

## Health Impacts from Proximity to Traffic

Residential proximity to motor vehicle traffic is associated with increased exposures to ambient noise, toxic gases and particulate matter, including diesel particulates. Based on the available evidence, residential proximity at a distance of roughly 100–300 meters is related to poorer health outcomes.[1,2] This proximity to traffic has been associated with various health impacts for residents, particularly asthma exacerbation and possibly onset of asthma, as well as increased mortality rates.[3,4] Living in proximity to traffic has also been associated with subclinical atherosclerosis (a key pathology underlying cardiovascular disease (CVD)), prevalence of CVD and coronary heart disease (CHD), incidence of myocardial infarction, and CVD mortality.[5] Proximity to traffic can also mean increased noise exposure, which is linked to stress and poorer health outcomes.[6]

<https://www.countyhealthrankings.org/explore-health-rankings/measures-data-sources/county-health-rankings-model/health-factors/physical-environment/housing-transit/traffic-volume>

## Residential Exposure to Traffic Is Associated With Coronary Atherosclerosis

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### Abstract

**Background**— Long-term exposure to fine-particulate-matter (PM<sub>2.5</sub>) air pollution may accelerate the development and progression of atherosclerosis. We investigated the associations of long-term residential exposure to traffic and fine particulate matter with the degree of coronary atherosclerosis.

**Methods and Results**— We used baseline data on 4494 participants (age 45 to 74 years) from the German Heinz Nixdorf Recall Study, a population-based, prospective cohort study that started in 2000. To assess exposure differences, distances between residences and major roads were calculated, and annual fine particulate matter concentrations, derived from a small-scale dispersion model, were assigned to each address. The main outcome was coronary artery calcification (CAC) assessed by electron-beam computed tomography. We evaluated the association between air pollution and CAC with logistic and linear regression analyses, controlling for individual level risk factors of coronary atherosclerosis. Compared with participants living >200 m away from a major road, participants living within 50, 51 to 100, and 101 to 200 m had odds ratios of 1.63 (95% CI, 1.14 to 2.33), 1.34 (95% CI, 1.00 to 1.79), and 1.08 (95% CI, 0.85 to 1.39), respectively, for a high CAC (CAC above the age- and gender-specific 75th percentile). A reduction in the distance between the residence and a major road by half was associated with a 7.0% (95% CI, 0.1 to 14.4) higher CAC. Fine particulate matter exposure was associated with CAC only in subjects who had not been working full-time for at least 5 years.

### Conclusions

Long-term residential exposure to high traffic is associated with the degree of coronary atherosclerosis.

## Road traffic noise and incident myocardial infarction: a prospective cohort study

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**Abstract:** Both road traffic noise and ambient air pollution have been associated with risk for ischemic heart disease, but only few inconsistent studies include both exposures.

**Methods:** In a population-based cohort of 57 053 people aged 50 to 64 years at enrolment in 1993-1997, we identified 1600 cases of first-ever MI between enrolment and 2006. The mean follow-up time was 9.8 years. Exposure to road traffic noise and air pollution from 1988 to 2006 was estimated for all cohort members from residential address history. Associations between exposure to road traffic noise and incident MI were analysed in a Cox regression model with adjustment for air pollution (NO(x)) and other potential confounders: age, sex, education, lifestyle confounders, railway and airport noise.

**Results:** We found that residential exposure to road traffic noise (L(den)) was significantly associated with MI, with an incidence rate ratio IRR of 1.12 per 10 dB for both of the two exposure windows: yearly exposure at the time of diagnosis (95% confidence interval (CI): 1.02-1.22) and 5-years time-weighted mean (95% CI: 1.02-1.23) preceding the diagnosis. Visualizing of the results using restricted cubic splines showed a linear dose-response relationship.

**Conclusions:** Exposure to long-term residential road traffic noise was associated with a higher risk for MI, in a dose-dependent manner.

