



# Newsletter

WHO Collaborating Centre for Housing and Health  
 Baden-Württemberg State Health Office



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## Editorial

### Health-based assessment of housing - on the way to healthier dwellings

When evaluating homes, mainly aspects of climate change, sustainability, ecology and economy are in the focus. For example, an energy performance certificate is required by law in several European countries on the basis of EU Directive 2010/31/EU, to identify and assess the energy efficiency of buildings.

Furthermore, there are various certified systems to assess the sustainability of buildings, eg the "Leadership in Energy and Environmental Design (LEED)" or the "German certification systems for sustainable building (DGNB)", where different environmental standards are established. Some health aspects are also taken into account in these systems, but in most cases they are not decisive in the overall.

On the subject of healthy housing we can find a lot of more or less good information brochures, but usually they only deal with one specific topic. Numerous brochures from health authorities and consumer groups give helpful advice on mould and moisture problems in homes, on indoor air quality, or on safety in the home. One can also find useful information on the Internet, but it is often difficult for the layman to distinguish reliable, evidence-based information from dubious statements.

Meanwhile, also various health-based assessment systems are established for individual products which play a role in the home furnishing. In Germany for example, healthy products can be awarded with the label "Blue Angel", and health based requirements for emissions from building products are enshrined in the AgBB-scheme.

But in many countries there is a gap at the comprehensive health assessment of housing. The importance of a more holistic view of healthy housing is reflected in the discussion on the influence of ventilation on damp and mould

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in energy-saving measures. In the assessment of housing, there are two different approaches:

- Health assessment of dwellings by professionals
- Health assessment of dwellings by the user of the apartment itself

Both systems have both advantages and disadvantages. In the first case, the building itself is more in the focus. The aim of the assessment is an objective, quantitative evaluation of the health risks of the house. Basically, the suitability of the building for residential purposes and the classification of housing from a health perspective is examined. The target group of the procedure is the builder or the owner of the building. The advantage of this approach is to ensure the most objective evaluation of experts, the comparability of buildings from a health perspective, if the assessment criteria are transparent. The disadvantage is that appropriate procedures must be legally established, or at least introduced as certified methods, which are often lengthy proceedings. Due to the required knowledge, the assessment can not be performed by amateurs, and additional charges arise for this reason.

In the assessment by the user, the user's behavior is more prominent. An objective and quantitative assessment by the layman is difficult to perform in many cases, so that the comparability of the assessment is not given easily. The purpose of this assessment is rather the recognition of deficiencies and their remedy by simple measures and a health-based management of the dwelling. The advantage of such an assessment is the easy implementation without additional costs. However, the assessment requires a certain amount of motivation through the home user, and often the owner has no interest in such an evaluation, since a poor performance in the evaluation of his apartment reduces the chances of marketing.

The following contributions give examples for both ways. David Ormandy presents the Housing Health and Safety Rating System, which has been established by law in England

and Wales since 2004. Evert Hasselaar has created a checklist for the Netherlands that allows a semi-quantitative health risk assessment by the users of the dwelling.

What rating systems are possible in practice depends certainly also on the concrete political situation. Both ways can be used to improve the housing situation, the legal implementation is certainly the more effective and sustainable way, but not necessarily the faster one. Both authors share their experiences with the different systems, and I would like to thank both very much for their contributions.

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## Putting Health at the Centre of Housing Strategies

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### Introduction

The Housing Health & Safety Rating System (HHSRS) is a risk based method of assessing housing conditions. It was developed and tested over ten years, and introduced into the English legislation in 2006, replacing the previous approach which had been the statutory standard for over 50 years.

While there were health based principles underlying the previous standard, these had been forgotten and were ignored. This was primarily because the phrasing focused on the building structure and facilities, stating what should and should not be present. This building focus meant that the severity of any defect or deficiency was judged in terms of the extent and cost of any remedial work, rather than the severity of the threat to health.

