Chapter 1
Housing - Its Meaning in Multidimensional Perspective
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1.1 Definition of Housing:

Housing is the conjunction of the dwelling, the home, the immediate environment and the community. It is too simplistic to see housing as merely a physical dwelling in which one resides. The World Health Organization (WHO) (Bonnefoy, 2007) defines housing as being based on four interlinked levels, with an array of possible health effects in each:

- the physical structure, including factors such as mould growth, quality, design, and noise exposure;
- the meaning of "home" as a protective, safe and intimate refuge where one develops a sense of identity and attachment;
- the immediate housing environment, including the quality of urban design (e.g., public services, playgrounds, green space, parks, places to socialize); and
- the community, that is, the quality of the neighbourhood and its relation to social cohesion, sense of trust and collective efficacy.

Bonnefoy (2007) suggests that a house becomes a home when it acts like a "physical and psychological envelope" that fosters the growth of relationship intimacy and development among its occupants. A house loses its protective value when trouble breaks in from the outside and this may be due to noise, scrutiny, intrusion or other factors. The meaning of "home" is highly individualised and it may not always be a refuge. Experiences of abuse or family violence may characterise the home as a negative experience (Shaw, 2004). A healthy home is not a specially designed house, it is more a
residential setting for a household that is including all standards and "best practice" knowledge that has been gained over centuries of dwelling construction and immediate environment design.

According to Turner (1976), housing can be considered as a product (from an individual housing unit to the housing stock in a neighbourhood or city). He also suggested that housing can be considered as a process by referring to the provision and maintenance of all kinds of residential buildings. Turner's interpretation of housing enables researchers and practitioners to consider the multiple interrelations between housing conditions and human processes in precise localities.

Healthy housing is a comprehensive concept taking into consideration a variety of factors contributing to the quality of housing and housing environments. "Healthy housing" covers the provision of functional and adequate physical, social and mental conditions for health, safety, hygiene, comfort and privacy. The Habitat declaration, Istanbul (1996), defines the characteristics of an "adequate shelter"; which are very much in line with what healthy housing is.

"Adequate shelter means more than a roof over one's head. It also means adequate privacy; adequate space; physical accessibility; adequate security; security of tenure; structural stability and durability; adequate lighting, heating and ventilation; adequate basic infrastructure, such as water-supply, sanitation and waste-management facilities; suitable environmental quality and health-related factors; and adequate and accessible location with regard to work and basic facilities: all of which should be available at an affordable cost. Adequacy should be determined together with the people concerned, bearing in mind the prospect for gradual development. Adequacy often varies from
country to country, since it depends on specific cultural, social, environmental and economic factors. Gender-specific and age-specific factors, such as the exposure of children and women to toxic substances, should be considered in this context...” (2nd HABITAT Conference in Istanbul).

1.2 Feelings of "home" and ontological security:

Housing provides "ontological security" which is defined as a sense of confidence, trust and reliability in the world as it appears to be (Dupuis & Thorns, 1998). Dupuis and Thorns (1998) found that ontological security was present if four conditions were met:

- Home is a site of constancy in the social and material environment, that is, a source of control and privacy. A sense of permanency and continuity is created through home ownership and family ownership over time.

- Home is a space for day-to-day routine and rituals, especially involving children.

- Home is a refuge that provides freedom from the surveillance of the contemporary world, thus enhancing an individual's sense of control over his or her life. Bonnefoy (2007) also suggests that there is a link between home and mental health, as home provides a basis for place attachment and identity, and a refuge from daily life.

- Home ownership is a rite of passage, achievement and source of pride, which forms part of an adult identity.

The meaning of home was, nevertheless, seen as context-specific and varied according to demographic variables such as age.
The most commonly cited definition of health is one contained in the World Health Organization (WHO) charter as "a state of complete physical, mental and social well-being and not merely the absence of disease and infirmity". Health is also defined by Lawrence (2004) as a condition or state of human beings resulting from the interrelations between humans and their biological, chemical, economic, physical, and social environment. All components of the residential environment should be compatible with the basic needs of the residents and their full functional activity, including reproduction over a long period. Health is the result of both (a) the direct pathological effects of chemicals, several biological agents, and radiation; and (b) the influence of physical, psychological, and social dimensions of daily life, including housing, transport, and other characteristics of metropolitan areas.

In the field of health promotion, health is not considered an abstract condition but rather the ability of an individual to achieve her/his potential and to respond positively to the challenges of daily life. From this perspective, health is an asset or a resource for everyday life, rather than a standard or goal that ought to be achieved. This redefinition is pertinent for the field of housing and health because the environmental and social conditions in specific residential environments have an impact on human relations, induce stress, and can have a positive or negative impact on the health status of groups and individuals.

The relationship between housing and health is obviously a complex mix. The lack of health conditions in housing, negatively affects the human health. The body of research conducted over the past 20 years, which shows that associations between housing and health do exist, supports the argument that good quality housing has a role to play in both physical and mental health.
1.3 Housing Satisfaction:

Housing satisfaction is defined by Galster (1987, p.93; cited in Varady & Preiser, 1998) as the “perceived gap between a respondent’s needs and aspiration and the reality of the current residential context”. McCray and Day (1977) refer to housing satisfaction as the degree of contentment experienced by an individual or a family member with regard to the current housing situation. Housing satisfaction is a complex attitude (Satsangi & Kearns, 1992). It encompasses satisfaction with the dwelling unit and satisfaction with the neighbourhood and the area (Onibokun, 1974). According to Ogu (2002) the concept of housing or residential satisfaction is often employed to evaluate residents’ perceptions of and feelings for their housing units and the environment. Lastly, the concept of housing satisfaction has been used as a key predictor of an individual’s perceptions of general “quality of life” (Campbell et al., 1976; cited in Djebarni and Al-Abed, 2000).

