Injuries among children and adolescents in the home environment – epidemiological analysis based on the European Injury Data Base

In 2007, the EU Commission pointed out in its council recommendation “On the prevention of injury and the promotion of safety” that injuries in Europe are a considerable burden on the health and social systems. In contrast to other causes of illness, injuries can be effectively prevented. The Commissions call for the Member States to use the available data more efficiently and to observe the efficacy of the preventive measures [1].

Since 2007, the Injury Data Base (IDB) has been implemented in the federal state of Brandenburg as well as in 5 hospitals led by the Brandenburg Public Health Office. The IDB is a hospital based injury surveillance system and collects data (based on 18 core variables) on all injured patients coming through the accident and emergency department [2].

The following epidemiological analysis relates to 5,080 injuries in the home environment of a total of 10,660 injured children under the age of 18 years (N= 81,248) in the cities of Cottbus and Leipzig. The average injury rate in the home environment is 6.3% and a quarter of the injured sustained severe injuries (e.g. head injuries, fractures and scalds among infants). The following results identify risk groups, injuries by intent and the products involved.

The figure shows that infants and toddlers are most at risk of injuries in the home environment (120.7 and 125.8 per 1,000 respectively) and decrease with age to a rate of 18.2 per 1,000 among adolescents. Differentiating injuries by intent (accidents, violence, self-harm) makes evident that infants and toddlers are most at risk in the home environment (97.9% of all home injuries), whereas adolescents are at lowest risk (71.4%). The 15 to 18-year-olds additionally suffer from self-harm. The rate of self-harm among 15 to 17-years-old females is three times as high as among boys (5.9 vs. 1.6 per 1,000) and represents a third of all injuries in the home environment. Violence shows to be a rare event in comparison to accidents. Infants, again, are most at risk (2.5 per 1,000). With respect to infants, parents are identified to be the offenders, whereas interpersonal violence is more common among school children and adolescents [3]. On the basis of a standardized documentation and assessment of the injury event by intent, 5 additional suspicious cases could be identified.

According to international studies showing an age specific injury profile, the following results refer to the age specific injury mechanism and to the products involved.

The major causes of falls are related to baby changing tables, high chairs, seats, beds and stairs. Already in infancy, boys are most at risk of accidents in the home environment. According to doctors’ reports, around 40% of accidents in the home could have been prevented by the use of safety products or an altered behaviour.
Children’s injuries from accidents in the home are a major public health problem throughout Europe, and it is notable that the problem is greater in low to middle income countries showing a very steep social gradient. There is considerable information on the situation in Europe provided by a wide range of publications (see sources of information at the end of this piece), so the information and discussion presented here concentrates on the situation in the UK.

Some figures from the UK - Over 40% of all childhood injuries occur in or around the home. In 2005, 75 children under 15 years old died as a result of a home accident, and 49 (65%) of these were children under 5 years old. Of the 900,000 children under 15 years who attended an Accident and Emergency department with an injury from a home accident in 2002, almost 480,000 (53%) were under 5 years old. That the majorities are children under 5 years old is not that surprising – they spend most of their time in and around the home. In 2002, around 390,000 children under 15 years old required medical attention for injuries resulting from a home accident. Almost 37,000 children attended hospital with burns or scald injuries. Of these, around 450 children are admitted to hospital and another 2,000 attended the Accident and Emergency department suffering hot water scalds.

Home hazards - The ideal would be a safe and healthy environment for all the occupiers and visitors. However, this is impossible. We want and need hazards. We need doors, windows, stairs, steps, cooking facilities, electricity, and perhaps gas. As adults, we tend to take our home environment for granted; we get used to the layout, and all the hazards (necessary or not). Added to the hazards, we create hazardous situations – we use boiling water to make drinks, we cook, we position furniture
carelessly (e.g., chairs in front of windows), we put down loose carpets, we put objects on stairs (to “take them next time we go upstairs”), and we leave medicines and cleaning products in unlocked cupboards. While these are potential hazards for us as adults, they are more so for children, particularly the very young who have no experience to inform their actions and a lack of danger awareness. For children, the home can be an accident black spot.

**Enough about the problem – what about solutions?** - There is evidence that practical action can reduce the likelihood of accidental injuries. The options include

- identifying the danger (awareness)
- eliminate the danger (avoid by safe design)
- modify (make safe(r))
- isolate (the danger)
- train and instruct (safe behaviour)
- warn (awareness)
- supervise

These options are not mutually exclusion, but complement each other, one leading to another.

