NEWSLETTER

WHO COLLABORATING CENTRE FOR AIR QUALITY MANAGEMENT AND AIR POLLUTION CONTROL

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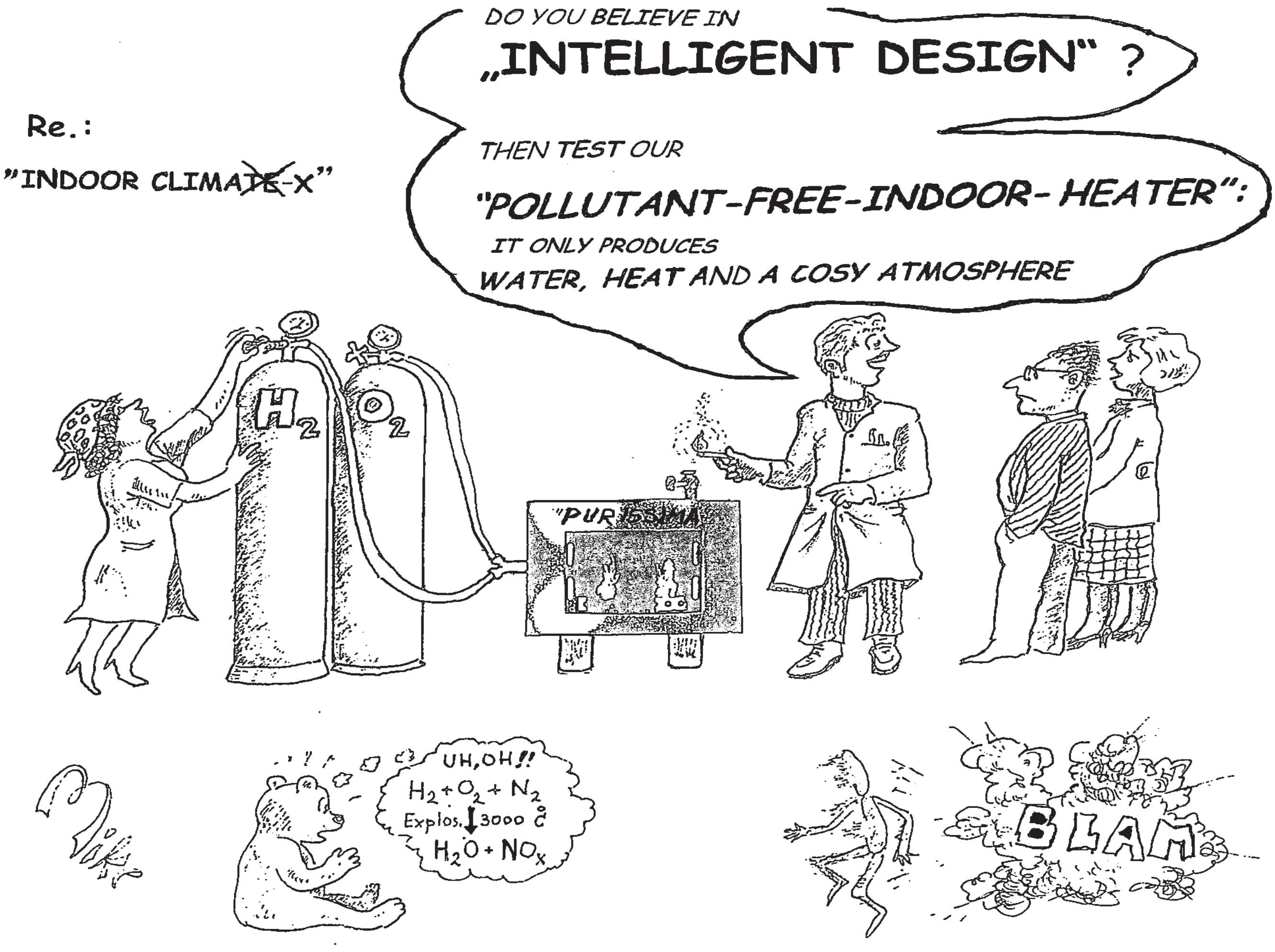

UPDATE OF WHO AIR QUALITY GUIDELINES

Michal Krzyzanowski and Aaron Cohen

Introduction

In 2005, the World Health Organization (WHO) updated its Air Quality Guidelines (AQG), an international reference on the health consequences of exposure to air pollution and a policy tool for reducing these consequences worldwide. Based on a systematic review of the rapidly growing literature on the adverse health effects of air pollution and drawing on recent estimates of the health impacts of air pollution, the AQG are intended to be relevant and applicable worldwide while also being specifically designed to address large regional inequalities in exposures to air pollution and the burden of disease due to such exposure.

The WHO Regional Office for Europe project "Systematic review of health aspects of air quality in Europe," performed to support the development of the European Commission "Clean Air for Europe" programme in 2002-2004, concluded that the growth of knowledge warranted revision of the air quality guidelines for particulate matter, nitrogen dioxide, and ozone (WHO 2004). Of critical importance, more studies had been conducted in developing countries in Asia and Latin America, where levels of air pollution are among the highest worldwide, providing stronger evidence of the global nature of the public health challenge posed by air pollution. (HEI 2004, PAHO 2005). Though the AQG are neither standards nor legally binding criteria, they are designed, via expert evaluation of current scientific evidence, to offer guidance for reducing the health impacts of air pollution. The AQG are an important resource for governmental authorities as they develop health-based national air quality management strategies, especially in those countries which lack the necessary scientific infrastructure and resources to conduct their own assessments in support of public policy.

Challenges in Formulation of the AQG

The AQG are based on expert evaluation of the current state of knowledge about the health effects of exposure to air pollution and the magnitude and geographical distribution of its health impacts, recognizing relevant studies on epidemiology, clinical studies and toxicological experiments. An increasing range of adverse health effects has been linked to air pollution and at ever-lower air pollutant concentrations. This is especially true of airborne particulate matter. New studies use more refined methods and more subtle but sensitive indicators of effects, such as physiological measures (e.g., changes in lung function, inflammation markers). Therefore the updated guidelines are based on these sensitive indicators as well as the most critical population health indicators such as mortality and unscheduled hospitalizations.

