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Editorial

Environmental microbes and asthma and allergies

The importance of indoor environmental factors in development of allergy is still unclear in many aspects. Although there are evident causal connections such as house dust mites and some indoor pests and allergy, there are exposing agents where the relationship to health is to be revealed. Currently, extensive work focuses on the role of environmental microbes as either protective or harmful agents, providing interesting visions for understanding the etiology of allergy.

The two main sources of exposure to environmental microbes are first, food and drinks and second, the indoor environment via air and surfaces. We are exposed to these indoor microbes mainly through inhalation and children also through ingestion. Analyses of the DNA material of house dust show that indoor microbes originate from both outdoors and from indoor sources including humans themselves. Our skin with its necessary normal bacteria are indeed an important source of indoor bacteria!

Microbial exposure especially in early life is hypothesized to protect from the development of atopy and thereby from atopic diseases, like asthma and associated wheeze. On the other hand, environmental microbes can also act as irritants and increase respiratory symptoms and risk of asthma, as observed in buildings with mold problems and in microbially contaminated occupational environments. The characteristics of the microbial exposures that lead to either direction are being studied.

We performed a literature search for all articles published in 2000-2008 that have analyzed the association between levels of microbes measured in house dust in homes and atopy or asthma or wheezing. Atopy was defined based on increased levels of specific IgE or reactions in skin prick test to common allergens.

Most studies had assessed the microbial exposure as endotoxin (LPS) using Limulus assay. Endotoxin is part of the outer cell wall of gram negative bacteria. Of the studies looking at atopy (n=15), one half suggested a protective effect and only one a harmful effect on atopy. In contrast, almost all of the studies on asthma (n=9) and wheezing (n=14) suggested a harmful effect on asthma/wheezing.

However, most of the studies were cross-sectional or birth cohort studies with follow-up only up to age 1-2 years. This raises the possibility that the harmful effect on asthma/wheezing would be only temporary and the association would turn protective with longer follow-up. There are only two longer prospective birth cohort studies with follow-ups up to age 4 years and 7 years, but the one showed a protective and the other a harmful effect of asthma.

Other markers of microbial exposure used in some studies include extracellular polysaccarides (EPS) for the molds *Penicillium* and *Aspergillus*, ergosterol and beta-1,3-glucan as indicators of fungal biomass, muramic acid, which indicates gram positive bacteria, and culturing of viable bacteria and fungi. However, there are only a few studies on these markers.

Although the results on endotoxin are promising and supported by animal studies, it is likely that also other microbes than gram negative bacte-

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ria play a role in the development of asthma and allergy. Among Gram positive bacteria there is a large group of environmental organisms, mainly actinobacteria, with remarkable biological potential. It will be exciting to look at their role in relation to our health as well. Environmental microbes, present everywhere around us, are still a largely neglected group of agents from the health perspective, but we can hardly wait until the research provides more light to their importance. What to do and what to avoid, we will probably get new understanding how to prevent allergies in our daily behaviour at home and elsewhere.

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Protection from asthma and allergic diseases

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Allergic diseases comprise allergic rhinoconjunctivitis (hay fever), atopic dermatitis, food allergies and atopic asthma. Atopic sensitization, i.e. elevated levels of specific IgE antibodies in the peripheral blood, is the common laboratory finding in these health conditions.

Allergies have developed into a major health concern in the Western World. The prevalence of asthma and allergic diseases is higher in affluent, western countries with a high degree of industrialisation than in developing countries with a large rural population. An informative study has been conducted in Karelia where a 4-fold higher risk of atopic sensitization was seen in Finnish Karelia as compared to Russian Karelia [1]. The two populations are of the same ethnic background and live in adjacent geographical areas, but living conditions, lifestyles and environmental exposures are substantially different. Among the environmental factors discussed major differences in the origin and the diversity of indoor microbial exposures were found. Studies performed in Mongolia which is in transition from rural, farming lifestyles to an industrial society showed that the prevalence of allergic rhinoconjunctivitis and atopic sensitization was 9.3% and 13.6% in Mongolian villages, 12.9% and 25.3% in rural towns and 18.4% and 31.0% in the capital, Ulaanbaatar city, respectively [2]. Their findings further indicated that the prevalence of allergic illnesses increased in subjects moving from a rural village to a town.