Identifying the danger is the responsibility of a whole range of people. Those responsible for the design of housing, equipment, appliances, household goods, as well as the parents/carers. Once those responsible for the design have identified the potential danger they are in a position to eliminate or at least minimise that danger. Once parents and carers are aware they can supervise or at least warn the child. If the danger is present in an existing home, then, once identified, it may be possible to either modify it to make it safer or to isolate it. Warning children of potential dangers and training and instructing them in safe behaviour are important, as many hazards cannot be removed. Finally, for very young children, supervision is important.

**Preventative Strategies** - These can be divided into five inter-related and complementary categories. First, awareness campaigns directed at children, at parents/carers, and at the population generally. The campaigns should be geared to the target audience and should give practical advice on both how to avoid accidents and what to do if one does occurred. Safety devices need to be developed and tested. These are often developed by industry, and include cut-off devices for gas appliances, safety locks for windows, and child resistant closures on medicine and cleaning products to reduce the number of poisonings. Such devices should be incorporated into new dwellings and where possible existing dwellings as soon as they have been shown reliable and effective. There is reliable evidence that various modifications of the home environment can be effective in reducing certain types of children’s accidents. For example, properly designed guarding to stairs and balconies with no gaps greater than 100mm have been shown to reduce falls, as have restrictors on windows; burns and scalds have been reduced by safe layout of kitchens and the temperature control of hot water; and four sided fencing of pools and ponds reduce drowning and near-drowning. To ensure safety devices are installed, to control the design and construction of new dwellings, and to require modification of existing dwellings will require legislation. This could be linked to enforcement provisions, or, in the case of existing dwellings, could trigger financial assistance. Finally, there should be research and monitoring to examine and review the effectiveness of strategies and to inform policies.

**Legislation** - In 2006, England and Wales adopted the Housing Health and Safety Rating System (HHSRS) as the prescribed method for assessing housing conditions. The HHSRS introduced a radical new approach, shifting the focus of assessment from building defects to the potential effects of those defects in terms of threats to the health and/or safety of occupiers. It is a risk-based approach, taking into account the likelihood of an occurrence (such as a fall, or the exposure to hot surfaces) and the severity of the outcome. The HHSRS lists 29 potential housing hazards grouped into four categories one of which is Protection Against Accidents.

**Conclusions and Perspectives** - Much more needs to be done, in the UK and in Europe generally, to reduce the number of children suffering unintentional home injuries. To be effective, there needs to be co-ordinated action, bringing together the health sector, the housing sector, and the research and development sectors from industry. While there has been work to show the cost of children’s injuries to the health sector, the other potential costs to the individual and to society should not be forgotten –
including costs associated with quality of life, educational attainment, pain and suffering. It is hoped that the goals mentioned in the Parma Declaration of Environment and Health will lead to further action to reduce children's injuries from home accidents.

References

European references

- WHO/Europe - Addressing the Socioeconomic Safety Divide (2009)
- A Children's Environment and Health Strategy for the UK (Health Protection Agency, 2009)
- WHO/Europe - Children's Environment and Health Action Plan for Europe (CEHAPE)
- Eurosafe European Child Safety Alliance
- WHO/Europe - Parma Declaration of Environment and Health

UK references

- Better safe than sorry - Preventing unintentional injury to children (Audit Commission 2007)
- Child Accident Prevention Trust
- (Royal Society for the Prevention of Accidents)
- Housing Health and Safety Rating System: Operating Guidance
- Review of health and safety risk drivers
- BRE report: The real cost of poor housing
- English Housing Survey: Headline Report 2008-09

Other Information

- (Housing Interventions and Health: A Review of Evidence)

Housing and Children’s accidents: Situation in the German Federal State of Baden-Württemberg

Andrea Dreisigacker, Ministerium für Arbeit und Sozialordnung, Familien und Senioren Baden-Württemberg, Germany

Accidents, injuries and violence still remain the main health hazards in children and adolescents, which according to experts could have been prevented in the majority of cases [1], [2]. A considerable number of children's accidents occur in the home setting [2]. It was the goal of the Baden-Württemberg environmental health surveillance systems to investigate the annual prevalence of home accidents in 10-years-old children and to identify potential health risk factors, as the knowledge about these risks is incomplete due to the lack of relevant research [3]. In winter 2006/2007, more than 2000 fourth-graders from 17 public health department districts were examined. Data on the annual prevalence of children’s home accidents like burns, falls, crashes, cuts or thrusts were assessed by means of a parental questionnaire. Children's sex, their body-mass-index, the school-leaving qualification of their father/mother and the administrative district of the residence were considered as possible influencing factors.