Housing satisfaction is influenced by the numerous components in the system and the background characteristics of the occupants. Factors that have been found related to housing satisfaction include: age (Varady and Preiser, 1998; Varady et al., 2001), marital status (Tan and Hamzah, 1979), number of children and family size (Miller and Crader, 1979; cited in Theodori, 2001), socioeconomic status - income, education, employment and welfare (Brown, 1993; Freeman, 1998; cited in Varady et al., 2001), length of residency (Brown, 1993; Marans and Rogers, 1975; cited in Theodori, 2001; Varady and Preiser, 1998), housing physical characteristics (Yeh, 1972), satisfaction with housing physical condition and management services (Varady and Carrozza, 2000), social participation and interaction (Mohd Zulfa, 2000; Varady and Preiser, 1998) and past living conditions as well as residential mobility and future intention to move (Morshidi, et al., 1999; Yeh, 1972). Satisfaction with the dwelling is significantly related to the perception
of air quality, and the visual appearance of the neighbourhood. Satisfaction with the residential area is associated with the level of noise exposure, perceived annoyance due to environmental problems, and the presence and quality of greenery and vegetation. Differences in housing satisfaction have also been found between urban and rural residents. The former are more satisfied with inside storage and inside appearance, whereas the latter are more satisfied with the structural quality of their units and where their units are located in relation to church and social activities (McCray and Day, 1977).

In the housing satisfaction literature concerned with health, satisfaction has been hypothesized both to have an effect on health and to be an outcome of health. Housing dissatisfaction was found to be a significant predictor of psychological distress, controlling for other relevant factors likely to have an effect on health (Kearns et al., 1991). Saito et al. (1993) found poor psychological health among women living in multi-unit dwellings in Japan who were dissatisfied with their housing plan or with the arrangement of rooms. In contrast, the results from a survey of low-income residents of two New Zealand cities found no association between housing satisfaction and psychological distress (Smith et al., 1992). However, the study was a cross-sectional one and there was a failure on part of the researcher to control for gender.

1.4 Housing - Health Relationship:

1.4.1 Poor quality housing/housing conditions

Easterlow and Munro et al. (2003), in examining the relationships between housing and health inequalities, expand upon this by suggesting that housing actually contributes to the accumulation, or depletion, of the "health capital of individuals and communities". This study proposes that housing can either promote well-being or increase susceptibility
to disease, and in some instances the housing system that generally appears therapeutic can even have the opposite effect for people whose resilience is low or whose health is in decline.

An apparent lack of research into the impact of housing on mental health has prompted Evans, Wells, and Moch (2003) to undertake a critical review of existing research, and did so considering housing type (e.g., single-family detached versus multiple dwelling), floor level, and housing quality (e.g., structural damage). The researchers have attempted to develop a preliminary taxonomy of these processes which they believe may account for linkages between housing, and psychological well being. These include identity (given the symbolic nature of the house reflecting our accomplishments and what we stand for, means that failure to reside in a place that is consistent with an individual’s own ideals might influence self-esteem); insecurity (poor housing quality often affects safety, hygiene, local crime rate, hassles with increased maintenance, etc.); social support (isolation and loneliness, and lack of garden / play space); parenting (parenting practices in inadequate housing, especially if suffering from self-esteem and confidence, might include more rigid, restrictive control on activities); and control (poor housing quality reduces behavioural options, diminishes mastery, and contributes to a general sense of helplessness – size and quality of space can also restrict flexibility and disallow multiple uses of space). Evans (2003) noted that stressful housing conditions can aggravate pre-existing psychiatric pathologies.

Studies on house type have suggested that high-rise, multi-dwelling units are detrimental to psychological wellbeing, particularly that of mothers with young children and possibly the children themselves (Evans, Wells, and Moch, 2003). This may be due to
social isolation, a lack of access to play spaces that promote social interaction, the stigmatisation of high-rise living, or a combination of these.

Evans, Wells and Moch's (2003) review of 27 studies suggests that overall housing quality is positively correlated with psychological wellbeing, although issues that may affect this relationship include identity/self-esteem, anxiety about structural hazards or a fear of crime.

Evans (2003) provides some explanations for the possible link between issues with housing quality and mental health, including insecurity/tenure concerns, difficulties with repairs and landlords, frequent relocations, less controllable social interactions, and stigma associated with poor housing.

Welch (1997) examined the mental health effects of substandard housing, based on the experiences of women in a Chicago public housing focus group study. They described "intense loneliness," fear, chronic stress, suspicion, and mistrust of fellow tenants, all of which they attributed to the unpredictable environment in which they live. In this study, crowding, litter, and poor maintenance of facilities were suggested as factors contributing towards creating an environment of ambivalence and hopelessness. The findings also suggested that the mental health of adolescents may also be negatively affected by high levels of neighbourhood violence. Welch commented that in a study of black teens living in public housing, depression was highly correlated with exposure to violence and the perceived probability of not being alive by the age of 25.

One large-scale, cross-sectional, European housing and health study by the World Health Organization has indicated a relationship between depression/anxiety and living in a dwelling that has insufficient protection against external aggressions, e.g., cold,
draughts, noise; has little space for solitude or freedom; lacks light and/or an external view; does not facilitate socialisation; and is prone to vandalism. Low socioeconomic status, fear of losing dwelling, an inability to move due to financial constraints, and a bad image of the neighbourhood also contributed to anxiety and depression (Bonnefoy et al., 2004).

Collings (2000) suggests that people have a perceived high quality of life when there are strong or favourable family or social relationships, ample leisure time, and a high standard of housing.

There is some evidence to suggest that when people move to better quality housing, mental health can improve (AHURI, 2005; Evans, Wells, Chan, and Saltzman, 2000; Wells and Harris, 2007), with Evans, Wells, Chan, and Saltzman (2000) finding that the degree of improvement in housing predicted the level of change in psychological distress.

Hunt and McKenna (1992), in a study of 3 priority housing action areas in Liverpool, explored the effects of housing improvement on health. The study compared health in “capitalized” i.e. extensively renovated and repaired, moderately improved and unimproved housing. In terms of the association between housing quality and long term health problems, statistically significant effects were limited to the 45-64 age group where differences were found for heart problems, high blood pressure and allergy between unimproved and partially improved on the one hand and capitalized improved on the other. (This age group contained an atypically large number of permanently sick, unemployed men). The relationship with children’s health was much stronger, with diarrhoea, wheezing and persistent cough being significantly worse in unimproved
housing. This research was carried out in an area with a history of housing problems, with high levels of poverty and poor health among adults, though the children's health was generally good.

