DOCUMENTS

Health Impact Assessment of Air Pollution in 26 European Cities

First results of the APHEIS study

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Release of the second-year Report

The APHEIS programme, funded by the European Commissions' Health and Consumer Protection DG, recently released the findings of a health impact assessment of air pollution which was conducted in 26 cities in 12 European countries during 2001.

The APHEIS (Air Pollution and Health: a European Information System) study revealed in particular that air pollution continues to pose a significant threat to public health in urban environments in Europe despite tighter emission standards, closer monitoring of air pollution and decreasing levels of certain types of air pollutants.

As part of APHEIS' objective to bridge the gap between research findings and decision making, the second-year report, which uses the same standardized methodology in all its cities, constitutes the first Health Impact Assessments (HIA) of particulate matter conducted simultaneously at both local and European levels.

The APHEIS programme also fosters ongoing cross-fertilization between multiple disciplines and regions to create skilled, local teams and to enrich methodology, know-how and the quality of its findings [1].

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APHEIS is a collaborative undertaking of the EC's Joint Research Centre in Ispra, WHO's European Centre for Environment and Health in Bonn, and the many environment and public health organisations and institutions from 12 countries totaling 26 cities in Europe: Athens, Barcelona, Bilbao, Bordeaux, Bucharest, Budapest, Celje, Cracow, Dublin, Gothenburg, Le Havre, Lille, Ljubljana, London, Lyon, Madrid, Marseille, Paris, Rome, Rouen, Seville, Stockholm, Strasbourg, Tel Aviv, Toulouse and Valencia.

Following, some descriptive findings of the second-year report are compiled.

Concentration of Particulate Matter

In APHEIS air quality data of areas representative for the exposure of the population at large were used. Most of the time, this choice limits the measurement stations to urban background locations.

In most European cities particulate air pollution (or very small particles) is measured using one of two metrics: PM_{10} (particles less than 10 µm in size), or black smoke (black particles less than roughly 4 µm in size).

Levels of particulate air pollution, including PM_{10} and black smoke, vary widely across Europe. The annual average levels in APHEIS cities range from 14 to 73 µg/m^3 for PM_{10} (Figure 1, p. 500) and from 8 to 66 µg/m^3 for black smoke (Figure 2, p. 500).

Numerous studies conducted in Europe and other parts of the world have shown that such pollution levels constitute a health risk. The APHEIS report demonstrates that reducing these levels, even by a small amount, could produce significant benefits to public health.

