

**In utero and environmental tobacco smoke exposure:
A risk factor for allergic sensitization in childhood?**

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Objective: There is only insufficient and conflicting evidence about the influence of intrauterine and postnatal tobacco exposure on the immune regulation such as allergic sensitization. Therefore, we investigated the effect of in utero (IUT) and environmental tobacco smoke (ETS) exposure on the development of allergic sensitization during the first 7 years of life.

Methods: In a prospective, multicentre birth cohort study in Germany (Multicentre Atopy Study [MAS] with n = 1314 newborns), outcome and exposure were annually assessed: IUT and ETS exposure by questioning of parents' smoking habit, and allergic sensitization by specific IgE measurement. Children were regarded as sensitized if specific IgE ≥ 0.35 kU/l (Pharmacia CAP) was detected to at least one of the tested allergens (milk, egg, soy bean, wheat, birch, grass, mite, cat, or dog). In addition to IUT exposure, 4 different ETS exposure categories were compared: 1. never, 2. irregularly by father only, 3. irregularly by mother +/- father, and 4. continuously by mother +/- father from birth to the respective year of age.

Results: At 7 years participation rate was 72%. Prevalence of allergic sensitization increased with age from 16% to 41% at 7 years. Since genetic predisposition is currently the most important risk factor for atopy we stratified our analysis by atopic family history. In children with at least one atopic parent, occurrence of allergic sensitization, total sum of specific IgE to the various tested allergens, and the total number of positive tests were significantly associated with IUT exposure and consistent passive ETS after birth ($p < 0.05$). In the multivariate longitudinal data analysis (using random effects models adjusting for education, duration of breast feeding, number and order of siblings, pets and allergen levels at home), IUT and motherly ETS exposure only slightly increased the risk of allergic sensitization (OR=1.8, 95% C.I.: 1.1-2.8). However, this effect was confined to the first 3 years of age whereas in older children no significant association between tobacco exposure and sensitization was found. Consistent risk factors of allergic sensitization throughout all age groups were positive atopic family history (OR=2.1, 95% C.I.: 1.5-2.9) and male sex (OR=1.5, 95% C.I.: 1.2-2.0).

In conclusion, during the first 3 years of life IUT and consistent ETS exposure have an adjuvant effect on the development of allergic sensitization. However, this effect is transient and restricted to children with a genetic predisposition for allergy.