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Is Extra Care Housing in England Care-Neutral?

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Keywords

Assisted living, remodelling, care-giving, assistive devices, very sheltered housing, assistive technology, occupational therapy, physiotherapy, accessibility

Abstract

Purpose. Extra care housing (ECH) is housing for older people that aims to provide flexible care while fostering independence. The aim of this paper is to examine the impact that some of the successes and failures in improving accessibility during remodelling had on care provision, in order to offer advice to social housing providers planning to remodel existing properties into ECH. **Design and methods.** The data consisted of an inventory of accessibility features and assistive technology (AT) items in flats and common areas. The data was drawn from 10 ECH schemes in different regions of England. **Findings.** Most of the assistive technology found was low-technology supporting independence, such as grabbers; some was specific to care provision, such as hoists. Even after remodelling, the design and layout of most buildings did not fully comply with accessibility standards, leading to increased provision of care for some tenants: a care-negative situation. **Research and practical implications.** This multidisciplinary, original research on remodelling into ECH presents successful examples of accessibility, assistive technology and care integration that required active tenant involvement and creative design input from care staff, architects and builders who were assistive technology and accessibility aware. It is argued that for new and remodelled ECH buildings to be care-neutral, designers need to work towards the most inclusive model of ECH.

Is Extra Care Housing in England Care-Neutral?

Introduction

Moving to a new home can be a traumatic experience, especially in older age (De Coninck, 2004). As a possible solution, concepts such as ageing in place (World Health Organization, 2004) and lifetime homes (Carroll, *et al.*, 1999) have been developed, encouraging the design and building of dwellings that will suit people from birth to death, regardless of their changing needs and levels of ability. It is generally accepted (Croucher, 2008; Clough *et al.*, 2003), and indeed encouraged by public policy (Royal Commission on Long Term Care, 1999,), that it is best for older people to stay in their family home¹ for as long as possible. For some, this may mean making home adaptations and putting formal care and assistive technology (AT) in place in the home (Lansley, *et al.*, 2004). However, adaptations to the home such as widening doors may be insufficient or impossible for technical or economic reasons (Lansley, *et al.*, 2004) and people may decide to move. Some of the deciding factors for older people to move from their family home are those to do with location, physical aspects of the home, quality of life, declining health and a lack of help in the home (Hanson, 2001; Tinker, 2000).

¹ For the purposes of this paper a family home is the home where older people have lived most of their lives and probably where they have also raised a family.

When older people choose to or need to move, Extra Care Housing (ECH) is one alternative that could allow the person not to have to move again. ECH is a relatively new type of housing for older people in the United Kingdom (UK) and while in the UK there is no agreed list of exactly what physical and service elements it should have (Care Services Improvement Partnership, 2006; Hanson *et al.*, 2006; Riseborough and Fletcher, 2003; Tinker, 1999; Tinker *et al.*, 2007), it is broadly agreed that it provides groups of inclusive and accessible self-contained dwellings², and aims to provide flexible care and support while fostering independence (figure 1). Though apparently paradoxical since both care and independence are a presupposed part of ECH, through carefully tailored support packages, older people both receive as much care as they require and can achieve as much independence as they aspire to. ECH can be a bridge between living in a mainstream home, with little or no support, and living in a nursing home, with little independence.

Figure 1. "A Home for life" model of ECH. This model assumes the building is the base for care provision, is fully accessible and inclusive and is flexible enough to

² Including sitting-dining room, bathroom, kitchen and bedroom

accommodate all residents without change (represented as a fixed rectangle). The care and support element is assumed to be adaptable as residents' needs change, either short term (e.g. recovery from illness) or long term (e.g. with increased frailty) (represented by a triangle increasing with dependency). Diagram redrawn from Care Services Improvement Partnership (2006).

The definition of ECH used by the research team was called 'A home for life' by the Care Services Improvement Partnership (2006) and spans low dependency (or maybe even no dependency) to high dependency residents. This is a home designed to accommodate people of all abilities and from where most older people would not need to move. Since there is no agreed list of minimum elements of what constitutes ECH as there used to be for sheltered housing categories (Ministry of Housing and Local Government, 1969), for the purposes of having a framework of elements in ECH for this project, the elements for very sheltered housing were used as this was the housing that could cater for the more dependent residents but not yet requiring residential care. According to the summary published by Tinker *et al* (1989) the characteristics of very sheltered housing included a purpose-built block in which both the individual flats and the communal areas were wheelchair accessible, the provision of a residents' lounge, communal laundry, assisted bathroom, and a lift in schemes of more than one storey. Services included 24-hour warden or care staff cover, possibly a nurse (permanently) on site, daily hot mid-day meal provision, help with personal

care and an emergency alarm system linked to the warden. Also see Hanson *et al* (2006) for a subsequent questionnaire-based project on the elements of ECH.