A number of studies have been carried out in rural areas in Europe, namely in Switzerland [3-5], Germany [6-8], Austria [4,5,8], France [9], Sweden [5, 10, 11], Denmark [12,13], Finland [14-16] and Britain [17] to contrast the prevalence of asthma and allergic diseases in children and adults living on farms as compared to subjects also living in rural areas but not on farms. Almost all studies reported a decreased prevalence of hay fever and allergic rhinoconjunctivitis among farm children as compared to non farm children. In some studies a protective 'farm effect' was also found for childhood asthma. Similar figures have been observed among adults. In the European farmers' study, the prevalence of allergic rhinitis was 14.0% in 20-44 years old animal farmers as compared to 20.7% among other participants of the European Community Respiratory Health Survey [18].

Exposure to livestock has been identified as an important contributor to the protective farm effect [4, 6, 14, 17] as well as the consumption of farm produced milk and dairy products [19]. Also exposure to fodder such as hay or silage has been shown to contribute to the protective 'farm effect' [20]. It therefore seems likely that not one but a limited number of factors within these farm environments convey allergy protection.

Children exposed to livestock may be exposed to more allergens, bacteria, viruses and fungi than children without exposure to livestock. Yet, only few out of the many microbial exposures have been measured in farming environments so far. In the multicentre PARSIFAL study bacterial substances

(such as endotoxin from gram negative species and muramic acid, a component of peptidoglycan from the cell wall of all types of bacteria,) have been found to be more abundant in mattress dust from farm children than from non farm children [21]. Likewise, fungal constituents (extracellular polysaccharide (EPS) from Penicillium and Aspergillus spp.) are more prevalent in farming households than non farm households [21]. Moreover, these bacterial compounds were inversely related to the prevalence of hay fever and asthma in children. These epidemiological observations have been transferred into animal models. Recent work has shown that the intranasal application of heat-killed bacteria which were isolated from animal sheds, indeed prevents mice from developing allergic airway disease [22].
Consumption of cow's milk directly from a farm ever in life was significantly inversely associated with asthma in school age children in central and northern Europe. The association was independent of farm related co-exposures. However, the relevant protective farm milk components and the underlying biological mechanisms are still unknown [19]
The analysis of questionnaire data of the PARSIFAL cohort of 8263 children between 5 and 13 years old revealed, that frequent stays in barns were inversely related to atopic sensitization. Exposure to silage as animal fodder or involvement in haying showed protection against asthma [20].

The timing of exposures matters. In the cross-sectional PARSIFAL Study maternal exposure to farm characteristics was associated with a decreased risk of atopy in the offspring. Such cross-sectional surveys are, however, prone to recall bias. Therefore, a prospective birth cohort was started in rural areas of Europe. The EFRAIM study prospectively investigates the protective factors in early life influencing the development of allergies among farm and non farm families. EFRAIM has enrolled over 1,100 families collecting detailed information on a large variety of environmental exposures. Large biobanks have been established. The mechanisms mediating these protective exposures such as the maturation of immune responses, gut colonisation, the mucosal barrier function and the genetic and epigenetic factors interacting with the environmental exposures are under investigation.

Not only the timing of the exposures, but also the genetic background of an exposed subject matters. A number of gene by environment interactions have been observed with polymorphisms in genes of innate immunity receptors and various exposures to farming environments. For example, a significant interaction between genetic variation in CD14/-1721 and farm milk consumption was found modifying the risk to develop allergic rhinoconjunctivitis and asthma [23]. Therefore, it is conceivable that increased levels of microbial exposures recognized by innate immunity receptors affect adaptive immune responses resulting in decreased levels of atopic sensitization and asthma.

Most of the studies exploring the protective 'farm effect' have been hampered by low numbers. Therefore, an extensive environmental study has been set up in four alpine European regions as part of the ongoing GABRIEL project [24]. The aim of this study is a systematic approach to investigate novel environmental and genetic determinants of childhood asthma in a large population. Particular attention will be given to the identification of the microbial or other factors, which confer strong protection against asthma in children living in a rural and a farming environment.

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11. Klintberg, B., et al., *Fewer allergic respiratory disorders among farmers' children in a closed birth cohort from Sweden.* Eur Respir J, 2001. 17(6): p. 1151-7.

12. Omland, O., et al., *Lung status in young Danish rurals: the effect of farming exposure on asthma-like symptoms and lung function.* Eur Respir J, 1999. 13(1): p. 31-7.

13. Portengen, L., et al., *Low prevalence of atopy in young Danish farmers and farming students born and raised on a farm.* Clin Exp Allergy, 2002. 32(2): p. 247-53.

