NEWSLETTER

WHO COLLABORATING CENTRE FOR AIR QUALITY MANAGEMENT AND AIR POLLUTION CONTROL

at the

FEDERAL ENVIRONMENTAL AGENCY
GERMANY

No. 34 December 2004

CONTENTS

WHO: "CHILDREN'S HEALTH and ENVIRONMENT"

GERMAN ENVIRONMENTAL SURVEY FOR CHILDREN (GerES IV) 2003 – 2006

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Abstract

The German Environmental Survey for Children (GerES IV, see: www.umweltbundesamt.de/survey-e/index.htm) is the environment-oriented module of the "National Health Interview and Examination Survey for Children and Adolescents (www.kiggs.de)" which is performed nationwide in Germany. From 2003 to 2006, a random sub-sample of 1.800 children aged 3 - 14 years is studied with regard to their body burden and health impairments linked to housing conditions and the personal environment and health-relevant behaviour. The basic study programme includes the analysis of blood, urine, tap water and house dust as well as the application of an extensive questionnaire. The data gained from this population sample, which is representative for German children, are the basis for deriving reference values to characterize the background exposure of children of age 3 – 14 years. Trends over time can be detected and the success of environmental policies verified by comparing the data with those of the German Environmental Survey 1990/92 (GerES II), also conducted in close co-operation with the National Health Survey, including children aged 6 to 14 years.

By linking the data from the Environmental and the Health Surveys, health-relevant environmental exposures can be detected and different scientific hypotheses tested. The main subjects that are being dealt with using sub-collectives of GerES IV are 'Volatile organic compounds causing eye and nasopharynx irritation', 'Indoor allergens and allergic diseases of the respiratory system', 'Chromium, nickel, fragrances and contact allergens', and 'Noise, hearing capacity and stress hormones'.

GerES IV is commissioned by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) and the German Federal Ministry of Education and Research (BMBF) and conducted by the German Federal Environmental Agency (UBA), Berlin.

Introduction

The German Environmental Surveys (GerES) conducted since 1985 have provided representative data about the exposure of the adult population and are thus contributing to the environment related health surveillance system envisaged by the German National Environment and Health Action Programme (www.apug.de).

Children must be considered as a risk group for adverse health effects caused by environmental factors. This is due to their specific exposure-relevant behaviour patterns (hand-to-mouth contact, crawling, playing on the floor, playing with soil, and uptake of dust outdoors) and the specific characteristics of their physiology (higher rates of ventilation and resorption). Therefore in many cases, children experience a higher exposure to pollutants than adults. Their health is particularly at risk as a result of their higher relative exposure if body weight is considered. Since the organism of a child is still developing it is thought to be especially sensitive in the different phases of its development (inter alia, neurotoxic substances in the prenatal phase, endocrine substances in puberty).

To date, there are no representative data on contaminant levels in children in Germany aged between 3 and 5 years and in the households they live in. For children aged 6 to 14 years such data have been collected in GerES II (1990/92). However, these data need to be updated.

The study parameters in the present survey of children (GerES IV) comprise substances known or suspected to cause adverse health effects at higher levels: neurotoxins (Pb, Hg); carcinogenic/co-carcinogenic substances (polycyclic aromatic hydrocarbons, benzene, halogenated volatile organic compounds, As, Cd); substances that cause disorders or irritation of the respiratory tract, allergies and asthma (indoor air pollutants, such as excrements of dust mites, pet allergens, fungal spores, volatile organic compounds, formaldehyde and carbonyls); substances that have a possible effect on development with potentially long-term consequences (such as DEHP, PCB). In addition, damage to hearing and stress caused by noise is being studied.

Using standardized interview-based questionnaires, details on behaviour patterns that are relevant to exposure, on the situation in the home and the immediate surroundings of the home, and on the environmental health situation of the children will be recorded. In addition, there will be questionnaires and data sheets for the documentation of field measurements and the samples taken.

GerES IV is being conducted in co-operation with and linked to the National Health Interview and Examination Survey for Children and Adolescents which is conducted by the Robert Koch-Institute (RKI), Berlin. The Ethics Commission and the data protection officers concerned have consented to the project.

Aims of GerES for Children

One of the main aims of GerES is to generate, update, and evaluate representative data to facilitate an environmental health related observation and reporting of information at the national level. These representative data are also useful:

- as a basis for establishing reference values with regard to the levels of noise and environmental pollutants to which children and teenagers are exposed;
- to indicate trends over time and regional differences in contaminant levels;
- to identify and quantify contamination routes;
- to evaluate influences on children's health;
- to design and evaluate preventive, interventive and control strategies within the framework of policy measures related to health and environment.

An overview of the investigation programme

The investigation programme comprises the following components:

<u>Human biomonitoring</u>

- *Whole blood*
  During the blood sampling conducted for the Health Survey, an additional collection tube (Blaukopf vacutainer containing the anticoagulant sodium heparin) will be filled, as follows:

  - for children aged between 3 and 6 years with 2 ml (for lead, cadmium, mercury);
  - for children aged 7 to 14 years with 6 ml (for lead, cadmium, mercury and organochlorine compounds such as PCBs, DDE, HCB, HCH);
  - for all children five fungi-specific IgE in addition to a panel test in 200 µl serum.

- *Sample of morning urine (total volume of urine)*
  If diapers are no longer worn at night samples are taken in 750 ml ”toilet inserts” (for girls possibly until the age of 6 years, in consultation with their parents). 1 l wide-neck polyethylene flasks are used for children from the age of 5 years. The pollutants that will be analysed include:
  - for all children: creatinine, arsenic, cadmium, mercury, nicotine, cotinine;
  - for children from the age of 8: cortisol, adrenalin and noradrenalin;
  - in 600 randomly selected samples from children of all ages: pentachlorophenol (PCP) and other chlorophenols, metabolites of pyrethroids, organic esters of phosphoric acid and PAHs.

Noise, hearing and stress in children aged 8 to 14 years

- *Hearing test* (Screening/audiometry as set out in DIN ISO 8253, point 9).
- *Measurement of traffic noise* outside the window of a child's/teenager's bedroom (short-term mean assessment level using an integrated class 3 sound level gauge as prescribed by IEC 804/DIN EN 60604).
- *Morning urine* (see above) for cortisol, adrenalin, and noradrenalin.

Monitoring of the domestic environment in children aged 3 to 14 years

- *House dust* (vacuum cleaner bag as found in the home at the time of the visit). Analysis of 600 randomly selected sieved samples (63 µm) for biocides such as methoxychlorine, chlorpyrifos, propoxur, polychlorinated sulfonamide-diphenyl ether and DDT, HCH, HCB, PCBs and PCP.
- *Drinking water samples* from tap water used for drinking and cooking (½ l and 1 l polyethylene flasks) are tested for elements that can get into the water from pipe material: lead, cadmium, copper and nickel.

Monitoring of the domestic environment of sub-collectives

- *Chemical pollutants in indoor air* (using passive OVM-3500 (3M) collectors, Perkin Elmer type diffusion collectors (PE) and UMEX-100 type collectors for volatile organic compounds such as benzene, and carbonyl compounds such as formaldehyde). Size of sample N = 600 of all ages.

  - Measurement of indoor air: collection period of 7 days.
  - Questionnaires.

- *Biological pollutants in indoor air* using active measurements of air and dust to detect mould spores, house dust mites and pet allergens. Size of sample N = 600 of all ages.

  - Indoor air: mould spores, particles.
  - Floor dust: mould spores and Fel d 1.
  - Mattress dust: Der p 1 and Der f 1.
  - Serum samples: specific IgE (see above).
  - Interview-based questionnaire (parents).

