

Urban air pollution and emergency room visits for respiratory complaints

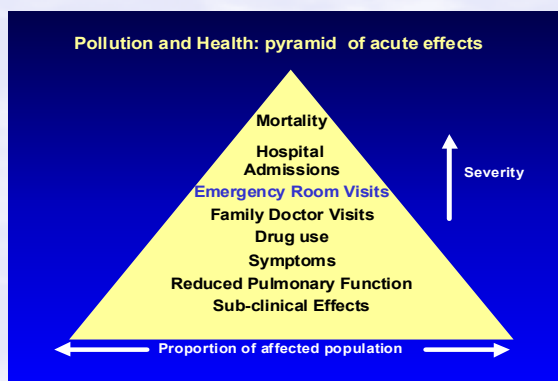
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Background

Several studies indicate that exposure to NO₂ and PM₁₀, homes proximity to roadsides/motorways, exposure to high rates of road traffic particularly to truck traffic increases the risk of respiratory symptoms. High levels of air pollution may start and/or aggravate respiratory symptoms and may result in an urgent visit to an Emergency Room (ER)

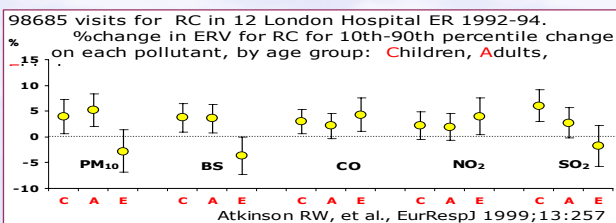
ER visits are more sensitive indicator of acute respiratory effects of short-term elevation in air pollution since only the more serious cases seen in the ER are likely to be hospitalized. ER are not restricted by bed availability.

Therefore among patients seen in an ER the clinical spectrum of respiratory illnesses is probably greater.



Some previous evidences

In 741 children 7-11 years old living in non-urban towns (Netherlands 1987-90) respiratory symptoms reported by either children or parents were correlated with a reduced respiratory function (FVC, FEV_{1,0}, PEF, FEV₂₅₋₇₅) but were not associated with air-pollution (Hoek G, et al. Int. J. Epidemiol. 1999 28: 293-299)



In Sao Paulo do Brazil in 1986 prevalence of respiratory symptoms among children of low-income families was much higher in areas with medium-high pollution levels, but was similar to all other children in the low pollution area (Ribeiro H. Soc Sci Med. 1989;29(8):959-64)

Twelve years later in 1998 in the area where both PM and SO₂ levels decreased, there was a reduction in the prevalence of respiratory symptoms (Ribeiro H et al. Soc Sci Med. 2003;57(11):2013-22)

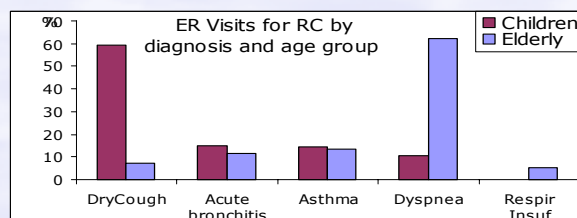
Urban air Pollution and ER visits for respiratory complaints, Pisa, Italy, 2000

Pollutants and meteo: PM₁₀, NO₂, CO, temperature, relative humidity, total rain

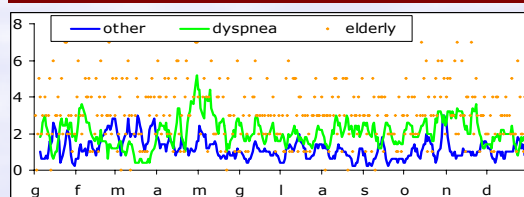
Health data: 1724 visits (533 for children, 1191 for elderly) collected and coded by medical personnel.

758 visits for dyspnea in elderly were excluded

Methods: Poisson autoregressive models allowing for overdispersion were used to model the outcomes. Generalised Additive Models for studying non linear relationships between confounders and morbidity. Up to 5 days lags were investigated



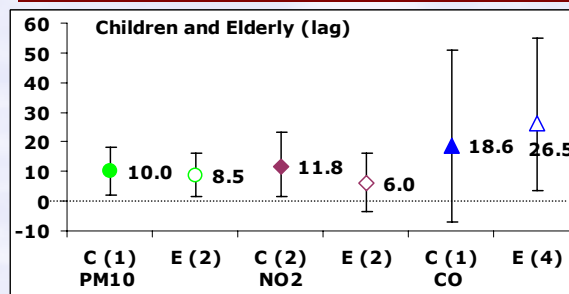
Time trend of daily ER visits for elderly: 5 days moving average and absolute values



Distributions of daily values, Pisa 2000

Pollutant	unit	mean	s.d.	Min	Median	Max
PM ₁₀	24h µg/m ³	35.4	15.8	9.5	31.6	100.1
NO ₂	24h µg/m ³	45.6	11.0	21.3	44.8	74.0
CO	24h mg/m ³	1.5	0.7	0.3	1.4	3.5
Meteo						
Temp	24h °C	15.8	6.1	1.1	15.6	27.0
Rel.Hum	24h mm/Hg	82.7	11.1	42.8	83.6	99.6
Max Rain	24h mm	2.2	7.1	0.0	0.0	90.6
E.R.visit						
Children	24h num.	1.4	1.3	0.0	1.0	6.0
Elderly	24h num.	1.2	1.1	0.0	1.0	6.0

% change of ER visits for RC for an increase of 10 µg/m³ of PM₁₀ or NO₂ and 1mg/m³ of CO, Pisa 2000



Results confirm also in Pisa that an increase in daily levels of urban air pollution is associated, in children and in elderly, with a decrease in quality of respiratory health that require a medical attention