The following discussion about the effects of housing conditions on health is organized into four distinct categories based on the exposure, housing factor, or characteristic:

1) specific physical or chemical exposures; 2) specific biological exposures; 3) physical characteristics of the house; and 4) social, economic, and cultural characteristics of housing.

1.4.2 Specific Physical or Chemical Exposures:

1.4.2.1 Lead: Lead is the main environmental toxin affecting children in housing. The main sources of lead are air, mainly from car exhaust fumes, leaded paint and lead pipes for drinking water. Lead exposure in young children is a particular hazard because children absorb lead more readily than adults do. Children can also be affected before birth. Recent research suggests that there is probably no lower-level threshold of blood lead (Bellinger and Needleman 2003; Canfield et al. 2003). Lead disrupts processes regulated by calcium and changes synapse formation (Bressler et al. 1999). Even at quite low levels (2.5-10 µg), deleterious effects of lead can be detected (Canfield et al. 2003). Mushak and Crocetti (1989) have found lead poisoning to be associated with a decline in children’s IQ, anemia, and damage to the nervous system. An inverse relationship between blood lead concentration and arithmetic and reading scores has been observed for children with blood lead concentrations < 5 µg/dL (Lanphear et al. 2000). No treatment can replace nervous tissue destroyed be chronic lead absorption, or lost intelligence (Landrigan, 1990).
1.4.2.2 Radon: Radon is an alpha-emitting radioactive gas that emerges from the soil and enters homes primarily through openings or cracks in the building foundation or through well water. A house with windows and doors that are kept closed most of the time has higher radon levels. Ambient radon gas and its particulate progeny result in respiratory exposure to alpha emissions. The only established health effect of radon is lung cancer (Field et al., 2000) and radon has been estimated to be responsible for 2,500 deaths per year in the UK.

1.4.2.3 Asbestos: Asbestos is a generic term that covers two kinds of fibrous silicates: the serpentine, mainly chrysotile ("white asbestos"), which has a more flexible texture, and the amphiboles, mainly amosite ("brown asbestos") and crocidolite ("blue asbestos"). The fibres are regarded as being equally toxic to the pulmonary epithelium and to the immune response.

Causal evidence exists in linking asbestos to asbestosis, respiratory tract cancers, malignant mesothelioma, tumours, and gastrointestinal tract cancers, at least in occupational studies (McDonald, 1985). According to the World Health Organization (1987), exposure to very low levels of airborne fibres typically found in buildings poses an extremely low risk of lung cancer — estimated to be between one in 100,000 and one in a million.

1.4.2.4 Electromagnetic Fields (EMF): Exposure to elevated EMF in the household setting usually occurs when homes are located close to high-current electrical power lines. The potential health effect of EMF has been the subject of extensive debate. Research has focused on four possible health impacts of EMF: (1) childhood cancers, (2) adult cancers,
(3) pregnancy outcomes, and (4) psychological effects though the results of these studies have been contradictory.

1.4.2.5 Urea Formaldehyde Foam Insulation (UFFI): The primary sources of UFFI are inside the home: insulation, particle board, carpeting, and gas appliances (Norman and Newhouse, 1986). Studies have examined such health related consequences of UFFI as symptoms of the upper and lower respiratory tract and gastrointestinal tract, asthma and chronic bronchitis, dermatitis, psychological symptoms (such as insomnia and depression), nasal cancer, and lymphoma (Harris et al., 1981, Schenker et al., 1982, Infante et al., 1981, Nantel et al., 1982, as cited in Norman and Newhouse, 1986). However, it is difficult to isolate the health effects of UFFI from other potential chemicals with which it may be combined.

1.4.2.6 Carbon monoxide (CO): Carbon monoxide (CO), an odourless, colourless, tasteless, highly toxic poison, occurs naturally as the by-product of the incomplete combustion of fuels. Early symptoms of CO poisoning are difficult to detect because they may be mistaken for the symptoms of food poisoning or influenza.

1.4.3 Specific Biological Exposures:

1.4.3.1 Hygrothermal Conditions and Mould Growth: Hygrothermal conditions include the factors that affect thermal comfort - temperature, humidity and air movement. Fanger (1970) states “Thermal comfort is that condition of mind that expresses satisfaction with the thermal environment”. He found that thermal comfort is dependent on six main variables, air temperature, relative humidity, radiant temperature, air speed, clothing level and metabolic rate (activity level).
Condensation, a consequence of inadequate heating, insulation and ventilation, encourages mould, fungi and other micro-organisms to grow. Poor social conditions (large household size, state rental housing and financial difficulty with housing costs) were found to be also significant predictors of damp, mouldy homes (Butler et al., 2003). Many moulds in damp houses are allergenic and provide a food supply for house mites which are also potential allergens. At certain stages some fungi become toxic. Mould allergy is a recognized cause of asthma.

Frequently quoted research in this field includes a series of Scottish studies. The study Conducted by Martin et al. in 1987 found no clear evidence to support the hypothesis that damp housing has a detrimental effect on physical health of adults. There was no significant difference in health between those living in damp and non-damp homes, with the exception of emotional reaction scores which were higher in damp homes. However, defective housing was strongly associated with ill health among children. Aches and pains, bad nerves, diarrhoea and headache were more prevalent among children in damp housing; 85% had experienced at least one respiratory problem in the previous 2 months compared with 60% of children in non damp housing. Children in homes with visible mould had higher symptom rates, vomiting and sore throats.

A second study set up by the same research team in winter 1989 reached firmer conclusions on the relationship between adult ill health and damp and mouldy housing. Adults in such housing had more symptoms and were more likely to suffer from nausea and vomiting, blocked nose, breathlessness, backache, fainting and bad nerves. As an example 21% of those in mouldy houses had blocked noses compared with 13% in damp and 14% in dry homes. Levels of nausea and vomiting were 4% in dry homes, 6% in damp and 10% in mouldy homes. Children in damp and mouldy houses showed a greater
prevalence of respiratory symptoms and headaches and fever. A dose-response relationship was established between the number of symptoms and increasing severity of dampness and mould. These differences persisted after controlling for confounding factors and other sources of bias were ruled out.

These studies have been criticized for their reliance on self reported i.e. "subjective" measures of illness, and their concentration on areas where levels of dampness and mould and ill health were particularly high. (In the second study 31% of dwellings were damp and 46% had fungal growth.)

