NEWSLETTER

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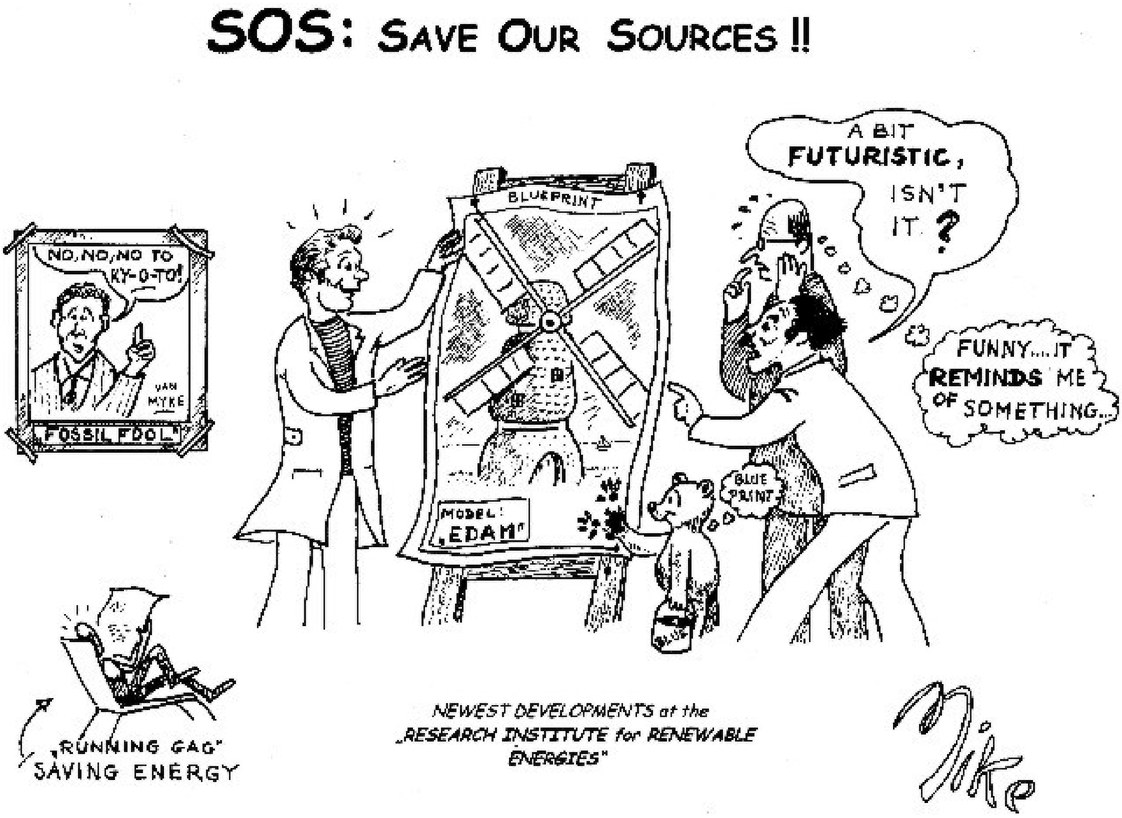

MOULD GUIDE - GUIDE FOR THE PREVENTION, INVESTIGATION, EVALUATION AND REMEDIATION OF INDOOR MOULD GROWTH

Heinz-Jörn Moriske, Regine Szewzyk and Maryline Leonidas

1. Introduction

The exposure to filamentous fungi (the moulds) in indoor environments has become a growing concern over the last decade. The German Federal Environmental Agency has elaborated a “mould guide” which presents recommendations on how to prevent, investigate, evaluate, and eliminate indoor mould growth (Umweltbundesamt 2002).

This publication is addressed to all persons in charge of preventing, investigating, evaluating and eliminating mould exposure from buildings. This includes experts from surveillance authorities (environmental, health and building authorities), several occupational groups (building experts, analysts, public health specialists and microbiologists), and building owners as well as building managers (property management, house-building associations, etc.).

The guide is basically limited to the problem of mould exposure in areas or buildings which are “naturally” ventilated by opening doors and windows. Specific problems related to mechanical ventilation systems are only shortly addressed. Hospitals as well as indoor working areas related to production activities (such as waste recycling plants) are not dealt with.

The guide is organized as follows:

Part A gives background information on the characteristics of fungi and their occurrence in indoor air environments. The health effects caused by fungi and their metabolic-products are also addressed.

Part B discusses the issue of prevention of mould growth in buildings. Advice is given regarding the proper way in which people should use their dwellings and how buildings should be constructed in order to prevent fungal growth.

Part C refers to the inspection of buildings for mould growth using harmonized methods. Assistance is given on how to assess the hygienic risk of mould growth. Measures to reduce its growth and to eliminate mould problems in the area concerned are indicated.

Part D presents appropriate ways to proceed in practice to investigate and evaluate indoor mould exposure by describing a number of case studies.

The intention of the guide is to harmonize

i) the methods for the detection and enumeration of fungi in indoor environments and

ii) the assessment of hygienic risks by fungal growth and the subsequent need for remedial actions.

2. Methods for detection and enumeration of fungi

The guide gives recommendations on how to detect a source of fungal growth in indoor environments. The first step should always be a thorough professional inspection of the building or rooms followed, if necessary, by specific measurements. Harmonized methods for the detection of fungi in indoor air (culturable and total number), in materials, and in house dust have been elaborated and are described in the guide.

3. Assessment of indoor mould growth

The use of harmonized methods for the detection of fungi in indoor environments is basically needed for an assessment of indoor mould growth.

However, the task of evaluating the concentrations of fungi that have been measured is difficult because limit values based on health risk assessment are absent and fungi are naturally present in the environment.

Epidemiological studies conducted in several countries revealed that dampness and/or mould growth in dwellings and health problems affecting occupants are closely related. The health effects include irritations of the throat and eyes, allergies and asthma, as well as general symptoms such as tiredness, dizziness and headaches. Furthermore, in some single cases the presence of moulds in dwellings has been identified as the cause of serious diseases.

However, no environmental epidemiological studies have enabled the establishment of a dose-response relationship between the measured concentrations of fungi and the registered health problems. Subsequently, these studies enable neither quantitative risk assessment nor the identification of standard values which set the "acceptable" concentration of fungi in indoor environments.

Another problem is the natural occurrence of fungi in the environment. Fungi are active in the decomposition of organic substances and may be found in natural environments in rather high concentrations. These concentrations vary greatly over time and according to place. Even if no fungal growth has been detected indoors, fungi originating from outdoor air will always be present. As a consequence, in order to assess the concentration of fungi indoors, outdoor concentrations must always be taken into consideration.

Given the problems mentioned above, the aim of the "mould guide" is not to derive individual health risk assessments based on the absolute number of fungi detected indoors but to determine whether sources of fungal growth can be found indoors recognizing environmental background concentrations.

If sources of fungal growth are detected in the indoor environment, remedial measures should be taken. The "mould guide" gives general information on how to minimize or eliminate the growth of fungi in indoor environments. Growth of fungi in indoor environments should be regarded as hygienic risk and should not be tolerated. Epidemiological studies have clearly established the link between dampness/growth of fungi in indoor environments and health risks of the occupants. Even if a dose-response relationship could not be derived, the precautionary principle should be applied.

3.1 Culturable fungi in indoor air

The most commonly used method to detect problems with moulds in indoor environment is the determination of culturable fungi in the indoor air. The "mould guide" provides a harmonized enumeration method and a table for assessing the results in order to detect sources of fungal growth (see chapter 3.2).

