Green Week 2013

Burden of Disease from Air Pollution as part of the Aphekom project

Sylvia Medina
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Road map

Overview

About the Aphekom project

Questions Aphekom addressed

  Public health burden of air pollution in Europe
  Impact of vehicular traffic
  Evaluation of public policies
  Stakeholder involvement

Conclusion
Overview

Despite significant improvements in air quality in Europe since the 1950s and the implementation of successive EC Directives on ambient air, important disparities still remain in exposure to air pollution both within and between European countries.

Aphekom’s interrelated work packages aimed at developing and delivering consistent, evidence-based, actionable information on the health impacts and monetary costs of urban air pollution in 25 European cities. They also devised and delivered shareable tools for analyzing this information.
About Aphekom

• 3-year EU project (2008-2011)

• Coordinated by InVS in France in conjunction with Umea University in Sweden

• 60 scientists

• 25 cities in 12 European countries

• Co-funded by the EC Programme on Community Action in the field of Public Health (Grant Agreement No. 2007105)
Questions Aphekom addressed

• Q1. What are the latest findings on the health impacts and monetary costs of air pollution in European cities?

• Q2. How can HIAs be made more relevant and actionable for developing policies and recommendations on air pollution for urban populations?

• Q3. Do policies designed to reduce air pollution and its health impacts and monetary costs work?

• Q4. How can we improve communication both among and between scientists and stakeholders concerned with the impact of air pollution on health?
Q1. What are the latest findings on the health impacts and monetary costs of air pollution in European cities?

Christophe Declercq, Mathilde Pascal, Magali Corso, InVS, France

Olivier Chanel, CNRS, France

on behalf of the Aphekom WP5 team and of all the Aphekom centers
• **HIAs in 25 cities**
  - Short-term effects of PM10 and ozone on mortality and hospitalisations
  - Long-term effects of PM2.5 on mortality
  - Economic valuation
    - Direct and indirect costs

• **Standardised guidelines and tools**
  - [http://si.easp.es/aphekom](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
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 PM2.5 to 10 µg/m³.

Compliance with WHO AQG (10 µg/m³) would result in:
- nearly 19,000 premature deaths avoided per year (15,000 from cardiovascular causes)
- €31.5 billion saved annually
Assessing the public health impacts of urban air pollution in 25 European cities: Results of the Aphekom project

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HIGHLIGHTS

- Aphekom performed health impact assessments of urban air pollution in Europe.
- Improving air quality would result in significant health and monetary gains.
- PM$_{2.5}$ annual mean to 10 µg/m$^3$ could add more than 6 months of life expectancy at age 30 in half of the cities.
- The associated costs would reach 30 billion Euros annually.

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ABSTRACT

Introduction: The Aphekom project aimed to provide new, clear, and meaningful information on the health effects of air pollution in Europe. Among others, it assessed the health and monetary benefits of reducing short and long-term exposure to particulate matter (PM) and ozone in 25 European cities.

Method: Health impact assessments were performed using routine health and air quality data, and a common methodology. Two scenarios were considered: a decrease of the air pollutant levels by a fixed amount and a decrease to the World Health Organization (WHO) air quality guidelines. Results were economically valued by using a willingness to pay approach for mortality and a cost of illness approach for morbidity.

Results: In the 25 cities, the largest health burden was attributable to the impacts of chronic exposure to PM$_{2.5}$. Complying with the WHO guideline of 10 µg/m$^3$ in annual mean would add up to 22 months of life expectancy at age 30, depending on the city, corresponding to a total of 19,000 deaths delayed. The associated costs were estimated at $24 billion annually, including economic health-quality gain penalties.
Only the tip of the iceberg

• These findings give a robust estimate of the impact of air pollution in each Aphekom city as calculated using a standardised HIA method.

• Yet they may underestimate the total impact of air pollution.

• For this reason Aphekom also explored new avenues, e.g., chronic diseases and exacerbations, contrasts in exposure within cities.

What we studied

![Pyramid of health effects associated with air pollution](source: American Thoracic Society)
Q2. How can HIAs be made more relevant and actionable for developing policies and recommendations on air pollution for urban populations?