The experts revising the guidelines agreed that no "threshold" concentration of particulate matter (PM) or ozone had been identified below which there are no adverse health effects. Therefore, no guideline value can be specified that, if achieved, will fully protect human health.

In setting the PM guideline value, an Expert Group considered the range of long-term average $PM_{2.5}$ concentrations associated with adverse effects on chronic cardiovascular and respiratory disease in epidemiologic studies and set the guideline level - 10 $\mu g/m^3$ as an annual average - at the bottom of this range. The group also took into consideration the results of time-series studies that estimate the effects of short-term exposure to $PM_{2.5}$ and PM_{10} on acute adverse health outcomes conducted in the cities with annual PM concentrations just above the selected guideline level. Table 1 presents the full set of guideline values from the updated AQG.

Table 1: Updated WHO Air Quality Guideline values

Pollutant	Averaging Time	AQG Value (µg/m³)
$PM_{2.5}$	1 year	10
	24 h (99th percentile)	25
PM_{10}	1 year	20
	24 h (99th percentile)	50
Ozone, O_3	8 h, daily maximum	100
Nitrogen Dioxide, NO_2	1 year	40
	1 h	200
Sulfur Dioxide, SO_2	24 h	20
	10 min	500

For ozone, the selected guideline value is still in the range which has been found to increase risk of mortality by some 1-2%. This residual risk was accepted by the group since ozone concentrations at the set guideline level may be due occasionally to natural phenomena, such as intrusion of stratospheric ozone into the troposphere. The Expert Group was keenly aware that achieving the AQG might appear impossible in situations where air pollution levels greatly exceed the recommended guideline levels. Rapid and radical improvement of air quality is rarely possible, and the recommendations have the potential to be easily ignored as not realistic. Therefore, the Working Group recommended a gradual approach to the health risk reduction and improvement of air quality, proposing a set of interim target values in moving towards the strictest guidelines. These targets aim to promote a shift from high air pollutant concentrations, which have acute and serious health consequences, to lower air pollutant concentrations. If these targets are achieved, significant reductions in risks for acute and chronic health effects from air pollution should follow (Table 2). The estimated reduction in health risks associated with the achievement of consecutive interim target levels has been specified in the AQG, allowing the authorities and the public to appreciate the result of air quality improvement results while also providing incentive for further efforts to control air pollution and reduce the risk to health. Progress towards the guideline values should, however, be the ultimate objective of air quality management and health risk reduction in all areas.

The AQG have always addressed exposures and health effects of individual pollutants or indicators (such as PM_{10} mass, an indicator of a complex pollution mixture with multiple sources). However, as understanding of the complexity of the air pollution mixture has improved, the limitations of controlling air pollution and its risk through guidelines for single pollutants have become increasingly

Table 2: WHO Air Quality Guidelines and interim targets for Particulate Matter: annual mean concentrations

	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)	Basis for the selected level
Interim target-1 (IT-1)	70	35	These levels are associated with about a 15% higher long-term mortality risk relative to the AQG level
Interim target-2 (IT-2)	50	25	In addition to other health benefits, these levels lower the risk of premature mortality by approximately 6% (2-11%) relative to the IT-1 level
Interim target-3 (IT-3)	30	15	In addition to other health benefits, these levels reduce the mortality risk by approximately 6% (2-11%) relative to the IT-2 level
Air Quality Guideline	20	10	These are the lowest at which total, cardiopulmonary, and lung cancer mortality have been shown to increase with more than 95% confidence in response to long-term exposure to $PM_{2.5}$

apparent. Nitrogen dioxide (NO_2), for example, is a product of combustion processes and is generally found in the atmosphere in close association with other primary pollutants, including ultrafine particles. It is itself toxic and is also a precursor of ozone, with which it coexists along with a number of other photochemically generated oxidants. Concentrations of NO_2 are often strongly correlated with those of other toxic pollutants. Its concentration is readily measured but needs interpretation as a potential surrogate for a set of sources and the resulting mixture. Achieving guideline concentrations for individual pollutants, such as NO_2, may therefore bring public health benefits that exceed those anticipated on the basis of estimates of a single pollutant's toxicity. Therefore, while the AQG present risk assessments focused on individual pollutants, they also recommend addressing all relevant pollutants in health risk management simultaneously and particularly the four most common, for which guidelines have been reviewed. The present revision of the AQG provides new guideline values for three of the four pollutants examined. For two of them (PM and ozone), it is possible to derive a quantitative relationship between the concentration of the pollutant, as monitored in ambient air, and specific health outcomes, such as mortality. These relationships are invaluable for health impact assessment and allow insights into the mortality and morbidity burdens from current levels of air pollution as well as the health improvements expected under different air pollution reduction scenarios. The burden-of-disease estimates can also be used to estimate the costs and benefits of interventions that reduce air pollution (AEAT 2006).

Use of the Guidelines in Policy Formulation

The introductory chapters of the updated AQG document the wide diversity of air quality in the world, posing quite different challenges to air quality management. In many areas with high levels of pollution, pollution reduction is technically feasible, but political or socio-economic considerations are critical determinants, and lack of organizational capacities of the administration may limit the effectiveness of air quality management. In many developed countries, air quality has improved in recent decades. Further progress, necessary for the reduction of adverse impacts of pollution on health observed even at those low pollution levels, requires development and use of new technologies and often potential changes in lifestyle and in the urban landscape. While the costs of this development are estimated to often be orders of magnitude below the benefits due to prevented morbidity and mortality (AEAT 2006), the clear rationale for such actions, given by the AQG, is an important factor to catalyze such actions.