Furthermore, mortality due to road and other accidents in children in Baden-Württemberg between 1980-2007 was compared with the relevant data from the Germany. These data are shown for 10 to 15-years-old children in figures 1a and 1b (References: Baden-Württemberg state health office, 2009, unpublished data; Statistisches Landesamt Baden-Württemberg 1980-2007). As a result, mortality in children due to accidents has generally decreased in Germany and Baden-Württemberg. In 1980-2007, mortality due to accidents in 10 to 15-years-old boys declined from 14 to 2 per 100.000 and in 10 to 15-years-old girls from 8 to 2 per 100.000 within the same period of time.

Analyses of the data from the Baden-Württemberg environmental health surveillance systems show that about one child of three is involved in at least one accident within one year. School-leaving qualifications of the parents had no influence on the prevalence of accidents. Most causes for home accidents were constructive elements like stairs, doors, windows, walls etc. as well as knives/cutlery; toys and knives/cutlery more often injured boys than girls [3].
Conclusions: Although children’s mortality due to home accidents has decreased within the past 25 years in Baden-Württemberg as well as in Germany as a whole, accidents still belong to the most frequent causes of death in infancy. Apart from road accidents, the danger of children’s accidents still remains being highest in the home. In order to reduce the number of home accidents in the long run, special attention should be paid to the reduction of health hazards in and around the home. Detailed age specific and practicable interventions, however, need profound knowledge on the causes of accidents, their frequency and their magnitude [3].

Figures 1a/b show the decline of mortality in adolescents in Baden-Württemberg from 1980-2007

![Figure 1a: Mortality due to accidents, girls aged 10-15 years in Germany (Ger) and Baden-Württemberg (BW) 1980-2007](image)

![Figure 1b: Mortality due to accidents, boys aged 10-15 years in Germany (Ger) and Baden-Württemberg (BW) 1980-2007](image)

References


[2] BZgA: Health for Children and Adolescents
http://www.kindersundheit.info/fileadmin/user_upload/kindersundheit-info.de/Download/Fachinformationen/KiGGS_GPA.pdf
Publications and Resources

BRE report: The real cost of poor housing
Davidson M, Roys M, Nicol S, Ormandy D, Ambrose P.

The relationship between poor housing and poor health has been recognised for a long time, but until recently it has not been possible to estimate the cost to society of poor housing. Although the problems of disease associated with slum living have largely been eradicated in England, a significant number of health and safety hazards in the home remain. ‘Poor housing’ is defined as housing which fails to meet the statutory minimum standard for housing in England, as assessed by the Housing Health and Safety Rating System. This report highlights weaknesses in existing models of the housing stock and proposes a new model which overcomes them. The model uses data from the English House Condition Survey to illustrate the effects of various scenarios and repair options. It allows all the hazards measured in the Survey to be compared, and identifies repair solutions which provide direct benefit to the NHS through reduced injury rates and treatment costs. This model allows the total health cost of poor housing in England to be estimated as over £600 million per year. The total cost to society each year may be greater than £1.5 billion.

Eurosafe Publications & Resources
The European Child Safety Alliance (ECSA) have launched a new range of fact sheets on child injury prevention. The new fact sheets cover a range of injury topic themes including water, road, home and leisure, and product safety. Each sheet includes European based data and injury facts.

Global Alliance to Eliminate Lead in Paints
The Global Alliance to Eliminate Lead in Paints launched the first UNEP/WHO Newsletter N^21 in March 2010. The overall goal of this All-iance is to prevent children’s exposure to lead via paints containing lead and to minimize occupational exposure to lead in paint, as lead exposure is a well-known source of injury to human health, and particularly to the health of children and to workers in lead industries.

Information Brochure of BfR of 2010-02-03; Cases of Poisoning - Reported by Physicians 2008
Carbon monoxide poisoning on the increase indoors - The Federal Institute for Risk Assessment (BfR) observed a slight increase in the number of cases of carbon monoxide poisoning in indoor areas in 2008. Carbon monoxide poisoning is a central theme in the brochure “Cases of Poisoning Reported by Physicians 2008” which has just been published. According to this, a total of eleven cases were notified in which adults and children suffered damage to their health after using a charcoal grill in their homes. The brochure also describes cases of carbon monoxide poisoning that occurred in indoor go-kart centres. It is available free of charge.

