Editorial
Pests in housing and the risks to health

The dwelling, be it a house or apartment, is the physical structure in which it should be possible to establish a home. The home is the social cultural and economic structure created by the household, a refuge from the outside world. Any intrusion of external factors or stressors such as pests strongly limits the psychosocial feeling of safety, intimacy and control, and inhibits the mental and social function of the home. Additionally, pests in and around the home are more than a mere nuisance but can pose a risk to health. Furthermore, global trade, urban sprawl, and changes to the climate make the spread of pests and pest-borne diseases increasingly likely, and about 75% of emerging infectious diseases are of animal origin.

It is difficult to assess the environmental burden of disease attributable to pests in housing, because there is a lack of data, not helped by a common problem of misdiagnosis of the conditions. It is rare for the medical professions to consider pests as the source of the infection other than in occupational exposures. More effective surveillance mechanisms for identifying the contribution of many pests to the spread of disease are needed. Poor health often results from poor living environments, and rodent infestations in particular are associated with poor environments. So it is likely that those lower down the social gradient of health, and whose health status may already be compromised, are more likely also to be living in closer proximity to pests.

The WHO LARES survey (Large Analysis and Review of European housing and health Status) found that 60 % of the dwellings in eight cities had been infected by at least one pest in the previous year. Bedbugs (Cimex lectularius) (and there appears an increasing problem of these pests), lice and fleas which all feed on humans can impact on the mental wellbeing of the sufferer even if they do not directly transmit disease. The LARES study showed a clear association between pest-infested premises, depression, migraines, allergies and asthma. When cockroaches are present in a dwelling, residents are over three times more likely to suffer headaches.

Norway rat infestations (Rattus norvegicus), in particular, are an indication of a degraded environment and studies show an association of rat and house mouse (Mus musculus) infestations with:

- Older housing in poor condition
- Multi-occupied buildings and housing at high density
- Ageing and damaged infrastructure e.g. drainage
- Poor environment – litter, dereliction, neighbourhoods of social deprivation etc.

The LARES study found that presence of rats and mice within a dwelling could trigger psycho/social stresses on people of all ages and backgrounds. Studies have found that the presence of rodents in the home may contribute to
increased levels of indoor allergens causing allergic asthma and rhinoconjunctivitis.

The range of parasites and zoonotic agents infecting rodents has been found to be greater than previously recognised and are reservoirs of more diseases than thought until recently. Indeed, while bubonic plague and leptospirosis (Weil's disease) are the diseases most commonly associated with rats, it has been shown that rats can also be infected with a range of helminths, that can be transmitted to humans via contaminated environments for example Capillaria spp. that cause Capillariasis, and Trichuris spp. that causing diarrhoeal disease. Bacteria such as Coxiella burnetii (causing Q fever), and Yersinia enterocolitica, that causes Yersiniosis have also been identified in rats. Rats may also play a role in the transmission of the protozoan Toxoplasma gondii. Research has shown that rats exhibit behavioural changes when infected with the organism whose definitive host is the cat. The infection makes them more susceptible to predation by cats making transmission to cats more likely, potentially increasing the risk of transmission to humans. House mice can also be infected with the protozoan. Hantavirus (HTV) is one of the recently discovered etiological agents of acute viral haemorrhagic fever and is one of the most well-known viral diseases transmitted to humans from rodents. House mice are known to transmit lymphocytic choriomeningitis (LCM) caused by an arenavirus, and more recently, LCM virus has been isolated from wild Norway rats.

The prevalence of the difference of the organisms appears to vary with the rodent population being studied. For rats, population dynamics appear to be an influence on the prevalence rates of zoonotic agents. Studies suggest where there is higher level of predation in urban areas (from pest control and domestic animals), the population density is lower and the prevalence is generally lower than on farms where population densities are greater. If the control efforts by the municipal authorities, owners or managers, depend on complaints, then such rundown neighbourhoods may be those where people do not complain. Inadequate levels of rodent control could then lead to an increase in the prevalence of zoonotic agents within the rodent population, further enhancing risk to the health of those already likely to have lower health status. The effects of climate change on populations are uncertain, but milder winters will reduce death rates, and it is known that increased flooding from heavy rainfall events increases surface rat infestations.