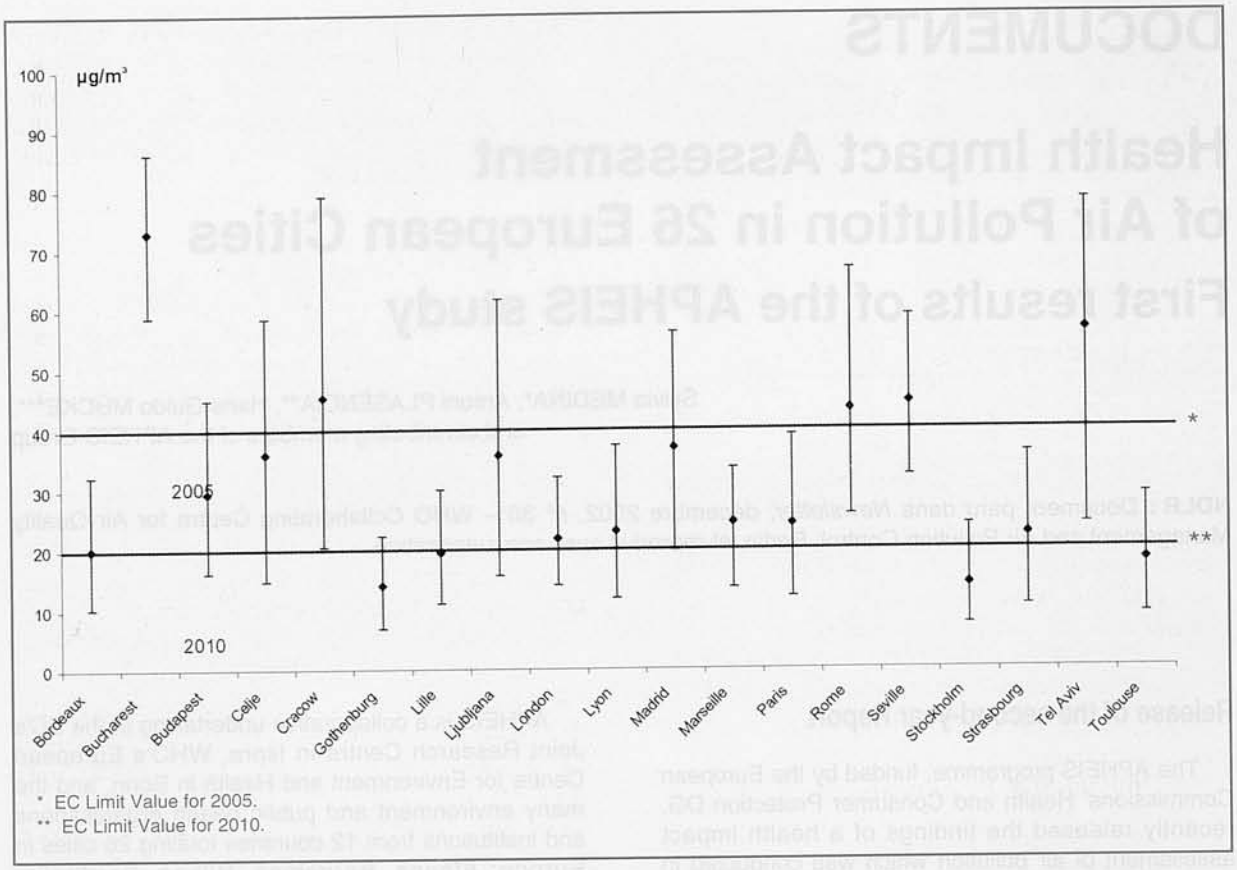

Figure 1.
Annual mean, 10th and 90th percentiles of PM_{10} concentration.

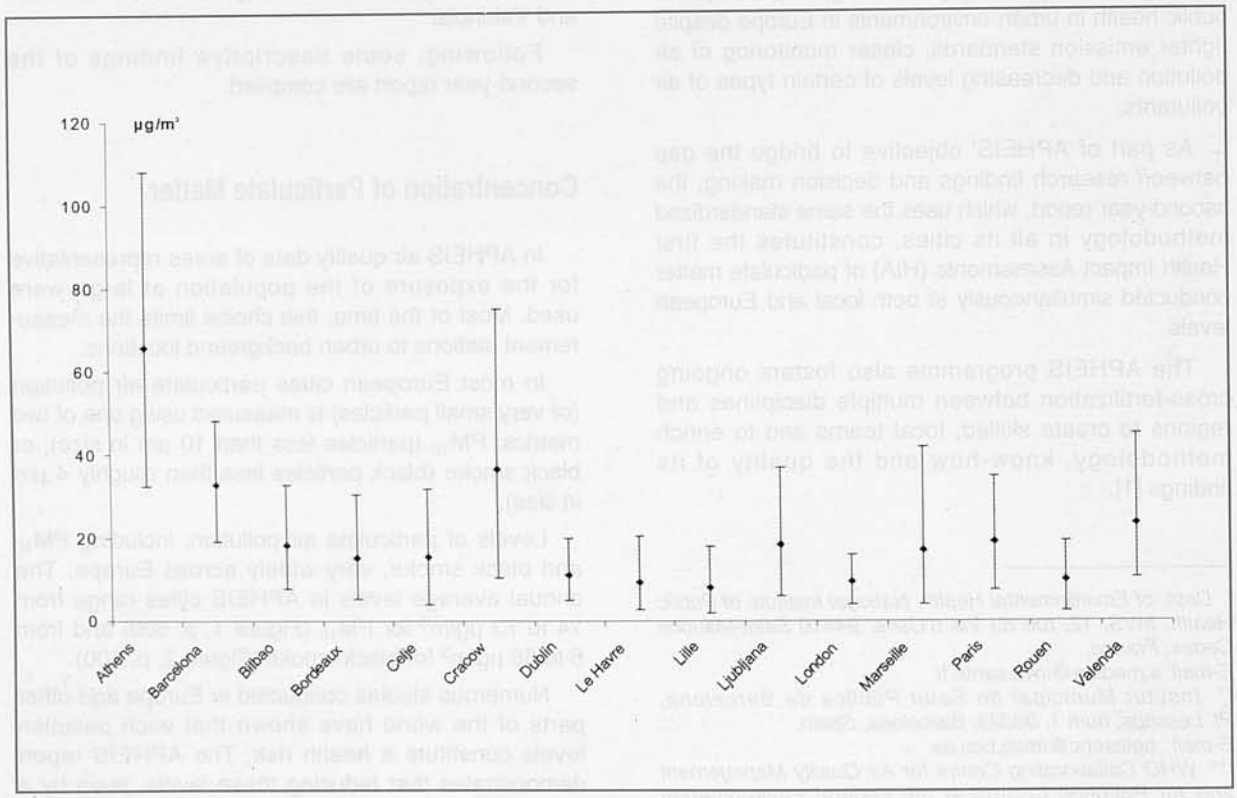

Figure 2.
Annual mean, 10th and 90th percentiles of black smoke concentration.