Linking Housing Conditions and Health
This is a report on the findings from a pilot study carried out by Warwick Law School working with the Building Research Establishment (BRE). The report is targeted at policy-makers at local, regional and national levels, in particular, those in the housing and the health sectors. The findings from the study will hopefully encourage these sectors to co-operate to remove threats to health and health inequalities.

Risikofaktor nächtlicher Fluglärm - Abschlussbericht über eine Fall-Kontroll-Studie zu kardiovaskulären und psychischen Erkrankungen im Umfeld des Flughafens Köln-Bonn
Umweltbundesamt (UBA) 1/2010
Risk of poisoning accidents involving children
Federal Institute for Risk Assessment (BfR) of 2009-06-10
Along with infectious diseases, malnutrition as well as obesity, accidents are the biggest health risk for children. Falls head the list but poisoning also occurs frequently, mainly at home and surroundings. In fact for small children between seven months and four years, poisoning tends to be the most important group of accidents. The new BfR brochure outlines the risks to children posed by chemical products, toys, medicines, plants and mushrooms. The brochure contains not only tips on the child-proof storage of chemical products but also information that can save lives in an emergency.

Schadstoffe in Innenräumen und an Gebäuden. Erfassen, bewerten, beseitigen. 
Gesamtverband Schadstoffsanierung GbR 2009.

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

*Genetic and environmental risk factors for childhood eczema development and allergic sensitization in the CCAAPS cohort.*

*Impact of a household environmental intervention delivered by lay health workers on asthma symptom control in urban, disadvantaged children with asthma.*

*Asthma severity according to Global Initiative for Asthma and its determinants: an international study.*
Indoor environmental risk factors and seasonal variation of childhood asthma.
Han YY, Lee YL, Guo YL.

House dust mite-promoted epithelial-to-mesenchymal transition in human bronchial epithelium.
Heijink IH, Postma DS, Noordhoek JA, Broekema M, Kapus A.

An association between floor vacuuming and dust-mite and serum eosinophil cationic protein in young asthmatics.
Koh GCH, Shek LP, Kee J, Tai BC, Wee A, Ng V, Koh D.

Heat recovery ventilators prevent respiratory disorders in Inuit children.

A randomised trial of home energy efficiency improvement in the homes of elderly COPD patients

Home and school environmental assessment and remediation
Lupoli TA, Ciaccio CE, Portnoy JM.

Genes, environment, child care, and asthma.
McBride JT.

The effect of low-cost modification of the home environment on the development of respiratory symp-toms in the first year of life.

Are Neighborhood-Level Characteristics Associated with Indoor Allergens in the Household?
Rosenfeld L, Rudd R, Chew GL, Emmons K, Acevedo-García D.

Air filters and air cleaners: rostrum by the American Academy of Allergy, Asthma & Immunology In-door Allergen Committee.
Sublett JL, Seltzer J, Burkhead R, Williams PB, Wedner HJ, Phipatanakul W; American Academy of Allergy, Asthma & Immunology Indoor Allergen Committee.

Modifiable risk factors for asthma morbidity in Bronx versus other inner-city children.
Warman K, Silver EJ, Wood PR.

Housing and allergens: a pooled analysis of nine US studies.
Environ Res. 2010 Feb;110(2):189-98.

Indoor Air

Organic compound characterization and source apportionment of indoor and outdoor quasi-ultrafine particulate matter in retirement homes of the Los Angeles Basin.
Arhami M, Minguillón MC, Polidori A, Schauer JJ, Delfino RJ, Sioutas C.
Polybrominated diphenyl ethers (PBDEs) contents in house and car dust of Portugal by pressurized liquid extraction (PLE) and gas chromatography-mass spectrometry (GC-MS).

Lung function and indicators of exposure to indoor and outdoor particulate matter among asthma and COPD patients.

A new multiple regression model to identify multi-family houses with a high prevalence of sick building symptoms "SBS", within the healthy sustainable house study in Stockholm (3H).

Air pollution and increased levels of fractional exhaled nitric oxide in children with no history of airway damage.

Lens opacities in young individuals long after exposure to protracted low-dose-rate gamma radiation in 60Co-contaminated buildings in Taiwan.

Cancer risk disparities between hispanic and non-hispanic white populations: the role of exposure to indoor air pollution.

Household exposures to polybrominated diphenyl ethers (PBDEs) in a Wisconsin Cohort.

Association between indoor exposure to semi-volatile organic compounds and building-related symptoms among the occupants of residential dwellings.

