ISIAQ
INTERNATIONAL SOCIETY OF INDOOR AIR QUALITY AND CLIMATE

2013 Number 1 **ISIAQ NEWSLETTER** February 2013

Abstract Deadline extended to February 20 for EH Basel 2013

ISEE-ISES- ISIAQ Environmental Health: Bridging South North East and West will take place in Basel 19-23 August 2013. The Call for Abstracts has been extended to 20 February 2013. You are invited to submit your abstract for an oral or poster presentation. The guidelines are on the conference web site and contain the instructions for abstract submissions.

The ISIAQ Board of Directors considers this conference an extremely important opportunity for ISIAQ Members to become more familiar with the work being done by members of the co-organizing societies, ISEE and ISES. It is also a great opportunity for ISIAQ Members to show members of the other two societies how indoor air research has advanced, what it offers that is important for exposure science and environmental epidemiology. ISIAQ's members can show the range and extent of interdisciplinary work done by the indoor air quality research community.

To become eligible for science awards and/or any type of Conference Fellowships (e.g. travel, free housing, fee waiver etc.), you need an accepted abstract as first (or "presenting") author. Further details about awards and fellowship will be made available in the spring.

There will be special programs for student members and a student poster competition is being planned. More information on student programs will be posted on the conference website as details become available. ISIAQ will keep our members informed through our web site and the newsletter.

The call for symposia was a great success. 130 proposals of high quality were submitted out of which 40 were selected for the conference. Those whose presentations for symposia not selected by the conference organizers are very strongly encouraged to submit abstracts for oral or poster presentations during the conference technical sessions.

The pre-conference workshop program for Monday, Aug19, 2013 will be online as well as open for registration in March. These courses will be open to all conference participants.

Important Dates

- Abstract Submittal Deadline February 20, 2013
- Early-bird registration closes May 31, 2013
- Pre-Conference Courses take place on Monday Aug 19, 2013
- Opening Ceremony is on Monday late afternoon, Aug 19, 2013
- Closure will be on Friday Aug 23, 2013, at 4 pm

For more information, visit the conference web site at http://www.ehbasel13.org/index.php.

To learn about **submitting an abstract**, go to http://www.ehbasel13.org/english/cfa_abstracts.php

In This Issue

Air pollution in China, January 2013

Air pollution in Beijing in mid-January made international news as levels exceeded the World Health Organization's recommended maximum $PM_{2.5}$ concentration limit of 25 µg/m^3 by a factor of almost 30 and the U.S. EPA's criterion of 15 µg/m^3 for $PM_{2.5}$ by a factor of more than 45.

A photo from NASA's Earth Observatory Laboratory shows far darker atmosphere above Beijing in mid-January than elsewhere in the region of China.