A 1988 Edinburgh study by Strachan tried to address the possible sources of bias by using "objective" measures of respiratory function and bedroom relative humidity and by drawing a city wide sample (from children in 1 in 3 primary schools). The relationship between parental reports of respiratory symptoms, bronchospasm measures after exercise, and the presence of visible fungal mould was assessed in a population of 873 seven year old children. After adjustment for tenure, overcrowding, smokers and gas cooking, children in homes with mould were three times as likely to have (reported) wheeze. However there was no significant difference in the degree of clinically measured bronchospasm and, after considering other physiological explanations, the author concluded that awareness of dampness/mould might be a determinant of parental reporting. Because the sample was drawn from the general population it was possible to calculate excess cases of wheeze (a symptom of childhood asthma) caused by mould as 14%. Although no correlation between respiratory function and mould was found, it had been noted that this study only measured relative humidity in one bedroom, which might be a poor indicator of the microenvironment suitable for mould growth.
Packer et al. (1994) conducted a postal survey of 2353 residents of Worcester to examine the relationship between reported health and dampness. People in damp housing were more likely to report long standing illness, disability or infirmity. The prevalence of long-standing illness was 37% among people in dry housing and 49% among those in damp housing, a disparity which widened after controlling for age, sex and social class, and increased with the severity of dampness i.e. showed a dose-response relationship.

In a 1995/96 study of a mainly Bengali population in Stepney (quoted in Ambrose, P., 1997) monitored illness episodes over a five month period and established statistically significant correlations between damp and inadequate warmth and coughs/colds, digestive disorders and stress/depression. On average people felt ill 37% of the time and 60% of respondents felt their illnesses were very closely related to housing and local environmental conditions.

Depression and the presence of general symptoms like fatigue, headache, dizziness and difficulties in concentration of the residents of damp and mouldy dwellings were also reported by Rylander and Etzel (1999) and Moriske et al. (2003).

The continuing debate about the role of housing conditions in the rising prevalence of childhood asthma and other allergies has led researchers to broaden their search for causal factors. A study in the Scottish Highlands by Austin & Russell (1997) which was based on a questionnaire survey of 1537 children aged 12 to 14 found no consistent relationship between respiratory symptoms and indoor environment although cough was associated with damp, double glazing and maternal smoking. The prevalence of wheeze, cough and atopy was higher in children in more mobile families leading the researchers to
conclude that this factor may be more important than exposure to individual allergens of pollutants.

Strachan et al. (1990) found a highly significant association between mould and wheezing in a study of 1,000 children aged six and seven. The association was found to be largely independent of other social and housing variables. The study seems to suggest an allergy to fungi that may spore.

A case-control study by Lindfors et al. (1995) found that dampness in the home increased the risk of asthma among children of one to four years of age who were also exposed to environmental tobacco smoke.

In a large cross-sectional survey of children aged 12 to 14, home dampness was found to be associated with coughing (Austin and Russell, 1997). However, although the effects are significant, they are not very strong.

1.4.3.2 House Dust Mites: House dust mites (HDM) are microscopic organisms the growth of which depends on a combination of temperature (17-25°C) and humidity (greater than 50 per cent) and on the age, cleaning and use of soft furnishings. This is not normally considered to be a house condition problem; most preventative measures involve cleaning.

In a cross-sectional survey carried out in two Canadian cities with different climates, Vancouver and Winnipeg, Chan-Yeung et al. (1995) measured mite allergen levels in the dwellings of 120 asthmatic patients and found that certain home characteristics, i.e., the type and age of the house, type of heating, use of feather pillows, and the number of occupants favoured the proliferation of HDMs and hence increased levels of their allergens. Mean indoor relative humidity in Vancouver was significantly
higher than in Winnipeg in each season. In multivariate analyses, allergen levels differed significantly from home to home, but were significantly higher in Vancouver than in Winnipeg for all seasons. Floor allergen levels were positively associated with the number of occupants, in both cities.

HDMs cause allergic manifestations in humans, typically manifesting as bronchial asthma, allergic rhinitis, and atopic dermatitis. People with high levels of HDMs in their homes have five times greater risk of having atopic dermatitis (Beck and Korsgaard, 1989). Mites also feed on human skin scale (Platts-Mills and de Weck, 1989).

Trying to find efficient and cost-effective methods for combating the proliferation of HDMs, Colloff, Taylor and Merrett (1995) found that steam cleaning of carpets and furniture is the only method of HDM control combining elimination of the mites and significant reduction of their allergens. Humidity reduction is the most effective method.

1.4.3.3 Cockroaches: Cockroach antigens are proteins found in insects’ saliva, excreta, eggs, and shed cuticles. After being airborne, they are inhaled and induce the formation of antibodies. Allergy to cockroach antigens causes respiratory symptoms in children, which most commonly manifests as asthma. Rosenstreich et al. (1997), for example, have reported a cockroach sensitization rate of 36% in inner-city asthmatic children.

1.4.4 Physical Characteristics of the Home:

1.4.4.1 Various Characteristics and Home Safety: Unintentional home injuries are a serious public health problem. There are two factors relevant to home accidents – human behaviour and dwelling design and maintenance. Behaviour can contribute, to a greater or lesser extent, to a home accident or it can be the sole cause. Young children lack the knowledge and experience to recognise danger, but are inquisitive by nature. The pattern
of accidents among children shifts with hazards of the environment and the child’s stage of development (Ranson, 1993). The mobility and sight of the elderly may be impaired. Elderly persons over the age of 75 years account for more than half of all home accidents. These accidents are largely as a result of falls, many of which can be fatal (Ranson, 1990). A person may be distracted by something, such as an unexpected noise. Some people, while in a rush, take risks, whereas others may be maladroit, or just careless. There may be an association between accidents and a reduced understanding of hazardous risks (Ranson, 1993). Also, occupiers can create hazards by leaving obstacles on stairs, having loose carpets, and leaving medicines and cleaning products easily accessible to young children. Studies have demonstrated a close correlation between the number of home accidents and socioeconomic characteristics such as income and class (Constantinides et al., 1986).