Prolonged time to pregnancy in residents exposed to ionising radiation in cobalt-60-contaminated buildings
Lin CM, Chang WP, Doyle P, Wang JD, Lee LT, Lee CL, Chen PC
Occup Environ Med 2010;67:187-195

The effects of indoor particles on blood pressure and heart rate among young adults in Taipei, Taiwan.
Lin LY, Lin CY, Lin YC, Chuang KJ.

Ultrafine particles in indoor air of a school: possible role of secondary organic aerosols.
Morawska L, He C, Johnson G, Guo H, Uhde E, Ayoko G.

Akute und chronische CO-Intoxikationen: Ein unbeachtetes und möglicherweise häufiges Problem.
Acute and chronic carbon monoxide intoxications: often unnoticed and possibly not infrequent.
v. Mühlendahl, KE.

Resuspension of indoor aeroallergens and relationship to lung inflammation in asthmatic children.
Raja S, Xu Y, Ferro AR, Jaques PA, Hopke PK.
Radon in Indoor Spaces—An Underestimated Risk Factor for Lung Cancer in Environmental Medicine
Schmid K, Kuwert T, Drexler H.
Dtsch Arztebl Int 2010; 107(11): 181-6

Mould and Dampness

Symptoms after mould exposure including Stachybotrys chartarum, and comparison with darkroom disease.
Al-Ahmad M, Manno M, Ng V, Ribeiro M., Liss GM, Tarlo SM.
Allergy 2010; 65(2): 245-55.

Mould and mycotoxin symposium: towards healthy homes.
Kilburn KH.

Severe Asthma with Fungal Sensitization: A case report and review of literature.
Madani Y, Barlow A, Taher A.

Epidemics of mold poisoning past and present.
Meggs WJ.

Link between allergic asthma and airway mucosal infection suggested by proteinase-secreting household fungi.

Indoor mold concentration in Eastern France.
Indoor Air 2009 Dec; 19(6); 446-53

The biocontaminants and complexity of damp indoor spaces: more than what meets the eyes.
Thrasher JD, Crawley S.

Smoking / Environmental Tobacco Smoke

Smoking and Environmental Tobacco Smoke play an important role in housing and health topics. However, it would go beyond the scope of this newsletter to present here all relevant literature on ETS. We therefore decided to list only selected literature. For further information, we wish you to refer to the WHO Collaborating Centre on Tobacco Control: www.tabakkontrolle.de.

Best D; Committee on Environmental Health; Committee on Native American Child Health; Committee on Adolescence.

Committee on Environmental Health; Committee on Substance Abuse; Committee on Adolescence, Committee on Native American Child


Tobacco use causes 20 % of cancer deaths worldwide. The International Agency for Research on Cancer predicts 10 million tobacco-related deaths annually by 2020, of which 70 % will occur in the developing world. Although the United States and other countries have successfully reduced exposure to smokers to secondhand smoke (SHS), the US Surgeon General Report 2006 warned that progress has been slower in the protection of young children, for whom the most important exposure setting is the home as they are in contact with surfaces and dust contaminated with residual smoke gases and particles. This type of lingering residue of tobacco smoke has recently been called third-hand smoke (THS). Reactions of atmospheric species with residual smoke on surfaces (furniture, walls, skin, clothing) may be a source of long-term exposure to harmful pollutants. The study is an exploration of the in situ reaction of nicotine sorbed to indoor surfaces with nitrous acid (HONO) to form tobacco-specific nitrosamines (TSNAs), some of which have been reported to be strong carcinogens. They deposit almost entirely on indoor surfaces and persist for weeks to months. There are several potentially important exposure routes through which surface-formed TSNAs may enter the body. Dermal contact with surfaces contaminated by TSNAs (skin, clothing and furnishings), as well as inhalation and ingestion of TSNA-loaded dust, are likely the main exposure pathways. Because of their frequent contact with surfaces and dust, infants and children are particularly at risk. More research is needed on the identification and characterization of specific biomarkers to assess human intake of THS pollutants and to better understand their health implications.
Perceptions of second-hand smoke risks predict future adolescent smoking initiation.

Exposure to secondhand tobacco smoke and child behaviour - results from a cross-sectional study among preschool children in Bavaria.

Home Safety

Relationship between home hazards and falling among community-dwelling seniors using home-care services.

Housing and Ageing Society

Perceived autonomy and activity choices among physically disabled older people in nursing home settings: a randomized trial.

Homes get smarter. New technology a boon for stay-at-home seniors.
Crawford M. Health Prog. 2009 Nov-Dec;90(6):40-3.

Feasibility and effects of preventive home visits for at-risk older people: design of a randomized controlled trial.

