

Building a Local Infrastructure that Supports the Use of Assistive Technology in the Care of People with Dementia

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Abstract

There is a growing interest in the potential of assistive technology to contribute to the care of people with dementia. However, despite this interest, no local social care or health service provider has developed services that utilise technology. This paper suggests that a major obstacle is the absence of an infrastructure to support its use. This infrastructure is described within a process containing a series of distinct steps. Within each of these steps the paper looks at current practice and what needs to happen to enable technology to be properly used. It argues that local infrastructures are needed to create the conditions within which technology can be successfully used, though some of the issues may be more efficiently addressed at a national level.

Introduction

Technology has been used for many years to support the independence of disabled people. Until quite recently, most technology could only be used if the disabled person had the capacity to learn how to operate the equipment. Because many people with dementia develop disabilities with memory and learning they will be unable to use equipment that is designed in this way. As a result, it has often been assumed that technology cannot be used to support people with dementia. In fact, an increasing range of technologies operates 'passively' rather than actively - operating 'around' the end user and requiring no input from them. It may be helpful to briefly distinguish between three categories of technology.

- First are 'stand alone' technologies that do not link in to any form of community alarm system: for example, calendar clocks to aid orientation in time.
- Second are technologies that 'piggy back' on community alarm systems. When activated, these devices send information to a community alarm centre for a social response. An example of this kind of technology might be a smoke, gas, or CO₂ carbon monoxide detector.
- The third type of technology is that offering smart 'systems' to filter information from a range of devices or sensors and react according to parameters set within a computer programme located in a computer installed in the user's home.

These three types of assistive technologies are 'retro-fitted' - they can be installed into the existing home of a user. Other kinds of assistive technology are more commonly installed in the

architecture of new buildings because of the difficulties of retro-fitting.

A re-examination of the potential role of technology in the care of people with dementia has taken place over the last few years. There have been a number of reasons for this. First, the idea of using technology, and the issues surrounding its use have been extensively explored in the work of a number of writers and academics (Marshall, 1997; Bjerneby et al, 1999; Marshall et al, 2000). Secondly, technological progress has created new opportunities for its use. Third, there has been a policy shift brought about by the present Government towards preventive services and services that promote independence.

The reasons local service providers should be interested in exploring the use of assistive technology in dementia care have been explored elsewhere (Woolham and Frisby, 2002). The UK has an ageing population, and as a consequence, the number of people who will have dementia is also rising. Over the next few decades there will be a shift in the proportions of people of working age and those who are retired, with consequent loss of tax revenue to pay for care at a time when demand will rise. Despite legislation specifically intended to promote community care, the growth in the residential sector continues, both locally and nationally (The Audit Commission, 1997, Department of Health, 2001 b, c and d). Residential care is also expensive, and many older people would prefer to remain living in their own homes with the right support.

Technology offers considerable potential for enabling people with dementia to remain living in their own homes for longer, or to avoid moving into residential care altogether. It is also relatively

inexpensive compared with the costs of residential care.

Over the past few years, a small number of projects have been established to explore the use of technology in caring for people with dementia at home. These include the Northampton Safe at Home Project, Adren Saff (Ynys Mon Social Services Department, Anglesey), The Gloucester Smart House Project (www.bath.ac.uk/BIME/projects/smart/smart/htm and www.dementia-voice.org.uk/projects_GloucesterProject.htm) and the Glasgow Smart House project (Glasgow City Council). These projects all have slightly different aims, and this is reflected in the kinds of technology used. For example, the Gloucester Smart House was established primarily to 'show-case' and demonstrate technical equipment and systems, and as a research project that combined both technical innovation and practical application. The project team has developed a number of sophisticated technological systems – including:

- bath monitors – to automatically turn off the water supply when a critical depth is reached;
- a locator device to enable people to find everyday items such as keys or spectacles that may become mislaid;
- thermal cooker monitoring devices that respond to overheating pans;
- the use of EIB (European Installation Bus) to enable a computer to control and monitor all the devices used in the house.

With the exception of the EIB, none of these are currently in manufacture and one purpose of the project is to explore with people with dementia and their carers how such systems can be used most effectively.

The Northampton Safe at Home Project, by contrast, has as its main objectives to explore whether the deployment of technology that is currently manufactured can be used to reduce carer stress, and whether technology can delay admission into residential care. The technology used in this project is much less sophisticated, and can be installed in the existing home of the person with dementia (i.e. retro-fitted) simply and cheaply. Where necessary, the devices used are linked to Tunstall Care-Line telephones installed in

the home of the service user. Should a device then be activated, an 'alarm signal' is immediately sent to the local call care centre where staff take appropriate action. The kinds of devices used include:

- Bed leaving devices and door sensors to alert resident carers
- Flood detection devices
- Smoke detectors
- Fall detectors
- Gas detectors linked to motorised valves to temporarily disconnect gas
- Calendar clocks

Other local authorities are becoming interested in using technology. However, despite the existence of these innovative projects, and despite what is now a benign policy environment, at the present time no local authority in England and Wales has succeeded in developing mainstream *services* for people with dementia that include technology as part of the care that is offered.

