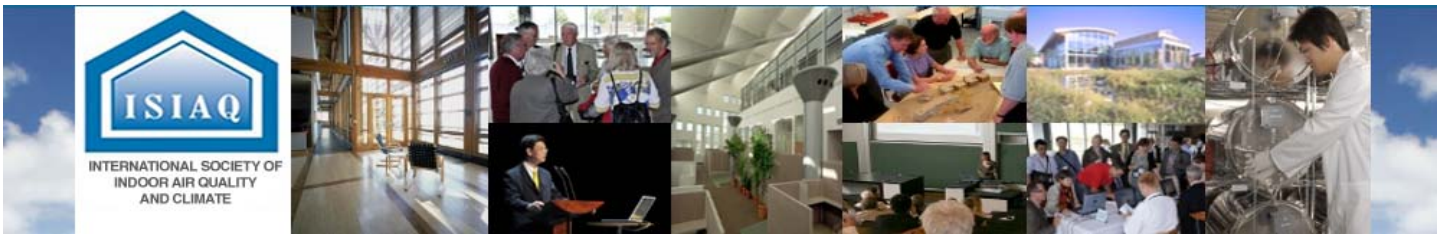

2012 Number 4

ISIAQ NEWSLETTER

October 2012

ISIAQ joins ISES and ISEE to organize EH2013 in Basel, Switzerland

In its first-ever joint effort with ISES and ISEE, ISIAQ will co-host "Environment and Health – Bridging South, North, East and West" in Basel, Switzerland, 19–23 August 2013.

ISES is the International Society for Exposure Science (originally ISEA, the International Society for Exposure Assessment). ISEE is the International Society for Environmental Epidemiology.

ISES and ISEE have held their annual conferences jointly many times in the past. ISIAQ will join them for what promises to be an exciting, high quality conference of interest to every ISIAQ member.

The Call for Abstracts and the Call for Symposia are both open now.

Following is the text of the first announcement. The brochure is attached for your convenience or downloadable from ISIAQ's web site EB2013.

Welcome to the Conference!
In August 2013, three leading scientific societies in the field of health and the environment will come together in Basel for the 2013 Conference on Environment and Health – Bridging South, North, East and West; an interdisciplinary event dedicated to research to improve local, national and global public health. The first-ever joint conference of the International Society for Environmental Epidemiology (ISEE), the International Society of Exposure Science (ISES), and the International Society of Indoor Air Quality and Climate (ISIAQ) hosted by the Swiss Tropical and Public Health Institute (Swiss TPH) offers scientists, researchers and health professionals from all over the world an excellent and affordable platform from which to discuss the latest scientific achievements at the interface of health, disease prevention, the environment, and policymaking. Some 1,500 international experts, junior scientists and doctoral students are expected to participate. The conference will offer a diverse programme of symposia, oral presentations, poster sessions and lively round table discussions, as well as plenary sessions featuring keynote speakers from around the world. The conference opens on August 19th late afternoon and ends on August 23rd in the afternoon.

Conference Themes
Specific topics to be addressed include
• The environmental risks of rapid urbanization in resource-poor settings
• Environmental susceptibility and resilience due to genes, co-morbidities, and socio-cultural and socio-economic factors
• Indoor and outdoor air pollution and interventions to improve public health
• The challenges of linking science to policy through impact assessment
• The relationships between agriculture, environment and diseases of poverty
• Assessing exposure to air pollution, noise, chemicals, toxic waste and electromagnetic fields and evaluating long term health impacts
• Tackling the health effects of climate change and climate variability

In this Issue

• State-of-the-art methods in epidemiology, exposure research and other sciences for addressing these issues

Green Conference

Regular in-person conferences are necessary for scientific exchange and progress. To minimize the environmental impact and footprint of the conference, the local organizing committee has established an environmental working group and adheres to a range of strategies and policies, including:
• A pro-active strategy to have participants minimize CO2 footprints (including information on how to reach Basel by train)
• Encouraging international research networks to piggy-back their annual meetings before/after the Conference to reduce travels
• Asking invited key-note speakers with no inherent scientific interest in the rest of the conference to join by video presentation
• Providing only seasonal and organic food from regional producers, with a strong preference for vegetarian options
• Strategies to minimize trash and to maximize recycling
• Recommending hotels based on proximity, access to public transport, and in-house environmental policies
• Integrating current knowledge on how to reduce the environmental impacts of conferences (for suggestions: Martina.Ragettli@unibas.ch)

Building Bridges

Bridging is the symbol of this conference – namely bridging between:
• Scientific disciplines: to enable scientists with diverse backgrounds to enhance scientific exchange and create productive transdisciplinary research
• Geographic regions: to foster partnerships between South, North, East and West
• Cultures around the globe: to enhance the contextual understanding of prevention and health
• Low- and high-income countries: to strengthen capacities and to foster low-cost solutions to protect health where environmental stressors are most prevailing
• Science and policy: to encourage the development of evidence based policies In order to bring together scientists from all continents, the hosting institution will undertake fund raising efforts to provide travel awards for scientists from low income countries and to make it an affordable conference.