The HHSRS shifts the focus from the building and facilities to the potential hazards from the condition – it focuses on the effect of any defect. And, rather than setting a 'standard', it provides a means of grading the severity of any threats to health and safety. As well as including all potential housing hazards it was designed to apply to any form of dwelling however constructed. Also, it provides a structured and logical approach to the assessment.

The principle behind the HHSRS is that any dwelling, including any associated outbuildings, amenity space and means of access, should provide a safe and health environment for any potential occupier and visitor. This, however, is not completely possible as we want and need hazards – gas, electricity, cooking facilities, space heating appliances, stairs, windows, doors etc. So, any necessary and unavoidable hazards should be as safe as possible.<sup>i</sup>

### Development

The first stage in the development of the HHSRS was a literature review to identify the evidence on hazards in dwellings. The review included searches of various data-bases including those covering medical, architectural and engineering research. It also included searches of the so-called grey literature<sup>ii</sup>. Based on this review, 29 potential housing hazards were identified (see Box 1).

To compare these hazards, datasets on health outcomes were matched and combined with datasets on housing conditions<sup>iii</sup>. The analyses showed the prevalence of the hazards in the English housing stock and which age groups were more vulnerable to particular hazards than others.

The next development stage was to devise a methodology for assessing and comparing the potential hazards. To overcome our generally flawed perception of risks, and the fact that the identified Hazards differ widely, a two stage assessment process was adopted. First, the likelihood of a hazardous occurrence over the next twelve months and second that of the severity of the outcome. This first stage helps with a comparison of those hazards that have a fairly quick outcome (such as a fall) with those that only have an impact with a relatively long exposure (for example dampness), and also covers the effect of different seasons. The second stage was to judge the severity of the outcome from the occurrence, taking account of other factors such as the presence of a glass door at the foot of stairs increasing the severity of the outcome from a fall, or whether mould growth is in a passageway or a bedroom taking account of the level of exposure.

To bring these two stages together, numbers are used to reflect the assessor's judgment and a formula created to generate a Score for each Hazard. The higher the Hazard Score, the greater the risk to health and safety.

### Use of the HHSRS

Local authorities in England and Wales are charged with taking action to deal with unsatisfactory housing conditions. Their options include compelling owners to carrying out remedial works and/or providing financial assistance. To determine whether action should be taken, the dwelling is surveyed and the condition assessed, and it is for this assessment that the local authorities are required to use the HHSRS.

To inform housing policies and strategies, sample house conditions surveys are carried out at both national and local levels. Since its introduction in 2006, these surveys use the HHSRS as the basis for determining the range and prevalence of hazards in the housing stock and the effectiveness of policies in dealing with hazards<sup>iv</sup>.

### Perspectives

Unsatisfactory conditions in English housing are implicated in thousands of deaths and tens of thousands of injuries and illness requiring medical attention every year. The HHSRS reflects this, and, its incorporation into the housing legislation, provides a means to tackle unhealthy housing conditions. Also, by including the HHSRS in housing surveys, it has put health at the centre of housing policies and strategies, locally and nationally.

An example of how a local authority has adopted this health focus for its strategy is the Liverpool Healthy Homes Programme. This is run jointly by Liverpool City Council (the local authority) and Liverpool Primary Care Trust (the local health Trust). Its stated aim is to prevent ill health and injury resulting from poor quality housing conditions<sup>v</sup>. With motto of 'Healthier Homes: Healthier Lives', the objective is to reduce ill health attributable to poor quality conditions in housing so improving the health and wellbeing of occupiers. The HHSRS is used as the basis for the housing assessments.

As the HHSRS focuses on health outcomes from housing conditions it has been possible to estimate the cost of poor housing. This has been achieved with data from the national housing survey on the potential health outcomes from HHSRS Hazards identifies, and figures provided by the English National Health Service for the diagnosis and treatment of those health outcomes. This allowed the total annual cost to the health sector to be estimated. For example, it is estimated that energy inefficient dwellings (the HHSRS Hazard of Excess Cold) cost the health sector some £750 million every year (approximately 926 million €)<sup>vi</sup>.

