

# THE EFFECT OF COARSE PARTICLES, MAINLY ROAD DUST, ON DAILY MORTALITY IN STOCKHOLM

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**Background and Aims:** Numerous epidemiological studies have been published on health effects associated with PM<sub>10</sub> and PM<sub>2.5</sub>. Research on the health effects of coarse particles with aerodynamic diameter between 2.5 and 10 µm (PM<sub>2.5-10</sub>) is limited. Our aim was to study the short-term effects of coarse fraction to daily mortality and morbidity in Greater Stockholm area. The concentrations of coarse particles in this region are relatively high in comparison with other cities in Europe. The particles consist largely of crustal materials and the main source during winter and springtime is the wear of road surfaces caused by studded tires.

**Methods:** Data on daily mortality in Greater Stockholm area (population approx. 1.3 mil.) for 2000 - 2008 were collected from the Cause of Death Register at the National Board of Health and Welfare. On average there are 28.4 deaths per day (min=12, max=52). PM<sub>10</sub> and PM<sub>2.5</sub> were measured simultaneously at an urban monitoring site in central Stockholm. PM<sub>2.5-10</sub> was calculated as the difference between PM<sub>10</sub> and PM<sub>2.5</sub> and the average concentration was 7.3 µg/m<sup>3</sup> (min=0, max= 61.9 µg/m<sup>3</sup>). We used additive Poisson regression models, controlling for trend and seasonality, meteorological variables and influenza episodes. Lag 01 single and multi-pollutant models (with PM<sub>2.5</sub>, O<sub>3</sub> and CO) were considered.

**Results:** For winter and spring (Nov-May) we found a 0.91% (95% CI: 0.11% to 1.72%) increase in daily mortality per IQR (5.25 µg/m<sup>3</sup>) increase in PM<sub>2.5-10</sub> (lag01) from the single pollutant model. When adjusted for other pollutants, particularly for PM<sub>2.5</sub>, the effect estimate slightly decreased, but was higher than the estimate for PM<sub>2.5</sub>.

**Conclusions:** Our analysis shows an increased mortality associated with coarse particles, in Stockholm originating mainly from road dust caused by the use of studded tires. Our estimates indicate around 30 premature deaths per year due to coarse particle exposure in Stockholm.