

# TECHNOLOGIES FOR INDEPENDENCE IN LATER LIFE



# POST - 134

Post Note

February 2000

The UK, along with most countries in the industrialised world, is seeing an increase in the number of older people within the population (**Figure 1**), due to declining fertility<sup>1</sup> and mortality rates. About 25% of the population will be over 60 in 2020. There are many issues associated with this, the most important being the goal of maintaining autonomy and independent living for as long as possible.

*This briefing explores the technologies currently available to meet the needs of older people and analyses their accessibility to the end-user.*

## STATE OF AFFAIRS

There are about 12 million older people (over the age of 60) in the UK at present. Two thirds are in good health and live independently without support from either family or formal agencies. As age increases however, so does the level of dependency. Estimates are that 28% of older people living in private households have some level of dependency - i.e. require help with domestic tasks or personal care. Technologies are increasingly seen as a key to independent living and improving quality of life.

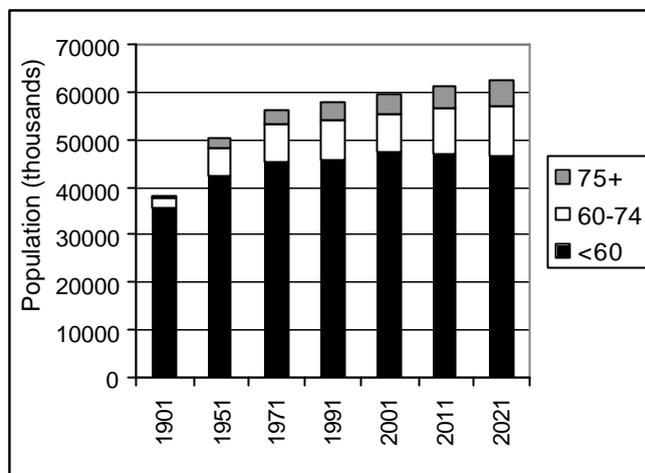
## INDEPENDENT LIVING

Independent living has several advantages:

- **Economic:** The Royal Commission on Long Term Care highlighted a number of examples suggesting that independent living is cheaper than residential accommodation. For instance, it has been found that 'smart' homes, which combine a range of technologies to allow independent living, could be more cost-effective than residential homes.
- **Health:** Studies have indicated that older people living independently are less likely to experience physical or mental decline. They are, for instance, less likely to suffer from depression than their peers in residential homes.
- **Quality of life:** Research has also found that 80% of older homeowners prefer to remain in their own homes. This is because their own homes are seen as a place of refuge, where individuality can be expressed and, above all, where they can retain control over their lives and not be dependent.

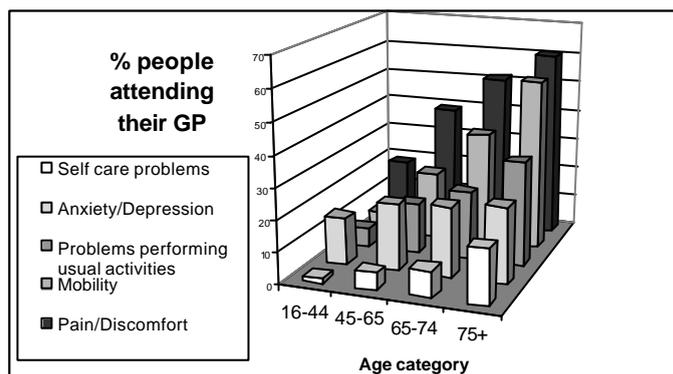
Independent living is a process of consciousness raising, empowerment and emancipation, enabling older people to achieve equal opportunities, rights and full participation in all aspects of society.