Even if the prevalence rates are lower than on farms, rats in urban areas rodents are living in closer proximity to the human population than rural rats, thus increasing the risk of contamination of the domestic environment and transmission of disease. Synanthropic rodents clearly pose a risk to public health, and their presence demands a high level of personal hygiene. However if housing and economic conditions are poor so that good personal hygiene is difficult to achieve the risks are increased. While traditionally rodent control has been about reducing damage to crops and buildings (economic damage), increasingly in developed countries the concern is about risks to public health.

Dr Stephen Battersby, Senior Visiting Research Fellow, RCPEH, University of Surrey and Associate of the Safe and Healthy Housing Unit, University of Warwick
sabattersby@blueyonder.co.uk

References and further information
Small, hardly visible and hiddenly living unwanted pests can occasionally be found in a household. They generally do not have a negative impact on human health. However, there are also those that quite possibly harm human health and the well-being. In this context we distinguish between the categories of material pests, storage pests and hygiene pests. The following article will examine these categories providing an example for each category.

**Material pests: Dust and book lice (Psocoptera)**

Dust and book lice (picture 1) are among the most important material pests. These insects are harmless, usually wingless inhabitants of damp dwellings. The high humidity in the dwelling can be a result of renovation and/or inadequate ventilation. Under these conditions, it is possible that dust and book lice appear in libraries, on upholstered furniture, in basements, kitchens or on indoor plants. They can live on the hardly visible layers of mould and algae on food, wallpaper, stationery and books. Only when appearing en masse, dust and book lice become annoying and contaminate books, wallpapers or food which consequently may deteriorate more quickly. Primary preventive measures against their infestation are the reduction of the air humidity indoors by adequate ventilation and heating. Beside the damage they cause, dust and book lice may be important regarding their allergological impact.

**Storage pests: Darkling beetles (Tenebrionidae)**

The shade-loving meal beetle, *Tenebrior molitor* (picture 2), of the family of darkling beetles (*Tenebrionidae*) is a frequently appearing storage pest in private dwellings. It belongs to the bigger and thus more eye-catching storage-damaging insects. In Central Europe it can also be found outdoors (for example in birds’ nests, deadwood and duff). The meal beetle and its larvae (also called flourworm) eat and pollute starchy materials like grain, flour, dough and bakery products. Meal beetles may also enter private dwellings in already contaminated food. If food is contaminated by meal beetles or flourworms it should be destroyed in order to prevent further contamination. Cupboards should be cleaned thoroughly. Flour and other cereals should be stored only in well-sealed containers. As a precaution, uncontaminated food should be deep-frozen for some days. In the case of a major meal beetle plague, a pest controller may be contacted. Picture 2

**Hygiene pests: Bedbugs (Cimicidae)**

The bedbug, *Cimex lectularius* (pictures 3, 4), of the family of *Cimicidae*, is primarily a temporary ectoparasite specialized on the blood of humans and apes. It is nocturnal and attacks its victims while they are sleeping. Throughout the day it hides close to where its host sleeps, in slots and clearances on the floor, on walls, between door frames or in furniture. In the case of a severe infestation bedbugs leave a typical sweetish smell in the room. The medicinal and hygienic relevance of bedbugs primarily...
is their annoyance as bloodsuckers. But not all bugs indoors are bedbugs. Sometimes, blood-sucking insects like pigeon- or batbugs can be found. Especially after remediation measures, these animals can’t return to their nest, because the loophole has been closed, and their bugs are left. After a hunger period of about half a year, the bugs will search for a new host. They migrate into the flat and suck at humans. According to the present state of knowledge bugs surprisingly do not play a role in the transmission of dangerous diseases. Due to their hidden living mode eradication measures should necessarily be carried out by an official pest controller who also should have a look at the garret. Especially in warm seasons an occasional bug infestation can result from birds’ nests situated close to windows.

References:

http://www.gesundheitsamt-bw.de/oegd/Gesundheitsthemen/HygieneInfektionsschutz/LaestlingeSchaedlinge

What are biocides?