The definition of AT that was used in this project was ‘any device or system that allows an individual to perform a task that they would otherwise be unable to do, or increases the ease and safety with which the task can be performed’ (Cowan and Turner-Smith, 1999). In previous housing work looking at adapting the family homes of older people (Lansley *et al.*, 2004) AT had been classified as fixed, portable or semi-fixed. Because care, albeit flexible, is an integral characteristic of ECH, in this project AT was classified in terms of care (figure 2):

- Care-neutral: AT that allowed someone to retain their independence;
- Care-supporting: AT used to assist with care;
- Care-substituting: AT that facilitates the recovery of independence.

Figure 2. Care-based classification of assistive technology items

Accessibility was understood as “... the opportunity for everyone to get to the entrance of a building, enter and move freely through it, using all the facilities as and when necessary, and to exit a building safely, especially in an emergency situation’ (National Health Service Estates, 1996: 3). The standards in place for accessibility in Britain, known as ‘Document M’ for short, were used as the main accessibility resource (The Stationery Office, 2004). However, Document M does not cover all of the elements inside a home. To bridge the gaps a combination of other international standards and recommendations was used (College of Occupational Therapists and

Housing Corporation, 2006; Platform Wonen van Ouderen, 1999; United States Access Board, 2004; World Health Organisation, 1981).

There is a need to distinguish between purpose-built ECH and existing buildings whose original purpose has been superseded or has become unpopular such as some residential care homes or some sheltered housing units that are being remodelled into ECH (Tinker *et al.*, 1995). Remodelling was understood as changes to buildings requiring planning permission from the authorities. These remodelling projects hold special interest from the design, economic, health and social care points of view and therefore for this research a multidisciplinary team was assembled consisting of two social gerontologists, two architects, one economist, one occupational therapist and one rehabilitation engineer. During the course of this research project it soon became apparent that far from fostering independence, the poor design and accessibility of a building or its fixtures and fittings was producing ‘architectural disability’ in its occupants (Hanson, 2001). An increase in care provision was then necessary to compensate for the inadequacies of the building or its fittings and fixtures. Thus, concepts linking care and building characteristics were devised by the research team that could be applicable to new as well as remodelled buildings. A building can be regarded as:

- Care-neutral if it does not have any impact – either positive or negative – on the support and care regime that takes place in the building. In terms of care, the building’s residents would not require the help of a caregiver to overcome the building’s physical attributes;

- Care-positive if its inclusive design allows or even encourages the independence of its residents;
- Care-negative because of its poor, inaccessible design that would have adverse quality of life ramifications for the residents or increased cost implications for the care service provider.

The aim of the paper was to examine the impact that some of the successes and failures in improving accessibility during remodelling into ECH had on care provision. Successes included either examples of good and best practice or innovative solutions to the challenges presented by the remodelling, while failures included examples of poor solutions or missed opportunities. The repercussions of poor accessibility are often hidden from many ECH stakeholders, including scholars, policymakers, developers, architects and urban planners. The central roles played by accessibility and AT with respect to care are discussed in this article. Results from other aspects of the project are presented elsewhere (Tinker *et al.*, 2007; Tinker *et al.*, 2008; Wojgani, 2006, Wright *et al.*, 2009; Wright *et al.*, 2010). The rest of this article is structured thus. An explanation is made of the mixed methodology used. The results section presents overarching items as well as five specific examples of failures and successes in making ECH inclusive and care-neutral. The discussion explores the results in depth.

Methods

Inclusion criteria: Social housing schemes of flats, provided by local authorities (councils) or by registered social landlords (housing associations), remodelled into ECH from either residential care or sheltered housing since the year 2000. Sample recruitment: Housing schemes that met the inclusion criteria were contacted by letter. A purposive sample of 10 was chosen (Table 1) from among those housing schemes replying that they were willing to participate. Representativeness of the sample: this was based on a) having a sample distributed across the different regions of England (Figure 3) and b) balanced in terms of the two types of providers at the time of the decision to remodel. Since the time of remodelling, three properties previously under councils have been converted to housing associations, as a result of policy changes in the UK. Two schemes were previously residential care homes and the rest were sheltered housing. Ethical approval: Approval for the project was obtained from both King's College London and University College London Research Ethics Committees.