**FIGURE 1 AGE DISTRIBUTION OF UK POPULATION IN 20<sup>TH</sup> CENTURY AND PROJECTIONS TO 2021**



(Source: Office for National Statistics, Abstract of Statistics, 1999)

**FIGURE 2 SELF-REPORTED HEALTH PROBLEMS (UK)**



(Source: General Household Survey, Office for National Statistics, 96-7)

## NEEDS OF OLDER PEOPLE

Although two thirds of older people enjoy a healthy and autonomous later life, ageing is associated with a variety of illnesses, diseases and other problems. As shown in **Figure 2**, older people are more likely to suffer from pain / discomfort, mobility problems, anxiety/depression, etc. **Box 1** outlines other common causes of illness/disease in older people.

### Mobility Aids

Whereas only 6% of the health problems reported by 16-44 year olds involve mobility issues, this figure increases to 55% in people aged 75 and over (Figure 2). Technologies to assist mobility are thus a prerequisite for encouraging independent living.

Reduced mobility is generally caused by arthritis, osteoporosis, muscle wastage and/or other physical disabilities. The reduced function of arms and hands makes every-day tasks such as unscrewing bottle

1 i.e. the average number of children per woman

tops or climbing the stairs difficult or impossible. Mobility problems can also cause further disability (30% of over 65 year olds have at least one fall a year). Fall-related injuries are the fifth most common cause of death in older people and the most likely cause of accidental death. Falls may also result in anxiety, disability and depression.

## Communication

Communication aids provide emotional and psychological reassurance or enable social calls. The latter is particularly important to house-bound older people. The same is true for technologies providing information about the types of services available and for requesting that service.

## Transport

Without an accessible transport system, many disabled older people can be deprived of their freedom to move beyond their immediate environment. Most older people only undertake short distance trips, often on foot, bicycle or public transport, although an increasing number now also rely on cars. Indeed, for the generation now moving into retirement, personal transport can be considered synonymous with freedom, dignity and security.

## EXISTING TECHNOLOGIES

A wide range of technologies can be used to encourage independent living (**Box 2**). For instance, microwave ovens, programmable washing machines and mobile phones are all technologies that can improve older people's quality of life and encourage independence. While such technologies cannot completely replace human care, they are applicable in a variety of different settings.

### In the Home

A lot of equipment is designed especially for people with disabilities to help in areas such as personal and domestic care, cooking, eating and leisure.

#### *Aids to daily living*

The spectrum of mobility aids available ranges from simple walking sticks/frames to specialised medical technologies such as hip replacements. Grab rails are examples of commonly found low-tech assistive devices. Whether wall-fixed within a bath/shower unit, free-standing around the toilet or attached to the side of a bed, grab rails are easily installed, relatively cheap and highly effective in providing the extra support for older people with impaired mobility. More high-tech alternatives include stairlifts and powered or manual reclining chairs.

## BOX 1 CAUSES OF ILLNESS AND COMMON DISEASES IN OLD AGE

Healthy life expectancy is determined largely by a relatively limited number of diseases that become more common with increasing age. The four main causes of morbidity in old age are due to **neurodegenerative disorders** such as Parkinson's disease and dementias, especially Alzheimer's disease, **cardiovascular disease** such as stroke and coronary heart disease and **cancers**, mainly of the lung, breast, prostate and intestine. Musculoskeletal diseases such as arthritis and osteoporosis also have a great impact on healthy life expectancy. Other causes of death include traffic accidents, 45% of all fatalities being over the age of 60.

Other common disorders leading to a decreased quality of life include **cataracts** and macular degeneration (both causes of visual impairment), hearing disability and glaucoma.

### Prevalence

- **Arthritis:** the biggest cause of physical disability in the UK with over 8 million people affected, 41% of these being over 65.
- **Osteoporosis:** affects one in three women and one in twelve men over the age of 50. More than 3 million people in the UK are believed to be affected.
- **Visual disability:** there are almost 1 million blind or partly sighted people in the UK; as many as eight out of ten are over 60.
- **Hearing disability:** 8.7 million people in the UK have some degree of hearing loss (one in seven of the population); this increases to 55% of all people over the age of 60.
- **Parkinson's disease:** 120,000 people in the UK suffer from Parkinson's, the majority of which are over the age of 60.
- **Dementia:** the risk of developing dementia doubles among each five year age group over the age of 65; by the age of 80 it is estimated that one person in five may be affected. An estimated 633,000 people over 65 suffer from dementia in the UK.