The methods for the enumeration of culturable fungi include the classification of important fungi to the genus or species level. This classification is considered more important than the mere concentration of fungi. Especially the detection of species with pathogenic or toxic potential *(e.g. Aspergillus fumigatus, Aspergillus flavus, Stachybotrys chartarum*) or which indicate high moisture content (moisture indicators) is of importance.

The following Table 1 describes three concentration ranges for the assessment of culturable fungi in indoor air:

- Background concentration range for fungal genera or species of significance
- A transitory range in which the concentrations for fungal genera or species exceed the background level, indicating the presence of sources of indoor mould contamination
- A concentration range which presents concentrations higher than those characterizing the transitory range. Levels in this range indicate the presence of an indoor contamination source with a high probability.

Table 1: Assessment scheme for culturable fungi in indoor air samples.
All three lines of the table have to be included for a comprehensive assessment.

Parameter	**Indoor source unlikely (Background level)**	**Indoor source possible (Further investigations required)**	**Indoor source probable (Immediate further investigations required)**
Cladosporium and other genera which may reach high concentrations in the outdoor environment (sterile mycelia, yeasts, *Alternaria*, *Botrytis*).	Concentration (cfu/m^3) of one genus in the indoor air is 0.7 to 1.0 times lower than the concentration in the outdoor air $I_{typ\ A} \leq A_{typ\ A}$ x 0,7 (+0,3)	Concentration (cfu/m^3) of one genus in the indoor air is 1.5 ± 0.5 times lower than the concentration in the outdoor air $I_{typ\ A} \leq A_{typ\ A}$ x 1,5 (± 0,5)	Concentration (cfu/m^3) of one genus in the indoor air is more than 2 times as the concentration in the outdoor air $I_{typ\ A} > A_{typ\ A}$ x 2
Sum of concentrations for those species that are unlikely to occur in the outdoor environment	Concentration in the indoor air is less than 150 cfu/m^3 above the concentration in the outdoor air $I_{\Sigma untyp\ A} \leq A_{\Sigma untyp\ A} + 150$	Concentration in the indoor air is less than 500 cfu/m^3 above the concentration in the outdoor air $I_{\Sigma untyp\ A} \leq A_{\Sigma untyp\ A} + 500$	Concentration in the indoor air is more than 500 cfu/m^3 above the concentration in the outdoor air $I_{\Sigma untyp\ A} > A_{\Sigma untyp\ A} + 500$
Concentration of one species that is unlikely to occur in the outdoor environment (!)	Concentration in the indoor air is less than 50 cfu/m^3 above the concentration in the outdoor air $I_{Euntyp\ A} \leq A_{Euntyp\ A} + 50$	Concentration in the indoor air is less than 100 cfu/m^3 above the concentration in the outdoor air $I_{Euntyp\ A} \leq A_{Euntyp\ A} + 100$	Concentration in the indoor air is more than 100 cfu/m^3 above the concentration in the outdoor air $I_{Euntyp\ A} > A_{Euntyp\ A} + 100$

cfu:	colony forming units
I:	concentration in indoor air in cfu/m^3
A:	concentration in outdoor air in cfu/m^3
typ A:	species that are likely to occur in outdoor environment
untyp A:	species that are unlikely to occur in outdoor environment (e.g. indicator species for dampness like Acremonium sp., Aspergillus versicolor, A. penicillioides, A. restrictus, Chaetomium sp., Phialophora sp., Scopulariopsis brevicaulis, S. fusca, Stachybotrys chartarum, Tritirachium (Engyodontium) album, Trichoderma sp.)
Σuntyp A:	sum of species that are unlikely to occur in outdoor environment
Euntyp A:	one species that is unlikely to occur in outdoor environment
!:	these concentrations apply to species forming highly mobile spores. Lower concentrations have to be considered for species with spores not spreading easily in indoor air as well as for thermotolerant species.

A high level of expertise is required to use Table 1. Not only the concentration ranges but all information available – including the results of the building inspection – must be taken into consideration for an adequate assessment. Indeed, in some cases the results obtained through the enumeration of culturable fungi may indicate that there is no presence of mould sources indoors in spite of existing damage. A corresponding table concerning the total number of fungi in indoor air is given in the “mould guide” (Umweltbundesamt 2002).

3.2 Fungi on materials

Investigation of fungi on or in contaminated materials gives information on source and extent of the damage. Again, the classification of fungal genera and species is considered to be more important than the concentration of fungi. The mould guide provides a table to assess the extent of fungal growth and gives recommendations for remedial actions (Table 2). It is considered unnecessary to measure mould concentrations in indoor air when significant mould growth is clearly visible and the origin of the damage identifiable. In this case remedial measures should directly be taken.

The extent of mould growth on materials is classified as follows (see also Table 2):

- First category: normal condition or very little damage. It is not generally necessary to take action.

- Second category: little to medium damage. The dissemination of fungal fragments must be stopped and the cause of the fungal growth must be located and eliminated.

- Third category: serious damage. The dissemination of fungal fragments must be stopped and the cause of the fungal growth must be immediately located and eliminated. The affected occupants should be properly informed and appropriate health checks are recommended. After the remediation has been completed control measurements should be performed to evaluate the effects of the remedial actions.

Table 2: Assessment scheme for mould growth on materials (see also text above)

	Category 1*	**Category 2***	**Category 3***
Extent of the damage (visible and non visible material damage)	No or very little biomass Small damage on the surface < 0.2 m^2	Medium biomass Damage mainly restricted to the surface, <0.5 m^2, deeper layers only locally affected	Large biomass Large damage at the surface, > 0.5 m^2, deeper layers may be affected

The values given in Table 1 are not meant as absolute limit values. All additional information available must be taken into consideration for the classification of a damage as for example:

- not only the surface extension of the mould damage but also the amount of fungi on the surface (colony growth versus growth covering the whole area) has to be considered.

- The spreading of fungal growth in deeper layers especially when cracks are present in the material should result in a classification into a higher category.

- The composition of fungal species has also to be taken into consideration. The predominant occurrence of fungal species with pathogenic or toxigenic potential (such as Aspergillus fumigatus, Aspergillus flavus, Stachybotrys chartarum) should result in a classification into a higher category.

- One must differentiate between active growth and dried old damage or spore contamination. Detection of active growth may lead to a classification into a higher category.

4. Conclusions

The "mould guide" of the Federal Environmental Agency provides information on the prevention, investigation, evaluation and elimination of indoor mould growth. The policy behind the guide is not to make a health assessment for every individual case but to detect and eliminate sources of fungal growth in indoor environments. Fungal growth in buildings is considered as a potential health risk and should therefore not be tolerated (precautionary principle). A high level of expertise is required to detect sources of indoor mould growth. The harmonized detection methods and assessment schemes presented in the guide will contribute to a more consistent detection and assessment of mould sources present indoors.

5. Reference

Umweltbundesamt 2002 (available in German only): Leitfaden zur Vorbeugung, Untersuchung, Bewertung und Sanierung von Schimmelpilzwachstum in Innenräumen. Erstellt durch die Innenraumlufthygienekommission des Umweltbundesamtes.

