms makes it very difficult to study associations between early pet exposure and subsequent allergic disease. At the same time, indirect cat exposure at school worsens asthma in already sensitised children, which has clear implications for secondary prevention.