Air Pollution Blamed for 3% of Deaths in the United States
Medscape Medical News October 3, 2000

A study in the October issue of the European Respiratory Journal describes how fine dust particles released into the atmosphere really constitute an independent cause of mortality, and its authors call for urgent review of permitted pollution limits. At the same time, the study conclusively invalidates the theory that a large proportion of such deaths are due to seasonal epidemics of influenza or pneumonia. The harmful effect of air pollution on health, and especially on the lungs, is now beyond any doubt, as established recently in Europe by an international study that caused a considerable stir. And the situation has now been found to be equally alarming in the United States.

Most of the blame can be laid on dangerous microparticles present in exhaust gases. The name given by the specialists to such tiny dust particles is PM10s (PM stands for "particulate matter" and the 10 refers to a diameter size of less than 10 microns). Owing to their microscopic size, these dust particles penetrate deep into the lung alveoli, causing serious respiratory disorders such as asthma and bronchitis. The study looked at 5 major US cities that carry out daily measurements of PM10 concentration in the atmosphere, Minneapolis, Minnesota; Chicago, Illinois; Detroit, Michigan; Pittsburgh, Pennsylvania; and Seattle, Washington. Led by Joel Schwartz, professor at the Harvard School of Public Health in Boston, the team of scientists estimated the number of deaths potentially related to air pollution on a day-to-day basis.

According to the study, **Minneapolis carries the highest risk factor: for every 10-mcg increment in the dust particles per cubic meter, the rate of daily mortality increases there by 1.3%.** In Pittsburgh and Detroit, for the same concentration of pollutants, excess mortality is only 0.80% and 0.77%, again for every 10-mcg increment in pollution. The most populated city (Chicago, with 5 million inhabitants) comes fourth, and in Seattle the figure drops to only 0.44%. **The explanation offered for these disparities by the scientists is that the polluting particles, though identical in size, differ in their composition.** The set of **molecules involved can change from one region to another, leading to different effects on people's health. I**n addition, random statistical variability may account for much of the difference.

The data used for the study were collected between 1986 and 1993. During that period, the 5 cities showed a daily pollution rate of around 30 mcg per cubic meter, which is equivalent to about 3% excess mortality. Because this pollution rate is far below the authorized limit of 150 mcg, however, Schwartz and colleagues wondered whether some of the deaths should not be attributed to epidemics of respiratory diseases, such as those related to influenza or pneumonia.

To find out, they identified critical periods by looking at the number of daily hospital admissions for pneumonia: if the number exceeded a certain threshold for 10 days or more, they would classify the outbreak as an epidemic. But while they did observe a slight decrease in the number of deaths due to pollution at the time of such respiratory epidemics, Schwartz and colleagues estimated that this effect could on the whole be considered negligible. **"Our results confirm the strength of the causality between PM10 exposure and deaths,"** according to Alfesio Braga, coauthor of the study. "They show that this association is not due to any other external effects."

The study has drawn attention to one fact that has caused the scientists serious concern : the negative effects on health start to appear at relatively low pollution rates. As Schwartz points out, **"since this effect can be seen also on days when air pollution levels are well below the adopted air quality standard, the extent of the phenomenon appears quite alarming."**

The scientist is therefore calling for an urgent review of current standards, and the World Health Organization (WHO) has also issued similar warnings. Just recently, it recommended reforming transport policies in the European Union, where there are already half as many cars as people. It even launched a broad-ranging epidemiological study to evaluate the number of pollution victims in 3 European countries in particular (Switzerland, France, and Austria). The findings of this study stunned participants at the recent World Congress on Lung Diseases in Florence, Italy, where it was revealed that PM10s in the 3 countries concerned were responsible for 40,000 deaths a year.

In addition, it was found that air pollution each year triggered over a million asthma attacks, as well as more than 47,000 cases of chronic bronchitis in adults and 540,000 cases of acute bronchitis in children.