Houses contain physical dangers, many of which society considers necessary or desirable – such as gas and electricity supplies, steps and stairs, and balconies. Most of these can be made relatively, but perhaps not completely, safe. However, some structural features may increase the risk of an accident. For example, small children may use the horizontal bars to balcony guarding as a climbing frame, and a trip hazard may be created by the small change in floor levels in unexpected locations.

It is necessary to ensure the following two lines of action: Home safety awareness campaigns and actions to ensure potentially dangerous dwelling features are removed or minimized.

The results of a pan-European housing survey recommended by a housing and health expert meeting convened by WHO in Paris in 2000 (WHO 2000: Integrated...
approaches to housing and health. Meeting Report) suggest that the likelihood of any accident is increased where:

- there is dissatisfaction with the dwelling size and/or layout;
- bedrooms are shared;
- the home is considered too warm or too cold;
- there is poor natural lighting or glare; and
- there is dissatisfaction with the kitchen or insufficient workspace.

The results also show that the incident of an accident is significantly greater where the individual is tired all the time or most of the time. There also appears to be a link between sleep disturbance and accidents, with 22% of those reporting an accident also report having their sleep disturbed during the previous four weeks.

1.4.4.2 Perception of safety and fear of crime: A dwelling is defined as a holding space, a physical and psychological envelope within which intimacy will appear and develop and where each and every individual will find an opportunity to be himself or herself. Thus, what was just a house will become a home. Integrity of body and mind are dependent upon this possibility of living in intimacy. A house will become that by which an individual, or a family group, will be able to control its relationship to the outside world and define the limits of intimacy, of what is private and what is public.

The concept of private space is akin to that of private property. Poor quality housing, providing insufficient protection from the outside, from noise, scrutiny and intrusion, turning a housing project into some sort of “community loft”, can be the source of major suffering. Ill defined boundaries of a home allowing easy unauthorized entry from the outside will induce the feeling that intimacy is intruded upon with a subsequent
feeling of badly defined self. Such events may generate pathological manifestations such as anxiety, depression, insomnia, paranoid feelings and social dysfunction.

There are two relevant but strongly overlapping concepts for public safety issues: a) the more general perception of safety; and b) the more specific fear of crime (Austin et al. 2002). As far as the subjective perception of safety is concerned, it is especially the occurrence of physical or environmental cues in the residential environment that leads to insecurity and feelings of not being safe (Mozingo 1995). Such cues that raise concerns about safety issues can, for e.g., be physical incivilities such as deterioration of neighbourhoods, trash or graffiti (indicating a low community spirit and, in effect, a low social control), and social incivilities such as conspicuous youth groups or persons with strange behaviour (questioning the degree to which social norms and customs may be kept) (Halpern 1995).

Previous findings have demonstrated that fear of crime is strongly associated with prior victimization and with the prevailing rate of crime in the city or the immediate vicinity. Other important factors affecting feelings of safety and fear of crime include having windows that close properly, being able to escape in case of fire, having adequate working lights in the common areas, and being able to overlook the street from some part of the dwelling. Knowing the importance of this condition on quality of life, reducing “fear of crime” through actions at housing level will improve the health and overall well-being of the population.

1.4.4.3 Design Characteristics of the House: The housing environment can positively or negatively influence people’s ability to satisfy their needs in terms of contact with others, privacy, experiences, play and development, structure, identification, and aesthetics
The findings of past research suggest that successful adjustment to high-rise living is affected by such factors as the nature of the physical structure, social networks, and the adaptability of children (Williamson, 1981). Ambrose (1997) has listed indirect effects as including lowered resistance to physical and mental illness through living in a poor, stressful and uncongenial setting; unhealthy habits (possibly coping strategies); and reduced self-organisation.

Floor level is a research area that has not received a great deal of attention. A review of the literature on mental health and high-rise housing by Freeman (1993) concludes that evidence of a positive correlation between mental health and floor level is modest. To determine the independent effect of the height of a dwelling from the ground on mental health requires controlling for social class, size, and quality of the dwelling, stage in the life-cycle, structural features of the block, and the immediate surroundings of the block (Freeman, 1993). However, it is hard to separate these factors since they tend to cluster.

1.4.4.4 Location of the House: A small body of work has considered housing in the context of its location. McCarthy et al. (1985) conducted a study in the north east of England and analysed respiratory condition according to 5 independent variables; housing area - whether "good" or "bad"; dwelling type; smoking; working environment; and class. While the smoking variable emerged as the most powerful determinant of respiratory illness, when smoking, age and the other three variables were controlled for, people living in poor and particularly difficult to let housing areas still had more symptoms than those in good areas. Residents in the former were more likely to associate their chest condition with their housing circumstances.
1.4.4.5 **Building Type:** There has been some suggestion that there is a relationship between housing type and psychological health, whereby persons living in high-rises or multiple dwelling units are unhappy about their housing circumstances than those who live in houses (McCarthy, Byrne, Harrison, and Keithley, 1985). This unhappiness may result in the development of psychological distress, and eventually, some form of mental illness. Mental health of occupants of high-rise flats has been found to be poorer than that of equivalent households living in different situations (Ineichen, 1986, cited in Blackman, Evason, Melaugh and Woods, 1989). Edwards et al. (1982) found that apartment dwellers had a greater likelihood of reporting symptoms of stress.

Numerous studies had identified depression in mothers living in flats, both low-rise and high-rise, but comparative studies have failed to agree whether neurotic symptoms are more or less common in flat dwellers compared with house dwellers; flat dwellers do consistently complain more. One study found reduced symptoms after families moved out of flats, while another concluded it was the area rather than the dwelling type which was more closely associated with psychological impairment. This body of research (summarized in Lowry S, 1991) typifies the problems of confounding variables where housing characteristics are embedded with poverty, illness and social problems.

Security is a major issue in high-rise buildings. Threats to security can realistically be considered a health risk and can result in psychological distress Van Vliet (1983) also emphasizes the need for planning to include contextual considerations, including factors such as building type and residential location.

1.4.4.6 **Density and Overcrowding:** It is commonly assumed that living in a crowded environment is unhealthy. This has led researchers to hypothesize about a wide range of
outcomes that could be influenced by high levels of household crowding, including psychological health, physical health, and specific bacterial diseases such as those caused by Haemophilus influenzae type b.