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EUROPEAN FIELD TEST PROCEDURE TO ESTABLISH AN APPROPRIATE $PM_{2.5}$ REFERENCE METHOD

Lothar Laskus

Background

In order to support the review of the First Daughter Directive 99/30/EC (EC, 1999) under the Air Quality Framework Directive 96/62/EC (EC, 1996) Working Group 15 of the European Standardization Committee (CEN/TC 264/WG 15) carried out an elaborate field study on $PM_{2.5}$ measuring methods. The purpose of this study was to establish an appropriate $PM_{2.5}$ reference method by testing all $PM_{2.5}$ methods of main interest in a field test procedure following a well documented quality assurance and control protocol. Standardization of a European $PM_{2.5}$ reference method is also part of the development process within the Clean Air For Europe (CAFE) programme of the European Commission (EC).

European PM $_{2.5}$ field test procedure

The EC-granted $PM_{2.5}$ field test procedure started in September 2000 and finished in July 2003. In order to cover a wide range of European climate conditions the field tests were conducted at nine sites spread all over Europe from North to South. The measuring sites involved in this study were located at: Aspvreten/S, Teddington/UK, Vredepeel/NL, Berlin and Duisburg/D, Madrid/ES, Rome/I and Athens/GR. Generally, the $PM_{2.5}$ test procedure should cover the same aspects as the PM_{10} test procedure described in CEN standard EN 12341 (EN, 1998): Assessment of an appropriate and practical reference method as well as a suitable test procedure to prove equivalence of further candidate methods to the reference method.

Different from the PM_{10} test procedure there was no primary reference method like the WRAC for the intercomparison of $PM_{2.5}$ candidate methods available. However, according to the decision of CEN/TC 264/WG 15 the $PM_{2.5}$ reference method has to meet the following requirements:

- The separation process of the $PM_{2.5}$ reference inlet must base on established first physical principles.
- The flow control of the reference sampler has to be related to ambient air conditions prevailing at the $PM_{2.5}$ inlet.
- The measurement uncertainty of the reference method calculated according to the GUM (ISO, 1993) must be very low.
- The reference method must base on the gravimetric evaluation of filters using a balance.
- The reference method should also be suited for the practice of $PM_{2.5}$ monitoring.
- The reference method must be constructed such that losses of particles by kinetic, thermal and chemical processes are minimized.

Furthermore, experiences gained from other studies shall be considered for establishing a $PM_{2.5}$ reference method.

Different from the requirements of CEN standard 12341 for testing PM_{10} candidate samplers the equivalence test procedure as laid down in the drafted CEN standard for $PM_{2.5}$ may be also applied to automated instruments. Former experiences made with several PM_{10} samplers in the framework of WRAC studies (van Elzakker et al., 1990) had shown that the separation efficiency of various PM_{10} samplers differed from each other up to 30 % at that time. Therefore, the EN 12341 focuses on judging only the separation efficiency of PM_{10} inlets rather than the sampling efficiency of complete automated methods. Nowadays, the construction of reliable $PM_{2.5}$ as well as PM_{10} inlets is not any longer a problem.

With respect to that and according to the above-mentioned requirements for a $PM_{2.5}$ reference method CEN/TC 264/WG 15 laid emphasis i.a. on the following test site criteria: High and low relative humidity, high and low ambient temperatures, strong solar radiation in summer as well as high and low amounts of ambient volatile particulate matter (nitrates). To check the feasibility of the test procedure regarding the test of automated instruments, these methods were also used in the field tests beside manual methods. In detail the following samplers and instruments were involved in the field test procedure:

- 2 Mini WRAC's (special construction of the Fraunhofer Institute for Toxicology and Experimental Medicine, Hannover; 0.172 mol/sec ~ 15 m^3/h)
- 2 US Federal Reference Samplers (WINS; 1.0 m^3/h)
- 2 LVS single channel samplers (2.3 m^3/h)
- 2 Partisol Plus sequential samplers (1.0 m^3/h)
- 2 SEQ 47/50 LVS sequential samplers (2.3 m^3/h)
- 2 HDI sequential samplers (30 m^3/h)
- 1 Beta-gauge "ADAM" (1.0 m^3/h)
- 1 TEOM SES (filter temperature 30 - 35 °C; 1.0 m^3/h)
- 1 Beta-gauge FH 62 I – R (1.0 m^3/h)
- 1 Beta-gauge BAM (1.0 m^3/h)

At all test sites, relevant meteorological parameters as well as the nitrate concentrations were measured.

The $PM_{2.5}$ CEN standard is being drafted in November/December 2003 and will be distributed as prEN to all member bodies of CEN (EU and EFTA countries) by the end of 2003. The voting time for the draft is five months.

As a draft Position Paper to revise the First Daughter Directive was prepared by the CAFE Working Group on Particulate Matter already in 2003 there was the need to give guidance on a $PM_{2.5}$ reference method before the final adoption of the $PM_{2.5}$ prEN for supporting the revision process. Therefore, the European Commission prepared a decision on a provisional $PM_{2.5}$ reference method (EC, 2003) in January 2003.

With regard to the requirements of CEN/TC 264/WG 15 the provisional $PM_{2.5}$ reference method shall be constructed such that devices, the sample and/or the filter of which can be heated up by solar radiation during sampling, shall not be used. To prevent losses of volatile particles as far as possible samplers shall be employed having an inlet system that samples as close as possible to the ambient temperature. The Commission Decision of January 2003 (EC, 2003) shall be valid until the drafted $PM_{2.5}$ standard is adopted by the EU Member States.

In general, the complete sampling train of the $PM_{2.5}$ reference sampler shall consist of impactor inlet, sampling position with filter placed inside the sampler's housing, connecting pipework between inlet and sampling position, flow measuring device installed behind the filter and flow-controlled pump. The volume flow measured by the flow measuring device has to be converted to ambient condition according to Boyle-Mariotte's law. In order to fulfil the requirement to sample as close as possible to the ambient temperature, the connecting pipework can be protected by sheath air or the flow velocity inside the pipe has to be high, e.g. in the range of some m/sec.

The requirements concerning an appropriate $PM_{2.5}$ reference method and criteria for the test sites to prove equivalence of candidate methods to the reference method base on experience gained in connection with the $PM_{2.5}$ field test procedure, further $PM_{2.5}$ and also PM_{10} measurements. Therefore, CEN/TC 264/WG 15 recommends to adapt the EN 12341 to the new $PM_{2.5}$ standard. As the EN 12341 dates from November 1998, this standard can be reviewed after five years in November 2003.

Experiences in Germany

A separate particulate matter comparison field test study was conducted by a PM working group of several State Environmental Agencies in Germany. Scope and purpose of the study was to compare manual PM_{10} samplers with automated PM_{10} instruments. These tests were conducted at a measuring site of the Hessian Agency for Environment and Geology in Wiesbaden from February to September 2003. It could be shown that the sampled filters of a sequential PM_{10} sampler equipped with sheath air did not exhibit any remarkable losses even after a storage time of 30 days. Inside the sampler's housing the blank filters as well as the sampled filters were stored in separate magazines, each covered by a cap.

Additionally, the sampled filters were covered inside their magazine such that the air volume above filters was too small to absorb volatile material, that could be evaporated from the dust deposited on the filter. It is to note that the PM_{10} fraction contains the same amount of volatile particles as the $PM_{2.5}$ fraction. Insofar, these PM_{10} results may be also valid for $PM_{2.5}$. The results of this comparison field test will be published by the above-mentioned working group in spring 2004.

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GUM – Guide to the expression of uncertainty in measurement. ISO, 1993.

EC Council Directive 96/62/EC of 27 September 1996 on ambient air quality assessment and management. Official Journal of the European Communities, 21 November 1996, L 296/55 – L 296/63.

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EC Commission Decision of 16 January 2003 concerning guidance on a provisional reference method for the sampling and measurement of $PM_{2.5}$ under Directive 1999/30/EC. Official Journal of the European Communities, 17 January 2003, L 12/31 – L 12/33.