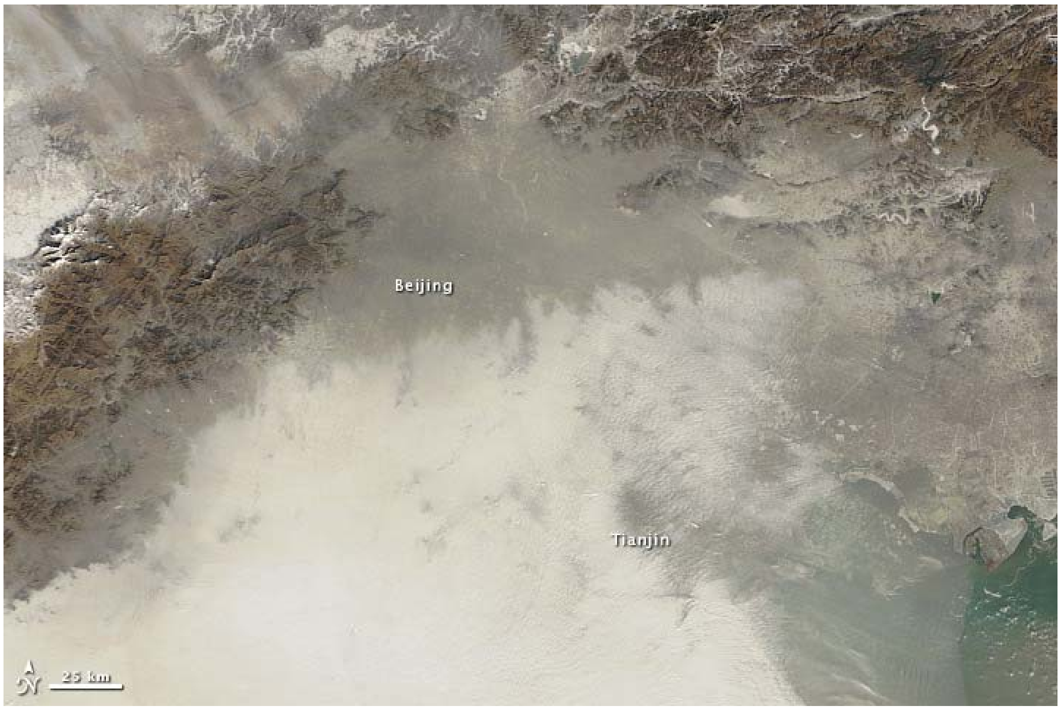

Photo: http://earthobservatory.nasa.gov/IOTD/view.php?id=80152

Beijing was not the only Chinese city with high levels of $PM_{2.5}$ in January. Some data from Shanghai in late January reveal that it also can have severe air pollution.

Glenn Morrison, Cong Liu, and Yinping Zhang have provided an article about the air pollution episode in Beijing and a summary of a survey of residents to ascertain behavioral adaptation by those surveyed.
Zhou Jiang and Fang Yanbing contributed some data and photos from severe air pollution in Shanghai later in the month of January.

ISIAQ Board Member Andrea Ferro contributed an article on the U.S. Environmental Protection Agency's new standard for particulate matter less than 2.5 micrometers (µm) in aerodynamic diameter – ($PM_{2.5}$).

Sheltering from the Airpocalypse in Beijing

By Glenn Morrison, Cong Liu, Yinping Zhang

Most of us in ISIAQ are passionate standard-bearers for enhancing the human condition by improving indoor environments. Our focus, naturally, is on scientific investigation and practical application of that science. We now recognize that controlling indoor quality is not as simple as removing a source or by increasing ventilation rates. The vast number of pollutants and sources, persistence ambient air pollution problems and the indoor-outdoor air continuum continue to challenge us. These realities prevent us from making simple or straightforward recommendations that protect occupants from even a fraction of the components that comprise indoor air pollution. What, then, do we recommend when outdoor air pollution becomes so bad that our measurement metrics fail?

Recent headlines have been dominated by a particularly bad air pollution episode in Beijing. On January 12th, monitors reported $PM_{2.5}$ values greater than 700 micrograms per cubic meter (Wong, 2013). This vastly exceeds the World Health Organization limit of 25 micrograms per cubic meter (World Health Organization, 2006). This episode was so bad, it received its own nickname: the Airpocalypse. As rapid development increases the number of combustion and industrial sources, efforts to control ambient air pollution in Beijing are having little effect. Of course, Beijing is not the only city struggling to manage air quality. A January 31 New York Times blogger pointed out that the air quality in Delhi was much worse than Beijing (Timmons, 2013). Although it has a strangely competitive feel to it (our air is worse than yours!), the article reminds us that we are presently losing the battle in so many intensely populated areas of the world.