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22. Debarry, J., et al., *Acinetobacter lwoffii and Lactococcus lactis strains isolated from farm cowsheds possess strong allergy-protective properties.* J Allergy Clin Immunol, 2007. 119(6): p.1514-21.

23. Bieli, C., et al, *A polymorphism in CD14 modifies the effect of farm milk consumption on allergic diseases and CD14 gene expression.* J Allergy Clin Immunol, 2007.120(6): p.1308-15.

24. http://www.gabriel-fp6.org/

Literature

In this section we will provide a collection of recent housing and health publications from a variety of backgrounds. Literature that is published in German or French, respectively, is indicated with the German flag or the French flag.
If you have suggestions for interesting journals that we should screen for the literature collection, please let us know!

Table of Topics

Allergies and Respiratory Diseases

Global map of the prevalence of symptoms of rhinoconjunctivitis in children: The International Study of Asthma and Allergies in Childhood (ISAAC) Phase Three.
Aït-Khaled N, Pearce N, Anderson HR, Ellwood P, Montefort S, Shah J; ISAAC Phase Three Study Group.
Allergy. 2009 Jan;64(1):123-48.

Indoor allergens, environmental avoidance, and allergic respiratory disease.
Bush RK.
Allergy Asthma Proc. 2008 Nov-Dec;29(6):575-9.

Deaths from chronic obstructive pulmonary disease--United States, 2000-2005.
Centers for Disease Control and Prevention (CDC).
MMWR Morb Mortal Wkly Rep. 2008 Nov 14;57(45):1229-32.

[Housing and health counselling services in the management of allergic respiratory disease]
Charpin-Kadouch C, Mouche JM, Quéralt J, Ercoli J, Hugues B, Garon M, Dumon H, Charpin DA.
Rev Mal Respir. 2008 Sep;25(7):821-7.

Impact of allergic rhinitis on asthma: effects on bronchial hyperreactivity.
Cirillo I, Pistorio A, Tosca M, Ciprandi G.
Allergy. 2009 Jan 28.

International Differences in Asthma Guidelines for Children.
Cope SF, Ungar WJ, Glazier RH.
Int Arch Allergy Immunol. 2008 Nov 11;148(4):265-278.

Pearls and pitfalls of allergy diagnostic testing: report from the American College of Allergy, Asthma and Immunology/American Academy of Allergy, Asthma and Immunology Specific IgE Test Task Force.
Cox L, Williams B, Sicherer S, Oppenheimer J, Sher L, Hamilton R, Golden D; American College of Allergy, Asthma and Immunology Test Task Force; American Academy of Allergy, Asthma and Immunology Specific IgE Test Task Force.
Ann Allergy Asthma Immunol. 2008 Dec;101(6):580-92.

Parent report of pests and pets and indoor allergen levels in inner-city homes.
Curtin-Brosnan J, Matsui EC, Breysse P, McCormack MC, Hansel NN, Tonorezos ES, Eggleston PA, Williams DL, Diette GB.
Ann Allergy Asthma Immunol. 2008 Nov;101(5):517-23.

An examination of interventions to reduce respiratory health and injury hazards in homes of low-income families.
Dixon SL, Fowler C, Harris J, Moffat S, Martinez Y, Walton H, Ruiz B, Jacobs DE.
Environ Res. 2009 Jan;109(1):123-30.

Pets keeping in home, parental atopy, asthma, and asthma-related symptoms in 12,910 elementary school children from northeast China.
Dong GH, Ma YN, Ding HL, Jin J, Cao Y, Zhao YD, He QC.
Indoor Air. 2008 Dec 3.

Anti-cockroach and anti-mouse IgE are associated with early wheeze and atopy in an inner-city birth cohort.
Donohue KM, Al-alem U, Perzanowski MS, Chew GL, Johnson A, Divjan A, Kelvin EA, Hoepner LA, Perera FP, Miller RL.
J Allergy Clin Immunol. 2008 Nov;122(5):914-20.

The association of allergic symptoms with sensitization to inhalant allergens in childhood.
Govaere E, Van Gysel D, Verhamme KM, Doli E, De Baets F.
Pediatr Allergy Immunol. 2008 Sep 26.

Factors affecting bronchial hyperreactivity in asthmatic children.
Harmanci K, Bakirtas A, Turktas I.
J Asthma. 2008 Nov;45(9):730-4.

