

# Aphekom

Improving Knowledge and Communication for  
Decision Making on Air Pollution and Health in Europe

## Summary report of the Aphekom project 2008-2011



Average annual NO<sub>2</sub> levels in Paris 2009

*Credit: Airparif*

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## Answers to Key Questions on the Impact of Air Pollution on Health in Europe

**M**UCH HAS BEEN DONE IN RECENT YEARS to reduce air pollution and its harmful effects on the health of Europeans. Yet gaps remain in stakeholders' knowledge and understanding of this continuing threat that hamper the planning and implementation of measures to protect public health more effectively.

Sixty Aphekom scientists have therefore worked for nearly 3 years in 12 countries across Europe to provide new information and tools that enable decision makers to set more effective European, national and local policies; health professionals to better advise vulnerable individuals; and all individuals to better protect their health.

Ultimately, through this work the Aphekom project hopes to contribute to reducing both air pollution and its impact on health and well being across Europe.

To these different ends, the project has focused on answering the following key questions.

### 1. What are the latest findings on the health impacts and monetary costs of air pollution in European cities?

Aphekom used traditional HIA (health impact assessment) methods to conduct an in-depth update of the impact of air pollution on health in 25 European cities totalling nearly 39 million inhabitants. This work shows that a decrease to 10 micrograms/cubic metre of long-term exposure to PM<sub>2.5</sub> fine particles (WHO's annual air-quality guideline) could add up to 22 months of life expectancy for persons 30 years of age and older, depending on the city and its average level of PM<sub>2.5</sub>.

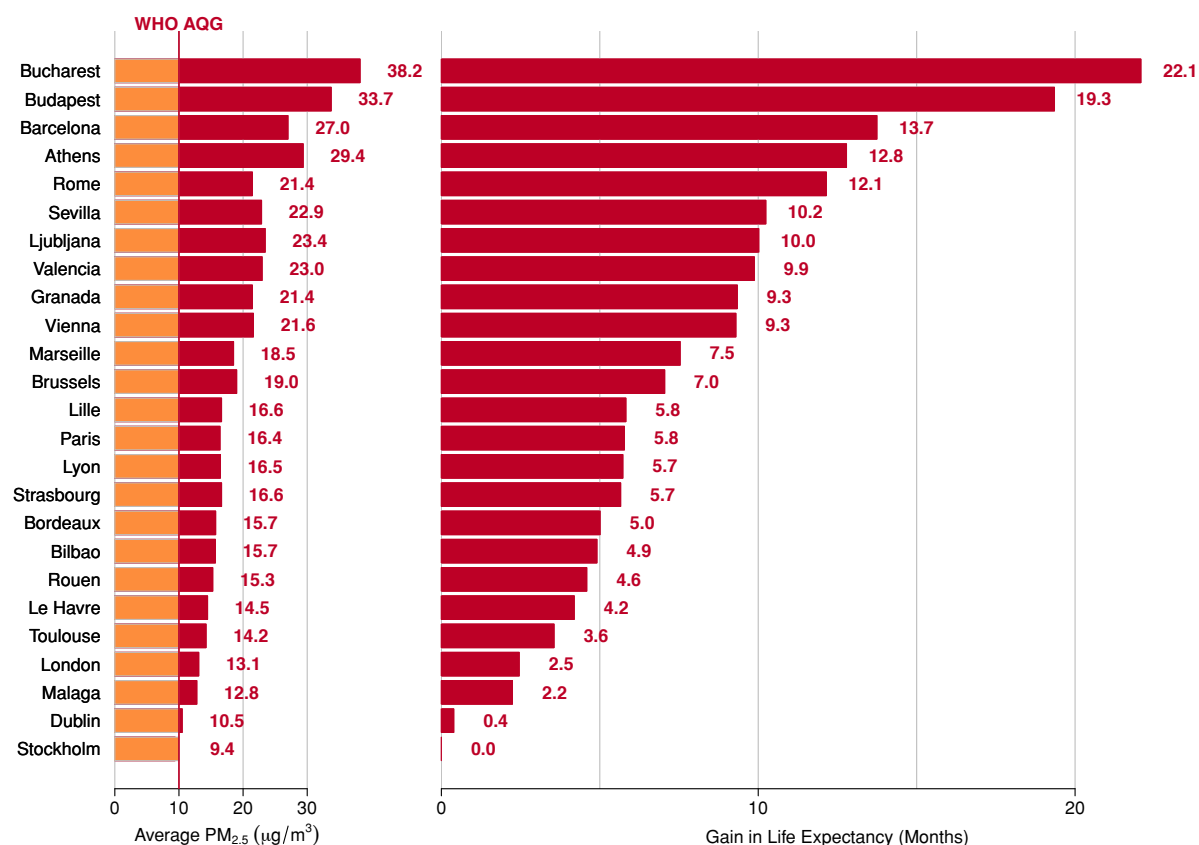
Hence, exceeding the WHO air-quality guideline on PM<sub>2.5</sub> leads to a burden on mortality of nearly 19,000 deaths per annum, more than 15,000 of which are caused by cardiovascular diseases.

