

# Evidence on health effects of air pollution

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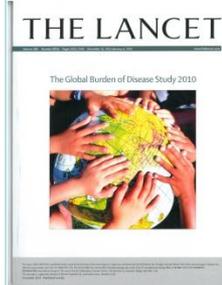
# Presentation outline

- Recent evidence on health effects of air pollution
  - Results from Global Burden of Disease Project
  - IARC Carcinogenicity assessments
  - WHO/Europe REVIHAAP and HRAPIE projects
- Recent TFH activities
  - Workshop on health aspects of wildfire smoke (May 2012)
  - Brochure on health effects of PM and policy implications for EECCA countries
  - Review paper on health aspects of biomass combustion for residential heating

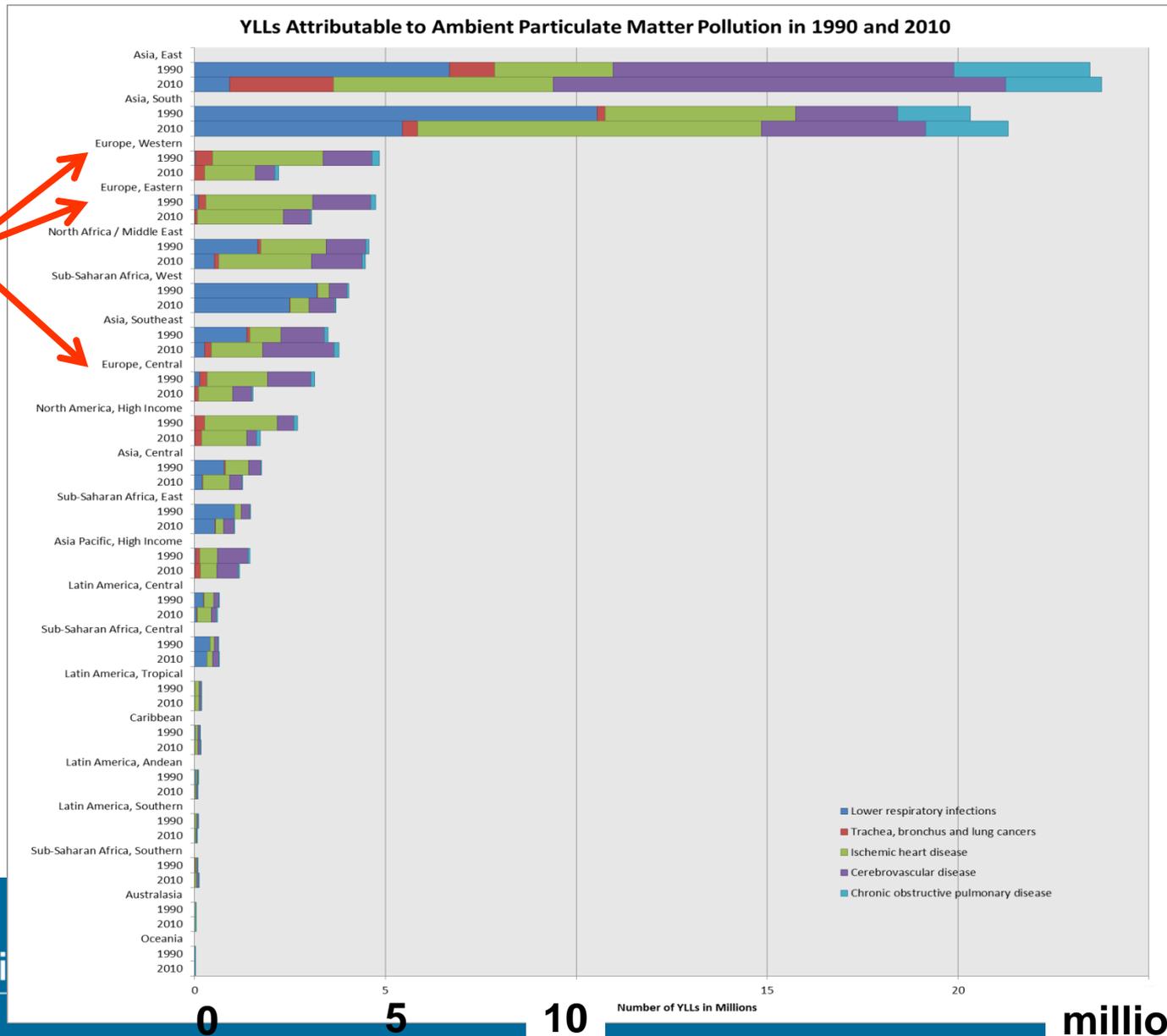
# RECENT EVIDENCE ON HEALTH EFFECTS OF AIR POLLUTION



# Years of life lost due to PM – GBD 2010 project



YLLs Attributable to Ambient Particulate Matter Pollution in 1990 and 2010

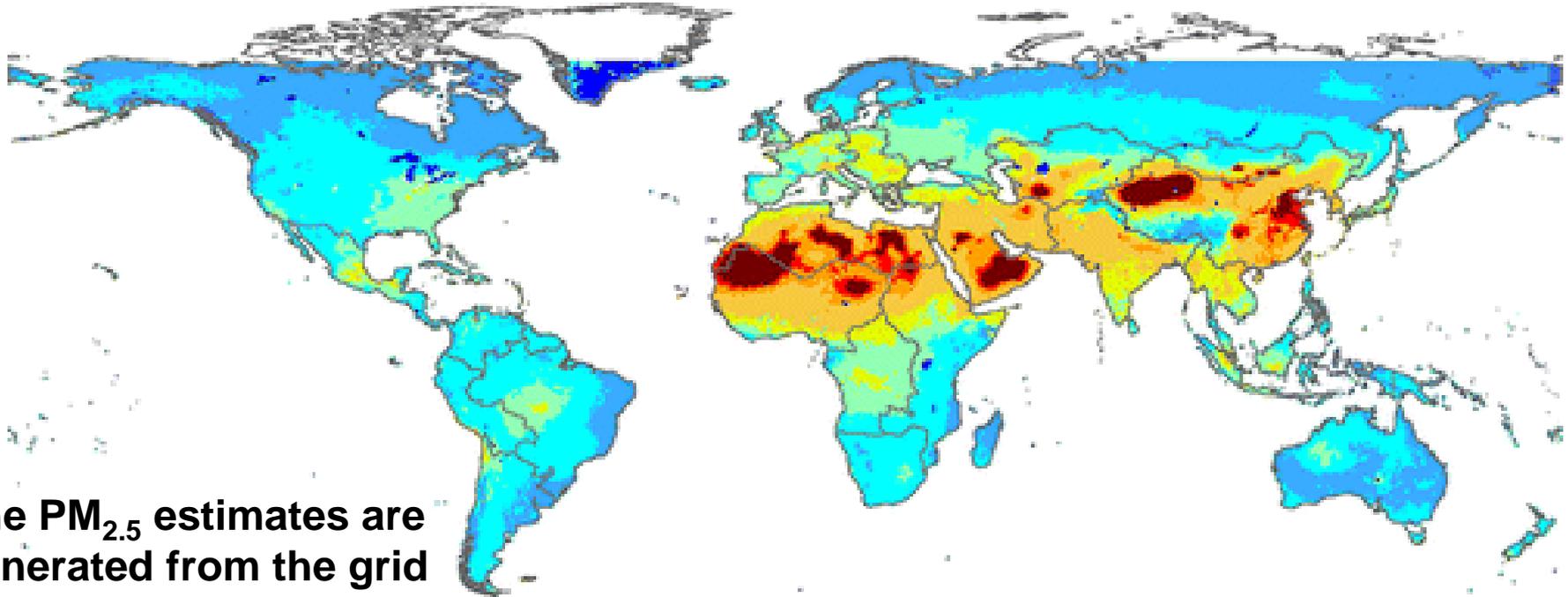


Europe

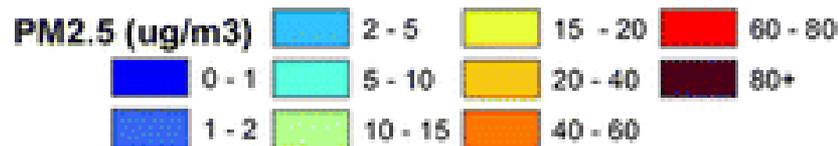


Lim S et al. Lancet 2012

# PM<sub>2.5</sub> annual exposure estimates for 2005 – GBD 2010 Project

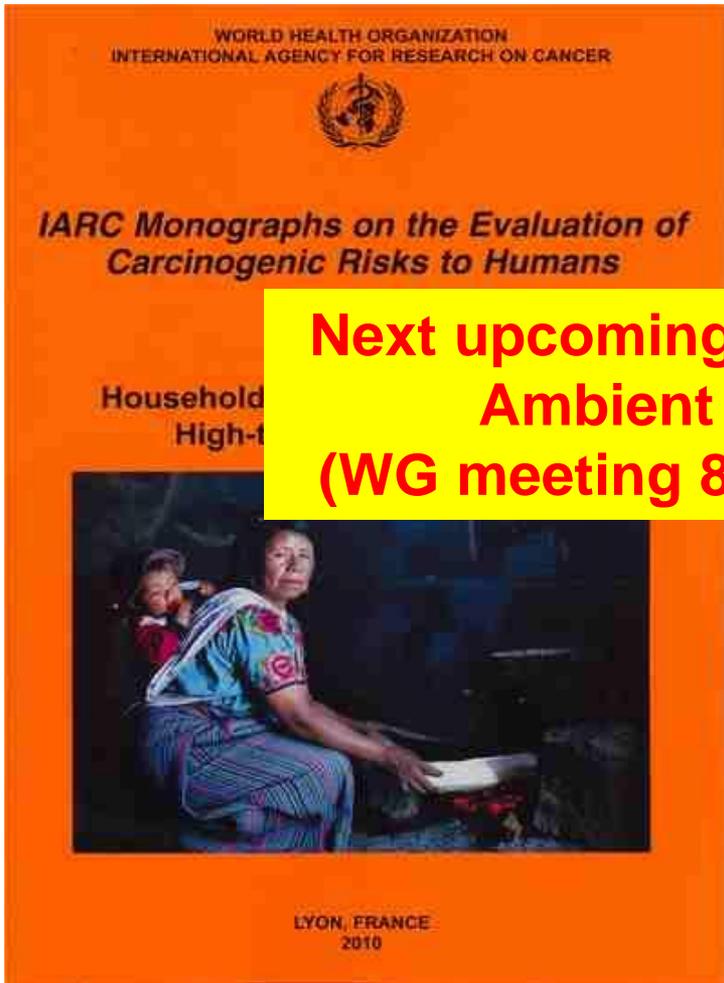


