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# Particulate matter and out-of-hospital coronary deaths in eight Italian cities

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## Abstract

**Objectives** We evaluated the association between $PM_{10}$ concentration and out-of-hospital coronary deaths in eight Italian cities during 1997–2004.

**Methods** 16 989 subjects aged >35 years who died out-of-hospital from coronary causes were studied and hospital admissions in the previous 2 years identified. We studied the effect of the mean of current and previous day $PM_{10}$ values (lag 0–1). A city-specific case-crossover analysis was applied using a time-stratified approach considering as confounders weather, holidays, influenza epidemics, and summer decrease in population. The pooled percentage increase (95% CI) in mortality per 10 μg/$m^3$ increase in $PM_{10}$ was estimated.

**Results** A statistically significant increase in out-of-hospital coronary deaths was related to a 10 μg/$m^3$ increase in $PM_{10}$: 1.46% (95% CI 0.50 to 2.43). Although no statistically significant effect modification by age was found, the effect was stronger among subjects aged >65 years (1.60%, 0.59 to 2.63), particularly those aged 65–74 (3.01%, 0.74 to 5.34). People in the lowest socio-economic category (3.34%, 1.28 to 5.45) had a stronger effect than those in the highest category. No clear effect modification was seen for gender, season or any specific comorbidity. An indication of negative effect modification was seen for previous admission for cardiac dysrhythmias. Subjects without hospital admissions in the previous 2 years were slightly more affected by $PM_{10}$ effects (1.91%, 0.28 to 3.47) than those with at least one previous hospital admission (1.44%, 0.09 to 2.82).

**Conclusions** Our results show that short term exposure to $PM_{10}$ is associated with coronary mortality especially among the elderly and socio-economically disadvantaged. No clear effect modification by previous hospitalisations was detected except for cardiac dysrhythmias, possibly due to protective treatment.