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# Asthma, rhinitis, and asthma-related symptoms in relation to vehicle exhaust using different exposure metrics.

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## Akademisk avhandling

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försvar i Sal Major Groove, byggnad 6L, fredagen den 29 Maj, kl. 13:00.  
Avhandlingen kommer att försvaras på svenska.



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**Abstract**

Air pollution is a well known public health problem that involves both long-term and acute effects. An outcome associated with traffic-related air pollution is respiratory illness.

The overall aim of this thesis was to study the relationship between vehicle exhaust levels at home and the prevalence of self-reported annoyance and asthmatic symptoms, and the incidence of asthma and rhinitis. These relationships were evaluated using different indicators of exposure with a high spatial resolution.

Paper I is based on a questionnaire that was sent to a random selection of the adult population within three Swedish cities (Gothenburg, Uppsala, and Umeå), to study the prevalence of annoyance related to vehicle exhaust, and asthmatic symptoms. Paper II is based on new asthma cases identified within the OLIN Study (Obstructive Lung disease In Northern Sweden), each with a matched referent. Papers III and IV were based on the RHINE (Respiratory Health in Northern Europe) Cohort, a prospective cohort of adults, included in 1990, and followed up with in 1999. The proportion of new cases of asthma (papers III and IV) and rhinitis (paper IV) were identified based on the answers from the initial and follow-up questionnaires. In paper I, III, and IV, exposure was assessed by using meteorological dispersion models to calculate the levels of NO<sub>2</sub> outside each home (papers I and III) and the levels of exhaust particles, as indicators of the levels of vehicle exhaust. In paper II and III, alternative indicators was used, based on geographical indicators.

The results show that the levels of vehicle exhaust outside the home are significantly correlated with the degree of self-reported annoyance and the prevalence of asthmatic symptoms, and also with the risk of developing asthma, but not rhinitis, among adults. Paper II showed there was a non-significant tendency for increased risk of developing asthma among those living with high levels of vehicle exhaust outside their home. This finding was then supported by papers III and IV, showing a significant relationship between asthma and the levels of NO<sub>2</sub>, and the levels of vehicle exhaust particles outside the home. In paper III, living close to a major road was significantly related to the risk of developing asthma. No significant results were seen between vehicle exhaust and rhinitis.

In conclusion, vehicle exhaust outside the home is associated with the prevalence of annoyance and asthmatic symptoms, and with the risk of developing asthma, but not rhinitis, among adults.

**Key words:** Asthma, Rhinitis, Asthmatic symptoms, Annoyance, Vehicle exhaust