Walking skill can be assessed in older adults: validity of the Figure-of-8 Walk Test.

Relationship of quality of life to dispositional optimism, health locus of control and self-efficacy in older subjects living in different environments.

Therapeutic home adaptations for older adults with disabilities.
Unwin BK, Andrews CM, Andrews PM, Hanson JL. Am Fam Physician. 2009 Nov 1;80(9):963-8; hand-out 970.

Housing Conditions

Review: The Impact of Light in Buildings on Human Health
Boyce PR
Indoor and Built Environment 2010;19 8-20. Review

Home environmental health risks of people with developmental disabilities living in community-based residential settings: implications for community-health nurses.
Del Bene Davis A.

Sustainable and Healthy Buildings
Kim JT

What happens to people before and after disability? Focusing effects, lead effects, and adaptation in different areas of life.
Powdthavee N.

The health impacts of housing improvement: a systematic review of intervention studies from 1887 to 2007.
Thomson H, Thomas S, Sellstrom E, Petticrew M.

Housing and Mental Health
Housing and living with a mental illness: exploring carers' views.
Browne G, Hemsley M.
Int J Ment Health Nurs. 2010 Feb;

A social ecological approach to investigating relationships between housing and adaptive functioning for persons with serious mental illness.
Kloos B, Shah S.

Does moving from a high-poverty to lower-poverty neighborhood improve mental health? A realist review of 'Moving to Opportunity'.
Jackson L, Langille L, Lyons R, Hughes J, Martin D, Winstanley V.

Thermal Comfort / Energy
Health and social care responses to the Department of Health Heatwave Plan.
Abrahamson V, Raine R.

Effects of apparent temperature on daily mortality in Lisbon and Oporto, Portugal.
Almeida SP, Casimiro E, Calheiros J.

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Blättner B, Heckenhahn M, Georgy S, Grewe HA, Kupski S
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Huang W, Kan H, Kovats S.
Sci Total Environ. 2010 Mar 8. [Epub ahead of print]

Heat-related mortality in residents of nursing homes.
Klenk J, Becker C, Rapp K
The thermal environment of the human being on the global scale.
Jendritzky G, Tinz B.

Urban heat island and air pollution--an emerging role for hospital respiratory admissions in an urban area.
Lai LW, Cheng WL.

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Montero JC, Mirón IJ, Criado JJ, Linares C, Díaz J.

Mapping community determinants of heat vulnerability.
Reid CE, O'Neill MS, Gronlund CJ, Brines SJ, Brown DG, Diez-Roux AV, Schwartz J.

Modeling effects of urban heat island mitigation strategies on heat-related morbidity: a case study for Phoenix, Arizona, USA.
Silva HR, Phelan PE, Golden JS.

Heat waves observed in 2007 in Athens, Greece: synoptic conditions, bioclimatological assessment, air quality levels and health effects.

Spatial analysis of heat-related mortality among the elderly between 1993 and 2004 in Sydney, Australia.
Vaneckova P, Beggs PJ, Jacobson CR.

Thermal comfort: research and practice.
van Hoof J, Mazej M, Hensen JL.

Review of the physiology of human thermal comfort while exercising in urban landscapes and implications for bioclimatic design.
Vanos JK, Warland JS, Gillespie TJ, Kenny NA.
Int J Biometeorol. 2010 Feb 15. Review

Yamamoto N, Shendell DG, Winer AM, Zhang J

Urban Planning / Built Environment

Mixed land use and walkability: Variations in land use measures and relationships with BMI, overweight, and obesity.
Key stakeholder perspectives on the development of walkable neighbourhoods.
Clark MI, Berry TR, Spence JC, Nykiforuk C, Carlson M, Blanchard C.

The relationship of physical activity and overweight to objectively measured green space accessibility and use.
Coombes E, Jones AP, Hillsdon M.

Does the built environment relate to the metabolic syndrome in adolescents?
Dengel DR, Hearst MO, Harmon JH, Forsyth A, Lytle LA.

Neighborhoods and Chronic Disease Onset in Later Life.
Freedman VA, Grafova IB, Rogowski J.

An economic evaluation of health-promotive built environment changes.
Guo JY, Gandavarapu S.

Bicycle use for transport in an Australian and a Belgian city: associations with built-environment attributes.
Owen N, De De Bourdeaudhuij I, Sugiyama T, Leslie E, Cerin E, Van Van Dyck D, Bauman A.
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Exploring the Role of the Built and Social Neighborhood Environment in Moderating Stress and Health.
Matthews SA, Yang TC.

