

## Housing future for ageing in place

Dr Elizabeth Karol  
Curtin University of Technology  
GPO Box U 1987  
Perth 6845, Western Australia

Nancy Spanbroek  
Curtin University of Technology  
GPO Box U 1987  
Perth 6845, Western Australia

### **Abstract**

This paper examines how the desire of people to age in their home is being met through the design of new and renovated homes in Western Australia. The question is asked whether new housing portrayed in the popular press in Western Australia considers the older and potentially frail home occupant. The publicity given to new homes over the recent past in the 'New Homes' weekly supplement of the West Australian Newspaper was reviewed and analysed to determine what emphasis has been given to ageing at home. The analysis shows that there is almost no consideration of the older, frail occupant in the design of new houses. This indicates that baby-boomer consumers are not yet recognizing their own future needs of the housing market. In addition housing designers are taking no initiatives in this area.

### **Background**

#### **Housing stock**

The Australian Housing and Urban Research Institute Research Agenda (2006) states that Australia's ageing population is one of the most significant policy challenges of the 21<sup>st</sup> Century. The Agenda refers to the need to provide for older people who wish to age in their own homes and acknowledges that the physical housing stock will have important ramifications for future generations. In spite of this emphasis in public policy since the 1970s (Department of Health and Ageing 1997) and currently in the popular media it is debatable whether new homes actually address the needs of the frail elderly, even though the homes now being constructed will inevitably be occupied by an older person at some stage.

In Australia new homes form approximately 2% of the housing stock in any one year. However in Western Australia, new homes are being started at the rate of approximately 80 per day (ABS 2006). This is an annual increase of approximately 4% on the current housing stock in Western Australia (Australian Bureau of Statistics 2005).

Despite the trend toward smaller households and the slight shift towards higher density housing, the average number of bedrooms in Australian dwellings has increased. In 1991 the average number of bedrooms per dwelling was 2.8 (Australian Bureau of Statistics 1994) whereas the latest data shows that the average number of bedrooms per dwelling is 3.3 (Australian Bureau of Statistics 2005). In 1997-8, half of all dwellings had three bedrooms, 23% had four or more and 21% had two bedrooms (Murray, Wright et al. 2005).

The design of the new typical project home has not changed substantially for 60 years. Existing and new housing stock is primarily designed for the nuclear family, a detached house with three or more bedrooms, where rooms are program specific with 'special purpose' areas such as home theatres and parent retreats being added to conventional Australian house plans (Murray, Wright et al. 2005). Baby-boomers (people born between 1945 and 1963) are moving into many of these new homes or are carrying out major renovations on their existing homes to accommodate 'special purpose' rooms.

The question asked in this paper is whether there is any indication that an older occupant is being considered in the new homes that are currently being constructed? Is there any indication that the principles of Universal Design (as described in Australian Standard 'Adaptable Housing AS4299') in the areas of accessibility, personal hygiene and safety or an equivalent of 'WoonKeur', a user-quality label for housing in the Netherlands that indicates barrier-free architectural design, supportive interior design, and technologically-advanced assistive devices (Englebert 2005), is being considered in house design in Western Australia?

### **Population characteristics**

Australia's population is ageing and the youngest of the baby-boomers will turn 65 in 2029. In 2051 it is predicted that between 26% and 38% of the population will be 65 years or older compared with only 12% of the population in 1994 and 13% of the population in 2004 (Australian Bureau of Statistics 2005a). This aged cohort will be made up of two distinct groups of baby-boomers. Each group will make different housing choices. One group will consist of relatively wealthy people with significant superannuation and investments who are entering into a period of unprecedented and extended retirement. The other group will be reliant on the age pension and may need to work past the normal retirement age (Murray, Wright et al. 2005).

These baby-boomers are differentiated from preceding and succeeding generations in that they share life experiences that could well influence their choices in their retirement. Baby-boomers have experienced considerable shifts in household types, leisure patterns and financial expectations in contrast to previous retirees. This suggests that the baby boomers will seek alternative housing services, experiences, locations and types to those currently provided (Murray, Wright et al. 2005).