One reason is simply that many care professionals still do not know that the technology exists. The publication of information about Research and Development work relating to assistive technology by the Department of Health (2001a) is a starting point in improving knowledge about technology. However, simply providing knowledge about what technology is or will become available, or how technology should be used (Marshall et al, 2000), though essential pre-conditions, are unlikely to be enough to ensure it *is* used. There is a need to create an *infrastructure* to support its use.

This paper will describe what this infrastructure might look like. It will do this by describing a series of linear *steps* - within a process that has five *stages*. This framework builds upon earlier work by Bjerneby et al (1999) and Marshall et al (2000). It is an attempt to develop a 'whole system' approach to the use of assistive technology for people with dementia, and one that can deliver a high quality service. The framework of this system is summarised briefly below and fully set out in an appendix to this paper.

<p>Identify the person with dementia</p>
<p>Assess the needs of the person with dementia</p> <ul style="list-style-type: none"> • Describe the living circumstances of the person with dementia • Analyse the needs of the person with dementia • Identify the problems that need to be solved • Identify potential technology and alternatives, and suppliers • Consider ethical issues
<p>Prepare the care plan and arrange services</p> <ul style="list-style-type: none"> • Recommend technology • Complete an ethical protocol • Choose solutions and decide • Approve funding • Order equipment
<p>Implementing the care plan: operationalising the equipment</p> <ul style="list-style-type: none"> • Install equipment and test • Arrange social response to alarm • User acceptance
<p>Review</p> <ul style="list-style-type: none"> • Reassess person with dementia • Monitor equipment • Maintain equipment • Remove equipment

Identifying people with dementia

The early identification of people with dementia is very desirable. This is because it may enable the person with dementia to be in a position to offer informed consent to the use of specific kinds of technology. Early installation of equipment may also cause less anxiety to the person with dementia and mean that there is greater acceptance of the technology as the disability progresses. Early identification could therefore enable services and equipment to be deployed that will reduce risk, offer support to unpaid carers, promote independence and therefore help to divert some people with dementia away from residential care.

What are the issues?

The need for earlier identification of people with dementia is recognised in the National Service Framework for Older People (Department of Health, 2001c). Although the Government has advised on the desirability of GP health checks on people aged over 75 - something that might radically improve early identification of people with dementia - many GPs feel that early diagnosis of dementia is unnecessary, as little can be done for people who have the condition (Audit Commission, 2000). Early clinical diagnosis is also reported to be difficult (Barker, 2001).

Many people with dementia and their relatives or carers will also not know where to seek advice or help, and for obvious reasons, some people may be reluctant to acknowledge that they have a problem and will not seek advice or assistance. As a result, referral to Social Services will frequently be as a consequence of a crisis. Sometimes, this crisis may be a rubicon that, once crossed, will mean that residential care is the only practical solution. Early identification may help to prevent the occurrence of the crisis.

What needs to happen?

At first glance it might be seen to be desirable for GPs or district nurses working in primary care settings to routinely screen for dementia amongst older people. In practice this is unlikely, and possibly undesirable, for both logistic and ethical reasons. However, much more could be done at a local level to raise awareness amongst clinicians working in primary care. This could be achieved in a number of ways. Locally based partnerships might offer training to GPs and other health professionals to encourage early identification. Information might be given to primary care professionals via Primary Care Trust web-sites, and disseminated within HImP action plans. Social care professionals would also need access to similar training and information.

Some NHS Trusts within England and Wales have established, or plan to establish, memory clinics. These also offer significant opportunities to offer assistive technologies to people who have dementia at an earlier stage. Reference is also made the value of memory clinics in the National Service Framework for Older People standard seven.

Assessment: Describing the living circumstances, analysing the needs, and identifying the problems to be solved

Without a full understanding of the living circumstances, needs and problems of the person with dementia it is more likely that the assessment will uncover the effects of problems rather than the causes.

What are the issues?

First, current practice in assessment within many care management teams in England and Wales focus upon both need and risk (PSSRU 1998 & 1999). Although this may be an effective means of targeting services, it is an obstacle to the delivery of preventive services. People at an early stage of a progressive and increasingly disabling condition - like dementia - are unlikely to demonstrate in an assessment that they have levels of need that 'qualify' them for much help. Little may be offered until their disability reaches a point at which there are concerns for their well-being and safety. A traditional response once this stage is reached is to offer residential care.

Second, few assessment documents, or eligibility criteria, used by social care services in England and Wales at the present time are likely to collect information about needs that focus on the physical environment of the person being assessed. Social workers and care managers are not well trained in identifying home environmental problems of the person they are assessing. General statements made in care planning documents about risk and safety issues if a person with dementia remains living at home are often, on closer inspection, a result of a specific issue – for example, leaving a gas stove switched on, unlit - for which there may be a technological solution.

