SOCIAL DETERMINANTS OF HEALTH SECTORAL BRIEFING SERIES 1

HOUSING: SHARED INTERESTS IN HEALTH AND DEVELOPMENT

World Health Organization

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PREFACE

Public health is built on effective interventions in two broad domains: the biomedical domain that addresses diseases; and the social, economic and political domain that addresses the structural determinants of health. Effective health policy needs to tackle both domains. However, less rigorous and systematic attention has been paid to health issues in social, economic and political domains in recent decades.

Increasingly complex social, economic and political factors are affecting health and health policy-making. One area of complexity relates to health inequities. As emphasized by the WHO Commission on Social Determinants of Health, the social gradient in health is driven by policies in other sectors. Hence, looking at population well-being from the perspective of health and health equity rather than disease demands a new approach to intersectoral collaboration and an imperative to participate earlier in policy processes. Some of the new responsibilities for public health include:

- understanding the political agendas and administrative imperatives of other sectors;
- creating regular platforms for dialogue and problem solving with other sectors;
- working with other arms of government to achieve their goals and, in so doing, advancing health and well-being[1].

By providing information on other sectors' agendas and policy approaches, and their health impacts, and by illustrating areas for potential collaboration, the *Social Determinants of Health Sectoral Briefing Series* (the Series) aims to encourage more systematic dialogue and problem solving, and more collaboration with other areas of government.

Examples of intersectoral action for health – current and historical – reveal that health practitioners are frequently perceived as ignoring other sectors' goals and challenges. This creates barriers to intersectoral work, limiting its sustainability and expansion. In order to avoid this perception, instead of starting from the goals of the health system (e.g. health, health equity, responsiveness, fairness in financial contributions), the *Series* focuses on the goals of other sectors. Rather than concentrating on traditional public health interventions (e.g. treatment, prevention, protection), the *Series* uses the goals of other sectors to orient its analysis and explore areas of mutual interest.

The target audience for the *Series* is public health officers, who are not experts on determinants of health but who have responsibilities for dealing with a broad range of development issues and partners. Each briefing will focus on a specific policy area, summarizing and synthesizing knowledge from key informants from health and other areas, as well as from the literature. They will present arguments and highlight evidence of impacts and interventions, with special emphasis on health equity. They will make the case to health authorities for more proactive and systematic engagement with other sectors to ensure more responsive and cohesive government that will meet broader societal aspirations for health, equity and human development.

Dr. Rüdiger Krech
Director
Department of Ethics, Equity, Trade and Human Rights
World Health Organization

1 WHO and Government of South Australia. *Adelaide Statement on Health in All Policies.* Adelaide, 2010.

THE HOUSING SECTOR

Mutually reinforcing interests

Millions of people struggle every day with poor housing, overcrowding, lack of affordability, and lack basic services connected to their homes. Poor transportation services between areas of home and work, and for social activities, often create barriers to accessing employment and social opportunities. These issues present challenges to housing policy-makers and have implications for the health and well-being of populations. As stated in the Adelaide Statement on Health in All Policies, "well-designed, accessible housing and adequate services can successfully address fundamental determinants of health for disadvantaged individuals and communities".

For the housing sector, paying attention to the health impacts of its policies can yield huge benefits. Indeed, housing interventions that consider citizens' quality of life create better living conditions and improve housing policies' sustainability. For the health sector, improving determinants of health such as housing is key in reducing health-care costs. In England, poor housing, damp and mould, cold, overcrowding, fires, and domestic injuries as a result of falls on floors cost the National Health Service (NHS) up to £600 million a year (Braubach, Jacobs & Ormandy, 2011).

Global housing trends

The world is increasingly urban, thus changing the context of housing and settlements. For the first time, in 2008, more people lived in cities than in rural areas. Today, one billion people live in informal settlements ('slums'). In less than two decades it is expected that this number will double. However, many cities have poor or no planning systems to cope with the magnitude of urbanization. A similar trend affecting housing worldwide is the demand for and the increasing price of energy. Energy-efficient housing is a key mechanism to mitigate climate change but, from the health equity perspective, the acute challenge lies in the affordability of energy. As is often the case, the disadvantaged are most affected by the negative health impacts of housing conditions, which reinforce their vulnerability to ill-health.

Housing goals: more than shelter

Table 1 summarizes the objectives of government involvement in the housing sector, which are described in terms of eight policy goals. A core assumption of best practice in housing policy-making takes into consideration that housing is more than shelter. From this viewpoint, housing policies, therefore, need to embrace environmental, social and economic rights that allow dwellers to improve their quality of life (Bonnefoy, 2007). The housing goals selected in Table 1 reflect this breadth, and in so doing also cover issues that are dealt with at the local level as part of urban planning or transport. When considering housing determinants of health, health experts should consider the comprehensive character of housing, exploring opportunities for joint work at a variety of levels.

Table 1. A set of policy goals commonly addressed in the housing sector

	GOAL	DESCRIPTION
1	Sound construction: Dwellings provide adequate shelter from natural elements and hazardous substances.	Dwellings should be of sound construction, in a reasonable state of repair, weatherproof and adequately ventilated.
2	Safety and security: Housing ensures personal and household privacy, safety and security.	Housing should allow occupants to live without fear of intrusion, provide safety, and allow safe entry and exit.
3	Adequate size: Dwellings provide space appropriate to household size and composition.	Dwellings should have space for individual and common purposes within accepted crowding ratios, and allow separations between uses.
4	Basic services available: Reasonable levels of basic services are available at the dwelling.	Clean water, sanitation, waste disposal, access infrastructure and power should be available.
5	Affordability: Housing costs are reasonable and affordable.	Accommodation costs should be within accepted affordability limits to secure housing for all.
6	Accessibility: The location of the dwellings allows access to social services, services and space for activities of daily life, and economic opportunities.	Residential locations allow access to opportunities for education, purchasing or growing food, purchasing other necessities for daily living, recreation, and employment.
7	Tenure: Tenure arrangements ensure reasonable continuity of occupation.	Terms of occupation provide stability for individuals, households, communities and areas or neighbourhoods.
8	Protection from climate change: Dwellings protect occupants from climate change.	Dwellings should protect people from extreme weather events and contribute to the reduction of greenhouse gas emissions.

The historical perspective

Public decision-makers recognized the links between housing conditions and health during the early days of the Industrial Revolution and the emergence of public health as a discipline in most European cities. Since the 1850s, poorly constructed units, overcrowding, and lack of basic services have moved many local authorities to seek to improve housing conditions in many cities. In the late 1890s, several countries adopted 'tenement laws', which introduced the first housing codes and standards. This collaboration between sectors was demonstrated by the fact that "a vast number of these housing laws made health authorities the primary enforcers of housing codes. Counting on the professional expertise of health inspectors and visiting nurses, in cities like New York, London and Paris health departments were given the legal authority to inspect and enforce housing standards" (Lopez, 2009).

The concept, the reasons for intervention, and the nature of public action in the housing sector have evolved over time. Nowadays, adequate housing is considered a human right and is included in the 1948 Universal Declaration of Human Rights as well as subsequent human rights instruments. It is of such importance that the human right to adequate housing is recognized by all states of the world. The concept is not equated merely with having a roof over one's head, but as the right to live somewhere in security, peace and dignity. Thus, current public intervention in the housing sector is grounded in public health considerations and in human rights law.

The economic perspective

Housing is an engine for most economies. For example, in the United States in 2001, the Millennial Housing Commission reported how the residential housing stock represented more than one third of the country's tangible assets. Spending on utilities, furnishings, appliances and landscaping amounted to 7% of GDP (MHC, 2002). Equally important is how the provision of affordable housing specifically, stimulates employment and economic growth (Wardrup et al. 2011).

New housing developments also add to public revenues. In 2001 home building generated about US$65 billion in combined taxes and fees in the United States (MHC, 2002). Housing finance systems have the potential to impact greatly, either positively or negatively, on national economies. Although in the late 1990s housing finance regulations contributed to the recovery from a global recession (MHC, 2002), one of the lessons of the 2008 global financial crisis was that poorly regulated housing financial markets can inflict great damage on the housing sector, which ultimately impacts on households and their health status.

Stakeholders

The most important actor in the delivery of housing in the majority of countries is the private for-profit construction industry. This group comprises builders that often perform all the activities necessary to produce new units (e.g. land acquisition, design, finance, construction, and property management), and a myriad of smaller businesses that supply goods and services to the builders. Another important group is the architects who design and often implement new housing standards.

In most countries the housing sector represents a sizeable portion of the labour market. Although an important source of employment, jobs in construction are frequently characterized by more hazardous and precarious employment conditions – often affecting minority groups or other marginalized groups. Consumers make up an important group driving the sector. Consumers' purchasing power shapes the size of the housing market, its capacity and the way it diversifies in order to supply affordable housing for all socioeconomic groups. In many countries affordability and housing market diversification are critical factors that determine the emergence of informal housing markets, the growth of informal settlements and slums, and other related factors, such as the rise in informal builders and small-scale building enterprises. Other actors servicing consumers and housing markets are financial institutions and capital investors, mortgage lenders and insurance companies.

Government intervention. The societal importance of housing as a human right, as a key factor in national economies, as a source of income security for workers, and as a contributor to public health and well-being makes the case for government intervention. Often governments play a regulatory role in this sector for example by enacting zoning regulations, devising legislated housing standards, adopting measures to provide financial or tax incentives to promote affordable housing, or by regulating financial markets that impact on mortgage lending. In most countries government's role goes beyond regulatory measures and includes a subsidiary role to directly provide housing to groups commonly excluded from housing markets (e.g. social housing, provision of rental voucher schemes). Yet, differences are significant in that social housing can be 2–3% of the total stock and does not always provide for households that cannot afford market prices. Other government functions, usually assigned to local authorities, consist of urban planning and the execution of urban revitalization programmes or informal settlements upgrading. Regulatory standards monitoring is another area commonly assigned to local governments.

SCOPE AND LIMITATIONS

The bulk of the global burden of disease and the major causes of health inequities, which are found in all countries, arise from the conditions in which people are born, grow, live, work, and age. These conditions are referred to as *social determinants of health* - shorthand that encompasses the social, economic, political, cultural and environmental determinants of health. The most important determinants are those that produce stratification within a society - *structural* determinants - such as the distribution of income, discrimination (e.g., on the basis of gender, class, ethnicity, disability, or sexual orientation), and political and governance structures that reinforce inequalities in economic power. Discrepancies in social position arising from these mechanisms shape individual health status and outcomes through their impact on intermediary determinants such as material living conditions, psychosocial factors, and the health system itself.

Recognizing this spectrum, and given the nature of public policy challenges in housing, the Housing Briefing takes a national perspective, but makes reference to implementation at sub-national levels of government. While contexts and governmental structures differ across countries, many actions to address housing challenges at the local level also implicate urban planning and transport divisions. The scope of actions described specifically exclude, for reasons of space, global economic interests and the organization of labour in the construction industry.

GOAL 1. DWELLINGS PROVIDE ADEQUATE SHELTER FROM NATURAL ELEMENTS AND HAZARDOUS SUBSTANCES

DWELLINGS SHOULD BE OF SOUND CONSTRUCTION, IN A REASONABLE STATE OF REPAIR, WEATHERPROOF AND ADEQUATELY VENTILATED

Housing challenges and policy responses

Despite the fact that shelter is a basic human need, the housing sector is increasingly confronted with the reality of substandard dwellings. Such dwellings arise because they are poorly designed, constructed and maintained. In order to tackle this problem, governments commonly develop building standards to ensure people are provided with better quality shelters and are protected from cold and heat. These standards are often set out in legislated building codes. Housing authorities – frequently at the local level – are in the frontline when it comes to dealing with substandard dwellings and normally have the power to impose rent controls and public housing provisions, and to carry out regeneration and upgrading initiatives to improve urban areas.