It is arguable that the HHSRS principles and core methodology are transferable to other countries. This is because it is probable that the same hazards will be found in housing whatever the country, although the rank order will differ. As mentioned above, by focusing on the threats to health and safety, the form and construction of the dwelling is irrelevant to the assessment; these become relevant when determining the remedial action necessary. This argument is support by the fact that the US Department of Housing and Urban Development has adopted the HHSRS (changing only the

name to the Healthy Homes Rating System), and now requires all organisations to which it awards grants, to use this System<sup>vii</sup>.

<p><b>A. Physiological Requirements</b> Damp and mould growth etc Excessive cold Excessive heat Asbestos (and MMF) Biocides CO &amp; Fuel combustion products Lead Radiation Uncombusted fuel gas VOCs</p> <p><b>B. Psychological Requirements</b> Crowding and Space Entry by intruders Lighting Noise</p>	<p><b>C. Protection Against Infection</b> Domestic hygiene, Pests &amp; Refuse Food Safety Personal Hygiene Sanitation &amp; Drainage Water supply</p> <p><b>D. Protection Against Accidents</b> Falls associated with baths etc Falling on level surfaces Falling on stairs and steps Falling between levels Electrical Hazards Fire Flames, hot surfaces etc Collision and entrapment Explosions Position and operability of amenities etc Structural collapse and falling elements</p>
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### Box 1 – The 29 HHSRS Potential Housing Hazards

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- <sup>i</sup> HHSRS Operating Guidance – Housing Act 2004: Guidance about Inspections and Assessments of Hazards given under section 9 - <https://www.gov.uk/government/publications/hhsrs-operating-guidance-housing-act-2004-guidance-about-inspections-and-assessment-of-hazards-given-under-section-9>
- <sup>ii</sup> See, for example, *Review of Health and Safety Risk Drivers* (2008) DCLG - <http://webarchive.nationalarchives.gov.uk/20120919132719/www.communities.gov.uk/publications/planningandbuilding/reviewhealthsafety>
- <sup>iii</sup> For an explanation of this process see *Statistical Evidence to Support the Housing Health and Safety Rating System*, Vol I, Vol II, and Vol III. ODPM, London.
- <sup>iv</sup> See *English Housing Survey: Headline Report 2010-2011* - <https://www.gov.uk/government/publications/english-housing-survey-headline-report-2010-to-2011>
- <sup>v</sup> <http://www.liverpool.gov.uk/council/strategies-plans-and-policies/housing/healthy-homes-programme/>
- <sup>vi</sup> *Quantifying the Cost of Poor Housing* IP 16/10. (2010) IHS –BRE Press, Watford, UK
- <sup>vii</sup> *Overview of the Healthy Homes Rating System (HHSRS)* - <http://portal.hud.gov/hudportal/HUD?mode=disppage&id=HHSRS>
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### Popular health risk assessment

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### Introduction

Health risk assessment is needed when living conditions have a potential (negative) impact on health. The main parameters of health performance of residential buildings are air quality, acoustics, thermal comfort, safety and social quality. Table 1 presents agents (e.g. gases and aerosols) and environmental conditions e.g. (stair safety, burglar protection, etc.) that may have an impact on occupant health. The health risk depends on the period of exposure and conditions that exceed safety limits and also on the condition and perception of the occupant. The occupant, for that reason, deserves a central position in the assessment process.