Health Impact of PM_{10}

The report indicates that 2,653 premature deaths (or 9 premature deaths per 100,000 inhabitants) could be prevented annually if long-term exposure to annual mean values of PM_{10} were reduced to 40 µg/m³ in the 19 cities that measured PM_{10} particles and whose populations total nearly 32 million inhabitants. The level of 40 µg/m³ is the limit value set by the European Commission for all the Member States which is to be attained by 2005.

If the more ambitious limit value of 20 µg/m³ set for 2010 is achieved in the same cities, 11,855 premature deaths (or 43 premature deaths per 100,000 inhabitants) could be prevented annually.

Furthermore, the report shows that reducing long-term exposure to outdoor PM_{10} by just 5 µg/m³ would prevent 5,547 premature deaths annually (or 19 premature deaths per 100,000 inhabitants) in all the cities, including those with the lowest pollution levels. It should also be noted that at least 832 (or 15%) of these 5,547 deaths (due to long-term exposure to PM_{10}) could be prevented by reducing short-term exposure to PM_{10} by 5 µg/m³.

Health Impact of Black Smoke

Concerning black smoke, according to a Dutch cohort study just published, the effects on mortality rates of long-term exposure to this pollutant should be similar to the effects of PM_{10}. However, since no exposure-response functions were available for the chronic, long-term effects of exposure to black smoke when the APHEIS study was conducted, the second part of Health Impact Assessment was limited to acute, short-term effects, and thus addressed only a small fraction of the total long-term impact of black smoke.

The assessment conducted in the 15 cities in which black-smoke particles was measured and whose populations total almost 25 million inhabitants, revealed that nearly 577 premature deaths (or 3 premature deaths per 100,000 inhabitants) could be prevented annually if short-term exposure to outdoor concentrations of black smoke were reduced by 5 µg/m³.

Conclusion of the Report

The APHEIS report findings show that even very small reductions in air pollution levels of particulate matter, such as 5 µg/m³, have a beneficial impact on public health, and thus justify taking preventive action in all cities, no matter how low their levels of air pollution.

The findings are also consistent with those of other organisations, and add one more brick to the wall of evidence that air pollution continues to have an impact on public health.

As another key point, the APHEIS report, entitled "A Health Impact Assessment of Air Pollution in 26 European Cities," states that the major reason air pollution exposure results in important health impacts is the ubiquity of the exposure, over which individuals have little control. This contrasts with other health-risk factors, such as cigarette smoking and diet, which individuals can control more readily.

APHEIS Today and Tomorrow

The APHEIS programme aims to provide European decision makers, environmental-health professionals, the general public and the media with an up-to-date, easy-to-use information resource to help them make better-informed decisions about the issues they face concerning air pollution and public health.

To meet these goals, during its first and second years the APHEIS programme assembled a network of environmental and health professionals in the above 26 European cities, created an epidemiological surveillance system that generates information on an ongoing basis, and conducted the present HIA of particulate matter in these cities.

The second-year report constitutes the initial step in meeting the information and decision-making needs of the different audiences the programme serves.

As the next steps in fulfilling its mission, during its third year APHEIS is now researching key European policy makers and influencers concerned with the impact of air pollution on public health to understand how the programme can better meet their information needs.

Within APHEIS years of life lost or reduction in life expectancy, in order to estimate the health impacts of long-term exposure to air pollution will also be calculated.

In the future to collaborate with economists on calculating the costs to society of the health effects of air pollution in the cities participating in the programme is planned too.

Within APHEIS a more closely collaboration with local, regional, national and European programmes is foreseen to share its latest findings with them. These programmes include NEHAPs (National Environmental Health Action Plans); the European Union's AIRNET (A Thematic Network on Air Pollution and Health); WHO's European programme on air pollution and health; and the European Union's CAFE (Clean Air for Europe) programme, and EUROHEIS (A European Health and Environment Information System for Disease and Exposure Mapping and Risk Assessment), and Air Quality-Related actions of the European Environment Agency.

The APHEIS programme is coordinated by Institut de Veille Sanitaire (InVS) in Saint-Maurice, France and by Institut Municipal de Salut Pública de Barcelona (IMSPB) in Spain.

For further results and information visit: www.apheis.net

Références

1. WHO Newsletter, December 2000 ; 26 : 4-8.