Local Organizing Committee(LOC)
Sina Henrichs, Nino Künzli (Chair), Martina Ragettli (Chair Green Working Group) Martin Röösli (Chair Scientific Programme Committee) (all Swiss TPH) and Organizers Switzerland Ltd (Organizer)
The LOC coordinates all issues between the IOC (see below), the three societies, the researchers, and the organizing agency. For questions and comments on scientific issues or content, kindly contact the host institution (Swiss TPH).

International Organizing Committee (IOC)

Kalpana Balakrishnan, ICMR Center for Advanced Research on Environmental Health, India, ISEE
Carl-Gustaf Bornehag, Karlstadt University, Sweden, ISIAQ
Heiko Kaefferlein, Ruhr University Bochum, Germany, ISES
Nino Künzli, IOC Chair, Hosting Institution, Swiss TPH
Kiyoung Lee, Seoul National University, Korea, ISES
Hal Levin, Building Ecology Research Group, USA, ISIAQ
Jaymie Meliker, Stony Brook University, USA, ISES
Annette Peters, Helmholtz Centre Munich, Germany, ISEE
Beate Ritz, University of California Los Angeles, USA, ISEE
Martin Röösli, Chair Scientific Programme Committee, Hosting Institution, Swiss TPH
Huey Jenny Su, National Taiwan University, Taiwan, ISIAQ

Scientific Programme Committee (SPC)

In addition to Martin Röösli (Chair), and the IOC, some 50 international authorities from all three societies will be appointed (see web site) to serve on the SPC to ensure that the programme meets the highest standards.

Contacts, Registration Office, Exhibition, Logistics

For questions about scientific content, contact the host (Swiss Tropical and Public Health Institute, loc-ehb@unibas.ch) Web: www.swisstph.ch http://www.ehbasel13.org

For all other questions and requests, including online registration, abstract submission, sponsoring and exhibition opportunities, kindly contact the registration office and main organizer:

Organizers Switzerland Ltd.
Obere Egg 2, 4312 Magden/Basel
Tel.: +41 (0)61 836 98 78
Fax: +41 (0)61 836 98 77
E-Mail: registration@organizers.ch
Web: www.organizers.ch

Conference Venue

The conference will be held at the Congress Center in Basel, Switzerland (www.congress.ch). Basel is located where the borders of Switzerland, France, and Germany meet and is noted for its five bridges over the Rhine. Situated at the heart of Europe, Basel is one of the continent's most convenient locations for major events. The Congress Center Basel is in the city centre and easy to get to from the airport and the train station. The old town, shopping districts and the city's many museums and parks are mostly within walking distance or just a few minutes by public transport (freely included in all hotel reservations).

Indoor Air, Volume 22, Number 4 October 2012
Abstracts

William W Nazaroff - ISIAQ and the Academy of Fellows

The International Society of Indoor Air Quality and Climate (ISIAQ) is an 'independent, multidisciplinary, scientific, non-profit organization whose purpose is to support the creation of healthy, comfortable and productivity-encouraging indoor environments'. In addition to having Indoor Air as its official journal, ISIAQ regularly convenes two international conference series: Indoor Air and Healthy Buildings. Tables 1 and 2 summarize the history of these conferences, showing strong participation from North America, Northern Europe, and East Asia.

C. J. Weschler and W. W. Nazaroff - SVOC exposure indoors: fresh look at dermal pathways

Abstract This paper critically examines indoor exposure to semivolatile organic compounds (SVOCs) via dermal pathways. First, it demonstrates that – in central tendency – an SVOC's abundance on indoor surfaces and in handwipes can be predicted reasonably well from gas-phase concentrations, assuming that thermodynamic equilibrium prevails. Then, equations are developed, based upon idealized mass-transport considerations, to estimate transdermal penetration of an SVOC either from its concentration in skin-surface lipids or its concentration in air. Kinetic constraints limit air-to-skin transport in the case of SVOCs that strongly sorb to skin-surface lipids. Air-to-skin transdermal uptake is estimated to be comparable to or larger than inhalation intake for many SVOCs of current or potential interest indoors, including butylated hydroxytoluene, chlordane, chlorpyrifos, diethyl phthalate, Galaxolide, geranyl acetone, nicotine (in free-base form), PCB28, PCB52, Phantolide, Texanol and Tonalide. Although air-to-skin transdermal uptake is anticipated to be slow for bisphenol A, we find that transdermal permeation may nevertheless be substantial following its transfer to skin via contact with contaminated surfaces. The paper concludes with explorations of the influence of particles and dust on dermal exposure, the role of clothing and bedding as transport vectors, and the potential significance of hair follicles as transport shunts through the epidermis.