Parameters	Agents or conditions creating health hazards	Potential effects
<b>Air quality</b>	Emission of mould, house dust mite, pollen, bio-effluents, Legionella bacteria, PM2.5, NO <sub>2</sub> , CO, VOCs, benzene, benzo(a)pyrene, fuel-burning exhaust, formaldehyde, asbestos, aerosols	Infection, respiratory effects, stress, pneumonia, cardiovascular disease, cancer, neurological effects, suffocation
<b>Acoustics</b>	Ambient noise, technical noise, social noise	Stress, fatigue, headache
<b>Comfort</b>	Extreme temperatures and relative humidity, radiant asymmetry, draught, poor daylight and view	Stress, dehydration
<b>Safety</b>	Sharp edges, slippery floor, low placed glazing, storage places of toxic materials, poor ergonomic design and furniture, rubbish, toys around etc	Falls, cuts, bruises, scalds, burns, shock, poisoning, suffocation, drowning
<b>Social quality</b>	Easy trespassing, lack of privacy, unsafe places	Stress, social isolation, bodily harm

**Table 1: Agents and conditions that create health hazards (based on Hasselaar, 2006).**

These agents and conditions were selected on the basis of field work and modelling of the DPSEE sequence of WHO: driving force, pressure, state, exposure and effect. Other tools may include radiation (electromagnetic and Radon-based) and functional quality or may focus on fewer parameters, but air quality, comfort, acoustics and (construction) safety are widely used parameters. Literature reviews show similarity in parameters and agents (Thomsen 2002, Bergs 2002, Broeke 2003, Säteri 2003, WHO 2004).

### **Two decades of health risk assessment in the Netherlands**

The focus is on Dutch developments. The University of Technology in Eindhoven (Bronswijk) created awareness on health issues and presented academic courses on Public Health Engineering for Built Environments since 1991 until 2012. Kort (1997) (co-worker of Bronswijk) and Luxemburg (1997) presented a health quality classification for buildings. Broeke (2003) re-edited a study for the Dutch Ministry of Housing (VROM) on how to evaluate the health status of dwellings. Hollander (2004) evaluated the health impact of environmental exposure in a well-documented doctoral thesis. The Dutch Ministry of Housing presented an action plan for health and environment which includes actions to monitor the health status of the Dutch housing stock (2004). Elements in the action plan were the evaluation of indoor quality in a representative part of the stock and also the publication of assessment tools. Nieman (2004) designed a state-of-the-art health performance evaluation tool, commissioned by the central government. This document took the performance criteria of the Dutch Building Code as indicators, and selected health related indicators from those standards. The precondition is proposed by government officials: when minimum requirements are met, no other health risk than accepted by society should occur, or otherwise the risk will be created by the occupants. Versteeg (2003) came around that moment with a tool that was adapted for use by social housing associations in developing renovation plans.

### **Towards a new strategy for health risk assessment**

The author was involved in the discussions on healthy housing since 2001, very much inspired by Sonia Hunt from Glasgow (Hunt et al. 1980) and her action oriented approach, while connecting health and housing disciplines. Also, renovation and energy related actions provide many opportunities to improve the health performance and the Dutch "Insulation" covenant needed more focus on how occupants perceived the performance quality. Hasselaar inspected about 500 dwellings, often invited by the occupants, to inspect and discuss maintenance issues and complaints about mould and poor comfort. This experience led to the decision to assess occupied dwellings, distinct from the dwelling as a combination of functions, constructions and installations. Also, each room was recognised for its individual micro climate, with specific exposure levels and differences in perceptions. The bedroom received more attention than before, when the living room and kitchen were considered as the rooms with most serious environmental problems. The assessment protocol focussed more and

more on actions and on the communication between the occupant and those responsible for remediation. The goal became to provoke improvements, not to measure the status quo or the failures to meet building standards

### **The Checklist Healthy Housing**

SBR (Dutch building research agency) and the Woonbond (Dutch tenant association) supported the development of a do-it-yourself-assessment tool for active tenants and also a tool for professionals. The steps in the assessment protocol are:

1. occupant or home owner: assess the health performance for each room, using a checklist;
2. owner and tenant: discuss conditions, find issues that need remediation and agree on actions;
3. home owner: provide the means (money, capacity, planning) to solve the problems;
4. owner and tenant: discuss responsibilities, including tenant behaviour.