Third, at the present time, where social care or health professionals do identify an environmental need, they will refer on to the local occupational therapy service. At the present time it is unlikely that occupational therapists will know any more about assistive technology than anyone else. The Hamilton Index is a national database/catalogue of suppliers of equipment for disabled people available via subscription on the internet and used widely by Occupational Therapists as well as

disabled people themselves (www.dlf.org.uk/products/dlf.dataindex.htm). It contains a lot of information about technologies for older people. However, the index contains little information about 'passive' technological devices that may be suitable for use in the care of people with dementia.

Fourth, local arrangements for securing community aids and equipment are complex and the relationships between them are not well understood at either organisational or intra-professional levels (The Audit Commission, 1999). Although the Government has published guidance on the future role of community equipment services as part of the *NHS Plan* (DoH, 2001) the remit of the guidance is much wider than assistive technologies for people with dementia. The guidance recognises that people with dementia and their carers could be supported by appropriate technology, but offers little advice about *how* this may be achieved.

What needs to happen?

Social care or health professionals need assessment tools that focus upon the whole person and their environment. This should embrace medical, social, and environmental needs. The tools should focus both on the needs of the person, but also on their remaining capacities, so the assessment focuses on positive as well as negative issues. A number of validated assessment tools exist that fulfil this purpose. For example, the University of Stirling Dementia Services Development Centre have produced a Care Needs Assessment Pack for Dementia (CARENAP D). The Alzheimer's Society has also produced good assessment tools. By encouraging social care or health professionals to focus assessments upon both social and environmental contexts, it may be possible to more clearly identify cases where technology could play a significant role within the care package.

Eligibility criteria and assessment tools used by social care professionals also need to take account of degenerative illnesses and disabilities. Given the desirability of early identification of people with dementia, it is important that criteria used to determine access to services do not adopt thresholds that prevent access to technology that could be deployed early in the course of the disability.

In the medium term there is a need to ensure a closer working relationship between primary care, care management and occupational therapy services where these do not exist. Occupational therapists may also need training to enable them to understand the potential of technology in dementia care, but their professional role means that they may be best placed to understand how technology can be used in care. The current and potential relationship between social services departments and occupational therapy departments are thoroughly explored by Mountain (2000) who stresses the importance of the skills of occupational therapists in delivering the present Government's agenda of prevention and rehabilitation.

The single assessment framework proposed by the Government in the National Service Framework for Older People (Department of Health, 2001c) offers opportunities to develop an approach that considers social, medical and environmental needs. The danger is that in seeking to reduce the number of assessments that older people face before receiving services, the quality and quantity of information collected will compromise the quality and effectiveness of the subsequent care plan. There is a real danger that if a 'one-size-fits-all' approach is adopted, the specific needs of people with dementia will not be properly identified. The single assessment process needs to identify where a specialist dementia assessment tool ought to be used.

The Integrating Community Equipment Services initiative (Department of Health, 2001d) offers significant opportunities to encourage the use of assistive technology in the care of people with dementia. However, there is also a risk that the specific needs of people with dementia will be imperfectly understood or overlooked as the remit of the guidance is broad. It is important that in formulating their joint response to this guidance, local health and social services departments carefully consider the potential role of technology in meeting the needs of people with dementia.

Assessment: Identifying potential technological solutions, alternatives and suppliers

Within the assessment process, social care or health professionals also need to know what technologies are available to help people with dementia, and understand what the technology does and does not do. They also need to be able to make the link between the use of technology and the social response: for example, a smoke gas or fire detector may be little use for someone with dementia if no-one responds if one of them is activated.

What are the issues?

Both nationally and locally, at the present time, social care professionals have only limited access to information that will help them identify appropriate technology. The ASTRID guide website (www.ASTRIDguide.org) contains information relating to technologies that can be used to meet only four kinds of need – cooker switching off devices, alerting devices for resident carers, 'wandering' detection devices and calendar clocks. It is therefore far from comprehensive. Regional Disability Living Centres will have some information about assistive technologies that may be suitable for people with dementia. The Hamilton Index, referred to already above, contains little information. Apart from these sources, the only other source of information about the availability of assistive technology will come from local knowledge, informal networks of professionals, managers and academics at local, regional, and national levels, and marketing material produced by manufacturers, suppliers or professional associations. There is a need for a national response to address the information needs of practitioners and managers, and to suggest sources of help with training. This is to ensure that assessments are carried out in such a way as to enable the identification both of the issue or problem and the potential technological solution.