The baby-boomer cohort is also expected to be made up of a significant number of lone person households. (Australian Bureau of Statistics 2004) indicates that there could be between 2.4 million to 3.4 million people living alone by the year 2021, an increase of between 52% and 113%, from the 1996 level of 1.6 million. Growth in lone person households in Western Australia is projected to be the fastest of all the States and Territories, increasing by between 73% and 170%, from 155,000 households in 1996 to between 268,000 and 418,000 in 2021.

Another characteristic of the aged cohort is that a significant proportion will probably have some sort of disability. It is estimated that the total number of people living in Western Australia with disabilities will increase by 48% by the year 2021 (Australian Institute of Health and Welfare 2000). In 2003, 56% of Australians aged 65 years or above had a disability with 21% of Australians aged 65 years or above having a profound or severe disability<sup>1</sup>.

### Ageing in place

It is anticipated that the baby boomer generation, as with their parents and grandparents before them, will wish to remain in their homes as they age, irrespective of the adequacy of the housing. Yet (Olsberg and Winters 2005) in a study of 7000 older<sup>2</sup> Australians found that baby-boomers had the lowest expressed desire to age in their current homes. They saw 'ageing in place' as a negative idea representing immobility and old age. Baby-boomers attachments related more to familiarity with local services and facilities and proximity to friends. Evidence is not yet available to confirm whether these research findings will translate into actions for the baby-boomers although it appears that the term 'ageing in place' may take on a broader meaning than at present.

According to the American journalist Philip Langdon (2003) older people in the United States have a resistance to moving house even when the existing home lacks convenience. They remain in detached houses on large lots partly because they haven't seen attractive alternatives. He supports this position with figures that indicate that people in the 55-64 age bracket move less than a third as often as people aged 25-34.

(Kochera 2002) also points out the lack of design consideration for older occupants and its impact on ageing in place in the United States. In his review of single family homes, he states that one key method to promote continuing independence in the home is to modify existing houses to meet the unmet structural needs of the occupants. However, in the long run it may be even

---

<sup>1</sup> Profound or severe disability is defined in this data as a restriction, limitation or impairment lasting at least 6 months that relates to self-care, mobility or communication where the person needs assistance with tasks and/or has trouble understanding or being understood (Australian Institute of Health and Welfare 2000). Australian Institute of Health and Welfare (2000). Disability and ageing: Australian population patterns and implications, AIHW. **AIHW cat. no. DIS 19.**

<sup>2</sup> In this study, 'older Australians' referred to people over 50 years of age.

simpler (and possibly cheaper) to incorporate a number of architecturally friendly design features into new homes as they are being built.

A similar situation is highlighted by Denys Correll (2002) in a discussion related to the inadequacy of finances for home and community care services in Australia. Correll (2002), in a discussion about what needs to be considered if healthy ageing is to be successfully encouraged in Australia, referred to the difficulty of accessing low-level Home and Community Care (HACC) services that will assist older people to stay in their homes. Correll (2002) described an 'absurd situation' of older persons seeking hostel care for two reasons, both of which could be overcome by forward planning. One reason related to the design of their houses and gardens. These were designed without the older occupant in mind, both in terms of useability and maintenance. The other reason was the lack of availability of regular nursing and home-help assistance.

### **Universal Design/'WoonKeur'**

Universal design refers to the incorporation of standard design elements to meet the competencies of all people regardless of age, condition or ability (Coleman 1994). In Australia the principles of universal design are described in Australian Standard 'Adaptable Housing AS4299'. The Universal Housing Design Working Group for the Office of the Public Advocate in Queensland (2005) describe the following performance requirements for non-discriminatory housing:

1. Persons of all ages and abilities are able to gain easy access to at least one entry doorway from the road or to the inside of the dwelling from within any enclosed car accommodation.
2. The dwelling enables persons of all ages and abilities to enter or exit the building through a required doorway.
3. The dwelling enables persons of all ages and abilities to circulate and gain easy access within the living and outdoor living areas, to at least one bathroom and toilet, to kitchen and dining area and to at least one bedroom or room capable of being converted to a bedroom.
4. The dwelling enables persons of all ages and abilities to circulate within a kitchen area.
5. The dwelling minimises the likelihood and severity of an injury to a person caused by windows and doors closing unexpectedly.
6. The dwelling includes door, cupboard and window operating mechanisms which can be used by persons of all ages and abilities.
7. The dwelling includes switches, power points and environmental controls which can be easily reached by persons of all ages and abilities.
8. The dwelling enables persons of all ages and abilities to see the external ground surface within the property boundary from the bedroom that accommodates them.
9. The dwelling enables vertical access to be provided between all

levels of the building at any time in the future.

However the Universal Housing Design Working Group recognized that there were barriers to implementing the recommendations. Many of the barriers were related to costs. It was identified that the costs could be minimized if universal design features were included within the original design as adaptations to a traditional design would cost up to 20% more than early inclusion. The skill of the designer was identified as the major determinant for minimising the costs involved for universal design.

Englebert (2005) refers to 'WoonKeur' (translated as 'label for living') as indicating that a house is accessible, adaptable, safe and user-friendly. This 'label for living' is targeted at new residential projects. The label provides criteria for the technical aspects of user friendliness and economy for simple adaptation. This includes provisions that the home be fully accessible at entry level to visitors in a wheelchair and the bathroom must allow for easy wheelchair manoeuvrability, a lift must be able to be installed without requiring major structural changes and floor unevenness can not exceed 20 millimetres. In addition the house must remain useable for at least 50 years. Criticism of the label comes from designers not accustomed to focussing on both current and future occupiers of a dwelling, individuals whose personal demands may not be in line with future adaptation and from developers due to additional capital costs (Englebert 2005).

Another aspect of appropriate housing that should be addressed in a new house but is not specifically mentioned in AS4299 or 'WoonKeur' relates to lighting levels. Lighting levels contribute to independence and home safety. To enable older people to perform visual tasks to maintain independence and perform normal tasks such as reading, writing and safely moving around without tripping the lighting level should be approximately three times higher than for a young occupant (Aarts and Westerlaken 2005). This requirement is based on physiological ocular changes showing that only approximately one third of the light will reach the retina of a 60 year old compared to a 20 year old (Weale 1963). The need for higher levels of lighting is also compounded by the visual impairment from disease that occurs in older people.

## **Method**

The West Australian newspaper, Perth's only daily paper, produces a New Homes Supplement (NHS) every Saturday. The NHS includes a series of articles (average of 11 articles per edition over a one year period) by a team of journalists as well as advertising by project home builders. Anderson (2006) advised that the journalists for the NHS range from new graduates to experienced journalists with a passionate interest in the building industry.

Each article is developed on the basis of conversations with the marketing person or designer of the project and a personal visit. The articles, usually between 500 and 1000 words long, describe in words, photos and frequently with a plan, recently completed display homes and one-off designs

highlighting aspects of the particular home that would be of public interest. The NHS provides some indication of the public's housing dreams and aspirations and the type of house being built in Western Australia (Pegler 2005).

These articles in the NHSs have been scrutinized by one of the author's since April 2004. In this paper the results of a detailed examination of a limited number of these NHSs is presented for a 13 week period commencing in March 2005. These results are enhanced with a comparison of one week in April 2004 and one week in March 2006. In total, the 175 houses that were featured in the NHSs over 15 weeks have been analysed.

The raw data collected from the articles was tabulated and examined. It became clear that the information gleaned could be grouped into a number of categories of interest.

In examining these articles the intent was to identify key characteristics of the housing that could relate to the demographic of the market. These characteristics were consolidated to highlight two areas of interest in the housing of older people. One area required the identification of general characteristics of the home related to the anticipated home occupant. The other area revolved around identifying barrier-free architectural design. Such design was supportive of accessibility and personal hygiene, supportive interior design that improved personal hygiene and safety or technologically-advanced assistive devices that related to health and safety. The articles were examined and a record was kept of how often each area of interest was mentioned.