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NOTES AND NEWS

Launch of AIRNET ALERT

In summer 2003 AIRNET launched a new air pollution and health tool: Airnet Alert. Airnet Alert is aimed at policy makers and representatives from industry, non-governmental organizations, health care professionals and patient support groups working within the fields of air pollution and health. Airnet Alert was set up to alert visitors to new scientific research findings which may have important implications for policy development.

Information is disseminated through summaries of recently published peer reviewed papers or reports. The summaries, written by AIRNET members and contractors, are aimed at a non-specialist audience and highlight the policy implications of the research.

AIRNET would like to thank its members for their continuing effort in writing the summaries and ensuring the scripts are user-friendly, and Eef van Otterloo for his time and expertise in creating the database.

You can visit Airnet Alert by going to the Airnet website (http://airnet.iras.uu.nl) and clicking on the Airnet Alert button.

Health Impacts of Transport-Related Air Pollution

Research during the past 10-20 years consistently indicates adverse health effects of outdoor air pollution and points to road transport as an important source of these effects. There is increasing concern that transport related air pollution is responsible for a considerable number of deaths each year in Europe. Yet, there are still many open questions regarding the health effects of transport-related air pollution as well as the associated public health impact, the efficiency and adequacy of implemented air quality and traffic policies and benefits of alternative transportation technologies. The findings emerging from the new research need interpretation in order to be useful for risk assessment and risk management of air pollution.

WHO has launched a project whose aim is to systematically review recently published studies addressing the health hazards of air pollution from road transport. The review considers the entire chain from emissions to health effects, including fuel quality and additives, engine and after-treatment technologies, transport patterns, primary emissions, atmospheric concentrations, human exposure patterns, epidemiological findings and toxicological assessment of biological mechanisms. Invited experts are preparing the background material, which will be reviewed by the working group. The recent WHO/Europe assessment of the health aspects of particulate matter, ozone and nitrogen dioxide will provide an additional input to the discussion.

Following the preparatory work of WHO and consultation with a broad range of specialists, including the discussion at the Working Groups of the AIRNET project the scope and outline of the review was set in 2003.

Invited experts prepared the first draft of the Monograph. The Working Group task is also to evaluate the accumulated evidence and to formulate conclusions on the present understanding of the health impacts of the pollution emitted by transport. The Working Group will make recommendations on future actions leading to the reduction of health risks due to air pollution from transport as well as further research allowing effective risk reduction. The monograph will be published in 2004.

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EC Strategy on Health and Environment

The presence of natural or man-made hazards is a source of environmental diseases, which might be seen as the visible and clinical indication of inadequate environmental conditions. Key areas of action could be: Outdoor and indoor air pollutants quality, Noise, Indoor environment and housing conditions, Water quality contamination, Electromagnetic fields and radiation, Chemical exposures.

The impact of these factors are felt in association with hearing problems, sleeping disorders, stress leading to hypertension and other circulatory diseases, skin and other cancers, asthma, or birth defects.

The Commission has adopted on 11 June 2003 a Community's strategy for health and the environment. The strategy proposes to develop actions to tackle specific diseases such as asthma and respiratory allergies or to better prevent health from environmental risks such as pesticides residues. But the new strategy will also set up permanent monitoring and reporting systems to identify new emerging threats and to assess the health impact of the actions implemented at Community and national level (http://europa.eu.int/comm/health/ph_determinants/environment/Pollution/keydo_health_environment_en.htm).

An action plan on environment and health will be developed to implement the strategy and a consultative process has been set up (http://europa.eu.int/comm/environment/health/index_en.htm).

To start developing the tools needed by this approach the new public health programme of EC DG Sanco will support the establishment of networks to analyse the existing scientific knowledge and to assess the consistency and the progress made in the implementation of the Community's Health and Environment legislative framework.

The new health information system, which will also operate in the field of environment, will form the most important source of reliable data for the health impact assessment of environmental factors. In co-ordination with the activities developed under the rapid reaction systems for non-communicable diseases, the elements for an integrated and efficient approach of to tackle the environmental health determinants will be in place.

WHO Headquarters New Web Site on Human Environment

Within the WHO European Region the 4th Ministerial Conference on Environment and Health will be held from 23 to 25 June 2004 in Budapest, Hungary, and is focused on "The Future for Our Children" (http://www.who.dk/eprise/main/WHO/Progs/BUD/Home). Children's environmental health is one of the areas of work featured on the new web site for WHO's Protection of the Human Environment (PHE) programme of WHO headquarters.

The web site provides resources such as guidelines, briefings and publications, databases and statistics, training materials, press releases, links to partnering organizations and collaborating centres, and event announcements. See more: http://www.who.int/phe/en/

MEETINGS AND CONFERENCES

ISEE-CEE: The Future for our Children – Conference of the Central-Eastern European Chapter of International Society for Environmental Epidemiology 4 to 6 September 2003 in Balatonföldvar, Hungary

In 2003, the Central and Eastern European Chapter meeting was organized in Hungary. It was a good opportunity to offer a possibility for the researchers of environmental health to meet in Central Europe considering the fact that participation at the ISEE Conferences out of Europe is a great problem for lots Central-Eastern European members of the Society. This occasion fitted in the row of several successfully organized conferences in the Slovak Republic and in Poland. 58 participants representing 16 countries participated at the Balatonföldvar Conference, 38 presentations were grouped in six sessions and 23 posters were displayed in two poster sessions.

The theme of the conference was the "The future for our children" in order to get an overview of the related research findings in light of the preparation for the 4th Conference of the Ministers of Environment and Health to be held 23-25 June 2004 in Budapest with the same topic.

The **keynote presentations** gave a light on the main topics of the 4th Ministerial Conference. Its major document will be the "Children, Environment and Health Action Plan for Europe (CEHAPE)" – the scope and framework of the CEHAPE under WHO guidance (Leda E. Nemer, WHO/EURO Regional Office, Rome Division) was presented at the Conference. The need for a harmonised environmental health indicator system was already recommended by the Declaration of the 3rd Ministerial Conference 1999 in London. The system has been elaborated within the frames of a WHO project, its scope, purpose and the preliminary results were summarized by Dafina Dalbokova (WHO European Center for Environment and Health (ECEH), Bonn Office). The scientific activity of Hungary in the preparation for the 4th Ministerial Conference was presented by Gyula Dura, director of the National Institute of Environmental Health, National Center for Public Health of Hungary.

The *topic of the first session* was **"Environmental health impact in children".** Several Hungarian study groups analysed the impact of transport on respiratory diseases especially asthma, allergic diseases and chronic bronchitis. It was concluded that the number of children with allergic or asthmatic symptoms was growing both at national and at international level. Moreover, a significant association was found between the prevalence of asthmatic symptoms of children and living near busy roads in towns. On the contrary, this impact was not significant in rural areas which was explained by the different level of air pollution in rural areas. An unexpected finding was reported, namely an association was found between agricultural airborne pesticide vapours attaining inhabited areas with respiratory symptoms of school children in rural areas of Hungary. The self reported allergic symptoms were nearly twice more frequent in exposed areas than in unexposed areas. Another study revealed that 11-15% of 6-14-years old children suffered from allergic respiratory diseases in two counties in Hungary. 58% of the allergic children were allergic to grass and 55% to ragweed. However, a considerable proportion of ragweed positive pupils were also allergic to other types of pollen. The exposure to high concentration of air pollutants during the 3rd trimester of pregnancy significantly increased the risk of premature birth in polluted cities in Poland.