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PRONET - POLLUTION REDUCTION OPTIONS NETWORK: WORK STATUS REPORT

Peter van den Hazel, Joris van Loenhout, Diana Hein and Michael Fröhlich

Introduction

How do European regions cope with similar challenges within the field of environment and health? How can successfully implemented measures on indoor and transport related environmental quality be propagated for the benefit of people in other parts of Europe? PRONET (Pollution Reduction Options Network) was established to fill the gap and to provide answers on health protection related to indoor environment quality, outdoor noise and air pollution abatement. The project was initiated with partners all over Europe and funded by the European Commission. It is embedded in other EU and WHO Europe activities on indoor environment and health (Work Package 1) respectively transport, environment and health (Work Package 2). For further information on general project design please refer to WHO Newsletter No. 39 (van Loenhout 2007) or the PRONET webpage (www.proneteurope.eu). In this contribution the actual work is resumed.

After a kick-off-meeting in Amsterdam (March 2007) two workshops were held for each of the two work packages:

- Indoor: November 2007 in Barcelona and June 2008 in Copenhagen
- Transport: November 2007 in Düsseldorf and June 2008 in Stockholm

These workshops aimed to involve practitioners and to establish a network. Proceedings of the workshops can be obtained on the PRONET webpage. The focus of the first two project years (2007/2008) lies on the collection and analysis of good practise examples ("case studies") and the formation of a network of potential stakeholders in Europe.

To meet specific requests of central and eastern European countries, an additional workshop for both themes was organised at 23 and 24 September 2008 in Sofia. PRONET activities were discussed with representatives from Bulgaria, the Czech Republic, Hungary, Latvia and Lithuania. The participants contributed to the PRONET activities by providing good practice examples from central and eastern European countries. There will be additional PRONET promotion in these countries, e.g. in Lithuania several relevant organisations will be contacted and the project will be presented in the Lithuanian national noise council. The successful Sofia workshop led to an extension of the PRONET network. The promotion of the project by stakeholders in different regions, who are familiar with the language, problems and structures will facilitate the dissemination of the results of the PRONET project.

Work Package 1: Indoor Environment

In the indoor environment, people come into contact with a lot of different biological, chemical and physical factors. In a healthy situation, these factors do not have a detrimental influence on human health. However, when excessive exposure occurs to some of these factors, they can pose a health risk. Within the area of the indoor environment, the focus lies on private homes and schools.

Collected Case Studies

In a first step a number of case studies were obtained through screening of EU based projects and through a call for cases. These preliminary results in indoor measures show a variety of topics (e.g. allergens, radon, building material, ventilation) and geographical spread. In this investigation 54 cases were identified which met the basic inclusion criteria.

Within a second step a scientific literature search was done. The total number of potentially relevant case studies was n=636. Of these publications 48% were related to biological agents, 25% to physical and 21% to chemical factors in the indoor environment and only 6% were relevant to a remaining category of other topics, such as education, awareness raising or tax measures. In total, 48 case studies met the basic inclusion criteria.

Assessment of Case Studies

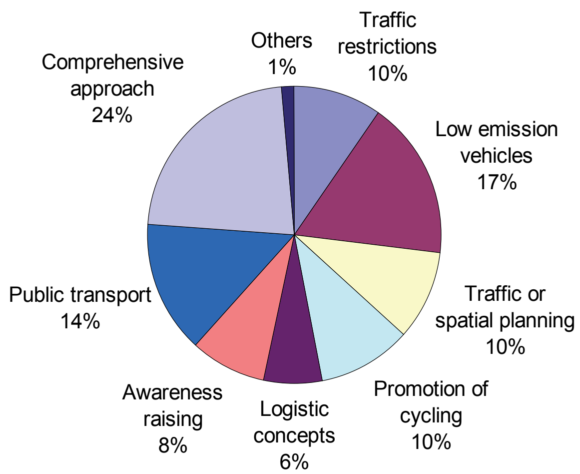
Of 102 case studies (54 from call for cases and 48 through scientific literature search), more information was obtained by contacting the case study owners and searching through the available literature. An assessment form was developed to decide which of these case studies would be transformed into fact sheets as selected "best practice" examples. Points for assessment were amongst others health effects, exposure effects, cost-effectiveness, societal impact and implementation issues.

Fact Sheets

Eventually, about 30 case studies will be created within a variety of topics: biological hazards (allergens, moulds, moisture), chemical hazards (combustion, volatile organic compounds, environmental tobacco smoke) and physical hazards (noise, radon, lack of ventilation). The indoor environment fact sheets describe the problem (why should stakeholders try to abate such hazard), the measure (what can stakeholders do to improve the situation), a description of collected case studies, including contact information and the applicability (what factors should be taken into account when implementing such measure).

Work Package 2: Transport, Environment and Health

Traffic related noise and air pollution are two major health risks of European outdoor environment. Since municipalities and regions in Europe are struggling with similar challenges, such as continuously increasing traffic flows, PRONET provides a platform of exchange of knowledge on applying measures. Case studies, like the implementation of measures, plans and campaigns, are collected and made available to interested stakeholders.



Traffic restriction: speed limits, low emission zones or environmental zones, congestion charging

Low emission vehicles: retrofitting of cars, busses, lorries, alternative fuels, reduction of emissions from ships

Traffic and spatial planning: building of new roads to keep traffic away from housing areas

Promotion of cycling: campaigns, reserving space for cyclists

Logistic concepts: optimizing the deliverance of goods

Awareness raising: campaigns, education

Public transport: public busses, car sharing, systems of financing public transport

Comprehensive approaches: air quality or noise reduction plans with a whole bundle of measures

Figure 1: Categories of measures and distribution of case studies in WP 2

Collection of Case Studies

A questionnaire was directed in a call for cases at practitioners, scientists and decision makers across Europe. Next to this call for cases, further examples within the transport area were collected from literature, internet search and other projects dealing with similar questions (OSMOSE, SOLVE, SMILE). The focus has been specifically on practical examples and not on scientific investigations. In summer 2008, the database comprised 379 case studies. There are still case studies added to the database. A lot of case studies do not provide sufficient information (e.g. website mentioned does not exist any more) or several case studies deal with the same kind of measure, thus 379 is not the amount of fact sheets to be expected. A selection process, similar to that described for WP 1 will lead to a considerable lower amount of case studies.