Independent mobility, perceptions of the built environment and children's participation in play, active travel and structured exercise and sport: the PEACH Project.
Page AS, Cooper AR, Griew P, Jago R.

Are neighborhood-level characteristics associated with indoor allergens in the household?
Rosenfeld L, Rudd R, Chew GL, Emmons K, Acevedo-García D.

Examining methodological details of neighbourhood observations and the relationship to health: a literature review.
Schaefer-McDaniel N, Caughy MO, O’Campo P, Gearey W.

Adverse Housing and Neighborhood Conditions and Inflammatory Markers among Middle-Aged African Americans.
Schootman M, Andresen EM, Wolinsky FD, Malmstrom TK, Morley JE, Miller DK.

Building capacity in local government for integrated planning to increase physical activity: evaluation of the VicHealth MetroACTIVE program.
Thomas MM, Hodge W, Smith BJ.

Sense of community and its relationship with walking and neighborhood design.
Wood L, Frank LD, Giles-Corti B.

Associations of residential density with adolescents' physical activity in a rapidly urbanizing area of Mainland China.
Xu F, Li J, Liang Y, Wang Z, Hong X, Ware RS, Leslie E, Sugiyama T, Owen N.
Climate Change and Housing

**US local action on heat and health: are we prepared for climate change?**

**Public health benefits of strategies to reduce greenhouse-gas emissions: household energy.**

**Influence of environmental characteristics and climatic factors on mites in the dust of air-conditioner filters.**
Wu J, Liu ZG, Ran PX, Wang B.

Social inequities and Housing

**Individual-level socioeconomic status is associated with worse asthma morbidity in patients with asthma.**
Bacon SL, Bouchard A, Loucks EB, Lavoie KL.

**Social inequities in environmental risks associated with housing and residential location--a review of evidence.**
Braubach M, Fairburn J.

**Patterns of urban violent injury: a spatio-temporal analysis.**
Cusimano M, Marshall S, Rinner C, Jiang D, Chipman M.

**Development of a Deprivation Index and its relation to premature mortality due to diseases of the circulatory system in Hungary, 1998-2004.**
Juhász A, Nagy C, Páldy A, Beale L.
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!

World Health Day 2010 - 1000 cities, 1000 lives
Date: April 7, 2010
Venue: worldwide
Further information: WHO | World Health Day 2010

Sustainable City 2010 - Sixth International Conference on Urban Regeneration and Sustainability
Date: April 14 - 16, 2010
Venue: La Coruña, Spain
Further information: The Sustainable City 2010 | 10 Conferences

Environmental Economics and Management International forum on “Greening Real Estate Markets – A Multi-Stakeholder Perspective”
Date: April 26-27, 2010
Venue: Dessau-Roßlau, Germany
Further information: Federal Environment Agency

Environmental Toxicology 2010 - Third International Conference on Environmental Toxicology
Date: May 4-6, 2010
Venue: Cyprus
Further information: Environmental Toxicology 2010 | 10 Conferences

Urban Transport 2010 - 16th International Conference on Urban Transport and the Environment
Date: May 5-7, 2010
Venue: Cyprus
Further information: Urban Transport 2010 | 10 Conferences

Clima 2010 - "Sustainable energy use in buildings" - 10th REHVA World Congress
Federation of European Heating and Air-conditioning Associations
Date: May 9-10, 2010
Venue: Antalya, Turkey
Further information: Clima 2010

17th WaBoLu-Innenraumtag (meeting of the German society for water, soil and air hygiene)
Date: May 10-12, 2010
Venue: Berlin, Germany
Further information: Verein für Wasser-, Boden- und Lufthygiene (WaBoLu)

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/

29th Congress of the European Academy of Allergy and Clinical Immunology (EAACI)
Date: June 5-9, 2010
Venue: London, United Kingdom
Further information: EAACI
**Symposium "Urbane Strategien zum Klimawandel - Austausch von Praxis und Wissenschaft"**
Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR)
Date: June 7-8, 2010
Venue: Berlin, Germany
Further information: [BBSR](#)

**10th Urban Environment Symposium - Urban Futures for a Sustainable World**
Date: June 9 - 11, 2010
Venue: Göteborg, Sweden

**10th National Child Safety Day**
Date: June 10, 2010
Venue: Berlin, Germany
Further information: [Eurosafe European Child Safety Alliance](#)

**UEP 2010 - Overcoming Obstacles to Sustainability and Quality of Life**
Date: June 20-23 June 2010,
Venue: Boston, USA
Further information: [Urban Environmental Pollution](#)