Practical Implications Human exposure to indoor pollutants can occur through dietary and nondietary ingestion, inhalation, and dermal absorption. Many factors influence the relative importance of these pathways, including physical and chemical properties of the pollutants. This paper argues that exposure to indoor semivolatile organic compounds (SVOCs) through the dermal pathway has often been underestimated. Transdermal permeation of SVOCs can be substantially greater than is commonly assumed. Transport of SVOCs from the air to and through the skin is typically not taken into account in exposure assessments. Yet, for certain SVOCs, intake through skin is estimated to be substantially larger than intake through inhalation. Exposure scientists, risk assessors, and public health officials should be mindful of the dermal pathway when estimating exposures to indoor SVOCs. Also, they should recognize that health consequences vary with exposure pathway. For example, an SVOC that enters the blood through the skin does not encounter the same detoxifying enzymes that an ingested SVOC would experience in the stomach, intestines, and liver before it enters the blood.

D. Twardella, W. Matzen, T. Lahrz, R. Burghardt, H. Spegel, L. Hendrowarsito, A. C. Frenzel and H. Fromme - Effect of classroom air quality on students' concentration: results of a cluster-randomized cross-over experimental study

Abstract To assess the effect of indoor air quality as indicated by the median carbon dioxide (CO2) level in the classroom on the concentration performance (CP) of students, a cross-over cluster-randomized experimental study was conducted in 20 classrooms with mechanical ventilation systems. Test conditions 'worse' (median CO2 level on average 2115 ppm) and 'better' (median CO2 level on average 1045 ppm) were established by the regulation of the mechanical ventilation system on two days in one week each in every classroom. Concentration performance was quantified in students of grade three and four by the use of the d2-test and its primary parameter 'CP' and secondary parameters 'total number of characters processed' (TN) and 'total number of errors' (TE). 2366 d2-tests from 417 students could be used in analysis. In hierarchical linear regression accounting for repeated measurements, no significant effect of the experimental condition on CP or TN could be observed. However, TE was increased significantly by 1.65 (95% confidence interval 0.42–2.87) in 'worse' compared to 'better' condition. Thus, low air quality in classrooms as indicated by increased CO2 levels does not reduce overall short-term CP in students, but appears to increase the error rate.

Practical Implications This study could not confirm that low air quality in classrooms as indicated by increased CO2 levels reduces short-term concentration performance (CP) in students; however, it appears to affect processing accuracy negatively. To ensure a high level of accuracy, good air quality characterized, for example, by low CO2 concentration should be maintained in classrooms.

Jitendra K. Gupta, Chao-Hsin Lin and Qingyan Chen - Risk assessment of airborne infectious diseases in aircraft cabins

Abstract Passengers in an aircraft cabin can have different risks of infection from airborne infectious diseases such as influenza, severe acute respiratory syndrome (SARS), and tuberculosis (TB) because of the non-uniform airflow in an aircraft cabin. The current investigation presents a comprehensive approach to assessing the spatial and temporal distributions of airborne infection risk in an aircraft cabin. A case of influenza outbreak was evaluated in a 4-h flight in a twin-aisle, fully occupied aircraft cabin with the index passenger seated at the center of the cabin. The approach considered the characteristics of the exhalation of the droplets carrying infectious agents from the index passenger, the dispersion of these droplets, and the inhalation of the droplets by susceptible passengers. Deterministic and probabilistic approaches were used to quantify the risks based on the amount of inhaled influenza virus RNA particles and quanta, respectively. The probabilistic approach indicated that the number of secondary infection cases can be reduced from 3 to 0 and 20 to 11, for influenza cases if N95 respirator masks are used by the passengers. The approach and methods developed can easily be implemented in other enclosed spaces such as buildings, trains, and buses to assess the infection risk.

Practical Implications Airborne infectious disease transmission could take place in enclosed environments such as buildings and transport vehicles. The infection risk is difficult to estimate, and very few mitigation methods are available. This study used a 4-h flight as an example in analyzing the infection risk from influenza and in mitigating the risk with an N95 mask. The results will be useful to the airline industry in providing necessary protection to passengers and crew, and the results can also be used for other enclosed spaces.

