ERS Research Seminar

The Impact of Air Pollution on Respiratory Health – a focus on persistent problems and new merging areas

19 – 20 November 2018 – Berlin, Germany

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Dear colleagues,

It is our pleasure to welcome you in Berlin for the European Respiratory Society Research Seminar entitled *"The Impact of Air Pollution on Respiratory Health – a focus on persistent problems and new emerging areas"*.

Over the past decade, the evidence linking air pollution to increased respiratory mortality and morbidity, particularly due to road traffic, has expanded dramatically. Thus, the purpose of this seminar is to review this enriched evidence base, and to address a series of questions that have either remained unanswered or are contentious, with significant differences of opinion within the research community.

This seminar will give the participants the opportunity to:

- Engage in discussion with experts working in the air pollution field from a wide range of disciplines
- Debate the respiratory impacts of air pollution
- Learn from senior academics who are experts on their field

A poster presentation session will be held in order to encourage junior academics to present their work.

These two days are dedicated to sharing knowledge of the latest advances in the field, discuss ideas and forge new collaborations throughout the world.

We hope that you will enjoy the scientific program and networking.

The Research Seminar's organisers,

Prof. Thomas Sandström

Dr. Ian Mudway

TP_12: Use of big data in environmental and occupational epidemiology: the beep project

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Introduction
One of the biggest challenges of modern environmental epidemiology is being able to collect and link, in a complex way, large amounts of geographical, environmental and health data, to obtain comprehensive information otherwise not available from individual sources.

Objectives
The two-year BEEP project (Big Data in Environmental and Occupational Epidemiology) started in June 2017 (http://www.progettobeep.it/index.php/en/). The project relies on BIG DATA methodology, and its general objective is estimating the health effects of air pollution, noise and meteorological parameters on the Italian general population. Such health effects include the risks of:
1. hospitalization and mortality at national level and in the leading Italian metropolitan areas;
2. occupational injuries;
3. commuting accidents;
The project has four specific objectives characterized by different spatial domains: national, regional, metropolitan and sub-urban.

Materials and Methods
Large spatio-temporal database are being linked to each other, and modern statistical models (random forests, splines, Poisson regression) are being implemented. The following data sources are being used:

1. Satellite data with high spatial-temporal resolution;
2. Environmental monitoring data;
3. Land use data;
4. Data on dynamic population distribution;
5. Data on mortality and hospital admissions;
6. Data from cohort studies (Rome and Pisa);
7. Data on work injuries and commuting accidents.

Results
In the first year of the project, estimates of air pollutant concentrations and meteorological parameters have been produced, and their health effects estimated at national and regional level. In particular, the following output were produced:
1. estimates of daily maps of atmospheric particulate concentration (PM_{10}, $PM_{2.5}$), with high spatial resolution (1 km^2), for the years 2006-2015 at national level;
2. estimates of daily maps of air temperature, with the same spatial resolution, for the period 2001-2010;
3. estimates of the effect of air pollutants and temperature on mortality in 5 Italian regions and urgent hospital admissions at national level;
4. estimates of the effect of temperature and PM on work injuries.

Conclusions
The results yielded by the BEEP project, beyond stimulating new scientific developments, will provide useful information for public decision-makers in the field of air quality, planning of urban environments and public health protection.