International Workshop on Housing, Health and Climate Change:

Developing guidance for health protection in the built environment - mitigation and adaptation responses

Geneva, 13- 15 October 2010

Meeting report
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Introduction

Background

Housing and built environments have a profound impact on human health. In developed countries, 80-90% of the day is spent in built environments and most of this is in the home. Therefore, exposures and health risks in this private setting are of crucial relevance. The role of the home for health is enhanced by the fact that the most vulnerable population groups (poor, sick, children and elderly, disabled...) spend even more of their time in this setting, and are therefore most vulnerable and most in need of healthy living environments.

Although the health relevance of the private home is well accepted, health considerations do not represent a major objective in construction and rehabilitation of housing and built environments. There is a wealth of evidence indicating that housing and construction standards are almost exclusively based on technical norms, engineering knowledge and architectural design aesthetics. Consequently, standards of “adequate housing” or “sustainable housing” in the modern era tend to be informed by technological rather than health rationales, despite the fact that many housing laws have their origins in public health concerns. Similarly, building codes and national regulations governing the production and approval of buildings often tend to be vague, requiring buildings to be “safe”, to be equipped with “adequate ventilation options” or “functional heating systems”. These requirements provide little information on what the minimum standards of healthy housing are, and what characteristics need to be fulfilled to provide adequate shelter from the perspective of human health.

Current evidence shows that the home – despite highly developed technologies, materials and construction styles – remains a major cause for ill health through exposure to many factors, including (but not limited to): home injuries, chemical substances, mould and damp, noise, radon, pests and infestations, poor access to water and sanitation, proximity to pollution sources, or flooding, and inadequate protection from extreme weather.

**Home injuries** – unintentional home injuries are a serious public health problem. In the years 2002–2004, in some countries home injuries were the leading cause of injury death in children under 5 years of age. Home injuries can be reduced through adequate building design

**Indoor Air Quality** – has been identified as a key concern of environmental health in many countries and is dependent on the quality of the building, the materials, cooking and heating technologies and user behaviour. Indoor air quality is therefore determined by biological (e.g. mould and moisture), chemical and physical factors. Hazards in the house include cleaning products, asbestos and other construction materials and deteriorating lead based paint.

**Pests** – in warmer climates, infestations pose health threats due to infections and food poisoning. Risks can be significantly reduced by adequate housing conditions.
Crowding – a major risk for social pathologies and mental symptoms, and increases the risk for infectious disease transmission. Problems with lack of space can be modified by housing design and usability.

Water/sanitation – one of the major public goods to be provided in or near the home and the biggest cause of child mortality – as well as the main requirement for any healthy home.

Location – selection of residential sites for urban development based on an assessment of environmental risks (flooding, pollution sources etc.) is crucial to avoid extreme exposures.

Climate protection function – if adequately built, the home is a shelter to protect from weather extremes such as heat and cold, but also wind and rain. Therefore, adaptation in the housing stock is a key public health issue to mitigate climate change effects on health.

Some of the health challenges described above can be partially addressed by efficient application of existing WHO guidelines (Air Quality Guidelines, Indoor Air Quality Guidelines, or Night Noise Guidelines) but for specific application in the housing context some of these may have to be modified, adapted or at least interpreted. More importantly, there is no guidance on avoiding the range of health risks in housing and construction at this time.

There is an urgent need for authoritative science based guidance on the relevant human health risks from the built environment and safe levels of exposure. The WHO has identified that there is a need to help fill that gap through developing housing and health guidelines.

There is a great potential for reducing green house gases from improving energy efficiency of buildings (IPCC second assessment report). In addition buildings have a major role in protecting people from extreme weather events that result from climate change. For both these reasons many countries are developing programs to improve the energy efficiency and durability of buildings. Overall these programs are expected to contribute to economic recovery and to become a key element in greening the economy.

The new investments in building improvements open unique opportunities for primary prevention of disease and injuries. The promotion and protection of public health through housing and construction measures should lead to increased wellbeing, reduced suffering and lower health care costs. Specific guidance is needed from health experts to ensure the potential benefits are realized.

Scope of the workshop

The workshop had the objective of bringing a health perspective and practical guidance to the proposed improvements in the built environment to be enacted in response to climate change, including mitigation and adaptation measures such as in energy efficiency. It developed science-based advise on how measures to reduce climate change in housing and construction could avoid risks to health, and produce health improvements.
The following set of background analysis and reviews were prepared and discussed at the workshop:

- Main programs and initiatives to improve the built environment to mitigate and adapt to climate change, at national/regional/global levels;
- Scientific evidence on health impacts (positive and negative) of housing and the built environment, with reference to how climate change mitigation and adaptation measures may affect those impacts;
- Existing guidance and building codes, from government, industry and civil society organizations, to identify if and when they may already protect public health, as well as gaps and areas that need strengthening;
- Gap analysis - identification of areas where health issues are not yet considered by the building stakeholders but would provide added value to the proposed building improvements; and
- Proposals to strengthen health protection in the built environment improvements that are about to take place to mitigate and adapt to climate change, including building design, materials and technologies.