It is not too much of a stretch to predict that our outdoor air pollution problems will continue for decades to come. A short term alternative to improving air quality is to find ways to protect the receptor: you and me. Officials in Beijing have introduced emergency measures including recommendations to limit time outdoors. This has an intuitive appeal to most people, because they can believe (or make themselves believe) that the air indoors is a truly separate world and that the building envelop is an effective barrier. We in ISIAQ know that this is only partially true.
All indoor air was outdoor air only minutes or hours ago. In the process of becoming indoor air, changes do happen. Pollutants can be attenuated by deposition on and reaction with surfaces of window or door cracks, flooring and walls or even people themselves (Liu and Nazaroff, 2001; Weschler, 2011; Wisthaler and Weschler, 2010). The protective nature of a building is limited by the physical and chemical nature of the pollutants. Ozone is very effectively removed on building surfaces by reaction; but ozone reactions with fragrances can result in an increase in $PM_{2.5}$ concentrations (Weschler, 2011). Very small particles are attenuated readily through air pathways in the building shell, but those in the dangerous 0.3 to 2 micrometer range can pass into buildings with little loss (Liu and Nazaroff, 2001). Carbon monoxide enters buildings like a ghost with no reduction at all. Even a brief look through the *Indoor Air* archives is eye opening: smog definitely changes as it enters buildings, but it is unclear whether it is always for the best. Actively closing windows and sealing up the home of a smoker may do more harm than good. A large fraction of ultrafine particles can be of indoor origin (Mullen et al., 2010). In the absence of complete information about every microenvironment, the recommendation to stay indoors seems to be better than the alternative. Staying indoors *and* using high-quality portable air cleaner could even be better (Ward et al., 2005).

Are the residents of Beijing taking the advice of their government to stay indoors? Are any taking the more active step of using a portable air cleaner? We decided to find out. Soon after the Airpocalypse became widely recognized, we put together an electronic poll and distributed it to friends and colleagues in Beijing. We recognize that this is not particularly scientific, but the results are telling. The following are the raw results from 42 participants:

As a result of the recent air pollution episodes,

1. Did you spend more time indoors than usual?
   a. Yes 85%
   b. No 15%
2. Did you keep windows at home closed more than you usually do?
   a. Yes 78%
   b. No 22%
3. Did you use a portable air cleaner more than you usually do?
   a. Yes 7%
   b. No 93%
4. Estimate how much more time you spend indoors a) at home and b) in buildings other than at home (work, office, shopping, etc.)

[*see Figure A on next page*]

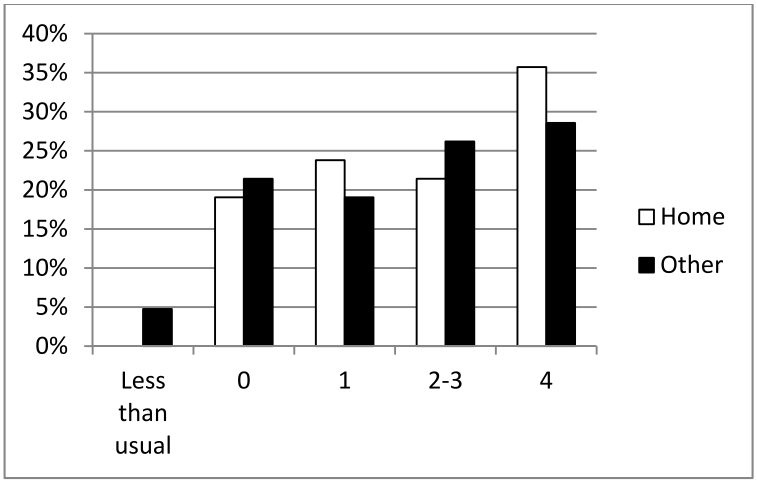

Figure A. Time spent at home and in other buildings during mid-January 2013 Beijing air pollution episode

What did we learn from this small survey? A large majority *did* spend more time indoors and, even more interestingly, most closed windows. This means that prior to this episode, many had at least one window open. Whether a window is open or closed can have a very large effect on ventilation rate and the resulting indoor concentration of some smog components. Thus, if we felt confident in extrapolating to the larger population, doubled during the episode, but could it have been worse had people not heeded the recommendation to stay indoors? Would more usage of effective portable cleaners help even more? We don't know the answer to this question without clear epidemiological evidence of the protective effects of being indoors on smoggy Beijing days.