*Dr. rer. nat. Bernhard Link, WHO Collaborating Centre for Housing and Health, Baden-Württemberg State Health Office, Stuttgart, Germany.* [who.cc@rps.bwl.de](mailto:who.cc@rps.bwl.de)

Biocides are active substances and preparations containing one or more active substances, with the intended property to destroy, deter, render harmless, prevent the action of, or otherwise exert a controlling effect on any harmful organism by chemical or biological means. Biocidal products are necessary for the control of organisms that are harmful to human or animal health or that cause damage to materials. But as their properties can also pose risks to humans, animals and the environment, they need careful regulation. The regulation of biocidal products in the EU refers to 23 different product types. These include disinfectants used in different areas, chemicals used for preservation of products and materials, non-agricultural pesticides and anti-fouling products used on hulls of vessels. The regulation process will not apply to certain product types already covered by other Community legislation, such as plant protection products, medicines, and cosmetics.


The Directive established a two-step process of approval:
1) Evaluation of the active substance at the Union level, and
2) Product authorisation at Member State level.

The basic principles of the Directive were:

- Active substances have to be assessed and the decision on their inclusion into Annex I of the Directive shall be taken at Community level.
- In accordance with Article 16 of Regulation (EC) 1451/2007, the competent authority reports concerning the evaluation of active substances in the review programme shall be made publicly available by electronic means, except for information that is to be treated as confidential. Reports as they become available are posted here.
- Comparative assessment will be made at the Community level when an active substance, although in principle acceptable, still causes concern. Inclusion to Annex I may be denied if there are less harmful, suitable substitutes available for the same purpose.
- Member States shall authorise the biocidal products in accordance with the rules and procedures set in Annex VI of the Directive. They can only authorise products which contain active substances included in Annex I.
- The producers and formulators responsible for the placing of the market of the biocidal products and their active substances must apply for authorisation and submit all necessary studies and other information needed for the assessments and the decision making.
- A biocidal product authorised in one Member State shall be authorised upon application also in other Member State unless there are specific grounds to derogate from this principle of mutual recognition.

New rules by the Biocidal Products Regulation (BPR; Regulation (EU) 528/2012)

A revision of the directive was carried out with the Regulation (EU) No 528/2012 of the European Parliament and of the Council concerning the making available on the market and use of biocidal products. It was adopted on 22 May 2012 and will repeal and replace Directive 98/8/EC, and will be applicable as of 1 September 2013. The Regulation was published on 27 June 2012 and the text can be found here.

The new Regulation will maintain the two-step approach of the Directive while providing for the possibility that some biocidal products are authorised at the Union level giving them direct access to the entire Union market.

The objective of the new Regulation is to improve the functioning of the internal market in biocidal products whilst ensuring a high level of environmental and human health protection. The new Regulation will also remedy a number of weaknesses that were identified during the 11 years of implementation of the current Directive 98/8/EC.

For the approval of active substances, the Regulation introduces the exclusion and substitution criteria as new elements. Active substances meeting the exclusion criteria will not be approved. This includes carcinogens, mutagens and reprotoxic substances category 1A or 1B according to the CLP Regulation, endocrine disruptors, persistent, bioaccumulative and toxic (PBT) substances, and very persistent and very bioaccumulative (vPvB) substances. Derogations are foreseen, in particular when the active substance might be needed on grounds of public health or of public interest when no alternatives are available.

Active substances meeting the substitution criteria will be designated as candidates for substitution during the approval procedure. The criteria are based on the intrinsic hazardous properties in combination with the use and potential exposure. During the evaluation for national or Union authorisation of a biocidal product that contains active substances considered as candidates for substitution, a
comparative assessment will be performed to estimate whether less harmful products are available for the same use.

The new provisions will also reduce animal testing by making data sharing compulsory and encouraging a more flexible and intelligent approach to testing. A dedicated IT platform (the Register for Biocidal Products) will be used for submitting applications as well as recording decisions and disseminating information to the public. The new Regulation is also the first piece of legislation to build in the new Commission definition on nanomaterials.

The European Chemicals Agency (ECHA) will provide a strong scientific and technical back-up to the Commission and the Member States under this new Regulation. In particular, ECHA will be responsible for the assessment of applications for the Union authorisation of biocidal products.