Nationally, there is probably also room for growth in what should be a rapidly expanding market. The ASTRID database identified less than 50 UK based manufacturers or suppliers of assistive technologies suitable for people with dementia. It is very likely that at the present time there will be large areas of unmet need for technological

solutions. This is not because existing technology is not used – though available technology *is* seldom used at the present time. It is also because manufacturers have not been aware of, or responded to, the needs of people with dementia. Put simply, many assistive technological devices still remain to be invented. Some of the major manufacturers in the field of personal technologies have been slow to respond to the needs of older people with dementia, although this does now seem to be changing. For some years, whilst the Government, local and health authorities have tried to meet the needs of frail older people in community settings, some manufacturers have been selling products designed for use in institutional settings – which are too cumbersome or expensive to be of much use in ordinary homes.

What needs to happen?

Major manufacturers are now beginning to respond by developing a range of technologies that are appropriate for use in the homes of people with dementia. However, it is important that manufacturers and suppliers listen to people with dementia and their relatives and carers so that technology that is brought to the market reflects what is *actually* needed rather than what manufacturers *think* is needed. There is probably also scope for the manufacture, or importation under licence, of a handful of products – for example, stoves and cookers that have switching off devices built in – that are already used in parts of Scandinavia but are not available within the UK.

Nationally, the need for appropriate, accurate and up-to-date information about existing technology, presented in an accessible way, is essential. The ASTRID Guide was originally conceived as a ‘pilot’ project that would lead to the development and maintenance of a ‘full’ guide, listing a much wider range of appropriate assistive technologies. This work still needs to be done. Consumer organisations could play a role in this process through being able to offer dispassionate advice based on ‘road tests’ of equipment against manufacturers claims. For example Ricability (www.ricability.org.uk) is a consumer organisation for disabled people. It has carried out standardised assessments of the performance of equipment specifically designed for disabled people.

Social care and health professionals will need access to this information, but if the use of assistive technology is to become widespread, it will probably be necessary to prioritise the use of a limited number of specific kinds of technology through cost-benefit analysis. What this simply means is – which kinds of technologies, if made available, would have the greatest benefit to the person with dementia and their carers, and have the greatest impact in keeping the person out of residential or nursing care? Research undertaken by the authors of *Technology Ethics and Dementia*, (Bjorneby, et. al, 1999) established a prioritised list of problems for people with dementia for which technology might offer assistance. The ‘top 10’ from this list were:

- Failure to switch off domestic equipment
- Remote supervision (where the person with dementia needed 24 supervision)
- ‘Wandering’ and/or way-finding
- Use of time / keeping the person with dementia active and occupied
- Disorientation in time
- Problems with handling domestic equipment
- Risk of falls/ falling/ disequilibrium
- Problems using the telephone
- Inability to call for help
- Problems with meal-times.

Finally, local demonstration sites, where technological devices or systems can be viewed are likely to have an important role in providing information to carers and others and in ‘demystifying’ technology.

Assessment: Consideration of ethical issues within the assessment process

As soon as attempts are made to identify technologies that might offer solutions to needs, consideration of ethical issues should begin.

What are the issues?

Technology can be used to enhance the independence of someone with a failing memory, to compensate for their disability and to help to maintain their health and well being. Unfortunately it can also be used to control, or to contain ‘problem’ behaviour – usually for the

benefit of someone else and not the person with dementia.

There may be a choice of several different possible technological ‘solutions’ to needs identified in assessments. For example, for a person with dementia who sometimes leaves their gas stove on, but unlit, there a number of possible ‘solutions’.

- The first solution, and one perhaps frequently chosen in the past, is for general claims to be made about this person’s behaviour - that they are unsafe to remain living independently - to justify admission into residential care.
- The second is to recognise that the person may have a specific need, not a general problem. Permanent disconnection of the cooker would be one way of addressing this specific problem, but would mean that the person would no longer have the ability to cook their own meals, and would be dependent on relatives, or meals on wheels. Another approach might be a replacement – electric – cooker. However, if the person is used to using a gas cooker, the disabling effects of dementia will make it unlikely that they will be able to adjust to using something so different.
- The third is to offer to supply and fit a gas detection device, linked with a motorised valve to temporarily disconnect the gas supply. This would at the same time alert a local call care centre that temporary disconnection has taken place, in order that a carer or relative can visit to re-connect the gas supply. Which of these are likely to be the least disabling or most enabling for the person with dementia?

Social care and health professionals, relatives or other carers may all have legitimate concerns about the possibility that technology may undermine privacy and reduce independence. It is true that some technology – particularly devices that act in a way that enables surveillance of the service user to take place – will erode privacy. The perspectives of all key ‘stake-holders’ – the service user, relatives, friends, and care professionals – should be considered. Is some loss of privacy justified if the alternative may be a very significant loss of autonomy and independence – such as admission into residential care? The ASTRID Guide discusses these issues in some detail: a suggested

framework for an ethical protocol is contained in The ASTRID Guide on page 41.