Interviews and data sheets

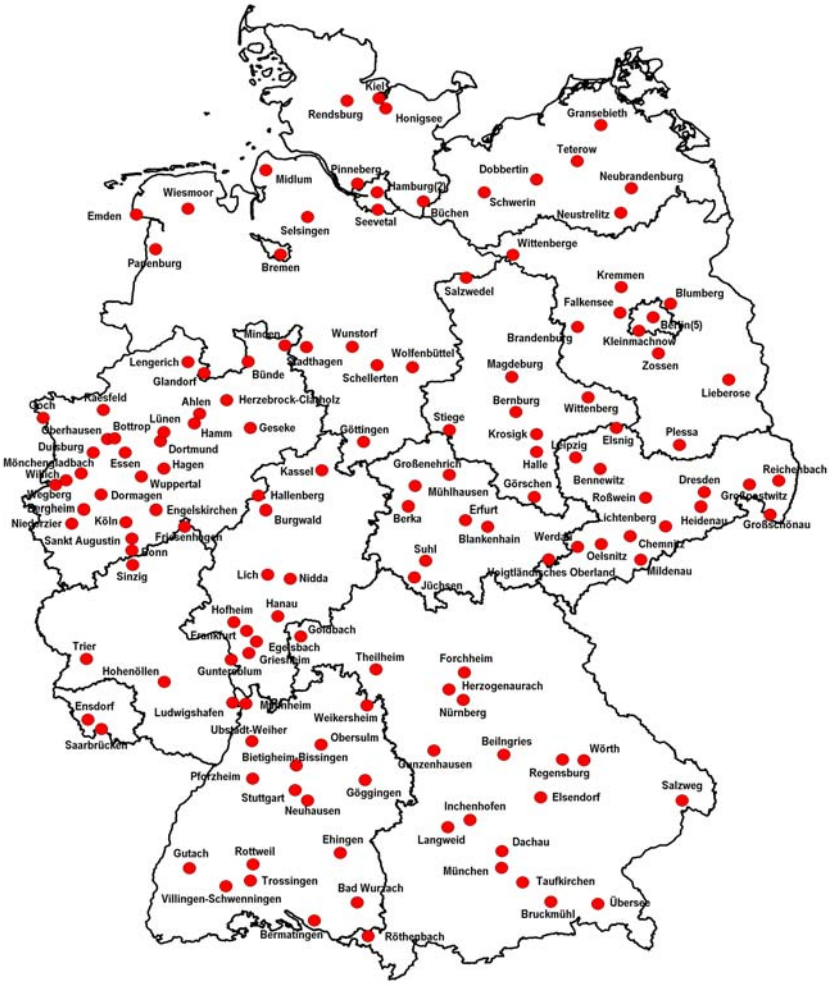
- Standardized basic interview (parents).
- Standardized basic interview (children aged 8 to 10 years).
- Standardized basic interview (children aged 11 to 14 years).
- Standardized data sheets for documenting the immediate environment around the home.
- Standardized data sheets for documenting the samples (morning urine, drinking water, dust from vacuum cleaner bags, measurement of traffic noise, hearing test).

Study population (sub-sample of the Health Survey)

GerES IV will be conducted on randomly selected children from the cross-sectional sample of the Health Survey for Children and Adolescents carried out by the RKI (planned: n=18.000).

The target population of the Health Survey are children and adolescents in Germany aged zero to 17 years registered in registration offices. Excluded are children living in institutions such as hospitals or children's homes. The GerES IV sample is drawn from this population in a multistage random sampling procedure (due to limited funding, it is not possible to study the entire sample of the Health Survey). The sub-sample comprises at least 1.800 net cases aged 3 to 14 years. In each of 150 sampling locations (Map 1) 12 children (one child of each one-year age group) will be invited to take part.

Map 1: 150 sampling locations in Germany



If the child and the parents agree, he or she will be included in the survey. If the answer is negative another child will be chosen. Due to limited funding, some parts of the survey programme will be carried out on only 600 children. In these cases, one child from each of the four age groups, 3 to 5 years, 6 to 8 years, 9 to 11 years, 12 to 14 years will be randomly selected.

Differences in exposure between different groups of children are to be confirmed at a 0.1 % level of significance. Based on the knowledge gained in previous GerESs and the pilot study, it can be estimated that for a sample size of 1.800 children differences between geometric means larger than 8 % (pollutants with a low variance) and larger than 20 % (pollutants with a high variance) will be significant. These values increase to 14 % and 38 %, respectively, for the sub-sample of N=600. Although in this case the sample size is considerably smaller it will be possible to confirm differences between groups at the 0.1 % level. If a 1 % level of significance is assumed the lowest difference between the geometric mean values of the groups will be 5 % and 16 % for the sample size of 1.800 children and 11 % and 29 % for the sample size of 600 children.

Field work

The field work, which is conducted in cooperation with the Health Survey for Children and Adolescents, started in 2003 and will be finished in 2006. At each of the 150 sample points one of three field teams will operate for two weeks. The quality of the field work is being monitored by a consultant.

Chemical analysis and quality control

All chemical analyses are carried out by external laboratories. Contractors are required to meet given standards in terms of precision and accuracy. The laboratories of the German Federal Environmental Agency, which did the analytical work in previous GerESs, are part of the quality control system.

Evaluation of data

Primary steps before analysing the data are: checking and revising data, matching different data files, weighting (data have to be weighted according to the population characteristics like age, gender, community size and region).

The actual evaluation comprises several parts: The distribution of the substances in different media are depicted for groups stratified by sampling characteristics (age, sex, size of town, former West-/East-Germany) and important substance-specific variables. To describe the distribution the following statistical parameters will be given: sample size, percentage of values below the limit of quantification, 10th, 50th, 90th, 95th, 98th percentile, maximum value, arithmetic mean, geometric mean and the 95 % confidence interval for the geometric or arithmetic mean. The 95 % confidence intervals of the 95th percentiles are calculated for the different subgroups. These values are the basis for derivation of reference values for children from the age of 3 to 14 years in Germany.

Exposure routes, environmental conditions and individual patterns of behaviour will be evaluated by systematic hypothesis testing for selected relevant substances only.

Using data of both surveys (the Environmental and the Health Survey) it will be possible to evaluate relations between environmental conditions and the health of the children. The following issues will be examined using multivariate methods:

- Allergies of the respiratory system (asthma, hay fever) due to the occurrence of mould spores, house dust mites or pet allergens.
- Allergies due to nickel and chromium (from, e.g., costume, jewellery, piercing) or scents (e.g., terpenes in indoor air).
- Impact of noise on hearing loss, stress and sleep disturbances.
- Irritation of the eyes and the respiratory system due to formaldehyde, aldehydes, or VOC in indoor air.

Information of study participants

Participants are notified of their results, along with an evaluation and, if applicable, recommendations on how to minimise any strikingly high levels of exposure. For additional support and possible follow up examinations the participants will be advised to turn to an outpatient clinic for environmental medicine.

Reporting and use of results

The exposure situation of children (3 to 14 years) in Germany will be described in a status report. This report will include an overview of human biomonitoring data, stratified by exposure relevant characteristics, a comparison with threshold values and data from international studies and an evaluation of exposure trends over time. This report will provide nationwide data for the evaluation of other exposure studies. It is planned to make the data available as a public use file, by the end of 2007 after completion of the field work.

The basis for the evaluation of the data on human biomonitoring are the reference and human-biomonitoring values established by the Human Biomonitoring Commission of the German Federal Environmental Agency (http://www.umweltbundesamt.de/uba-info-daten-e/daten-e/monitor/index.htm).

Chemical pollutants in indoor air are evaluated on the basis of the guideline values of the Commission on Indoor Air Hygiene of the German Federal Environmental Agency. The German Drinking Water Ordinance is used for the evaluation of the drinking water samples.

Measurement of chemical pollutants in house dust is first of all a screening tool to get an insight into the general exposure situation. An interpretation of the data in relation to health effects is not possible. Study participants will only receive their results in the case of very high values.

The results of the screening-audiometry are evaluated on the basis of the accident prevention regulation relating to noise issued by the Employers' Liability Insurance Association and the recommendations of the „Soziakusis“ committee of the Federal Environmental Agency. They will be handed over to the participants or their parents directly after the measurements have been completed.

International input

In the framework of the Environment and Health Action Plan (2004 - 2010) the European Commission plans to launch a feasibility assessment of human biomonitoring in Europe. The German Environmental Survey for Children (GerES IV) may provide input for harmonization of such a monitoring programme.

Acknowledgement

The financial support of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety and the Federal Ministry of Education and Research is gratefully acknowledged.