A variety of manual and powered appliances are available for people who have problems getting into and out of the bath. Long-handled or big-grip sponges and brushes for washing and grooming, toileting aids, bed raisers and easy grip scissors are also common appliances for people with a limited range of movement. In the kitchen, special hob surfaces allow pans to be slid rather than lifted and special tap, jar and bottle openers are useful devices for people with weak or arthritic wrists.

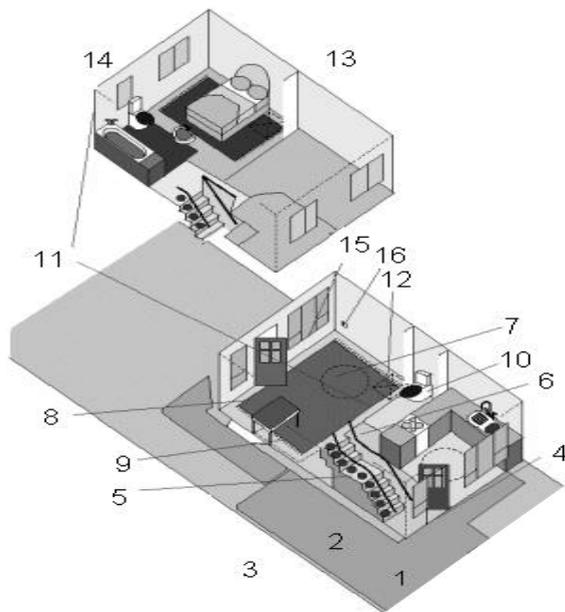
### **Communication technology**

A variety of special telephones exist to amplify incoming and outgoing speech or have large buttons for people with dexterity-impairment. Some sets incorporate flashing units and loud-tone callers to alert the owner that the telephone is 'ringing'. Text telephones for the completely deaf and speech-impaired also exist to enable communication through keyboards and screens.

### **Environmental control systems**

These are mechanisms that allow the user to retain control of their environment within the home, despite changing physical abilities. They allow control of any household item via a remote control. Infra-red (or radio frequency) operated power

FIGURE 3 LIFETIME HOMES - 16 DESIGN FEATURES



- 1 Enlargable parking space
- 2 Minimal distance from parking space to house
- 3 Level or gently sloping approach to house
- 4 Accessible, covered and lit entrance
- 5 Provision for possible stair lift
- 6 Doors wide enough for wheelchairs
- 7 Turning circles for wheelchairs
- 8 Living room on ground-floor
- 9 Space for ground-floor bed
- 10 Ground-floor WC, convertible to shower unit
- 11 Adaptable walls
- 12 Provision for possible lift to first-floor
- 13 Easy route for a hoist from bedroom to bathroom
- 14 Side access to WC and bath possible
- 15 Low window sills
- 16 Sockets, control etc. at convenient height

(Source: Joseph Rowntree Foundation –www.jfr.org.uk)

modules are plugged into standard electrical sockets and the devices to be controlled, such as televisions or video recorders, are connected to them. Other devices, such as heating controls, curtains, windows, door openers and locks as well as intercoms and telephones can also be adapted to function from an infra-red input.

Remote control pads can also be designed to be simple to operate - for instance by using codes that operate a range of different devices, through single-switch operations.

## Built Environment

Appropriate housing is a key to independent living. As people get older and have increasing mobility problems, their homes often require adaptation.

One approach is by building so-called 'lifetime' homes, specifically designed to provide maximum accessibility. They incorporate design features, which make the home flexible enough to meet the owners changing needs. **Figure 3** shows the design features of such a house. Since October 1999 an extension in Part M of the Building Regulations requires all new houses to incorporate some of these design features. Thus the approach and entrance to the house as well as the corridors within it are to be widened, switches and sockets are to be at waist height and accessible toilets are to be provided in the entrance storey.