As a local technology service develops and an awareness of the potential of the technology spreads, a situation may occur in which demand will outstrip supply. There will probably be insufficient capacity within the public sector to offer such a service to every person with dementia, or every relative or carer, who might benefit from it. As a result, some people will seek private solutions to their needs. If technology is bought privately by, for example, a relative of someone with dementia there is a risk that the wrong kind of technology may be purchased, or the right technology may be obtained but not installed correctly. No arrangements for servicing the equipment may be made with the supplier. The customer may be overcharged. Rival private sector organisations may spring up, purportedly offering the same services but in practice these may be of varying quality. A social response via a call care centre may not be possible. Perhaps most importantly, the ethical issues that must always be considered may be overlooked. (It would, of course, *be* possible for the public sector to offer a limited range of technology on demand, *without* assessment of the person and their needs, and *without* trying to integrate the use of technology within a wider care package. This would be commercially feasible and would enable the service to be developed quickly in response to demand. However, it would not serve end users well as services would not be ‘joined up’, and little or no account could be made of whether technology was being used appropriately or ethically). A ‘whole system’ approach envisaged in this paper offers ‘quality assurance’ rather than ‘quality control’.

What needs to happen?

It is important that public sector agencies take steps to try to protect people with dementia – or other vulnerable people who cannot give informed consent – from being controlled and disempowered by inappropriately used technology. At an operational level, the use of technology in care plans should always be informed by careful consideration of the ethical implications of using technology.

At a policy level, the development of a national 'quality standard' would be helpful. One way by which this might be achieved would be for an appropriate national organisation to develop, with others, quality standards for a technology service. This could be a professional association of technology suppliers, a national organisation representing the interests of people with dementia and their carers, or a national local authority organisation. These standards should have reference amongst other things to ethical and social response components of a technology service. These standards could then be used as a benchmark against which the quality of what may be offered by all organisations can be judged.

Preparing the care plan and arranging services: recommending appropriate technology, completing an ethical protocol and choosing technological solutions

Following an assessment, a social care or health professional should be able to match the needs of the person with dementia to the technological solution, and recommend a range of items that might meet the needs identified. Technological solutions to identified needs should be chosen by the person with dementia, if this is possible, or by a close relative or carer.

What are the issues?

The preparation of the care plan will need to specify in some detail how technology and social care will be integrated within the overall plan. All those involved in the delivery of care to the person with dementia will need to be informed about the use of technology and where necessary given clear information to enable them either to use the technology or to 'work around it' as appropriate. The care plan should also clearly specify which individuals will have responsibility for the various parts of the care plan, and the social response to the technology that is deployed if this is needed.

This attention to detail is important. Without it, there will always be the possibility that a carer will inadvertently activate the technology, or that malfunctioning technology will not be identified and put right. In addition, any failure of installed technology to meet the needs for which it was intended will not be picked up, and there may be a

loss of confidence in the technology by relatives or other unpaid carers.

What needs to happen?

The completed care plan should contain detailed and specific information about the technologies being used, why they are being used, and how they work. Ideally, the plan should specify an objective, or series of objectives, so the success of the care plan, and the technology that is used can be evaluated.

The professional who has been co-ordinating the assessment should complete, with others involved, an ethical protocol to safeguard the person with dementia from the possibility that the technology might be inappropriately used. If the person with dementia is able to do so, their views about the use of the technology should be sought and carefully recorded, and used as an 'expression of will' if or when verbal communication becomes impossible. Earlier discussion around the ethical implications of using technology between the key 'stakeholders' should be made explicit, discussed, resolved, and fully recorded.

The care plan: ordering and paying for equipment

Funding will be needed to pay for the equipment, the integration of the equipment (designing a system in which a range of discrete components are made to work together), any social response that is required, the installation of the equipment in the person's home, servicing and maintenance, and de-commissioning.

What are the issues?

At the present time it is likely to be difficult to obtain funding for assistive technology. There is currently a large number of potential sources of money from which funding could be sought. These include modernisation funds such as the promoting independence grant or HImP funds, as well as community care budgets, equipment budgets and so on. However, because 'operational' budgets are already overstretched and because funds are time limited, it is not easy to identify funding to integrate assistive technology into the care packages of people with dementia. Differences in the criteria for allocation, the size of

the funding available, and the speed with which requests for funding will be answered are also evident.

Delivery times of manufacturers and suppliers vary. At the present time, if technology is used at all, much is ordered 'ad hoc' from a range of manufacturers, suppliers and distributors. If there are integration or installation requirements, further work needs to occur, such as co-ordinating the work of electricians, Corgi registered plumbers, or even more specialist electrical engineers. All these factors will slow the deployment of the technology.

What needs to happen?

In many cases it will be important that technology is provided quickly. To make local arrangements more efficient, funding arrangements need to be streamlined and simplified. The integration of community equipment services proposed in the Integrating Community Equipment Service guidance is a welcome step in this direction.

Provision for a local stock of routinely available technological devices would mean the ready availability of frequently used equipment, or equipment that achieves most benefit for its cost. Local equipment services units might be the obvious local organisation within which to locate this equipment.