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HEALTH IMPACT ASSESSMENT OF AIR POLLUTION IN 26 EUROPEAN CITIES AND COMMUNICATION STRATEGY - LATEST FINDINGS OF THE APHEIS PROGRAMME -

Sylvia Medina and Elena Boldo on behalf of the APHEIS group, and Michael Saklad

Release of the Apheis-3 phase report

Apheis (Air Pollution and Health: A European Information System) recently released the latest findings in its ongoing assessment of the impact of particulate air pollution on health in 26 cities in 12 European countries. The new evidence provided by the third phase of the Apheis programme confirmed the finding of Apheis-2 that air pollution continues to pose a significant threat to public health in urban environments in Europe.

Another key part of Apheis-3 investigated how to reach individuals who make and influence policy on air pollution and health in Europe, and how to deliver Apheis' findings to them effectively and efficiently. This work produced a model that shows who the key players are in the policy-making process; how information flows between them; what types of information scientific and policy users active in the process each require; and what are the best forms in which to deliver this content to them to ensure maximum understanding and usage of the information Apheis produces.

This twin focus on both providing the latest scientific findings and developing a strategy for communicating them aims to fulfill Apheis' mission of meeting the information needs of individuals and organizations concerned with the impact of air pollution on health in Europe, and in particular the needs of individuals who influence and set policy in this area on the European, national, regional and local levels.

Created in 1999, the Apheis programme is co-funded by the European Commission's Directorate General of Health and Consumer Protection and by Apheis' partners. The Apheis programme is coordinated by Institut de Veille Sanitaire (InVS) in Saint-Maurice, France and by Agencia Municipal de Salut Pública de Barcelona (AMSPB) in Spain.

During the first phase (Apheis-1, 1999-2000), this programme defined the best indicators for epidemiological surveillance of the effects of air pollution on public health in Europe, and developed its own guidelines for data collection and analysis. On the other hand, this programme identified those institutions best able to implement the epidemiological surveillance system in the participating centres in 12 countries (see WHO Newsletter No. 26, December 2000, pp 4-8).

In the Apheis-2 phase (2000–2001), among other tasks, and based on its epidemiological surveillance system, Apheis conducted a first HIA (health impact assessment) of PM_{10} and black smoke applying WHO guidelines for environmental health risk assessment (see WHO Newsletter No. 30, December 2002, pp 2-5).

This contribution presents a summary of the main findings of the Apheis-3 phase (2002–2003).

Health impact assessment findings

To broaden and deepen the previous assessment in Apheis-2 of the impact of air pollution on health, the Apheis-3 phase included new sources of data on air pollution and health in its analysis. In particular, in this second HIA Apheis-3 added data for $PM_{2.5}$ (particles less than 2.5 micrometers in size) to the existing black smoke and PM_{10} measurements, and Apheis-3 investigated cause-specific mortality (cardiovascular, lung-cancer and respiratory deaths) as well as total mortality. In addition to calculating attributable number of deaths at a given point in time, Apheis-3 also calculated the potential gain in life expectancy in order to provide a dynamic picture of the effects of air pollution on health over subjects' lifetimes.

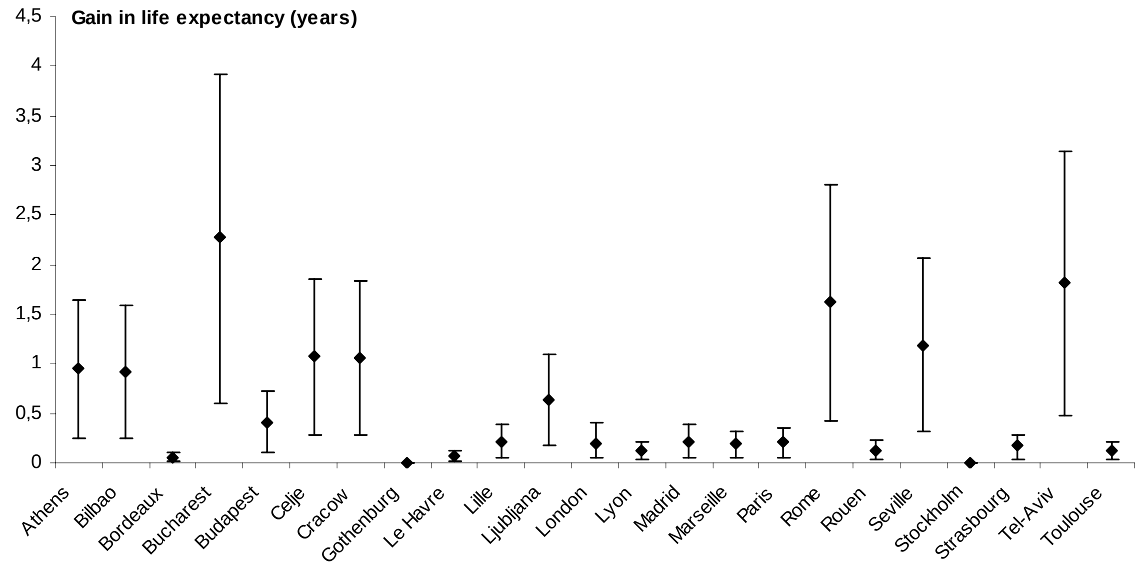
The total population covered in this HIA included nearly 39 million inhabitants of Western and Eastern Europe. The study showed that the estimated magnitude of the impact of urban air pollution on health, in terms of attributable number of deaths and potential gain in life expectancy, is large. If policies can achieve reductions in human exposure, the potential health benefits may therefore be substantial.

Health impact of $PM_{2.5}$

Apheis-3 revealed that reducing converted $PM_{2.5}$ levels to 15 µg/m^3 produces a benefit in terms of both total and cause-specific mortality that is over 30 % greater than for a reduction to 20 µg/m^3 (for most of the cities, $PM_{2.5}$ measurements were not available, and $PM_{2.5}$ levels had to be calculated from PM_{10} measurements using a local or, by default, European conversion factor of 0.7). In specific, the Apheis-3 HIA estimated that 11.375 "premature" deaths, including 8.053 cardiopulmonary deaths and 1.296 lung-cancer deaths, could be prevented annually if long-term exposure to the annual mean of converted $PM_{2.5}$ levels were reduced to 20 µg/m^3 in each city, and that 16.926 premature deaths, including 11.612 cardiopulmonary deaths and 1.901 lung-cancer deaths, could be prevented annually if long-term exposure to converted $PM_{2.5}$ were reduced to 15 µg/m^3.

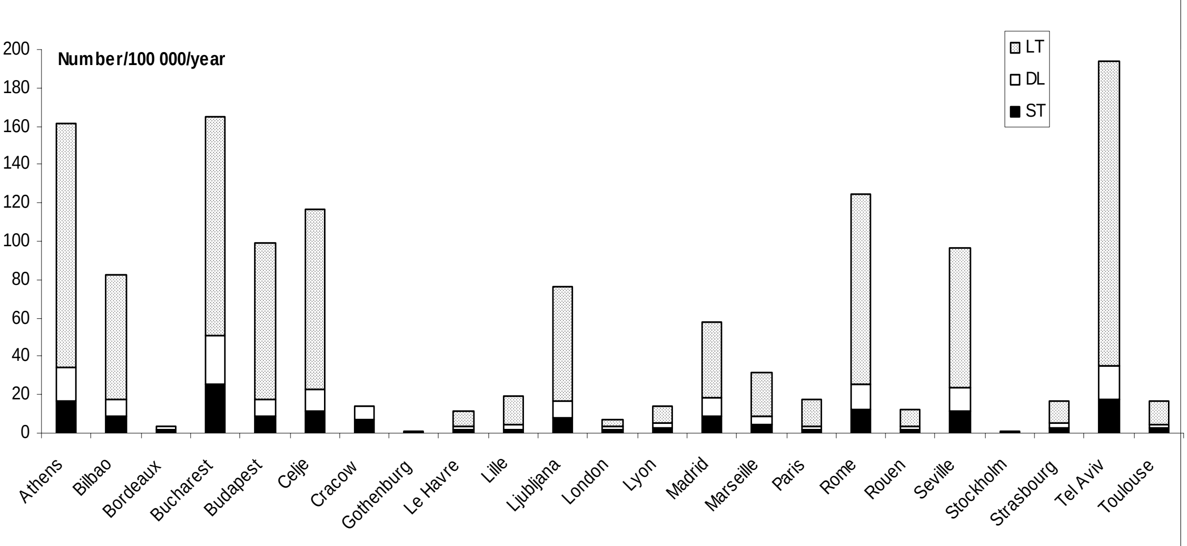
In terms of life expectancy, if all other things were equal and the annual mean of converted $PM_{2.5}$ did not exceed 15 µg/m^3, the potential gain in life expectancy of a 30-year-old person would average between 2 and 13 months, due to the reduction in total mortality. The expected gain in life expectancy would benefit all the Apheis cities, except Swedish cities which already present $PM_{2.5}$ levels below 15 µg/m^3 (Figure 1). These findings on the benefits of reducing $PM_{2.5}$ to 20 and 15 µg/m^3 are particularly relevant at a time when discussions are taking place to set limit values for $PM_{2.5}$ as part of the CAFE legislation process at the European Commission.