A growing global problem is the growth of informal settlements, where buildings are usually constructed with unsuitable materials or to inadequate standards. In these circumstances, when implementing urban regeneration processes, many countries approve flexible building standards that are gradually improved over time. Another problem related to this goal is 'neighbourhood decline', which is often the result of underinvestment and the absence of economic opportunities, resulting in reduced physical standards associated with increasing poverty, reduced access to services, and negative impacts on social cohesion. Housing professionals often address these challenges by monitoring housing stock quality and needs, conducting stock condition surveys, and devising policy responses such as standards and inspections (see more in Goals 4–7).

Some health impacts and pathways

Indoor biological agents. Structural and plumbing deficiencies are a source of water intrusion and provide a way for rodents, cockroaches and other pests to gain entry into the home (NCHH, 2009). Excess moisture in the home often encourages the growth of mould and provides a favourable environment for dust mites, cockroaches, mice, rats and other pests. Dust mites are found in the pillows, mattresses, carpets, and upholstered furniture, where they feed on human skin scales, fungi and other organic material found in dust. A national survey in the United States found that over 80% of homes have detectable levels of dust mite allergen in the bedroom (NCHH, 2009). Heavy infestations of cockroaches create reservoirs of allergens in carpets, rugs, beds, and in difficult to reach areas around appliances and furniture.

Indoor chemical agents. Chemical agents are associated with neurotoxicity and developmental disorders, asthma and cancer. These include lead, pesticides, carbon monoxide, volatile organic compounds and radon. Structural deficiencies, faulty gas stoves or building materials that release toxic agents are factors that increase the presence of chemical agents.

Most carbon monoxide (CO) exposure occurs in the home (CDC, 2005) and in the form of indoor air pollution (IAP), which globally kills around 1.6 million people a year (see below on the equity impacts of IAP). Volatile organic compounds (VOCs) are chemical gases at normal temperature. Household items, for example furniture, carpets, paint, varnish, wax, disinfecting materials, cosmetics and degreasing products, can contain VOCs, which include toluene, styrene, xylene, benzene, trichloethylene, formaldehyde and other aldehydes. Elevated indoor concentrations of VOCs may trigger symptoms of 'sick building syndrome' (e.g. headaches, fatigue, and eye and upper respiratory irritation).

Formaldehyde is a component of some building materials, like particleboard and plywood adhesives, and may be found at high levels in many new buildings. At higher levels, the risk of cancer, and respiratory and other problems, is pronounced (NCHH, 2009). Asbestos, a construction material now banned in many countries, is still posing threats, especially in relation to the renovation and rehabilitation of old buildings. Radon gas is the leading cause of lung cancer among non-smokers overall with 21 000 deaths annually in the United States (EPA, 2003). A decay product of uranium, radon is colourless and odourless. It occurs in soil and rock, and moves through porous building foundations and water systems where groundwater is the main water supply.

SOCIAL DETERMINANTS AND EQUITY FOCUS

In the last few decades, progress in controlling chemical agents has been remarkable, yet inequities persist, making these agents in low-income families' homes a large source of exposures. Three billion people are exposed daily to indoor air pollution (IAP) with high concentrations of CO and other pollutants due to reliance on solid fuels (e.g. wood, coal) for cooking and heating. Indoor air pollution kills 1.6 million people a year and represents 2.7% of the global burden of disease (BOD) (WHO, 2009b). The problem affects low-income households. More than half of this mortality rate occurs in China and India (800 000 deaths). In 22 African countries, the IAP burden largely exceeds the average BOD (e.g. in Nigeria 3%, in Malawi 5.3%, in Togo 6.4% and in Burkina Faso 8.5%).

In high-income countries, chemicals affect the poor. There have been major reductions in lead usage in the United States with legislation banning its use in several products. Yet, lead is still a serious health risk for children as around 40% of dwellings (38 million) contain lead-based paint. Most of them are poorly maintained units in low-income neighbourhoods (NCHH, 2009). The negative impacts of pesticides are also of concern as they are concentrated in low-income neighbourhoods where pests (e.g. cockroaches, mice) are more prevalent (Berkowitz et al., 2003; Whyatt et al., 2003).

What can both sectors do together?

Technical standard setting. The wealth of evidence on the impacts of adequate shelter on health provides a sound basis for the involvement of the health sector in the preparation of housing standards. For example, WHO has worked with the International Organization for Standardization (ISO) and its member states on standards for building design, indoor air quality and energy efficiency. These standards need to be adapted so that they can be enacted and implemented in national legislation. Yet, research suggests that collaboration to review international standards and adapt them to national settings is limited. More systematic collaboration between housing and health authorities in standard-setting processes would be an opportunity to integrate health considerations into housing standard-setting processes. In order to support the implementation of such legislation, health experts could also contribute to the formulation of guidelines for professionals in the construction industry and carry out training activities for policy-makers and professionals.

Criteria for targets on the use of biological and chemical agents, and their implementation. Health experts can support housing authorities in defining criteria for targets and setting values for pollutants, and can work with them to integrate these criteria into current legislation and building codes for new construction. Amongst others, environmental authorities may also be interested in being involved in this work. The implementation of targets for standards on existing housing units may require gradual implementation to allow owners to upgrade dwellings over time. The health sector can support housing authorities in evaluating the options for phasing in minimum standards and work with Housing during public consultations to discuss why these changes are needed from a health perspective.

Contributing to proactive inspection processes. In many countries, housing authorities carry out building inspections to ensure compliance with housing standards. Here also, health experts can make a contribution by helping to improve housing and indoor environments. In New Zealand, housing authorities documented their positive experience of partnering with the health sector on inspection activities (Jackson et al., 2011). Field teams with staff from both sectors were able to identify sources of IAP, provide capacity building, increase awareness on health impacts, replace heaters and upgrade housing units. These actions increased the quality of dwellings and health determinants, and improved people's use of community health and other services.

Building materials and consumer-product emissions. Joint action can be adopted to prepare guidelines and undertake inspections to measure emissions from building materials and consumer products. Both sectors can work together on labelling practices to guarantee that products are risk-free for humans and pose minimal harm to the environment. Standards and labelling measures can also be developed to ensure proper maintenance and usage of cleaning materials. Other potential areas for standard setting include manufacturing and trading to ensure commercialization of low-polluting materials and products. In Canada, the authority for standardization works with both health and housing sectors in the design and adoption of product labeling.

Programmes to reduce indoor air pollution. Indoor air pollution is not only a health risk but also a factor that affects housing supply and habitability, as well as the environment. In China, coal burning for household heating and cooking is a major source of IAP. Health, housing and environmental authorities work together (along with local authorities and community groups) on programmes to reduce IAP by evaluating and promoting low-emission stoves according to their potential health and environmental impacts, and by promoting the development and use of clean, low-emission energy innovations. Furthermore, as part of these programmes, the health sector provides information on how to better manage stoves, and on healthy living (Zhang & Smith, 2011).

Further readings

WHO (2010b). WHO guidelines for indoor air quality: selected pollutants. Geneva, World Health Organization.

Useful links

A key focus of the *WHO European Office programme on housing and health* is the link between design and home accidents:
http://www.euro.who.int/en/what-we-do/health-topics/environment-and-health/Housing-and-health.

Web page of the *US Environment Protection Agency (EPA)* with resources, key facts and links to additional resources:
http://www.epa.gov/mold/moldresources.html.

GOAL 2. HOUSING ENSURES PERSONAL AND HOUSEHOLD PRIVACY, SAFETY AND SECURITY

HOUSING SHOULD ALLOW OCCUPANTS TO LIVE WITHOUT FEAR OF INTRUSION, PROVIDE SAFETY, AND ALLOW SAFE ENTRY AND EXIT

Housing challenges and policy responses

A home that provides privacy, peace, safety and security is a recognized human right. In broad terms, safety refers to the possible occurrence and prevention of injuries in or around a dwelling while security refers to dwellers' vulnerability to crime. This goal can be monitored by using indicators on property and/or personal crime rates, number and location of fires, and/or number of home injuries.

Common housing policies related to safety consist of the enactment of standards on the design and layout of dwellings and on fire. Implementation of these policies is often through local governments, who are in charge of building approval systems and inspection regimes (e.g. fire safety), and carrying out community awareness campaigns. In relation to security, housing ministries work with other ministries in charge of police to promote community involvement in crime prevention.

Some health impacts and pathways

Domestic injuries. Although fragmentary, global data show that unintentional domestic injuries (including falls, drowning, burns and poisoning) represent 3.9% of the global burden of disease. Domestic injuries caused 1.4 million deaths in 2000. Globally, almost 90% of these injuries (with the exception of falls) occur in homes in low- and middle-income countries. Groups at especially high risk are children, the elderly and people with disabilities. For example, in low- and middle-income countries in 2001, people aged 70 years and over accounted for 40% of domestic injuries from falls (WHO, 2009b).

Burns and children. In the case of children, burns are the main cause of injury-related deaths affecting those between one and four years of age in low- and middle-income countries. This is related to housing conditions. Only 29% of households in sub-Saharan Africa are electrified. For this reason, it is common in informal settlements for dwellers to store kerosene and flammable materials to be used in homemade stoves, substandard heating systems, or bottle lamps (WHO &UNICEF, 2008). Another source of increased risk are the dwellings themselves, which are commonly made of materials such as plastic, wood and cardboard, with poorly designed spaces and small living areas that increase exposure to heat sources (Seedat et al., 2009).

Violence in and around the home. Of the 59 million deaths that occurred in 2004 globally, homicide accounted for approximately 3.2 million deaths (WHO, 2009b). Homicide especially affects young men aged 16–24 years, who are involved in violence as victims or perpetrators. Worldwide, 250 000 homicides occur among youth each year. For each young person killed 20–40 more sustain injuries requiring hospital treatment (WHO, 2002). A survey of youths in Algeria found that demographic growth coupled with rising unemployment and inadequate housing led to frustration, anger and tensions among youths (Ludwig, Duncan & Hirschfield, 2001). As a result, young people are more likely to turn to petty crime and violence, particularly under the influence of their peers (WHO, 2002).

SOCIAL DETERMINANTS AND EQUITY FOCUS

Domestic injuries due to exposure to risks emanating directly from housing are among the most documented in the health literature. Most at risk are groups who spend the greatest time at home: the elderly, children, unemployed, sick or disabled people, and those that take care of homes.

At the neighbourhood level, the nature of the threat varies from setting to setting. A boy celebrating his 15th birthday in the Cape Town settlement of Nyanga, South Africa, has a greater than 1 in 20 chance of being shot dead by the age of 35. In the Banshbari slum of Dhaka, Bangladesh, politically and economically marginalized residents report not going out after nightfall due to security fears, and the targeting of women for abduction, rape and trafficking. In other settings, the threat may come from major arterial, high-speed traffic routes that cut such areas off from the rest of the urban area, or bisect entire neighbourhoods.

Housing inequities are also related to injury rehabilitation, with housing badly adapted to people living with disabilities, further disabling them in terms of day-to-day living.

Source: Blas & Sivasankara (2010).

What can both sectors do together?

Adequate housing designs. Important topics in this area are issues related to injury prevention, accessibility and mobility. The Convention on the Rights of Persons with Disabilities (UN, 2007) outlines the civil, cultural, political, and social and economic rights of people with disabilities. So far, 140 countries have agreed to protect and ensure the equal enjoyment of the human rights of people with disabilities. The treaty underpins WHO's disability work, promoting and supporting the adoption of national strategies and action plans for disability and rehabilitation that gives health and housing sectors an opportunity to collaborate with other sectors to address the needs of people with disabilities. Only half of the countries around the world have accessibility criteria in their building standards, as reported by the Special Rapporteur on Disability to the United Nations (OHCHR, 2008). Some countries have well-developed technical specifications on accessibility, others are still introducing accessibility into their building codes.