## BOX 2 TYPES OF TECHNOLOGIES AVAILABLE

There are four main classes of technologies to increase independence in living:

- **assistive technologies**, which are devices or systems allowing an individual to perform a task they would otherwise be unable to do or which increase the ease and safety with which the task can be performed;
- **adaptive technologies**, through which any system or device can be modified according to the needs of an individual so that a task can be performed more easily and safely;
- **inclusive designs** or 'design for all' technologies are developed on the principle that devices and systems can be used by as wide a range of the population as possible.
- **medical devices** cover all products other than medicines, which are used in the healthcare environment for the diagnosis, prevention, monitoring, treatment or alleviation of illness or injury.

Research is currently also underway to harness technologies found in other settings into 'smart' homes (see **Box 3**) although these are so far only found as demonstration models in this country. Existing houses could theoretically be converted to the 'smart' concept, although this would entail structural alterations (unless the home had been designed for such conversion in the first place).

'Millennium' homes are also being researched that incorporate a multitude of sensors installed throughout the house (e.g. toilet, bed, lights, floors, taps, locks and cookers) linked to a computer. For instance, the sensors can detect whether someone is in bed or whether gas is escaping from an unlit oven. If there is a problem, the computer can 'talk' to the residents to remind them to turn the gas off.

**BOX 3 SMART HOMES**

'Smart homes' or 'intelligent houses' incorporate some of the technologies found useful in other settings to bring about increased comfort and quality of life within the inhabitants' own home. This is achieved by electronic and computer controlled integration of many of the devices within the home. Thus curtains can be drawn on command, windows opened, lights dimmed, the oven switched on, the kettle boiled, or even a bath run. Similar to the environmental control systems, individual devices are either activated via a remote control or infra-red beams. They can also be activated automatically or from outside the home via the telephone.

Telemedicine can also be included within the system to allow daily health checks. For instance, an instrumental toilet/bidet has been developed to measure heart rate, temperature and nutrition. Some systems can also detect a resident falling out of their bed and alert a carer living nearby.

**Out and About**

One of the most popular outdoor walking aids is the shopping trolley, which provides stability when in an upright position as well as taking the weight of the shopping. There is also a wide range of wheelchairs on the market although these do not tend to be very popular with older people as they are regarded as stigmatising. Electric scooters, on the other hand, are very popular.

**Motor cars**

Various aids are available to people with impaired physical ability to help them drive. For instance, power steering is an aid to those with weak upper limbs while automatic transmission (with hand-controlled braking and acceleration) assists those with lower limb problems. Features such as wide opening doors, low sills and adjustable seating can also help people get in or out of a vehicle.

Adaptations that can be fitted to the car at a later stage are also available and include key turners for helping to open the car door, fitted hand grips inside the car, a leg lifter to help lift both legs over the sills, extended seat runners to allow the seats to be pushed further back in order to achieve maximum leg clearance or swivel seats to allow easier access. Seat-belt modifications may also permit easier release and improved comfort.

**Public transport**

The Disability Discrimination Act 1995 introduced a range of requirements for all new public transport vehicles to allow greater access to the disabled and frail elderly. Thus, floors in new buses and coaches are to be lowered to allow easier access. Visual and audio announcements on trains and trams should also enable hearing and visually impaired people to get on and off at the right stop.

**Technologies for Sensory Disability****Visual impairment**

Glasses are the most common technical aid used by visually impaired people. They are cheap, easy to supply and can greatly improve quality of life. Other frequently used devices are low-vision aids such as adapted magnifiers. For close-up reading, there are hand-held magnifiers with an in-built light source or, for distance reading (e.g. of bus numbers), small telescopes can be used. Other assistive and inclusive technologies are easy-to-see, flashing, vibrating, or talking devices within clocks/watches, microwave ovens, door bells, phones, thermometers, washing machines, address books, etc.

On a more hi-tech level, closed circuit television sets can enlarge images of items or documents 70 fold while other devices include reading machines, screen magnification software and screen readers. Such items are not cheap, however, and have so far not really caught on with older people.