The general characteristics identified that appeared to focus on a particular occupant group were:

- size of dwelling (the size excluded garages, verandahs or the like)
- number of bedrooms
- number of storeys
- children's zone
- parent retreat

The characteristics identified that could relate to accessibility, personal hygiene and safety were:

- accessibility
  - unobstructed access to and within the house and outdoor areas
  - width of doors and passages to accommodate a wheelchair
  - lift
- personal hygiene
  - bathroom/ toilet designed to accommodate wheelchair
- safety
  - high level of natural or artificial lighting
  - security/ smart wiring
  - home theatre

## Results

With the average household size in Western Australia down to 2.5 persons per dwelling (Australian Bureau of Statistics 2005) it would be logical to expect that homebuyers would be looking for smaller homes with fewer bedrooms. However this is not the feedback from project home builders. The Executive Director of the Housing Industry Association (HIA), John Daslik, wrote in *The West Australian New Homes Supplement* "The feedback from HIA members for some time has been that despite the trend of smaller households, there has been a great demand for bigger living space.... Home owners are seeking a minimum of four bedrooms, home theatres and rumpus rooms, along with more storage space, particularly built-in cupboards and walk-in robes" (19 March 2005 p13).

Examination of 175 houses featured in the West Australian NHSs supports this position regarding floor area and number of bedrooms. As shown in Table 1 less than one percent of the houses had an enclosed covered floor area of less than 150m<sup>2</sup>, an interesting statistic when one considers that the brief for a four bedroom family home for public housing in Western Australia limits enclosed covered floor area to 110 m<sup>2</sup>. Table 1 indicates that 44% of houses reviewed were larger than 250 m<sup>2</sup>. These floor areas show a substantial increase over the past two decades in spite of a reduction in the number of occupants per household. In 1984-1985 the average house size in Western Australia was 185 m<sup>2</sup> and average household size was 3.3. In 2002-2003 the average house size in Western Australia had increased to 229 m<sup>2</sup> and average household size was 2.6 (ABS 2006).

Size of dwelling (m <sup>2</sup> ) (excluding garage & covered outdoor space)	Number of houses			
	2004 <sup>a</sup>	2005	2006 <sup>a</sup>	total
<150	-	2	-	<b>2 (1%)</b>
150-250	6	87	5	<b>98 (56%)</b>
>250	4	65	6	<b>75 (43%)</b>
<b>total</b>	<b>10</b>	<b>154</b>	<b>11</b>	<b>175</b>

**Table 1 Summary of number of dwellings of different floor areas (<sup>a</sup> one week of NHS)**

Of the 175 houses examined in the NHSs, only one house had two bedrooms. Twenty seven percent showed three bedrooms whilst 73% had more than three bedrooms. As discussed previously the increase in the size of Australian housing can be attributed to a general increase in wealth (Murray, Wright et al. 2005).

One aspect of accessibility for all ages in a house is related to the absence of stairs and steps or the provision of some form of lift. The houses were categorised into one storey and more than one storey. The single storey houses were further examined to identify split level areas. However steps to access the house from the street, car parking area or garden area and steps to access baths or showers were not considered as this was often not clear from the information presented in the article. As can be seen in Table 2, 28%

of the house had two storeys or more. Seventy-two percent of the houses were single storey but 6% of these had changes in internal floor level. Thus 66% of the houses had no steps between rooms. Only two of the multi-storeyed houses had a lift installed or had made provision for a lift to be installed.

From a scrutiny of the NHSs since 2004 there is some indication that the proportion of new two storey houses is increasing as a result of smaller building lots and continuing demand for large houses. A more complete analysis of the data in 2006 is required to confirm this trend though.