#### KEY APHEKOM NUMBERS

- 60 scientists
- 3 years
- 25 cities
- 12 countries
- 39 million inhabitants

Aphekom also determined that the monetary health benefits from complying with the WHO guideline would total some €31.5 billion annually, including savings on health expenditures, absenteeism and intangible costs such as well being, life expectancy and quality of life.

**Predicted average gain in life expectancy (months) for persons 30 years of age and older in 25 Aphekom cities for a decrease in average annual level of PM<sub>2.5</sub> to 10µg/m<sup>3</sup> (WHO's Air Quality Guideline)**



These findings show that air pollution continues to have damaging effects on public health in Europe, and that further steps to reduce PM (particulate matter) would result in significant health and monetary gains.

The findings are particularly relevant now when various European Union member states have exceeded mandated limit values on particles since 2005, especially in large urban areas. When the European Commission has recently put a number of member states on notice for this reason. And when EU and national agendas are being prepared for implementing existing regulations on air pollution and for revising current EU legislation in 2013.

**KEY APHEKOM NUMBERS**

Exceeding WHO Air Quality Guidelines on PM<sub>2.5</sub> in 25 European cities with 39 million inhabitants results annually in:

- 19,000 deaths
- 15,000 of them from cardiovascular diseases
- €31.5 billion in health and related costs

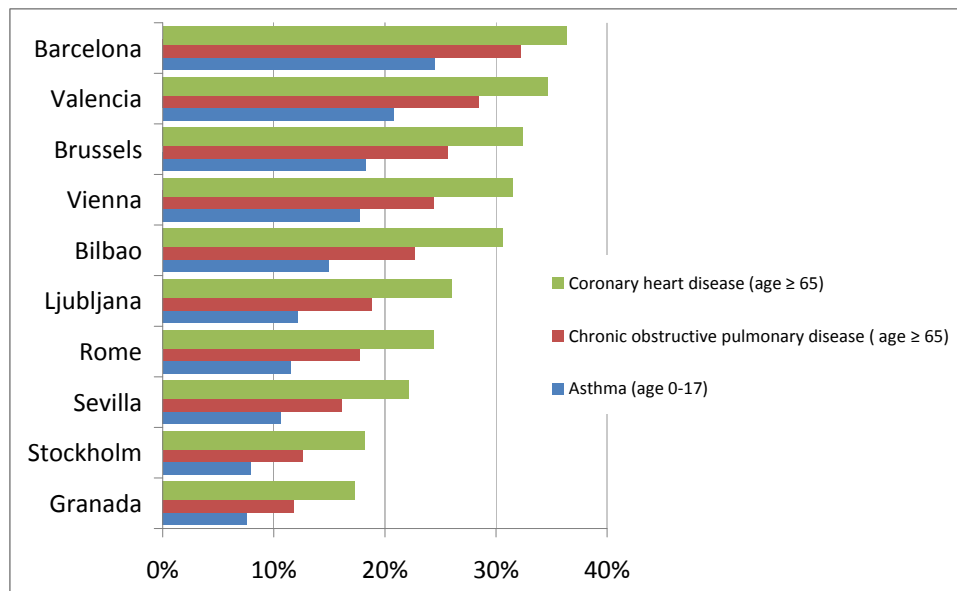
## 2. How can we make HIAs more meaningful and actionable for developing policies and recommendations on air pollution for urban populations?