Meeting participants were asked to cover the following tasks:

- Consider the background analysis;
- Agree on recommendations about areas of public health that can be protected and promoted through the building improvements that respond to climate change;
- Agree on processes and mechanisms whereby the proposed health promotion and protection can be achieved;
- Agree on a roadmap to promote and disseminate the above measures, and monitor the uptake of those recommendations; and
- Consider and make recommendations about the need and opportunity for wider science-based guidance for healthy housing and buildings to be led by the WHO.

The above analysis, recommendations and international meeting had the aim to launch long term international cooperation on health in housing and the built environment, beyond the initiatives aimed at responding to climate change.

The meeting was organized in two parts. On the 13th and 14th of October discussions focused on the impact of climate change mitigation measures of housing and their impact on health, while the last day of the workshop focused on the development of WHO housing and health guidelines. In accordance with these thematic priorities, this report will be organized in two main parts.

The workshop was attended by 40 experts, representing 18 countries and various sectors contributing to housing and health policy-making and research and several international organizations, including the Ministry of Health, Brazil; National Engineering Research Center for Human Settlements, China; National Institute of Hygiene, Cuba; National Institute for Health and Welfare, Finland; Ministry of Health, France; WHO Collaborating Centre for Housing and Health Stuttgart, Germany; The Energy and Resources Institute, India Habitat Centre, India; Medical Department Kyoto University, Japan; Faculty of Architecture and Design, Jordan University of Science and Technology, Jordan; Centre for Sustainable Cities and He Kainga Oranga/Housing and
Summary of opening speeches

The meeting was opened on the 13th of October 2010 by Carlos Dora, Co-ordinator Interventions for Healthy Environments (IHE), Department of Public Health and the Environment (PHE) of WHO. Maria Neira, Director of PHE, opened the meeting on the 14th of October 2010.

In his opening remarks, Carlos Dora acknowledged the great efforts that the Regional Offices, in particular EURO and PAHO had made in the past years to put housing on the health agenda and emphasized the need to take it up on a global level. He also emphasized that a global effort on housing and health was built on experience and achievements by the Regional Offices related work, as well as on the existing solid basis of environment and health risk analyses completed by WHO regarding air quality, noise, chemicals, radiation, injury prevention, water and sanitation and other areas.

Maria Neira expressed her gratitude to the French Ministry of Health for supporting the implementation of the workshop. She underlined the opportunity for WHO to make climate change mitigation recommendations for housing and health at the COP 16 Climate Change meeting in Cancun, Mexico. She underlined the need to further strengthen efforts to provide solid recommendations beyond climate change for ensuring that healthy environments at urban, housing and school level become a reality for the population of the regions of the world.
Housing, health and climate change – 13-14 October 2010

Summary of presentations

The sessions of the first two meeting days were chaired by: He Jianqing from the National Engineering Research Center for Human Settlements, China Architecture Design & Research Group (CADG); Hina Zia, Centre for Research on Sustainable Building Science, The Energy and Resources Institute India Habitat Centre; David Jacobs, National Center for Healthy Housing, US; and Paul Wilkinson, Department of Social and Environmental Health Research, London School of Hygiene & Tropical Medicine. The parallel working groups on day 2 were chaired by Ms Nisha Naicker, South African Medical Research Council, and Mr Humaid Abdulla Al Marzouqi, Abu Dhabi Urban Planning Council.

Presentations and Speakers

Overview of housing and health issues as they connect to climate change mitigation and adaptation measures
Philippa Howden-Chapman, New Zealand Centre for Sustainable Cities and He Kainga Oranga/Housing and Health Research Programme, University of Otago

Policies and measures listed in the IPCC reports regarding mitigation in housing and the built environment
Nathalie Röbbel, IHE, WHO

Main programs and initiatives to improve the built environment to mitigate and adapt to climate change, at national/regional/global levels
David Ormandy, Institute of Health, UK

Existing guidance and building codes, from government, industry and civil society organizations, that may have relevance for health
Rebecca Morely, NCHH

Roundtable discussion
How the work of other international agencies connect to housing and health issues

Improving the health of workers in key sectors of the urban economy
Edmundo Werna, ILO

Sustainable urban development - Adequate shelter for all
Ellen Daltrop, UN-HABITAT

How the work of UNECE is connected to housing and health issues
Sergii Yampolskyi, Environment, Housing and Land Management Division, UNECE

Buildings, health and climate in the Green Economy
Cornis van Lugt, UNEP
Philippa Howden-Chapman summarized the main health impacts of housing environments in the context of climate change. There are multiple components of housing environments, including outdoor areas, which should be considered in terms of their potential contribution to physical health as well as social and psychological well-being. The association between housing and health is complex, and causal relationships can be hidden or otherwise influenced by a host of confounding variables and effect modifiers. Some aspects of housing and health are directly impacted by climate change mitigation strategies, others indirectly so. Health conditions and categories typically considered in the health literature, include: Respiratory diseases related to indoor air quality; Thermal comfort-related morbidity and mortality; Vector borne and zoonotic diseases; Exposure to pests and infestations; Air-borne infections; Waterborne diseases; Domestic injuries; Mental health; Noise effects and morbidity; Lead poisoning; Asbestos; Health relevance of urban design, density and the immediate housing environment. Many of these outcomes refer to formal houses, while there are many people who are living in informal houses. Exposure to dangerous waste, asbestos, insufficient hygiene and sanitation are only a very few to mention in regard. Philippa Howden-Chapman underlined the need to strengthen life-cycle analysis of buildings when looking at the health effects of mitigation measures.