Figure 1. Expected gain in life expectancy at 30 years of age if the annual mean of converted $PM_{2.5}$ levels did not exceed 15 µg/m^3



In specific, for public-health reasons our HIA recommends 15 µg/m^3 as the limit value for $PM_{2.5}$. However, because a significant health impact can be expected even at 15 µg/m^3, we advise reducing air pollution to levels even lower than 15 µg/m^3.

Figure 2. PM_{10}: Short term (ST), cumulative short-term (DL), long term (LT) health impact on all causes mortality (ICD9 <800). Reductions to 20 µg/m^3. Number of deaths per 100 000 inhabitants.



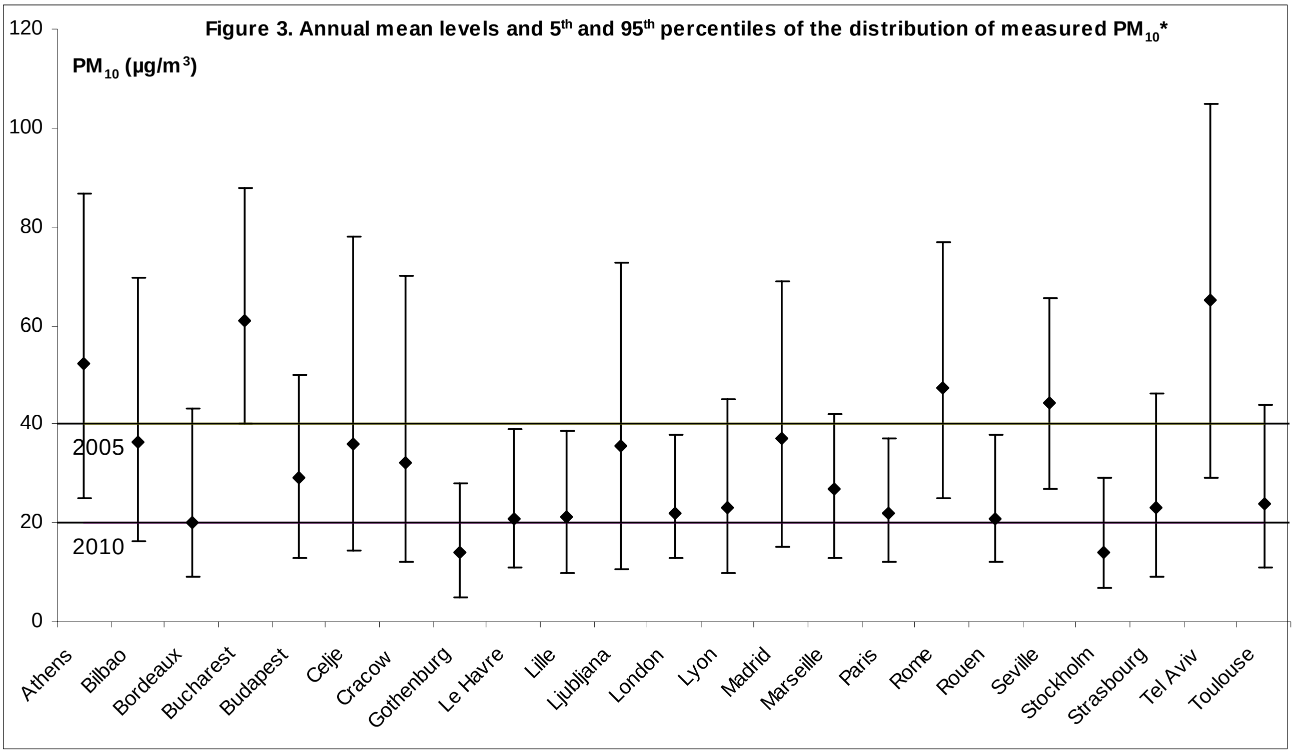
Health impact of PM_{10}

Concerning the impact of exposure to PM_{10} in the very short, short and long terms, in the 23 Apheis cities that measured PM_{10}, totalling almost 36 million inhabitants, if all other things were equal and exposure to PM_{10} outdoor concentrations were reduced to 20 µg/m^3 in each city, 2.580 premature deaths, including 1.741 cardiovascular and 429 respiratory deaths, could be prevented annually if the impact is only estimated over a very short term of 2 days (for HIAs of very short and short-term exposures, we used PM_{10} and BS levels measured directly at monitoring stations). The short-term impact, cumulated over 40 days, would be more than twice as great, totalling 5.240 premature deaths prevented annually, including 3.458 cardiovascular and 1.348 respiratory deaths. And the long-term impact over several years would be even higher, totalling 21.828 premature deaths prevented annually (for HIAs of long-term exposure, we had to correct the automatic PM_{10} measurements used by most of the cities by a specific local or, by default, European correction factor of 1.3 in order to compensate for losses of volatile particulate matter). Most of the Apheis cities would benefit if PM_{10} levels were reduced to 20 µg/m^3 (Figure 2).

Concerning the ability of Apheis cities across Europe to meet future standards designed to reduce the impact of air pollution on health, Apheis-3 determined that, while most of the 26 cities studied met the annual mean cut-off of 40 µg/m^3 set as the limit value for PM_{10} to be reached by all member states of the European Union by 2005, 21 cities still exceeded the 2010 indicative limit value of 20 µg/m^3. Nonetheless, nine cities nearly met the latter value (Figure 3).

Health impact of black smoke

Black smoke is often considered a good proxy for traffic-related air pollution. In the 16 Apheis cities that measured BS, totalling over 24 million inhabitants, if all other things were equal and BS levels were reduced to a 24-hour value of 20 µg/m^3, 1.296 total premature deaths, including 405 cardiovascular deaths and 109 respiratory deaths, could be prevented annually.



* Horizontal lines indicate the European Commission PM_{10} annual mean cut-offs of 40 µg/m^3 and 20 µg/m^3 to be reached respectively in 2005 and 2010.

Model for communicating Apheis' findings better to policy makers

As a reminder, the Apheis programme seeks to meet the information needs of individuals and organizations concerned with the impact of air pollution on health in Europe, and in particular the needs of those individuals who influence and set policy in this area on the European, national, regional and local levels.

Like many providers of scientific information, however, Apheis doubted the ability of scientific reports alone to meet the needs of this key audience.

Because the Apheis programme wanted to go beyond just ensuring that its findings are scientifically valid and up-to-date, Apheis-3 sought to develop an actionable strategy to communicate Apheis' findings to this key audience based on learning its needs directly from its members.

Our communication research identified each of the many types of key players in the long, complex chain that leads from the scientists to whom we distribute our reports directly, and who use them, to the policy makers whose actions ultimately have the greatest effect on public health, but who only receive our reports indirectly and use them rarely, if at all.

Our research showed that:

- Policy advisors and makers, who comprise both scientific and policy users, each have different problems to solve, different ways of processing information, different levels of scientific knowledge and different cultures, meaning each group has different information needs.
- These policy advisors and makers are generally unlikely to use the scientific reports we develop as is, contrary to scientists.

Based on this evidence, we concluded that Apheis needs to act proactively to:

- Apply the above learnings to the way it shapes and delivers its information and messages to both scientific and policy users.

- Develop a range of communication tools that goes beyond our comprehensive scientific reports to include summary reports, brochures, presentations and questions and answers whose focus, content and form are tailored to the separate information needs of scientific and policy users.
- Ensure that the information needed by policy advisors and makers actually reaches them.