Number of levels	Number of houses			
	2004	2005	2006	total
Single storey	7	112	7	<b>126 (72%)</b>
Split level single storey	-	8	-	<b>8</b>
More than one storey	3	42	4	<b>49 (28%)</b>
Lift provisions	-	2	-	<b>2</b>

**Table 2 Accessibility of houses internally related to lack of steps**

The specific reinforcement of the assumption that the future occupants of the houses would be families with children was reviewed by noting the number of times a children's zone or parent retreat was nominated. As shown in Table 3, 34% of houses identified a children's zone, almost in all cases associated with the minor bedrooms and separated from other living areas. Twenty percent of houses nominated a parent retreat adjacent to the main bedroom.

Zone	Number of houses			
	2004	2005	2006	total
Children's zone	3	53	3	<b>59 (34%)</b>
Parent retreat	2	30	3	<b>35 (20%)</b>

**Table 3 Reinforcement of assumption of children oriented houses**

A number of characteristics identified as user-friendly for all ages were recorded. These user-friendly characteristics were found generally in homes that were designed for a specific client rather than in a project home. Only one home, of the total 175 homes that were reviewed, referred to the avoidance of steps in or around the home to cater for an elderly occupant. Three homes mentioned wide doorways and passages to enable wheel chair access whilst two homes provided for wheelchair access to a toilet and bathroom. Two homes mentioned the importance of high levels of natural lighting but this was in the context of saving energy by avoiding the need for artificial lighting.

As described in Table 4 there were more references to potentially technologically assistive devices than to user-friendly design. Home theatres were placed in this category on the basis that digital and connected home technologies can be used in aged and assisted living in Australia (Connection Research Services Pty Ltd 2005) although, in the NHSs, home theatres were promoted as a hub of social activity for a family rather than technologically assistive centres.



Assistive Technology	Number of houses			
	2004	2005	2006	total
Security	-	2	-	<b>2</b>
smart wiring		10		<b>10 (6%)</b>
Home theatre	6	83	5	<b>94 (54%)</b>

**Table 4 Technology that could assist ageing in place**

More than 50% of new homes included a home theatre (Table 4). It is unclear what sort of technology is currently being installed into a space to warrant the name 'home theatre' but it is assumed that some digital technology is provided. This technology could be utilised to extend an older person's period of independence in the home. Smart wiring was occasionally mentioned (in 6% of houses). In most instances this was related to artificial lighting control but again, this technology could be utilised to extend an older person's period of independence in the home by being connected to doors, windows, cooking appliances and the like. Security, a significant concern for older people particularly women living alone (Olsberg and Winters 2005), was very rarely mentioned although this could be integrated with a digital technology package in a home.

## Discussion

The examination of the NHSs in the West Australian newspaper indicates that there is virtually no demand for homes to be designed to meet the competencies of all people regardless of age, condition or ability. Even baby-boomers, who have in so many ways shaped consumer demands and are now economically the most powerful demographic in Australian society, are not yet demanding that their new homes or extensive home renovations serve them well when they move into their seventh, eighth and ninth decades. Is this lack of demand a result of ignorance or a refusal to acknowledge the ageing process or is it a demonstration that staying in the family home is not important to baby boomers? The precise reason for the limited awareness by home buyers of universal design is a matter of conjecture. What is evident is that the choices buyers make about their homes rarely relate to their future needs, or the needs of future occupants.

A pilot study of baby-boomers intentions regarding ageing in place was undertaken by one of the authors (Spanbroek 2005). Spanbroek found that in Fremantle, a well-established suburb of Perth, the majority of baby-boomers wanted to maintain their independence for as long as possible and grow old in their own homes. This would allow them to retain their self respect and participate in their local community. However the pilot study also found that this baby-boomer cohort had made no preparation for coping in their homes as personal frailties developed. Simple renovations and in some cases major renovations were required to prepare the home for an ageing occupant. As the occupants aged it was clear that problems would occur with the upkeep of the home. Maintenance and services problems would not be recognized and the occupant may not have the finances nor the energy or expertise to do anything about them. Further, a lack of knowledge about reputable builders,

an inability to organize and supervise building work and a lack of confidence to check the work would all inhibit action later in life (Hugo and Thomas 2002).