In her presentation, Nathalie Röbbel presented key climate change mitigation options for residential buildings as per the review by the IPCC, Working Group III, Mitigation of Climate Change, Residential and Commercial Buildings (Chapter 6). Reference here was made to key IPCC-reviewed mitigation strategies in terms of energy efficient building design and function. Following that, a review was presented of related literature on health impacts, both in terms of potential co-benefits and risks. In this context, discussion in this section was limited to the following strategies, which are also the primary focus of IPCC:

1. Improvement of the thermal envelope of buildings (IPCC 6.4.2.)
2. Heating systems, passive solar systems, and domestic hot water (IPCC 6.4.3.,6.4.7 & 6.4.8)
3. Cooling loads (IPCC 6.4.4.)
4. Air conditioning and HVAC (IPCC 6.4.5)
5. Photovoltaic solar energy for electricity generation (IPCC 6.4.7)
6. Lighting and day lighting (IPCC 6.4.9-10)
7. Household appliances and consumer electronics (IPCC 6.4.11)

David Ormandy presented a review of policies, programmes, and initiatives aimed at improving the built environment, particularly the housing environment, from a health perspective. In particular he presented policies focusing on energy, and on climate change mitigation and adaptation at national, and regional levels. His summary statements show that countries across the regions are widely different and their policies and priorities reflect this, having been influenced by factors such as their historical development, climate, geography, economics, culture and the administrative and political environment. Nonetheless housing is often recognized as an important determinant of health and quality of life, and lack of adequate housing is acknowledged to have a negative impact on health. Similarly, the importance of services and
infrastructure, in particular, energy, water, sewerage, and transportation, and their contribution to healthy housing is plainly recognised.

Energy conservation and climate change are often given a high priority however it seems that the probable contribution to climate change is the driver behind energy conservation. It is not apparent whether the health benefits from dealing with energy precariousness are fully acknowledged.

In her presentation, Rebecca Morley provided a summary overview of housing codes and voluntary building guidelines in four countries: the United States, England, New Zealand and France. The focus of her presentation was on existing housing, although some new construction guidelines and codes were discussed as well. The analysis focused on the major national programs/policies in each country. For example, in the United States, many localities have adopted green building ordinances. Major national green building programs were presented, both voluntary and regulatory programs.

Roundtable discussion

During the roundtable discussions the representatives of various international organizations presented their work as it connects to housing and health issues and in particular to housing mitigation measures.

In his contribution Cornis van Lught presented the green buildings part of the UNEP green economy work and presented existing tools for financing interventions in housing and the built environment. In particular he described the CDM mechanisms, underlying that credit trading schemes require reliable measurement and baselines. One of the reasons that the CDM under the Kyoto Protocol attracted so few building energy efficiency projects was the lack of baselines and reference cases that could be used to implement the projects. High transaction costs and the absence of a sector-specific methodology was another reason for so few CDM projects in developing countries involving the buildings sector. Energy efficiency projects for buildings are often small in scale and use a variety of measures to decrease overall consumption. He presented an evaluation undertaken by UNEP on efficient financing tools for green buildings.

Edmundo Werna from ILO focussed in his presentation on the occupational health and safety in construction and home-based enterprises; Green economy/green jobs in housing and construction sector and presented some reflections on occupational health risks in regard to climate change mitigation measures in housing and construction. He underlined that green construction are not safer per se, due to changes in OHS practices, new technologies/types of activities, etc Additionally, existing health and safety problems can be simply transferred from old practices into green practices.

In his presentation Sergeji Yampolskyi shared the UNECE experience of three activities related to housing and health. a) Background paper: Principles and Goals for Affordable, Healthy and Ecological Housing; b) the UNECE Study on Informal Settlements: “Self-made cities made cities” and c) the “Action Plan for Energy -Efficient Housing in the UNECE Region”.


Ellen Daltrop from UN-HABITAT stressed the opportunities and challenges of the urbanization processes on health across the word. Particular attention was given to the growing number of slums and their impacts on health.

**Work in plenary - Conclusions and recommendations**

During the meeting participants agreed that the IPCC has identified building and housing as one of the top priorities for climate change mitigation. Insofar as housing is likely to be important to the global mitigation effort, there is a strong evidence base that these measures can have important health co-benefits, but also risks that must be considered in the context of policymaking.

The overriding principles to be followed are traditional public health principles: "do no harm", control contaminants at source, make smart choices, and use a systems approach that looks at healthy people as well as buildings.

**Knowledge and implementation gaps**

However, the meeting acknowledged that there is a lack of access to information on the health benefits/risks of housing interventions. The evidence should be communicated in ways that facilitate their use by UNFCCC and by climate change negotiators in Cancun and in other relevant fora.