Associations of wheezing phenotypes in the first 6 years of life with atopy, lung function and airway responsiveness in mid-childhood.
Henderson J, Granell R, Heron J, Sherriff A, Simpson A, Woodcock A, Strachan DP, Shaheen SO, Sterne JA.
Thorax. 2008 Nov;63(11):974-80.

Effects of improved home heating on asthma in community dwelling children: randomised controlled trial.
Howden-Chapman P, Pierse N, Nicholls S, Gillespie-Bennett J, Viggers H, Cunningham M, Phipps R, Boulic M, Fjällström P, Free S, Chapman R, Lloyd B, Wickens K, Shields D, Baker M, Cunningham C, Woodward A, Bullen C, Crane J.
BMJ. 2008 Sep 23;337:a1411. doi: 10.1136/bmj.a1411.

Indices of lower airway inflammation in children monosensitized to house dust mite after nasal allergen challenge.
Inal A, Kendirli SG, Yilmaz M, Altintas DU, Karakoc GB, Erdogan S.
Allergy. 2008 Oct;63(10):1345-51.

Maternal smoking increases risk of allergic sensitization and wheezing only in children with allergic predisposition: longitudinal analysis from birth to 10 years.
Keil T, Lau S, Roll S, Grüber C, Nickel R, Niggemann B, Wahn U, Willich SN, Kulig M.
Allergy. 2009 Jan 17.

Early exposure and sensitization to cat and dog: different effects on asthma risk after wheezing in infancy.
Korppi M, Hyvärinen M, Kotaniemi-Syrjänen A, Piippo-Savolainen E, Reijonen T.
Pediatr Allergy Immunol. 2008 Dec;19(8):696-701.

Innate immune responses of airway epithelium to house dust mite are mediated through beta-glucan-dependent pathways.
Nathan AT, Peterson EA, Chakir J, Wills-Karp M.
J Allergy Clin Immunol. 2009 Jan 27.

Indoor exposure to environmental tobacco smoke and dampness: respiratory symptoms in Sardinian children--DRIAS study.
Pirastu R, Bellu C, Greco P, Pelosi U, Pistelli R, Accetta G, Biggeri A.
Environ Res. 2009 Jan;109(1):59-65.

Rhinitis and onset of asthma: a longitudinal population-based study.
Shaaban R, Zureik M, Soussan D, Neukirch C, Heinrich J, Sunyer J, Wjst M, Cerveri I, Pin I, Bousquet J, Jarvis D, Burney PG, Neukirch F, Leynaert B.
Lancet. 2008 Sep 20;372(9643):1049-57.

Variability of IgE reactivity profiles among European mite allergic patients.
Weghofer M, Thomas WR, Kronqvist M, Mari A, Purohit A, Pauli G, Horak F, Grönlund H, van Hage M, Valenta R, Vrtala S.
Eur J Clin Invest. 2008 Dec;38(12):959-65.

Age Healthier Breathe Easier

Exposure to indoor and outdoor environmental hazards can worsen the health of persons living with lung disease. The Environmental Protection Agency has released a fact sheet for older adults and their caregivers that offers information on steps that can be taken to reduce their exposure to these environmental hazards. For more detailed information, please see:
http://www.epa.gov/aging/resources/factsheets/ahbe/index.htm

Home Safety

An examination of interventions to reduce respiratory health and injury hazards in homes of low-income families.
Dixon SL, Fowler C, Harris J, Moffat S, Martinez Y, Walton H, Ruiz B, Jacobs DE.
Environ Res. 2008 Nov 25.

Performance-based building codes: a call for injury prevention indicators that bridge health and building sectors.
Edwards N.
Inj Prev. 2008 Oct;14(5):329-32.

Video messaging: What works to persuade mothers to supervise young children more closely in order to reduce injury risk?
Morrongiello BA, Zdzieborski D, Sandomierski M, Lasenby-Lessard J.
Soc Sci Med. 2009 Jan 20.

Physical environment of the home and adolescent injury risk.
Schwebel DC, Janice Gilliland M, Moore JG.
Int Emerg Nurs. 2009 Jan;17(1):47-51.

Housing and Ageing Society

Frailty among community-dwelling elderly people in France: the three-city study.
Avila-Funes JA, Helmer C, Amieva H, Barberger-Gateau P, Le Goff M, Ritchie K, Portet F, Carrière I, Tavernier B, Gutiérrez-Robledo LM, Dartigues JF.
J Gerontol A Biol Sci Med Sci. 2008 Oct;63(10):1089-96.