**Hearing impairment**

Hearing aids are commonly used and can be highly effective (although the best models are not always available through the NHS). Some aids are also fitted with telephone inputs beside the microphone, to allow the reception of magnetic signals/loops within theatres and cinemas. Glasses with acoustic amplification also exist.

For deaf people or those with extreme hearing loss, alerting devices with flashing lights can help make day-to-day life easier and provide a greater sense of independence. For instance, lighting alerts can signal when the telephone rings, there is a knock on the door or an oven-timer goes off. Vibrating alarm clocks are also available which can be placed under a pillow. The same idea can be used for other devices such as mobile telephones or even smoke alarms.

**Technologies for Cognitive Disability**

Modern approaches to care for older people with dementia focus on allowing them to live in familiar social surroundings for as long as possible. In addition to living in a 'smart home' (see Box 3), other options include alarm systems and tagging devices. These can increase the safety of people with dementia and reduce worry on the part of the carer if they do not live in the same household. For instance, some systems activate an alarm when a sensor worn or carried by an individual passes a detector fitted to a door or gate.

Research is also being undertaken on special pagers,

time/planning aids and on telephones that aid recognition by displaying a picture of a family member rather than showing their number.

## General Health and Well-Being

### Telecare

This can broadly be defined as any healthcare-related activity (including diagnosis, treatment and monitoring) that involves a professional and a patient who are separated in space and is facilitated through the use of information and communication technologies. The information being transmitted may be a combination of text and numeric data, sound, and still or moving images.

Such systems include emergency alarm services that allow older people to send a personal alarm signal when in need. This can be achieved by pressing a button on a neck-tied pendant or on a special telephone set. As soon as a signal is triggered, the number of a control centre, manned by specially trained staff around the clock, is automatically dialled. At the control centre, detailed information on the particular person appears on the operator's computer screen and a voice link between the person calling and the operator is set up. Depending on the nature of the call, the operator will then take appropriate action to summon assistance from next of kin, family doctor, ambulance, fire department, police, etc.

A Department of Health (DoH) initiative launched in April 1999, 'NHS Direct', aimed to provide guidance, advice and information on health matters through a confidential telephone consultation with a qualified nurse. It is expected to cover the whole of the country by the end of 2000 and an on-line version has also recently been launched.

### Information Technology

A variety of IT systems are available which enable users and carers to access an increasingly wide range of information. Specially developed touch-screen computers are now found in public places such as libraries and stations and can provide a comprehensive source for enquiry.

The Internet and E-mail are also becoming increasingly popular with older people in order to communicate with their family, for general interest and education as well as tele-banking and shopping. In a sample of 500 older people, 6% were already using the Internet; 22% were interested in doing so.

## DELIVERING THE TECHNOLOGY

Older people who are not disabled *per se* but nevertheless feel that their welfare would benefit from technical aids, can apply to their local authorities for support under the Health Services and Public Health Act 1968. This empowers, though does not oblige, local authorities to provide practical assistance within the home including adaptations to secure greater safety, comfort or convenience.

### Aids to Daily Living

Under the National Health Service and Community Care Act 1990 section 47, the local social services department has the duty to assess everybody they consider may be in need of community care services. During this assessment the council decides what services each individual needs and, under the Chronically Sick and Disabled Persons Act 1970, becomes responsible for those services. This includes practical assistance in the home, help with obtaining adaptations or practical aids in the home, provision of meals and other services.

Examples of assistive and adaptive equipment (see Box 2 for more details) provided by the social services include: products for personal care and hygiene such as bath boards and raised toilet seats; products for food preparation, such as adapted kitchen utensils and cutlery; and devices to help with the use of beds and chairs. Social services may also provide specially adapted telephones and other equipment such as alarm systems and communication aids for people with sensory impairment. They may also arrange services to be provided by another organisation such as a charity or a private agency.

Community care services also include health care. The NHS provides general nursing utensils (such as commodes and hoists), hearing and communication aids as well as environmental control systems. Walking sticks and frames as well as (electric) wheelchairs for indoor and outdoor use are also obtainable through the NHS. It does not, however, provide electrically powered wheelchairs or scooters which are predominantly for outdoor use.