Table 1. Overview of case studies. LA= local authorities, HA= housing associations, SH= sheltered housing, RCH= residential care home

Housing Scheme	Housing Provider	Formerly	Total units before remodelling	Total units after remodelling	Number of flats visited	Care hours per week for admittance or other eligibility criteria
1	HA	SH	52 ^a	52 ^a	3	7
2	HA	SH/RCH	54	42	5	3 bands: 2, 4 and 10

3	HA	SH	21	16	2	75% high dependency
4	HA	SH	35 ^a	29	6	Low/medium/high dependency mix
5	LA	SH	39	39	5	Low/medium/high dependency mix
6	LA	RCH	18	16	5	4 or more
7	HA	SH	22	30	5	10.5 (no hoisting)
8	HA	SH	32 ^a	30	3	10.5
9	LA	SH	110 ^a	110 ^a (16 ECH)	5	4
10	HA	SH	33	32	5	10.5

^a Includes the resident warden's flat

Figure 3. Map of case study distribution in the regions of England

Preparation for data collection: Architectural drawings of the existing and remodelled buildings were received in advance to help plan the site visits. For a given housing scheme, differences in area, number of bedrooms, layout and additional information about diverse features of the flats were used to group the flats into kinds (Wojgani, 2006). In order to have as diverse a sample as possible, it was decided that at least one flat from each kind would be examined but with no more than six flats visited in any particular scheme (table 1). In the one case where there were more than six flat types in the scheme, it was decided not to visit the two unique flats because they were not characteristic of the rest of the scheme. Ahead of the visit, the ECH scheme manager contacted the residents on the team's behalf using a letter supplied by the team. At least one household from every identified flat type was sent a letter. Because the scheme managers knew their residents, they were asked not to recruit any residents with cognitive impairments because they could not give informed consent. Some scheme managers sent letters to all of their residents who were able to give consent. Scheme managers reported that almost all of the residents contacted agreed to be visited. When two or more residents of the same kind of flat agreed to be visited, the flat to examine was randomly selected. The scheme manager then arranged a convenient time for the visit to the short-listed flats and all communal areas. A flat visit usually took about 30 minutes while a scheme visit usually took about six hours. All volunteers, whether visited or not, were later thanked by letter.

Site visits: When visiting the schemes, the team first spoke with the scheme manager who had all of the consent forms as well as the timetable for the visit. When arriving at the flats, the team introduced themselves to the resident, verified that he or she had

agreed to be visited by the team, verbally explained the project's aims, asked if there were any questions and asked for permission to take measurements and photographs around the flat. It was not specified *a priori* whether a member of staff would accompany the team during the visits. On three occasions a staff member accompanied the team into every flat and communal area, acting as a guide to the scheme. These staff members left the flat once they had introduced the team members to the resident. An architect and an occupational therapist completed the access and AT inventory while the rehabilitation engineer usually stayed in the living room with the residents (and their partners for the four participants who had them). The AT and accessibility checklist was finalised during the pilot phase of this project and was based on the checklist developed for a predecessor project (Lansley *et al.*, 2004a). The checklist can be found in Appendix 1. The engineer first answered any questions about the resident's participation in the project and then asked them about:

- Their AT acquisition and use;
- The amount and type of care they received;
- Their general state of health;
- Their participation in communal activities.

These questions were developed during the pilot study and were considered the core information to relate the accessibility features and the number and types of AT found in the flats visited to the capabilities of the resident. For example, there was a walking stick in one of the flats that belonged to the resident's late husband; it was not relevant to the present resident's needs and was not reported below. The replies were taken

down by the engineer and the notes transcribed in full the next day to make sure all of the details were included accurately. These were then circulated to the occupational therapist and architect for review in terms of accuracy and completeness. In total 44 flats, each of a different architectural layout, were visited, of which 40 flats had residents at the time of the visit and four were unoccupied.; three out of the 44 flats were in the ‘sheltered’ part of housing schemes that integrated ECH and sheltered tenants.

AT and accessibility were combined into a single inventory because they have an interdependent relationship. For example, Mann *et al.* (1999) use the term ‘environmental interventions’ to identify changes to the built environment, such as a level access shower, as well as changes in organisation and layout of the furniture. Therefore a single form was used to enter all elements that were being counted and measured in the inventory.

The communal areas of the buildings were also examined for AT and accessibility using the same checklist. These areas mainly consisted of lounges, dining rooms, tea kitchens, commercial kitchens, laundries and assisted bathrooms.