There is evidence that appropriate consideration of accommodation is a critical factor in reducing institutionalization of older people and in promoting their integration and inclusion in the local community (Gibson and Griew 2003). There has been some discussion (Stimson, Manicaros et al. 1997) that ageing baby-boomers will choose to relocate from large, non-user friendly housing to smaller, more conveniently located houses that comply with universal design principles. The current analysis of new housing does not support such a position in Western Australia as, over the past two years, there is almost no mention in the NHSs of housing to accommodate the older, frail occupant. In regard to maintaining large houses, this may be an acknowledgement by baby-boomers that they have an increasing role as carers of grandchildren. This role could involve significant periods of cohabitation throughout the day, or for more extended periods. Alternatively, it may simply be a reflection of youth-obsessed baby-boomers (the oldest ones having only just turned 60) refusing to acknowledge the ageing process.

Murrey, Wright et al. (2005) claim that the relatively wealthy baby-boomer cohort will, on entering a period of unprecedented and extended retirement activity, create unique housing demands. This will require new insights into the nature of dwelling provisions and preferences for this group. But when will this happen as it is clear that the housing stock currently being created will, by necessity, be occupied by frail, older people. For increasing numbers of baby-boomers, the future is now. For some, the tasks of daily living routines that once came so easily are already becoming more difficult to perform.

The housing industry is historically hampered by an inability to innovate unless forced to do so. Will legislation be required to enable baby-boomers to age in place? Will this be a more economical option than dealing with institutional care for demanding baby boomers? Alternatively should Australia by developing an equivalent of WoonKeur in new housing? Many of the features of WoonKeur require simple changes to Australian housing design but these changes could make all the difference to elderly people, enabling them to continue living in their own homes as long as possible. If nothing is done in the near future it will be too late for the baby-boomers. It has been suggested by Hill (1999) that even if all new dwellings were designed to meet universal design criteria it would take over 50 years for this new stock to constitute the majority of all dwellings.

It may be that technology provides part of the solution. As can be seen in Table 4, more than 50% of new homes now include a home theatre. The CRS Connected Home Report (2005), based on a survey of over 1000 randomly selected households, showed that those over 60 years of age were far less likely to own a home theatre than the general population<sup>3</sup>. This situation could

---

<sup>3</sup> Approximately one-third as many homes inhabited by over 60s had a home theatre compared to the general population ( Connection Research Services Pty Ltd (2005). Aged and assisted digital living. Melbourne, Copper Development Centre.

change rapidly based on the history of the willingness of Australian baby-boomers to adopt new technology, particularly if it can prolong their independence.

The United States based Intel (Connection Research Services Pty Ltd 2005) has suggested 3 component parts of a solution to reduce health care cost for ageing Americans:

- Concentration on prevention rather than treatment
- Shifting care from costly clinical settings to the home
- Shifting some care responsibility to friends and family

The first two components depend to some degree on house design, particularly on the technology built into a house. Telemedicine and telecare in the home are already a reality. These technologies enable electronic health records to be maintained and accessed by all medical services thus making computer based medical prescriptions possible. Consumer electronics in the home can integrate motion sensors with monitoring systems that alert carers to extraordinary behaviour and telephone based emergency call systems and context based text or voice communication can raise an alarm. Research on a modular home clinical workstation to measure vital signs of well-being such as blood pressure continues. Other technologies that support ageing in the home include:

- Assisting technologies designed to predict and meet users needs such as remote controlled appliances and security
- Phone amplification and talking watches/clocks
- Alternate keyboards or voice output devices for computers

It is of note that at present these new technologies are not governed by standards across the industry to enable all parts of the system to communicate AND be readily updated. This lack of consistency and compatibility has the potential to create another problem for older people if they become dependent on such technology.