In the session of "**Outdoor air quality**" the results of the **APHEIS (Air Pollution and Health: a European Information System)**: a health impact assessment of air pollution in 26 cities project were discussed with a special emphasis on the Central and Eastern European cities (www.apheis.net). It was pointed out that a reduction of 5 µg/m^3 annual mean of the PM10 levels in 19 cities of Europe would lead to a reduction in total mortality (number of premature deaths of 5547 95% CI: 3368-7744) – out of them 1220 in the CEE cities. The health impact assessment carried out by APHEIS provided a conservative but accurate and detailed picture of the impact of air pollution on health in 26 European cities, and shows that air pollution continues to threaten public health in Europe. It should be stressed that even very small and achievable reductions in air pollution levels have a positive effect on public health even in cities with low levels of air pollution.

Another main environmental pollution problem in several CCE countries is **long term PCB** exposure. A higher blood level of PCB was detected in children living in polluted areas of the Czech and the Slovak Republic as well as in the Russian Federation.

In the session "**Water and Health"** a report was given on the present state of the development of the surveillance of water related diseases as a part of the fulfilment of the Protocol of Water and Health, a legally binding treaty, adopted by the 3rd Ministerial Conference.

In the frame of the Conference, WHO/ECEH organised a workshop on **Environmental Health Indicator System**. The aim of this system is to support the monitoring of public health and environmental policies. Currently the process focuses on setting up the system, to link with assessment and reporting mechanisms. Information on the project is regularly published on the WHO/Europe Web: www.euro.who.int/Ehindicators.
The system allows monitoring population health status related to risks in ten most relevant environmental issues, its determinants and trends at different geographical scales. Through their built-in system of international comparisons the EH indicators enable the effects of the national efforts to be compared with the situation in other participating countries to facilitate policy evaluation and planning. Several countries, involved in the project – Germany, UK, Poland, Lithuania, Romania, Hungary, Netherlands, Czech Republic – showed the results of their own pilot study.
Global climate change and health was discussed in six presentations. Bettina Menne (WHO/EURO, Regional Office, Rome Division) pointed out that the effect of extreme heat waves of this summer called the attention of the scientists and politicians to work out and implement preventive measures.
In the session of **"Lifestyle"** a presentation from the Slovak Republic reported the preliminary results of the development of a complex health impact assessment (HIA). This methodology of HIA should help the assessment of health hazards related to children from prenatal life to the present period of life. A current problem was touched by a colleague from Romania: hypertension and obesity among school children. The survey showed positive relationship between blood pressure and body mass index. A positive family history of cardiovascular diseases is an important risk factor in teenagers with hypertension. Other significant risk factors for hypertension were coffee and cola consumption and smoking.

Rural health is of major concern in Central and Eastern Europe. A study group from the Slovak Republic used life expectancy as a relevant health status indicator for evaluation of the health status of rural and urban population. Major environmental health problems are the quality of drinking water of wells, a lack of waste water treatment and improper waste disposal. The main sources of air pollution is local heating and burning household waste, other problems: exposure to chemicals, mainly pesticides, socio-economic factors namely high unemployment rate, poor diet, stress, unhealthy lifestyle as well as limited access to health care services.

23 posters were discussed on the last day of the Conference. The studies called the

attention of the major environmental as well as social-economic factors affecting the health state of children. Low birth weight of newborns and pre-term delivery was found more frequent among gypsy mothers in Slovakia. Smoking in prenatal and postnatal childhood was associated with higher level of Pb, Hg, Cd in blood in a Slovak study. The growing rate of smoking prevalence in young adults in Romania was highlighted: namely 40% of young adults smoke and 37,5% of them are passive smokers. An increasing noise exposure was identified in Bulgaria associated with increased frequency of mental disorders, diseases of circulatory system and of digestive system. A study concluded that boys were more susceptible to develop cardiovascular diseases than girls.

A Hungarian group studied the **harmful effects of tropospheric ozone** by applying the APHEIS methodology. Increasing ozone concentration related to higher traffic rate and higher summer temperature significantly increased mortality in Budapest. It was suggested include the health impact assessment of ozone when studying the effect of air pollutants. The effect of stratospheric ozone depletion was studied by GIS methods, as well: a positive association was found between the spatial distribution of morbidity of melanoma and cataract and the levels of global radiation in Hungary.
The oral presentations of the Conference can be found at the web site http://www.pzh.gov.pl/isee

The members of the CEE chapter of the ISEE elected the president for the next two years: Anna Paldy MD, MPH, PhD and the Secretary: Esther Erdei MSc, PhD both from the National Institute of Environmental Health, Budapest, Hungary.
The kind support of the Hungarian Ministry of Health, Social and Family Affairs and the WHO in organising the Conference is acknowledged.

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ISEA 2003 - Annual Meeting of the International Society of Exposure Analysis 21 to 25 September 2003 in Stresa, Italy

In the early days of air pollution analysis, the focus was on outdoor air pollution. Towards the end of the 1970ies, awareness grew that people do not spend their time where the air monitors are installed, but rather at home, at their workplaces, in restaurants, bars, theatres, and other confined spaces. This was the starting point for growing activity in a new research area, namely indoor air quality. Much work was devoted to determining the concentration levels of various chemicals in indoor air. However, in the course of this work it became clear that generating more information about the composition of indoor could also not be the one and only thing to be done if we are interested in the body burden of pollutants. "Exposure" became the magic word. Exposure takes into account the intake of pollutants via inhalation, and through oral and dermal uptake. To promote the theme and to give scientists working in this field a platform, a society was formed, the International Society of Exposure Analysis (ISEA; for more information see: www.iseaweb.org).

ISEA publishes the Journal of Exposure Analysis and Environmental Epidemiology and organises annual meetings at which the newest research findings concerning exposure analysis are presented and discussed. This year, ISEA 2003 took place in Stresa, Italy, on 21-25 September. The conference was attended by some 400 scientists and comprised 6 plenary lectures, 10 oral and 8 poster sessions, and 12 workshops. This report addresses only the part of the conference that was devoted to exposure to indoor and outdoor air pollutants, especially from the sessions “Indoor exposure” and therefore is not meant to be comprehensive.

Generally speaking, exposure to air pollutants can be measured by doing personal sampling, i.e., by having an individual wear a monitor all day long for one or more days. This gives direct information on the pollutant concentration in the air that this individual has breathed. As this approach cannot always be followed due to the logistical and financial problems, and the difficulty to obtain the co-operation of people, a modelling approach is often being used. In this approach one needs to know the time spent in a specific microenvironment (home, office, car, outdoors) and the pollutant concentration in this microenvironment. Papers covered both aspects, with many of them having reported on the first step of the modelling approach, namely the determination of the concentration levels of various pollutants in the various spaces.

In most of the papers and posters that were presented, emphasis was on quite well-known compounds, such as environmental tobacco smoke, volatile and semi-volatile compounds (VOC, SVOC), nitrogen dioxide, and carbon monoxide. Presentations on microbiological agents were scarce, perhaps due to the fact that exposure to these agents can be less well defined. While the findings that were presented enlarge the body of knowledge, no spectacular new results were presented. From the discussion it became clear that biomonitoring is closer to exposure analysis than air concentration monitoring only for compounds with longer half-life in the body. These are generally to be found among the SVOC and not the VOC. The possibility to model exposure are not sufficiently developed yet and measurement work needs to be continued to validate the existing models.