The last point refers to the potential multiplier effect of action: while the dwelling is being improved, the occupants are more willing to adapt their behaviour, and vice versa. First comes the recognition of complaints, then communication about the assessment, followed by technical measures. By involving the tenants, they could have better understanding how physical conditions are linked with occupant behaviour. The tenants will have a more positive perception of their position as a tenant and will be better motivated to take a different opinion during this process (Thomson et al. 2002). Taking positive action towards change of conditions will lead to better perception of health.

### **Complexity and simplicity**

Despite several simplification steps, the topic is still quite complex and the tool is only accessible for motivated persons. Lay people with interest in healthy housing have used the tool without problems. Feedback indicates that using the tool leads to more critical view on ventilation behaviour and especially better ventilation of the bedroom. Leaving the bed open, so the covers and mattress can dry faster, has become a widespread pattern. Also, preventing mould growth in the bathroom by wiping off water droplets from the floor and walls seems to have popular support.

The goal of promoting action taking by tenants via filing of complaints, does not work.

After the presentation of this tool, Cox and Loomans (2005) compared all state-of-the-art tools in the Netherlands. He suggested to stop this "uncontrolled" publication of different tools and offered to make a final compilation. But these different tools were needed in their specific context. There are reasons for making tools for special target groups with different levels of expertise, for instance:

- a tool to check whether official building standards are met;
- a tool to improve maintenance and renovation plans;
- a tool to avoid negative side effects of energy saving measures and to improve EPBD consultations, meaning that labelling of the Energy Performance of Buildings is combined with health assessment;
- a tool, as part of a strategy, to stimulate occupants in taking actions when health risk occurs.

## **Discussion**

### **Impact of health performance evaluation**

In general, the health performance evaluation tools are well aligned with daily procedures of housing managers, for instance in the process of dealing with complaints, while studying energy related improvements and especially when preparing renovation plans. Health performance is on the agenda, but this is more the effect of public debate in the popular media than the effect of the tools. The public debate has been supported by the background information for the tools especially by placing straight and simple action points on the agenda:

- correction of the capacity of ventilation systems by performing periodic and regular maintenance;
- improving ventilation of the bedrooms by burglar safe controls and larger openings under the door;
- precaution against mould in bathrooms by smooth surface layers and wiping wet surfaces;
- solving indoor air problems in houses with HRV by improving natural inlet services;

- cleaning inlet air ducts more frequently;
- seal the floor over crawl spaces;
- select individual hot water appliances that prevent Veterans' disease;
- deal more effectively with noise problems from technical installations;
- communicate more about conditions that require remediation and adaptation;
- improve safety prevention measures and information.

Topics with the potential to change occupant behaviour are:

- replacement of mattress and application of mite control measures in bedrooms;
- flushing of water pipes and buffer tanks after a period of stagnancy;
- better ventilation, especially at night and when heating is not needed;
- pro-active behaviour, to take control over the quality of the environment.

A number of consultants use the tool to highlight their integrated approach and sustainable ambition, but the number of commissions for this "high quality strategy" is rather limited. Exploration of the landscape of tools indicates that the use of tools is quite low. The time and money involved, the voluntary character and low added value, in the eyes of housing managers, cause low interest in health performance evaluation. During the execution of a research project on health performance a rather hidden reason became evident: home owners avoid discussion on health issues with tenants, out of fear to trigger anxiety and a potential confrontation with unforeseen claims when negative health effects of dwelling characteristics are being identified. This fear also leads to poor diagnosis of health risks that the owner is (even in part) responsible for. The poor link between problem identification and problem solving is much like the missing link in the interaction between front- and back offices in housing and public organisations. A solid diagnosis requires an independent inspector and non-biased expert knowledge. Also, the circle of blame in which the owner and the occupant are caught, is a barrier for finding the essential cause-effect relations. Especially when moisture and ventilation is at stake, the tenant blames the owner for mould, while the home owner blames the occupant for poor ventilation. A housing manager acknowledged: "When we appear in court because of serious complaints about dampness and mould, our solicitor is told to blame it on poor ventilation behaviour, disregarding other conditions" (interview with former head of technical department, 2004). "So let us support the users in taking action" became the strategy for the "Checklist Healthy Housing" (SBR and Woonbond, 2005).