In some countries, for example Canada, health and housing authorities participate and provide technical information and assess options during the process of adoption of standards related to the design of dwellings to ensure safety and accessibility (e.g. housing layouts, storage areas, hallways and doors, stairs, living areas, bedrooms, bathrooms, kitchens and gardens) (OHCHR, 2008). In other countries, for example in Sweden, health and housing sectors have incorporated 'design for all' principles as a framework for making products and the building environment universally usable, and ensuring the needs of groups that may not be able to use them to the fullest extent are taken into consideration. This concept not only covers people with disabilities but also other groups such as elderly people, pregnant women and children. The goal is to remove the physical barriers and create inclusive environments.

Anticipating and preventing risks from hazards in the household. The health sector can contribute to this goal by *anticipating* the risks for vulnerable groups such as children, older people, or people with disabilities. It can also assist in controlling hazards by helping to develop and implement regulations on the sale of unsafe products and their storage (e.g. kerosene, cleaning products). Other preventive activities include actions to promote the separation of people from hazards (e.g. by fitting window bars and fencing pools) or to modify *the qualities* of the hazard (by enacting rules on playgrounds and related equipment). In addition, both sectors can work together to improve the safety of home environments with regard to hazardous substances by proposing or enacting legislation for hot water temperature or mandatory child-resistant containers (WHO, 2002b; WHO & UNICEF, 2008).

Joint engagement of communities in intersectoral activities. Engagement of communities is essential in ensuring the appropriateness and sustainability of interventions. For example, in the Safe Block project, based in an inner-city community in Philadelphia, in the United States, the city government sponsored a network of community volunteers, who identified the need to work with both health and housing authorities to introduce simple modifications to homes to prevent injuries, and implemented capacity building interventions on injury prevention. Modified homes performed significantly better than control homes by keeping medications out of children's reach, by having fire escape plans, by not having frayed electrical cords, and by not having tripping hazards in living rooms and hallways (WHO, 2002b).

Crime prevention through environmental design (CPTED). This type of approach adopted by urban planners aims to reduce the risk of crime by planning physical environments in a way that enhances openness and promotes social interaction. Commonly, CPTED is accompanied by social services (e.g. schools, and health and community centres). Applying CPTED principles, Brazilian health and housing authorities of the Government of the State of Minas Gerais worked together with local governments in the 'Stay Alive' programme that integrated police action, CPTED interventions and community, social and health programmes into violent slum areas. With the participation of health staff, the programme provides youths with social support, and education and sports opportunities. It also offers workshops on violence, drug prevention, sexually transmitted diseases and job training. A key component of the programme is a community forum that meets to discuss issues such as unemployment, education and housing conditions. The programme achieved a 40% drop in homicides in the first 12 months in 2004 and subsequent evaluations have shown similar positive results (WHO, 2010a).

Housing and urban planning for violence reduction. Existing housing strategies for development, regeneration or upgrading of urban areas are also opportunities for the health sector to engage with housing authorities. Local authorities commonly implement 'broken windows' initiatives to prevent urban physical degradation that can encourage minor delinquency and further abandonment of public spaces. These initiatives require actions to clean up physical environments, promote their maintenance, and provide counseling to minor offenders and victims. These actions require work that draws on the relative competencies and knowledge of health and housing authorities, as well as those of environmental authorities. Frequently the processes call for citizens' forums, which require the participation of governmental health and housing authorities and other health providers.

Further readings

WHO (2002a). *World health report 2002 - Reducing Risks, Promoting Healthy Life.* Geneva, World Health Organization.
WHO-EURO (2007a). *Large analysis and review of European housing and health status (LARES)*. Copenhagen, World Health Organization Regional Office for Europe.
WHO, World Bank (2011). *World report on disability.* Geneva, World Health Organization.

Useful links

Design for all Europe. The network was originally formed around the theme of using design to support inclusion of disabled people in European societies, but has translated its work into a more mainstream approach of enhancing the quality of life for all: http://www.designforalleurope.org/About-EIDD/.

WHO's Violence and Injury Prevention programme web site offers a wide range of information on safety and injuries in the home and for vulnerable groups: http://www.who.int/violence_injury_prevention/child/en/ and http://www.who.int/violence_injury_prevention/other_injury/en/.

GOAL 3. DWELLINGS PROVIDE SPACE APPROPRIATE TO HOUSEHOLD SIZE AND COMPOSITION

DWELLINGS SHOULD HAVE SPACE FOR INDIVIDUAL AND COMMON PURPOSES WITHIN ACCEPTED CROWDING RATIOS, ALLOWING SEPARATIONS BETWEEN USES

Housing challenges and policy responses

A common characteristic of the rapid growth in many urban communities is the increase in the number of people occupying a dwelling. In many countries, the housing sector addresses this problem by adopting crowding standards to regulate the number of people that can live in a dwelling.

Yet, crowding is not a uniform concept. In some countries, standards are set considering objective parameters linked to the concept of density. In these cases, standards are set in terms of, for example, the number of occupants who can live in a dwelling with reasonable space for each one (commonly 'number of people per room' or 'number of people per square metre'). In other jurisdictions, the concept of crowding incorporates more subjective considerations and includes the number of people per room, the use of a room, the sex or age of those occupying a room or the relationship between occupants (e.g. single people, couples).

At the population level, indicators such as crowding ratios by income or ethnic group are increasingly adopted to explore the differential impacts of overcrowding across vulnerable groups. Minimum occupancy standards are often adopted to address these challenges. A range of interventions can be used to address overcrowding, including incentives for property upgrades, family relocations and, in some cases, rent controls.

Some health impacts and pathways

Housing space is a core component of quality of life. It also has a key impact on the spread to disease and on mental health, and is a contributing factor of other determinants of health, well-being and the economy, such as educational attainment.

Increased risk of infectious disease transmission. Evidence from WHO shows that high occupancy rates increase the risk of transmission of some diseases, for example bronchitis, tuberculosis, pneumonia and gastrointestinal infections, owing to the close proximity of people living together. Moreover, the shared use of hygiene facilities is linked to an increased risk of exposure to pathogens. Individuals sleeping in close proximity to one another are more exposed to airborne infections (e.g. meningitis, rheumatic fever, influenza, cold, measles and pertussis) (WHO-EURO, 2007b). Inadequate separation between living quarters and livestock pens is increasingly linked to the emergence and transmission of recent outbreaks of previously unknown infectious diseases such as H1N1 and H5N1.

Mental health. Several reviews document how overcrowding and lack of space increase a sense of loss of control, which adds to stress and depression. Studies show that this leads to low levels of social tolerance and increased risk of aggression and injuries (WHO, 1989).

Health impacts on children. Among all affected groups, the most vulnerable are children. Moreover, a systematic review of international literature undertaken in the United Kingdom documented that crowding increases child mortality, respiratory conditions, meningitis, tuberculosis, and chronic diseases in adulthood such as heart disease and respiratory conditions. Due to the lack of space and sharing of rooms with different functions, people in crowded households often have difficulties in concentrating on specific tasks and stress situations occur more easily. Overcrowding is associated with limited educational attainment, increased domestic injuries and child maltreatment. Limited educational attainment in turn is a major driver of health inequities over the life course and intergenerationally (Office of the UK Deputy Prime Minister, 2004; CSDH 2008).

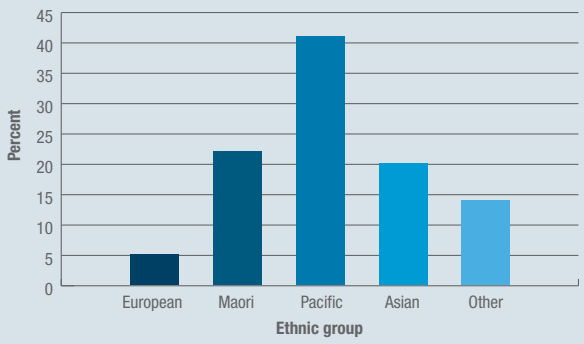
Low occupancy as a source of health risks. The opposite problem was also documented, namely that in single occupancy households and those occupied by the elderly, health problems increased, (e.g. mental issues related to isolation, loss of a social network, and lack of motivation to interact socially). Elderly people in these types of households often become fragile and are in increased need of support. When they become sick or get injured at home, isolation prevents access to health care.

SOCIAL DETERMINANTS AND EQUITY FOCUS

At the population level, the various pathways described earlier show that overcrowding is strongly associated with health inequities as observed between ethnic groups in Australia and New Zealand. A study in Australia found that overcrowding explained almost one third of the health gap between remote indigenous populations and non-remote populations (Booth and Carroll, 2005).

In New Zealand, as described in Figure 1, overcrowding is much higher among ethnic minorities, a finding that is replicated for groups with lower status elsewhere (Government of New Zealand, 2010).

Figure 1. Proportion of the population living in dwellings requiring at least one more bedroom, by ethnic group, New Zealand, 2006.



Source: adapted from Government of New Zealand (2010).

What can both sectors do together?

The planning of housing initiatives. Initiatives to provide access to housing are an opportunity for the health sector to contribute to the goal of the housing sector to reduce overcrowding. They also allow the health sector to attain its goal to promote health and health equity. New housing initiatives abound (e.g. Egypt's National Housing Program launched in 2005 to build 85 000 housing units per year or Brazil's My Home, My Life programme aiming to provide two million low-cost housing units by 2015) and will continue to grow as governments try to address the pressures of rapid urbanization. Given the housing-health links explained above, these initiatives call for a more active involvement of the health sector. The inception of these programmes requires several regulatory measures to facilitate the expansion of the housing stock, including new building codes and affordable housing design. The health sector can contribute to both these measures (as described for Goal 2), thereby helping housing decision-makers to ensure that potential health impacts are fully considered.

Defining adequate occupancy and crowding ratios. A key first step in developing building codes for new housing initiatives is the establishment or revision of standards for occupancy and crowding. Occupancy ratios establish the number of people that can share a bedroom based on criteria such as age (e.g. children or adults), sex (e.g. male, female, boys or girls) and interrelationships of household members (e.g. single people or couples). Commonly, in the definition of occupancy standards, several factors associated with living and housing conditions are taken into consideration. Health can contribute to setting these standards and, with evidence, can support housing authorities in setting occupancy standards or periodically reviewing them. An important issue confronting housing practitioners is that the acceptance of occupancy and crowding standards is related to social norms. An occupancy ratio may not comprehensively reflect concepts and cultural values in all population groups. Health sector authorities are ideally placed to work with communities, both to explore their preferences and to analyse the potential health impacts of specific options being considered (Lauster & Tester, 2010).

Physical changes to existing dwellings. In supporting households to implement new housing standards, both sectors can promote and assist them in the improvement of dwellings. In New Zealand, for example, the National Housing Corporation currently works with the health authorities to assist households to reduce overcrowding. They facilitate infrastructure changes and increase access to health and social services. Infrastructure changes include housing renovations, additions or house improvements (e.g. insulation or ventilation), as well as transfer to new homes. The programme also identifies other issues affecting well-being and refers dwellers to health and social services. A team of housing and health professionals applies a risk assessment when visiting participating families. The 2010 evaluation of the programme showed improvements in tenants' satisfaction with housing, increased health awareness, increased visits to primary health-care providers, and reduced acute hospitalization rates (Jackson et al, 2011).

An important lesson from this example and from a recent evaluation of several programmes implemented under the Australian National Aboriginal Health Strategy (NAHS) since 2004, is that housing programmes that only focus on achieving good infrastructure standards appear to fail to reduce crowding. A broader approach that includes access to health services, community participation, and collaboration with health and social services appears to improve the impact of infrastructure interventions.

Assisting local authorities in implementing relocation initiatives. The health sector can evaluate the potential impact of initiatives that relocate families in order to address overcrowding problems. Evaluations need to consider health equity impacts in terms of access to services as well as in terms of impacts on health determinants. During the implementation of these programmes, it is essential for primary health-care providers to assist in the integration of relocated families into new neighbourhoods and to be alert to any emerging health needs (including mental health).