The meeting participants underlined the need to define housing in an integrated manner. WHO has adopted a broad definition of housing, recognising that it encompasses four inter-related aspects. A house (or dwelling) is the physical structure used, or intended to be used, for human habitation. The term home is the economic, social and cultural structure established by the household. The neighbourhood (or immediate housing environment) includes the streets, the estate, the shops, places of worship, recreational and green space, and transport. And the community comprises those living, working and providing services in the neighbourhood.

This definition goes hand in hand with WHO’s definition of health, being a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.

Participants agreed that we need to go beyond the individual building level and look at the urban level to effectively address both mitigation goals and health goals. For instance, the urban heat island effect needs to be addressed at the urban planning as well as building/neighbourhood level. This implies a systems approach.

There is also the need to keep in mind both geographic and income/health inequities, but also opportunities we have to address those in climate change mitigation measures.

In particular, the world's growth is happening in developing cities, and nearly 40% of that is in slums on urban peripheries. Slums have a tremendous immediate health impact right now; but their potential long term climate footprint should be appreciated,
too, in terms of the urban sprawl they create and the carbon costs of rebuilding them later.

Priority should be given to low-carbon, low-cost and health co-benefit “packages” that yield immediate health benefits and longer-term carbon efficiencies. Doing this will optimise health in climate friendly housing in new housing being built right now, and address a key MDG where we are lagging, MDG 7; (improve lives and health of urban slum dwellers).

Not doing this will increase both the immediate health impacts due to air pollution, heat and cold, and, long-term, their carbon footprint, in terms of transport and other costs associated with urban sprawl.

The participants made three recommendations on the mitigation measures for the housing sector to be presented through the Fourth IPCC Assessment report:

1. Recommendations on health co-benefits and potential risks of specific IPCC mitigation measures, as detailed by the Fourth Assessment report.
2. Recommendations on health co-benefits and risks on mitigation areas that have not been given adequate attention by IPCC
3. Gaps in knowledge and tools about health co-benefits and risks in housing measures to mitigate/adapt to climate change

1. Health co-benefits and risks of strategies covered by the IPCC

1. Improved hygro-thermal performance of building envelope

Benefits
- Reduced mortality and morbidity due to cold or hot weather
- Reduction in asthma and respiratory diseases due to dampness
- Reduction of pest intrusion/infestation (e.g. rodents, cockroaches)
- Less sleep disturbance and annoyance from noise
- Better mental health from greater thermal comfort

Risks
- Providing adequate ventilation (including fresh air supply) to avoid build up of indoor air pollutants, excess moisture, avoided dust mite increase, and provide for infection control:
- Avoiding use of dangerous/cancer-causing insulation materials
- Ventilate for radon

2. More low-carbon energy efficient heating

Benefits
- Reduced asthma symptoms, increases number of days children attend school
- Reduced mortality (potentially 2 million deaths a year) from indoor smoke due to biomass/coal in developing countries
Reduced scalding injuries by conventional electric or fossil fuel hot water heating by lowering thermostat for energy savings

Solar hot water heating - can provide more cost-effective access to hot water for sanitation in regions with abundant sunshine/without electricity grid access - for a net health improvement

Better thermal comfort, including better mental health from greater thermal comfort

Risks
- Bacterial proliferation in very large solar tanks/cooling towers

3. Reduced cooling loads through passive or hybrid means, e.g. building siting, positioning/shading, passive natural ventilation or low-energy hybrid means (e.g. fan-supported, evaporative coolers dehumidifiers, etc)

Benefits
- These measures can protect health in that they can protect against very high indoor air temperatures in summer. However, design needs to take account of summer and winter risks.
- Natural ventilation can help control infection risks of airborne infections, (e.g. TB), indoor air pollution, and with correct dehumidification, mites and mould.
- Use of passive methods can decrease reliance on more energy intensive air conditioning
- Inexpensive methods available require more emphasis by IPCC and other mitigation groups, e.g. building and site position, tree planting, use of white painted roofs to reflect light (Albedo effect), "green" living roofs to reduce cooling load.

Risks:
- Better urban planning measures also are critical to reducing the heat island effect and thus overall building cooling load.
- Avoid use of lead in paint
- Ventilation is also bringing in outdoor pollution

4. More efficient air conditioning and HVAC

Benefits:
Air conditioning may be essential as a short-term heat wave response measure in some high risk settings (e.g. homes of elderly in heat waves). HVAC is also built into many existing buildings.

