

# Cat allergen exposure at school

## Evaluation of sampling methods and allergen avoidance strategies

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### ABSTRACT

Cat allergy is the most common allergy among school children in Sweden. Cat allergen is ubiquitous in school premises and other public places and this indirect exposure to cat may induce symptoms among cat sensitized children with asthma. The aim of the present thesis was to evaluate sampling methods and allergen avoidance strategies used in this environment.

The first study evaluated a new allergen sampling method (Petri dishes) for collection of airborne settling dust. Sampling with Petri dishes and personal air samplers was performed in 22 classes with a low rate of cat owners (<10%) and 22 with a high rate of cat owners (>20%). In addition, Petri dish sampling was performed in 40 pet free homes. There was a significant correlation between Petri dish sampling and personal air sampling. Levels were 5-fold higher in classes with many cat owners than in classes with few cat owners. A corresponding difference was found in homes. Petri dish sampling was concluded to be useful as an alternative method to personal air sampling of airborne allergens.

In the second study, comparison of 4 different allergen sampling methods (dust collectors, Petri dishes, personal air samplers and intranasal samplers) was made by simultaneous sampling in 35 classrooms: 5 with implemented allergen avoidance measures, 7 with additional cleaning and 23 controls. The correlation between sampling methods was generally poor and there was no significant difference in allergen levels between allergen avoidance and control classes. Children in allergen avoidance classes were more satisfied with the indoor air quality and cleaning than children in control classes. Nine percent reported allergic symptoms while at school. The lack of correlation between sampling methods demonstrates the difficulty in assessing allergen exposure.

In the third study, 25 classes, including 5 established allergen avoidance classes participated during a school year. After one term, 6 classes underwent a number of intervention measures recommended by the Swedish National Institute of Public Health. Curtains, upholstery and plants were removed, bookshelves were replaced with cupboards and cleaning was increased. Airborne dust was collected weekly using Petri dishes and on 6 occasions using personal air samplers in each class. Cat allergen levels were unaltered after intervention and were not significantly lower in the established allergen avoidance classes, compared to the other classes. Cat allergen levels differed, however, significantly between classes with few and many cat owners. It is reasonable to conclude that measures that fail to reduce allergen levels also fail to influence health status in allergic children but this remains to be shown.

In the fourth study, the effect of school clothing or pet owner free classes on airborne cat allergen levels was investigated. Allergen sampling was carried out in 2 classes with school clothing, 1 class of non-pet owners and 3 control classes during 2 six-week periods using personal air samplers, Petri dishes and a roller for sampling on clothing. Airborne cat allergen levels were 4 to 6-fold lower in intervention classes, compared to control classes. Pet ownership ban seemed less accepted than school clothing as an intervention measure. For the first time it has been shown that levels of airborne cat allergen can be reduced by allergen avoidance measures at school, using school clothing or pet ownership ban and that both measures are equally efficient.

Last, we investigated cat allergen levels in hair from cat owners and non-cat owners. Levels were more than 100-fold higher in hair from cat owners compared to non-cat owners. Hair may be an important source for transferral and deposition of cat allergen in schools and may explain why cat allergen is found in environments with strict allergen avoidance measures.

In conclusion, we have demonstrated that the choice of allergen sampling method should be carefully considered and that the outcome of allergen reduction measures in classrooms is largely dependant on the presence and number of cat owners.