'Preferred supplier' relationships with a smaller number of manufacturers, suppliers and distributors might also be desirable. These relationships will need to be negotiated to enable local authority commissioners to achieve key service standards in terms of inputs, outputs and outcomes. Providers or suppliers need to be assured that their commitment to a relationship with the 'commissioner' will generate sufficient business to prove worthwhile.

Implementing the care plan and getting equipment installed and working

What are the issues?

As well as knowing where equipment can be obtained, social care or health professionals will need to know who can install it, how quickly, who will service it and who will remove it when it's no longer needed. Falkirk Council have an

established relationship with a local electrical contractor who is able to install ordered equipment on a contractual basis. This is an efficient service: the contractor can install within 48 hours of the order being placed if this is requested by the social worker. The Falkirk scheme relies on relatively simple, 'off the shelf' technologies, and restricts the service to people with dementia who have carers who are interested in using the technology to support them in continuing to care. Though a recent evaluation of this project (Mitchell, 1996) suggests it has been extremely successful, it would not necessarily be a useful model to adopt if the 'tailoring' of technology to meet specific needs was required, or if the technological requirement was for a complex system. The Northampton Safe at Home Scheme referred to earlier offers a wider range of technologies to support people with dementia, but it is a pilot project rather than a service. It is also using relatively simple technologies. So far it has accepted over 18 referrals and over 40 items of technology have been used to meet identified needs. Technical staff employed by the borough council, have installed and tested the technologies that are being used, and the call-care centre – also managed by the borough council - initiates any social response should the technology be activated. However, current arrangements would not be viable within a larger scheme.

At this stage in the process, the most likely problem to occur is that equipment may fail to work to specification. There could be many reasons for this. At the simplest level, the failure may be due to a faulty device or component. Alternatively, it could be because the device was not installed correctly, or is being used inappropriately. It could also be because the communication protocols – the design specification of different items of equipment that enable different items of equipment to communicate with one another – are different.

Protocols, or even service level agreements between a number of statutory agencies, may also be needed to guarantee a social response to an alarm.

What needs to happen?

These issues highlight the need for equipment to be

installed by a competent technician or engineer.

There are a number of possible sources of expertise. These include technical staff working in call care centres if they have expertise in installing non-standard call care applications, or staff working in equipment services teams. The work could also be carried out by appropriate technical contractors. Whatever approach is adopted, it would be desirable for the installer to have an understanding of the needs of people with dementia to improve the quality of the installation process. Very few technical staff will have this combination of skills. It might therefore be necessary to offer training to improve the knowledge-base of the installer. Before installed equipment is 'signed off' each component should be carefully tested to ensure that it is working properly.

The contractual relationship between supplier/installer and commissioner should include reference to immediate supply of replacement parts. It is essential that component failures are identified and corrected as quickly as possible, for obvious reasons. Contingencies should also be made within the care plan to address any short-term problems that may arise from component failure.

Protocols will be needed for any social response that may be required if the technology is activated. For example, as a desirable standard, the fire service might respond to fire, smoke or carbon monoxide alarms, the ambulance service to falls monitors, relatives or neighbours or other unpaid carers to 'wandering' detection devices, and so on.

The Review

The review is the final stage in the process. It is an opportunity to reassess the person with dementia, monitor the equipment: maintaining and servicing it as necessary, and removing it if it is no longer needed.

What are the issues?

The date of the first review will depend on whether any difficulties are identified immediately following the installation and commissioning of the equipment, but should be within ten days of the

technology being deployed (Bjorneby et al, 1999). The focus of the review will obviously vary from case to case, though closer examination may indicate that what may at first seem to be different issues have similar underlying causes.

First, the technology might work perfectly but fail to fully address the problem. If this is so, then the locus of the problem will probably be with the quality of the assessment that was carried out, and a failure to fully identify the entire problem.

Second, the efficiency and cost-effectiveness of the service could be undermined if the 'social response' that occurs if an alarm is activated is a false alarm. This will also generate disenchantment with the idea of using technology by all concerned. It is therefore very important that the technology is deployed in such a way as to avoid the occurrence of false alarms.

Third, reviews offer an opportunity to monitor whether installed equipment continues to function correctly, and whether, if there is a servicing requirement, this has been carried out. This may involve replacement of items that have a finite life: for example, pressure mats placed underneath carpets, or the installation of new batteries to some items at regular intervals.

Fourth, the needs of people with dementia are likely to change over time. As a consequence, existing technologies within the care plan may not address emerging needs. A full reassessment may be needed in these contexts. It may be that for some people, technology can no longer help to maintain them safely at home, and a residential or nursing home place may be needed.

Fifth, it may be necessary to replace existing technologies with new and up-graded equipment as new devices become available on the market.