Assessment of Case Studies

Most case studies were conducted in western European countries such as the Netherlands, Austria and Germany. 16% of the case studies came from replies to the call for cases, 68% from other (EU) projects, 7% from literature and internet search and 9% from other sources.
These case studies have been allocated to nine categories according to the kind of measure applied. See Figure 1 for types of categories and their distribution.

The first review of these case studies resulted in the following findings:

Health effects:

- very few case studies exist with distinct results on health effects;
- a lot of case studies exist with estimated or predicted health effects;
- most summaries make no statement on health effects.

Environmental effects:

- few case studies exist with distinct results on reduction of air pollutants and noise;
- a lot of case studies exist with estimated and predicted reduction of air pollutants and noise;
- only few case studies deal with noise;
- very few case studies deal with air pollutants and noise.

Very few summaries give a hint on cost-benefit-analysis. Most case studies belong to the category “comprehensive approach” outlining the importance of an integrated planning before taking any measures. These practice examples are available via the PRONET webpage. They are presented in a standardised form (“fact sheets”).

Fact Sheets

A fact sheet template was developed. The coming period, fact sheets are generated. Compared to the indoor environment fact sheets, the transport facts sheets are structured slightly different. They present brief summaries of best practise examples to draw attention to the case studies content as well as to enable stakeholders to contact the respective institution and/or person responsible for the case study. If available, links to additional information, such as reports or websites dealing with the case study, will be shown.

In addition cross cutting issues (such as gender, environmental justice) are intended to be regarded and recommendations for future EU policy in the field of environment and health are to be developed.

Gaining political support is essential for planning and implementation of measures. The view should not be restricted on health outcomes but it should include additional benefits, which are covered by intended measures, e.g. improvement of quality of life or road safety. This makes it easier to ensure political support. Not only politics, but also the public should be actively involved.

Outlook of the third and final PRONET project year (2009)

The last year of the project will be used for dissemination of the obtained results to stakeholders in European member states. These stakeholders include local, regional and national authorities, as well as umbrella organisations or private companies. The PRONET website will contain all fact sheets and other results, and will be promoted by linking up to other projects and websites. The results will be presented at several conferences in the field of Indoor Environment or Transport. Stakeholders (local, regional and national policy makers) will be actively approached to take advantage of the knowledge on measures collected in the project. PRONET partners stimulate the request by stakeholders to organise local workshops at ministries or within city networks. This could be done in-company as interactive workshops with a focus on the measures, the implementation, the barriers and an indication of the costs associated with the measure. A final conference of PRONET will be organised in November in Brussels. Details for this meeting will be announced in the course of 2009.

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URBAN CLIMATE AND AIR QUALITY - AN OVERVIEW OF UNIVERSITY RESEARCH IN GERMANY

Wilhelm Kuttler

Introduction

The following overview of urban climate and air quality research in Germany given below builds on the Country Report Urban Climate in Germany (Matzarakis 2005) and is mainly based on the evaluation of publications accessible internationally. In Germany, urban climate and air quality research and teaching are mainly established at university institutes with a meteorological or geographic orientation.

Urban Climate Research

Apart from overall analyses of urban climate (e.g. Endlicher and Lanfer 2003), many studies cover individual aspects. The urban heat island (UHI), one of the best-known features of urban climates, is one of the main focuses of research. Subjects covered by UHI studies include small-scale relationships between surface-specific energy balances (Weber and Kuttler 2005), especially counter-radiation as a function of road geometry and vegetation (Blankenstein and Kuttler 2004), topography (Kuttler et al. 1996) and the effects and dynamics of cold air on UHI intensity and air quality at night (Junk et al. 2003). The demonstration of the penetration depth of rural cold air into urban areas (Weber and Kuttler 2004, Dütemeyer 2000, Kuttler et al. 1998), modelling of cold air dynamics (Sievers 2005) and the occurrence of country breezes (Barlag and Kuttler 1990/91) are relevant for urban planning. The intensity of the UHI is mainly due to the difference of rural and urban land use: although it was possible to establish large-scale relationships, for example with latitude, these were relatively minor, with an explanation of variance of only 6% (Wienert and Kuttler 2005).

In general, the urban boundary layer has lower humidity than the surrounding countryside. However, in low-exchange summer weather situations, these conditions are frequently reversed as the temperature falls below the dew point earlier in the evening and more frequently at night in the surrounding area (Mayer et al. 2003). Studies carried out for a year in the city of Krefeld and the surrounding area show that an urban moisture excess (UME, $\Delta e_{u\text{-}r} > 0$ hPa) is established in 36 % of cases (Kuttler et al. 2007).

Knowledge of the complex turbulence structure with the urban boundary layer, especially in urban canyons, and the height of the mixing layer over the course of the day is essential for statements on heat and pollutant transport (Emeis and Turk 2004, Bohnenstengel et al. 2004). This kind of studies are carried out by vertical sounding (Feigenwinter and Vogt 2005, Rotach et al. 2005) and remote sensing (SODAR, RASS, ceilometer, Emeis et al. 2007, Emeis and Schäfer 2006, Emeis 2004, Emeis et al. 2004, Reitebuch et al. 2000). However, numerical model simulations (PALM, Letzel et al. 2008), available to provide also information on the thermal effects of urban canyon circulation (MITRAS, Schlünzen et al. 2003) and wind tunnel studies (Kastner-Klein et al. 2004) are also used. In this context, the validation of the values obtained by numerical model simulation plays an important role (Leitl 2008). It has also been possible to demonstrate large-scale effects of urban settlements on the regional climate. For example, significant changes in total annual precipitation and average air temperatures in connection with the conversion of rural areas into urban areas were quantified using the meso-scale MM5 model (Trusilova et al. 2008).