Taking these steps will greatly enhance the way Apheis communicates with the key audiences that set policy on air pollution in Europe, and will thus help Apheis contribute better to improving public health.

About the Apheis network of environment and health professionals

To fulfill its mission, the Apheis programme has assembled a network of environment and health professionals in 26 European cities and created an epidemiological surveillance system that generates information on an ongoing basis and produces reports at periodic intervals.

The 26 cities, located in 12 European countries, include Athens, Barcelona, Bilbao, Bordeaux, Bucharest, Budapest, Celje, Cracow, Dublin, Gothenburg, Le Havre, Lille, Ljubljana, London, Lyon, Madrid, Marseille, Paris, Rome, Rouen, Seville, Stockholm, Strasbourg, Tel Aviv, Toulouse and Valencia.

The Apheis programme fosters ongoing cross-fertilization between multiple disciplines and regions to create skilled, local teams; enrich know-how and the quality of its findings; and explore important HIA methodological issues. Using this approach, Apheis has established a good basis for comparing methods and findings between cities. This unique combination provides both local officials with standardized local data, analysis and knowledge for local decision making, and European officials with standardized local data analyzed to provide a global view for European policy making.

Future steps

Apheis will implement its communication strategy when funds are allocated to developing the different communications tools recommended for each of its target audiences.

While continuing the development of HIAs of outdoor air pollution, Apheis will join the ENHIS project (Environment and Health Information System) of the WHO-European Centre for Environmental Health (ECEH) co-sponsored by the European Commission and ENHIS's partners.

In this new project, Apheis will coordinate health impact assessment issues, and it will test and adapt, in new cities and for new environmental risk factors, the methodology developed by Apheis. The ultimate goal of this new phase of Apheis' work is to provide a global picture of the environmental burden of disease in Europe.

For further results and information on the APHEIS group, visit: www.apheis.net .

Acknowledgements

Elena Boldo was supported by a grant from the Regional Ministry of Education, Madrid Regional Government, Spain (Orden 7580/2003).

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NOTES AND NEWS

Accreditation of Air Quality Laboratory according to European Legislation

The Air Quality Laboratory in the Executive Environmental Agency (EEA) is the National Reference Laboratory of Bulgaria. It is engaged in the control of the following measurements:

- Automatic measurements of PM_{10}, SO_2, NO/NO_2, O_3, CO, hydrocarbons (methane and non-methane), H_2S, NH_3 and meteorological parameters - wind speed, wind direction, relative humidity and atmospheric pressure, measured by a mobile laboratory for air pollution control.
- Automatic measurements of SO_2, NO_x, CO, CO_2, O_2 and exhaust gases parameters, measured by a mobile laboratory for emission control.
- Determination of PM_{10} and spectro-photometric determinations of SO_2, NO_2, H_2S and C_6H_5OH.

In addition, the laboratory supervises the operation of four stationary stations for air quality control in Sofia, which are working “in real time”.
The Air quality laboratory in EEA was accredited as a testing laboratory during 1999 and 2002, regarding EN 45001. At the moment, the laboratory is accredited according to EN ISO/IEC 17025:2001 “General requirements for the competence of testing and calibration laboratories”.

The main elements of quality assessment and quality control procedures are:

- *Harmonization of measurement methods and ISO/CEN standardization*

Requirements made by the European Union are set into Bulgarian legislation very well. A number of Directives - 96/62/EC (ambient air quality assessment and management) and 1999/30/EC (limit values for sulphur dioxide, nitrogen dioxide, nitrogen monoxide, PM and lead in ambient air) – are converted completely into Bulgarian legislation.

- *Method validation*

The laboratory validates non-standardized methods, laboratory-designed/developed methods, standardized methods used outside their intended range and amplifications of standardized methods to confirm that the methods are suitable for the intended use. Various events that take place from time to time, e.g. development of new laboratory methods, change of methods, implementation of standardized methods, slightly modified methods or new instruments, will call for a method validation.

- *Type approval of instruments*

For every single automatic analyser for air pollution or emission control the following documents are available: Certificates for electromagnetic compliance according to Directive 89/336/EC and EN 61326, TÜV and UBA reports of suitability tests for all components measured by automatic analysers for air pollution or emission control, and in addition, TÜV certificates for the implementation of a Quality Management System in accordance with ISO 9001. This Quality Management System governs research, development, manufacture and service of air quality and emission monitoring instruments and systems. The UV-VIS spectrophotometer used in the laboratory has a certificate for type approval issued by the National Centre of Meteorology.

- *Reference materials*

Good quality management depends on the use of high quality reference material with known concentrations. Certified reference materials require certificates or documents issued by a certifying body and provide the essential traceability in measurements. Certified reference materials are used to demonstrate the accuracy of results, to calibrate equipment, and to validate methods. The calibration technique, used for example in case determination of NO_x in ambient air is

Table 1: Harmonization of air pollution monitoring methods, manual (in bold letters) and automated, in Bulgaria .

Pollutant	Method used in Bulgaria	ISO method and reference method according Directive N
Sulfur dioxide	**p-rosaniline method** uv-fluorescence	**p-rosaniline method - ISO 6767** uv-fluorescence - ISO/DIS 10498 Directive 99/30/EC CEN: prEN 14212
Nitrogen oxides	**spectrophotometric method with Saltzman reagent** chemiluminiscence	**spectrophotometric method with Saltzman reagent - ISO 6768** chemiluminiscence - ISO 7996 Directive 99/30/EC CEN: prEN 14211
Ozone	uv-absorption	uv-absorption - ISO 13964 Directive 2002/3/EC CEN/TC 264 N448
Carbon monoxide	infrared spectroscopy	infrared spectroscopy - ISO 4224 Directive 2000/69/EC CEN/TC 264 N149
PM_{10}	**gravimetry** β-absorption	**Gravimetry - EN 12341** **Directive 99/30/EC** β-absorption - ISO 10473
Hydrogen sulphide	**spectrophotometric method** uv-fluorescence	**spectrophotometric method-** **ISO/DIS 6769**
Ammonia	**spectrophotometric method** chemiluminiscence	
Phenol	**spectrophotometric method**	
Hydrocarbons (methane and non-methane)	**gas chromatography and hydrogen flame ionization detector** flame ionization detector	flame ionization detector - ISO14965
Lead	**AAS method**	**AAS method - ISO 9855** **Directive 99/30/EC**

the permeation method. The transfer standards are calibration gas mixtures of NO_x (which includes traceability to the national standards).

- *Intercomparison exercises*

The laboratory takes a part in the process of harmonizing air quality measurements by international quality assurance and quality control exercises. For example,: Intercomparison exercises for air quality measurements (CO, SO_2, NO/NO_2, O_3), 7 to 11 October 2002, Ispra, Italy.

- *Uncertainty of measurements*

Uncertainty of measurements is defined according to the guideline on the expression of uncertainty in quantitative testing EA-4 / 16 EA).

For a measurement procedure an uncertainty budget is estimated based on the standard deviations for each contribution and the measure of the combined uncertainty calculated by taking the square root of the sum of the squared estimates of the standard deviations of all uncertainty contributions. Then the overall uncertainty is obtained by multiplying the combined uncertainty with the factor k = 2. In the case of normal distribution the factor k = 2 means, that the limits of the overall uncertainty have a confidence level of 95 %.

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Determination and Evaluation of Ambient Air Quality
Manual of Ambient Air Monitoring in Germany

This Manual of Ambient Air Quality Control in Germany gives an overview of the methods employed for the measurement of ambient air pollution in the Federal Republic. It describes the relevant regulations contained in the Federal Emission Control Act (BImSchG), in the Technical Instructions on Air Quality Control (TA Luft), and in the Fourth General Administrative Instruction (4. Allgemeine Verwaltungsvorschrift) in consideration of the Directives of the European Community.

The tasks of ambient air quality measurement are outlined, and discontinuous as well as continuous measurement methods are described. The Guidelines on measuring techniques issued by the Commission on Air Pollution Prevention in VDI and DIN, and a list of suitability-tested measuring devices are included as Appendices. Furthermore, a summary is given of the results of suitability tests.

Special attention is paid to the quality assurance of ambient air quality measurements, concerning both measurement methods and testing institutes. The sections on measurement planning contain the most important terms, measurement regulations and measurement plans as well as measurements in the vicinity of emission sources and measurement networks in Germany.