In summary some key elements in a nutshell:

- Provide for the authorisation at the Union level of certain biocidal products;
- Improve the functioning of national authorisations and mutual recognition by introducing binding deadlines and strengthening the system of mutual recognition dispute settlement;
- Reduce the number of animal tests by obligatory data sharing with respect to vertebrate animal studies;
- Strengthen the rules on data waiving (i.e. not request data which is not necessary);
- Extend the scope to cover articles and materials treated with biocidal products (e.g. furniture treated with wood preservatives), which are imported from third countries;
- Harmonised fee structure which will harmonise the conditions and criteria for setting the fees in all Member States;
- The European Chemicals Agency (ECHA) will be involved in the scientific work on biocides;
- Persons placing biocidal products on the market will have to hold the data on active substances (before they are obliged to do so under the product authorisation application).

For further information, please see:
http://www.umweltbundesamt.de/chemikalien/biozide/index.htm
http://biozid.info/
http://www.baua.de/de/Chemikaliengesetz-Biozidverfahren/Biozide/Dokumente/Dokumente.html

Publications and Resources

How vulnerable could your city be to climate impacts?
Climate change will affect Europe’s cities in different ways. It is expected to increase the frequency and intensity of river floods and extreme temperature events in many parts of Europe. If heavy rain caused rivers to rise by one metre, which European cities could be most at risk from flooding? Which cities could provide relief during heat waves with large green areas and which city designs could most exacerbate the effect of heat waves? What are the capacities of different European cities to cope with climate change impacts and to adapt to future changes? To give an overall impression of the challenge for European cities to adapt to climate change, the European Environment Agency (EEA) has published a series of detailed interactive maps, allowing users to explore data from more than 500 cities across Europe. Further information is available online:
http://www.eea.europa.eu/highlights/how-vulnerable-is-your-city

Climate change: Property management strategies
BBSR report on the need for action of private owners in climate change adaptation.
In Germany, privately owned residential properties make up about 80% of the total housing stock. Yet, so far there is only little scientific evidence on the socio-demographic structure, the decision motives and the actual investment behaviour of this heterogeneous group of owners and landlords.
There may be a considerable lack of information and resources with respect to the consequences of climate change. This special report will give a prospect on the required actions of private owners in the climate change adaptation by example scenarios. The scenarios are based on so-called settings. A certain combination of future environmental conditions, location types, building types and forms of ownership is made to establish a hypothetical, plausible scenario. [http://www.bbsr.bund.de/BBSR/DE/Veroeffentlichungen/BMVBS/Online/2012/ON142012.html](http://www.bbsr.bund.de/BBSR/DE/Veroeffentlichungen/BMVBS/Online/2012/ON142012.html)

### Literature

In this section we will provide a collection of recent housing and health publications from a variety of backgrounds. Literature 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

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allergies and Respiratory Diseases</td>
<td>7</td>
</tr>
<tr>
<td>Indoor Air</td>
<td>8</td>
</tr>
<tr>
<td>Mould and Dampness</td>
<td>10</td>
</tr>
<tr>
<td>Light and Radiation</td>
<td>10</td>
</tr>
<tr>
<td>Smoking / Environmental Tabacco Smoke</td>
<td>11</td>
</tr>
<tr>
<td>Home Safety</td>
<td>11</td>
</tr>
<tr>
<td>Housing and Ageing Society</td>
<td>12</td>
</tr>
<tr>
<td>Housing Conditions</td>
<td>12</td>
</tr>
<tr>
<td>Housing and Mental Health</td>
<td>13</td>
</tr>
<tr>
<td>Thermal Comfort / Energy</td>
<td>13</td>
</tr>
<tr>
<td>Urban Planning / Built Environment</td>
<td>13</td>
</tr>
<tr>
<td>Social Inequality</td>
<td>14</td>
</tr>
<tr>
<td>Noise</td>
<td>14</td>
</tr>
</tbody>
</table>

### Allergies and Respiratory Diseases

**Particular characteristics of allergic symptoms in tropical environments: follow up to 24 months in the FRAAT birth cohort study.**


**Dry collection and culture methods for recovery of methicillin-susceptible and methicillin-resistant Staphylococcus aureus strains from indoor home environments.**

Davis MF, Baron P, Price LB, Williams DL, Jeyaseelan S, Hambleton IR, Diette GB, Breysse PN, McCormack MC.


**A study on indoor environment contaminants related to dust mite in dwellings of allergic asthma patients and of healthy subjects.**

Feng M, Yang B, Zhuang YJ, Yanagi U, Cheng XJ.