It has been hypothesized that high density leads to mental "overload," and that an overabundance of inputs can have an adverse effect on the mind. However, the findings from the literature on psychological health are mixed. A group of studies have found household density to be related to mental health (Gove, Hughes, and Galle, 1979; Landon, 1996; Blackman et al., 1989).

The results of other studies suggest that density may interact with other factors in its effect on psychological health. A study of low-income residents from two New Zealand cities found an association between housing discomfort and psychological distress (Smith, Kearns and Abbott, 1992). Other studies have found no relationship between density indicators and alcohol problems (Kearns, Smith and Abbott, 1991) or psychological health in general (Saito et al., 1993). There is some suggestion in the literature that the relationship between household density and psychological health may be non-linear, with increased psychological symptoms for both low density housing and high density housing (Gabe and Williams, 1986). An influential study of women in West London done by Gabe and Williams (1993) showed a J shaped relationship between internal density and psychological symptoms (i.e. symptoms initially fell then rose as density increased), a relationship which persisted when variables such as social class, unemployment and the presence of children were controlled.

Studies examining the influence of household density on physical health have employed both general physical health indicators as well as the prevalence of particular
diseases or infections. Those that employ general measures of physical health, find a relationship with crowding indicators. Gove et al. (1979) found a strong association between the experience of crowding and poor physical health with respect to the following indicators: generally getting insufficient sleep, catching infectious diseases, and not being cared for by others when one is sick.

A group of studies have shown associations between household crowding and various measures of mortality. An aggregate-level analysis of London boroughs revealed strong correlation between mortality and population per hectare and between mortality and persons per room among individuals 55-63 years of age. This study controlled for social class (Kellett, 1993). Landon (1996) found that living in overcrowded conditions was among the most significant indicators of increases in ill-health or mortality from heart disease, respiratory disease, asthma, and tuberculosis. An analysis of geographical distributions of mortality in Scottish communities found significant correlations between stillbirths and perinatal mortality and persons per room, while post-neonatal mortalities was significantly correlated with persons per hectare (Williams and Lloyd, 1990). In a follow-up study of a subgroup of subjects who were children at the time a housing survey was carried out in Chesterfield, Coggon et al. (1993) found death rates to be high among individuals whose houses were crowded.

1.4.4.7 Accessibility and usability of housing: Accessibility includes the concept of complete use of the dwelling and immediate environment. It is not sufficient for a person to merely have access to the building, dwelling or environment, but she/he has to be able to make a complete use of the building and residential environment regardless of her/his age or physical condition. Accessibility refers to the meeting between a person’s or...
group’s functional capacity and the environmental demands, i.e. person – environment fit (P-E fit).

There is some evidence that higher levels of housing accessibility problems are related to a dependence of activities of daily living like washing, cooking, or getting dressed (Fänge, 2004; Nygren et al., 2004; Sixsmith et al., 2004), low subjective well-being (Iwarsson and Isacsson, 1997), poor perceived health, and poor psychological well-being (Oswald et al., 2004; Tomsone et al., 2004).

The issue of accessibility problems is of importance for all frail groups of the society, for instance in Germany, one-third of the persons above 80 years have problems in climbing staircases (German Ministry for families, elderly, women and youth, 1996).

The issue of housing accessibility therefore receives increasing attention, in particular since in most countries the proportion of elderly people increases – as well as the proportion of elderly living in their own dwelling.

1.4.4.8 Indoor Air Quality: A considerable range of factors that fall under the broad heading of indoor air pollution have been considered to affect health. Among those which have received attention in the literature are exposure to tobacco smoke, volatile organic compounds, pollutants emitted from cooking with gas and heating, nitrogen dioxide, sulphur dioxide, ventilation, and “sick building syndrome.”

a) Environmental Tobacco Smoke (ETS): ETS can be harmful to human health, in particular for children. Effects include asthma, Sudden Infant Death Syndrome (SIDS), bronchitis and pneumonia and other respiratory diseases. It has also been suggested that ETS also has an adverse effect on the developing fetus (Dejmek et al., 2002). Exposure to tobacco smoke during and after pregnancy is associated with prematurity, low birth
weight, low Apgar scores, poor growth of infants, and dysfunctional behavior (Bauman et al. 1991; Eskenazi and Trupin 1995; Fergusson et al. 1993; Williams et al. 1998). Currently, evidence related to child development and behavior is stronger for prenatal than for postnatal exposure. Recent research using blood cotinine levels as an indicator of exposure to ETS shows a robust inverse relationship between postnatal cotinine levels and cognitive scores (math and reading) in 6- to 16-year-old children. The relationship remains statistically significant after controlling for various characteristics (Lanphear et al., 2000).

Exposure to secondhand smoke may also cause lung cancer, eye, nose and throat irritation and may affect the cardiovascular system.

b) **Volatile Organic Compounds:** The presence of volatile organic compounds in dwellings is primarily the result of building and furnishing materials (Harving, Dahl, and Molhave, 1991). Virtually all materials and products employed in construction, furnishings, consumer products, and pesticides emit organic compounds. Combustion fuels, tap water, and tobacco smoke as well as human metabolism, also generate a substantial variety (Angle, 1988). Examples of organic compounds include propane, butane, limonene, methylene chloride, tetrachloroethylene, benzene, ethanol, methanol, and acetone. The literature to date generally supports the association between volatile organic compounds and various respiratory outcomes.

c) **Emissions of pollutants from cooking with gas and heating** have been found to affect respiratory illnesses in children. Observed effects were an increase in respiratory diseases (Burr, 1999) and respiratory infections (Chauhan et al., 2003), an increase in the susceptibility to asthma and changes in lung function (Corbo et al., 2001).
d) **Energy and socioeconomic aspects:** The household energy and appliances uses must be taken into account in terms of health and comfort. Cooking and heating can affect respiratory health, in particular in children (Triche, 2002). Use of some heating sources and fumes from certain heating fuels may have adverse health effects (Dejmek et al., 2002). Acceptable levels, from a health point of view, of indoor air pollutants related to energy production can be achieved by eliminating or controlling the sources of these compounds and by maintaining adequate ventilation in the dwelling.

e) **Ventilation:** The concentration of pollutants depends upon rates of production and removal, the source, and their dilution by ventilation (Lowry, 1989). In terms of air quality, ventilation can take on two different meanings: (1) the supply of fresh outdoor air to occupied regions of a building and (2) air circulation within a dwelling, not necessarily including the supplementation of any fresh air (Mood, 1993). Healthy dwellings should have both kinds of ventilation.

