Traffic, asthma and genetics: combining international birth cohort data to examine genetics as a mediator of traffic-related air pollution's impact on childhood asthma.

Abstract:
Associations between traffic-related air pollution and incident childhood asthma can be strengthened by analysis of gene-environment interactions, but studies have typically been limited by lack of study power. We combined data from six birth cohorts on: asthma, eczema and allergic rhinitis to 7/8 years, and candidate genes. Individual-level assessment of traffic-related air pollution exposure was estimated using land use regression or dispersion modeling. A total of 11,760 children were included in the Traffic, Asthma and Genetics (TAG) Study; 6.3 % reported physician-diagnosed asthma at school-age, 16.0 % had asthma at anytime during childhood, 14.1 % had allergic rhinitis at school-age, 10.0 % had eczema at school-age and 33.1 % were sensitized to any allergen. For GSTP1 rs1138272, the prevalence of heterozygosity was 16 % (range amongst individual cohorts, 11-17 %) and homozygosity for the minor allele was 1 % (0-2 %). For GSTP1 rs1695,
the prevalence of heterozygosity was 45 % (40-48 %) and homozygosity for the minor allele, 12 % (10-12 %). For TNF rs1800629, the prevalence of heterozygosity was 29 % (25-32 %) and homozygosity for the minor allele, 3 % (1-3 %). TAG comprises a rich database, the largest of its kind, for investigating the effect of genotype on the association between air pollution and childhood allergic disease.