Disability equipment can, of course, be purchased privately. An increasing number of companies specialise in selling such equipment. A number of charities also offer financial help towards the purchase of disability equipment whilst others offer items on short-term loan or hire.

## Out and About

Anyone entitled to a higher rate mobility component of the Disability Living Allowance or to the War Pensioners' Mobility Supplement can use their allowance towards the cost of obtaining a car or powered wheelchair through the so called Motability Scheme. Motability is a charity set up by the Department of Social Security (DSS) in 1977 that brings together motor manufacturers offering discounts on vehicles, a finance company acting as the primary partner in the Scheme and other suppliers such as insurers and roadside recovery providers. It can also provide grants to pay for adaptations to vehicles.

In February 1996, a NHS wheelchair voucher scheme was launched. This provides for a NHS contribution towards the cost of a more expensive wheelchair of a disabled person's choice.

## Built Environment

Since the 1970s, Home Improvement Agencies have come into existence which aim to help older people remain independent in their own homes for as long as possible by identifying necessary repairs and improvements and advising older people about the grants and loans available.

Under the Housing Grants, Construction and Regeneration Act 1996, disabled older people can apply for a disabled facilities grant from the housing department of their local council. Work covered under this grant can include ease of access into, out of and within the home, providing suitable bathroom and kitchen facilities, ensuring safety of the home, adapting heating or lighting controls and improving the heating system.

## ISSUES

### Access to Services

A number of problems arise in ensuring people have access to services they are entitled to:

- **Lack of information** about what is available and what they are entitled to. All in all, Age Concern estimates that 1 million of the poorest pensioners do not to claim up to £1 billion in benefits they are entitled to.
- **Lack of expectation** - older people generally express higher degrees of satisfaction with their quality of life than objective criteria would suggest is appropriate (which might also be a reason why a lot of benefits go unclaimed). This is possibly due to the fact that they compare their

situation to past standards of living or to others of their own age rather than to society in general.

- **Stigma** - older people who require aids to daily living might not put themselves in the same category as people who have had a disability since birth or acquired one later in life. The stigma involved in being classed as disabled leads many older people to 'make do' as best they can without seeking help.
- **Lack of familiarity with technology** - new technology can be perceived as being complex and thus be mistrusted. The increasing number of telephone-based information services for instance, which give details about travel timetables or benefit information can be confusing to older people who are often used to (and prefer) dealing with a 'real person'. Such problems can be exacerbated by decreased reaction time and hearing impairment so that some older people might be discouraged from using these services altogether. If there is no alternative source of information, they might thus be prevented from using the facility at all.

### Uniformity of Service

Another issue facing older people is that the level of services provided may vary from one region to another. There are two main reasons for this.

- **Different 'levels' of assessment** exist between different local authorities. For instance, in some areas a person asking to have a grab rail installed might be considered to have a 'simple' need resulting in a 'low-level' assessment by a physiotherapist. The waiting time for such 'low level' assessments can extend up to two years.
- **Variability in expenditure** and services provided are also common between the different local authorities, depending on their own resources. Whereas some local councils provide free equipment others will expect items to be bought privately if they are below a certain cost. Some items may be classed as adaptations, which are the responsibility of the housing department through disabled facilities grants.

Health authorities may also set their own criteria about the type, range and amount of services offered; these may differ for each part of the country.

### Co-ordination of Services

The NHS and Community Care Act 1990 allows each local authority to decide how it will carry out assessments. This can lead to a fragmentation of the services provided.

There is scope for improving integration between health and social services assessment. For instance, while the NHS provides environmental control systems to severely disabled people, the social services are generally involved in referral and installation of the system and might also supply them.

Joint community equipment services that provide nursing and daily living equipment, serviced by professionals from both the health and social services do, however, exist in some areas. Guidance produced by the Disabled Living Centres Council on behalf of the DoH recommends such joint working. The Department is encouraging each health authority and local authority to work towards this goal.