Further readings

Department for Communities and Local Government (2009). *Survey of English housing preliminary report: 2007-08.* London (Housing Statistics Summary, No. 28).

WHO-EURO (2009a). *Social inequalities and their influence on housing risk factors and health.* A data report based on the WHO LARES database. Copenhagen, World Health Organization Regional Office for Europe.

WHO-EURO (2009b). *Environment and health risks: a review of the influence and effects of social inequalities.* Copenhagen, World Health Organization Regional Office for Europe.

Housing in Canada Online (HiCO) [online database]. This database provides an interesting example of the power of housing sector information to help to identify at risk households. The database profiles housing conditions in Canada by Aboriginal status, household type, tenure and age group, indicating if a dwelling meets housing standards: http://cmhc.beyond2020.com/HiCOStarting_EN.html.

Useful links

Statistics Finland provides an overview of key concepts and definitions related to housing statistics: http://stat.fi/til/asu/kas_en.html.

GOAL 4. REASONABLE LEVELS OF BASIC SERVICES ARE AVAILABLE AT THE DWELLING

CLEAN WATER, SANITATION, WASTE DISPOSAL, ACCESS INFRASTRUCTURE AND POWER SHOULD BE AVAILABLE TO THE DWELLING

Housing challenges and policy responses

An agglomeration of housing creates urban communities for which a range of services is required in order that people and households cohabit safely and peacefully. To achieve adequate urban conditions, the provision of housing needs to be aligned with access to basic services and infrastructure such as:

- supply of safe drinking water;
- adequate sanitation and waste management;
- sustainable and affordable energy supply;
- provision and maintenance of infrastructure, roads, streets.

Housing professionals pursue these aims largely through regulatory systems enshrined in construction codes, and in land use and town planning regulations. Associated standards and monitoring systems are included in city and regional planning regimes. Interventions to achieve these goals include the supply of public infrastructure, maintenance of civic facilities, and the provision of basic infrastructure and public spaces.

As urban areas grow and change, the challenges for professionals range from the management of new communities to the regeneration of existing communities and upgrading of slum conditions.

Some health impacts and pathways

Clean water. The positive health impacts of access to basic services are widely documented. Clean water is critical for personal and food hygiene. An improved drinking-water source (that protects the source from contamination, in particular from fecal matter) prevents infectious diseases caused by microorganisms (e.g. shigellae, salmonellae, *Escherichia coli*, and protozoal and helminthic parasites), which are linked to the spread of gastrointestinal diseases that affect low- and middle-income countries (diarrhoea, cholera, etc.) (WHO, 1989).

Despite the fact that progress in providing access to improved water sources is remarkable (currently 5.9 billion people or 87% of the world's population have access to a water source), lack of access is still a major problem, which is linked to the four billion diarrhoea cases that occur globally each year. In 2007 there were 2.1 million diarrhoea-related deaths, most of them children (WHO, 2007). Lack of such access varies regionally. In sub-Saharan Africa, just 55% of the total population can access an improved water source. The impacts of a lack of access to water on vulnerable groups are a source of great concern, as 80% of deaths from diarrhoea are children under the age of four living in sub-Saharan Africa and South-East Asia.

Legionellosis is an infectious disease caused by the *Legionella bacteria*. Infection usually occurs when inhaling fine airborne particles with the bacteria that originate from infected water sources. This can occur in poorly ventilated areas. Documented sources of contaminated water include cooling water systems and central air-conditioning systems, evaporative coolers, hot water systems, showers, architectural fountains, or air humidifiers. The disease is particularly associated with hotels, fountains, or hospitals with old, poorly maintained pipework and cooling systems.

Sanitation. Access to improved sanitation is also a major health concern. It is proven that the disposal of excreta effectively reduces fecal-oral transmission of infectious diseases and the breeding of disease vectors. However, current statistics show that almost 2.6 billion people (39% of the world's population), the vast majority of whom live in Asia and sub-Saharan Africa, have no access to improved sanitation.

Waste disposal. Inadequate waste disposal practices and services provide food and nesting opportunities to insect and rodent vectors. Discarded waste and toxic substances increase the risk of fatal accidents, poisonings, suffocation, cuts and other injuries. These hazards increase with urbanization and are exacerbated by inadequate housing conditions (WHO, 1989). Although high-income countries have well-organized waste disposal services, in many low-income countries these services are constrained.

Energy supply. A sizeable share of the world's population still lacks access to modern energy services. Indeed, 1.5 billion people, 70% of whom live in sub-Saharan Africa, live without access to electricity. This has implications for thermal comfort in homes, the fuel sources used, ventilation in the home, and related health impacts (see Goal 1).

Infrastructure. The type of roads and streets permitting access to and from the dwelling impacts on health through various pathways. Major pathways include injuries (see Goal 2), pollution from traffic (road-based airborne emissions), and the extent of daily movement that the access facilitates (see Goal 6). Pollution and reduced daily movement are associated with the prevalence of chronic diseases (see Goal 6).

What can both sectors do together?

Contributing to the preparation of master plans. Master plans are tools prepared for urban planning with an overall view of the configuration of an urban area including buildings, housing units, traffic, public services, public infrastructure and land use. Adequate urban planning always

needs to consider the citizens' needs for supplies of daily goods and resources (water, food, energy, transport, etc.) and their disposal (water disposal, and sewage and waste disposal).

Given the relevance of health in urban planning and neighbourhood conditions, health authorities should seek an active role and provide inputs into urban design and implementation. They can set up mechanisms to ensure that dedicated and skilled health staff provide evidence, and support local and regional housing authorities when formulating and implementing master plans. They can provide evidence on the impacts of planning options using Health Impact Assessments (HIAs). A HIA of a county's General Plan (a type of master plan), conducted in the United States, was finalized in 2010 in Humboldt County, California (population: 150 000). The plan considered different scenarios to accommodate population growth, ranging from infrastructure in core urban areas to the expansion of cities. The Public Health Branch was tasked with leading a team that included the county's planning and housing authorities, and community actors and researchers. All partners participated in the adoption of recommendations. Health and housing staff collected evidence, worked with communities and contributed to the development of a set of indicators to assess health and social impacts. Based on the assessment's findings, the General Plan focused on future growth in urban core areas (Harris, 2009).

Assessments of housing and basic services needs. Commonly, housing and local authorities are mandated to undertake regular assessments of housing needs, the availability of services and infrastructure. Public health authorities can contribute to assessing the availability of health services and outreach programmes. They can also assess needs in terms of services and infrastructure for healthy living, such as the quality of road networks, the safety of bike paths (by measuring road accidents) and open spaces, and the quality of basic services, such as water and waste management.

Health authorities can also work with housing authorities on the health aspects of plumbing to ensure the availability of safe drinking water and basic sanitation facilities. Technical work has been advanced by WHO proposing processes for the design, installation and maintenance of plumbing systems, including installation specifications, the microbiological, chemical, physical and financial risks of plumbing, and risk management approaches to achieve the best possible plumbing levels and the highest health benefits (WHO and World Plumbing Council, 2006). More specifically, health can support housing authorities in sharing information and implementing actions related to: the basic principles of safe drinking-water supply; the hazards in drinking-water supply and waste management; water safety plans in the operation and management of water systems; the principles of effective plumbing systems; codes of practice for plumbing; the formulation of standards for materials used in plumbing systems; the design of plumbing systems; water drainage; the conservation of water in public and domestic supply systems; and wastewater use (WHO and World Plumbing Council, 2006).

Wastewater infrastructure in many growing cities in low-income countries does not meet local conditions, and is poorly maintained and unable to keep pace with rising populations. Comprehensive integrated water and wastewater planning and management are being promoted as a key implementation strategy to ensure healthy outcomes. Health and housing authorities can work together in urban planning, applying basic principles to the management of wastewaters, risk controls and safety plans, and wastewater use (Corcoran et al., 2010).

Facilitating community voice in master plans. As mentioned earlier, many studies show how housing and health interventions achieve sustained results whenever the involvement of beneficiaries and communities is sought in the formulation and implementation of interventions. A key action by health authorities, which forms part of the primary health-care approach, is the engagement of communities at the local level to understand their health concerns. Community health centres and primary health-care workers are well placed to facilitate this engagement. In countries such as Costa Rica, community health workers regularly work with local actors and identify problems and needs affecting communities, including key basic services and infrastructure needs.

Further readings

Cunliffe D et al., eds. (2011). *Water safety in buildings.* Geneva, World Health Organization.
WHO (2009c). *Water safety plan manual (WSP manual): step-by-step risk management for drinking-water suppliers. How to develop and implement a Water Safety Plan – a step-by-step approach using 11 learning modules.* Geneva, World Health Organization.
WHO-EURO (2010). *Urban planning, environment and health: from evidence to policy action – meeting report.* Copenhagen, World Health Organization Regional Office for Europe.

Useful links

Several WHO and UNEP sites provide information on impacts affecting health and environment and practical responses:

- *WHO's programme on Public Health and Environment:* http://www.who.int/phe/en/ and http://www.who.int/hia/examples/en/ (for examples of health impacts by theme).
- *WHO and UNEP's Health and Environment Linkages Initiative:* http://www.who.int/heli/en/ and the Health and Environment Strategic Alliance: http://www.unep.org/roa/hesa/.

International Federation for Housing and Planning. A global network of professional institutions and individuals working on housing, urban development and planning and with a main focus on sustainable development: http://www.ifhp.org/.

San Francisco Bay Area Health Impact Assessment Collaborative. A group of academic, government, and non-profit practitioners contribute to this web site which includes database case-studies, several tools for HIA and training material: http://www.hiacollaborative.org/.

GOAL 5. HOUSING COSTS ARE REASONABLE AND AFFORDABLE

ACCOMMODATION COSTS SHOULD BE WITHIN ACCEPTED AFFORDABILITY LIMITS TO SECURE HOUSING FOR ALL

Housing challenges and policy responses

Housing is the biggest expenditure most families make and it provides them with a range of basic human needs (shelter, security, privacy, water supply, food preparation, thermal protection, etc.). Its affordability can thus have an impact on the well-being of household members, while the active participation of all population groups in the housing market also contributes to the broader economy.

A frequent problem in the housing market is the undersupply of dwellings. As a consequence, housing costs, whether in the rental or owner-occupier sectors, can be unaffordable. Yet, affordability is not only a matter of housing supply but also of low real incomes that prevent millions of poor people from securing access to decent housing. Affordability may also exacerbate crowding (Goal 3). However, the problem of affordability is not exclusively linked to undersupply; it can also be linked to the quality, size and amenities of existing affordable housing, which may not match households' needs. It can, therefore, also appear in countries with well-developed housing stock.

Excessive housing costs are a major challenge for households as well as for local and national governments as they exclude less wealthy dwellers from adequate or at least minimum housing conditions, and reduce household budgets for meeting other basic human needs. The housing sector usually advocates for housing costs that are within accepted benchmarks but implementation and control are not straightforward – especially when housing markets are highly privatized. In many countries, housing authorities track housing costs over time through regular surveys. One common measure of affordability is the use of a ratio between shelter cost and income. Commonly a 30% level for this ratio is accepted internationally as a limit for affordable housing, yet it is important to consider that this is a relative threshold that depends on household expectations and the prioritization of other expenses.

In some countries 'demand interventions' are in place. These interventions aim to assist households to address housing costs through direct subsidies or rental vouchers. Affordable homeownership programs can also provide reduced interest rates. They have been found to be effective in housing markets that are highly privatized in reducing mortgage foreclosures (Wardrip et al. 2011). Another set of interventions termed 'supply-side' measures aim to provide housing construction companies, local authorities, or public housing agencies with incentives to expand the number of dwellings and social housing schemes.

