

Main results of the Aphekom project

Closing the gap between science and action

Mathilde Pascal, Sylvia Medina
on behalf of the Aphekom network

14/06/2012



Outline

- The Aphekom project
- Objectives
- Main results
 - Public health burden of air pollution in Europe
 - Influence of traffic
 - Evaluation of public policies
 - Stakeholder involvement
- Relevance



Overview

- Despite a major decrease in pollutant levels in Europe since the 1950s and the successive implementation of EC Directives on ambient air, important disparities in exposure to air pollution still remain between and within European countries
- Through a set of interrelated work packages, Aphekom developed and delivered consistent, evidence-based, actionable information and tools on the health impacts and monetary costs of urban air pollution in 25 European cities
- By including complex scientific evidence in HIAs (health impact assessments) and developing more effective communication tools for stakeholders, Aphekom sought to improve urban health governance and accountability enabling:
 - decision makers to set more effective local and European policies
 - health professionals to advise vulnerable groups better
 - and individuals to make better-informed decisions



The Aphekom project

- 3-year EU project (2008-2011)
 - Coordinated by InVS in collaboration of Umea University
 - 12 countries, 25 cities
 - 60 scientists
 - co-funded by the EC Programme on Community Action in the field of Public Health (Grant Agreement n° 2007105)





Objectives

- Update HIAs (health impact assessments) of urban air pollution in Europe
- Take into account recent findings on the health impacts of traffic
- Evaluate the impact of public policies: EU legislation on SO₂
- Share methods, tools and good practices
- Facilitate stakeholder involvement



HIA of urban air pollution in Europe

- HIA in 25 cities
 - Data 2004-2006
 - Short-term effects of PM₁₀ and ozone on mortality and hospitalisations
 - Long-term effects of PM_{2.5} on mortality
 - Economical valuation
 - Direct and indirect costs
- Standardised guidelines and tools
 - <http://si.easp.es/aphekom>
- Key findings
 - Air pollution continues to be a significant public health burden in European cities
 - Long-term effects >>> Short-term effects

Aphekom

4. Guidelines for performing an HIA of the health impacts of urban air pollution

The general principle of an HIA is to use a concentration-response function (CRF) linking the concentration of pollutants to which the population is exposed with the number of health events occurring in that population. This CRF is expressed in terms of a percent change in the number of health events per unit change in the pollutant concentration. This CRF is derived from epidemiological studies in a given population, applied to a pollutant concentration and a baseline health outcome. The CRF allows calculating the change in the health outcome associated with a change in the concentration of the pollutant. This process is illustrated in Figure 1.

```
graph TD
    A[Current (2004-06) air pollution levels, e.g. [PM2.5]] --> B[Air pollution change for two types of scenarios  
- decrease by a fixed amount, e.g. [PM2.5] - 5 µg/m³  
- decrease to the WHO air quality guidelines (WHO-AQG), e.g. [PM2.5] = 10 µg/m³]
    C[Current (2004-06) health outcomes, e.g. mortality] --> D[Concentration-response function = % change in health outcome per unit change in pollutant levels]
    B --> D
    D --> E[Impact = change in health outcome associated with the change in pollutant levels]
```