Low air movement and poor building ventilation are risk factors for heat illness (Collins, 1993). Overall reduction of indoor air pollution may be achieved through increased ventilation throughout the structure or in particular areas (Samet et al., 1988). Controlled ventilation can also produce a better level and consistency of indoor air quality while preserving energy efficiency (Raw and Prior, 1993).

f) **“Sick Building” Syndrome:** The symptoms of “sick building” syndrome include irritation of the eyes, nose, and throat, dry mucous membranes and skin, skin rashes, mental fatigue, dizziness, airway infections, coughing, hoarseness, wheezing, non-specific hypersensitivity reactions, nausea, and diarrhea. These symptoms occur with no explanation in clusters associated with a specific building. Often the building is relatively
new (Lowry, 1989). No single factor, not even psychological distress or hysteria, has successfully explained the numerous physical complaints of occupants of stuffy buildings (Angle, 1988). Most frequently incriminated in sick building syndrome are volatile organic compounds (Angle, 1988).

1.4.4.9 *Sleep disturbance and strong annoyance during day time:* Sleep is an essential condition for humans and can be severely disturbed by noise. Acute sleep disturbances affect the subjective condition and with an individual latency, also affect qualitative or quantitative performance. Environmental noise acts as a stressor at night by disturbing sleep and via strong annoyance (or bothering) during the day and may impair the cardiovascular and the mental health in the long run (Babisch, 2000; van Kempen et al., 2002; Lercher et al., 2002; Maschke et al., 2003; and Rosznlund et al., 2001).

1.4.4.10 *Cold and Heat:* Housing must provide protection from extremes of temperature well as other environmental hazards (Collins, 1993). The thermal equilibrium of the body is affected by four environmental elements in the indoor climate: ambient air temperature, radiant temperature, air humidity, and air movement. The interaction of these factors generates thermal stress and can cause undue heating or cooling of the body (Collins, 1993). The occurrence of noticeable shifts in indoor conditions are a health threat, particularly for vulnerable groups like the elderly, infants, the sick and the disabled and those who spend most of their time indoors. One study shows a minimum in cardiovascular mortality at a daily mean temperature of about 20 °C and an increase in mortality both as the temperature drops from this point and also as it rises, (Wilkinson, Armstrong and Landon, 2001). This relationship has been shown for many cities around the world with the minima consistently near 20 °C except for some tropical countries that have higher minima. Studies have indicated that rheumatic pain is linked to climatic
conditions, specifically humidity and temperature (Strusberg et al., 2002). The incidence of domestic accidents also increases in winter, probably due to the effect of cold temperature on cerebral function. Two analyses of hospital admissions for cold related illnesses in Edinburgh and Glasgow between 1970 and 1980 and between 1980 and 1985 (cited in Markus T, 1993) showed that cold weather explained at least 10% of admissions, with highest correlations with bronchitis/ emphysema.

1.4.5 Social, Economic, and Cultural Characteristics of Housing:

There are many conceivable relationships between health and the social, economic, and cultural characteristics of housing. Access to adequate and appropriate housing at an affordable price is one of the essential human needs for even basic survival.

1.4.5.1 Housing Tenure (Owning and Renting): Housing tenure refers to whether occupants own or rent their housing. Kind et al. (1998) reported that: “When respondents were grouped according to housing tenure, significantly higher rates of problems were recorded on all the dimensions for those living in rented property compared with owner occupiers.” Studies have examined associations between housing tenure and various types of cancers, sudden infant death syndrome, and chronic illness. Two studies in Italy examined the association between tenure and cancer (Faggiano, Zanetti, and Costa, 1994; Rosso et al., 1997). Faggiano et al. (1994) investigated cancer risk and social inequalities in Italy and found that renters had higher odds of lung cancer and cancers of the upper respiratory and digestive tract. Using education and housing tenure as proxies for social class, Rosso et al. (1997) found home ownership to be significantly associated with a lower risk for cervical cancer, prostate cancer, and bladder cancer, when controlling for education.
An Australian study found that people in rental accommodation were more likely than homeowners to report fair/poor health and visit the doctor more often, but the cause and effect relationship is unclear (AHURI, 2002).

The effect of security of tenure on family stability in relation to public housing residents is described in a study by AHURI (2006). Security of tenure resulted in less residential mobility, which in turn meant residents felt more in control, more settled and less stressed. As a result they had more "mental room" to focus on things such as relationships or their children's education.

Shaw (2004), however, points out that although housing tenure is associated with better health outcomes, it is context-dependent, with a range of material factors (e.g., gardens, less damp/mould) and meaningful factors (e.g., able to do what you want with home) involved.

1.4.5.2 Insecurity and debt: Research on the effects of housing payment problems on health indicates that the health effects can be significant. In one Australian study, Yates and Milligan (2007) found that experiences common to stressed renters and stressed recent purchasers included the constant stress associated with a lack of money (which contributed to health problems and stress on family relationships), and financial hardship outcomes (such as children missing out on school activities and adequate health care).

Cummins, Woerner, Tomyn, Gibson and Knapp (2006) reported that worrying over not being able to make mortgage or rental payments contributed to significant damage to wellbeing. More generally, the wellbeing of renters was well below the normal wellbeing range, particularly for older renters (46-55 years) and sole parents.
A large-scale Canadian study found a gradient in mental health status by housing tenure, even after controlling for demographic variables such as age, gender, marital status and education levels (Cairney and Boyle, 2004). Home owners without mortgages reported less psychological distress than home owners with mortgages, who in turn reported less distress than renters. This type of low-level, "everyday hassles" stress may be more difficult to address than stress associated with significant life events (Reding and Wijnberg, 2001). Housing affordability can be a source of independent chronic stress, often in addition to other stressors, for low-income people in particular (Mueller and Tighe, 2007). Stressors can also have widespread repercussions, with responses to the stress creating further stressful circumstances for the self and others. For example, the anxiety and stress associated with a lack of permanent, affordable housing may contribute to child neglect, with children in turn becoming depressed, aggressive or difficult for parents to handle (Leslie, 2005).