The global urban population is expected to grow to 4.9 billion by 2030. Much of this growth will be in urban slums in low-income countries (WHO, 2007). In these settings, constrained budgets and institutional capacity to directly fund social housing schemes have resulted in organized communities and civil society organizations taking the lead, with government assistance. In this context, the role of government in the formalization of tenure or land ownership is key to stabilize settlements and gradually improve dwellers' housing quality.

Some health impacts and pathways

Self-rated health and adherence. The relationship between housing affordability and health is strong. A survey of 10 000 households in the United States showed that almost 50% of people having difficulties in paying for housing reported higher levels of poor self-rated health, and higher levels of arthritis, hypertension and non-adherence to health-care treatment (Anderson et al., 2003).

Overcrowding. A study in England showed that high housing costs leads to lack of maintenance and poor housing conditions related to overcrowding, exposure to damp, cold and mould (see Goal 1).

Emergencies and multiple impacts. Complex emergencies (e.g. natural disasters and conflict situations) have multiple impacts. They frequently cause the destruction of housing infrastructure, displacement of communities and the loss of income for households. One immediate effect of such emergencies is people's inability to access affordable shelter.

SOCIAL DETERMINANTS AND EQUITY FOCUS

It is widely documented that the lack of affordable housing impacts most upon low socioeconomic groups and people in otherwise vulnerable positions. Families lacking the means to pay for good quality housing may have to make frequent moves in search of appropriate accommodation ('transience'). Affordable and stable housing creates a positive environment to raise children. Research suggests that children living in neighbourhoods with low turnover have a higher probability of completing high school.

A systematic review commissioned by the United States Government in 2003 found that, in the course of one year, approximately 2.3 million people, of whom one million were children, experienced at least one period of homelessness. Negative impacts have been documented on school attendance, primary sources of medical care, access to preventive services (e.g. child immunizations), increased risk of sexual assault and violence (Anderson et al., 2003). In Canada, a study showed that people living alone, single mothers and immigrants are population groups mostly affected by unaffordable housing (Statistics Canada & Canada Mortgage and Housing Corporation, 2008).

What can both sectors do together?

Several of the potential areas of joint work related to Goals 6–8 are linked. As we will see in this section and in the following sections, the interventions described are more complex; they entail the participation of many stakeholders beyond health and housing authorities. These interventions may address several factors that negatively impact on households, such as lack of affordability, lack of economic and social opportunities, or problems arising from tenure and land titling.

The design and implementation of supply-side interventions to improve affordability. Two common supply-side interventions are public housing programmes and mixed-income housing developments. Both cases commonly entail multi-family housing developments with subsidized rents. Mixed-income developments group families with different income levels, commonly in better-off urban areas, and make a portion of affordable units available to households with incomes below a defined level. Experience in the United Kingdom and the United States shows that the health sector can support the planning of such schemes with health impact assessment information from these developments, and with the integration of healthy housing principles (see Goals 1–3 for more details) and health principles into the urban landscape. Other more direct health contributions include planning for health services provision, promoting health, and conducting home visits to assess and plan for the primary health-care needs of residents in new housing units (HUD, 2010).

The design and implementation of demand-side interventions. The health sector can support housing authorities in evaluating the potential impact of initiatives like rental voucher programmes and the relocation of individual households to new neighbourhoods. As with cash transfer payments related to nutrition interventions, these forms of social transfers can have wide positive repercussions for the health of the most marginalized in society. Different from supply-side measures where usually a whole housing development project is implemented and where a large group of households is allocated a housing unit, demand-side cases often imply that individual families relocate and settle themselves in a location they choose (at a subsided price), commonly in new neighbourhoods. The objective is to provide opportunities for low-income families to move out of concentrated poverty areas to more affluent areas, improving access to education, social services, and economic opportunities. In 2003 a systematic review found that housing authorities were increasingly facing the challenge of assisting families to integrate into new neighbourhoods and confronting emerging social and health needs. In some cases documented in the United States, health authorities participated in multidisciplinary teams to deal with such challenges at the community level (Anderson et al., 2003).

Housing opportunities for homeless and transient people. In addition to the moral imperative to end the suffering caused by homelessness, there are advantages for broader public health goals (HUD, 2010). In the United States, the Department of Housing and Urban Development partners with several organizations, including health authorities, to uncover evidence on design interventions that improve the well-being of homeless people and to advocate for their adoption across local authorities. Effective measures identified include homelessness prevention programmes, counseling, and rapid reintegration and rehousing initiatives (2010). They found that reintegration and rehousing programmes require particularly close coordination with health and social-service providers. Local authorities commonly implement these initiatives in close cooperation with housing and health sectors, and with civil society organizations.

Responding to complex emergencies. In many countries, housing and health authorities partner with emergency management agencies and local governments to formulate minimum housing standards for emergency shelter (HUD, 2010). These can also be considered in the formulation of emergency response strategies that provide affordable housing and temporary resettlement plans. In many of these cases, health authorities contribute to planning and implementation phases. Health authorities are able to anticipate the potential health impacts of emergency and resettlement plans, plan the provision of health services, and conduct training activities.

Further readings

Department for Communities and Local Government (2010). *English housing survey. Headline report 2008–09.* London.
Pollack CE et al. (2010). Housing affordability and health among homeowners and renters. *American Journal of Preventive Medicine*, 39:515–521.
Reed E et al. (2011). The role of housing in determining HIV risk among female sex workers in Andhra Pradesh, India: considering women's life contexts. *Social Science & Medicine*, 72:71.
Statistics Canada & Canada Mortgage and Housing Corporation (2008). *The dynamics of housing affordability.* Ottawa (Income Research Paper Series).

Useful links

Canada Mortgage and Housing Corporation. Resources and interactive tools and technical requirements for affordable housing projects: http://www.cmhc-schl.gc.ca/en/inpr/afhoce/tore/.

UN-HABITAT. The United Nations Human Settlements Programme. *Best Practices Database in Improving the Living Environment:* http://www.unhabitat.org/bestpractices/2006/bplist.asp.

GOAL 6. THE LOCATION OF DWELLINGS ALLOWS ACCESS TO SOCIAL SERVICES, SERVICES AND SPACE FOR ACTIVITIES OF DAILY LIFE, AND ECONOMIC OPPORTUNITIES

RESIDENTIAL LOCATIONS ALLOW ACCESS TO OPPORTUNITIES FOR EDUCATION, PURCHASING OR GROWING FOOD, PURCHASING OTHER NECESSITIES FOR DAILY LIVING, RECREATION, AND EMPLOYMENT

Housing challenges and policy responses

The spatial considerations affecting the location of a residential area are crucial to the impact of housing on people and communities' living conditions and opportunities. This goal highlights the links between housing, and social and economic development. The location of a residential area should facilitate access to economic opportunities, employment and required services. A problem affecting millions of low-income families and slum dwellers is that residential areas are often in isolated areas with little independent infrastructure (jobs, schools, post offices, shops). Inadequate transportation, limited financial resources and gender norms, among other barriers, create circumstances where whole communities are excluded from mainstream economic and social opportunities. In the long term, these constraints cause economic stagnation of the communities, which impacts on the availability and the liveability of the housing stock.

An issue related to this goal is disability. As mentioned previously for Goal 2, global progress to ensure equal accessibility is mixed (UN, 2007). People with disabilities often lack access to social services, which contributes to their exclusion – lack of access to education, livelihood activities and health care. In most countries, infrastructure or transport projects, and urban planning processes, fail to seek the perspectives of persons with disabilities, including mental disabilities.

Some of the indicators used to monitor these factors include travel distance to work or school, labour market participation by income groups or areas, availability of grocery stores selling nutritious foods, and indicators of public service utilization (e.g. transport, education and health). Systems that plan and coordinate the location of residential land use with infrastructure and other service providers are ideal in achieving the goal of access to social services and economic opportunities. Aligning the use of land with measures to increase transport and other investment projects is considered the most effective means of ensuring that factors pertaining to location create the best opportunities for households.

Some health impacts and pathways

Urban living and health. In 2008 the Commission on Social Determinants of Health documented the positive health and health equity impacts of the social determinants of health, such as universal education, employment conditions and social security. The Commission found that better urban planning was an important entry point for impacting on social determinants (CSDH 2008, WHO, 2007).

Sedentary lifestyles, social isolation and chronic diseases. Trends in most countries around the world show an increase in urban sprawl, which is characterized by the formation of communities, usually just outside core urban areas, with low access to social services and economic opportunities, and long travel times to access these services.

Important characteristics of the built environment that support healthy behaviors include: walkable and bikable neighborhoods, public transit, parks, recreation facilities, and open spaces, and healthy food environments.

The rise of urban sprawl has lifestyle and social isolation implications for health, in particular for chronic diseases. Some studies in the State of Washington, in the United States, have estimated that sedentary living contributes to 255 000 deaths each year (Malekafzali, 2010). Rush-hour gridlock and long commutes are stressful and take time away from family, friends and leisure activities – social activities necessary for health and well-being. Rural areas are left with underinvestments in transport systems, inhibiting access to services, in particular for vulnerable groups.

SOCIAL DETERMINANTS AND EQUITY FOCUS

A recent report from the United States describes the interaction between housing location and health impacts.
"More than one in five Americans ages 65 and older do not drive because of poor health or eyesight, limited physical or mental abilities, concerns about safety, or because they have no car. More than half of nondrivers, or 3.6 million Americans, stay home on any given day—and more than half of that group, or 1.9 million, have disabilities. Isolation is especially acute in rural communities, sprawling suburbs, and black and Latino communities. Compared with older drivers, older nondrivers take 15 percent fewer trips to the doctor; 59 percent fewer trips to shops and restaurants; and 65 percent fewer trips for family, social, and religious activities".

Source: Malekafzali (2010).

What can both sectors do together?

Many issues related to this goal are complex and often involve broad-based initiatives with several stakeholders and sectors. Housing or health authorities may not necessarily lead policy and programme responses, but they may join efforts and contribute to activities led by

local or regional planning authorities. Also, many of these actions are often the responsibility of urban planners.

Planning and implementation of informal settlements upgrade. Several countries have implemented slum upgrading initiatives, often linking renewed urban infrastructure (housing and public infrastructure) with social programmes in which local governments, community organizations, and housing and health authorities participate. The Jamaica Social Investment Fund (JSIF) is a public entity that plans, coordinates and funds development initiatives. In 2004 it launched the Inner-City Renewal Initiative covering 12 slums, which still operates today. The initiative benefits 80 000 people, giving them improved access to basic services, job training, income-generating activities and a microfinance scheme (Heinrich & Lopez, 2009). The Jamaica Social Investment Fund initiatives are mandated to involve relevant sectors. In the specific case of the Inner-City Renewal Initiative, the health authorities' involvement included support for the planning and implementation of components related to health centres, training for community mobilizers and crime prevention. The health sector participated in the planning and implementation of basic infrastructure activities for water, sanitation, solid-waste collection (see Goal 2 for a description of the health sector's role).

Another example comes from Brazil, where around 30% of the population of the Municipality of São Paulo (10 million) live in *favelas* (shanty towns). *Favelas* are settlements with no proper infrastructure or housing standards. In 2000 the city of São Paulo launched an upgrading process linking housing provision, sanitation, job training and income- generating activities for 130 000 families – amounting to one third of people living in *favelas* (Cities Alliance, 2008). Literature highlights the role of the health authorities that provided evidence on health impacts and healthy design for planning processes. Health authorities also participated with housing authorities on bodies convened by local governments to contribute to upgrading and assist in consultations.

Contributing to transit-oriented developments. In many cities, long travel times between jobs and homes result in congestion and high transportation costs. Transit-oriented development (TOD) is a concept that promotes urban planning processes that create multifunctional cities and combine denser residential neighbourhoods with mixed-use zoning. They include housing, retail, public, social and leisure usages. The aim is to reduce travel times and better connect home, work and social life. Some TODs, such as a recent one developed in Adelaide, South Australia, are starting to incorporate health and health equity as a key component in the design of mixed-income housing programmes, transportation and housing measures. This is an emerging area to which public health authorities can contribute during planning and implementation phases.