J.-H. Park, K. Kreiss and J. M. Cox-Ganser - Rhinosinusitis and mold as risk factors for asthma symptoms in occupants of a water-damaged building

Abstract Mold exposure in damp buildings is associated with both nasal symptoms and asthma development, but the progression of building-related (BR) rhinosinusitis symptoms to asthma is unstudied. We examined the risk of developing BR-asthma symptoms in relation to prior BR-rhinosinusitis symptoms and microbial exposure among occupants of a damp building. We conducted four cross-sectional health and environmental surveys among occupants of a 20-story water-damaged office building. We defined BR-rhinosinusitis symptom (N = 131) and comparison (N = 361) groups from participants' first questionnaire responses. We compared the odds for the development of BR-asthma symptoms between these two groups over the subsequent surveys, using logistic regression models adjusted for demographics, smoking, building tenure, and first-survey exposures to fungi, endotoxin, and ergosterol. The BR-rhinosinusitis symptom group had higher odds for developing BR-asthma symptoms [odds ratio (OR) = 2.2; 95% confidence interval (CI) = 1.3–3.6] in any subsequent survey compared to those without BR-rhinosinusitis symptoms. The BR-rhinosinusitis symptom group with higher fungal exposure within the building had an OR of 7.4 (95% CI = 2.8–19.9) for developing BR-asthma symptoms, compared to the lower fungal exposure group without BR-rhinosinusitis symptoms. Our findings suggest that rhinosinusitis associated with occupancy of water-damaged buildings may be a sentinel for increased risk for asthma onset in such buildings.

Practical Implications Exposure to mold is associated with the development of asthma in damp building occupants, and rhinitis is known to be a risk factor for asthma. However, there is little information about the degree of risk for the progression of rhinosinusitis to asthma owing to mold exposures in damp buildings. Our study of damp building occupants demonstrates that building-related (BR) rhinosinusitis symptoms were a risk factor for the development of BR asthma symptoms and that exposure to mold (fungi) or other dampness-related agents augments risk for the development of BR asthma symptoms among those with BR rhinosinusitis symptoms. Our findings suggest that occurrence of BR upper respiratory illness in water-damaged buildings may presage future endemic asthma.

M. Frankel, M. Timm, E. W. Hansen and A. M. Madsen - Comparison of sampling methods for the assessment of indoor microbial exposure

Abstract Indoor microbial exposure has been related to allergy and respiratory disorders. However, the lack of standardized sampling methodology is problematic when investigating dose–response relationships between exposure and health effects. In this study, different sampling methods were compared regarding their assessment of microbial exposures, including culturable fungi and bacteria, endotoxin, as well as the total inflammatory potential (TIP) of dust samples from Danish homes. The Gesamtstaubprobenahme (GSP) filter sampler and BioSampler were used for sampling of airborne dust, whereas the dust fall collector (DFC), the electrostatic dust fall collector (EDC), and vacuum cleaner were used for sampling of settled dust. The GSP assessed significantly higher microbial levels than the BioSampler, yet measurements from both samplers correlated significantly. Considerably higher levels of fungi, endotoxin, and TIP were found in the EDC compared with the DFC, and regarding fungi, the EDC correlated more strongly and significantly with vacuumed dust than the DFC. Fungi in EDC and vacuum dust correlated most strongly with airborne dust, and in particular, the measurements from the EDC associated well with those from GSP. Settled dust from the EDC was most representative of airborne dust and may thus be considered as a surrogate for the assessment of indoor airborne microbial exposure.

Practical Implications Significant discrepancies between sampling methods regarding indoor microbial exposures have been revealed. This study thus facilitates comparison between methods and may therefore be used as a frame of reference when studying the literature or when conducting further studies on indoor microbial exposure. Results also imply that the relatively simple EDC method for the collection of settled dust may be used as an alternative to otherwise tedious and time-consuming airborne dust sampling**.**

S. Youssefi and M. S. Waring - Predicting secondary organic aerosol formation from terpenoid ozonolysis with varying yields in indoor environments

Abstract The ozonolysis of terpenoids generates secondary organic aerosol (SOA) indoors. Models of varying complexity have been used to predict indoor SOA formation, and many models use the SOA yield, which is the ratio of the mass of produced SOA and the mass of consumed reactive organic gas. For indoor simulations, the SOA yield has been assumed as a constant, even though it depends on the concentration of organic particles in the air, including any formed SOA. We developed two indoor SOA formation models for single terpenoid ozonolysis, with yields that vary with the organic particle concentration. The models have their own strengths and were in agreement with published experiments for d-limonene ozonolysis. Monte Carlo analyses were performed, which simulated different residential and office environments to estimate ranges of SOA concentrations and yields for d-limonene and α-pinene ozonolysis occurring indoors. Results indicate that yields are highly variable indoors and are most influenced by background organic particles for steady-state formation and indoor ozone concentration for transient peak formation. Additionally, a review of ozonolysis yields for indoor-relevant terpenoids in the literature revealed much uncertainty in their values at low concentrations typical of indoors.