The PM<sub>2.5</sub> estimates are generated from the grid cell average of SAT and TM5 and calibrated with a prediction model incorporating surface measurements



*Brauer et al. EST (2012)*

# IARC Monographs



**Next upcoming IARC monograph  
Ambient air pollution  
(WG meeting 8-15 October 2013)**

International Agency for Research on Cancer



PRESS RELEASE  
N° 213

12 June 2012

## IARC: DIESEL ENGINE EXHAUST CARCINOGENIC

... week-long meeting of international experts, the International Agency for Research on Cancer (IARC), which is part of the World Health Organization (WHO), today announced that diesel engine exhaust is **carcinogenic to humans (Group 1)**, based on sufficient evidence of a causal link between exposure and an increased risk for lung cancer.

## INDOOR COMBUSTION OF COAL FROM HOUSEHOLD COMBUSTION OF COAL

Indoor combustion of coal was considered by a previous IARC Working Group in 2006 ([IARC, 2010a](#)). Since that time, new data have become available, these have been incorporated into the *Monograph*, and taken into consideration in the present evaluation.

### 1. Exposure Data

#### 1.1 Constituents of coal emissions from household use of coal

##### 1.1.1 Types and forms of coal

Coal is a highly variable fuel, which ranges from high heating-value anthracite through

##### 1.1.2 Constituents of coal emissions

When using small and simple combustion devices such as household cooking and heating stoves, coals are difficult to burn without substantial emission of pollutants principally due to the difficulty of completely pre-mixing the fuel and air during burning. Consequently, a substantial fraction of the fuel carbon is converted to products of incomplete combustion. For example

# WHO review of evidence on health aspects of air pollution for guidance of EU policy : REVIHAAP and HRAPIE Projects

## OBJECTIVE:

To provide the European Commission and its stakeholders with scientific evidence- based advice on health aspects of air pollution in support of the comprehensive review of air quality legislation due in 2013.