Falls risk among a very old home-dwelling population.
Iinattiniemi S, Jokelainen J, Luukinen H.
Scand J Prim Health Care. 2009 Mar;27(1):25-30.

The optimal sequence and selection of screening test items to predict fall risk in older disabled women: the Women's Health and Aging Study.
Lamb SE, McCabe C, Becker C, Fried LP, Guralnik JM.
J Gerontol A Biol Sci Med Sci. 2008 Oct;63(10):1082-8.

Older people's experience of falls: understanding, interpretation and autonomy.
Roe B, Howell F, Riniotis K, Beech R, Crome P, Ong BN.
J Adv Nurs. 2008 Sep;63(6):586-96.

Housing and Mental Health

Flooded homes, broken bonds, the meaning of home, psychological processes and their impact on psychological health in a disaster.
Carroll B, Morbey H, Balogh R, Araoz G.
Health Place. 2009 Jun;15(2):540-7.

Housing for persons with serious mental illness: consumer and service provider preferences.
Piat M, Lesage A, Boyer R, Dorvil H, Couture A, Grenier G, Bloom D.
Psychiatr Serv. 2008 Sep;59(9):1011-7.

Indoor Air

The radon issue: considerations on regulatory approaches and exposure evaluations on the basis of recent epidemiological results.
Bochicchio F.
Appl Radiat Isot. 2008 Nov;66(11):1561-6.

Indoor contaminants from newspapers: VOCs emissions in newspaper stands.
Caselli M, de Gennaro G, Saracino MR, Tutino M.
Environ Res. 2009 Feb;109(2):149-57.

Children with elevated blood lead levels related to home renovation, repair, and painting activities--New York State, 2006-2007.
Centers for Disease Control and Prevention (CDC).
MMWR Morb Mortal Wkly Rep. 2009 Jan 30;58(3):55-8.

Indoor airborne endotoxin assessment in homes of Paris newborn babies.
Dassonville C, Demattei C, Vacquier B, Bex-Capelle V, Seta N, Momas I.
Indoor Air. 2008 Dec;18(6):480-7.

CALCULATION OF THE INDOOR GAMMA DOSE RATE DISTRIBUTION DUE TO BUILDING MATERIALS IN THE NETHERLANDS.
de Jong P, van Dijk JW.
Radiat Prot Dosimetry. 2008 Dec 30.

Particle dose estimation from frying in residential settings.
Evans GJ, Peers A, Sabaliauskas K.
Indoor Air. 2008 Dec;18(6):499-510.

Lung cancer deaths from indoor radon and the cost effectiveness and potential of policies to reduce them.
Gray A, Read S, McGale P, Darby S.
BMJ. 2009 Jan 6;338:a3110. doi: 10.1136/bmj.a3110.

A longitudinal study of indoor nitrogen dioxide levels and respiratory symptoms in inner-city children with asthma.
Hansel NN, Breysse PN, McCormack MC, Matsui EC, Curtin-Brosnan J, Williams DL, Moore JL, Cuhran JL, Diette GB.
Environ Health Perspect. 2008 Oct;116(10):1428-32.

Influence of indoor air quality (IAQ) objectives on air-conditioned offices in Hong Kong.
Hui PS, Mui KW, Wong LT.
Environ Monit Assess. 2008 Sep;144(1-3):315-22.

Whole house particle removal and clean air delivery rates for in-duct and portable ventilation systems.
Macintosh DL, Myatt TA, Ludwig JF, Baker BJ, Suh HH, Spengler JD.
J Air Waste Manag Assoc. 2008 Nov;58(11):1474-82.

Lead dustfall from demolition of scattered site family housing: developing a sampling methodology.
Mucha AP, Stites N, Evens A, MacRoy PM, Persky VW, Jacobs DE.
Environ Res. 2009 Feb;109(2):143-8.

Control of asthma triggers in indoor air with air cleaners: a modeling analysis.
Myatt TA, Minegishi T, Allen JG, Macintosh DL.
Environ Health. 2008 Aug 6;7:43.

Household exposure to paint and petroleum solvents, chromosomal translocations, and the risk of childhood leukemia.
Scélo G, Metayer C, Zhang L, Wiemels JL, Aldrich MC, Selvin S, Month S, Smith MT, Buffler PA.
Environ Health Perspect. 2009 Jan;117(1):133-9.