Pollutants such as ultrafine particles occur in high concentrations along streets and roads carrying heavy traffic. And evidence is growing that living near such streets and roads may have serious health effects, particularly on the development of chronic diseases. Until now, however, HIAs have not explicitly incorporated this factor.

travelled by 10,000 or more vehicles per day and could thus be exposed to substantial levels of toxic pollutants.

In the cities studied, our HIA showed that living near these roads could be responsible for some 15-30 percent of all new cases of asthma in children; and of COPD (chronic obstructive pulmonary disease) and CHD (coronary heart disease) in adults 65 years of age and older.

**Percentage of population with chronic diseases whose disease could be attributed to living near busy streets and roads in 10 Aphekom cities**



For this purpose, Aphekom has applied innovative HIA methods to take into account the additional long-term impact on the development of chronic diseases from living near busy roads. We also evaluated the monetary costs associated with this impact.

We first determined that, on average, over 50 percent of the population in the 10 European cities studied lives within 150 metres of roads

### KEY APHEKOM NUMBERS

- Living near busy roads could be responsible for some 15-30% of all new cases of asthma in children; and of chronic obstructive pulmonary disease and coronary heart disease in adults 65 years of age and older
- The associated economic burden could total €300 million every year

Aphekom further estimated that, on average for all 10 cities studied, 15-30 percent of exacerbations of asthma in children, acute worsening of COPD and acute CHD problems in adults are attributable to air pollution.

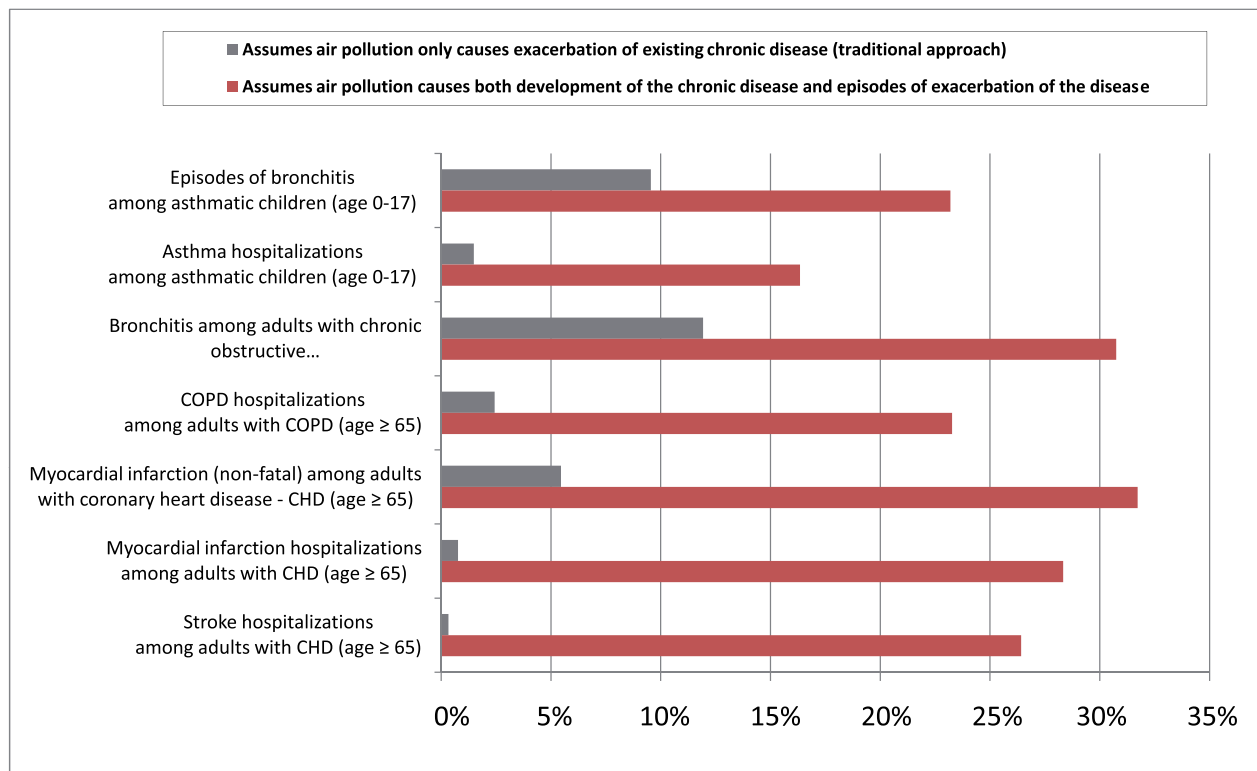
This burden is substantially larger than previous estimates of exacerbations of chronic diseases, since it has been ignored so far that air pollution may cause the underlying chronic disease as well.