Urban water bodies and green spaces have a favourable effect on climatic and air quality conditions in urban areas. In this context, green spaces not only include parks at ground level, which can have a positive impact on climatic conditions and air quality even if they only have a very small area (Bongardt 2006, Ropertz 2008), but also planted roofs and façades (Köhler 2008). In addition, lakes can also result in an improvement of the climate in and on the margins of urban areas (Kuttler 1991). In the atmospheric boundary layer of a lake located on the edge of an urban area (surface area 3 ha) lower concentrations of the primary pollutants NO and CO were measured but significantly higher concentrations of ozone, as a secondary pollutant, were observed on clear days (Kuttler et al. 2002).

Air Pollution Research

Particle distribution in the urban atmosphere (PM_{10}) is one of the main focuses of current research related to air constituents. The questions to be answered here include: What kind of mechanisms determine the fine particulate concentrations measured in urban canyons (Holst et al. 2008, Weber et al. 2006), what kind of spatial distribution patterns can be determined as a function of land use (Weber and Weber 2008, Wolf-Benning et al. 2005, Wolf-Benning et al. 2008), what are the effects of the time of day (Vogt et al. 2005), what is the contribution of meteorological (Fig. 1) and traffic conditions (Weber and Litschke 2008)

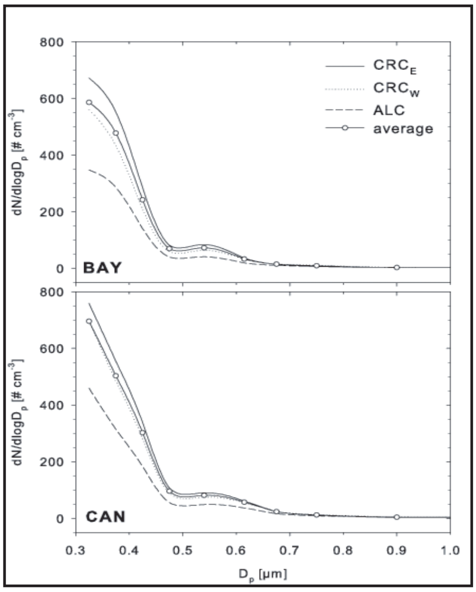

Figure 1: Influence of meteorology on particle number concentrations. The plot shows average number concentration of fine particles measured in a street canyon (CAN) and an adjacent backyard (BAY) during different flow regims within the study area. CRC - flow is perpedicular to street canyon axis either from west (CRCw) or east (CRCe), or is blowing along the canyon axis (ALC). After Weber and Weber (2008).

and how can fine particulate concentrations be predicted with reference to location and time by a high-resolution weather forecast (Klingner and Sähn 2008)?

Comparative studies of fine particulate concentrations in neighbouring cities (Erfurt and Leipzig) show similar patterns in distribution and diurnal course of particle size (Tuch et al. 2003, Tuch et al. 2006). However, as expected, there are significant quality and quantity differences between urban areas and the surrounding countryside (Gietl et al. 2008). There are also relationships between the particle size distribution and vehicle type (Schneider et al. 2008) as well as the source of the air mass concerned (Vester et al. 2007). With respect to air quality improvement, especially near to busy roads, the question arises as to the extent to which planted roadsides and facades can contribute to a reduction in fine particle concentrations (Litschke and Kuttler 2008). To investigate this problem, simulations are conducted with a view to determining the effectiveness of vegetation on the distribution and formation of air pollutant concentration fields (Ries and Eichhorn 2001, Gromke and Ruck 2007) and the basic interaction between plants and the surrounding area with reference to the deposition of dust (Bruse and Fleer 1999). For theoretical modelling, it is important to determine vehicle emission factors as precisely as possible; however, these factors not only vary as a result of fleet differences but are also determined by the season (Ketzel et al. 2007).

A general overview of meteorological factors affecting the propagation of gaseous and particulate pollutants is given by Fisher et al. (2005), who indicate ways to improve air quality. Policy aspects of air pollution are discussed by Schatzmann et al. (2006). As regards the secondary pollutant ozone, it was possible to demonstrate a pronounced north-south gradient in maximum summer concentrations in Germany, as in other European countries. Especially in southern German cities, the EU limits are exceeded, as are the AOT 40 values (Accumulated exposure Over a Threshold of 40 ppb, Klumpp et al. 2006), which have a

sustained detrimental impact on the growth of urban vegetation.
It is still the case that well-founded data for the establishment of carbon dioxide balances for German cities are not yet available. Apart from the calculation of CO_2 emissions from the relevant sources, information which will be needed in this context also includes precise horizontal distributions in the urban canopy layer and a calculation of CO_2 fluxes for different surfaces (Kordowski and Kuttler 2008, Schmidt et al. 2008). Investigations of horizontal CO_2 distribution in urban areas have been made using mobile and stationary measurements in the city of Essen and indicate significant concentration differences as a function of land use during low-wind conditions (Henninger 2008, Henninger and Kuttler 2007). Investigations of the horizontal distribution of CO_2 as a function of relief energy are currently being carried out in the cities of Münster and Lüdenscheid by the Applied Climatology Department of Duisburg-Essen University.

Work on air quality issues also includes epidemiological studies with a view to analysing the effects of air pollutant concentrations as a function of weather conditions on morbidity and mortality rates among the urban population (Junk et al. 2007, Janssen et al. 2008). For the assessment of the air quality component, indices based on various air quality indicators were developed. With the aid of these indices, long and short-term effects on human health can be evaluated. As well, it is possible to give statements on spatial distributions and on the development of air pollutants over the course of time (Mayer et al. 2008b).

Various guidelines of the Association of German Engineers (VDI) on environmental meteorology (such as VDI 3787, Part 1, 2, 5, 9; Baumüller et al. 2008) contain practically oriented notes for the consideration of climate and air quality factors and the presentation of urban climate matters in maps (Scherer et al. 1999). Examples concerning the improvement of air and climate quality in cities are mentioned by Barlag (1997). Mayer et al. (2008a) indicate further possibilities of improving thermal factors by urban planning measures. Widely spread synthetic climate function and planning maps of the type developed in Germany are increasingly being used in other countries, such as China (Katzschner and Mülder 2008) and Japan.