*\*While some of the questions directly address policies, the recommendations from the projects are based solely on scientific conclusions on health aspects of air pollution, and do not consider other issues which are relevant for policy formulation.*

# Context for REVIHAAP and HRAPIE work

DIRECTIVE 2008/50/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 21 May 2008

on ambient air quality and cleaner air for Europe

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 175 thereof,

Having regard to the proposal from the Commission,

Having regard to the opinion of the European Economic and Social Committee <sup>(1)</sup>,

- (2) In order to protect human health and the environment as a whole, it is particularly important to combat emissions of pollutants at source and to identify and implement the most effective emission reduction measures at local, national and Community level. **Therefore, emissions of harmful air pollutants should be avoided, prevented or reduced and appropriate objectives set for ambient air quality taking into account relevant World Health Organisation standards, guidelines and programmes.**

- Jointly financed WHO and EC
- Coordinated by WHO/Europe
- Provide answers to 26 key questions posed by the EC
- More than 60 international experts involved

**REVIHAAP  
(24 questions)**

**HRAPIE  
(2 questions, building on  
REVIHAAP work)**

Evidence  
review on  
health  
aspects of  
air  
pollution

Oct 2011  
to  
April 2013  
(18  
months)

Identification  
of CRFs for  
cost-benefit  
analysis of  
EU policies

Emerging  
issues on  
risks to  
health from  
air  
pollution  
(survey)

Sept  
2012  
to  
Sept  
2013  
(12  
months)

# 26 Key policy-relevant questions

- PM, ozone, NO<sub>2</sub>, SO<sub>2</sub>, metals (As, Cd, Hg, Pb, Ni), PAHs
  - New findings regarding health effects
  - Concentration-response functions and thresholds
  - Air pollution constituents and sources
  - Integration of evidence and policy implications
    - WHO air quality guidelines
    - EU policies
  - Critical data gaps