In addition, for the population studied Aphekom estimated an economic burden of more than €300 million every year attributable to chronic diseases caused by living near heavy traffic. This burden is to be added to some €10 million attributable to exacerbations of these diseases.

Our work thus suggests that the total benefits of reducing traffic exposure for urban populations may have been largely underestimated until now.

Together these important findings strengthen earlier arguments that there is an urgent need for policy makers and urban planners to reduce the exposure to air pollution of urban populations living along congested roads. In addition, health professionals and individuals can draw on this information to advise on and adopt behaviours for better health.

### Comparison of impact of air pollution on chronic diseases calculated using two different HIA approaches in Aphekom



### 3. Do policies designed to reduce air pollution and its health impacts and monetary costs really work?

Beyond reviewing the documented benefits to health of the historic Dublin coal ban in 1990 and the recent implementation of congestion charges in London and Stockholm, Aphekom investigated the effects of EU legislation to reduce the sulphur content of fuels (mainly diesel oil used by diesel vehicles, shipping and home heating).

Our analysis in 20 cities showed not only a marked, sustained reduction in ambient SO<sub>2</sub> levels but also the resulting prevention of some 2,200 premature deaths valued at €192 million.

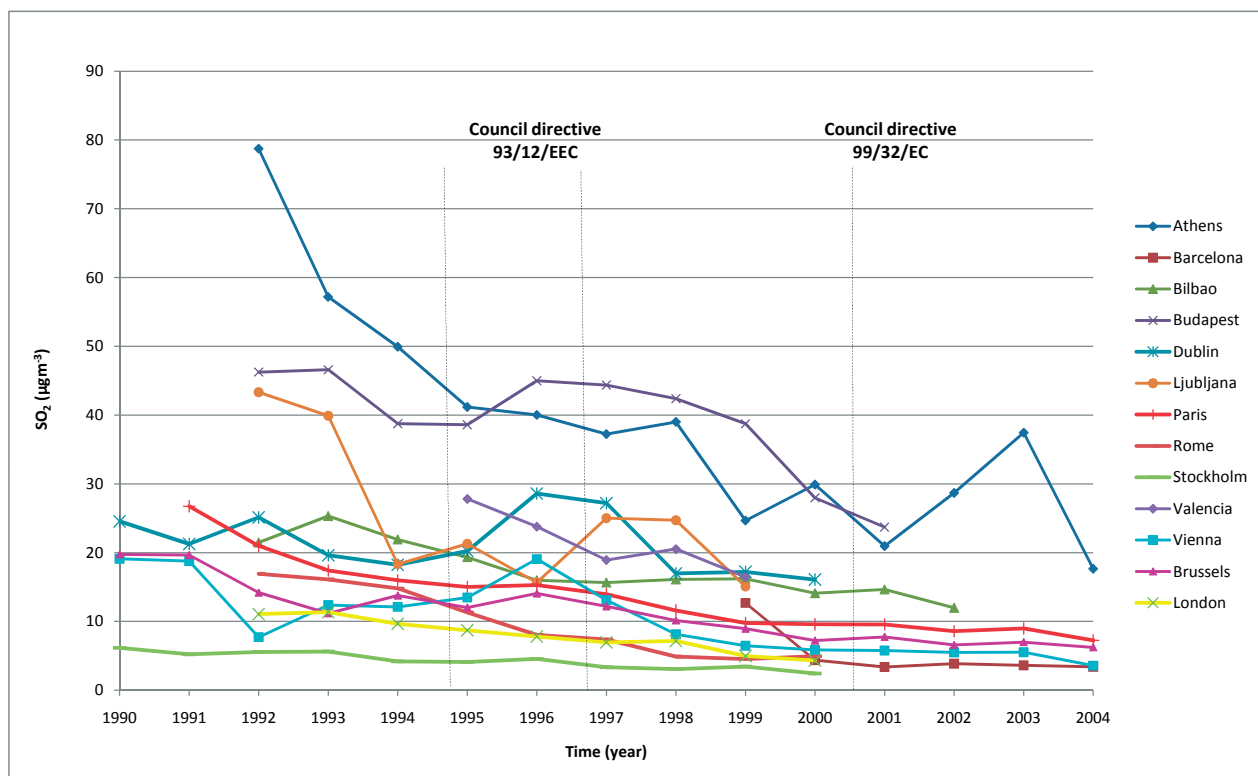
#### KEY APHEKOM NUMBERS

In 20 cities where sulphur in fuels was reduced by EU legislation:

- 2,200 premature deaths from ambient SO<sub>2</sub> prevented
- Some €192 million saved

These findings underscore the health and monetary benefits from drafting and implementing effective EU policies on air pollution and ensuring compliance with them over time.