Sixth, if it becomes necessary for someone receiving technology within their care package to enter residential care, or if they die, it is important that equipment is removed from the home promptly, for repair and re-installation elsewhere.

A review is both an opportunity to reflect on, and respond to changes in need, and also a means of

responding positively to needs identified through knowledge gained since services were deployed. The extent to which this can occur will depend on the quality of monitoring information collected by paid care staff and unpaid relatives and carers. Technology can also be used to assess the frequency with which certain kinds of behaviours occur: for example the number of times that gas taps are left on unlit, medication is not taken, or people leave their homes at inappropriate times. Call care centres that can monitor the frequency, date and time with which particular kinds of device are activated can provide important information about the patterns of behaviour of the person with dementia enabling technology to be more finely ‘tuned’ to their specific needs.

What needs to happen?

First, if difficulties occur as a result of inadequate assessment information, there may be a need for an additional, more detailed, assessment. The frequency with which this is the cause of difficulties should be monitored and any underlying assessment quality issues addressed in supervision.

Second, to address difficulties arising from the volume of false alarms, it may be necessary to configure the technology within parameters consistent with the end user’s normal life-style. For example, door alarms could be set up to be activated only at times that the end user would normally not be expected to leave the house.

Third, periodic inspection and servicing of the installed technology will be necessary. Some routine servicing – for example, the replacement of batteries at specific intervals, could potentially be carried out by a number of care professionals or unpaid carers. The inspection of items of equipment with a finite life should be arranged, and the inspector should be appropriately trained/qualified for this task.

Fourth, it is important to recognise that not everyone with dementia will necessarily benefit from the use of technology, and to recognise that as the condition progresses, technology may no longer be the best way of meeting need.

Fifth and finally, when the technology is no longer needed, the installed equipment should be decommissioned and disconnected by an appropriate person. Provision for storage prior to re-cycling will be needed.

Conclusions

The lack of an appropriate infrastructure at a local level is an important obstacle to using assistive technology in the care of people with dementia. This paper has offered an assessment of current issues and possible ways of resolving specific obstacles. The grid attached as an appendix presents these issues and solutions in a summary format. Precisely how these issues will be addressed will vary according to local conditions. There has been clear interest shown in the potential of technology shown by the Department of Health, - and important guidance and legislation to promote its use. However although some of the infrastructure issues identified in this paper are best tackled locally, others would be more efficiently addressed at a national level. The grid below attempts to delineate whether the step or stage concerned is best addressed locally or at a national level.

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Web-site addresses

The ASTRID Group: www.ASTRIDguide.org

Bath University Institute of Medical Engineering: www.bath.ac.uk/BIME/projects/smart/smart/htm

Dementia Voice – the Dementia Service Development Centre for the South West: www.dementia-voice.org.uk/projects_gloucestercproject.htm

Disabled Living Foundation: www.dlf.org.uk/products/dlfdaindex.htm

Ricability – Research and Information for Consumers with Disabilities: www.ricability.org.uk

Appendix

Developing quality assured and person-centred use of technology within dementia care: a summary of issues and solutions			
STEP	ISSUES	POSSIBLE SOLUTIONS	SCOPE
<i>Assess the needs of the person with dementia</i>			
1	Identification	<ul style="list-style-type: none"> • People with dementia (PWD) not identified early on • Technology rarely considered 	<ul style="list-style-type: none"> • Primary care screening • Better early identification by care managers Local
2	Describe the living circumstances of the person with dementia	Need to understand the relationship between the person and their environment – social and built	Assessment tool that looks at the whole person and their environment Local
3	Analyse the needs of the person with dementia	Need for a validated assessment tool that emphasises the complex needs of PWD (not problems)	<ul style="list-style-type: none"> • Use or development of existing validated tools (eg Carenap D) • Development of an eligibility framework Local
4	Identify the problems that need to be solved	Need for an assessment tool that accurately defines problems and specifies goals of the PWD and their carers	<ul style="list-style-type: none"> • Development of a Risk Assessment framework • Development of the eligibility framework Local
5	Identify potential technology and alternatives, and suppliers	Care staff need help in finding out about the availability of assistive technology solutions	<ul style="list-style-type: none"> • More manufacturers / suppliers designing, building, importing solutions not available in the UK • Development through technology partnerships • Descriptions of technology solutions (what they do, how they work, etc) • Production and exploitation of 'full' ASTRID Guide (starting with the TED 'top 10') • Costs of equipment, installation, support and decommissioning • Cost – benefit analysis of the use of technology solutions (starting with the TED 'top 10') • Lists' of suppliers of approved equipment / solutions • Testing and validation (or not) of equipment National
6	Consider ethical issues	Need to ask questions that shed light on the various dilemmas that can arise in considering what is appropriate care for people with dementia	<ul style="list-style-type: none"> • Development of an ethical framework • Staff training Local / National
<i>Prepare care plan and arrange service</i>			
7	Recommend technology	Each particular technology must be assessed according to the goals and needs that have been agreed	<ul style="list-style-type: none"> • Staff competent in assessing and recommending technology • Development of guidance for staff • Staff training Local / National
8	Complete ethical protocol	<ul style="list-style-type: none"> • Making ethical issues explicit • Ensuring that they have been addressed 	<ul style="list-style-type: none"> • Staff competent and supported in using ethical protocols • Development of an ethical protocol • Development of a 'Risk' Policy • Staff training Local / National
9	Choose solutions and decide	<ul style="list-style-type: none"> • Agreeing what technology will be used • Making a decision • Ensuring that all relevant parties are involved in the decision 	Development of an agreement record Local
10	Approve funding	<ul style="list-style-type: none"> • Not clear who pays or from which budget • No readily identifiable funding source 	Creation of a single budget or the development of guidelines to using existing budgets Local & National
11	Order equipment	<ul style="list-style-type: none"> • Sourcing and obtaining equipment • Who places the order • Need for fast delivery • Need for clarity about costs and cost options (e.g. purchase /lease) 	<ul style="list-style-type: none"> • Restructure existing equipment services • Establish a new entity (possibly via Joint Investment) Local