The particulate matter issue was addressed in part in this session, but mainly in a separate session exclusively devoted to this topic. Over the last few years, extensive work has been carried out in Europe in the framework of the EXPOLIS study that was run in parallel in 6 European cities and considered $PM_{2.5}$ exposure. Source apportionment work unveiled that, depending on the city, between 55 and 75 % of personal exposure to $PM_{2.5}$ came from outdoor air, which underlines the need for further control measures of ambient air quality.

In the US, repeated measurements were made during the last few years of outdoor, indoor and personal air on persons with chronic obstructive pulmonary disease, and coronary heart disease. Personal $PM_{2.5}$ exposure was higher than indoor concentrations by several $\mu g/m^3$, and longitudinal correlations between personal and outdoor air ranges from 0.1 to 0.89.

As the average persons spends between 5 and 10 % of the daily time in means of transportation (car, bus, train), it is also of interest to know what contribution these microenvironments make to total daily air exposure. Studies in Finland showed that $PM_{2.5}$ concentrations inside a metro car were almost equal to ambient air concentrations when the car was running in the open air (15 to 25 $\mu g/m^3$). However, they increased by a factor of 5 to 8 after the metro car had entered the tunnel. Analysis of the elemental composition of particles inside the metro car and, equally, at an underground station showed that iron oxide was the major constituent of the particles (up to 90 %). In contrast, at an outdoor air metro station, iron oxide amounted to about 20 % of the particle mass.

In addition to the topics addressed here briefly, the meeting covered a wide range of exposure-related issues, among them workplace exposure, exposure to food contaminants, exposure to biological risks in health care facilities, and methodological issues to only name a few.

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AIR QUALITY – Assessment and Policy at Local, Regional and Global Scales
The 14th International Conference, 6 to 10 October 2003 in Dubrovnik, Croatia

The international conference Air Quality – Assessment and Policy at Local, Regional and Global Scales was organized by Croatian Pollution Prevention Association (CAPPA) and International Union of Air Pollution Prevention and Environmental Protection Associations (IUAPPA). More than 190 delegates from 19 countries attended the conference. Countries represented were: Austria, Brazil, Bulgaria, Canada, Croatia, Finland, France, Germany, Italy, Israel, Japan, Latvia, Portugal, Slovakia, South Korea, Switzerland, Taiwan, UK and the US. The working part of the conference started with nine plenary lectures and continued afterwards in five sections in the form of 68 oral and 23 poster presentations. Section titles were: Emission and Control, Monitoring and Measurement, Global and Regional Environment, Impacts and Air Quality Studies. In extenso papers of the presentations are presented as both hardcopy and CD version of the conference proceedings distributed to the participants at the conference site (ed: Kresimr Sega, 800 pp).

Significant contribution to current information on air pollution as well as its understanding gave the numerous papers covering local studies of pollutant emissions and immission measurements. Another significant group of presentations covered the field of health impacts and its assessment. It could be concluded from the numerous discussions which were held after each presentation that three major overarching conclusions emerged:

- The science is progressing more rapidly than policy instruments. Over the coming years the framework of air quality policy and management, in particular some principal elements such as limit values, will need to be fundamentally reassessed in order to take account of some of the emerging results of scientific assessment.

  Another important conclusion is that the concept of personal exposure is assuming increasing importance and that current policy systems do not adequately take account of it.

- From some of the presentations it could be concluded that there remains a gulf between the scientific perception and the public perception of air pollution. When we recall that the further reductions in air pollution rely substantially on voluntary changes in personal behaviour by individuals, the above mentioned conclusion becomes of greater significance. This goal will be very difficult to achieve if this gulf persists to remain in such extent. The common perception and understanding between scientists and policy makers on the one hand, and the public at large on the other, should be achieved.

- The most important single contribution was however in the development of the relationship between the air pollution at local, regional and global environment. This issue highlights the critical interface between the air pollution and global climate change, inadequately covered in recent years. This problem needs to come to the forefront of scientific and policy review.

In clarifying and highlighting these conclusions, the conference represented a major contribution to the scientific and policy foundation for the next World Congress in London in August 2004 (see: www.kenes.com/cleanair/).

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Air Quality and Health in Eastern Europe, Caucasus and Central Asia
13 to 14 October 2003 in St. Petersburg, Russian Federation

The Air Quality and Health programme of the WHO European Region organized this conference, with financial support of the German Ministry for the Environment, Nature Protection and Nuclear Safety. The main purpose of the WHO meeting was to support Eastern Europe, Caucasus and Central Asia (EECCA) countries in their efforts to reduce the health risk due to ambient air pollution. Such a reduction is urgently needed, since urban air pollution has a major impact on health in Europe, in particular in the Eastern parts of the WHO European Region. Consequently, the reduction of air pollution was listed as one of the key objectives of the environmental strategy for EECCA countries adopted by the 5th Ministerial Conference "Environment for Europe", held from 21 to 23 May 2003 in Kiev, Ukraine. The optimization of standards, accounting for health impacts based on WHO criteria was adopted as a key measure required. WHO/Euro was requested to facilitate the implementation of this action.

Representatives from both the health and the environmental sector of Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Ukraine and Uzbekistan reported at the St. Petersburg meeting on current practice of air quality monitoring and management in their countries. Many experts drew the attention of the participants to the fact that road traffic with private cars and also freight transport are rapidly increasing in these countries, and that use of low quality fuels was quite frequent. This has led to an increase in the emissions of harmful pollutants, in particular in urban situations. On the other side, it became obvious that presently applied air quality monitoring and assessment systems were established several years ago, implementing regulations and standards which were developed decades ago and which therefore did not take into account the most recent evidence on health effects of ambient air pollution. Currently, a number of different pollutants is measured in these countries. However, since no major increases in allocated resources can be expected, it is essential to focus on those pollutants, which – according to state-of-the art scientific knowledge – give rise to the most severe health effects on a population basis. As an example, there are hardly any measurements of fine particulate matter (PM_{10} and $PM_{2.5}$) in these countries, even though several scientific studies and assessments have linked this pollutant to severe health effects.

The meeting confirmed the urgency of the need to revise the current legal and practical framework of health related air quality monitoring and assessment at the EECCA countries and requested the Air Quality and Health programme of WHO/Euro to actively support this process. It was agreed that as an initial step, health-related monitoring of fine particulate matter (PM_{10} and $PM_{2.5}$) should be launched. The meeting document will be published by the WHO/Euro soon.

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Second AIRNET Annual Conference / NERAM International Colloquium
'Strategies for Clean Air and Health'
5 to 7 November 2003 in Rome, Italy

"What is it we policy makers want from scientists? Scientists don't need to tell us what to do, but tell us what will happen" (Conference participant)

On 5 to 7 November 2003 scientists, stakeholders and policy makers from all over the world came together in the beautiful surroundings of Santo Spirito Hospital near St Peter's Basilica in Rome to discuss science-policy issues in air pollution and health. Even the Pope was spotted by some of the participants which let us to wonder whether air pollution is high on the Vatican's agenda as well.
The first day of the conference focused mainly on AIRNET activities and what progress AIRNET has made over the past two years. Since the initiation of AIRNET working groups in the disciplines of exposure, epidemiology, toxicology, health impact assessment and science-policy interface have been formed and draft reports have been written. This has lead to the creation of a network within air pollution and health where scientists can discuss and exchange research findings. Over the past year AIRNET work has focused on greater involvement of stakeholders. As a part of this work the results of the AIRNET stakeholder survey were presented.

What is AIRNET?