Details are given on technical means and national regulations relevant for the evaluation of ambient air quality measurement data and the evaluation. Furthermore, the measurement reports published by the national institutions of the Federal Administration and in particular those of the individual Federal States are being described.

In comparison with the second edition, this manual includes new legal provisions (Amendments to the Federal Emission Control Act, 22nd and 33rd Ordinance and Fourth General Administrative Instructions for the BImSchG, Framework Directive and Daughter Directives issued by the European Union), additional measuring methods and Guidelines of the Commission on Air Pollution Prevention in VDI and DIN, international standards (ISO and CEN) which have been adopted as DIN standards as well as further descriptions of suitability-tested automated continuous measuring devices. The chapter on “Quality Assurance” and the list of references have been updated. The index shall make it easier to find one’s way through the text.

Abstract taken from: Determination and Evaluation of Ambient Air Quality - Manual of Ambient Air Monitoring in Germany, UBA-Texte 08/04, ISSN 0722-186X.
This manual can be obtained at :
http://www.umweltdaten.de/medien/kat-e-b.pdf

Common Information to European Air – CiteAir

CiteAir is a project co-funded by the European Union’s INTEREG IIIC programme. The project started in March 2004 and will last for 36 months. Cities through Europe experience environmental problems relating to poor air quality. In most urban areas, traffic is the dominant source of these adverse environmental impacts. This can contribute to human health effects, therefore Local and Regional Authorities must take action to improve the quality of life of its citizens. Currently, administrators set their objectives based on EU air quality regulations. This has led to a variety of solutions to reporting and managing air quality, which in many cases cannot be readily compared across different authorities. What is now required are efficient and integrated solutions for environmental and traffic management. The CiteAir project will tackle these problems by focusing on the development of common approaches and sustainable solutions that can be applied throughout Europe (for further information see: http://citeair.reg.org).

MEETINGS AND CONFERENCES

Improving Air Quality in the enlarged EU - Workshop on Plans and Programmes of Air Quality and National Emission Ceilings Directives 1 and 2 September 2004 in Brussels, Belgium

The workshop was jointly organized by the European Commission DG Environment Clean Air and Transport Unit (DG ENV C1), the European Federation of Clean Air and Environmental Protection Associations (EFCA) and the European Environment Agency (EEA), as part of the Clean Air for Europe (CAFE) programme. It attracted more than 90 participants from 15 EU and EFTA countries. The presentations and participation provided a good geographical coverage of countries, and in particular there was a good balance of old and new Member States.

‘Plans and Programmes’ and ‘National Programmes

The Air Quality Directives require assessing and managing ambient air quality throughout the territory of Member States. The Air Quality Directives package includes the Framework Directive 96/62/EC, which lays down the general obligations and the list of pollutants to be regulated, and four Daughter Directives, covering specific pollutants: 1999/30/EC (SO_2, NO_x, PM, Pb), 2000/69/EC (benzene, CO), 2002/3/EC (ozone and its precursors); the fourth directive is to be adopted in 2004 (heavy metals, PAH).

The directives define limit and target values, their date of entry into force, monitoring requirements and reporting obligations. For specific pollutants limit or target values are established, including their date of entry into force. For the period prior to that date, the directives set a margin of tolerance for most of the limit values; exceedance of the limit value plus the margin of tolerance triggers the obligation (Art. 8.3 96/62/EC) to prepare a ‘*plan or programme’* with the purpose of attaining the limit value within the specific time limit. The plan or programme must be communicated to the public and reported to the Commission. Because Member States may have to prepare a large number of plans and programmes, the Commission has provided a template (Commission Decision 2004/224/EC) to facilitate reporting to the Commission. Because the margin of tolerance decreases every year, the list of plans and programmes that have to be drawn up and reported changes annually. End of 2003 was the deadline for the first submission. Since a number of Member States have not submitted in time, formal procedures have been launched by the Commission. Monitoring data suggest that for the end of 2004 more plans or programmes are due than in 2003.

The National Emission Ceilings (NEC) Directive (The National Emission Ceilings Directive 2001/81/EC sets requirements for the reduction of emissions of specific pollutants (SO_2, No_x, VOC, NH_3) causing acidification, eutrophication and exposure to the ground level ozone.) requires each Member State to prepare and report a ‘*national programme*’, which details its programme for reducing emissions to below the national emissions ceiling and gives the emission projections for 2010, the year for which the ceilings have been set. The first report to the Commission was required by the end of 2003 and an update must be sent in 2006.

The two types of planning obligations are different, since one is oriented towards the compliance with the ambient air quality concentration limit values in the area of exceedance, while the other deals strictly with total national emissions and a limited number of pollutants (no PM included, for example). In addition, the plans under AQ Directives are usually prepared by the local authorities, while NEC national programmes are prepared on the country level. However, they are in practice related, as they share common objectives, require abatement of air pollution from often the same types of sources and require interaction with related policies, such as climate change and transport policy. In addition, due to the transboundary character of air pollution, local exceedances must often be tackled on a regional or even wider scale to be effective.

Purpose of the workshop

Plans and programmes and national programmes are key obligations under the European Air Quality and National Emission Ceilings (NEC) directives. Their implementation at local and national level is a challenging task that has increased in scope with the accession of the ten new Member States and their specific environmental situation. It is important to assess the progress at the European level, to identify further policy needs, and to monitor and facilitate the implementation of the directives.

The workshop was intended to provide a forum to exchange initial experiences on fulfilling these obligations and to communicate related EEA and Commission activities to the Member States. Its objective was to disseminate good practices and to facilitate integration of the new Member States. Of particular interest to the Commission was the interplay in the implementation of Ambient Air Quality directives and the NEC directive, this being one of CAFE's issues in its 'better regulation' strategy. The Workshop also took outcomes of the recent IUAPPA 13th World Clean Air Congress in London into account.

Workshop sessions

After the introductory session, three major sessions followed, which are briefly outlined below. For more information, the reader should consult the webpage (see the end of article) for the full programme and the presentations, as well as the upcoming Workshop report.

Session on Plan and Programmes under Air Quality Directives

The presentations showed how the legislation was implemented. Extensive interaction between authorities was necessary and stakeholders were usually involved. The speakers discussed the main measures that were being taken. There were major attainment problems for PM_{10} and NO_2, predominantly due to the high background concentrations (around 50% or more of the limit value), which is beyond the direct control of the local authorities. This was an important reason for involving local, regional and national authorities in the development of the plans and programmes. Measures usually considered other targets besides solving the problem of local exceedance, notably urban background air quality or total emissions ("your emissions are contributing to someone else's background") and other policy issues such as congestion or noise. Some countries had addressed this issue by bringing NEC emission reduction requirements through a burden sharing agreement down to the regional level, and the Commission is considering in this context the possibility of an emission ceiling for the particulate matter. It was suggested to the Commission to think also about further possibilities to reduce population exposure at large.

The Commission expressed concern that the presentations gave hardly any quantitative evaluation of the effectiveness of the measures or indicators for monitoring the implementation of measures.

National Programmes under NECD

EEA presented its findings of the evaluation of NEC national programmes. There were considerable discrepancies in the quality of the progress reports that Member States had sent on their emissions and the progress towards the ceilings and in many cases the assumptions made for prognoses, uncertainties and synergies between measures have not been addressed.

The presentations showed that most Member States had problems in attaining one or more ceilings. For NO_x and NH_3 there were more attainment problems than for the other two substances; especially for VOC there were important uncertainties which impaired the reliability of the attainability prognoses. Improvements of emission inventories often lead to higher total emission, rendering the gap between emissions and the ceiling larger than foreseen and thus complicating decisions on the required measures.

A range of measure types for emission reductions were shown: permits, voluntary agreements with sectors, economic instruments, product standards, information campaigns, with IPPC permitting mentioned several times as one of the most effective tools. The national programmes had often been set up to serve also the Climate Change targets to increase synergy and to identify conflicting measures (e.g. investing in emission trading for Climate Change does not reduce the national emission; promoting dieselization could reduce CO_2 emission, but increases PM pollution).

During the session several suggestions for improving the system were given, including guidance for the preparation of a national programme and a more detailed format for reporting. The concluding session included an interesting comparison between USA and European system, and information was given by the Commission on the NEC review, scheduled in 2005. A concluding plenary discussion was held at the end.