Scaling up programmes, evolving roles for health. In 1998 Chile created *Chile Barrio* (Chile Neighbourhood), a national programme to address poverty in slums, focusing on housing and social inclusion interventions. Given the clear links between housing and health, the involvement of the health sector in implementation became a critical component of the programme (Handzic, 2010). In 2001 the programme was merged with *Chile Emprende* (Chile Enterprise), adding micro-enterprise components to the original interventions. Later this programme was merged again into *Chile Solidario* (Chile in Solidarity). Finally, in 2006, this programme was relaunched as *Chile Crece Contigo* (Chile Grows with You). In its current form, the programme adopts a rights-based approach with a universal vision. It guarantees all Chileans support during key life-course events such as birth, preschool, education, employment and retirement. It also guarantees universal rights in health and housing. This evolution reflects the idea that integrated approaches across sectors, rather than parallel efforts, are more effective in ensuring individual well-being. The roles of the health and housing authorities evolved. Indeed, at the beginning, the housing sector led the process (during *Chile Barrio*). However, in 2006 the programme was put under the leadership of the Ministry of Planning, with the ministries of health and housing contributing along with five more ministries.

Filling knowledge gaps. Health can contribute to the development of analytical tools for housing, health and urban planning. In Egypt and Jamaica, for example, the health sector contributed to the mapping of the Geographic Information System (GIS). Another example is the use of the WHO Urban Health Equity Assessment and Response Tool (Urban HEART), which allowed a network of 10 municipalities to identify inequities in urban areas and formulate initiatives to address their determinants. The analysis included the identification of slum areas and defined actions for the health sector. The information from this tool also provides opportunities to convene multiple actors to address health inequities (WHO, 2011).

Further readings

Gerard M & Corrales D (2009). *Medellín: transformación de una ciudad [Medellin: the transformation of a city].* Medellin and Washington DC, City of Medellin, Colombia, and Inter-American Development Bank.
WHO (2011). *Urban health equity assessment and response tool (Urban HEART).* Kobe, World Health Organization Centre for Health Development.

Useful links

The Cities Alliance. A global partnership created in 1999 by donor governments, the World Bank, UN-HABITAT and the major international associations of local authorities. It aims at promoting urban poverty where slum growth is taking place and the role of cities in sustainable development: http://www.citiesalliance.org/ca/.

Planetizen. Urban Planning, Design and Development Network. A public-interest information exchange platform on resources and general information on urban planning news, commentary, interviews, events coverage, book reviews, announcements, and training: http://www.planetizen.com/.

The Alliance for Healthy Cities. An international network aiming at protecting and enhancing the health of city dwellers, and supporting the health cities approach that was launched by WHO: http://www.alliance-healthycities.com/htmls/about/index_about.html.

WHO European Healthy Cities Network: http://www.euro.who.int/en/what-we-do/health-topics/environmental-health/urban-health/activities/healthy-cities/who-european-healthy-cities-network.

The Health Development Measurement Tool, developed by the San Francisco Department of Public Health, considers health needs in urban land use plans and projects: http://www.sfphes.org/enchia/enchia_HDMT.htm.

GOAL 7. TENURE ARRANGEMENTS ENSURE REASONABLE CONTINUITY OF OCCUPATION

TERMS OF OCCUPATION PROVIDE STABILITY FOR INDIVIDUALS, HOUSEHOLDS, COMMUNITIES AND NEIGHBOURHOODS

Housing challenges and policy responses

Tenure refers to the legal basis under which people occupy a dwelling. The most common forms of tenure are ownership and renting. A common fact present in most low- and middle-income countries is informal tenure, which is often the result of dwellers squatting on state land or private property. Dwellers in this case have no legal basis for occupancy. The negative impacts of a lack of legal basis for occupying a dwelling (or the land on which a dwelling is built) are widely documented in the literature. Although issues related to irregular tenure are related to affordability (Goal 5), the negative impacts of lack of tenure are broader than homelessness and transience.

Most informal settlements are erected on land that is state or privately owned, which often means that housing units in slum areas are illegal. Consequently, legal authorization to register property or improve the liveability of housing and settlements is refused. Local governments are often forbidden to provide services such as water, sanitation, waste removal, electricity, roads or schools. Moreover, squatters are commonly under threat of eviction.

Forced evictions affect millions of people globally. The General Comment 7 of the Committee on Economic, Social and Cultural Rights (CESCR, 1997) defines forced evictions as the "removal against the will of individuals from their homes with no provision of and access to legal protection". It stipulates that evictions should only take place if conservation of houses is not feasible and relocation measures are in place. Unfortunately, these standards are not usually applied. Multiple factors lead to evictions, for example infrastructure projects (dams, mines and ports), urban renewal, city `beautification', sports events, industrial developments, or designation of Special Economic Zones (SEZs). In some cases, land revaluation prompts authorities to evict slum dwellers in city centres and use the land for revenue generating projects (e.g. shopping malls, entertainment complexes, high-rise office buildings) (HIC, 2009).

Related to this goal, the housing sector usually promotes regulatory measures that can ensure stable and fair occupation terms (e.g. rent controls, tenure regularization, etc.). Residential stability gives not only access to social opportunities (e.g. school attendance, employment and other aspects of community life) but also incentives that can promote capital investments in housing (by owners and renters). These types of capital investments can have economic multiplier effects. Common indicators used to monitor this goal are occupancy duration rates or school completion. Some of the housing interventions that are used to address these problems are tenancy rights, measures to regulate ownership and occupation, and land titling systems.

Some health impacts and pathways

Tenure and behavioural factors. Tenure is not a direct determinant of individual health, but it increases exposure and vulnerability. For example, studies in India, exploring the link between insecure tenure and health, found increased HIV risk behaviour in sex workers who had been evicted five or more times in the last two years due to pressure to ensure better incomes.

Forced evictions are a common result of insecure tenure and contribute to increased transience, with serious impacts on health. Forced evictions affect millions of people globally. The General Comment 7 of the Committee on Economic, Social and Cultural Rights (CESCR, 1997) defines forced evictions as the “removal against the will of individuals from their homes with no provision of and access to legal protection”. It stipulates that evictions should only take place if conservation of houses is not feasible and relocation measures.

Forced resettlement and direct and indirect health impacts. In addition to the traumatic experience of having dwellings and belongings destroyed, resettlement plans are rarely implemented; dwellers are often allocated small plots of land with no provision for rebuilding or basic services. Health impacts documented as a result of such evictions are malnutrition, diarrhoea, respiratory infections and skin infections. Equally grave is the impact on health determinants: family economies are ruined as savings are often used to rebuild shelters, which impacts on nutrition; jobs are lost due to relocation; access to education is limited; and community ties and social capital are weakened.

SOCIAL DETERMINANTS AND EQUITY FOCUS

Women, children and the elderly suffer excessively from evictions. Women are particularly vulnerable given the different forms of discrimination that many countries apply to home ownership, particularly as regards title rights. This is exacerbated by their increased vulnerability to violence and sexual abuse when they are homeless. Children are also greatly affected by evictions, with exposure affecting nutritional status, the incidence of infectious diseases, and school attendance.

A case-study of the economic and social conditions of 3000 families resettled from Delhi, India, to a location 50 kilometres away found that poverty increased as a direct result of relocation. The study found that 20% of men and 35% of women from 18 to 60 years could not work, although they wanted to do so. A large number of male workers continued working in their previous occupations but the commuting time increased. Although their wages did not increase, travel expenses went up by 50%.

Source: HIC (2009).

What can both sectors do together?

Formulating resettlement guidelines. The health sector can provide expert information for the formulation of legislation or standards to be applied in resettlement processes to protect affected communities, and to ensure relocation plans consider and mitigate potential negative impacts on health and its structural determinants. Some institutions (e.g. World Bank, Organization for Economic Cooperation and Development – OECD) have adopted similar guidelines in the context of large infrastructure projects. More importantly, the United Nations Office of the High Commissioner on Human Rights (OHCHR) has approved the basic principles and guidelines on development-based evictions and displacement, and countries are expected to respect them as part of their commitment to the protection of human rights (OHCHR, 2008).

This is an opportunity for the health and housing sectors to work on similar guidelines or standards at national level to ensure respect of human rights in access to shelter, water, sanitation, health services and education for those affected by any type of eviction. To date, only a few countries have approved such instruments.

Promote human rights. Both housing and health sectors can work together to promote international human rights principles and undertake evictions only in exceptional circumstances. To do this, both sectors can promote and commission impact assessments of planned evictions to anticipate the health, social, environmental and economic impact of any eviction *before* it is carried out. While this has become a common practice in infrastructure projects when there is a need to relocate communities, more can be done by national governments to adopt similar measures (HIC, 2009).

Protecting affected communities. For households facing an actual eviction, health and housing authorities have a role to play in actively highlighting the negative social and economic impacts of forced evictions and providing assistance to communities. Joint data collection of the impacts of resettlements can help to ensure new communities meet basic housing standards. Documenting the vast array of negative impacts caused by evictions would increase awareness across local authorities of the implications of evictions and would motivate policy change.

Working with affected communities after evictions. In the event of forced evictions, the health sector should highlight the vast array of negative impacts and advocate for the health of the affected communities. Community health centres have close contact with affected communities and need to engage with housing authorities to support access to minimum shelter, water, sanitation, and health and education services.

Further readings

CESCR (1991). *General comment 4. The right to adequate housing (Art. 11(1) of the Covenant): 12/13/1991*. Geneva, Committee on Economic, Social and Cultural Rights. Office of the United Nations High Commissioner for Human Rights.

Useful links

Centre on Housing Rights and Evictions (COHRE). International, non-governmental human rights organization whose mission is to ensure the full enjoyment of the human right to adequate housing for everyone: http://www.cohre.org/.

Office of the High Commissioner on Human Rights. Information and resources related to forced evictions: http://www.ohchr.org/EN/Issues/Housing/Pages/ForcedEvictions.aspx.

Housing and Land Rights Network (HLRN) [on line database]. Web site focusing on defence, promotion, and realization of the right to adequate housing and land: http://www.hlrn.org/english/home.asp.

UN-HABITAT Advisory Group on Forced Evictions. Site of the UN advisory group that monitors acts of forced evictions globally: http://www.unhabitat.org/campaigns/tenure/taskforce.asp.

GOAL 8. DWELLINGS PROTECT OCCUPANTS FROM CLIMATE CHANGE

DWELLINGS SHOULD PROTECT PEOPLE FROM EXTREME WEATHER EVENTS AND CONTRIBUTE TO THE REDUCTION OF GREENHOUSE GAS EMISSIONS

Housing challenges and policy responses

Housing has a fundamental function in protecting people from outdoor threats. As extreme climatic events are likely to become more frequent, the situation, structural integrity and resilience of housing become more important in safeguarding the health of inhabitants.

At the same time, residential buildings are contributing to global emissions and thereby to climate change. Global emissions from residential buildings comprised close to 18% of direct carbon dioxide emissions in 2008.

Common housing policies related to this goal consist of improving the adaptability of residential buildings to climate change effects and developing mitigation strategies to cut greenhouse gas emissions. The housing sector has great potential for cutting GHG emissions, at the least cost, and using available and mature technologies.

In supporting the integration of adaptation measures, it is important to consider not only how these measures may have co-benefits but also some risks. There is a need to ensure that adaptation measures undertaken today do not contribute to greater climate change impacts in the future, and that mitigation measures undertaken today include optimal health-enhancing strategies.

Some health impacts and pathways

Increased indoor thermal variability. Indoor thermal conditions, one of the main consequences of climate change, are major determinants of cardiovascular and respiratory health problems. Thermal conditions are often linked to poorly insulated, poorly heated or poorly ventilated buildings. Available estimates from the United Kingdom show that, between 2004 and 2008, more than 130 000 people over the age of 65 died from cold-related illnesses during the winter months. Similar cases of excess winter mortality are observed in regions such as the Baltic countries, eastern Europe and central Asia.