**Effect of cat and daycare exposures on the risk of asthma in children with atopic dermatitis.**

Gaffin JM, Spergel JM, Boguniewicz M, Eichenfield LF, Paller AS, Fowler JF Jr, Dinulos JG, Tilles SA, Schneider LC, Phipatanakul W.

Predicted risk of childhood allergy, asthma, and reported symptoms using measured phthalate exposure in dust and urine.

[The revised guideline on Primary Allergy Prevention].


Childhood asthma and indoor allergen exposure and sensitization in Buffalo, New York.

Mouse (Mus m1) and rat (Rat n1) allergen levels in dust from private and public houses in Strasbourg, France are lower than houses in the U.S.A.

Indoor Air

Effect of indoor air pollution from biomass and solid fuel combustion on prevalence of self-reported asthma among adult men and women in India: findings from a nationwide large-scale cross-sectional survey.

Modeling the residential infiltration of outdoor PM(2.5) in the Multi-Ethnic Study of Atherosclerosis and Air Pollution (MESA Air).

Assessment of human exposure to indoor organic contaminants via dust ingestion in Pakistan.

Poor air quality in classrooms related to asthma and rhinitis in primary schoolchildren of the French 6 Cities Study.

Neutrophilic inflammatory response and oxidative stress in premenopausal women chronically exposed to indoor air pollution from biomass burning.

Particulate matter concentrations in residences: an intervention study evaluating stand-alone filters and air conditioners.

Household air pollution and children's blood pressure.
Residential black carbon exposure and circulating markers of systemic inflammation in elderly males: the normative aging study.

Lethal carbon monoxide poisoning in wood pellet storerooms--two cases and a review of the literature.

Suspension and resuspension of dry soil indoors following track-in on footwear.

Contamination of benzotriazole ultraviolet stabilizers in house dust from the Philippines: implications on human exposure.

Polychlorinated biphenyls in vacuum dust and blood of residents in 20 Wisconsin households.

Lead contamination in French children's homes and environment.

Bioaerosols in residential micro-environments in low income countries: a case study from Pakistan.

Clinical Inquiry. How does smoking in the home affect children with asthma?

Lead exposures from varnished floor refinishing.

Contribution of solid fuel, gas combustion, or tobacco smoke to indoor air pollutant concentrations in Irish and Scottish homes.

Endotoxin exposure in inner-city schools and homes of children with asthma.

Performance of installed cooking exhaust devices.

Influence of home characteristics on airborne and dustborne endotoxin and β-D-glucan.

Asthma induced by exposure to spray polyurethane foam insulation in a residential home.
Housing and Health

Indoor air pollutants and health in the United Arab Emirates.

Measurement of air exchange rates in different indoor environments using continuous CO2 sensors.

Concentrations and seasonal variations of polybrominated diphenyl ethers (PBDEs) in in- and out-house dust and human daily intake via dust ingestion corrected with bioaccessibility of PBDEs.

Mould and Dampness

Assessment of home environments with a fungal index using hydrophilic and xerophilic fungi as biologic sensors.

Some chronic rhinosinusitis patients have elevated populations of fungi in their sinuses.

Association between indoor fungi in Delhi homes and sensitization in children with respiratory allergy.

Light and Radiation

Field experience on indoor radon, thoron and their progenies with solid-state detectors in a survey of Kosovo and Metohija (Balkan region).

Estimation of past radon exposure to indoor radon from embeded 210Po in household glass

A prediction model for assessing residential radon concentration in Switzerland.

How to ensure that national radon survey results are useful for public health practice.

Human exposure to indoor radon: a survey in the region of Guarda, Portugal.

Preliminary results from an indoor radon thoron survey in Hungary.
Indoor radon levels in schools of South-East Italy.
Trevisi R, Leonardi F, Simeoni C, Tonnarini S, Veschetti M.

Smoking / Environmental Tobacco Smoke

Pollution exposure and child health: evidence for infants and toddlers in Germany.
Coneus K, Spiess CK.

Assessing the knowledge of the potential harm to others caused by second-hand smoke and its impact on protective behaviours at home.
Evans KA, Sims M, Judge K, Gilmore A.