Nino Künzli, Laura Perez, Swiss Tropical and Public Health Institute, Basel, and University of Basel, Switzerland

Olivier Chanel, CNRS, France

on behalf of the Aphekom WP4 team and of all the Aphekom centers
Exploratory HIAs in 10 cities:

Percentage of population living near roads travelled by 10,000 or more vehicles per day

And its influence on the development and exacerbation of chronic diseases

• Key findings
Living close to traffic is responsible for:
- More than 15% of all new asthma cases in children
- Similar or larger percentages for coronary heart diseases in adults >65 years
- Added cost of €310 million every year
Chronic burden of near-roadway traffic pollution in 10 European cities (APHEKOM network)

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Abstract

Recent epidemiological research suggests that near road traffic-related pollution may cause chronic disease, as well as exacerbate related pathologies, implying that the entire "chronic disease progression" should be attributed to air pollution, no matter what the proximate cause was. We estimated the burden of childhood asthma, chronic obstructive pulmonary disease, ischaemic heart disease, and stroke in 10 European cities (apart from Athens) in 2001 as a result of this pollution. We used data from air pollution monitoring networks. We used the 

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Abstract

Full Text (PDF)

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Q3. Do policies designed to reduce air pollution and its health impacts work?

Patrick Goodman, Susann Henschel, Dublin Institute of Technology, Ireland

Olivier Chanel, CNRS, France

on behalf of the Aphekom WP6 team and of all the Aphekom centers
Objective

Review of EU air quality legislation on sulphur content in fuels

- Key findings
  - SO2 mean levels decreased by about 66%
  - 2,200 premature deaths avoided annually
  - €192 million saved each year
Air pollution interventions and their impact on public health

Susann Henschel · Richard Atkinson · Ariana Zeka · Alain Le Tertre ·
Antonis Analitis · Klea Katsouyanni · Olivier Chanel · Mathilde Pascal ·
Bertil Forsberg · Sylvia Medina · Patrick G. Goodman

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Abstract

Introduction Numerous epidemiological studies have found a link between air pollution and health. We are reviewing a collection of published intervention studies with particular focus on studies assessing both improvements in air quality and associated health effects.

Methods Interventions, defined as events aimed at reducing air pollution or where reductions occurred as a side effect, e.g. strikes, German reunification, from the 1960s onwards were considered for inclusion. This review is not a complete record of all existing air pollution interventions. In total, 28 studies published in English were selected based on a systematic search of internet databases.

Results Overall air pollution interventions have succeeded at improving air quality. Consistently published evidence suggests that most of these interventions have been associated with health benefits, mainly by the way of reduced cardiovascular and/or respiratory mortality and/or morbidity. The decrease in mortality from the majority of the reviewed interventions has been estimated to exceed the expected predicted figures based on the estimates from time-series studies.

Conclusion There is consistent evidence that decreased air pollution levels following an intervention resulted in health benefits for the assessed population.
Q4. How can we improve communication both among and between stakeholders concerned with the impact of air pollution on health?

Yorghos Remvikos, UVSQ, France

on behalf of the Aphekom WP7 team and of all the Aphekom centers
Facilitating stakeholder involvement

- Aphekom provided a decision-support tool that enables:
  - sharing information and opinions
  - choosing common criteria to identify and prioritise stakeholders’ needs
    http://aphekom.kertechno.net
- Case studies in Paris and Brussels
Aphekom output

• Aphekom local city reports
• Review of literature and guidelines on innovative methods that integrate emerging evidence of air-pollution health effects into HIAs
• 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 strategies to reduce air pollution in Europe
• Guidelines for better disseminating scientific findings to policy makers and other stakeholders for decision making, and an interactive online tool for multiparty discussions in decision-making processes
• Published paper on HIAs that study traffic exposure and sub-clinical impacts of air pollution and related costs
• Published paper on health impacts of air pollution and related costs in 25 European cities
• Published review of literature on intervention studies
• Paper on health impacts and monetary benefits of a given strategy to reduce air pollution in Europe (submitted)
• Paper on economic impacts of air pollution (to be submitted)
• Paper on informing the decision-making process through stakeholder deliberative involvement in AQ management (to be submitted)
Aphekom’s ultimate goal

Deliver new information and tools at the city and European levels on the health and monetary impacts of air pollution to help:

- decision makers set more effective European, national and local policies
- health professionals better advise vulnerable individuals
- and the general public better protect its health
Thank you!

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