Results

Physical elements and services

Table 2 lists the main elements and services and the numbers of each found in the ECH schemes. Some of the elements were found to be present in all or most of the case study schemes, such as community alarms, while others, such as consulting rooms, were underrepresented.

Table 2. Physical and service elements found in the 10 schemes studied. List based on the elements defined for very sheltered housing; 10 possible maximum

Element	Total	Element	Total
Flat's own front door	10	Staff room	8
Social alarm	10	Hairdressing facilities	8
Wheelchair accessibility (inconsistent)	10	Communal dining room	7
Communal lounge	10	Guest room	7
Flexible care	10	Commercial kitchen	7
Laundry room (shared with staff 6)	10	Staff WC	7
Scheme manager's office	10	Provision of communal meals	6
Carers' office	10	Waking night staff on site	5
Communal activities	9	Sleeping night staff on site	4
Staff sleep-over area	9	Consulting room	4
Assisted bathroom	9	Tenant's shop	2
Scooter/wheelchair store	9	Internet (dial-up)	2
Tea kitchen	8	Scheme manager's flat	2

Internet provision was not one of the elements identified by any previous research but it is included here because two schemes acquired computer rooms as a result of the remodelling, though neither room contained a computer at the time of the visit.

Two other schemes provided communal internet access, one in a converted cupboard in the main lounge area and another in a spacious library setting. Two of the residents visited had their personal internet connection.

Residents

Four of the residents (10%) visited had a partner who shared the dwelling with them and did not require extra care. Only five per cent of the residents visited did their own laundry, 15 per cent did their own shopping, 15 per cent wore their alarm pendant daily, 28 per cent used a hearing aid, 68 per cent had vision problems requiring glasses and 68 per cent had used the community alarm at least once.

Assistive technology

A total of 356 AT devices of 52 types were found in the flats. The most commonly encountered were: community alarm (in all 44 flats), crutches and walking sticks (in 35 flats), big-button and cordless telephones (in 27 flats), tea trolleys (in 23 flats), recliner chairs (in 21 flats), grabbers (in 19 flats), manual wheelchairs (in 18 flats), toilet frames with raised seats (in 15 flats). The least commonly encountered were: pressure sore prevention mattress (in two flats), wireless door intercom (in one flat), big-button TV remote control (in one flat), environmental control unit (in one flat), pressure sore cushion (in one flat), height adjustable work table (in one flat), bath lift (in one flat). Residents were often unaware of the origin of their AT unless they had bought it themselves or an occupational therapist had recently visited to make an assessment and equipment had subsequently been delivered. Sixty-eight devices

(19% of the total) were bought by the residents or their children, the most frequent being: 13 recliner chairs (62% of those found), 12 big-button or cordless telephones (44% of those found), nine grabbers (47% of those found), four profiling beds (31% of those found) and three mobility scooters (100% of those found). This self-provision is notable because these were social housing residents where statutory provision would have been expected to be more likely because of the higher likelihood of being in contact with the local authority.

Of the 52 different types of AT, 33 (49% of the total) were classified as care-neutral, 30 (44%) as substituting of care and 5 (7%) as supporting of care. Table 3 lists the most and least frequently found of these items.

Table 3. Identification of AT devices in the flats according to care model; 44 possible maximum

Highest frequencies	Total	Lowest frequencies	Total
Care-support AT			
Community alarm	44	Mobile hoist	3
Profiling bed	13	Ceiling hoist	3
Shower chair	10	Transfer pole	2
Care-substitution AT			
Crutches and walking sticks	35	Scooter	3
Grabber	19	Medication reminder	2

Manual wheelchair	18	Environmental control unit	1
Toilet frame with raised seat	15	Kettle tipper	1
Care-neutral AT			
Big-button and cordless telephone	27	Big screen TV	1
Tea trolley	23	Big-button remote control	1
Recliner chair	21	Talking books player	1

Of the residents visited those with the greatest number of AT devices in their flats were three people in a late stage of multiple sclerosis (one with 15, one with 16 and one with 22 devices), a person in the terminal stage of cancer (20 devices), a person with advanced emphysema (16 devices), a person with poor motor skills and a history of falls (14 devices), and a tenant in the sheltered part of an ECH scheme (14 devices). This latter individual, who required no care, lived in a sheltered flat in a scheme that also had extra care flats; the other individuals mentioned were the frailest residents visited and had the greatest medical needs.