Professional training to reduce children's exposure to second-hand smoke in the home: evidence-based considerations on targeting and content.
Gordon J, Friel B, McGranachan M.

Environmental tobacco smoke as a source of polycyclic aromatic hydrocarbons in settled household dust.
Hoh E, Hunt RN, Quintana PJ, Zakarian JM, Chatfield DA, Wittry BC, Rodriguez E, Matt GE.

The motivators and barriers to a smoke-free home among disadvantaged caregivers: identifying the positive levers for change.

Minh HV, Giang KB, Xuan le TT, Nga PT, Hai PT, Minh NT, Quan NT, Hsia J.

Clinical Inquiry. How does smoking in the home affect children with asthma?
Neogi T, Neher JO, Safranek S.

Hair nicotine/cotinine concentrations as a method of monitoring exposure to tobacco smoke among infants and adults.
Tzatzarakis MN, Vardavas CI, Terzi I, Kavalakis M, Kokkinakis M, Liesivuori J, Tsatsakis AM.

Association between environmental tobacco smoke exposure of children and parental socioeconomic status: a cross-sectional study in Korea.

Home Safety

Perceptions of tap water temperatures, scald risk and prevention among parents and older people in social housing: a qualitative study.
Keeping children safe at home: protocol for three matched case-control studies of modifiable risk factors for falls.

Housing and Ageing Society

The meaning of "aging in place" to older people.

Housing Conditions

Airborne engineered nanoparticles: potential risks and monitoring challenges for assessing their impacts on children.

Children's exposure to metals: a community-initiated study.

Pb particles from tap water: bioaccessibility and contribution to child exposure.

Raising chickens in city backyards: the public health role.

Perfluorooctanoic acid (PFOA), an emerging drinking water contaminant: a critical review of recent literature.

A new Rickettsia species found in fleas collected from human dwellings and from domestic cats and dogs in Senegal.

First isolation in Argentina of a highly virulent Shiga toxin-producing Escherichia coli O145:NM from a domestic cat.

How healthy is urban horticulture in high traffic areas? Trace metal concentrations in vegetable crops from plantings within inner city neighbourhoods in Berlin, Germany.

Overview of the study design, participation and field work of the German Environmental Survey on Children 2003-2006 (GerES IV).
Housing and Mental Health

The impact of climate change on obsessive compulsive checking concerns.

Thermal Comfort / Energy

Personal cooling with phase change materials to improve thermal comfort from a heat wave perspective.

Urban Planning / Built Environment

Associations of estimated residential soil arsenic and lead concentrations and community-level environmental measures with mother-child health conditions in South Carolina.

Association of neighbourhood residence and preferences with the built environment, work-related travel behaviours, and health implications for employed adults: findings from the URBAN study.

Taking up cycling after residential relocation: built environment factors.

Demographic variations in observed energy expenditure across park activity areas.

Cities, environmental stressors, ageing and chronic disease.

"HealthKick": Formative assessment of the health environment in low-resource primary schools in the Western Cape Province of South Africa.

Neighborhood Walkability and Active Travel (Walking and Cycling) in New York City.

Effect of increasing active travel in urban England and Wales on costs to the National Health Service.

Talking the talk, walking the walk: examining the effect of neighbourhood walkability and social connectedness on physical activity.
Children's environmental health in agricultural settings.
Karr C.

Environmental risk presented by arsenic contamination of building and facility surfaces in a coking plant.
Liao XY, Yan XL, Wang YZ, Li P, Ma D.

Body mass index, safety hazards, and neighborhood attractiveness.
Lovasi GS, Bader MD, Quinn J, Neckerman K, Weiss C, Rundle A.

Insomnia and urban neighborhood contexts -- are associations modified by individual social characteristics and change of residence? Results from a population-based study using residential histories.

Regulation to create environments conducive to physical activity: understanding the barriers and facilitators at the Australian state government level.

Attention-deficit hyperactivity disorder in children chronically exposed to high level of vehicular pollution.
Siddique S, Banerjee M, Ray MR, Lahiri T.

Assessment of wearable global positioning system units for physical activity research.
Wieters KM, Kim JH, Lee C.

Social Inequality

Epidemiology, policy, and racial/ethnic minority health disparities.
Carter-Pokras OD, Offutt-Powell TN, Kaufman JS, Giles WH, Mays VM.