The Workshop report will soon be put on the CAFE webpage: http://europa.eu.int/comm/environment/air/cafe/general/workshop_on_plans_programmes.htm, on which you can already find the complete Workshop programme with the abstracts and the Power Point presentations.

The readers are also invited to browse through the other CAFE pages: http://europa.eu.int/comm/environment/air/cafe/index.htm for an update of the current state of the CAFE programme as well as the meetings to come in the countdown to the delivery of the Thematic Strategy on Air Pollution in July 2005.

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WHO/EEA/JRC Workshop ‚Review of Methods for Monitoring of PM_{10} and $PM_{2.5}$' 11 and 12 October 2004 in Berlin, Germany

The WHO European Centre for Environment and Health, Bonn Office (WHO/ECEH Air Quality and Health programme) organised this workshop in collaboration with the European Environment Agency, the Joint Research Centre in Ispra. Around 80 environment and health experts from 36 WHO/EURO Member States, from the European Commission (DG ENV.), EC-JRC, EEA and WHO/ECEH participated in the workshop which was held at the Federal Environmental Agency in Berlin and hosted by its WHO Collaborating Centre for Air Quality Management and Air Pollution Control.

Within two days various $PM_{10}/PM_{2.5}$ monitoring methods, their comparability and quality were reviewed. The first session concentrated on the methodology of $PM_{2.5}$ monitoring which has recently been reviewed and a European Standard describing a reference method to determine $PM_{2.5}$ in ambient air is currently elaborated by the European Committee for Standardisation (CEN). Based on the experiences of $PM_{2.5}$ field intercomparisons, which were performed as part of the CEN procedure, the features of the proposed reference methods was presented and discussed. Additionally, first experiences and results of PM_{10} field intercomparisons in Germany (conducted by the air quality networks of the German Länder) and at the EU level have been introduced. The second session dealt with the experiences of twenty-one WHO/EURO Member States in development and operation of PM monitoring networks towards population exposure assessment. Further more, the technical specification of the equipment, network design and operational procedures (including QA/QC) were discussed, and it was stressed that the necessary development of PM monitoring in the newly independent states should profit from the experiences in other parts of Europe. The third session highlighted the compilation, exchange and use of PM data within international organizations, authorities and projects.

The workshop conclusion and recommendations will help the Member States to define the most practical approaches for establishment of $PM_{2.5}$ monitoring and increase of the effectiveness of PM_{10} monitoring in the cities. The focus will be on the validity of the information provided by the monitoring networks for population exposure and health impact assessment as well as impacts of the implemented or planned pollution abatement activities.
A workshop document will be prepared by WHO/ECEH, Bonn Office and published (http://www.euro.who.int/eprise/main/who/progs/aiq/home) in 2004.

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Final AIRNET Conference: Air Pollution and Health – Connecting Science, Policy and Practice 21-23 October 2004 in Prague, Czech Republic

From 21-23 October 2004, some 130 delegates from 24 countries, representing researchers, policy makers and practitioners working in air pollution and health issues across Europe, met in Prague for AIRNET's final conference. The aim of the conference was to consolidate and comment on work completed over the past three years since AIRNET began. Major themes such as air pollution and health in Central and Eastern Europe, the role of research in policy, WHO and AIRNET reports and scientific research highlights were addressed through plenary sessions and a number of interactive activities to encourage active participation between scientists and policy makers which has been an important objective of the AIRNET project.

The conference host, Dr Radim Sram of the Institute for Experimental Medicine in Prague, opened the conference with a presentation to highlight the pollution situation – past and present - in the Czech Republic and the Black Triangle area. The Black Triangle area, where Poland, Germany and the Czech Republic come together, was one of Europe's most heavily industrialized regions and as a consequence one of the most heavily polluted areas on the continent. Given that the conference was located in Eastern Europe and in light of the new countries joining the EU membership, air pollution and health issues in this region of Europe were an important focus for the conference. A plenary session was dedicated to air pollution and health issues in Central and Eastern Europe from the perspectives of local and national policy makers, academic science, non-governmental organizations and national institutes of public health.

In order to achieve detailed discussions between the conference participants breakout sessions with 'roundtable' discussions formed a major part of the conference programme. On the first day participants could choose to attend two out of twelve different breakout discussions focusing on the role of research in the development of air pollution and health policy. In particular each breakout session focused on issues and research projects which have been central to the AIRNET experience. Sessions attracting the most participants were the ones discussing the findings of the EU-funded research such as the APHEA project (a European wide epidemiology project focusing on the short-term effects of particulate matter on mortality and hospital admissions) and the RAIAP and HEPMEAP projects (both investigating the health effects of ambient particulate matter). A session discussing issues for exposure assessment also attracted keen interest from conference participants.

However, other sessions attended by fewer participants also provided fruitful discussions. As an example the session on Oil and Refining Industries was attended by an EU policy maker, epidemiologists, toxicologists and industry representatives. Discussions on the relationships between scientists from industry and academia focused on collaborative research projects to examine the health effects of new products. All roundtable discussions were recorded as ‘mind maps’ and displayed during the conference to give participants an impression of the issues raised during sessions they were unable to attend.

During the second conference day the participants could experience activities used during the so-called national AIR-NETwork days that had been organized in the Netherlands, Sweden and Hungary prior to the conference and which have been designed to facilitate interactions and discussions between the various stakeholders. Ongoing or recently completed research projects and initiatives within the field of air pollution and health were presented through posters and participants had the possibility to contribute to ‘silent wall discussions’ by adding comments and reactions to statements available on the walls of the conference rooms. Several participants brought air pollution and health reading material such as reports, booklets and brochures to be displayed on the ‘literature table’.
Statements on issues from the five AIRNET reports (exposure, toxicology, epidemiology, health impact assessment and science-policy interface) and three WHO reports (health effects of air pollution on children, health effects of transport-related air pollution, WHO systematic review of health aspects of air pollution) were discussed during ‘roundtable sessions’.

At the end of this very interactive day, the outcomes of these discussions were discussed in plenary together with general questions and comments about AIRNET. In order to possibly increase the impact of the integrated AIRNET report (which will be available in Spring 2005) delegates from North America recommended that AIRNET should consider their conclusions in comparison with results and reviews from non-European organizations such as the Health Effects Institute and Health Canada. A discussion on “life after AIRNET” was unavoidable. Some participants expressed that it would be wrong to end AIRNET now it is on the “highway”, whilst others expressed that there was networking before AIRNET and naturally there would be networking in the future as well. As one of the initiatives starting after AIRNET, Regina Hitzenberger from Austria presented the “COST action 633”. This project, which will be focusing on exploring European differences in properties and health impact of particulate matter, was set up to improve the basis for the setting of new standards and will do so by bringing together experts from different disciplines.

A plenary session on the last day of the conference used the traditional format for most conferences: plenary session of scientific highlights. Sylvia Medina presented work of the National Institute of Public Health Surveillance on the contribution of photochemical pollution during the 2003 heat wave in France. Tony Fletcher of the London School of Hygiene and Tropical Medicine presented results from the PATY (Pollution And The Young) study. Mike Jerrett of University of Southern California gave two presentations on the mortality related to small-scale spatial variations in pollution in the USA and Canada. Frank Kelly, of King’s College London, brought toxicological aspects of air pollution research to the meeting in a very clear presentation on measurement of in vitro toxicity of particles in the framework of population studies. Finally, Per Nafstad of the Norwegian Institute of Public Health gave a presentation on the air pollution and mortality in a Norwegian cohort.

The conference ended with plenary feedback from regional breakout sessions. The aim of the regional sessions was to give participants the opportunity to discuss air pollution and health issues, research and abatement priorities specific to the Northern, Southern, Central and Eastern, and Western regions of Europe. A further aim of the regional discussions was to give participants the opportunity to instigate methods to continue networking in the post-AIRNET era. Whilst some commented that regional discussions were somewhat restricted by the fact that EU policy applies to the entire European region, there were some specific issues highlighted by each region. It was recognized by the Southern region that participant numbers for this region were the lowest compared to other regional areas. Therefore they stressed the need for the numbers actively participating to increase. Air pollution from wood burning and tyre and road dust were issues specific to the Northern region. In the Western region a strong statement was made that traffic and fossil fuel use is the fundamental issue that needs to be dealt with successfully. In addition long-term goals for air pollution abatement (2050) together with more imaginative approaches to abate air pollution would be needed. Furthermore the rapporteur from the Eastern region mentioned that their region can offer unique opportunities to study the impact of changes in air pollution levels on human health due to substantial improvements, growth in traffic and shift of industry.