Given our slow progress on improving ambient air pollution in so many cities, the research cost of quantifying the true benefits (if any) of shelter-in-place is likely to be dwarfed by the value in lives saved and quality of life improved. Money spent on indoor air studies *does* speak to the ambient air pollution problem and speaks loudly. These tragic episodes are reminders to keep the faith and to continue lobbying for the value of the indoor air sciences.

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Shanghai air pollution, late-January 2013

Contributed by Hal Levin with data from Fang Yanbing, photos from Zhou Xiang and Hal Levin

In response to our request to ISIAQ's current Chinese members, some air pollution data and photographs in Shanghai were received from Jun Gao and his student, Fang Yanbing. The data and the photos show that Shanghai also had serious air quality problems in January.

Here are the data from Fang Yanbing obtained with a TSI Model 8534 DustTrak™ DRX Aerosol Monitor. (units are mg/m^3)

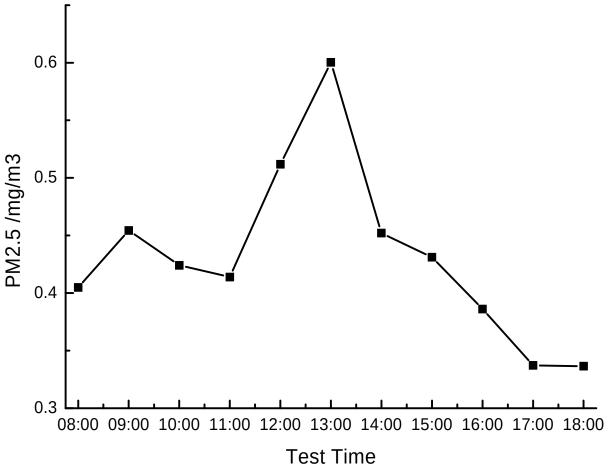

Figure 1. 24 January 2013, from Huan Sha Si Cun at East Guoshun Road in Shanghai

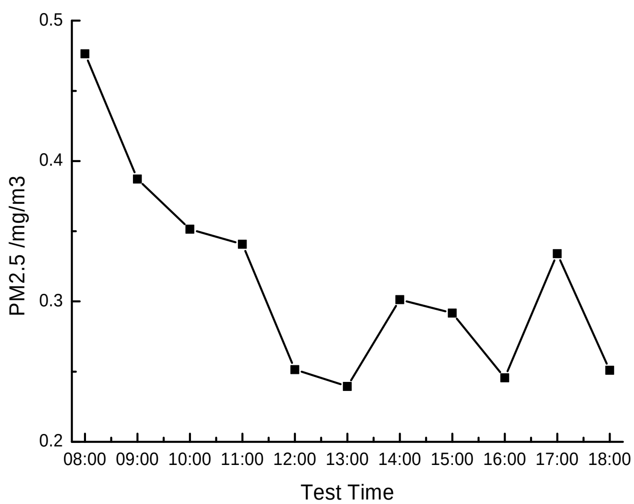

Figure 2. 25 January 2013, from Tongji Xin Cun at Zhangwu Road in Shanghai.

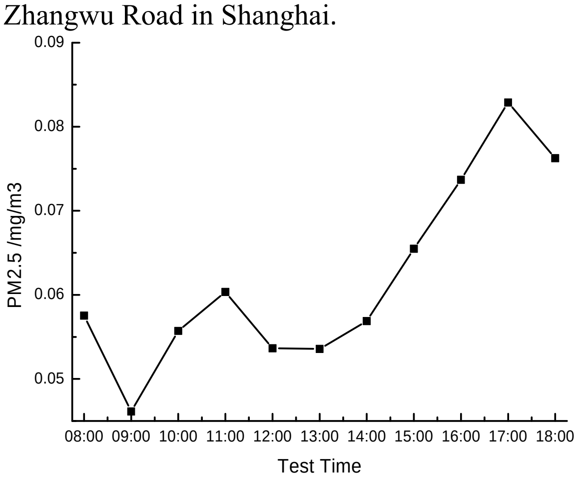

Figure 3. 27 January 2013, Tongji Xin Cun at Zhangwu Road in Shanghai.