Practical Implications The results in this study suggest important factors that govern indoor secondary organic aerosol (SOA) formation and yields, in typical residential and office spaces. This knowledge informs the development and comparison of control strategies to reduce indoor-generated SOA. The ranges of SOA concentrations predicted indoors allow the quantification of the effects of sorptive interactions of semi-volatile organic compounds or reactive oxygen species with SOA, filter loading owing to SOA formation, and impacts of SOA on health, if links are established.

S.-J. Cao and J. Meyers - On the construction and use of linear low-dimensional ventilation models

Abstract The construction of fast reliable low-dimensional models is important for monitoring and control of ventilation applications. We employ a discrete Green's function approach to derive a linear low-dimensional ventilation model directly from the governing equations for indoor ventilation (i.e., the Navier–Stokes equations supplemented with a transport equation for indoor-pollutant concentration). It is shown that the flow equations decouple from the concentration equation when the ratio α of air-mass-flow rate to pollutant-mass-flow rate increases to infinity. A low-dimensional discrete representation of the Green's function of the concentration equation can then be constructed, based on either numerical simulations or experiments. This serves as a linear model that allows for the reconstruction of concentration fields resulting from any type of pollutant-source distribution. We employ a suite of Reynolds-averaged Navier–Stokes (RANS) simulations to illustrate the methodology. We focus on a simple benchmark ventilation case under constant-density conditions. Discrete linear ventilation models for the concentration are then derived and compared with coupled RANS simulations. An analysis of errors in the discrete linear model is presented: Dependence of the error on the (low-dimensional) resolution in the discrete model is quantified, and errors introduced by too low values of α are also investigated.

Practical Implications The paper introduces the derivation and construction of linear low-dimensional ventilation models, which allow reconstructing concentration fields resulting from any type of indoor-pollutant-source distribution. Once constructed, these ventilation models are very efficient to estimate indoor contaminant concentration distributions, compared to direct CFD simulation approaches. Therefore, these models can facilitate monitoring and control of ventilation systems, to remove indoor contaminants.

Send us your news to fill this space in the next ISIAQ Newsletter

Tell your ISIAQ Colleagues what you are doing! Send us news about your latest publication, grant or project.

Has your government adopted a new law or regulation that would be of interest to your ISIAQ colleagues around the world? Send us a brief summary or send a link to a web site where we can learn about it.

About ISIAQ

With more than 800 members from more than 45 countries, ISIAQ is an international, independent, multidisciplinary, scientific, non-profit organization whose purpose is to support the creation of healthy, comfortable and productive indoor environments. We strongly believe this is achievable by advancing the science and technology of indoor air quality and climate as it relates to indoor environmental design, construction, operation and maintenance, air quality measurement and health sciences.

As a Society, our major role is to facilitate international and interdisciplinary communication and information exchange by publishing and fostering publication on indoor air quality and climate. We organize, sponsor and support initiatives such as meetings, conferences, and seminars on indoor air quality and climate; and we develop, adapt and maintain guidelines for the improvement of indoor air quality and climate.

ISIAQ's journal, *Indoor Air*, published six times per year, is the most respected and widely-cited source of scientific information relevant to building scientists and professionals. Our two major international conferences -- the Indoor Air 'xx and the Healthy Buildings 'xx conference series -- set the standard for high quality scientific information and its application to making healthy buildings. We also cooperate with government and other agencies and societies with interests in the indoor environment and climate.

To find out more about us, visit our website: http://isiaq.org

International Society of Indoor Air Quality and Climate—ISIAQ

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Corporate Memberships are available

If your organization is involved in indoor air science, policy, or practice, a corporate membership in ISIAQ will place you in the limelight with the international indoor air community.

- ISIAQ reaches more than 45 countries around the world.
- ISIAQ's conferences, considered the most important in the field, have been attended by more than 4,000 individuals.
- The official Society journal, *Indoor Air*, is respected by scientists and policy-makers as the most reliable way to keep up with the latest scientific findings in the field.

To learn more about the benefits of corporate membership in ISIAQ, visit the membership page on our web site and click on the corporate membership link.

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