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NOTES AND NEWS

APHEKOM tackles Air Pollution in Europe – A continuing Threat to Health from the Air we breathe

Much has been done in recent years to reduce air pollution and its detrimental effects on the health of Europeans. Yet pressing gaps remain in stakeholders' knowledge and understanding of this continuing threat, impeding progress in the planning and implementation of measures to protect public health.

To address the problem, the new APHEKOM project (Improving Knowledge and Communication for Decision Making on Air Pollution and Health in Europe; running from June 2008 to November 2010) will develop and deliver new, reliable and actionable information and tools so decision makers can set more effective local and European policies; health professionals can better advise vulnerable groups; and individuals can make appropriate decisions as a result.

In specific, during the project's two and a half years APHEKOM'S 35 scientists and specialists in 23 cities in 12 EU Member States will propose and report on health-impact indicators, respiratory and cardiovascular morbidity and mortality, and will calculate and report on related costs. They will evaluate strategies designed to reduce air pollution, stimulate the dialog between stakeholders, and provide guidance to health professionals on helping patients reduce their exposure to air pollution.

APHEKOM is a multi-country project whose cities cover a large part of Europe, from Stockholm in the north to Athens in the south, and from Dublin in the west to Bucharest in the east. The project builds on the firm foundation of the earlier APHEIS HIA (health impact assessment) project by adding new research, interaction with stakeholders, and more effective communication on HIAs to those who need to know in Europe. The APHEKOM project will gather and analyse reliable, actionable information on the health impact of air pollution and related costs, and provide it directly and indirectly to our target audiences so they can make informed decisions.

- For public-health professionals APHEKOM will improve their practices in Europe by providing in a coordinated way new, standardised methods for evaluating the health impacts and monetary costs of urban air pollution.

- Policy makers, health professionals and non-governmental organisations (NGOs) will have better information and understanding for making effective policy decisions, and for providing better guidelines and advice to the general public and more vulnerable groups. APHEKOM will reach these groups through our local network, and by preparing specific reports and presentations we will post on our Web site and disseminate through EU Community and local communication channels.

- More vulnerable groups will improve their health more effectively by having information tailored to their specific needs. APHEKOM will reach these groups through health professionals in each participating city and through patients' organisations.

- Urban populations in general will have information that will help them actively reduce air pollution levels and improve their health. We will reach this affected population through representative NGOs at the EU and local levels.

The APHEKOM project is organised in following work packages (WPs):

WP "Impact of motorised road traffic" (coordinated by Centre for Research in Environmental Health (CREAL), Barcelona, Spain)

- Integrate new policy-relevant traffic indicators relevant to policies
- Evaluate the contribution of chronic diseases and susceptibility factors
- Evaluate the suitability of using pre-clinical markers
- Apply to case studies

WP "From dose-effect to cost-benefit" (coordinated by French Institute of Public Health Surveillance, InVS, Saint Maurice, France)

- Develop new exposure-response functions
- Up-date definitions of geographic study areas
- Measure the influence of particle correction factors
- Measure the differences in European health care and health information systems
- Perform standardised health-impact assessments of urban air pollution
- Develop methods and tools and identify data needs for evaluating costs
- Apply to case studies

WP "Intervention studies" (coordinated by Dublin Institute of Technology, Dublin, Ireland)

- Develop innovative methods to analyse the decrease in air pollution levels following implementation of a European regulation
- Follow the evolution of health risks over time
- Track related effect modifiers
- Cost of health impacts of the implemented strategy

WP "Describing uncertainties" (coordinated by Versailles Saint Quentin-en-Yvelines University, Versailles, France)

- Identify and prioritise uncertainties in the many steps in the decision-making process
- Promote an on-going dialogue between producers and users of the information provided

WP "Communication" (coordinated by Medical University of Vienna, Vienna, Austria)

- Communicate focused information to all those who need to know, using diverse local and European media and events.

Coordinated by Institut de Veille Sainitaire (InVS), France, and Umea University (UMU), Sweden, APHEKOM is co-funded by the European Commission's Programme on Community Action in the Field of Public Health (2003-2008) under Grant Agreement number 2007105, and by the many institutions that have dedicated resources to the fulfilment of this city-based project.

For the APHEKOM team:

Aymeric Ung and Sylvia Medina
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MEETINGS AND CONFERENCES

3rd Central and Eastern European Conference on Health and the Environment 19 to 22 October 2008 in Cluj-Napoca, Romania

The Central and Eastern Europe Conference on Health and the Environment (CEECHE) is a joint approach initiated and supported by European and US institutions, aimed to analyze and better define the complex links between health and environment. Beside topics addressing the specific problems met in Central and Eastern Europe, the Conference accommodates issues related to any part of the world, according to the proposed main themes. The third edition of CEECHE, to be held on 19 to 22 October 2008 in Cluj-Napoca, is a follow up of the successful Conferences in Prague 2004 and Bratislava 2006. Around 200 participants from universities, research organizations, government and industry of countries, predominantly from Central Eastern Europe, Caucasus and Central Asia presented 150 oral and poster papers in a broad variety of research fields, including ambient and indoor air hygiene, aerosols, monitoring and control of air pollutants, air quality modelling and management, regional studies, impact of toxic emissions from industries and transport on forests, vegetation and health. The papers are published in the symposium proceedings (Central European Journal of Occupational Health and Environmental Medicine; Volume 14, No. 1; HU ISSN 1219-1221).

EC/JRC Workshop on Air Quality Assessment Strategies: Addressing the new Air Quality Directive and CAFE Thematic Strategy, 17 to 18 November 2008 in Ispra, Italy

A new area of air quality legislation was introduced 1996 with the publication of the air quality framework directive, which described the basic principles as to how air quality should be assessed and managed in the Member States. Moreover, it listed the pollutants for which air quality standards and objectives were afterwards developed and specified in legislation. It has been followed by four daughter directives, dedicated to specific pollutants, addressing a common concept for assessment and reporting of air quality.