Risks
- Fewer air exchanges and more risk of exposure to airborne infectious diseases
- Risk of legionellosis in some situations, particularly poorly maintained systems
- Night noise disturbance - particularly to neighbouring units/buildings
- A vicious cycle for developing cities that exacerbates the urban heat island effect
- Delayed health impacts from the added GHG emissions (both CO2 and halocarbons)
Passive cooling/natural ventilation measures, or hybrids, may reduce cooling loads by as much as 60-70 percent, even in high rise buildings. (support with case studies of this as well as literature)

Equity issues: Income is a barrier to use; those not using suffer the immediate noise and heat island impacts of others' use

5. Photovoltaic solar energy for energy production

**Benefits:**
- For developing country households: reduced home injury/solar lighting, respiratory illness/replacement of kerosene lamps, food safety/solar powered fridges, emergency response/cell phones, overall social determinants of health.
- Developed and Developing countries: respiratory illness/Air pollution mitigation from more efficient electricity generation in light of the fact that 40% of energy use is from appliances in developed countries)

**Risks**
- In developed countries, more energy efficient technologies, on their own, may not reduce net overall use of electricity

6. Lighting and daylighting

**Benefits**
- Energy efficient lights, identified by IPCC as one of the biggest energy efficiency opportunities, does not mean sacrificing light for health, if net wattage is the same.
- Positioning of windows can help improve thermal comfort/reduce heat load

**Risks**
- Adequate daylighting is important to mental health and for bacteria/mould control
- Insufficient daylight can increase the risk of domestic accidents

7. More energy-efficient Household appliances and electronics

**Benefits**
- Since 40% of developed country household energy is from appliances, net reduction in ambient air pollution exposures from net reductions in electricity demand.
- Developing country access to solar/DC-powered appliances. Implications for: home injury, respiratory illness/kerosene lamp use, food safety, emergency response, overall social determinants of health.
- Less risk of injury (electroshock) from low-current DC-powered devices

**Risks**
- No net impact on air pollution exposures if there is not net decrease in energy appliance use by developed countries
2. **Health co-benefits and risks that have not been given adequate attention by IPCC**

2.1. More use of "eco-urban design" principles to reduce urban heat island effect and also promote multiple co-benefits from increased physical activity, reduced ambient air pollution exposures due to private car use, etc.

2.2. IPCC fails to consider linked CC/health opportunities for measures addressing developing country housing needs and realities, and long-term carbon and health "gains" of

- Low-carbon designs resilient to extreme weather
- Low-carbon HH energy that improves indoor and outdoor air quality;
- Immediate health risk reductions/long term carbon savings of: a) urban planning for access to safe drinking-water through grid and rain-water harvesting, sanitation, waste disposal; b) photovoltaics for lighting and solar hot water heating, new appliances, c) better urban planning for public transport, walking/cycling and d) passive ventilation, screens and household water management to protect against vector borne diseases.

2.3. Learn from traditional building design; evaporation of ponds in courtyards, natural cooling, very aesthetic and very practical; traditional local materials that can be heat and cooled.

2.4. Need to address behavioural factors that might help promote, or defeat, healthy mitigation strategies

2.5. Need to address housing and health inequalities as part of climate change mitigation strategies and promote equity in energy efficiency strategies

2.6 Occupational health risks of workers in charge of insulation and retrofits/construction needs consideration.

2.6 Need for manufacturer testing of products. In all cases, materials and practices to be avoided: Asbestos, radon, lead paint, avoid pressed wood products that use formaldehyde as binders, volatile organic compounds, avoid use of PCBs in caulk and timber, use of arsenic in timber insulation. Attention should be given to the environmental health aspects of the construction phase of the buildings. Carcinogen and endocrine interrupters in foams. Fly ash and other coal combustion residuals.

3. **Gaps in knowledge and tools about health co-benefits and risks in housing measures to mitigate/adapt to climate change**

There is an overall need for improved evaluation of mitigation strategies to consider health factors

1. Conduct health field studies and fine-tune large population models based on policy-relevant mitigation and health impact scenarios.
2. Look at health benefits of low-energy systems or non-energy systems.
3. Define an evidence-based definition of "thermal health" (as compared to thermal comfort), that is relevant to all regions, and useful in measuring health impacts of energy efficiency strategies
4. Assess systematically health co-benefits of renewables for low-income developing country settings (e.g. solar hot water heating, solar/photovoltaic lighting, etc)
5. Health assessment of low-cost housing strategies in developing countries that consider multiple health factors, including vector borne disease transmission, infection control, water and sanitation, and indoor air pollution exposures.
6. Build capacity for data collection and monitoring systems in countries to see that health parameters are addressed.
7. Advise architectural schools/schools of public health to include study of healthy housing design as part of green design and environmental health.
8. Improve finance mechanisms and incentives for healthy climate change mitigation in all regions and income groups. CDM fails to consider health co-benefits. Development banks and donors are not investing in climate change strategies for poor countries sufficiently. Needs to engage the role of the banks to see how they can take the savings and put them up front.

**Conclusions of the meeting**

In the final session of the meeting conclusions and recommendations were revised and synthesized. WHO was requested to continue to lead a longer-term effort to strengthen health considerations in housing interventions to mitigate and adapt to climate change.

Immediate steps the participants agreed upon included:

- WHO to integrate the comments received during the meeting and to share the next draft report with all meeting participants
- WHO to set up an electronic collaboration page to be used for sharing documents and information among participants
- Experts to review the updated documents
- WHO and experts to disseminate findings widely.
WHO Housing and health guidelines – 15 October 2010

The third day of the international workshop focussed on the development of WHO housing and health guidelines. In the first part of the day participants were provided with background information on the scope of the housing and health guidelines from a WHO perspective as well as on the WHO guidelines development process. In addition examples of the development and the usage of already existing WHO guidelines were presented to the international experts.