A photo from Shanghai 25 January 2013 reveals the limited visibility that day

Photo office building in Shanghai, 25 January 2013. By Zhou Xiang.

A photo taken in Shanghai in October 2001 shows that air pollution is not new to the city.

Photo of Shanghai, October 2001. by Hal Levin

Is there a take-home message here?

Is ventilating more with air from outdoors always going to result in the best indoor air quality or occupant health?

If you don’t open the windows, how do you dilute the pollutants released from indoor sources?

Send us your comments for the next ISIAQ newsletter

Strengthening of U.S. National Ambient Air Quality Standards for Fine Particles

(contributed by Andrea Ferro)

The U.S. EPA recently revised the air quality regulatory standards for ambient airborne particles (particulate matter). The U.S. Clean Air Act requires the U.S. EPA to set and periodically review the National Ambient Air Quality Standards (NAAQS) to protect human health and welfare based on the current state of the science. On December 14, 2012, the U.S. EPA lowered the annual NAAQS for fine particles ($PM_{2.5}$) to 12.0 micrograms per cubic meter ($\mu g/m^3$) from the previous level of 15.0 $\mu g/m^3$. EPA expects that strengthening the standard will increase the protection of humans against cardiovascular and respiratory disease from both long- and short-term exposure to $PM_{2.5}$. The $PM_{2.5}$ and coarse PM_{10} 24-hour standards remain at 35 $\mu g/m^3$ and 150 $\mu g/m^3$, respectively.

The final rule can be found at http://www.epa.gov/airquality/particlepollution/2012/finalrule.pdf

Indoor Air, Volume 23, Number 1 (February 2013) *Abstracts*

Kwok W. Tham - Priorities for ISIAQ in addressing climate change and sustainability challenges

Having had the privilege of serving as President of Healthy Buildings 2003 and subsequently as President of ISIAQ (2006–2009), I have reflected on recent trends that impact indoor environmental quality (IEQ). I have pondered the responses that ISIAQ could consider in the context of climate change, sustainability challenges, and socioeconomic developments. My thoughts on these matters were first shared at the Healthy Buildings 2012 workshop on Indoor Environments and Climate Change: Priorities for ISIAQ. Through this editorial, I now have the opportunity to articulate these ideas to a larger audience. In preparing these remarks, I considered a framework of anthropogenic drivers, the impacts of and responses to climate change (IPCC, 2007), and the linkages between these. I also considered the broader trends that affect the indoor environment and asked: What could ISIAQ's contributions be in continuing to work toward improved IEQ and health?

B. Hawley and J. Volckens - Proinflammatory effects of cookstove emissions on human bronchial epithelial cells

Abstract Approximately half of the world's population uses biomass fuel for indoor cooking and heating. This form of combustion typically occurs in open fires or primitive stoves. Human exposure to emissions from indoor biomass combustion is a global health concern, causing an estimated 1.5 million premature deaths each year. Many 'improved' stoves have been developed to address this concern; however, studies that examine exposure-response with cleaner-burning, more efficient stoves are few. The objective of this research was to evaluate the effects of traditional and cleaner-burning stove emissions on an established model of the bronchial epithelium. We exposed well-differentiated, normal human bronchial epithelial cells to emissions from a single biomass combustion event using either a traditional three-stone fire or one of two energy-efficient stoves. Air–liquid interface cultures were exposed using a novel, aerosol-to-cell deposition system. Cellular expression of a panel of three pro-inflammatory markers was evaluated at 1 and 24 h following exposure. Cells exposed to emissions from the cleaner-burning stoves generated significantly fewer amounts of pro-inflammatory markers than cells exposed to emissions from a traditional three-stone fire. Particulate matter emissions from each cookstove were substantially different, with the three-stone fire producing the largest concentrations of particles (by both number and mass). This study supports emerging evidence that more efficient cookstoves have the potential to reduce respiratory inflammation in settings where solid fuel combustion is used to meet basic domestic needs.