## Long-term effects of traffic-related air pollution on mortality in a Dutch cohort (NLCS-AIR study)

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### Abstract

**Background:** Several studies have found an effect on mortality of between-city contrasts in long-term exposure to air pollution. The effect of within-city contrasts is still poorly understood.

**Objectives:** We studied the association between long-term exposure to traffic-related air pollution and mortality in a Dutch cohort.

**Methods:** We used data from an ongoing cohort study on diet and cancer with 120,852 subjects who were followed from 1987 to 1996. Exposure to black smoke (BS), nitrogen dioxide, sulfur dioxide, and particulate matter  $\leq 2.5$  microm (PM(2.5)), as well as various exposure variables related to traffic, were estimated at the home address. We conducted Cox analyses in the full cohort adjusting for age, sex, smoking, and area-level socioeconomic status.

**Results:** Traffic intensity on the nearest road was independently associated with mortality. Relative risks (95% confidence intervals) for a 10-microg/m<sup>3</sup> increase in BS concentrations (difference between 5th and 95th percentile) were 1.05 (1.00-1.11) for natural cause, 1.04 (0.95-1.13) for cardiovascular, 1.22 (0.99-1.50) for respiratory, 1.03 (0.88-1.20) for lung cancer, and 1.04 (0.97-1.12) for mortality other than cardiovascular, respiratory, or lung cancer. Results were similar for NO<sub>2</sub> and PM(2.5), but no associations were found for SO<sub>2</sub>.

**Conclusions:** Traffic-related air pollution and several traffic exposure variables were associated with mortality in the full cohort. Relative risks were generally small. Associations between natural-cause and respiratory mortality were statistically significant for NO<sub>2</sub> and BS. These results add to the evidence that long-term exposure to ambient air pollution is associated with increased mortality.

**Living near a major road increases the likelihood of developing a neurological disorder such as Alzheimer's, Parkinson's and multiple sclerosis (MS) according to research published in the journal *Environmental Health*.**

<https://ehjournal.biomedcentral.com/articles/10.1186/s12940-020-0565-4>

There is little known about the air quality risk factors associated with these disorders, so researchers at the University of British Columbia set out to investigate the link between them and air pollution.

The researchers analysed data from 678,000 adults between the ages of 45 – 84 who lived in Vancouver between 1994 to 1998 and estimated individual exposure to road proximity, air pollution, noise and green space, based on each person's postcode.

During the follow-up period, the researchers identified 13,170 cases of dementia, 4,201 cases of Parkinson's and 658 cases of MS.

Based on this, the researchers found that living less than 50 metres from a major road or less than 150 metres from a motorway is associated with a 14% increased risk in developing dementia, Parkinsons, Alzheimers and MS due to the increased exposure to air pollution.

When the researchers analysed proximity to green space, they found that the effect of air pollution on neurological disorders was reduced, which suggests that living near green spaces can have a protective effect.

Air pollution is known to trigger neuroinflammation which is the immune response of the brain to fight an invasion of toxins. It can become over-active and cause damage to healthy tissue, which can consequently lead to neurological damage.

## Other Key Studies

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<https://www.lung.org> › clean-air › outdoors › who-is-at-risk

A study on residents of Ontario found that **rates of dementia increased the closer you lived to a major road all the way out to 300 m**, and was highest among people who lived near a major road, in an urban area, and lived there for an extended period.

<https://www.thelancet.com/journals/lancet/article/PIIS0140-6736%2816%2932399-6/fulltext>

A study on older women found that **COPD was much more common among women living <100 m from a major road** than women living >100 m from a major road.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1352358/>

A study on children in California found that growing up within 500 m of a major road had significant detrimental effects on lung development.

<https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736%2807%2960037-3.pdf>

A **study on children in California found that they were more likely to develop autism** if their mothers lived within 1000 feet of a freeway during the third trimester.

<https://ehp.niehs.nih.gov/doi/full/10.1289/ehp.1002835>

A study on older women found that **proximity to a major roadway was highly correlated with prevalence of hypertension:**

<https://www.ahajournals.org/doi/full/10.1161/JAHA.113.000727>