Accessibility

None of the buildings complied completely with accessibility regulations; areas of non-compliance varied across the different schemes. Of the communal areas, main entrances, dining rooms, lounges and most corridors were accessible. Some scooter stores were more accessible than others, having easier doors to handle, sufficient and

well-placed sockets for recharging batteries or a door to the inside of the housing scheme. The main problem with the scooter stores was the lack of sufficient space for the number of scooters and powered wheelchairs on site. Tea kitchens were usually part of, or close to, communal areas that were already accessible but there was no knee clearance under the sink in any of them and the small refrigerators were usually placed on the floor, under the counter tops. None of the toilets examined was of the necessary height to comply with the accessibility standard in Document M of 480 mm; most were 410 mm. In 18 flats (41%) the toilets did not have any grab rails. In 21 flats (48%) either raised toilet seats (4), toilet frames (2) or raised seats with frames (15) had been provided after the remodelling. There were no wash basins that were accessible and shower grab rails were absent in 14 (32%) of the flats.

As illustrations of the barriers and solutions to make ECH care-neutral that were found during this research, five examples of successes and failures have been chosen to explain how lack of accessibility can become care-negative while conversely accessibility can have a positive impact on inclusiveness as well as being care-neutral or even be care-positive.

Detailed example 1. Lifts

Twenty one (53%) of the residents visited reported having difficulty operating the lifts. They found that the lift was located too far away from their flat, the buttons were difficult to reach or see, the space inside the lift was tight, the shutting time of the door too quick and the movement of the lift too jittery. Some were frankly scared of using the lift. This meant that they either gave up on using the lift altogether or

needed a neighbour or member of staff to accompany them when moving around the housing scheme. For some, this in turn reduced their opportunities for social interaction within the housing scheme. For others it resulted in their having to depend on a carer³ to collect them for the communal meal and return them to their flats some time afterwards.

Eighty percent of schemes had only one lift and whenever it broke down residents were stranded. Lifts that barely complied with wheelchair-standard dimensions were too small to accommodate people riding scooters. Only two lifts were found that were large enough to fit a stretcher but neither of them was large enough to also accommodate an attendant travelling with a person on the stretcher. The team observed a sick resident being brought down the stairs on a stretcher by an ambulance crew during the last site visit. The impracticality and demoralising effect of having to take a person who is ill or dead down the stairs on a stretcher was then mentioned by both residents and carers at the time of the incident.

Detailed example 2. Kitchens

In the flats not one kitchen was found that was accessible to people with visual or mobility impairments; notwithstanding this 16 (43%) of the residents visited prepared all meals for themselves. Other residents had meals provided in the following ways: four schemes provided a communal hot meal to all who wished it and nine out of 21 residents visited in those schemes took the communal meal; two schemes provided communal meals by special arrangement, one out of nine residents visited in those

³ The term carer in this paper refers to care staff in the ECH schemes.

schemes took this communal meal option. Carers prepared individual hot meals for 11 people; three had one hot meal prepared daily while eight (22%) had all three meals prepared. Preparing this number of meals has a high cost in staff time and puts a lot of pressure on staff around meal times (Wright *et al.* 2010). The remainder depended on frozen meals or Meals on Wheels. Meals are central to independence and well-being and provide opportunities for social interaction. It is of note that seven residents (18%) said they would cook, if the kitchens were accessible. This would offset the considerable care-negative consequences outlined above and positively promote quality of life and independence.

Detailed example 3. Baths and assisted bathrooms

In one scheme, the bathtubs in the flats on the first floor were left unchanged during the remodelling, contending they were offering residents choice, while the flats on the ground floor were given new level-access showers. Residents who lived on the floor where the baths were left *in situ* either needed a carer to assist them in bathing, or they had to use the communal level-access shower located down the corridor, instead of the bathrooms in their own flats. Under these conditions leaving so many of the old baths unchanged resulted in a care-negative situation with additional care costs and defeated the ECH objective of having a self-contained home, encouraging independence.

Of course, not all baths are inaccessible, as bath lifts and other assistive technology can be used. In one scheme new walk-in baths were installed in every flat, at great expense, during the remodelling. One by one the residents asked for the walk-in baths

to be replaced by level-access showers. There is only one walk-in bath still in place in this particular building. The main reason for rejection was that during the long time it took for these baths to fill and empty, the residents grew very cold. Tenant input or ‘try before you buy’, which was not sought, could have been very valuable when making the decision to install these baths during remodelling. This top down approach is addressed in the discussion.

Assisted bathrooms in the remodelled schemes usually had a very institutional (as opposed to homey) look and feel, probably because of the presence of a bath that integrated a lift, or a hoist in the room. In one scheme an effort had been made to make it look more like a commercial spa, with modern décor and additional curtains for increased privacy. Three of the residents visited (7.5%) reported using the assisted bath in their respective schemes, with the required carer assistance, about once a week.