In the second part of the meeting participants presented their viewpoints on the guidelines development and put forward key questions that need to be addressed by the guidelines and need to be taken into consideration in the development process. At the end of the day all meeting participants agreed and committed to next steps.

The first part of the meeting was chaired by Philippa Howden-Chapman, director of the New Zealand Centre for Sustainable Cities and He Kainga Oranga/Housing and Health Research Programme, while the second part of the meeting was chaired by Emmanuel Briand, representative of the French Ministry of Health.

WHO Guidelines – from theory to practice

Presentations and Speakers

WHO guidelines: Their role, use and criteria for identifying expertise and knowledge
Regina Kulier, WHO Guideline Review Committee

Existing science-based health guidance (WHO guidelines on water, air, noise etc.) and criteria that can be applied for housing and health
Matthias Braubach, WHO EURO

The session began with Regina Kulier, who described the scope of WHO guidelines as well as the different types of guidelines that WHO produces. Emphasis was put on the very detailed planning and review process that makes the WHO guidelines a very solid tool for public health.

Matthias Braubach discussed the existing WHO science-based health guidance and criteria that can be applied for housing and health. He drew examples from already existing guidelines (e.g. indoor air quality guidelines) and described the impact that these guidelines have had in the scientific and policy community.

Work in plenary - Summary of discussions

All participants underlined the need to develop housing and health guidelines to address the current gap in international available information on the health issues in housing which should be authoritative. WHO housing and health guidelines were seen as an opportunity to prevent disease and promote health through the integration of health parameters in housing standards and through better awareness of individual home owner/user and other stakeholders (constructors, real state investors, insurances etc.).
Participants also underlined that in reference to the discussion held in the previous two meeting days on the health effects of housing mitigation measures in regard to climate change, the development of housing and health guidelines would support a better inclusion of health elements into green building codes and guidelines. WHO is seen as the global international agency that should lead this process in cooperation with all other relevant international organizations.

The unanimous voice of all participants to call for the development of WHO housing and health guidelines was summarized in an official note to be posted on the WHO PHE website. The text, as follows, can also be viewed under: http://www.who.int/hia/housing/en/index.html

‘Healthy housing’ - Experts call for international guidelines

International guidance on “healthy housing” should be developed to help prevent a wide range of diseases and unintentional injuries that can be effectively addressed through better housing. This was a key message emerging from an international consultation of 40 experts from 18 countries hosted by WHO in Geneva 13-15 October, 2010. The scientific evidence on the many links between housing and health has grown substantially in recent decades. This evidence can be used to guide “primary preventive” measures related to housing construction, renovation, use and maintenance, which can promote better overall health, said Dr Maria Neira, Director of WHO’s Department of Public Health and Environment, which is overseeing the initiative. “Housing improvements are accelerating for many reasons – to conserve energy in the face of climate change, address needs of a rapidly urbanizing global population, prevention of homelessness and slum growth, and other factors,” the participants said in a closing statement.

“There is a clear need and opportunity for governments and others to promote health in the course of making investments in housing. International guidance on healthy housing – targeting construction experts, architects and engineers as well as housing agencies and local authorities – would enable action that is scientifically-based, and protects and advances public health. Examples of key housing-related health risks include: respiratory and cardiovascular diseases from indoor air pollution; illness and deaths from temperature extremes; communicable diseases spread because of poor living conditions, and risks of home injuries. WHO estimates that nearly 2 million people in developing countries die from indoor air pollution caused by the burning of biomass and coal in leaky and inefficient household stoves. Inadequate ventilation is also associated with a higher risk of airborne infectious disease transmission, including tuberculosis, as well as the accumulation of indoor pollutants and dampness, which are factors in the development of allergies and asthma. Poor housing quality and design also can exacerbate the health impacts from exposure to temperature extremes, which are occurring more frequently due to climate change. During the course of the meeting, experts from both developing and developed countries assessed evidence about such risks, as well as needs and priorities in the context of guideline development. “This is an economic sector where major opportunities exist to promote primary prevention of diseases along with more resilient and energy-efficient housing,” participants said. “Most of the world’s population growth over the next 20 years will occur in low and middle income cities; nearly 40 percent of urban growth today is in unhealthy slum housing. Additionally, many countries have initiated programmes to modify their existing housing stock to make homes more energy
efficient and more resilient in the face of climate change.” Global guidance can help identify healthy choices in construction, rehabilitation, building and urban design, and ventilation measures. Construction workers also require protection from occupational health and safety hazards. And finally, home occupants need to know how to use their homes in a healthy manner, for instance, ventilating appropriately, particularly when homes are made more weather tight to save energy. The guidelines would be global in nature. They respond to requests from a number of member states as well as to recommendations by ministers of health and environment in diverse WHO regions. For example, Ministers at the Fifth European Ministerial Conference on Environment and Health, 10-12 March, 2010, agreed to step up actions related to unsafe homes and neighbourhoods, particularly environmental health risks affecting children. They also called for an increased focus on non-communicable diseases through policies in urban planning, health equity and environmental justice in housing. Interest in healthy housing is also high in other regions. The First Interministerial Conference on Health and Environment in Africa in Libreville, Gabon in 2008 called for greater intersectoral cooperation on “access to safe drinking water, hygiene and sanitation...and inadequate and poorly constructed road infrastructure, housing and waste management systems.” A Second Interministerial Conference on Health and Environment took place 23-26 November 2010 in Luanda, Angola. Experts at the October meeting in Geneva represented countries from all WHO regions, as well as international agencies such as UN-HABITAT, the United Nations Environment Programme (UNEP), International Labour Organization (ILO) and the United Nations Economic Commission for Europe (UNECE). The group drew up a "road map" for moving ahead on the development of guidelines, based on a systematic review of available evidence on measures that explicitly protect and advance the public health. Along with synthesizing new evidence, healthy housing guidelines would build upon existing WHO guidelines and expertise. WHO’s guidelines development process is anchored around systematic and transparent review of scientific evidence. As a next step in the process, the expert housing group will identify a set of "key questions" that could be then explored through such systematic review. Findings would then be peer reviewed, formulated as guidance, and then subject to examination by WHO’s Guidelines Review Committee.