1.4.5.3 Social bonds: An individual's sense of security and quality of life depends very much on the establishment of good relations with neighbours which in turn depends on circumstances, on how they take place, on how the building and the built environment are spatially organized, on the quality of the building, its maintenance; the way people look at each other, that is, whether they perceive others as a nuisance, as potentially dangerous or even as outright foes.

Neighbourhoods may influence the health of individual residents in different ways: via the social and physical environment, as well as through facilities and services. Ellen et al. (2001) suggest that neighbourhood context influences health through neighbourhood institutions and resources, through stresses produced by the physical and social environment, and through neighbourhood networks and norms. Macintyre et al. (2002)
also distinguish between material resources shaping neighbourhood services and the physical environment, and collective social functioning and practices. Both sets of authors point out that not all groups within the neighbourhood may be affected by the same factors. In addition, social factors may interact with neighbourhood resources.

Researches have indicated that neighbourhood factors are not equally important for the health of different subgroups. It seems likely that women with children, older people or the unemployed who spend more time in their neighbourhoods will be more vulnerable to neighbourhood conditions such as poor social support and inadequate services. Campbell et al.'s (1999) study pointed to strong gender and age differences in social networks and in the support that individuals derived from such networks. Ellaway and Macintyre (2001) found in a study of four Glasgow neighbourhoods that local problems and neighbourhood cohesion predicted health more strongly in women than in men for three out of four of their health measures (these were measures of physical symptoms). They also found that the most negative perceptions of the areas came from women with children, and women who were not employed outside the home. Robert (1999) found evidence that both supported and contradicted the hypothesis that women's health is more influenced by community socioeconomic context, and it seems that male and female health may be associated with different aspects of the neighbourhood (Molinari et al. 1998). Boardman et al. (2001) found that the association between neighbourhood disadvantage and drug use was stronger among individuals on lower incomes; and Kobetz et al. (2003) found that neighbourhood poverty had a more pronounced effect on the health of women if their income was below the neighbourhood median. Caughey et al. (2003) found that mental health problems in children showed an inverse relationship with the number of neighbours their parents knew in wealthy areas, but a positive relationship with
the number of neighbours known in poor areas. Berkman et al. (2000) have suggested that the benefits of social engagement are seen as distinct from those of social support which an individual may derive from close relationships with friends, relatives and neighbours, in that they may provide individuals with a consistent sense of identity and purpose, and contribute towards general self-efficacy, thereby helping to buffer the stresses caused by poverty and income inequalities that may contribute to high levels of social disorder (Cattell, 2001; Wilkinson, 1996).

1.5 The neighbourhood as a physical and services environment:

Aside from differences in housing conditions between neighbourhoods, which may relate to physical and mental health (Ellaway and Macintyre, 1998; Blackman et al., 2001), area health differences may reflect differences in the ease of access to essential services such as food shops, pharmacy and doctor (Morland et al., 2001; De Bourdeaudhuij et al., 2003), or stem from different opportunities for health related activities associated with differences in the provision of leisure services such as parks and leisure centres. In addition, more subtle environmental variables may influence health-related activities, as factors linked to the amount of traffic, provision of sidewalks, connectivity of paths, safety and aesthetic pleasure may promote or discourage the use of local streets and open spaces for physical activity and social interaction (Brownson et al. 2001; Giles-Corti and Donovan, 2002; Craig et al., 2002; Saelens et al., 2003).

Along with affecting the propensity to engage in health-related activities, environmental factors such as appearance, landscaping and noise may play an important general role in determining whether the neighbourhood is an enjoyable or a stressful place to live in. (DeVries et al., 2000 and Kaplan, 2001). Thus there are potential neighbourhood
environmental effects on health that parallel the influence of social context at the community level, in shaping health-related activities as well as general levels of stress and residential enjoyment.

Ellaway, A. and Macintyre, S. (2001) reported that in addition to the direct effects of housing and neighbourhood conditions on health, there are indirect effects caused by lack of opportunities to access education, jobs, services etc. Her research in Glasgow had compared 4 socially contrasting neighbourhoods and found that health related behaviours (smoking, drinking, diet, exercise etc.) were independently associated with neighbourhood among adults after controlling for gender, age, social class and income. She has concluded that housing disadvantage, personal disadvantage and neighbourhood disadvantage are inextricably linked in ways which influence health.

1.6 Identity and housing:

Identity has to do with that feeling that one is oneself (permanence of self) and at the same time different from others, and a number of processes contributing to the building of the self is based upon housing characteristics. Personalization of a space of intimacy in a home allows for feelings of being separate and differentiated. Loss of control over the environment, or difficulties in appropriating space will unsettle individuals and groups. Disorderly, reactive and transgressive appropriations will appear in overly impersonal places, in spite of the weight of standardization, under the form of vandalism, tagging, damaging common property and so forth (Freeman, 1993; Green et al., 2002).
1.7 Supportive Environment:

To sum up, the residents' perceptions of urban environmental quality and satisfaction with their residential situation have been found to be determined by a large number of different residential aspects (e.g. by physical, social and physical planning aspects). The most important residential quality aspects appearing in the literature are social ties in the neighbourhood, safety risks (e.g. crime, traffic), environmental hygiene (e.g. noise, air pollution), and the presence of facilities (e.g. shops, greenery). Personal characteristics like age, gender and socioeconomic status appear to influence quality judgements only marginally. It is not only the measurable "objective" aspects of the living environment that determine whether people are satisfied, but also the perceptions of these. These do not always parallel each other. Here lies the relevance of the concept of Supportive Environment which has been used in the field of health promotion and prevention to emphasize that policy definition and implementation should focus on all determinants of health, not just those within the health sector (Bistrup, 1991). Therefore, this concept includes the role of physical environmental factors that influence health, not only the lifestyle of individuals and groups in specific localities. In addition, supportive environment is not limited to the physical characteristics of the environment because it accounts for cultural, social, economic, and political dimensions.

Hence, the cluster of above mentioned issues are quite relevant and have had immense potentials to assess the consequences of living in any sort of residential setting – specially the high-rise buildings in urban area or in metropolitan cities.