Main Menu

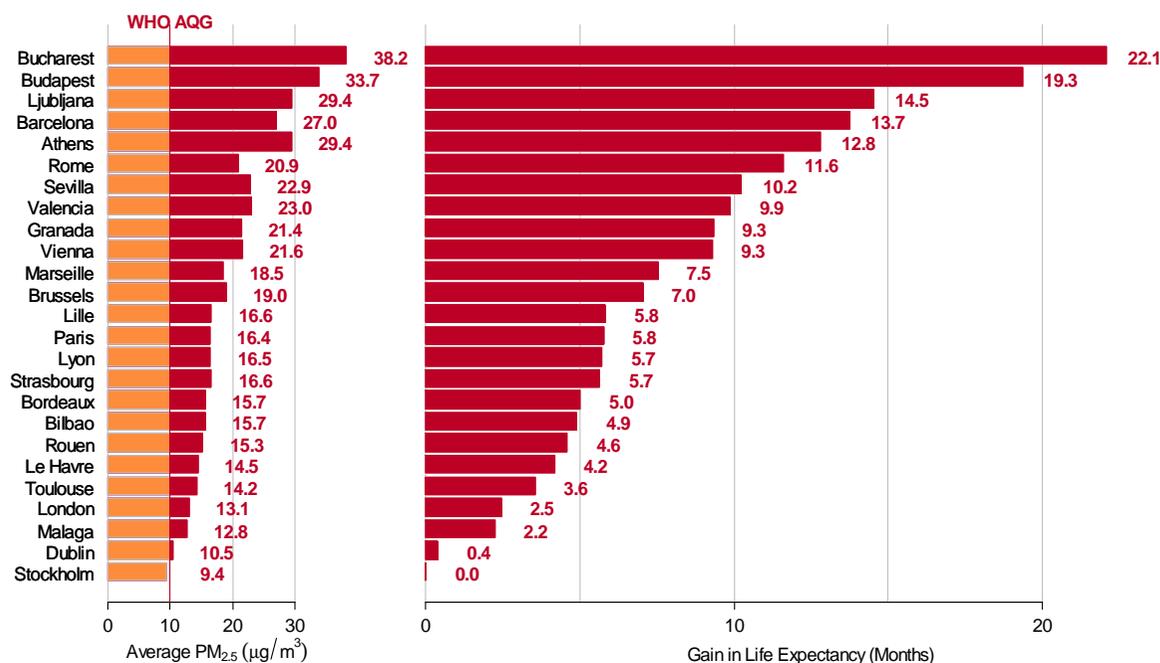
Foreword

1. What are the health impacts of air pollution?
2. Why perform a health impact assessment of air pollution?
3. Which HIA for which purpose?
4. Guidelines for performing an HIA of the health impacts of urban air pollution
 - 4.1. Definition of the study period
 - 4.2. Definition of the study area
 - 4.3. Exposure assessment
 - 4.4. Choice of the health outcome and the population data
 - 4.5. Choice of the concentration



Long-term impacts of PM_{2.5}

Predicted average gain in life expectancy (months) for persons 30 years of age in 25 Aphekom cities for a decrease in average annual level of PM_{2.5} to 10 µg/m³

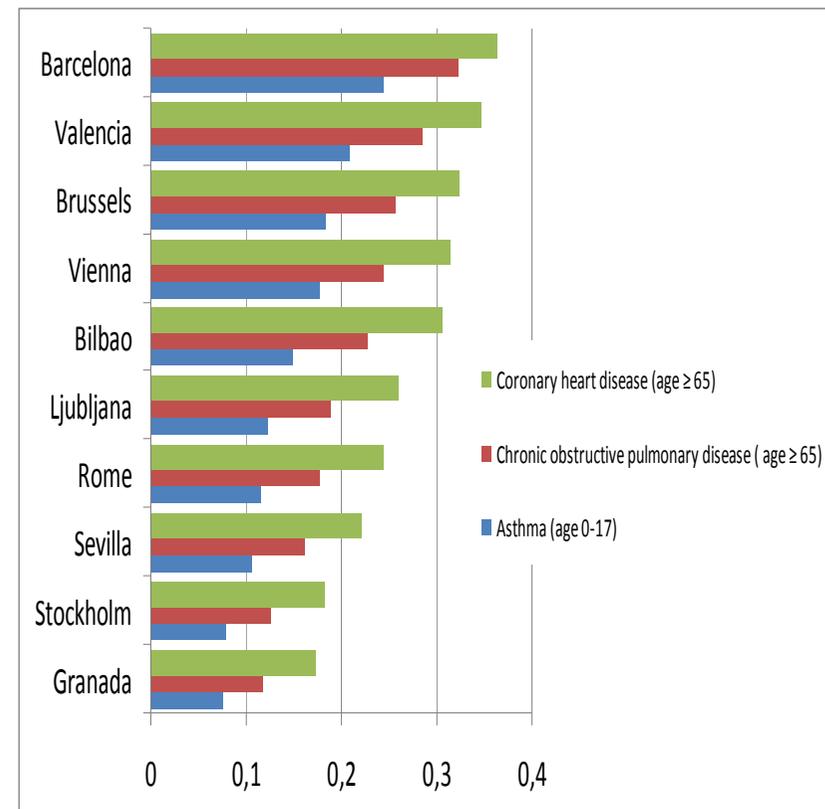


- Compliance with WHO AQG (10 µg/m³) would result in:
 - nearly 19,000 premature deaths avoided per annum (15,000 from cardiovascular causes)
 - €31,5 billion saved annually