- Multi stakeholder project in the field of air pollution and health
- Main objective: to create a widely supported basis for public health policy related to improving air quality in Europe and regulatory needs to achieve that goal
- Co-ordinated by Bert Brunekreef (Institute for Risk Assessment Sciences) and Leendert van Bree (Netherlands Environmental Assessment Agency)
- For more information please visit the AIRNET website: http://airnet.iras.uu.nl/

In addition AIRNET has been developing a communication plan to improve communication of air pollution and health information.

In the afternoon the AIRNET working groups met to discuss the progress of their reports and how to improve them for readability. The main focus of these discussions was how to communicate research findings to stakeholders and end-users. Each working group was asked to select 10 questions from the list of stakeholder questions gathered through the stakeholder survey and presentations at the first AIRNET conference. These questions will be answered in the final working group reports. Much discussion was focused on how to answer stakeholders' questions which tend to be not as specific as scientists would prefer.

The next two days of the conference were jointly run with NERAM (Network for Environmental Risk Assessment and Management, Canada) and included plenary and break-out sessions as well as poster presentations discussing science-policy interface issues. The first break out session discussed the key scientific findings important for air quality policy strategies and the key scientific issues and uncertainties which need to be resolved to guide effective policy decisions. The second break out session discussed priority strategies that should be implemented over the next five years to achieve improvement in air quality and health.

Plenary presentations were given by a range of professionals from different backgrounds working in the field of air pollution and health: researchers, representatives from industry, representatives from national regional and international government and environmental non-governmental organisations. Despite the varying backgrounds the conference managed to engage various stakeholders to better communicate with one another in both formal and informal settings.

The first presentation by David Briggs (Imperial College, London) introduced the issue of information mismatch: much information is available but for some reason it does not reach the policy maker. Briggs also referred to the GMES project where they are trying to examine the barriers to information flow between scientists and policy makers. This was also an issue coming out of the AIRNET stakeholder survey where the respondents stated that the problem is not that information is not available but that it is not presented in a useable format.

Uncertainty of research findings was also an important issue discussed throughout the conference. It was suggested that uncertainty and hypothesis analysis could be used to guide policy makers in their decisions. Both Ken Ogilvie (Pollution Probe, Canada) and Rob Maas (Netherlands Institute of Public Health) emphasised that uncertainty should not be used as a reason for inactivity. In discussion, Heather Walton (Department of Health, UK) suggested that it may be more useful if scientists defined degrees of uncertainty. This was discussed in greater detail by Peter Wicks (European Commission) who proposed a terminology to be used by scientists and policy makers to express and communicate the level of certainty of research findings.

Tony Clarke-Sturman (Shell International Petroleum) introduced a panel discussion session on the topic of technology contributions to clean air. The overall message from the panel was that technology and the corresponding infrastructure takes time to develop and implement. Although there was some criticism of the slow reaction by industry to implement clean air technologies, this session provided some useful discussion and also raised the issue that individual lifestyle wishes play an important role in the success of reducing emissions.

THIRD AIRNET CONFERENCE

21 to 23 October, 2004
Prague, Czech Republic.

The meeting will be co-hosted by Prof. Radim Sram, Institute of Experimental Medicine AS CR, Prague, Czech Republic.

Provisionally, the emphasis in this meeting will be on:

- Air pollution and Health in central and eastern Europe: Challenges for policy
- Science and stakeholders: Has AIRNET narrowed the gap between the two?
- AIRNET on display: presentation of main products and deliverables

The meeting will be held in the Prague Movenpick hotel, which is located opposite from the famous Bertramka villa (Mozart Museum) and near the historical city.

Please visit http://airnet.iras.uu.nl/ for continuous updates on registration and programme details

The plenary and breakout discussions also raised the need to look at air pollution and health from a wider perspective. For example, the link between the increasing number of susceptible groups to air pollution exposure such as those with diabetes or those in lower socio-economic groups was mentioned. There was also discussion on the need to address air quality through policies such as land use planning and urban development rather than focusing only on air quality standards.

Policy makers from different parts of Europe and North America gave presentations about their experiences in developing and implementing policy. Bart Croes (California Air Resources Board) gave a fascinating talk about California's air pollution policies. California distinguishes itself from the rest of the US with its more stringent air pollution standards. And with the new governor's election promise to terminate the air pollution problem Croes was interested to see how much further they could go.

We thank Francesco Forastiere (Rome Health Authority) for the excellent co-operation and hosting of this conference. Our overall impression of the conference is very positive. It brought together a number of people with different backgrounds working within the field of air pollution and health which stimulated lively discussions. We are very much looking forward to continuing these discussions at AIRNET's next conference to be organised in Prague in 2004.

Shortly, you will be able to find the conference presentations as well as a conference document on the AIRNET website (http://airnet.iras.uu.nl/).

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PUBLICATIONS

WHO

Environmental Health in Emergencies and Disasters

B. Wisner and J. Adams, WHO Publications, Geneva 2003, 280 pages, ISBN 92 4 154541 0, Sw.fr. 60,-, in developing countries Sw.fr. 42,-

This volume distills what is known about environmental health during an emergency or disaster. It draws on results from the International Decade for Natural Disaster Reduction, and on experience with sustainable development between the two Earth Summits, in Rio de Janeiro and Johannesburg. It is intended for practitioners, as well as for policy makers and researchers, and thus covers both general and technical aspects of environmental health.

In Part I of this volume, a conceptual framework is presented for understanding environmental health issues in the context of disaster management. The framework covers the entire disaster-management cycle, from preparedness and warning, to recovery and prevention. Guidelines are also suggested for planning and reducing the effects of extreme events on public health, and practical guidance is given in organizational and logistical matters. Throughout, the need for flexibility and innovation at the local level is emphasized, combined with solid advance planning. There is also a focus on the vulnerability of populations during an emergency or disaster, with the implication that such people have capacities and local knowledge that should be integrated into efforts to secure both environment and development against extreme events. The creative potential of balancing “top-down” and “bottom-up” approaches is emphasized in chapters on health promotion and community participation, and on human resources.

Part II of this book is a detailed compendium of best practices and strategies for risk reduction and response in the fields of: Shelter and emergency settlements; Water supply; Sanitation; Food safety; Vector and pest control; Control of communicable diseases and prevention of epidemics; Chemical incidents; Radiation emergencies; Mortuary service and handling of the dead; Health promotion and community participation; and Human resources.

This book will be useful in planning for, responding to, and recovering from the movements of displaced persons and refugees in humanitarian crises, as well as the floods, storms, earthquakes and other extreme events that could confront health workers in the first decade of the 21st century.

Exposure Assessment in Studies on the Chronic Effects of Long-term Exposure to Air Pollution – WHO/HEI Workshop in Bonn, Germany, 4 to 5 February 2002

WHO Regional Office for Europe, Copenhagen 2003, available through the net: www.who.dk/document/e78992.pdf .

The few published worldwide studies all indicate a significant health burden caused by long-term exposure air pollution. Such studies need to be conducted in a variety of populations to answer detailed questions about the nature of pollution responsible for the health effects, as well as the characteristics of susceptible population groups. These would also help to inform policies to reduce health risk due to air pollution. Accurate assessment of long-term exposure of study subjects is a critical element in such studies, and is the aspect that poses the most challenges to investigators. This workshop, convened by WHO in collaboration with the Health Effects Institute, reviewed the exposure assessment in long-term studies and formulated recommendations addressed to the investigators as well as to the research funding agencies, with the aim of optimising future research. The recommendations relate to epidemiological objectives and design, studied outcomes, the use of ambient air monitoring data as well as the use of exposure models, spatial modelling, personal monitoring and other methods.