## **Conclusion**

In spite of the influence of the baby-boomer generation on so many aspects of consumption in Australia, universal design in the home has not yet appeared on the baby-boomer radar. Accessible, safe housing is fundamental to ageing in place. It promotes independent living and reduces the potential costs of institutional care. Society, including the home building industry, generally needs to be better educated to understand the implication of our ageing population on housing design. Government needs to establish clear policy guidelines for new housing and assistance for home modifications for those planning to age in their homes. More research needs to be undertaken about ageing, quality of life and house design, as it is not just staying at home that is the main desire of the ageing baby-boomer cohort. It is the lifestyle that goes with it - the independence, the connection with the community and the

Karol, Elizabeth and Spanbroek, Nancy (2006) Housing future for ageing in place, in *2006 Australasian Housing Researchers Conference*, Adelaide, 19-21 June. Australian Housing and Urban Research Institute Southern Research Centre, Adelaide.

familiarity with local services in that community that influence the desire to age in place.

## References

Aarts, M. P. and A. C. Westerlaken (2005). "Field study of visual and biological light conditions of independently-living elderly people." *Gerontechnology* 4(3): 141-152.

Australian Bureau of Statistics (2006). Building Approvals, January, ABS. **Cat. No. 8731.0**

Australian Bureau of Statistics (1994). Australian Social Trends. A. B. o. S. ABS, Canberra. **Cat. No. 4102.0.**

Australian Bureau of Statistics (2004). Household and Family Projections, Australia, 1996 to 2021. A. B. o. S. ABS, Canberra. **Cat No. 3236.0**

Australian Bureau of Statistics (2005). Australian Social Trends. Australian Bureau of Statistics, Canberra. **Cat. No. 4102.0.**

Australian Bureau of Statistics (2005a). Population Projections 2004 to 2101. A. B. o. S. ABS, Canberra. **Cat. No.3222.0.**

Australian Institute of Health and Welfare (2000). Disability and ageing: Australian population patterns and implications, AIHW. **AIHW cat. no. DIS 19.**

Coleman, R. (1994). Design research for our future selves. *Research Papers* 1(2). London, Royal College of Art. **1.**

Connection Research Services Pty Ltd (2005). Aged and assisted digital living. Melbourne, Copper Development Centre.

Department of Health and Ageing (1997). "Commonwealth Aged Care Act 1997." **No. 112.**

Englebert, W. C. (2005). "'WoonKeur' a Dutch label for life-span sustainable living." *Gerontechnology* 4(3): 174-175.

Gibson, D. and R. Griew (2003). New Models and Approaches to Care. . Paper prepared for 2020 A Vision for Aged Care in Australia., The Myer Foundation.

Hugo, G. and T. A. M. Thomas (2002). Intergenerational Issues and the Impact of Cultural Change on the Care Needs Of The Elderly M. Foundation.

Kochera, A. (2002). Accessibility and Visitability Features in Single-family Homes: A Review of State and Local Activity. Policy and Strategy Group. Washington D.C, AARP.

Murray, S., L. Wright, et al. (2005). The Ageing of Aquarius: A housing primer Melbourne, RMIT (Draft Issue).

Karol, Elizabeth and Spanbroek, Nancy (2006) Housing future for ageing in place, in *2006 Australasian Housing Researchers Conference*, Adelaide, 19-21 June. Australian Housing and Urban Research Institute Southern Research Centre, Adelaide.

Olsberg, D. and M. Winters (2005). "Ageing in Place: intergenerational and intrafamilial housing transfers and shifts in later life." AHURI UNSWUWS Research Centre.

Pegler (2005). Editor New Homes Supplement, West Australian Newspaper. D. E. Karol. Perth: Discussion about how the projects are chosen for the NHS

Spanbroek, N. (2005). Ageing at home: How prepared are Australia's baby boomers, Curtin University of Technology.

Stimson, R., M. Manicaros, et al. (1997). Ageing and retirement housing in Australia. AHURI. Brisbane, Queensland University of Technology.

Weale, R. (1963). The aging eye. London, Lewis.