Taking traffic into account in HIA

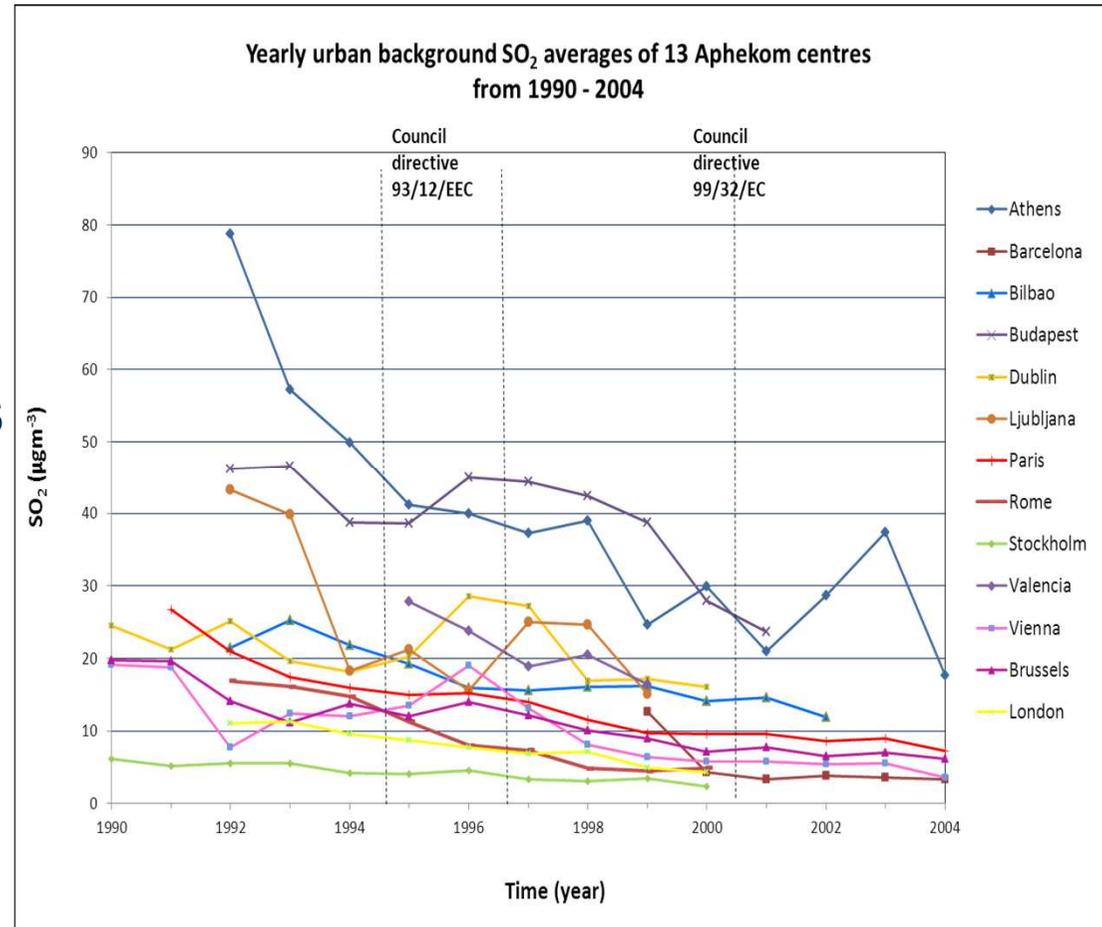
- Exploratory HIA in 10 cities
 - % of population living near roads travelled by 10,000 or more vehicles per day
 - influence on the development and exacerbation of chronic diseases
- Living close to traffic is responsible for:
 - 15 to 30% of all new asthma cases in children
 - 15 to 30% of asthma attacks in children
 - Similar or larger percentages for COPD and coronary heart diseases in adults >65 years
 - Added cost of €310 millions every year





Effectiveness of EU policies: review of air quality legislation with respect to sulphur content in fuels

- SO₂ mean levels decreased by about -66%
- Associated HIA :
 - 2,200 premature deaths avoided annually
 - €192 millions saved each year