Pyrethroid pesticides and their metabolites in vacuum cleaner dust collected from homes and day-care centers.
Starr J, Graham S, Stout D 2nd, Andrews K, Nishioka M.
Environ Res. 2008 Nov;108(3):271-9.

Annual average indoor radon variations over two decades.
Steck DJ.
Health Phys. 2009 Jan;96(1):37-47.

Particulate matter and gaseous pollutants in residences in Antwerp, Belgium.
Stranger M, Potgieter-Vermaak SS, Van Grieken R.
Sci Total Environ. 2009 Jan 15;407(3):1182-92.

Characterization of indoor air quality in primary schools in Antwerp, Belgium.
Stranger M, Potgieter-Vermaak SS, Van Grieken R.
Indoor Air. 2008 Dec;18(6):454-63.

Longitudinal Study of Indoor Particulate Matter and its Relationship to Outdoor Concentrations in New Delhi, India
Sumeet Saksena and R. Uma
Indoor and Built Environment 2008 17: 543-551.

Simulation of VOC emissions from building materials by using the state-space method.
Wei Yan, Yinping Zhang, Xinke Wang.
Building and Environment 2009 March;44(3): 471-8.

Changes in pest infestation levels, self-reported pesticide use, and permethrin exposure during pregnancy after the 2000-2001 U.S. Environmental Protection Agency restriction of organophosphates.
Williams MK, Rundle A, Holmes D, Reyes M, Hoepner LA, Barr DB, Camann DE, Perera FP, Whyatt RM.
Environ Health Perspect. 2008 Dec;116(12):1681-8.

Evaluation of HEPA vacuum cleaning and dry steam cleaning in reducing levels of polycyclic aromatic hydrocarbons and house dust mite allergens in carpets.
Yu CH, Yiin LM, Tina Fan ZH, Rhoads GG.
J Environ Monit. 2009 Jan;11(1):205-11.

Final reports of EnVIE published

The Public Final Reports of EnVIE, a European Co-ordination Action interfacing science and policy making in the field of indoor air quality, have been published and can be downloaded from http://www.envie-iaq.eu/finalreports.html. The final activity report includes a chapter on the assessment of health benefits that could be realized by a variety of indoor air quality and building-related regulations and policies.

Two new publications on indoor air released by the German Federal Environment Agency (Umweltbundesamt, UBA)

- Leitfaden für die Innenraumhygiene in Schulen  (Guideline on indoor air hygiene in schools)

- Untersuchungen zum Vorkommen und zur gesundheitlichen Relevanz von Bakterien in Innenräumen (Investigations on occurence and health impact of bacteria in interior spaces)

Mould and Dampness

Professional judgment and the interpretation of viable mold air sampling data.
Johnson D, Thompson D, Clinkenbeard R, Redus J.
J Occup Environ Hyg. 2008 Oct;5(10):656-63.

Detection of fungal development in a closed environment through the identification of specific VOC: demonstration of a specific VOC fingerprint for fungal development.
Moularat S, Robine E, Ramalho O, Oturan MA.
Sci Total Environ. 2008 Dec 15;407(1):139-46.

A comparison between occupants' and inspectors' reports on home dampness and their association with the health of children: The ALLHOME study.
K. Naydenov, A. Melikov, D. Markov, P. Stankov, C-G. Bornehag, J. Sundell.
Building and Environment 2008 Nov; 43(11):1840-9.

Use of headspace SPME-GC-MS for the analysis of the volatiles produced by indoor molds grown on different substrates.
Van Lancker F, Adams A, Delmulle B, De Saeger S, Moretti A, Van Peteghem C, De Kimpe N.
J Environ Monit. 2008 Oct;10(10):1127-33.

Respiratory Morbidity and Medical Visits Associated with Dampness and Air-conditioning in Offices and Homes.
Sahakian N, Park JH, Cox-Ganser J.
Indoor Air. 2008 Dec 2.

Screening Tools to Estimate Mold Burdens in Homes.
Vesper S, McKinstry C, Bradham K, Ashley P, Cox D, Dewalt G, Lin KT.
J Occup Environ Med. 2009 Jan;51(1):80-86.

Noise

Environmental noise and asthma in children: sex-specific differences.
Bockelbrink A, Willich SN, Dirzus I, Reich A, Lau S, Wahn U, Keil T.
J Asthma. 2008 Nov;45(9):770-3.

