842 Association of Traffic-Related Air Pollution With Atopy in Cities and a Small Town *U Krmer*†, T Koch*, U Ranft*, J Ring†, H Behrendt†‡* *Medical Institute of Environmental Hygiene at the University Dsseldorf †Department of Dermatology and Allergology at the Technical University (TU), Munich ‡†Division of Environmental Dermatology and Allergology GSF/TU, Munich

Traffic emissions are a major source of air pollution in western industrialized countries. There is evidence from human exposure studies that traffic-related air pollution increases the allergic immune response in an established allergy. In mice, diesel exhaust particles have been shown to express adjuvant activity for allergen-specific IgE production. Several epidemiological studies investigated the association of traffic-related air pollution with atopy in adults and in children using different types of exposure assessment. The results are not consistent, some found an association, some not.

Our studies were designed to investigate health effects of traffic related exposure on 6 and 9-year-old children by determining exposure conditions with a high spatial resolution.

Between 1988 and 1997 we conducted five studies and investigated 1003 six-year-old children from the inner-city areas of Cologne and Essen, 1146 six-year-old children from the small town Borken, and 317 nine-year-old from Düsseldorf. Distance to a busy street and NO2 measurements in front of the child's home were used to characterize exposure. Atopic sensitization was estimated by skin prick testing and determination of allergen specific IgE antibodies against seven common allergens. Occurrence of allergic symptoms was recorded by questionnaire or symptom diary and allergic diseases were determined by questionnaire or by physician assessed diagnoses. Information about possibly confounding factors was taken from the questionnaire too. Response was 70% in Essen/Cologne, 93% in Borken and 40% in Düsseldorf. Logistic regression was used to adjust for confounding.

A good correlation between living near a major road and outdoor NO2 values could be observed. Outdoor NO2 was a good predictor for traffic exposure but a poor predictor for exposure at the personal level. All studies done in cities show higher prevalence of hay fever, symptoms of allergic rhinitis, and sensitization against pollen allergens for children living near major roads than for those living farther away. This was not true for children living in the small town Borken, where the observed outdoor NO2 values were much lower than in the cities. In Düsseldorf, where outdoor and personal NO2 had been determined, the adjusted odds ratio (OR) describing the association between outdoor NO2 (per 10 ug/m^3) and symptoms of allergic rhinitis was 1.81 (95% CI: 1.02 - 1.31) but no association to personal NO2 could be found (OR: 0.99; 95% CI: 0.55 - 1.79).

We conclude that in cities, where children live near major roads with heavy traffic, there is an association between atopy in six- and nine-year-old children and traffic-related air pollution, which is not reflected by the association between atopy and mean personal NO2 exposure of the children. Since traffic related pollution varies on a small scale it is necessary to measure the exposure on a fine scale in order to detect the effects.

843 Ambient Aeroallergens and Asthma Exacerbations *RE Dales*, RT Burnett*, S Judek*, S Cakmak*, J Brook*, FA Coates†, WH Yang*†, LL Coates†* *University of Ottawa, Ottawa, Ontario, Canada †Aerobiology Research Laboratories, Nepean, Ontario, Canada

Emergency department admissions were used to determine the relationship between ambient aeroallergens and asthma in children. This population-based study was conducted using time-series analytic techniques which account for unwanted seasonal and day-of-the-week cycles in the data, and adjust for climate and air pollution. The study population was all patients presenting to the emergency department of The Children's Hospital of Eastern Ontario with a principal diagnosis of asthma between 1993 and 1997. Aeroallergen data (pollen grains and fungal spores) was collected using "Rotorod" samplers. Air pollution data included: ozone, nitrogen dioxide, sulfur dioxide, and sulfates. Meteorological data included: temperature, barometric pressure, and relative humidiy.

The daily number of emergency department visits for asthma ranged from 0 to 36 per day with an average of 7.53 patients. Fungal spores, but not pollen grains, were associated with admissions ($p < 0.05$). The percentage increase in asthma admissions associated with each group, independent of the others, was: 1.9% (SE 0.9) for deuteromycetes, 4.1% (1.6) for basidiomycetes, and 2.8% (1.0) for ascomycetes (all $p < 0.05$). In contrast to fungal spores we were unable to detect an association between emergency asthma visits and weeds, grasses, or trees. This data, therefore, indicates that fungal spores have a significant influence on severe asthma exacerbations among children.

844 A Recombinant Fc-epsilon Receptor Alpha Chain Based ELISA Can Be Used to Measure Anti-House Dust Mite IgE in Sera *KE Stedman, SW Hunter, EA Best, MJ McDermott, CA McCall* Heska Corporation, Fort Collins, CO

Currently available *in vitro* assays for allergen-specific IgE use polyclonal or monoclonal anti-IgE antibodies as detection reagents. While these antibodies are usually highly sensitive, the huge excess of IgG over IgE in human serum means that the smallest degree of IgG/IgE cross-reactivity in the detection reagent may result in false positive results. *In vivo*, IgE is bound specifically by the high affinity Fc-epsilon receptor (FcεR1), a four chain molecular complex (one alpha, one beta and 2 gamma subunits) present on mast cells and basophils. The capacity to bind IgE resides in the alpha chain of this receptor: the beta and gamma chains account for subsequent signaling events. We have used a recombinant truncated version of the human FcεR1 alpha chain, produced in a baculovirus expression system[1] and labeled with biotin, to detect anti-house dust mite specific IgE in human serum. The recombinant alpha chain binds a heat labile antibody in the serum of humans, dogs[2] and cats[2], but does not bind IgG or IgM. For this study, sera were obtained from 7 atopic patients, plus 16 healthy control subjects. The sera were screened for IgE specific for a *D. farinae* extract (Center Laboratories) or for purified native or recombinant Group 1 *D. farinae* allergens. All of the seven atopic patients had detectable anti-house dust mite IgE, as did 3 of the 16 undiagnosed control subjects. The results obtained correlated well with those observed using a more conventional detection reagent, namely an anti-human IgE monoclonal antibody. While the human Fc ε R1-alpha chain is routinely used at Heska Corporation to measure canine and feline serum IgE, this and other recent studies[3] suggest that this recombinant protein will serve as a valuable diagnostic aid for human allergy as well.

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