Practical Implication Emissions from more efficient, cleaner-burning cookstoves produced less inflammation in well-differentiated bronchial lung cells. The results support evidence that more efficient cookstoves can reduce the health burden associated with exposure to indoor pollution from the combustion of biomass.

C. A. Ochieng, S. Vardoulakis and C. Tonne - Are rocket mud stoves associated with lower indoor carbon monoxide and personal exposure in rural Kenya?

Abstract Household use of biomass fuels is a major source of indoor air pollution and poor health in developing countries. We conducted a cross-sectional investigation in rural Kenya to assess household air pollution in homes with traditional three-stone stove and rocket mud stove (RMS), a low-cost unvented wood stove. We conducted continuous measurements of kitchen carbon monoxide (CO) concentrations and personal exposures in 102 households. Median 48-h kitchen and personal CO concentrations were 7.3 and 6.5 ppm, respectively, for three-stone stoves, while the corresponding concentrations for RMS were 5.8 and 4.4 ppm. After adjusting for kitchen location, ventilation, socio-economic status, and fuel moisture content, the use of RMS was associated with 33% lower levels of kitchen CO [95% Confidence Interval (CI), 64.4–25.1%] and 42% lower levels of personal CO (95% CI, 66.0–1.1%) as compared to three-stone stoves. Differences in CO concentrations by stove type were more pronounced when averaged over the cooking periods, although they were attenuated after adjusting for confounding. In conclusion, RMS appear to lower kitchen and personal CO concentrations compared to the traditional three-stone stoves but overall, the CO concentrations remain high.

Practical Implications The rocket mud stoves (RMS) were associated with lower CO concentrations compared to three-stone stoves. However, the difference in concentrations was modest and concentrations in both stove groups exceeded the WHO guideline of 7 $\mu g/m^3$, suggesting the unvented RMSs on their own are unlikely to appreciably benefit health in this population. Greater air quality benefit could be realized if the stoves were complemented with behavior change, including education on extinguishing fire when not in use as well as fuel drying, and cooking in locations that are separate from the main house.

T. Schripp, D. Markewitz, E. Uhde and T. Salthammer - Does e-cigarette consumption cause passive vaping?

Abstract Electronic cigarette consumption (‘vaping’) is marketed as an alternative to conventional tobacco smoking. Technically, a mixture of chemicals containing carrier liquids, flavors, and optionally nicotine is vaporized and inhaled. The present study aims at the determination of the release of volatile organic compounds (VOC) and (ultra)fine particles (FP/UFP) from an e-cigarette under near-to-real-use conditions in an 8-m3 emission test chamber. Furthermore, the inhaled mixture is analyzed in small chambers. An increase in FP/UFP and VOC could be determined after the use of the e-cigarette. Prominent components in the gas-phase are 1,2-propanediol, 1,2,3-propanetriol, diacetin, flavorings, and traces of nicotine. As a consequence, ‘passive vaping’ must be expected from the consumption of e-cigarettes. Furthermore, the inhaled aerosol undergoes changes in the human lung that is assumed to be attributed to deposition and evaporation.

Practical Implications The consumption of e-cigarettes marks a new source for chemical and aerosol exposure in the indoor environment. To evaluate the impact of e-cigarettes on indoor air quality and to estimate the possible effect of passive vaping, information about the chemical characteristics of the released vapor is needed.