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Experts participating in the international consultation: The societies and bodies represented at the meeting included the following: Ministry of Health, Brazil; National Engineering Research Center for Human Settlements, China; National Institute of Hygiene, Cuba; National Institute for Health and Welfare, Finland; Ministry of Health, France; WHO Collaborating Centre for Housing and Health Stuttgart, Germany; The Energy and Resources Institute, India Habitat Centre, India; Medical Department Kyoto University, Japan; Faculty of Architecture and Design, Jordan University of Science and Technology, Jordan; Centre for Sustainable Cities and He Kainga Oranga/Housing and Health Research Programme, New Zealand; Medical Research Council, South Africa; Ministry of Health, Portugal; London School of Hygiene & Tropical Medicine, UK; WHO Collaborating Centre
Priorities for the development of HWO housing and health guidelines

The discussions on the housing and health guidelines raised several important points that need to be taken into consideration in the development process of the guidelines. The main points mentioned by the international experts are summarized as follows:

- The guidelines need to set a baseline condition for different housing and health conditions, as the housing situation can be very different in the different parts of the world;
- There is the need to address the different geographical locations;
- The target audience of the guidelines needs to be well defined;
- Guidelines need to differentiate between new and existing buildings;
- They should also provide a definition of housing and dwelling that sufficiently covers the regional variations;
- They need to be financially implementable and their benefits must be clear;
- Guidelines need to focus also on how to reach the targets set and not only on the targets to be reached;
- Guidelines need to address different actors involved in the construction value chain (architect / builders / installer / user);
- The development of the guidelines need to be done in cooperation with all sectors relevant to housing and stakeholders need to be involved at an early stage;
- Other sectors should not only be involved in the development but also in the dissemination of the guidelines;
- Lower income sector housing needs to be included;
- WHO guidelines are an opportunity to add to existing international and national healthy housing standards;
- There is the need to have a mixture of quantitative and qualitative recommendations. The guidelines needs to set minimum standards for some key housing relevant threats (e.g., asbestos) and elaborate on more qualitative guidelines for other housing and health areas;
- One key question to be addressed during the development of the guidelines is whether they should set targets that are achievable in the near term or use ideal values;
- The guidelines should take stock of already existing WHO and international guidelines relevant to housing and health.

Roadmap for the development, testing, review and dissemination of the guidelines

Based on the priorities defined by the plenary working session the following steps were
recommended by the working group and endorsed by all experts present:

- Fundraising
- Communication on the guidelines
- Preparation of the first meeting of the guidelines development process, in spring 2011

The participants identified several possible communication tools that could be developed and used in order to promote the guidelines and to support the fundraising process:

- Create a WHO housing and health website
- Write a common editorial in a relevant public health journal (e.g. WHO Bulletin)
- Write a common article in a relevant public health journal
- Use climate change (e.g. COP 16 in Cancun) as an opportunity to strengthen the role of housing on health
- Letter prepared by WHO on funding request and accompanied by a workplan to be used by meeting participants to fundraise with their national governments and/or relevant institutions
- Use planned international events on housing and health (e.g. National healthy homes conference in Denver, 20-23 June 2011) to organize back to back meetings for the guidelines development

The following timeline for the preparation and implementation of the WHO housing and health guidelines was discussed and endorsed by the participants:

- Subject to funding, the development of the Housing and health guidelines is expected to start in early 2011. The necessary timeframe is a minimum of 2 years.
- A first scoping meeting of the guidelines should be held in late spring 2011. The representative of the French Ministry of Health underlined the commitment of the French Ministry to support the guideline development process and would explore support for one meeting for the guidelines development to be sponsored by the French Ministry of Health.
- In preparation of the first meeting, several working groups focusing on key health risks from housing could be established under the coordination of WHO. Through a virtual web meeting, e-mail communication and electronic collaboration sites, these working groups, led by the different chairs of the meeting, could prepare the first scoping meeting and formulate first key questions to be addressed by the guidelines.
- Participants agreed to explore with their national governments and other possible sources the possibility for additional fundraising for the project.
- WHO to post a commonly endorsed statement on the need to develop housing and health guidelines on the WHO web.
- WHO to organize an electronic collaboration site.