<i>Implementing the care plan & operationalising the equipment</i>				
12	Install equipment and test	<ul style="list-style-type: none"> • Installation of equipment • Integrating devices where appropriate – e.g. social alarm unit, home Bus system, computer, etc • Testing • Giving information / teaching the person with dementia and their carers, where appropriate • Need for competent and safe installation • Need to ensure that someone is in charge of the quality assurance, i.e. that: <ul style="list-style-type: none"> - Someone supervises the installers - the technology works properly and is safe - devices ‘talk’ to each other as expected • the completed installation is approved 	<ul style="list-style-type: none"> • Installation by a local supplier, who: <ul style="list-style-type: none"> - is contracted to supply, fit and integrate a range of equipment to agreed standards - has equipment readily available - maintains and develops contracts with manufacturers / suppliers / installers - keeps abreast of technological innovation • Written contracts about who does what, within what timescales, and who pays • Restructure existing equipment services • Establish a new entity (possibly via Joint Investment) • Develop service specifications • Develop quality assurance standards 	Local
13	Arrange social response to alarm	<ul style="list-style-type: none"> • Agreeing what actions are to be taken, and by whom, in response to various situations, e.g. an alarm • Making contingency plans • Technology alone is rarely the solution – it needs to be integrated within a social care plan, and often with specific social responses • Certain social alarms require a specific response • Ideally the response should come from someone known to the person with dementia, but this isn’t always possible 	<ul style="list-style-type: none"> • Informal carers are able to provide a response • Where they are not, there is a service available that may be used • Written contracts about who does what, within what timescales, and who pays • Commission a social response service • Develop service specifications • Develop quality assurance standards • Staff training 	Local
14	User acceptance	<ul style="list-style-type: none"> • Ensuring that: <ul style="list-style-type: none"> - the technology works according to specification - the social response works alongside the technology • Getting agreement to ‘go live’ 	Mechanism in place for the person with dementia and / or their carers and other parties to formally accept ‘delivery’ of the solution	Local
<i>Review</i>				
15	Reassess person with dementia	<ul style="list-style-type: none"> • Need to assess the effects on the person’s quality of life within two weeks, and quarterly thereafter • Is the solution meeting the identified needs? • Need for validated assessment tool • Is it necessary to make adjustments to the technology? 	Assessment / review tool to assess the effects of implementing technology on the life of people with dementia	Local
16	Monitor equipment	Identifying clear responsibility for testing that the technology continues to function as specified	<ul style="list-style-type: none"> • Monitoring by the local supplier • Written contract about who does what, within what timescales • Commission a service • Develop service specifications • Develop quality assurance standards 	Local
17	Maintain equipment	<ul style="list-style-type: none"> • Need to make adjustments to the equipment as a result of the reassessment of the needs of the person with dementia • Need to carry out regular servicing (e.g. cleaning, replacing worn parts) and undertake necessary repairs when required • Need to upgrade equipment 	<ul style="list-style-type: none"> • Maintenance by a local supplier, who: <ul style="list-style-type: none"> - is contracted to maintain equipment to agreed standards - has replacement equipment and spares readily available - maintains and develops contracts third parties as appropriate - keeps abreast of technological innovation • Written contracts about who does what, within what timescales, and who pays 	Local
18	Remove equipment	<ul style="list-style-type: none"> • Identifying clear responsibilities for de-commissioning technology • Need to remove equipment that is no longer required • ‘Retro fit’ equipment may be available for use elsewhere 	<ul style="list-style-type: none"> • Removal by a local supplier, who: <ul style="list-style-type: none"> - is contracted to remove equipment to agreed standards - maintains and develops contracts third parties as appropriate • Written contracts about who does what, within what timescales, and who pays 	Local