Using exposure biomarkers in children to compare between-child and within-child variance and calculate correlations among siblings for multiple environmental chemicals.
Sexton K, Ryan AD.

The influence of parental smoking and family type on saliva cotinine in UK ethnic minority children: a cross sectional study.
Whitrow MJ, Harding S, Maynard MJ.

Noise

The sound-absorbing city-New ideas for living environments around airports.
Bauer J.

Traffic noise and blood pressure in low-socioeconomic status, African-American urban schoolchildren.
Belojevic G, Evans GW.
Eriksson C, Nilsson ME, Willers SM, Gidhagen L, Bellander T, Pershagen G.

Modeling population exposure to community noise and air pollution in a large metropolitan area.
Gan WQ, McLean K, Brauer M, Chiarello SA, Davies HW.

Railway noise annoyance and the importance of number of trains, ground vibration, and building situ-
ational factors.
Gidlöf-Gunnarsson A, Ögren M, Jerson T, Öhrström E.

Associations between Nighttime Traffic Noise and Sleep: The Finnish Public Sector Study.

Noise Levels Associated with Urban Land Use.
King G, Roland-Mieszkowski M, Jason T, Rainham DG.

Annoyance and other reaction measures to changes in noise exposure - A review.
Laszlo HE, McRobie ES, Stansfeld SA, Hansell AL.

Soundscape analysis of two parks in Berlin.
Manrique-Ortiz N, Schulte-Fortkamp B.

Community and individual variation in response to noise from high amplitude impulsive sounds.
Nykaza ET, Valente D.

Impact and revision of UK legislation on school acoustics.
Shield BM, Conetta R.

The quantitative relationship between road traffic noise and hypertension: a meta-analysis.
van Kempen E, Babisch W.

Event Announcements

7th National Housing Conference - Brisbane 2012
Date: October 30, – November 2, 2012
Venue: Brisbane, Australia
Further Information: Brisbane 2012 - National Housing Conference

Klimagerechte Stadtentwicklung in der Praxis - Kongress
Date: October 9-10, 2012
Venue: Berlin, Germany
Further Information: Klimagerechte Stadtentwicklung in der Praxis

Intelligent Cities Expo 2012
Date: October 30 - November 1, 2012
Venue: San Francisco, USA
Further Information: Intelligent Cities Expo 2012 | HOME
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

WHO Observatory publishes book on "Intersectoral governance for health in all policies"
Many of the policies and programmes that affect health originate outside the health sector. Governments therefore need to address population health using a strategy or policy principle that fosters intersectoral action.
Health in all policies (HiAP) does just that, encouraging intersectoral approaches to management, coordination and action. This publication captures the research on how intersectoral governance structures operate, showing:

- how governments and ministries can initiate action, and
- how intersectoral governance structures can be successfully established, used and sustained.

It provides accessible and relevant examples for policy-makers of the governance tools and instruments available, and over 20 mini case studies from Europe, the Americas, Asia and Australia on how countries currently use intersectoral governance for HiAP. It also identifies key intersectoral structures and how they facilitate intersectoral action.

The publication can be accessed at http://www.euro.who.int/__data/assets/pdf_file/0005/171707/Intersectoral-governance-for-health-in-all-policies.pdf

Addressing the social determinants of health: the urban dimension and the role of local government

This report summarizes the evidence on the social determinants of health in the urban context, drawing on the findings of the global Commission on Social Determinants of Health and the European review of social determinants of health and the health divide.

It also highlights how, through its leadership, local government can play a significant role in addressing these causes of health inequalities, by working across sectors and with civil society partners.

This report provides a helpful overview of practices from across Europe, and identifies priority action areas and key implementation issues, to support and accelerate the growing interest of local governments in being sensitive and proactive in tackling inequities.


"Atlas of health and climate" jointly published by WHO and WMO

The Atlas of health and climate is the product of an unique collaboration between the meteorological and public health communities. It provides sound scientific information on the connections between weather and climate and major health challenges. These range from diseases of poverty to emergencies arising from extreme weather events and disease outbreaks. They also include environmental degradation, the increasing prevalence of noncommunicable diseases and the universal trend of demographic ageing.