Closure of the meeting
The meeting was closed by Carlos Dora. On behalf of the WHO Department of Public Health and Environment he thanked all participants for their enthusiastic collaboration. Special thanks were expressed to the French Ministry of Health who supported the organization of the workshop. He concluded that the meeting showed that there is a wide agreement that this is the right time to develop global housing and health guidelines.
Annex 1: List of participants

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Annex 2: Programme

International Workshop on Housing, Health and Climate Change

Developing guidance for health protection in the built environment
Mitigation and adaptation responses

13 - 15 October 2010, WHO HQ Geneva, Switzerland

Meeting Room Salle G

DRAFT MEETING AGENDA

Wednesday 13 October

09:00 -09:15 Introduction of participants, chair election and adoption of the agenda
– Carlos Dora, Coordinator IHE, WHO

Chair: He Jianqing, China

09:15 -09:45 Background to the workshop - Carlos Dora, Coordinator IHE, WHO
• Aims, objectives, expected results -

09:45 – 10:30 Overview of housing and health issues as they connect to climate change mitigation and adaptation measures
• Key questions and relevant experience

10:30 -11:00 Coffee break

11:00 – 11:45 Policies and measures listed in the IPCC reports regarding mitigation in housing and the built environment – Nathalie Röbbel, IHE, WHO

11:45 - 12:30 Roundtable discussion: How the work of other international agencies connect to housing and health issues (ILO, UNHABITAT, UNECE, UNEP)

12:30 -14:00 Lunch break

Chair: Hina Zia, India
14:00 - 15:30  Main programs and initiatives to improve the built environment to mitigate and adapt to climate change, at national/regional/global levels – David Ormandy, Institute of Health, UK
• Example of measures being planned/implemented

15:30 - 16:00  Break

16:00 - 17:30  Existing guidance and building codes, from government, industry and civil society organizations, that may have relevance for health - Rebecca Morely, NCHH

17:30 - 18:00  Wrap up /overview of the day

Reception
Thursday 14 October

Chair: David Jacobs, USA

8:45 – 9:00  Welcome - Maria Neira - Director PHE, WHO

9:00 – 10:30  Group discussion
Gap analysis - identification of areas where health issues are not yet considered by the building stakeholders but would provide added value to the proposed building improvements

10:30 -11:00  Coffee break

11:00 - 13:00  Strengthen health protection in the built environment improvements about to take place to mitigate and adapt to climate change

Parallel working groups
A) Recommendations by geographical areas (Chair: Nisha Naicker, South Africa)

B) Recommendations by stages of the life cycle of buildings (planning, construction, use, demolition/recycling) (Chair: Amer Hussein Al-Hammady, United Arab Emirates)

13:00 - 14:00  Lunch break

Chair: Paul Wilkinson, UK

14:00 - 15:30  Roundtable discussion: Discussion and agreement on recommendations about areas of public health that can be protected and promoted through the building improvements that respond to climate change

15:30 - 16:00  Break

16:00 - 16:30  Roundtable discussion: Mechanisms whereby the proposed health promotion and protection can be achieved
• Discussion of matrix summarizing– governance, mechanisms, actors

16:30 - 17:00  Roadmap to promote and disseminate the above measures, and monitor the uptake of those recommendations

17:00 - 17:30  Closing remarks: what we can recommend today on the basis of the existing knowledge - Carlos Dora (WHO)
Friday 15 October  WHO housing and health guidelines

Chair: Philippa Howden-Chapman, NZ

09:00 -09:30  Opening of the meeting - – Carlos Dora, Coordinator IHE, WHO
Need and opportunity for WHO housing and health guidelines?
Key questions that needs to be addressed?
What are the steps to be followed for the guidelines development?

09:30 – 10:00  WHO guidelines
Their role, use and criteria for identifying expertise and knowledge –
Regina Kulier, GRC

10:00 – 10:30  Existing science-based health guidance (WHO guidelines on water,
air, noise etc.) and criteria that can be applied for housing and health –
Matthias Braubach, WHO EURO

10:30 – 11:00  Coffee break

11:00 – 11:30  Housing and health guidelines - key questions to be addressed -
Nathalie Röbbel, IHE, WHO
Which types of buildings you be covered by the guidelines?
What are the other options?
What format should the guidelines have?
How are the guidelines going to address regional variations, materials,
building styles, climates, and affordability?
How to take account of emergencies/ locations/ land use planning
issues?

11:30 -12:30  Roundtable discussion: Member states’ and stakeholders view on the
applicability of housing and health guidelines

12:30 – 13:30  Lunch break

13:30 – 15:00  Parallel working groups: setting priorities for the guidelines

15:00 - 15:30  Coffee break

Chair: Emmanuel Briand, France

15:30 – 17:00  Reporting back by the working groups and identification of priority
areas to be covered by the WHO housing and health guidelines

17:00 – 17:30  Group discussion: Roadmap for the development, testing, review and
dissemination of the guidelines

17:30 – 18:00  Closing remarks – Carlos Dora, Coordinator, IHE