Habitual traffic noise at home reduces cardiac parasympathetic tone during sleep.
Graham JM, Janssen SA, Vos H, Miedema HM.
Int J Psychophysiol. 2008 Dec 13.

Long-Term Exposure to Road Traffic Noise and Myocardial Infarction.
Selander J, Nilsson ME, Bluhm G, Rosenlund M, Lindqvist M, Nise G, Pershagen G.
Epidemiology. 2008 Dec 29.

Children's annoyance reactions to aircraft and road traffic noise.
van Kempen EE, van Kamp I, Stellato RK, Lopez-Barrio I, Haines MM, Nilsson ME, Clark C, Houthuijs D, Brunekreef B, Berglund B, Stansfeld SA.
J Acoust Soc Am. 2009 Feb;125(2):895-904.

Smoking / ETS

Impact of parental home smoking policies on policy choices of independently living young adults.
Albers A, Biener L, Siegel M, Cheng D, Rigotti NA.
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Event Announcements

In this section we will inform you about upcoming events with relevance to housing and health. If you know of any international event, please let us know!

14th World Conference on Tobacco or Health
Date: March 08 - 12, 2009
Venue: Mumbai, India
Further Information: http://www.14wctoh.org/

4th Biennial Partnership Forum
Date: March 23 - 28, 2009
Venue: Kampala, Uganda
Further Information: http://www.pciaonline.org

7th International Conference on Air Quality
Date: March 24 - 27, 2009
Venue: Istanbul, Turkey
Further Information: http://www.airqualityconference.org/

Approaches to Managing Mold in Buildings
Date: April 27 - 29, 2009
Venue: Orlando, Florida, USA
Further Information: http://www.utulsa.edu/iaqprogram/TulsaMoldFlyer.pdf

12th World Public Health Congress
Date: April 27 - May 1, 2009
Venue: Istanbul, Turkey
Further Information: http://www.worldpublichealth2009.org/

ROOMVENT 2009 - Air Distribution in Rooms
Date: May 24 - 27, 2009
Venue: Busan, South Korea
Further Information: http://www.roomvent2009.org/eng/roomvent2009/invitation.asp

International Green Roof Congress
Date: May 25 - 27, 2009
Venue: Nürtingen, Germany
Further Information: http://www.greenroofworld.com/

The 5th International Workshop on Energy and Environment of Residential Buildings and the 3rd International Conference on Built Environment and Public Health
Date: May 29 - 31, 2009
Venue: Guilin, Guangxi, China
Further Information: http://www.chinahvacr.com/eerb/

SASBE2009 - 3rd International Conference on Smart and Sustainable Built Environments
Date: June 15 - 19, 2009
Venue: Delft, The Netherlands
Further Information: http://www.sasbe2009.com/

ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) Annual Conference
Date: June 20 - 24, 2009
Venue: Louisville, Kentucky, USA
Further Information: http://www.ashrae.org/events/page/1919

ENHR 2009 Changing Housing Markets: Integration and Segmentation
Date: June 26 - July 1, 2009
Venue: Prague, Czech Republic
Further Information: http://www.enhr2009.com/info.php?l=cz&cid=25073

Healthy Buildings 2009
Date: September 13 - 17, 2009
Venue: Syracuse, New York, USA
Further Information: http://www.hb2009.com/

30st AIVC conference - Trends in High Performance Buildings and the role of Ventilation
Date: October 1 - 2, 2009
Venue: Berlin, Germany
Further Information:
http://www.aivc.org/frameset/frameset.html?../Conferences/conferences.html~mainFrame

3. Jahrestagung der Gesellschaft für Hygiene, Umwelt-und Präventivmedizin:
Gesundheit, Umwelt und Wohnen
Date: October 8 - 10, 2009
Venue: Stuttgart, Germany
Further Information: http://conventus.de/ghup2009/

XXI. World Allergy Congress
Date: December 6 - 10, 2009
Venue: Buenos Aires, Argentina
Further Information: http://www.worldallergy2009.com/

CIB (INTERNATIONAL COUNCIL FOR RESEARCH AND INNOVATION IN BUILDING AND CONSTRUCTION) World Congress 2010
Date: May 10 - 13, 2010
Venue: Salford Quays, United Kingdom
Further Information: http://www.cib2010.org/

Message Board

In this section we will inform you about activities and projects related to housing and health that are being carried out by WHO or the WHO-CC. This may relate to ongoing activities and projects, as well as invitations to participate in data collections or case study projects.