## Design Issues

The design of many everyday products has traditionally been aimed at the (non-existent) 'average' individual. Many older and disabled people experience difficulty operating such products.

This is particularly true for many hi-tech devices such as video recorders; these often have small buttons that are close together and thus are difficult to distinguish. Although IT systems with large screens and keyboards exist, most commercial software is not written with visually impaired people's needs in mind, and is thus hard to use.

## Improving Design

Technologies constitute an important part of everyday living, fitting into every-day home activities, transport, communication, commerce and entertainment. They are ubiquitous and often create perceived needs among consumers.

In order to achieve the most effective technologies that would suit the majority of people, companies need to consider older people's needs when they design their products. Such an approach is known as inclusive design or 'design for all' and increases the range of people benefiting from these products as well as removing potential stigmas attached to them. Companies also experience cost benefits from increasing the market for their products. **Box 4** gives details of the requirements needed for a technology to serve the needs of the whole of society.

Human factors engineering (ergonomics and usability engineering) has to be applied in order to try and fit technology to meet user needs. This is, however, not easily achieved, mainly because the

### BOX 4 REQUIRED FEATURES OF TECHNOLOGIES

- **Accessibility:** Inclusive technologies should be designed with particular attention to accessibility requirements of older and disabled people.
- **Availability:** Service providers should be encouraged to provide readily useable equipment and the necessary connections to older and disabled people who wish to use them.
- **Affordability:** Technologies should be affordable otherwise older people with a low income might not be able to benefit from them.
- **Awareness:** Greater awareness of the range of products and services available, and of the needs of older people.
- **Appropriateness:** End-users should be involved in the research and product development phases of a technology in order to ensure suitability of the application.

(Source: *Inclusion of Disabled and Elderly people in telematics* – [www.stakes.fi/include](http://www.stakes.fi/include))

design time allocated to a new product and the financial resources available within individual companies are often limited. Since Europe is potentially a big market for assistive and inclusive technology products in the industrialised world, research and development might be better conducted on a pan-European level. Such initiatives already exist within the European Union Research Frameworks such as 'European Co-operation in the field of Scientific and Technical research' (COST) and 'Telematics for Elderly and Disabled People' (TIDE). Since it started in 1971, COST has stimulated co-operation between industry, scientific institutes, universities and national research centres in a total of 293 projects. TIDE (running from 1991-1994) stimulated the creation of a European market in rehabilitation technology through 55 co-operatively conducted projects. The current EU Research Programme, running from 1998-2002, is also placing great emphasis on technology for the improvement of life quality and independent living.

## Government Actions

The DoH is investing £5m over 5 years in research and dissemination opportunities in the field of new technologies such as the New and Emerging Applications of Technology programme. The Disabled Living Centres Council and other voluntary organisations are other recipients of grants aimed at bringing together technologies and their users. 'Smart' and 'Millennium' home projects also receive funding from the DoH.

One of the key aims set out by the DoH in the White Paper 'Modernising Social Services', was that social services should seek to promote people's independence. They should also assist and support people to retain independence in their own homes and communities for as long as possible. In order to achieve this, new funding (£100m over 3 years) has

been introduced to stimulate the development of preventative strategies and effective risk management. Guidance on adopting a preventative approach and developing a strategy has also been given to local authorities. The importance of speed and effectiveness in assessing and providing equipment and adaptations was one of the points highlighted as well as the importance of small items of equipment (such as grab rails).

Within its initiative 'Building a Better Britain for Older People', the DoH indicated that a 'National Service Framework for Older People' is due to be published in Autumn 2000. This aims to raise the quality of services provided to older people and reduce any variation within these. The DoH and the Department of Environment, Transport and the Regions published a consultation paper called 'Better Care, Higher Standards: a charter for long term care' in December 1999 which set standards for housing, health and social care services for all adults. Local authorities are required to draw up local charters on this by June 2000.