Natural disaster frequencies. The increase in the number of natural disasters worldwide has made thousands of people homeless. Some escape to other regions where they live in emergency shelters and transitional housing arrangements. In addition to the acute effects of these disasters on housing conditions, when moving back to their residential quarters many households find they have lost their homes, which exposes them to the range of risks and challenges already discussed.

Fluctuations in water availability and quality. The widely anticipated flood and drought consequences of climate change threaten drinking water and sanitation. Increased water shortages, as well as increased flooding, drought and severe weather due to global warming trends, affect piped water and sanitation. Around 884 million people globally do not use improved drinking water sources; 2.6 billion people do not have access to any type of improved sanitation facility. These stark figures are compounded by the fact that about two million people die every year due to diarrhoeal diseases, the majority of whom are children under five years of age.

Improved habitats for disease vectors. Climate change is likely to cause changes in ecological systems, increasing the risk of infectious diseases, including those from the seasonal activity of local vectors, and the invasion of tropical and semi-tropical species into areas where they were previously not able to survive due to temperature and general environmental conditions. In the context of preventing vector-borne diseases, housing plays an important role.

Extreme weather and mental health. Moreover, climate change affects the social, economic and environmental determinants of mental health. Extreme weather events, such as hurricanes, wildfires and floods, can increase people's emotional stress and anxiety about the future. Similarly, prolonged heat and cold events can create stress situations that may initiate or exacerbate health problems in populations already suffering from mental disease and stress-related disorders.

SOCIAL DETERMINANTS AND EQUITY FOCUS

Populations living in poverty are more vulnerable to many of the housing risks resulting from climate change. For such populations the effects of climate change, such as temperature and weather extremes, disruptions in access to public services, water and sanitation, and increased stress are all magnified by their pre-existing conditions or situations.

Increased variability in indoor thermal conditions in many instances have a social dimension, as poor households may not be able to afford to heat or cool their homes adequately. In addition, climate change adaptation and mitigation measures undertaken today could contribute to greater future climate change impacts or to greater harm to health if risk assessments are postponed, affecting in particular vulnerable populations.

What can both sectors do together?

Consider health impacts of climate change policies. The health sector can contribute to the planning and implementation of policies to protect people from the effects of climate change. These policies can more explicitly consider both potential health benefits and risks. Health can be a driver for cost-effective housing strategies to mitigate the impact of climate change. Particularly in low-income settings, health benefits from improved housing are very immediate and tangible. For instance, improved insulation has been shown to reduce illness caused by cold and dampness. In economic terms, these savings may be larger than energy savings; thus, health may provide a good economic argument for mitigation measures.

Promote research and adopt low-emission technologies. Indoor air pollution (IAP) causes 1.6 million deaths a year and is linked to 50% of childhood pneumonia deaths due to proximity to open fires or coal and biomass stoves. The environmental impacts of IAP are also a source of concern as such pollution generates large proportions of climate change pollutants such as black carbon and methane. The damaging effects of IAP to health and environment risk increasing intergenerational poverty as, globally, more than 90% of those exposed to IAP are from low-income households. Working together to promote research and the adoption of new low-emission technologies, the benefits would be clear to health, housing and environmental sectors. Immediate gains for the health sector would be a reduction in asthmatic and respiratory illnesses, and burns caused by accidents in the home.

Harmonize and update standards. The health sector can engage with the housing and environmental sectors to change building codes, transportation infrastructure, housing standards, coastal development, and other urban planning strategies that can reduce energy use and contribute to the mitigation of climate change effects. For example, the adoption of climate-friendly passive cooling features, commonly supported by natural ventilation, have the potential not only to reduce the negative health impacts caused by heat stress or transmission of infectious diseases, but also greenhouse gases. To this end, the health, housing and environmental sectors could update and adapt housing standards for new construction, and consider measures to gradually apply them into existing housing stock.

As far as reducing the effects of climate change and natural disasters is concerned, housing and urban planning authorities could focus on the development of guidelines on indoor thermal conditions, and make recommendations on the location and stability of housing. This would ensure adequate protection from extreme events.

Support healthy low-cost energy upgrade initiatives. In Kuyasa, a low-income settlement in Cape Town, South Africa, the installation of solar water heaters, insulated ceilings, and ultra-low energy, long-life compact fluorescent light bulbs (CFLs) have all been critical in improving thermal, lighting and heating efficiency, and in reducing electricity consumption and carbon dioxide (CO2) emissions. Since 2008 a total of 6.5 tons of carbon reductions per year have been achieved, saving US$110 000 annually for the project and communities. In the planning and implementation of the project, health and housing staff collaborated to successfully reduce condensation, dampness and air pollution. Increased access to hot water helped to reduce the incidence of diarrhoea. The health benefits demonstrated by the Kuyasa project represent an important milestone for the Department of Health and emphasize the role of health in all policy approaches.

Generate relevant evidence for policy action. Public health professionals and researchers can support housing authorities in adapting research and strategic planning to harmonize health assessment with real-world housing adaptation and development scenarios. This would ensure that evidence gathered on health is relevant and provides feedback on initiatives and trends.

Further readings

WHO(2011). Health in the green economy: health co-benefits of climate change mitigation - housing sector. Geneva, World Health Organization.
WHO-EURO (2009c). *Euroheat: improving public health responses to extreme weather/heat-waves: summary for policy-makers.* Copenhagen, World Health Organization Regional Office for Europe.

Useful links

WHO web site on housing and environmental topics in the context of climate change mitigation provides more information on health in the green economy: http://www.who.int/hia/green_economy/en/index.html

Intergovernmental Panel on Climate Change (IPCC). The IPCC is the leading international body for the assessment of climate change. It was established by the United Nations to provide the world with a clear scientific view on the current state of knowledge in climate change and its potential environmental and socioeconomic impacts: http://www.ipcc.ch.

SouthSouthNorth (SSN). A network-based non-profit organization that pursues poverty reduction by building capacities and delivering community based mitigation and adaptation projects. It aims at mitigating climate change by reducing global greenhouse gas emissions, also assists communities to adapt to the adverse effects of climate change: http://www.southsouthnorth.org.

WHO 's Climate change and human health web site includes policies, training, current projects, publications and other useful resources related to climate change and human health: http://www.who.int/globalchange/en/index.html.

SUMMARY MESSAGES

Health equity is a guiding principle and catalyst for sustainable housing and development policies

- Ensuring that housing markets work for all by adopting health equity as a powerful orientation tool in policy design can remedy market limitations that often leave the most vulnerable with substandard or limited access to housing (e.g. safety regulations, zoning, rental assistance, public provision).
- Advancing the right to housing for all citizens through promoting empowerment and participation in decision-making requires the active involvement of health actors, in particular community health actors (e.g. in planning and implementing upgrading or regeneration initiatives, protecting those affected by forced evictions).
- Adopting an approach in urban planning and design that perceives housing as a basic condition to improve well-being and that ensures access to basic services, employment and education opportunities, promotes sustainable housing and overall development.

There is a new role for health in working with housing on cross-cutting functions

The health equity imperative and the intersectoral actions described here provide specific examples of a new role for public health, which was articulated in the Adelaide Statement on Health in All Policies (WHO and Government of South Australia, 2010). These functions call for better intersectoral collaboration. By performing them in a more systematic way or developing them where they do not exist, public health and housing authorities can expect to reap better returns from health and housing policies. Some notable areas with regard to housing include:

- surveillance systems for monitoring housing and health policies using disaggregated data on population groups and indicators to uncover equity impacts;
- development of guidelines, standards and recommendations on housing-related risk factors and dissemination of technical guidance as a shared responsibility for both health and housing actors;
- citizens' dialogue platforms to influence urban planning and zoning decisions to ensure the opinions of affected vulnerable groups are taken into consideration;
- cooperating on the development of policies related to evictions and resettlement, and the mitigation of impacts on affected populations;
- joint capacity building in the housing and health sectors to improve understanding of health and housing interlinkages by government actors, and shared capacity building in communities to encourage and facilitate opportunities for joint action.

There are many entry points for health to work with housing stakeholders

Table 2 shows several practical examples of how Health can collaborate with Housing to support them in achieving their goals, while improving health outcomes and health equity.

Table 2. Examples of intersectoral collaboration between health and housing

HOUSING ISSUE	AREAS OF COLLABORATION
Sound construction	• Neighbourhood decline and informal settlements increase inadequate housing, often affecting the most vulnerable in societies. Dilapidated structures, dampness, mould and pollution impact not only on health but also on housing sustainability and the attainment of housing sector goals. • The health and housing sectors can work together on the formulation of building standards, regulation of energy efficiency, water conservation, indoor air quality and emission technologies; and on the design of special standards for slum upgrading. The health sector can also provide expertise to detect health risks in the housing stock and support upgrading initiatives.
Safety and security	• An emerging challenge is the growing absence of safe and secure living spaces in many urban areas, which has a negative impact on quality of life in terms of personal injuries and vulnerability to crime. • Both sectors can work with other sectors on safety standards to prevent domestic injuries, anticipate risks to vulnerable groups (e.g. children, elderly, people with disabilities) and regulate factors that increase violence (e.g. alcohol, arms).
Adequate size	• Increasing slum formation undermines the space available for individual and common purposes. Satisfactory occupancy levels are critical to well-maintained buildings and neighbourhoods and to improved quality of life; overcrowding has pervasive impacts not only for housing, but also for the health, education and justice sectors. • The health and housing sectors can jointly provide assistance to households to ensure physical changes to dwellings meet housing and health standards, and thereby reduce overcrowding. They can support the relocation of families living in crowded homes to new neighbourhoods and facilitate their social integration.
Basic services	• Adequate housing cannot be achieved without basic services being available for dwellers, as they are conducive to maintaining occupants who care for their homes and vibrant, stable communities. At the same time, their availability improves health. • Both sectors can work on: i) reviews of basic needs; ii) impact assessments and the implementation of interventions to improve public spaces (e.g. roads, streets, drainage, water, sanitation, waste disposal and health); iii) capacity building; and iv) brown fields clean up. Community centres provide venues to facilitate community participation where explicit links to health issues can be made.
Affordability	• Increasing housing costs and continued widespread poverty leave millions unable to secure housing and are an important concern for housing authorities. Accomodation costs also prevent households from accessing other basic needs like health care services. • Government regulation of the housing market is an effective mechanism to influence the supply and demand of housing. Public housing initiatives, tax incentives, zoning and tenure regulations all provide opportunities for the health sector to work with the housing sector in formulating policy so that the health and, in particular, health equity impacts of housing affordability proposals are fully considered.
Accessibility	• Housing is more than a shelter; it contributes to ensuring access to employment and social services. Millions of dwellers are unable to lead active lives or to participate fully in economic and social life due to the distance they have to travel to work or poor transportation. Providing housing with access to economic and social opportunities has positive impacts on dwellers' health, and can break the cycle of economic deprivation. • The health sector can provide complementary expertise to other sectors involved in good urban planning to ensure plans include health considerations related to physical movement and the psychological and social benefits of social interconnectedness. Compact cities, and regeneration and upgrading initiatives are also opportunities for integrating health issues. Health specialists can contribute to impact assessments.
Tenure	• The legal status under which people occupy land and dwellings is critical. Stable tenure improves school attendance and labour market participation, and creates incentives for private investment in the housing stock. Stable tenure is linked to a reduction in exposure to disease (e.g. HIV, tuberculosis, allergies). • Both sectors can prepare and support the use of guidelines for eviction processes that ensure there is at least a minimum of guarantees for affected communities. They should actively highlight the catastrophic impacts of forced evictions on vulnerable groups, document these impacts and advocate for policies more coherent with the right to housing.
Protection from climate change	• Housing policies developed to respond to climate change can be enhanced by the explicit consideration of potential health benefits and the risks to be avoided. As housing responses to climate change will impact on people's, the health sector needs to be active in developing these climate change strategies. • The public health sector can support the housing sector by harmonizing health assessment with real-world housing adaptation and development scenarios and by contributing to the appropriate changes to building codes, transportation infrastructure, housing standards, coastal development and other urban planning strategies.