After nearly ten years of experience legislation has been revised and updated, in order to incorporate the latest health evidence and scientific developments and the experience of the Member States with implementation, the Information Exchange, Framework- and three Daughter Directives are now replaced by Directive 2008/50/EC on ambient air quality and cleaner air for Europe. New concepts are introduced or reinforced in this new Directive, like a limit value for $PM_{2.5}$, the reduction of $PM_{2.5}$ concentrations, the assessment of the contribution of natural sources, winter sanding or salting, attainment of limit values and other new features. In order to present and discuss future European air quality strategies related to te new legislation, aworkshop will be organized by the Joint Research Centre on 17 to 18 November 2008 in Ispra. The event will present the background and main new features addressed by the new CAFE Directive in the field of air quality assessment.

The workshop was dedicated to scientists and technical staff in the Member States, Associated Countries and Lombardy Region, responsible or involved in the implementation of legislation and air quality assessment.

The Air Quality Workshop presentations can be accessed via http://ies.jrc.ec.europa.eu/the-institute/units/transport-and-air-quality-unit/action-13203/workshop-conferences/air-quality-assessment-strategies-workshop.html.

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PUBLICATIONS

WHO

The World Health Report 2008: Primary Health Care-Now More Than Ever

WHO Publications, Geneva, Switzerland 2008, 139 pages, ISBN 9789241563734/Order-No. 12402008, CHF 40,-, in developing countries CHF 20,-, also available in Chinese and Russian language, and through the web: http://wwww.euro.who.int/whr/2008/en/index.html.

Why a renewal of primary health care (PHC), and why now, more than ever? The immediate answer is the palpable demand for it from Member States – not just from health professionals, but from the political arena as well. Globalization is putting the social cohesion of many countries under stress, and health systems, as key constituents of the architecture of contemporary societies, are clearly not performing as well as they could and as they should. People are increasingly impatient with the inability of health services to deliver levels of national coverage that meet stated demands and changing needs, and with their failure to provide services in ways that correspond to their expectations. Few would disagree that health systems need to respond better - and faster - to the challenges of a changing world. PHC can do that.

Health Risks of Ozone from Long-Range Transboundary Air Pollution

M. Amann, D. Derwent, B. Forsberg, O. Hänninen, F. Hurley, M. Krzyzanowski, F. de Leeuw, S. J. Liu, C. Mandin, J. Schneider, P. Schwarze and D. Simpson, WHO Regional Office for Europe, Copenhagen, Denmark 2008, 93 pages, ISBN 978 92 890 4289 5, Order-No. 1340081, CHF 20.00, in developing countries: CHF 14.00, also available through the web: http://www.euro.who.int/Document/E91843.pdf.

Ozone is a highly oxidative gas formed in the lower atmosphere (from gases originating to a large extent from anthropogenic sources) by photochemistry driven by solar radiation. Owing to its highly reactive chemical properties, ozone is harmful to vegetation, materials and human health. In the troposphere, ozone is also an efficient greenhouse gas. This report summarizes the results of a multidisciplinary analysis to assess the effects of ozone on health. The analysis indicates that ozone pollution affects the health of most of the populations of the WHO European Region, leading to a wide range of health problems. The effects include some 21,000 premature deaths each year in 25 countries in the European Union on and after days with high ozone levels. Current policies are not sufficient to reduce ozone levels in the Region or their impact in the next decade.

Environment and Health Performance Review Slovakia

WHO Regional Office for Europe, Copenhagen, Denmark 2008, 96 pages, available through the web: http://www.euro.who.int/Document/E91443.pdf.

The present report describes and evaluates the current environment and health situation in Slovakia. It evaluates strong and weak points of the national environmental and health status and brings recommendations from independent experts. The conclusions and recommendations are based on the detailed Environment and Health Performance Review (EHPR) carried out in the country. The review identified the most important environment and health problems, evaluated the public health impact of environmental exposures and reviewed the policy and institutional framework taking into account the institutional set-up, the policy setting and legal framework, the degree and structural functioning of intersectoral collaboration and the available tools for action. This project was developed by the WHO Regional Office for Europe as a follow up to the commitments made by Member States at the Fourth Ministerial Conference on Environment and Health in Budapest in June 2004 to reduce children’s exposure to environmental hazards. The project was designed to provide the evidence base for developing and implementing such actions. The EHPRs are country-based interdisciplinary assessments that WHO/Europe carries out at the request of Member States. Through the EHPRs, Member States receive support in the reform and upgrade of the overall public health system.

Atlas of Health, Second Edition

WHO Regional Office for Europe, Copenhagen, Denmark 2008, 136 pages, ISBN 978 92 890 1410 6, Order-No. 13402049, CHF 20,-, also available through the web: http://www.euro.who.int/Document/E91713.pdf.

This updated statistical atlas presents key health figures for the WHO European Region. They cover basic data on populations, births, deaths, life expectancy and diseases, lifestyle and environmental indicators, such as drinking, smoking and traffic accidents, and types and levels of health care. Each indicator is presented as a map to show overall regional variations, a bar chart to indicate country rankings and a time chart to show trends over time in three main country groupings. Using the WHO Regional Office for Europe’s unique Health for All database, combined with the best alternative sources of data around the Region, this atlas offers the most comprehensive overview of health in Europe in a handy size.

Health Impact of PM_{10} and Ozone in 13 Italian Cities

M. Martuzzi, F. Mitis, I. Iavarone and M. Serinelli, WHO Regional Office for Europe, Copenhagen, Denmark 2006, 145 pages, ISBN 92 890 2293 0, also available through the web: http://www.euro.who.int/document/e88700.pdf.