WHO work on indoor and built environments

The **WHO Indoor Air Quality guidelines on dampness and mould** – recommended by a WHO working group during an expert meeting in 2007 (http://www.euro.who.int/air/activities/20070814_1) – are expected to be published in spring 2009 by WHO headquarters. In the meantime, work is progressing on the development of guidelines on selected air pollutants (see http://www.euro.who.int/air/activities/20080910_1 for details) for which guidelines will be proposed during an expert meeting in Bonn from March 31 to April 3. Future work is expected on guidelines development for allergens and solid fuel combustion. For an overview of the ongoing work, please refer to http://www.euro.who.int/air/activities/20070510_2

The ongoing **WHO project on damp and mould interventions** – co-funded by the European Commission – has held its final meeting in Bonn on February 9 and 10 and developed a set of conclusions and policy recommendations on interventions and actions against damp and mould. The final report that will be published in summer 2009 will address policy advice on both technical actions as well as policy actions to improve the prevention, mitigation and remediation of damp and mould in indoor settings. For information, please visit http://www.euro.who.int/Housing/support/20080403_1

The **exposure to dampness** – and potentially also to mould – is a severe problem in many European countries (see http://www.enhis.org/object_document/o4720n27384.html). Data compiled for the WHO ENHIS project show that for many EU countries, the prevalence of damp in the private home is higher than 20%. Major problems are identified in many of the Southern European as well as Eastern European countries.

Public information brochure on damp and mould

In relation to the project on damp and mould interventions, WHO has initiated a collaboration with the Health and Environment Alliance (HEAL) to develop a **compilation of agencies and institutions** that are active in providing advice and guidance on damp and mould to the public. The compilation will cover as many of the 53 member states of the WHO Regional Office for Europe as possible and aims at providing the public with a list of adequate national sources of information if they face a problem of damp and mould in their home. Institutions and agencies that are active in the field of public information on damp and mould are asked to sign up for this compilation on the HEAL website at http://www.env-health.org/a/3226

Housing and Health Action Plans

Together with the Portuguese Ministry of Health, the WHO housing and health programme has developed a methodology and tools for producing **Local Housing and Health Action Plans**. Based on a validated survey undertaken in the early 2000s, these action plans have been developed to enable local authorities to easily identify their main priorities in the area of housing and health. The products of this project provide a manual and all necessary tools to produce an overview of local priorities for action within a short time period and based on the work of municipal staff. For downloading the project manual and a descriptive version of the tools, please go to http://www.euro.who.int/Housing/support/20080403_4

Home care in Europe

In late 2008, the WHO Regional Office for Europe has published a report on the current status of home care in Europe. With more and more elderly being taken care of at home by either mobile care teams or family members, the health system increasingly extends into the private setting. Next to a variety of issues, this report also highlights the necessity to support delivery of home care through technological progress and home modifications. The report can be downloaded at http://www.euro.who.int/document/E91884.pdf

WHO report "Addressing the socioeconomic safety divide: a policy briefing" published

This policy briefing summarizes evidence on the socioeconomic safety divide from a large systematic review: *Socioeconomic differences in injury risks. A review of findings and a discussion of potential countermeasures.* It provides messages for policy-makers, researchers and public health advocates and safety planners on what can be done to address this safety divide. Action needs to be intersectoral; governments need to aim for equity across all types of government policies; and action needs to be taken both to make the social and physical environment safer generally and to target disadvantaged populations.
The report can be downloaded from http://www.euro.who.int/document/e92197.pdf

WHO report on City leadership for health published

This summary evaluation of Phase IV of the WHO European Healthy Cities Network reviews the organization of healthy cities, their enduring values and their work on the core themes of health impact assessment, healthy ageing, healthy urban planning and active living. It gives 23 messages for city decision-makers and the international public health community. The report has now been published at http://www.euro.who.int/document/E91886.pdf

WHO report on child injury prevention

Every day more than 2000 children and teenagers die from an injury which could have been prevented. This joint WHO / UNICEF report is a plea to keep kids safe by promoting evidence-based injury prevention interventions and sustained investment by all sectors. The report presents the current knowledge about the five most important causes of unintentional injury – road traffic injuries, drowning, burns, falls and poisoning – and makes seven recommendations for action. The report can be downloaded from
http://www.who.int/violence_injury_prevention/child/injury/world_report/en/index.html
The European report can be downloaded from
http://www.who.int/violence_injury_prevention/child/injury/world_report/European_report.pdf

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