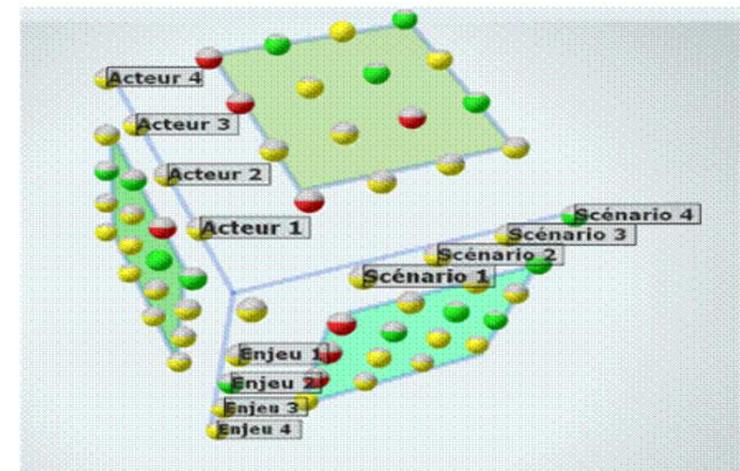
Stakeholder involvement

- Decision-support tool to help decision-making by
 - Sharing opinions on uncertainties associated to the HIAs
 - Choosing common criteria to identify and prioritize stakeholder's needs and interests

<http://aphekom.kertechno.net>

- Case studies in Paris Ile-de-France area and Brussels

Performance issue	sub-categories	Options																			
		Agrofuels				Types of vehicles				Low emission zones											
Equity and social aspects	Vulnerable or deprived sub groups	0	0	0	0	0	0	0	1	0	1	1	0	2	0	2	2	0	1	1	
	Equitable access to measures and services	0	0	1	0	1	0	1	1	2	1	1	0	1	1	1	1	0	0	1	1
	Environmental justice	0	0	0	1	0	1	0	0	1	1	0	0	2	0	1	2	NR	1	1	1
	Distant consequences	1	1	1	1	1	1	1	0	1	0	0	1	1	1	1	0	NR	0	0	0
Economic development	Creation of wealth	1	0	1	1	1	2	1	1	2	0	1	2	0	2	1	2	0	1	1	1
	Job opportunities	1	1	1	1	1	2	1	1	2	0	1	2	1	2	1	2	0	0	1	1
	Economic attractiveness	0	0	0	0	1	0	0	1	1	1	0	0	2	2	2	1	2	1	1	1
Health and quality of life	Impacts on living environments	0	0	1	1	0	0	1	1	0	1	1	2	2	2	1	1	2	2	1	1
	Attractivity of the living environment	0	0	0	1	0	0	1	2	2	0	1	1	2	2	2	1	2	2	1	1
	Individual aspects	0	1	0	0	0	0	1	1	0	0	1	0	1	1	2	2	1	1	2	2
Equilibrium of the environment	Direct impacts	0	1	1	0	0	1	0	1	0	2	1	0	1	2	2	1	1	1	2	2
	Indirect impacts	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1
	Incomplete responsibility	1	1	1	1	1	1	1	1	0	1	1	1	1	1	2	2	2	0	0	1
Institutional aspects	Strategies and political priorities	2	1	1	1	1	1	0	0	0	0	1	1	1	1	1	0	1	1	1	1
	Implementation	NR	2	0	1	1	1	2	0	NR	0	1	1	1	2	2	2	NR	0	1	1





Relevance

- At national and city levels
 - communication on the benefits of reducing air pollution
 - contribution to national and local plans for better air quality
 - dissemination of methods and tools
- At the EU levels and beyond
 - contribution to current revision of EU directive on air quality
 - dissemination of methods and tools



Aphekom outcomes

- Review of literature and guidelines on innovative methods that integrate into HIAs emerging evidence of air-pollution health effects
- Paper on HIA case studies that use traffic exposure and sub-clinical impacts of air pollution and related costs
- Paper on health impacts of air pollution in 25 European cities and related costs
- Paper on review of literature on intervention studies <http://www.springerlink.com/content/8114254516v20565/abstract/>
- Paper on health impacts and monetary benefits of a chosen strategy to reduce air pollution in Europe
- Paper on informing the decision-making process through stakeholder deliberative involvement in AQ management
- Guidelines and tools (including online tool) for performing local HIAs of air pollution in European cities
- Guidelines on monetary cost calculations related to the health impacts of air pollution
- Guidelines for conducting intervention studies, for determining health impacts and for calculating monetary costs of health impacts of a strategy implemented to reduce air pollution in Europe
- Guidelines for better dissemination of scientific findings for use by policy makers and other stakeholders in decision making processes
- Interactive online tool for multiparty discussions in decision making processes