Use of the tool is not pushed by legal obligation or even guidelines. When news media had enough of health issues and other issues such as a financial crisis came up, the use of the tools dropped. When, occasionally, housing health related issues came up, nobody pointed at the "old" tools. The central government is drawing back from campaigns funding tools, while branch organisations and committees of experts take over. This works well for energy related issues, including ventilation guidelines and better acoustic performance of ventilation systems, but not for the use of tools. Is that a problem? No.

## **Conclusions**

Environmental experts in the Netherlands developed comprehensive health performance evaluation tools. All are evidence-based (with different levels of proof, however) and applicable to existing dwellings. The tools by Versteeg (2003) and Nieman (2004) are responses to the need of the Dutch government for a uniform method to evaluate and describe the health status of dwellings. The Checklist Healthy Housing (Hasselaar et al, 2005) takes the occupant, their perceptions and willingness to take action for remediation and adapted behaviour as leading strategy. The tools can be organised along increasing abstractness, time and expertise involved and range from 'objective' status description to qualitative risk exploration. Comfort is a major parameter and poorly distinguishable from (more relevant) health aspects.

Many items became popular and have resulted in focus on single action points. The use of tools is poor. Health risk associated with energy performance is being promoted and enjoys attention.

Popular media have highlighted conflicts which led to action points. However, leaving health promotion to media and the commercial sector does not really support a solid diagnosis of everyday housing health risks.

## **Recommendation**

The DPSEE strategy (driving force, pressure, state, exposure and effect sequence) of WHO can be followed by Action: DPSEEA. Also, Prevention could have a place in this sequence as well. This leads to P-DPSEEA.

The tool can be accessed freely on the site of SBR and Woonbond on

<http://www.toetslijstgezondenveiligwonen.nl/>. The paper version can be ordered for € 2,50 (non-members € 5.-), but few occupants know about this and actually buy the tool.

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## Publications and Resources

### **Radon Measure for Schools and Apartment Buildings fails at Code Hearings**

Columbia, Maryland (December 3, 2012) – During a national meeting of code officials in Portland in October, a majority of the participants voted in favor of a proposal to require radon resistant construction in schools and apartment buildings. But the vote fell short of the two-thirds majority needed to make the measure a code requirement in high risk areas.

Only The National Association of Home Builders (NAHB), the National Multi-Housing Council, and one code official testified against the new protections from radon.

The American Lung Association of the Mountain Pacific, Cancer Survivors Against Radon (CanSAR), and the American Association of Radiation Scientists and Technologists voiced support for the proposal.

Radon is the leading cause of death from lung cancer among non-smokers – resulting in an estimated 22,000 deaths each year in the United States, according to the U.S. Environmental Protection Agency. Once enacted, the requirement for a radon reduction system will reduce risk of lung cancer for students in new schools and families in new apartment buildings in 1,000 high risk counties, which represent 34 % of all US counties.

“Radon-resistant new construction is cheap insurance for a builder from the standpoint of liability and providing a healthier indoor living environment,” said Steve Tucker, a Portland-area builder and mitigation specialist. “It is a straight-forward, low-cost application.”

When the radon proposal was first introduced in May 2012, the International Building Code committee voted it down with recommendations for refining the language. The authors of the proposals made the changes recommended by the committee. The housing industry opponents cited insufficient data specific to apartment buildings and schools in their opposition to the requirements.

In response to America's need for a single set of consistent construction regulations, the International Code Council (ICC) developed, through the governmental consensus process, the first set of coordinated and comprehensive construction and fire codes for use nationwide in 1995. More U.S. cities, counties, and states that adopt and enforce codes choose the International Codes developed by the International Code Council over any other code products.