# Main conclusions from REVIHAAP

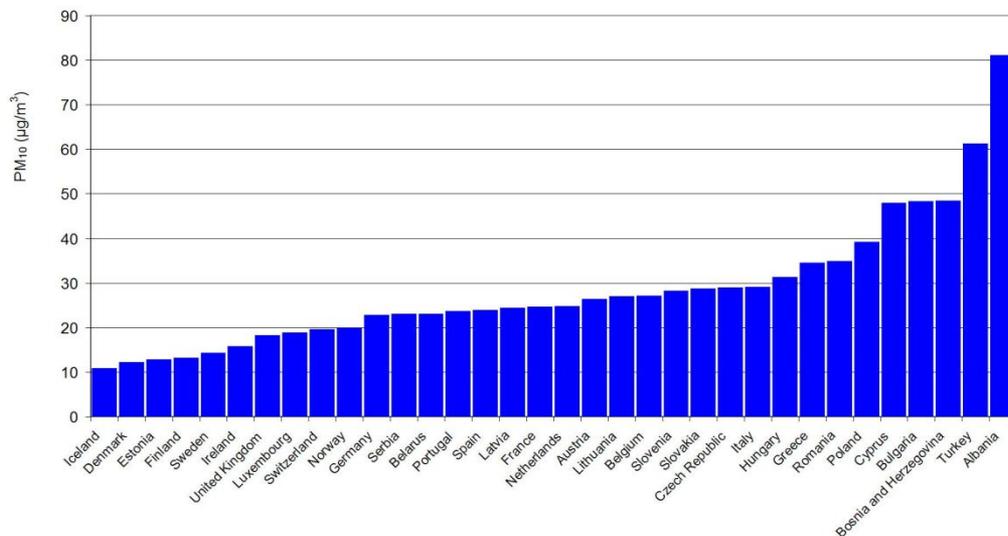
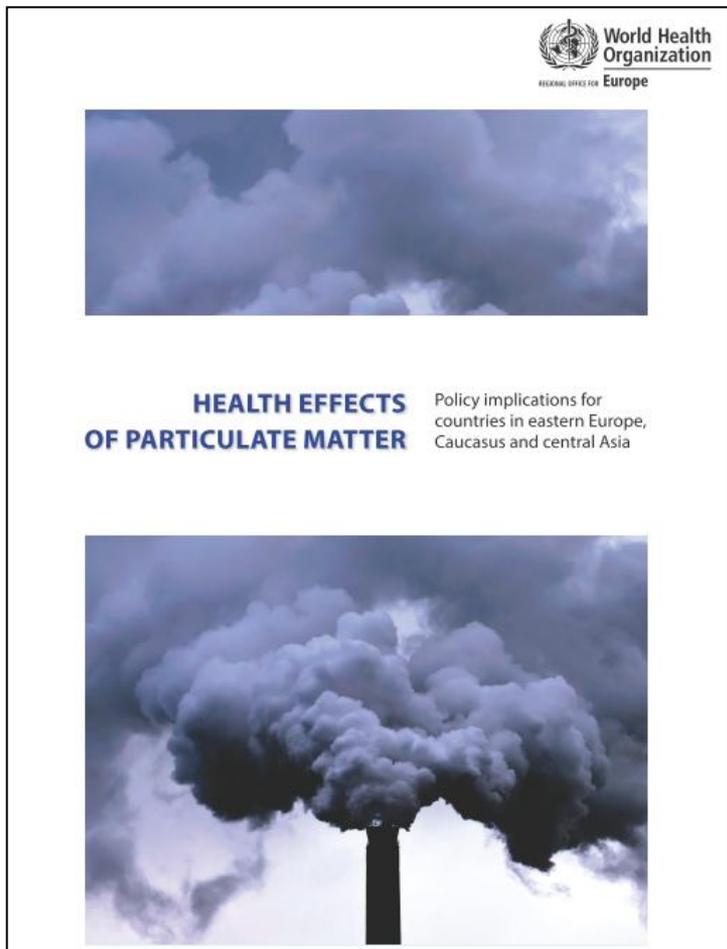
- Considerable amount of new scientific information on health effects of PM, ozone and NO<sub>2</sub>
  - Evidence has *strengthened*
  - Effects observed *at levels commonly present in Europe*
  - Supports the scientific conclusions of the WHO AQG 2005
  - Indicates that the *effects can occur at air pollution concentrations lower* than those serving to establish the 2005 Guidelines
- Provides scientific arguments for the decisive actions to improve air quality and reduce the burden of disease associated with air pollution in Europe
- HRAPIE Project ongoing until September 2013

# RECENT TFH ACTIVITIES

# TFH discussions on health aspects of wildfire smoke

- Workshop held on 21 May 2012, jointly organized with THL (Finland)
- Modelling and forecasting of concentrations for public health response
- Associations between PM from landscape fires and various health parameters (reliever medication use, hospital visits, asthma, increased mortality)
- Mitigation measures (building shell, mechanical ventilation, air conditioning, HEPA filters)
- Need for strengthened interdisciplinary collaboration

# TFH brochure “Health effects of particulate matter - Policy implications for EECCA countries”



- Levels, health effects, burden of disease
  - Evidence on effects of air quality improvements
  - Air quality management and policy
  - *Expected launch: May 2013*
- Available in English and Russian*

# Health aspects of biomass combustion for residential heating



- Context for review
- Emissions from residential wood heaters
  - Contribution to local air pollution and to population exposure
- Health aspects:
  - Mechanisms of action, toxicity and adverse health effects in controlled exposure studies
  - Epidemiological studies
- Abatement measures and interventions
- National and international measures and regulatory aspects
- Data gaps, conclusions and recommendations

# Next TFH meeting 11-12 June 2013, Bonn

- Presentation of TFH brochure on PM
- Discussion of review paper on biomass combustion for residential heating
- Presentation of results from REVIHAAP and HRAPIE and discussion of implications for the current revision of the EU air quality policies
- Methodologies and approaches for quantification of burden of disease due to air pollution
- Monitoring and modeling of air pollution and its health impacts in countries of eastern Europe, the Caucasus and central Asia



**THANK YOU**