#### Yearly urban background SO<sub>2</sub> averages for Aphekom cities from 1990 to 2004

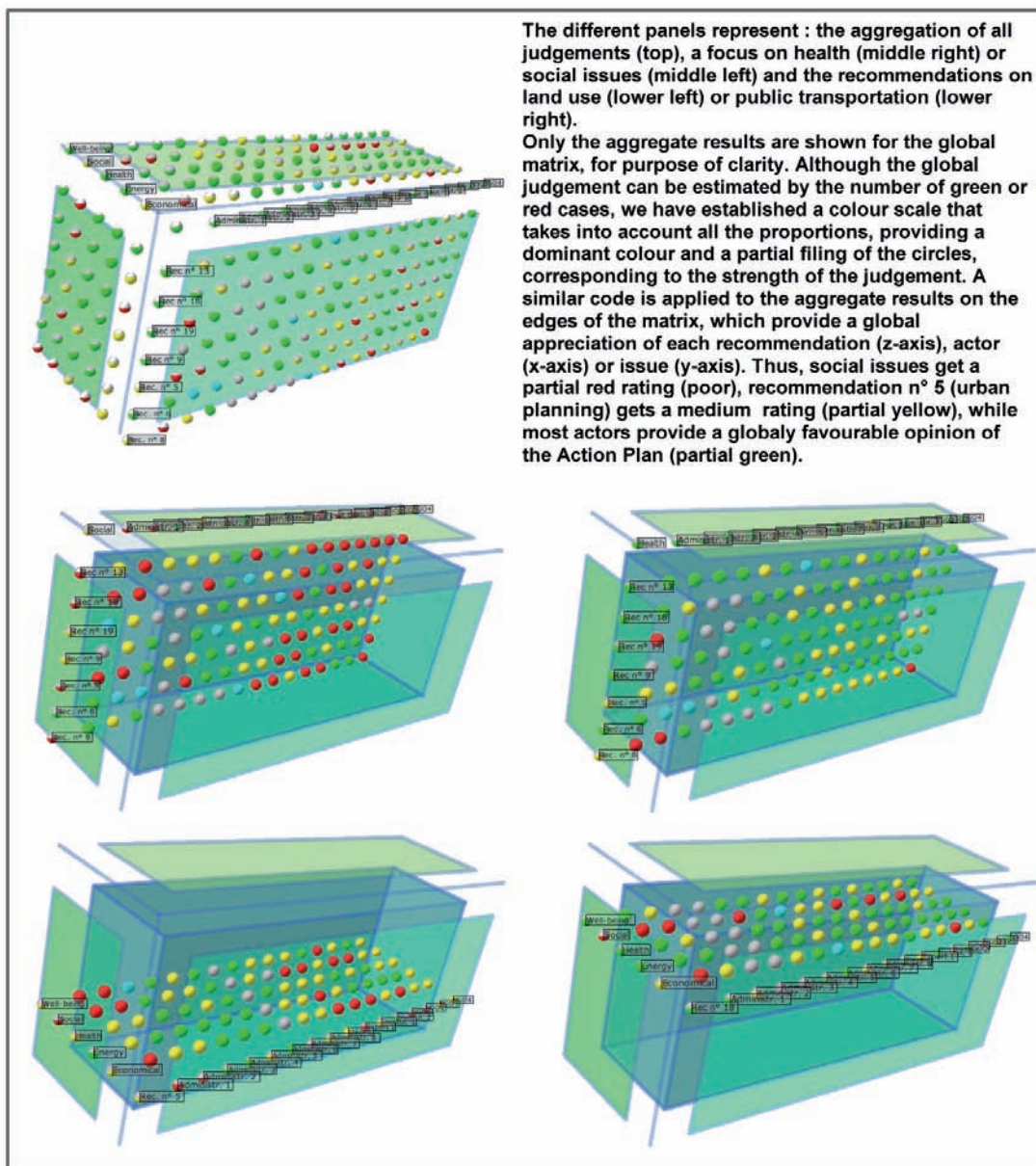


#### 4. How can we improve communication both among and between scientists and stakeholders concerned with the impact of air pollution on health?

Uncertainties perceived by scientists, policy makers and other stakeholders can undermine their confidence in the findings of HIAs. For this reason, Aphekom has developed a method that helps them discuss and share their views on both the uncertainties in HIA calculations and their impact on the decision-making process.

In addition, to help decision makers draft policies on air quality and related environmental-health issues, Aphekom has developed a process, based on a deliberation-support tool, that helps frame and structure exchanges between stakeholders working together. Using this process enables them to propose and discuss multiple criteria for evaluating, prioritising and aligning their various needs, and for choosing actions that match their objectives and preferences.