The ICC has an open multi-step process where anyone can submit a proposal to ICC to revise a code. The proposal is considered by a committee and accepted or denied, with or without modifications. The public may comment on the committee's decision and is free to re-propose the same proposal or revise it for consideration by the full assembly. Proposals accepted by the committee need a majority vote by the full assembly, while resubmitted or revised proposals require a two-thirds majority vote. Further information is available online: [NCHH > Home](#)

### **Italy develops national plan for elimination of asbestos-related diseases**



The recent [national asbestos conference in Italy](#) reviewed the challenges of asbestos-related environmental clean-up and health surveillance for people exposed to asbestos. The outcomes of this conference will result in a national action plan on elimination of asbestos-related diseases. Two decades after a national asbestos ban, Italy still registers annually about 1200 new cases of malignant mesothelioma. Ministers of health, labour and environment, as well as WHO and the European Commission participated in the conference, held 22–24 November in Venice, Italy. WHO information on elimination of asbestos-related disease is available [here](#).

### **Drinking Water Regulations - pipes and fittings become even safer**

For the first time, the German drinking water regulations implement binding rules for materials and substances that come in contact with drinking water. These amendments will enter into force on December 13<sup>th</sup>, 2012. Usually, drinking water from public mains is of very good quality when entering the homes in Germany. Where contamination of drinking water can be found, this usually occurs in the drinking water installation of the building, i.e. by improper materials for pipes, valves and hoses. Improper materials can emit undesirable substances into the drinking water. Errors in the design, installation and material selection of the installation can lead to progeny of pathogens such as Legionella, which are responsible for pneumonia. This happens particularly if the water stays too long

in the pipe system and is so stagnating. By changing the drinking water regulations, the Federal Environment Agency (UBA) can now define the requirements for an assessment of the hygienic suitability of materials and substances. The amendment to the Drinking Water Regulations also provides for more practical arrangements for legionella. Further information: [http://www.umweltbundesamt.de/uba-info-presse/2012/pdf/pd12-049\\_trinkwasser\\_auf\\_die\\_letzten\\_meter\\_kommt\\_es\\_an.pdf](http://www.umweltbundesamt.de/uba-info-presse/2012/pdf/pd12-049_trinkwasser_auf_die_letzten_meter_kommt_es_an.pdf)

## 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!

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### Allergies and Respiratory Diseases

#### [A community study of factors related to poorly controlled asthma among Brazilian urban children.](#)

de Magalhães Simões S, da Cunha SS, Cruz AA, Dias KC, Alcântara-Neves NM, Amorim LD, Rodrigues LC, Barreto ML.  
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## Events Announcement

### **BAU 2013 - World's Leading Trade Fair for Architecture, Materials, Systems**

Date: January 14-19, 2013

Venue: Munich, Germany

Further Information: [BAU – World's Leading Trade Fair for Architecture, Materials, Systems](#)

### **NCHH 20<sup>th</sup> Anniversary Healthy Housing Leadership Conference**

Date: February 13-15, 2013

Venue: Washington D.C., USA

Further Information: [National Center for Healthy Housing 20th Anniversary Leadership Conference > Home](#)

### **World Health Day 2013**

Date: April 7, 2013

Venue: Worldwide

Further Information: [WHO/Europe | Who we are - World Health Day](#)

### **WBCIB - World Building Congress 2013**

Date: May, 5-9, 2013

Venue: Brisbane, Australia

Further Information: [World Building Congress 2013 |](#)

### **AHCMC Annual Conference - Conference on Affordable Housing**

Date: May 10, 2013

Venue: Bethesda, Maryland, USA

Further Information: [Affordable Housing Conference of Montgomery County](#)

### **IAQ 2013 - Environmental Health in Low Energy Buildings**

Date: October 15 - 18, 2013,

Venue: Vancouver, British Columbia, Canada

Further Information: [IAQ 2013 | ashrae.org](#)