Over the last few decades, a broad range of adverse health outcomes due to short and long-term exposure to air pollutants, at levels usually experienced by urban populations throughout the world, are established. This report estimates the health impact of PM_{10} and ozone on urban populations of 13 large Italian cities. To do so, concentration–response risk coefficients were derived from epidemiological studies, and 25 adverse health outcomes and different exposure scenarios were considered. Average PM_{10} levels for the years 2002–2004 ranged from 26.3 µg/m^3 to 61.1 µg/m^3. The health impact of air pollution in Italian cities is large: 8220 deaths a year, on average, are attributable to PM_{10} concentrations above 20 µg/m^3. This is 9% of the mortality for all causes (excluding accidents) in the population over 30 years of age; the impact on short term mortality, again for PM_{10} above 20 µg/m^3, is 1372 deaths, which is 1.5% of the total mortality in the whole population. Hospital admissions attributable to PM_{10} are of a similar magnitude. Also, the impact of ozone at concentrations higher than 70 µg/m^3 amounts to 0.6% of all causes of mortality. Higher figures were obtained for the effects on heath that result in morbidity. The magnitude of the health impact estimated for the 13 Italian cities underscores the need for urgent action to reduce the health burden of air pollution.

OTHERS

$PM_{2.5}$ in the Netherlands - Consequences of the new European air quality standards

J. Matthijsen and H.M. ten Brink, Netherlands Environmental Assessment Agency, Bilthoven, Netherlands 2007, 78 pages, ISBN 978 90 6960 176 2, also available through the web: http://www.mnp.nl/en/publications/2007/index.html.

The highest $PM_{2.5}$ concentrations have been calculated for the western and southern parts of the Netherlands. With current national and European legislation, concentrations along busy roads are expected to be between 15 and 26 µg/m^3 in 2015. Consequently, the limit value of 25 µg/m^3 will probably be met at most locations in the Netherlands in 2015. If a more stringent limit of 20 µg/m^3 is chosen, however, then exceedances are expected in busy streets and local hot spots, even if the recently outlined additional national measures are taken. Moreover, concentration reductions of average urban background levels that are expected between 2010 and 2020 will be too small to meet the proposed exposure reduction target value of 20%. The new European standards for $PM_{2.5}$ will therefore require the Netherlands to adapt its policies regarding particulate matter. Furthermore, the instruments for policy support (monitoring, emission inventory and models) have to be updated in order to determine air quality based on the new Directive. This is an outcome of the Netherlands Research Program on Particulate Matter (BOP), a national program on PM_{10} and $PM_{2.5}$.

Environmental Health Monitoring System in the Czech Republic - Summary Report 2007

National Institute of Public Health, Prague, Czech Republic 2008, 108 pages, ISBN 80 7071 296 2, also available through the web: http://www.szu.cz/topics/environmental-health/environmental-health-monitoring.

The Environmental Health Monitoring System is a comprehensive system of collection, processing and evaluation of data on environmental pollution and effects on population health in the Czech Republic. Its particular subsystems have been run routinely since 1994, so the year 2007 is the 14th year of the standard monitoring activities. The data obtained from this system provide important background information for a long-term program focused on the improvement of population health in the Czech Republic, called “Health for All in the 21st Century”, which was approved by a Government Resolution from 2002. The data have also been used in the process of health impact assessment (HIA) and environmental impact assessment (EIA) of various activities, programmes and projects.

Facing Global Environmental Change - Environmental, Human, Energy, Food, Health and Water Security Concepts

Edited by H. G. Brauch, Ú Oswald Spring et al., Springer 2008, 1520 pages, ISBN 978 3 540 68487 9, EUR approx. 266,-, web link: http://www.springer.com/environment/book/978-3-540-68487-9.

Facing Global Environmental Change is published within the “Hexagon Series on Human and Environmental Security and Peace”, Vol. 4. Global environmental change and globalisation pose new security challenges in the 21st century. More than 100 experts assess the systemic, cultural, religious and spatial context of security in the 21st century, focusing on the referents (individual, society, state, region, global/planetary), major disciplines (philosophy, sociology, international law, economics, political science, international relations, security studies, peace research), dimensions (military, political, economic, societal and environmental), analysing climate change, desertification, water, population, urbanisation, food, hazards and migration as new security issues and sectoral (energy, food, health, water and livelihood) security concepts with a special focus on debates on environmental and human security.

COMING EVENTS

2009

March 2009

Seventh International Conference on Air Quality – Science and Application (formerly Urban Air Quality Conference)
24-29 March, Istanbul, Turkey. For more information, see: http://www.airqualityconference.org/.

May 2009

Second EFCA Symposium on Ultrafine Particles (UFP-2)
19-20 May, Brussels, Belgium.
For more information, see: www.efca.net.

June 2009

ETTAP 2009 – 17th Transport and Air Pollution Symposium and Third Environment and Transport Symposium
2-4 June, Toulouse, France. For more information, see: http://www.inrets.fr/services/manif/ettap09/index-EN.htm.

Air & Waste Management Association's 102nd Annual Conference and Exhibition
16-19 June, Detroit, Michigan, USA. For more information, see: http://www.awma.org/ACE2009/.

July 2009

Air Pollution 2009 – 17th International Conference on Modelling, Monitoring and Management of Air Pollution
20-22 July, Tallinn, Estonia. For more information, see: http://www2.wessex.ac.uk/09-conferences/air-pollution-2009.html.

August 2009

21st Conference of the International Society for Environmental Epidemiology (ISEE) – Food and Global Health
25-28 August, Dublin, Ireland.
For more information, see: http://www.isee2009.ie.

September 2009

Healthy Buildings 2009
13-17 September, New York, USA.
For more information, see: http://hb2009.org/.

Measuring Air Pollutants by Diffuse Sampling and Other Low Cost Techniques
15-17 September, Krakow, Poland.
For more information, see: www.aamg-rsc.org.

Environmental Health Risk - Fifth International Conference on the Impact of Environmental Factors on Health
21-23 September, New Forest, United Kingdom.
For more information, see:
http://www2.wessex.ac.uk/ehr2009rem1.html.

2010

March 2010

Climate Change – Global Risks, Challenges and Decisions
10-12 March, Copenhagen, Denmark.
For more information, see: http://climatecongress.ku.dk.

September 2010

15th World Clean Air and Environmental Protection Congress
12-16 September, Vancouver, Canada. For more information, see: http://iuappa.com/index.htm.

October 2010

Fourth Central and Eastern European Conference on Health and the Environment
10-13 October, Prague, Czech Republic.
For more information, see: www.ceeche.org.

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.

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