Detailed example 4. Communal laundry

In the cases where the scheme offered separate staff and tenant laundries, laundries for staff were paradoxically more accessible and usable than those for residents, probably because of health and safety at work regulations. However in one scheme a residents' laundry was found to have washing machines and driers placed on plinths, with front loading and easy to see and use controls on the front panel. The room had good illumination and ventilation and it had ample circulation and turning space. The sink for hand washing had lever action mixer taps (Figure 4A). One of the residents proudly reported that the laundry was ‘so good because we designed it’. There were

two residents' laundries in the building and this one had recently been refurbished. The residents had been consulted before its refurbishment and had rearranged the space and chosen the machines to go in it to best suit their needs to do their laundry independently—a care-positive solution. The other laundry in the building was much less accessible (Figure 4B). The residents reported that the refurbished laundry is their preferred choice when going to do their laundry.

Figure 4. A. Accessible laundry in an extra care housing scheme redesigned with tenant input. B. Laundry in the same building that has not benefited from a tenant-centred refurbishment

Detailed example 5. Internal communication

In 40% of the schemes the residents were using the community alarm as a means of communicating with the staff. However, using the community alarm for internal communication does not distinguish between real emergencies (such as a fall) and routine calls (for example, to ask whether a prescription has arrived or assistance is needed to get to the toilet). On the other hand, in the places where the alarm call goes outside of the scheme it leaves residents with no means to contact the staff or each other. Incorporating a hotel-like telephone system could provide a free internal communication system for carers and other residents, freeing the community alarm for use in real emergencies.

Discussion

Limits of the article

This work is based on case data and as such has limited generalizability.

Accessibility

Being remodelled rather than purpose-built, the buildings did not comply fully with accessibility recommendations. In the case of some corridors and lifts, there simply was not enough space and no viable alternative could be found. However the consequences of not having accessible lifts need to be weighed very carefully when deciding whether to remodel a building into ECH.

Provision of communal meals as part of ECH has been both praised as community- and health-building and criticised as institutionalising. In the case study schemes it was found that not only were the kitchens in the flats not accessible, but only four schemes used their commercial kitchens to cook a fresh communal meal. All the schemes provided hot meals to the residents who needed them, either by communal meals, by heating frozen meals in a microwave oven or by cooking them individually. However, an apparent saving by not building a commercial kitchen and paying a cook can be costly in terms of care staff hours preparing individual meals and social isolation of residents. Therefore careful consideration must be made in a remodelling project as to whether to include a commercial kitchen and to provide accessible kitchens in the flats.

There were a number of breaches of the accessibility standards that could have been corrected as part of the remodelling process, including: heights of sockets and switches; position of radiator valves, alarm pull cords and intercoms; stiffness of fire and front doors and heights of bathroom and kitchen fixtures. These breaches may be partly explained because for most architects and builders these remodelling projects were their first ECH experience, although most did have experience of either sheltered housing or residential care (Wojgani, 2006). It may also be because not making these changes may have cut some costs. However the top-down approach observed in most cases also contravenes the prevailing policy of user consultation. For example the National Institute of Health Research through INVOLVE⁴ supports public involvement in public health and social care research. In the cases where

² www.invo.org.uk

residents and staff were consulted, such as the case of the laundry presented above, the outcomes were much more satisfactory to all. Additionally, good examples can be found in the literature, for example consulting formal carers regarding AT for bathroom adaptations (Guay *et al.*, 2010).

Assistive technology

In general, the people visited did not know the term ‘assistive technology’. Staff, if they gave an answer, most often referred to high technology examples, such as telecare, while residents preferred the words ‘devices’, ‘gadgets’ or ‘equipment’. This may be a particularly British phenomenon where the debate about the use of the term ‘assistive technology’ continues. In every case once the term was clarified, a rich dialogue about AT was established. It was found that not all AT was well received such as the walk-in baths discussed above. It was also found that a number of assistive devices were self-purchased. The top five were: scooters (100% of total found), recliner chairs (62% of total found), over the bed tables (50% of total found), grabbers (47% of total found), and big-button and cordless telephones (44% of total found). Caring at the levels observed in this project, for example in cooking three individual meals per day or daily assisting residents with bathing, where the bathtubs were not removed from the flats, will probably be unsustainable in the future. Specifically for Europe, it has been argued that by 2050 to financially support retired people, full employment of over 70% of all other adults will be necessary (Carone *et al.*, 2005). This may bring a sharp decline in the number of people available to perform care duties, whether formal or informal. Although carers may come from