More detailed information and feedback from the conference, including posters, presentations and mind maps from the roundtable discussions, will be available shortly on the AIRNET website http://airnet.iras.uu.nl .

As AIRNET, in its current form is coming to an end, the AIRNET management team wish to use this opportunity to thank all those who have contributed to AIRNET over the past three years.

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Selected Internet Links on Air Pollution and Health Actions

Air4EU
http://www.air4eu.nl/

PAMCHAR (Chemical and biological characterization of ambient air coarse, fine, and ultra fine particles for human health risk assessment in Europe)
http://www.pamchar.org

The Network of Major European Cities
http://www.eurocities.org/

AIRGENE
http://www.gsf.de/EPI/en/pdf/airgene.pdf

CiteAir - Common Information to European Air
http://citeair.rec.org/

EU Life Project KAPA
http://www.feinstaubfrei.at

European Biomarker Study HELIOS
http://airnet.iras.uu.nl/resource/posters/london/22AirnetPoster_alfred_bernard_HELIOS.pdf

PUBLICATIONS

WHO

Health Aspects of Air Pollution – Results from the WHO Project "Systematic Review of Health Aspects of Air Pollution in Europe"

WHO Publications 2004, 24 pages, to order a copy, please contact: publicationrequest@euro.who.int .

This report summarizes the most recent information on the health effects of air pollution. It is based on the results of a comprehensive review of scientific evidence organized by the WHO in support of air pollution policy development in Europe, and in particular the European Commission's Clean Air for Europe (CAFÉ) Programme.

Inheriting the World: The Atlas of Children's Health and the Environment

B. Gordon, R. Mackay, E. Rehfuess (Eds.), WHO Publications 2004, 66 pages, ISBN 92 4 159156 0, to order a copy, please contact: bookorders@who.int .

More than three million children die every year due to unhealthy environments. This atlas tackles issues as diverse as the devastating and largely unknown impact of indoor air pollution, the unfashionable yet huge tragedy of sanitation, and complex emerging issues like climate change.
Full-colour maps and graphics clearly demonstrate the threats that children face everywhere, and underscore the impact of poverty on children's health. While this crisis cannot be ignored and demands urgent action, success stories, such as the Montreal Protocol, show a way forward for the world to make sure that our children will inherit a safer planet and a brighter future.

Environmental Health Indicators for Europe - A Pilot Indicator-Based Report

WHO Publications 2004, 52 pages, to order a copy, please contact: publicationrequest@euro.who.int .

Meta-analysis of time-series studies and panel studies of Particulate Matter (PM) and Ozone (O_3) – Report of a WHO task group

WHO Publications 2004, 74 pages, to order a copy, please contact: publicationrequest@euro.who.int .

Health Aspects of Air Pollution – answers to follow-up questions from CAFÉ

WHO Publications 2004, 72 pages, to order a copy, please contact: publicationrequest@euro.who.int .
This report summarizes the WHO Working Group Meeting in Bonn, Germany, 15-16 January 2004.

Extreme Weather and Climate Events and Public Health Responses

WHO Publications 2004, 48 pages, to order a copy, please contact: publicationrequest@euro.who.int .
Report on a WHO Meeting, Bratislava, Slovakia, 9-10 February 2004.

OTHERS

Air Quality in Cities

N. Moussiopoulos, Aristotle University, Thessaloniki, Greece (ed.). Springer 2003, Hardcover, 298 pages, ISBN 3 540 00842 X, € 96,25.

Understanding urban air pollution is a prerequisite to finding effective solutions to air quality problems and for a sustainable development in the urban environment. In this book the current state of the art in urban air pollution research is presented. A major focus is on suitable air pollution modelling concepts, covering also street canyon geometries. Such models may be applied to establish source-receptor relationships in support of urban air quality management. Procedures for evaluating the performance of air pollution models are proposed, and results from field experiments and laboratory studies are shown to provide better insight into the characteristics of air pollution at the urban and local scales. The contents of this book are of a high policy relevance, given their direct connection to the formulation of improved tools for urban air quality assessments.

World Atlas of Atmospheric Pollution

Edited by IUAPPA. Published by Arnolds, 2004, ISBN 0 340 80950 7, 180 pages, approx. $ 150.

Pollution of our atmosphere affects every aspect of our environment, at every scale and on all timescales from seconds to decades. This atlas is the first to provide a detailed global overview of these critical issues and will illustrate the distribution of pollution from local to global spatial scales; the historical and future trends of the major pollutants and the impacts on the environment.

COMING EVENTS

2005

February 2005

AAAR: Particulate Matter Supersites Program and Related Studies
7-11 February, Atlanta, Goergia, USA.
Conference by the American Association for Aerosol Research. For more information, see:
www.aaar.org/05Supersites/ConfInfo.htm .

March 2005

Fifth Int. Conference on Urban Air Quality
29-31 March, Valencia, Spain.
Jointly with **Workshop on Air Quality Assessment** (28 March) and **Workshop on Atmospheric Transport at the Urban/Local Scales** (1 April).
For more Information, see: www.urbanairquality.org .

April 2005

Urban Transport 2005 – XIth International Conference on Urban Transport and the Environment in the 21st century
12-14 April, Algarve, Portugal. For more information, see: www.wessex.ac.uk/conferences/2005/ut05 .

May 2005

Air Pollution 2005 – 13th International Conference on Modelling, Monitoring and Management of Air Pollution
16-18 May, Cordoba, Spain.
For more information, see:
www.wessex.ac.uk/conferences/2005/air2005/2.html .

June 2005

Acid Rain 2005 – 10th International Conference on Acid Deposition
12-17 June, Prague, Czech Republic.
For more information, see: www.chmi.cz/indexe.html .

September 2005

Indoor Air 2005 – 10th International Conference on Indoor Air Quality and Climate
4-9 September, Beijing, China. For more information, see: www.indoorair2005.org.cn/ .

17th Int. Congress on Biometeorology 2005
5-9 September, Garmisch-Partenkirchen, Germany.
For more information, see: www.icb2005.de .

ISEE 2005 – 17th Conference of the International Society for Environmental Epidemiology
13-17 September, Johannesburg, South Africa.
Theme: Sustaining World Health Through Environmental Epidemiology: Setting a New Global Research Agenda. For more information, see: www.isee2005.co.za .

Environmental Health Risk 2005 – Third International Conference on the Impact of Environmental Factors on Health
14-16 September, Bologna, Italy.
For more information, see:
www.wessex.ac.uk/conferences/2005/ehr05 .

October 2005

First International Conference on Environmental Exposure & Health 2005
5-7 October, Atlanta, USA. For more information, see: www.wessex.ac.uk/conferences/2005/eeh2005/1.html

2006

June 2006

Healthy Buildings 2006
4-8 June, Lissabon, Portugal.
For more information, see: www.hb2006.org .

Ninth Environmental Health Congress of the Int. Federation of Environmental Health (IFEH)
17-21 June, Dublin, Ireland. For more information, see: www.ifeh.org/ifehcongresses.html .

September 2006

ISEE 2006 - 18th Conference of the International Society for Environmental Epidemiology
2-6 September, Paris, France. Theme: Science, Population, Diversity, Caution and Precaution. For more information, see: www.paris2006.afsse.fr

EDITORS' NOTE

We appreciate submissions to NOTES AND NEWS regarding programmes and projects within the field. Notes (100-500 words) should be sent directly to the WHO Collaborating Centre for Air Quality Management and Air Pollution Control.

The NEWSLETTER is published twice a year, circulated in 1700 issues, and distributed to readers in more than 50 countries. The NEWSLETTER does not constitute formal publication; it should not be reviewed, abstracted or quoted without prior permission. Authors alone are responsible for their articles.

Cover cartoon by Prof Michael Wagner, Berlin

Published by

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http://www.umweltbundesamt.de/whocc/titel/titel21.htm