REFERENCES

Anderson et al.(2003). Providing Affordable Family Housing and Reducing Residential Segregation by Income. A Systematic Review. *American Journal of Preventive Medicine.* 24(3S)

Berkowitz GS et al. (2003). Exposure to indoor pesticides during pregnancy in a multiethnic, urban cohort. *Environmental Health Perspectives.* 111:79–84.

Blas E, Sivasankara A, eds. (2010). *Equity, social determinants and public health programmes*. Geneva, World Health Organization.

Bonnefoy X (2007). Inadequate housing and health: an overview. *International Journal of Environment and Pollution*, 30:411–429.

Booth A, Carroll N (2005). *Overcrowding and indigenous health in Australia*. Canberra, The Australian National University Centre for Economic Policy Research (Discussion Paper No. 498).

Braubach M, Jacobs D, Ormandy D (2011). *Environmental burden of disease associated with inadequate housing. A method guide to the quantification of health effects of selected housing risks in the WHO European Region*. Copenhagen, World Health Organization Regional Office for Europe (http://www.euro.who.int/__data/assets/pdf_file/0003/142077/e95004.pdf, accessed 15 June 2011).

Campbell-Lendrum D, Corvalán C (2007). Climate change and developing-country cities: implications for environmental health and equity. *Journal of Urban Health*, 84:109–117.

CDC (2005). *Unintentional non-fire-related carbon monoxide exposures—United States, 2001–2003*. Atlanta, GA, Centers for Disease Control and Prevention.

CESCR (1991). *General comment 4. The right to adequate housing (Art. 11(1) of the Covenant): 12/13/1991.* Geneva, Committee on Economic, Social and Cultural Rights. Office of the United Nations High Commissioner for Human Rights.

CESCR (1997). *General comment 7. The right to adequate housing (Art. 11.1 of the Covenant): forced evictions: 05/20/1997*. Geneva, Committee on Economic, Social and Cultural Rights, Office of the United Nations High Commission for Human Rights.

Cities Alliance (2008). Slum Upgrading up close. Experiences of Six Cities. São Paulo, Prefeitura da Cidade de São Paulo.

Cocoran E et al., eds. (2010). Sick Water? The central role of wastewater management in sustainable development. A Rapid Response Assessment. Geneva, United Nations Environment Programme, UN-HABITAT, GRID-Arendal (http://www.grida.no/files/publications/sickwater/SickWater_screen.pdf, accessed 30 June 2011).

CSDH (2008). *Closing the gap in a generation: health equity through action on the social determinants of health. Final report of the Commission on Social Determinants of Health*. Geneva, World Health Organization, Commission on Social Determinants of Health.

Cunliffe D et al., eds. (2011). *Water safety in buildings.* Geneva, World Health Organization.

Department for Communities and Local Government (2009). *Survey of English housing preliminary report: 2007-08*. London (Housing Statistics Summary, No. 28).

Department for Communities and Local Government (2010). *English housing survey*. Headline report 2008–09. London.

EPA (2003). *EPA Assessment of risks from Radon in homes*: US Environmental Protection Agency. Office of Air and Radiation.

Gerard M & Corrales D (2009). Medellín: transformación de una ciudad [Medellin: the transformation of a city]. Medellin and Washington DC, City of Medellin, Colombia, and Inter-American Development Bank.

Government of New Zealand (2010). *Social report and regional indicators 2010*. Wellington, Ministry of Social Development (http://www.socialreport.msd.govt.nz/documents/the-social-report-2010.pdf, accessed 29 June 2011).

Handzic K (2010). Is legalized land tenure necessary for slum upgrading? Learning from Rio's land tenure policies in the Favela Bairro Program. *Habitat International,* 34:11–17.

Harris C (2009). Humboldt County General Plan Update Health Impact Assessment: a case study. *Environmental Justice*, 2:127–134.

Health in the green economy: health co-benefits of climate change mitigation – housing sector. Geneva, World Health Organization, 2011.

Heinrich C, Lopez Y (2009). Does community participation produce dividends in Social Investment Fund Projects? *World Development*, 37:1554–1568.

HIC (2009). *Acts of commission, acts of omission. Housing and land rights in the Indian State. A report to the United Nations Committee on Economic, Social and Cultural Rights*. New Delhi, Housing and Land Rights Network. Habitat International Coalition.

HUD (2010). *HUD Strategic Plan FY 2010–2015*. Washington, DC, US Department of Housing and Urban Development.

Jackson G et al. (2011). Evidence-based public health policy and practice: reduced acute hospitalization with the healthy housing programme. *Journal of Epidemiology and Community Health*, 65:588–593.

Lauster N, Tester F (2010). Culture as a problem in linking material inequality to health: on residential crowding in the Arctic. *Health & Place,* 16:523–530.

Lopez R (2009). Public health, the APHA, and urban renewal. *American Journal of Public Health*, 99:1603–1611.

Ludwig J, Duncan GJ, Hirschfield P (2001). Urban poverty and juvenile crime: evidence from a randomized housing-mobility experiment. *Quarterly Journal of Economics*, 16:655–680.

Malekafzali S, ed. (2010). Healthy, equitable transportation policy: recommendations and research. Washington DC, Convergence Partnership.

MHC (2002). Meeting our nation's housing challenges. Washington, DC, Millennial Housing Commission.

NCHH (2009). *Housing interventions and health: a review of the evidence.* Columbia, MD, National Center for Healthy Housing (Draft; http://www.nchh.org/LinkClick.aspx?fileticket=2lvaEDNBIdU%3d&tabid=229, accessed 21 June 2011).

Office of the UK Deputy Prime Minister (2004). *The impact of overcrowding on health and education: a review of evidence*. London.

OHCHR (2008). *Basic principles and guidelines on development-based evictions and displacement (A/HRC/4/18)*. Geneva, Office of the United Nations High Commissioner for Human Rights.

Pollack CE et al. (2010). Housing affordability and health among homeowners and renters. *American Journal of Preventive Medicine*, 39:515–521.

Prevention Institute (2008). Strategies for Enhancing the Built Environment to Support Healthy Eating and Active Living : Oakland, California, Convergence Partnership. (http://http://www.convergencepartnership.org/site/c.fhLOK6PELmF/b.6136273/k.A18D/Publications.htm, accessed 9 August 2011).

Reed E et al. (2011). The role of housing in determining HIV risk among female sex workers in Andhra Pradesh, India: considering women's life contexts. *Social Science & Medicine*, 72:71.

Rumchev K et al. (2007). Indoor air pollution from biomass combustion and respiratory symptoms of women and children in a Zimbabwean village. *Indoor Air*, 17:468–474.

Seedat M et al. (2009). Violence and injuries in South Africa: prioritizing an agenda for prevention. Health in South Africa Series 5. *The Lancet,* 374:1011–1022.

Statistics Canada & Canada Mortgage and Housing Corporation (2008). *The dynamics of housing affordability.* Ottawa (Income Research Paper Series).

UN (1988). UN General Assembly, *Global Strategy for Shelter to the Year 2000: resolution adopted by the General Assembly, 20 December 1988*, A/RES/43/181. New York, NY, United Nations (http://www.unhabitat.org/downloads/docs/1393_76192_other1.htm, accessed 9 March 2011).

UN (2007). UN General Assembly, *Convention on the Rights of Persons with Disabilities*: *resolution adopted by the General Assembly, 24 January 2007,* A/RES/61/106. New York, NY, United Nations (http://www.unhcr.org/refworld/docid/45f973632.html, accessed 9 March 2011).

UNDP, WHO (2009). *The energy access situation in developing countries*. New York, NY, and Geneva, United Nations Development Programme, World Health Organization.

Wardrip K, Williams L, and Hague S (2011). The Role of Affordable Housing in Creating Jobs and Stimulating Local Economic Development: A Review of the Literature. Center for Housing Policy. (http://www.multihousingnews.com/in-focus/the-role-of-affordable-housing-in-stimulating-the-economy-2, accessed 8 August 2011).

WGEKN (2007). *Unequal, unfair, ineffective and inefficient – gender inequity in health: why it exists and how we can change it. Final report of the Women and Gender Equity Knowledge Network of the Commission on Social Determinants of Health*. Geneva, Women and Gender Equity Knowledge Network, World Health Organization.

WHO (1989). *Health principles of housing*. Geneva, World Health Organization.

WHO (2002a). *World health report 2002 - Reducing Risks, Promoting Healthy Life.* Geneva, World Health Organization.

WHO (2002b). *World report on violence and health*. Geneva, World Health Organization.

WHO (2007). *Our cities, our health, our future: acting on social determinants for health equity in urban settings. Final report of the Urban Settings Knowledge Network of the Commission on Social Determinants of Health*. Kobe, World Health Organization Centre for Health Development.

WHO (2009a). *WHO guidelines for indoor air quality: dampness and mould*. Geneva, World Health Organization.

WHO (2009b). *Global health risks: mortality and burden of disease attributable to selected major risks*. Geneva, World Health Organization.

WHO (2009c). *Water safety plan manual (WSP manual): step-by-step risk management for drinking-water suppliers. How to develop and implement a Water Safety Plan – a step-by-step approach using 11 learning modules.* Geneva, World Health Organization.

WHO (2010a). *Violence prevention: the evidence*. Geneva, World Health Organization (Series of briefings on violence prevention).

WHO (2010b). *WHO guidelines for indoor air quality: selected pollutants*. Geneva, World Health Organization.

WHO (2011). *Urban health equity assessment and response tool* (Urban HEART). Kobe, World Health Organization Centre for Health Development.

WHO-EURO (2007a). *Large analysis and review of European housing and health status (LARES).* Copenhagen, World Health Organization Regional Office for Europe.

WHO-EURO (2007b). *Local housing and health action plans*. A project manual. Copenhagen, World Health Organization Regional Office for Europe.

WHO-EURO (2009a). *Social inequalities and their influence on housing risk factors and health*. A data report based on the WHO LARES database. Copenhagen, World Health Organization Regional Office for Europe.

WHO-EURO (2009b). *Environment and health risks: a review of the influence and effects of social inequalities.* Copenhagen, World Health Organization Regional Office for Europe.

WHO-EURO (2009c). *Euroheat: improving public health responses to extreme weather/heat-waves: summary for policy-makers*. Copenhagen, World Health Organization Regional Office for Europe.

WHO-EURO (2010). *Urban planning, environment and health: from evidence to policy action – meeting report*. Copenhagen, World Health Organization Regional Office for Europe.

WHO, UNICEF (2008). *World report on child injury prevention.* Geneva, World Health Organization and United Nations Children's Fund.

WHO, the Government of South Australia. *Adelaide Statement on Health in All Policies.* WHO. Adelaide, 2010.

WHO, World Plumbing Association (2006). *Health aspects of plumbing*. Geneva. World Health Organization.

WHO, World Bank (2011). *World report on disability.* Geneva, World Health Organization.

Whyatt RM et al. (2003). Contemporary-use pesticides in personal air samples during pregnancy and blood samples at delivery among urban minority mothers and newborns. *Environmental Health Perspectives,* 111:749–756.

World Bank (2008). *Urban crime and violence in LAC: status report on activities*. Washington, DC.

Zhang J, Smith KR (2011) Household air pollution from coal and biomass fuels in China: measurements, health impacts, and interventions. *Environmental Health Perspectives*, 115:848–855.

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World Health Organization

Department of Ethics, Equity, Trade and Human Rights

World Health Organization
20 Avenue Appia
CH-1211 Geneva 27

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