outside the host country, a similar trend in ageing is anticipated in a large part of the world. Although some studies report that some reduction in formal and informal care hours is possible by increased use of AT by older adults living in their family homes (Agree *et al.*, 2005; Freedman *et al.*, 2005; Hoening *et al.*, 2003; Verbrugge *et al.*, 1997). Though this has not been previously studied in an environment such as sheltered housing or ECH, in the present study of ECH, an environment where care is supposed to be fully integrated with the housing, 44% of the device types found in the flats were AT for care substitution. However it is imperative that the built environment be at least care-neutral and at best care-positive because AT alone cannot bridge the gap of poor accessibility.

The data for this paper was gathered between 2005 and 2007. A full list of the AT and access recommendations resulting from this project are in a guidance document (Tinker *et al.*, 2007b) and can be requested from the corresponding author. However there are some wider implications when considering future provision. See Tinker (2011) for a more detailed discussion of how technology can enhance the lives of older people.

Conclusions

This paper provides data to support the centrality of complying with accessibility guidelines. The aim of the paper was to examine the impact that some of the successes and failures in improving accessibility during remodelling into ECH had on care provision. A few detailed examples were selected for this paper. As presented

above, the lack of lifts of sufficient size, accessible kitchens, accessible bathrooms and means of internal communication brought with them increased care requirements as well as social interaction restrictions. These were remodelling failures because the opportunity to make the necessary accessibility changes was missed. Based on the best examples encountered in the case studies, such as the tenant-redesigned laundry, the authors would like to argue that successful accessibility, AT and care integration require architects, builders, carers and housing managers to be access- and AT-aware. They would also argue it is indispensable to involve the residents in access and AT-related decisions before and during the remodelling process. This will also probably help to ensure the aesthetics of the homes, avoiding ineffective, institutional and stigmatising solutions. AT has the potential for improved care as well as care substitution, but breaches in accessibility had a great impact on the residents, resulting in increased care, sometimes in ways that not even the best of AT could bridge. Additional examples of successes and failures found in these remodelling case studies can be found in Wright *et al.* (2010) where a qualitative approach has been taken.

Nevertheless, the team's target definition for remodelled ECH remains the most ample model of ECH 'A Home for life'. This is the most sustainable long-term solution, championing inclusion, encouraging social interaction and making buildings at best care-positive or at least care-neutral. Yet the designers of the remodelled projects visited may have been confused as to what exactly was meant by ECH, judging by the variety of solutions found in the housing schemes (Wojgani, 2006; Tinker *et al.*, 2007a). They may have supposed that carers would be there to

compensate for accessibility shortcomings. However, compensation by human helpers is probably an unsustainable solution to providing housing for older people because it is not cost effective over the design life of the remodelled housing scheme. The definition of ECH urgently needs a consensus, but even beyond that, the significance of inclusion needs to be much better understood by those involved in remodelling social housing into ECH because they are looking to fully achieve the twin aims of ECH of providing flexible care while fostering independence, for life.

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Appendix 1. Assistive technology and accessibility checklist

Entrance - Hallway		No	Yes	Height	Width	Depth	Observations
	Clear opening door						
	Door bell	☒	☐				
	Door-bell amplifier	☒	☐				
	Visual door bell	☒	☐				Visual feedback where?
	Key less door lock	☒	☐				
	Key-safe	☒	☐				
	Lever door handles	☒	☐				
Ind. Flat	Door release	☒	☐				Controls where?
	Door opener	☒	☐				Controls where?
	Door entry intercom	☒	☐				Controls where?
	Door entry intercom with video	☒	☐				Controls where?
Main entrance	Door release	☒	☐				Controls where?
	Door opener	☒	☐				Controls where?
	Door entry intercom	☒	☐				Controls where?
	Door entry intercom with video	☒	☐				Controls where?
	Emergency assistance alarm	☒	☐				Where?
	Rocker switches	☒	☐				
	Motion detector light switch	☒	☐				
	Thermostatic radiator valves	☒	☐				
	Height electric sockets	☒	☐				
	Corridor narrowest point	☒	☐				
	Fire alarm	☒	☐				
	Smoke alarm	☒	☐				
Living Room		No	Yes	Height	Width	Depth	Observations
	Outward opening doors	☒	☐				
	Lever door handles	☒	☐				
	Height electric sockets	☒	☐				
	Rocker switches	☒	☐				
	Emergency assistance alarm	☒	☐				Where?
Ind. Flat	Door release	☒	☐				Controls where?
	Door opener	☒	☐				Controls where?
	Door entry intercom	☒	☐				Controls where?
	Door entry intercom with video	☒	☐				Controls where?
Main entrance	Door release	☒	☐				Controls where?
	Door opener	☒	☐				Controls where?
	Door entry intercom	☒	☐				Controls where?
	Door entry intercom with video	☒	☐				Controls where?
	Air cooler	☒	☐				
	Manual window openers	☒	☐				
	Electrical window openers	☒	☐				Controls where?
	Electric curtain openers	☒	☐				Controls where?
	Commode	☒	☐				
	Smoke alarm	☒	☐				
	Height thermostatic radiator valve	☒	☐				