#### Selected views of the deliberation matrix representing stakeholders' judgements



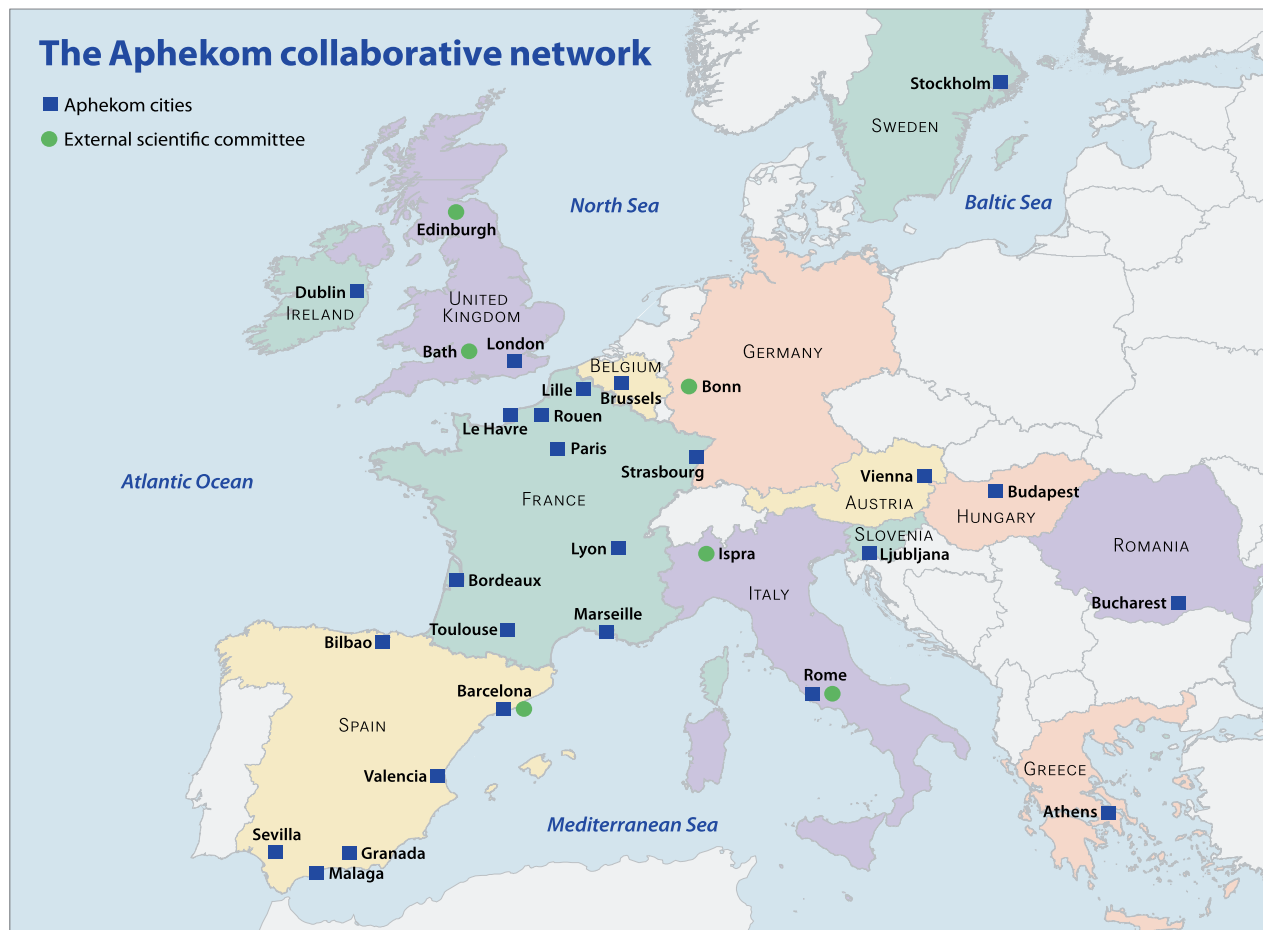
## 5. How can our many stakeholders access the Aphekom project's deliverables?

Aphekom makes its findings and tools available to all interested parties through a range of local, national and European media, organisations and events. Aphekom's full reports, presentations and videos can be found on our Web site ([www.aphekom.org](http://www.aphekom.org)). And members of the Aphekom network provide in their native languages city reports that highlight local issues and challenges on air pollution and health.

General and vulnerable populations and other groups can also have access to Aphekom's findings through health professionals, patients' organisations and NGOs at the EU, national and local levels.