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## 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

### **European mortality associated with Carbon Monoxide poisoning**

In closed environments, the concentration of carbon monoxide (CO) can easily rise to health-threatening levels and cause health effects and death. To evaluate the incidence of CO poisoning in Europe, national data on CO-related mortality and morbidity were compiled from Member States of the WHO European Region for 28 Member States, reporting a total of 140 490 CO-related deaths in the reporting period and indicating an annual death rate of 2.2/100 000. Unintentional CO deaths accounted for 54.7 % of the CO-related deaths (35.9 %: unintentional inhalation; 18.8 %: related to structure fires). The intentional deaths related to CO exposure account for 38.6 % of all CO-related deaths (38.1 %: suicides; 0.5 %: homicides).

More detailed results and national statistics are described in a paper published in Indoor Air at <http://onlinelibrary.wiley.com/doi/10.1111/ina.12007/abstract> and can be requested from the WHO European Centre for Environment and Health, Bonn.

### **Restructuring of European Centre for Environment and Health finished**

For more than 20 years, the WHO Regional Office for Europe has coordinated work on environmental health based on the European environment and health process. The work is carried out by the European Centre for Environment and Health. In early 2012, the Bonn office of the European Centre for Environment and Health was expanded and re-organized into four programmes, dealing with (1) climate change, sustainable development and green health services, (2) water and sanitation, (3) environmental health intelligence, and (4) environmental exposures and risks. By late 2012, all four programmes have been fully established and work started on a variety of topics, including new work areas such as chemical safety and environmental health economics.

The work on housing and health has been extended to reflect built environments on various spatial scales: housing, neighbourhoods and urban planning. The work on housing and urban planning (also including activities on environmental inequalities) is located in the programme on environmental exposures and risks.

Further information on the European Centre for Environment and Health is available at <http://www.euro.who.int/en/who-we-are/who-european-centre-for-environment-and-health-eceh>

### **WHO pilot studies on indoor air quality in schools**

Following up on the commitments made by the Member States of the WHO European region at the Fifth Ministerial Conference on Environment and Health, WHO has developed a methodology and toolkit for assessing the indoor air quality in schools. First pilot studies have been carried out in Albania and Croatia and detailed results are being analysed. First results of this work have been published at the ISEE Conference in North Carolina in August 2012 and can be accessed at [http://journals.lww.com/epidem/Citation/2012/09001/P\\_232\\_Pilot\\_WHO\\_Survey\\_in\\_Albania\\_to\\_Assess\\_636.aspx](http://journals.lww.com/epidem/Citation/2012/09001/P_232_Pilot_WHO_Survey_in_Albania_to_Assess_636.aspx)

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### **Interactive “Environmental Health Information System” (ENHIS) launched**

The ENHIS monitors the environmental health situation in the countries of the WHO European region using a set of environmental health indicators. A range of these indicators are relevant for housing and urban health as well. The ENHIS data is now available through an interactive website where individual data can be searched by variable, year and country. The ENHIS website can be accessed at <http://data.euro.who.int/eceh-enhiss> and

<http://www.euro.who.int/en/what-we-do/data-and-evidence/environment-and-health-information-system-enhiss>

### **Launch of “Environmental Health Economics network (EHEN)” and draft strategy**

In November 2012, the European Centre for Environment and Health held its first meeting on Health Economics, discussing the most suitable approaches for applying economic assessment principles on environmental health issues. The meeting agreed on the elements of a strategy and established a network for future collaboration. The meeting was attended by more than 30 technical experts from UN and other international organizations, foundations, academia, private sector and civil society organizations.

Experts interested in this network can request further information including the working papers developed for the expert meeting by email to [info@ecehbonn.euro.who.int](mailto:info@ecehbonn.euro.who.int). Furthermore WHO would appreciate if studies on economic aspects of housing, housing rehabilitation and health could be forwarded under the same address as well.

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