The Office of Science and Technology (OST) initiated a programme called 'Extending Quality Life' (EQUAL) in 1995. This aims to draw together research activities related to extending the active period of people's lives. Under this banner, Research Councils and non-governmental organisations have conducted a substantial amount of research. OST also manages the 'Foresight Programme' which looks at the future needs of society in order to act upon them now.

## The Future

As noted in Box 4, new technologies need to be efficient, affordable and effectively address the needs and wants of older people. Some technologies fulfilling these requirements are already on the market, although there is scope for a lot more. The concept of 'smart' technology has already been mentioned in relation to 'smart' homes but it can also be applied outside the home. For instance, 'smart' cards are currently being developed and tested to make information and other services more accessible (see **Box 5**). 'Smart' cars and even 'smart' street signs are being developed which are designed to 'talk' to people with visual impairments. Infra-red signals from the sign are picked up by a hand-held device which 'relays' its meaning through synthetic speech.

In the field of information technology, there is also scope for an improvement of facilities to cater for the increasing demand for Internet access. The potential

### BOX 5 SMART CARDS

These are credit card sized plastic cards incorporating integrated microcircuits which hold information in electronic form that can be easily, securely and accurately accessed by a range of terminals. There are three main types of smart cards:

- memory only ones which are often used as pre-payment cards for public telephones;
- microprocessors which add the possibility of incorporating security features (e.g. for banking applications); and
- contactless cards which eliminate the need to put the card in a reader (this type is used for public transport applications).

Ideally, the user would be able to select and store their preferred interface any time they use the card at a terminal. A preferred customer verification method could be programmed such as a pin number or a fingerprint. The card could also be programmed to allow for a longer reaction time, increase the size of characters on a screen, give verbal prompts, dial a pre-set phone number, etc.

### BOX 6 FURTHER READING

- Age Concern - [www.ace.org.uk](http://www.ace.org.uk)
- Continuing Care Conference, Fit for the Future: the prevention of dependency in later life, June 1998
- Disabled Living Foundation – [www.dfl.org.uk](http://www.dfl.org.uk)
- Fifth (EC) RTD Framework Programme - [www.cordis.lu](http://www.cordis.lu)
- Inclusion of Disabled and Elderly people in telematics, - [www.stakes.fi/include](http://www.stakes.fi/include)
- Joseph Rowntree Foundation – [www.jfr.org.uk](http://www.jfr.org.uk)
- Learning to live in the Information Society as an older person, STOA, Final Workshop Study, September 1998
- Motability Charity - [www.motability.co.uk/motability/ch-index.htm](http://www.motability.co.uk/motability/ch-index.htm)
- New Technology and Social Care, DoH, Disabled Equipment Evaluation Unit consultation paper, 1999
- Royal Commission on Long Term Care: With Respect to Old Age: Long Term Care - Rights and Responsibilities - [www.opengov.uk/royal-commission-elderly/index.htm](http://www.opengov.uk/royal-commission-elderly/index.htm)
- Royal National Institute for the Blind – [www.rnib.org.uk](http://www.rnib.org.uk)
- Technology for Living Forum UK - [www.tfl-forum.org.uk](http://www.tfl-forum.org.uk)
- The Millennium Debate of the Age – [www.age2000.org.ukcv](http://www.age2000.org.ukcv)

of tele-banking, shopping and communication is great, especially for mobility impaired people. Internet-encouraged third-age education could also lead to an improvement in mental health. Within this context, the 'University of the Third Age' is witnessing a great demand for their computer courses for older people.

Although technologies can aid independent living in older age, the value of human involvement should not be underestimated. Older people do, in general, rely far more on informal rather than formal care in order to achieve independent living (80% of the people requiring help with domestic tasks rely exclusively on informal help). Many see the need for greater encouragement/support for informal carers as one of the largest challenges in the years to come.

**Box 6** provides a list for further reading.

#### Parliamentary Copyright 2000

The Parliamentary Office of Science and Technology, 7 Millbank, London SW1P 3JA, tel: [0171] 219 2840.

See also [www.parliament.uk/post/home.htm](http://www.parliament.uk/post/home.htm)