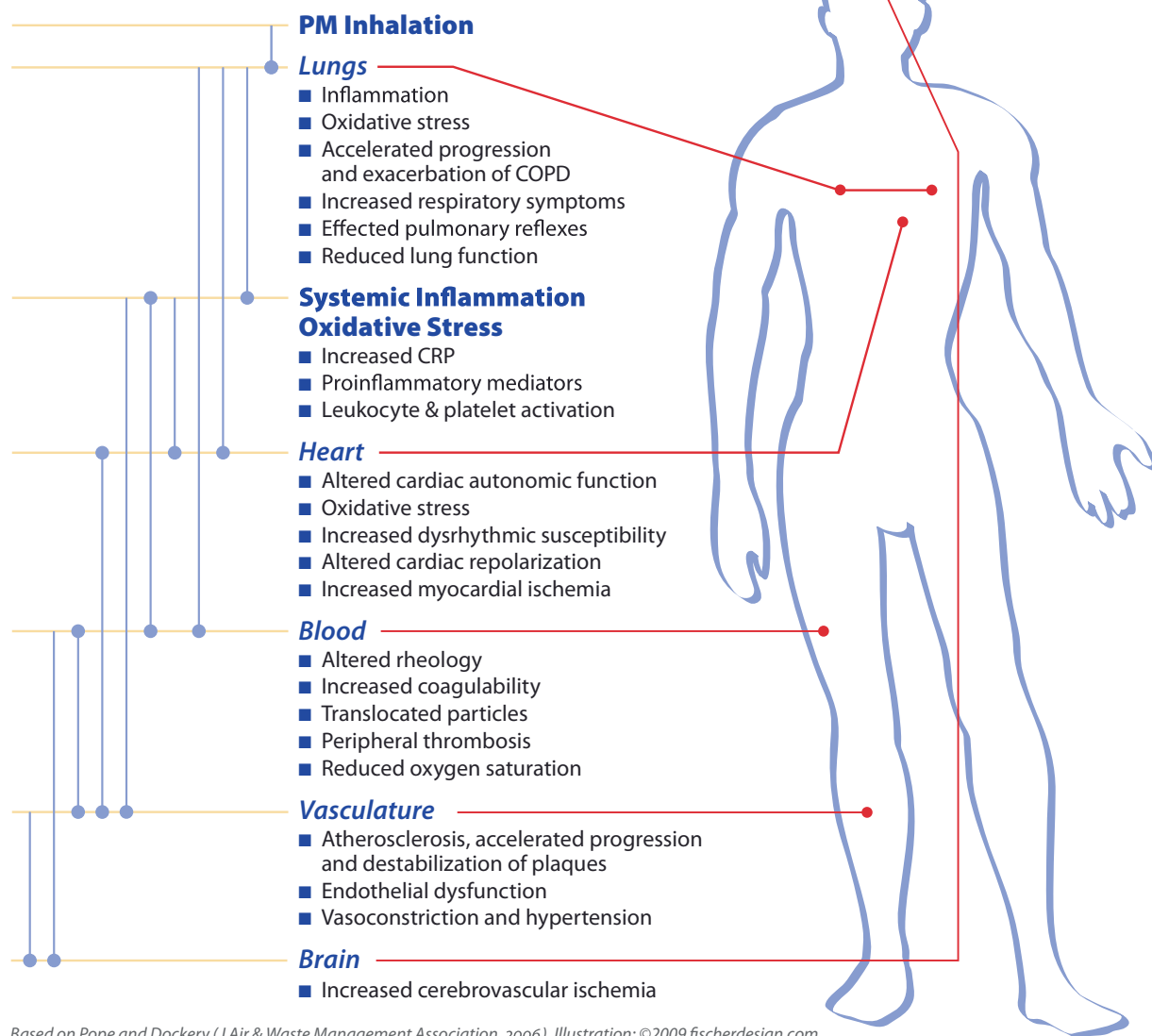
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## How inhalation of particulate matter may affect our health



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