F. Carlstedt, B. A. G. Jönsson and C.-G. Bornehag - PVC flooring is related to human uptake of phthalates in infants

Abstract Polyvinyl chloride (PVC) flooring material contains phthalates, and it has been shown that such materials are important sources for phthalates in indoor dust. Phthalates are suspected endocrine-disrupting chemicals (EDCs). Consecutive infants between 2 and 6 months old and their mothers were invited. A questionnaire about indoor environmental factors and family lifestyle was used. Urinary metabolites of the phthalates diethyl phthalate (DEP), dibutyl phthalate (DBP), butylbenzyl phthalate (BBzP), and dietylhexyl phthalate (DEHP) were measured in the urine of the children. Of 209 invited children, 110 (52%) participated. Urine samples were obtained from 83 of these. Urine levels of the BBzP metabolite monobenzyl phthalate (MBzP) was significantly higher in infants with PVC flooring in their bedrooms ($P < 0.007$) and related to the body area of the infant. Levels of the DEHP metabolites MEHHP ($P < 0.01$) and MEOHP ($P < 0.04$) were higher in the 2-month-old infants who were not exclusively breast-fed when compared with breast-fed children. The findings indicate that the use of soft PVC as flooring material may increase the human uptake of phthalates in infants. Urinary levels of phthalate metabolites during early life are associated with the use of PVC flooring in the bedroom, body area, and the use of infant formula.

Practical Implications This study shows that the uptake of phthalates is not only related to oral uptake from, for example, food but also to environmental factors such as building materials. This new information should be considered when designing indoor environment, especially for children.

J.-Y. Chin, C. Godwin, C. Jia, T. Robins, T. Lewis, E. Parker, P. Max and S. Batterman - Concentrations and risks of p-dichlorobenzene in indoor and outdoor air

Abstract p-dichlorobenzene (PDCB) is a chlorinated volatile organic compound that can be encountered at high concentrations in buildings owing to its use as pest repellent and deodorant. This study characterizes PDCB concentrations in four communities in southeast Michigan. The median concentration outside 145 homes was 0.04 $\mu g/m^3$, and the median concentration inside 287 homes was 0.36 $\mu g/m^3$. The distribution of indoor concentrations was extremely skewed. For example, 30% of the homes exceeded 0.91 $\mu g/m^3$, which corresponds to a cancer risk level of 10^{-5} based on the California unit risk estimate, and 4% of homes exceeded 91 $\mu g/m^3$, equivalent to a 10^{-3} risk level. The single highest measurement was 4100 $\mu g/m^3$. Estimates of whole-house emission rates were largely consistent with chamber test results in the literature. Indoor concentrations that exceed a few $\mu g/m^3$ indicate the use of PDCB products. PDCB concentrations differed among households and the four cities, suggesting the importance of locational, cultural, and behavioral factors in the use patterns of this chemical. The high PDCB levels found suggest the need for policies and actions to lower exposures, for example, sales or use restrictions, improved labeling, and consumer education.

Practical Implications Distributions of *p*-dichlorobenzene concentrations in residences are highly right-skewed, and a subset of houses has very elevated concentrations that are equivalent to an excess cancer risk of 10^{-3} or higher based on the California unit risk effect estimate. House-to-house variation is large, reflecting differences in use practices. Stronger policies and educational efforts are needed to eliminate or modify indoor usage practices of this chemical.

T. M. Korves, Y. M. Piceno, L. M. Tom, T. Z. DeSantis, B. W. Jones, G. L. Andersen and G. M. Hwang - Bacterial communities in commercial aircraft high-efficiency particulate air (HEPA) filters assessed by PhyloChip analysis

Abstract Air travel can rapidly transport infectious diseases globally. To facilitate the design of biosensors for infectious organisms in commercial aircraft, we characterized bacterial diversity in aircraft air. Samples from 61 aircraft high-efficiency particulate air (HEPA) filters were analyzed with a custom microarray of 16S rRNA gene sequences (PhyloChip), representing bacterial lineages. A total of 606 subfamilies from 41 phyla were detected. The most abundant bacterial subfamilies included bacteria associated with humans, especially skin, gastrointestinal and respiratory tracts, and with water and soil habitats. Operational taxonomic units that contain important human pathogens as well as their close, more benign relatives were detected. When compared to 43 samples of urban outdoor air, aircraft samples differed in composition, with higher relative abundance of Firmicutes and Gammaproteobacteria lineages in aircraft samples, and higher relative abundance of Actinobacteria and Betaproteobacteria lineages in outdoor air samples. In addition, aircraft and outdoor air samples differed in the incidence of taxa containing human pathogens. Overall, these results demonstrate that HEPA filter samples can be used to deeply characterize bacterial diversity in aircraft air and suggest that the presence of close relatives of certain pathogens must be taken into account in probe design for aircraft biosensors.