Role of Human Exposure Assessment in Air Quality Management – WHO/Joint Research Centre Workshop in Bonn, Germany, 14 to 15 October 2002

WHO Regional Office for Europe, Copenhagen 2003, available through the net: www.who.dk/Document/E79501.pdf .

European countries have put major efforts into formulating and implementing abatement strategies for outdoor sources, while indoor sources may not have been adequately taken into account. Consequently, the present approaches may not be effective in reducing the health risks linked to pollution. This workshop evaluated how appropriate the current exposure assessment methods are when designing and implementing comprehensive policies and air quality management approaches to address the health risks of air pollutants from both outdoor and indoor sources. After reviewing the presently available methods of exposure assessment, the workshop participants agreed that, for certain air pollutants, well designed outdoor air quality assessment and management approaches may be appropriate tools to reduce the health risks of pollution.

OTHERS

Air quality monitoring in Central Asia and the Caucasus

Working Paper Document (see: http://www-wds.worldbank.org/servlet/WDSServlet?pcont=details&eid=000094946_01010605374365)

The report summarizes the air quality monitoring component, as part of the regional study on Cleaner Transportation Fuels for Urban Air Quality Improvement in Central Asia and the Caucasus, and intends to implement environmental air quality monitoring for key air pollutants in two cities, Baku (Azerbaijan), and Tashkent (Uzbekistan), and, assess the current air quality monitoring system, providing recommendations for improvement. The methodology for sample collection, and analysis employed in Central Asia and the Caucasus are common to all former Soviet Union republics, whereas the continuous data from automatic analyzers, show the variability, and transient nature of pollution episodes, none of which could be captured from the sampling strategy currently in use in those countries. In Central Asia and the Caucasus, only total suspended particulates (which include coarse particulates having no impact on human health) have been measured, and no data are available for fine particulates, thus, there are many shortcomings in the measurement of total suspended particulates. Recommendations to improve current systems of air quality monitoring include: sampling integrity; site maintenance (overgrowing vegetation will act as a sink for acidic pollutants, compromising the validity of data); site locations (deploy sites among varied industrial/rural/suburban areas); sample collection methodology; filter collection systems (longer lead and particulate sampling); and, measure pollutants on a regular basis.

Urban air quality management - coordinating transport, environment and energy policies in developing countries

Working Paper Document (see: http://www-wds.worldbank.org/servlet/WDSServlet?pcont=details&eid=000094946_01100204051788)

Transport-related air pollution is increasingly contributing to environmental health risks in many developing country cities. The social costs of poor urban quality can be significant, making this issue an immediate priority. Long-term measures for dealing with the problem include urban planning, and traffic demand management. This paper however, focuses primarily on cost-effective measures, that are feasible to implement, and that can bring measurable results in the short to medium term. There is a tendency in the environment sector, to focus narrowly on controlling emissions by importing the best available technology. Cost-effective, and sustainable solutions, however, require much broader approaches. In developing countries, improving air quality is not simply a matter of importing advanced technologies, while, choices concerning feasibility, sequencing, and timing of pollution reducing measures, have serious fiscal, and economic consequences. Thus the guiding principle for selection of strategies, should be the balancing of costs, benefits, and technical, and institutional feasibility. Monitoring, and enforcement are essential , but countries need to know the nature, and magnitude of the pollution problem, to determine the speed, and rigor with which policies should be implemented. Furthermore, pollution enforcement measures have implications on petroleum taxation, and on the tariff regime, as well as for traffic management.

Jahresbericht der Luftgütemessungen in Österreich 2002

W. Spangl, C. Nagl, Umweltbundesamt Österreich, Wien 2003, 116 Seiten, ISBN 3-85457-699-4, EUR 7,50, auch als pdf-download erhältlich unter: www.ubavie.gv.at/.

Jahresbericht 2002 – Luftgütemessungen des Umweltbundesamtes und meteorologische Messungen

W. Spangl, C. Nagl, Umweltbundesamt Österreich, Wien 2003, 82 Seiten, ISBN 3-85457-698-6, EUR 7,50, auch als pdf-download erhältlich unter: www.ubavie.gv.at/.

Air Pollution in the Czech Republic in 2002

J. Fiala, J. Ostatnická (eds.), Czech Hydrometeorological Institute, Prague 2003, 158 pages, ISBN 80-86690-07-5, for more information, see: www.chmi.cz/indexe.html.

Environmental Health Monitoring System in the Czech Republic – Report 2002

V. Puklová, P. Denková (eds.), National Institute of Public Health, Prague 2003, 134 pages, ISBN 80-7071-215-5, also available through the net: www.szu.cz/chzpa/sumrep.htm

Proceedings of 4th International Conference on Urban Air Quality, Measurement Modelling and Management

R. Sokhi, J. Brechler (eds.), Atmospheric Science Research Group, Hatfield 2003, UK, 499 pages, £ 42.-, for more information, contact: C.M.Shepperson@herts.ac.uk

COMING EVENTS

2004

January 2004

25 Jahre NABEL – Nationales Beobachtungsnetz für Luftfremdstoffe
16 January, Akademie Dübendorf, Switzerland.
For information, see: www.empa.ch/nabel

March 2004

First International Conference -Molecular Research in Environmental Medicine
18-20 March, Düsseldorf, Germany. For information, see: http://www.iuf.uni-duesseldorf.de/MRIEM

Third International Conference on Children's Health and the Environment
31 March-2 April, London, UK. For information, see: http://www.pinche.hvdgm.nl/pinche_conferences.html

April 2004

MIAP 2004 – Monitoring Indoor Air Pollution - The Second International Conference
20-21 April, Manchester, UK.
For information, see: www.doc.mmu.ac.uk/aric/

May 2004

Gordon Research Conference on Biogenic Hydrocarbons and the Atmosphere
2-7 May, Castelvecchio Pascoli, Italy.
For information, see: www.grc.uri.edu/

Urban Transport 2004 – Xth International Conference on Urban Transport and the Environment in the 21st Century
19-21 May, Dresden, Germany.
For information, see: www.wessex.ac.uk

June 2004

XXIIIth Congress of the European Academy of Allergology and Clinical Immunology
12-16 June, Amsterdam, The Netherlands.
For information, see: www.congrex.com/eaaci2004

The Sustainable City 2004 – Third International Conference on Urban Regeneration and Sustainability
16-18 June, Siena, Italy.
For information, see: www.wessex.ac.uk .

AWMA 2004 – 97th Annual Conference and Exhibition of the Air and Waste Management Association
20-24 June, Indianapolis, Indiana, USA.
For information, see: www.awma.org

Air Pollution 2004 - XIIth International Conference on Modelling, Monitoring and Management of Air Pollution
30 June-2 July, Rhodes, Greece. For information, see: www.wessex.ac.uk/conferences/2004/air2004/cfp.html

August 2004

XIIIth World Clean Air and Environmental Protection Congress and Exhibition
22-27 August, London, UK.
For information, see: www.kenes.com/cleanair/

September 2004

Risk Analysis 2004 – Fourth International Conference on Computer Simulation in Risk Analysis and Hazard Mitigation
27-29 September, Rhodes, Greece. For information, see: http://www.wessex.ac.uk/conferences/2004/risk04/index.html

October 2004

Third Annual AIRNET Conference
21-23 October, Prague, Czech Republic.
For details, see page 19 or http://airnet.iras.uu.nl/

2005

June 2005

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

September 2005

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

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