Bathroom	No	Yes	Height	Width	Depth	Observations
Outward opening doors	☐	☐				
Lever door handles	☐	☐				
Emergency assistance alarm	☐	☐				Where?
Height electric sockets	☐	☐				
Rocker switches	☐	☐				
Height bathroom sink	☐	☐				
Tilted mirror (bottom height)	☐	☐				
Lever taps sink	☐	☐				Direction?
Mixer tap sink	☐	☐				
Thermostatic blending tap sink	☐	☐				
Electronic tap sink	☐	☐				
Thermostatic tap shower/bath	☐	☐				
Height bottom shower head bar	☐	☐				
Bathtub	☐	☐				
Level/low access shower	☐	☐				
Hinged shower seat	☐	☐				
Shower stool	☐	☐				
Shower/toilet combi	☐	☐				
Height toilet provided	☐	☐				
Toilet - frame	☐	☐				
Toilet - frame + raised seat	☐	☐				
Toilet - raised seat	☐	☐				
Grab rails (sink)	☐	☐				Adequately placed - take pictures
Grab rails (toilet)	☐	☐				Adequately placed - take pictures
Grab rails (shower)	☐	☐				Adequately placed - take pictures
Grab rails (bath)	☐	☐				Adequately placed - take pictures
Ventilation	☐	☐				
Smoke alarm	☐	☐				
Thermostatic radiator valves	☐	☐				
Bedroom	No	Yes	Height	Width	Depth	Observations
Outward opening doors	☐	☐				
Emergency assistance alarm	☐	☐				Where?
Additional sockets (TV and phone)	☐	☐				
Height sockets	☐	☐				
Commode	☐	☐				
Rocker switches	☐	☐				
Manual window openers	☐	☐				
Electrical window openers	☐	☐				Controls where?
Electric curtain openers	☐	☐				Controls where?
Lever door handles	☐	☐				
Thermostatic radiator valves	☐	☐				
Fire alarm	☐	☐				
Smoke alarm	☐	☐				
Air cooler	☐	☐				

[illegible]

Communal areas		No	Yes	Height	Width	Depth	Observations
Clear opening main entrance							
Clear opening inside doors							
Lever door handles							
Door bell							
Key less door lock							
Key-safe							
Colour contrast décor							
Level thresholds							Where?
Ramps							Where?
Platform lift							Where?
Through floor lift							Where?
Stairlift							Where?
Regular lift							Where?
Regular lift							Where?
Narrowest point communal corridor							
Handrails (steps/ramp)							Distance from wall, height, circumference
Height sockets							
Rocker switches							
Scooter storage							Where?
Wheelchair storage							Where?
Accessible laundry room							
Accessible living room							
Accessible kitchen							
Fire alarm							
Smoke alarm							Where?
Accessible Bathroom		No	Yes	Height	Width	Depth	Observations
Outward opening doors							
Lever door handles							
Emergency assistance alarm							Where?
Height electric sockets							
Rocker switches							
Height bathroom sink							
Tilted mirror + bottom height							
Lever taps sink							Direction?
Mixer tap sink							
Thermostatic blending tap sink							
Electronic tap sink							
Thermostatic tap shower/bath							
Height bottom shower head bar							
Bathtub							
Level/low access shower							
Hinged shower seat							
Shower stool							
Shower/toilet combi							
Height toilet provided							
Toilet - frame							
Toilet - frame + raised seat							
Toilet - raised seat							
Grab rails (sink)							Adequately placed - take pictures
Grab rails (toilet)							Adequately placed - take pictures
Grab rails (shower)							Adequately placed - take pictures
Grab rails (bath)							Adequately placed - take pictures
Ventilation							
Smoke alarm							
Thermostatic radiator valves							
Ceiling mounted hoist							Where?