Practical Implications A biosensor that could be deployed in commercial aircraft would be required to function at an extremely low false alarm rate, making an understanding of microbial background important. This study reveals a diverse bacterial background present on aircraft, including bacteria closely related to pathogens of public health concern. Furthermore, this aircraft background is different from outdoor air, suggesting different probes may be needed to detect airborne contaminants to achieve minimal false alarm rates. This study also indicates that aircraft HEPA filters could be used with other molecular techniques to further characterize background bacteria and in investigations in the wake of a disease outbreak.

I. Olmedo, P. V. Nielsen, M. Ruiz de Adana and R. L. Jensen - The risk of airborne cross-infection in a room with vertical low-velocity ventilation

Abstract Downward flow ventilation systems are one of the most recommended ventilation strategies when contaminants in rooms must be removed and people must be protected from the risk of airborne cross-infection. This study is based on experimental tests carried out in a room with downward flow ventilation. Two breathing thermal manikins are placed in a room face to face. One manikin's breathing is considered to be the contaminated source to simulate a risky situation with airborne cross-infection. The position of the manikins in relation to the diffuser and the location of diffuser in the room as well as the distance between the manikins are being changed to observe the influence of these factors on the personal exposure of the target manikin. The results show that the DWF in different situations often is unable to penetrate the microenvironment generated by the manikins. The downward ventilation system can give an unexpected high level of contaminant exposure of the target manikin, when the distance between the manikins is reduced.

Practical Implications Several guidelines recommend the downward ventilation system to reduce the risk of cross-infection between people in hospital rooms. This study shows that this recommendation should be taken into careful consideration. It is important to be aware of people position, position to other thermal loads in the room, and especially be aware of the distance between people if the exposure to the exhaled contaminants wants to be reduced.

C.-W. Chang, S.-Y. Li, S.-H. Huang, C.-K. Huang, Y.-Y. Chen and C.-C. Chen - Effects of ultraviolet germicidal irradiation and swirling motion on airborne Staphylococcus aureus, Pseudomonas aeruginosa and Legionella pneumophila under various relative humidities

Abstract *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Legionella pneumophila* have been detected in indoor air and linked to human infection. It is essential to adopt control methods to inactivate airborne pathogens. By passing bioaerosols horizontally into a UV device at two flow rates (Qs) and moving cells around a central UVC lamp at relative humidity (RH) of 12.7–16.7%, 58.7–59.6%, and 87.3–90%, the effects of swirling motion and 254-nm ultraviolet germicidal irradiation (UVGI) against bioaerosols were assessed under UV-off and UV-on settings, respectively. An inverse relationship between RH and UVGI effectiveness was observed for every test bioaerosol ($r = -0.74 \sim -0.81$, $P < 0.0001$). Increased UV resistance with RH is likely associated with the hygroscopicity of bioaerosols, evident by increased aerodynamic diameters at high RH ($P < 0.05$). UVGI effectiveness was significantly increased with decreasing Q ($P < 0.0001$). Moreover, *P. aeruginosa* was the most susceptible to UVGI, while the greatest UV resistance occurred in *L. pneumophila* at low RH and *S. aureus* at medium and high RH ($P < 0.05$). Results of UV off show *P. aeruginosa* and *L. pneumophila* were more sensitive to air-swirling motion than *S. aureus* ($P < 0.05$). Overall, test bioaerosols were reduced by 1.7–4.9 and 0.2–1.7 log units because of the UVGI and swirling movement, respectively.

Practical Implications The studied UV device, with a combination of swirling motion and UVGI, is effective to inactivate airborne *S. aureus*, *P. aeruginosa*, and *L. pneumophila*. This study also explores the factors governing the UVGI and swirling motion against infectious bioaerosols. With understanding the environmental and operational parameters, the studied UV device has the potential to be installed indoors where people are simultaneously present, for example, hospital wards and nursing homes, to prevent the humans from acquiring infectious diseases.

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

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- 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.

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