**Air Pollution 2010 - 18th International Conference on Urban Regeneration and Sustainability**
Date: June 21 - 23, 2010
Venue: Kos, Greece
Further information: [Air Pollution 2010 | 10 Conferences](#)

**7th International Conference on Indoor Air Quality, Ventilation and Energy Conservation in Buildings**
Date: August 15-18, 2010
Venue: Syracuse, New York, USA
Further information: [IAQVEC](#)

**15th International Union of Air Pollution Prevention and Environmental Protection Associations’ World Clean Air Congress**
12. - 16. September 2010
Venue: Vancouver, Canada
Further information: [IUAPPA](#)

**4th GHUP Annual Meeting 2010 - Society of Hygiene, Environmental and Public Health Sciences (GHUP)**
Date: September 29 - October 02, 2010
Venue: Aachen, Germany
Further information: [GHUP / University Hospital Aachen](#)
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 Fifth Ministerial Conference on Environment and Health

The Fifth Ministerial Conference on Environment and Health (March 2010), organized by WHO/Europe and hosted by Italy, marked a milestone in the European environment and health process. Focused on protecting children’s health in a changing environment, the Conference set Europe's agenda on emerging environmental health challenges for the years to come. Key issues considered were especially environmental inequalities and climate change for which background documents and policy briefs are available.

At the Conference, governments from across Europe signed a declaration, pledging to reduce the adverse health impact of environmental threats in the next decade.

The declaration as well as all details, speeches and background documents related to the Conference are available at the conference website at http://www.euro.who.int/parma2010

WHO work on indoor and built environments

Social inequalities and healthy housing

In preparation of the WHO Fifth Ministerial Conference on Environment and Health (March, 2010, Italy) WHO has undertaken various activities on environmental health inequalities and the overview of activities is available at the WHO website on social inequalities in environment and health at http://www.euro.who.int/envhealth/topics/20090706_1. The page also gives access to full-text articles on environmental inequalities published in the first 2010 issue of the European Journal of Public Health and dealing with inequalities in relation to housing; air quality; waste; and in relation to children. A fifth paper describes available policy options.

The report on an expert meeting on socially triggered environmental inequalities – including housing and residential location - is available at http://www.euro.who.int/document/E93037.pdf

Also available is a report by WHO on housing inequalities based on the WHO LARES dataset, which shows that income and the socioeconomic status (SES) - as well as other social determinants – are highly associated with quality of housing and housing-related health effects. The report can be accessed at http://www.euro.who.int/Document/E92729.pdf

Actions against dampness and mould

Complementing the recently published WHO Indoor Air Quality Guidelines on Dampness and Mould (see last newsletter), WHO has implemented a project on damp and mould – co-funded by the European Commission – to provide technical and policy recommendations on damp and mould interventions. The final reports are available at

- http://www.euro.who.int/Document/E92998.pdf - (English)
- http://www.euro.who.int/Document/E92998G.pdf - (German)

Case studies on damp and mould prevention and remediation can be found at http://www.euro.who.int/Housing/support/20080917_1 as well as the Addendum to the WHO expert meeting report on interventions against damp and mould at http://www.gesundheitsamt-bw.de/servlet/PB/show/1306095/Background_paper_LGA_Warm_climate_and_institutional_settings_actions_20091218.pdf. Further products related to this project – a brochure on damp and mould prevention and remediation for the public (also in Russian), and a compilation of...
national or regional damp and mould advice services - have been produced with the Health and Environment Alliance (HEAL) and can be accessed at http://www.euro.who.int/document/HOH/damp_mould_brochure.pdf (english) and http://www.euro.who.int/document/hoh/damp_mould_brochure.pdf (russian) or at http://www.env-health.org/r/157. Institutions and agencies that are active in the field of public information on damp and mould are asked to sign up for this compilation brochure on the same HEAL website.

The most recent statistics on the exposure of the European population to damp problems in their homes is provided by a new indicator fact sheet on dampness available at http://www.euro.who.int/document/EHI/enhis_factsheet09_3_5.pdf.

Children’s health

Other issues of relevance

World Health Day – 7 April 2010
World Health Day 2010 will focus on urbanization and health. With the campaign "1000 cities - 1000 lives", events will be organized worldwide calling on cities to open up streets for health activities. Stories of urban health champions will be gathered to illustrate what people are doing to improve health in their cities. For further information, please check http://www.who.int/world-health-day/2010/en/index.html