Royal Society project on developments in ICT relating to health and healthcare

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Background to this submission

This submission relates to the introduction of 'telecare' and is based on research undertaken over the last five years, including studies for EPSRC, Joseph Rowntree Foundation and European Commission. I have also been closely involved in the formation of UK policy in this area through membership of the Advisory Board to the Dept. of Health's Telecare Policy Collaborative and in my capacity as Chair of the Board's working group on evidence for telecare benefits. Our team at Imperial College has provided briefings to the Wanless / Nuffield Social Care Review, National Implementation Team for independent sector treatment centres, National Service Framework for Older People, Dept. of Health Strategy Unit and its Capacity Planning team, and the National Institute for Health and Clinical Excellence. We were also responsible for an Audit Commission report on telecare implementation, published in 2004.

Scope of submission

As we define it, telecare is the use of ICT to support the delivery of care directly to people outside conventional care settings (e.g. hospital, residential home). It involves an integrated system of sensors within people's homes or worn on their bodies, connected to a monitoring centre and then to a response service. This provides both an 'electronic security blanket' for those with medical or other risks and continuous monitoring to allow the early detection of changes in an individual's condition. Three basic types of telecare service can be distinguished:

- Monitoring individuals (both their vital signs and their activities of daily living)

- Monitoring the functions of the home itself (e.g. to detect the accidental escape of unlit gas or overflowing baths)

- Provision of information, advice and support through the internet or other delivery channels (mobile phone, digital interactive TV)

In addition, electronic assistive technology for very disabled people designed to improve the functionality of their home, which currently involves stand-alone devices, may in the future be integrated into telecare systems to allow monitoring of its use and therefore earlier detection of problems or deterioration in an individual's condition.

We believe that it is very important to draw a distinction between *telecare* and *telemedicine.* As we define it, telecare is essentially a B2C service, providing

care direct to the end-user. Telemedicine is a B2B service, using ICT to allow care professionals to communicate more effectively for the purposes of diagnosis or triage. The end-user (patient) may or may not be present. Telemedicine services are therefore inherently easier to implement because far fewer stakeholders are involved.

The importance of clear terminology also relates to the need for consistency over the inclusion of different types of telecare / telemedicine scheme in systematic literature reviews of the evidence for benefits – many reviews confuse very different types of scheme, making it impossible to draw clear conclusions on their impact.

This note deals solely with telecare.

Telecare policy

There are numerous small scale pilot or proof of concept telecare projects around world. Activity in the UK has been considerable in recent years and there are now some services that could be described as mainstream. The government recently launched two initiatives which may provide a further boost to telecare services. From April 2006 £80m will be available for pump priming innovative schemes to support older people in their homes (the Preventative Technology Grant). It is envisaged that telecare will form a significant component of these schemes. An additional £60m will be spent on establishing innovative schemes to maintain the independence of older people via Partnerships for Older People Projects (POPP). Telecare is not an explicit goal of POPP but it nevertheless recognises that schemes may include an element of telecare.

Telecare is also seen as an important component of other health policy initiatives, especially those relating to long term care / chronic disease management. This is because of its ability to greatly increase the quantity and quality of data gathered on changes to an individual's health status, and thereby improve the targeting of therapies and provide more timely intervention. Another area where telecare is seen as beneficial is in improving the capacity of the care system, because it can help prevent unnecessary hospital admissions and aid earlier discharge from hospital.

Trends in the development and implementation of telecare

Given this background, we *should* expect telecare to develop into a feature of mainstream health and social care in the UK. However, some important challenges remain. These largely relate to the complexity of implementation, as well as ethical and legal issues. Arguably, the technology is less of a problem, although some important development questions remain.

Complexity of implementation

Telecare is a complex innovation spanning different groups from across health and social care, and also involving other stakeholders such as housing services and the voluntary sector. Implementation is essentially a question of service redesign, inherently difficult in a highly complex care system. Apart

from project management problems, there are also issues over the distribution of costs and benefits across the system ('who pays for what' in the absence of shared budgets). Problems over the quality of evidence for the benefits of telecare may also emerge once it moves from an essentially social service led innovation to bring in clinicians who may have a different view of what constitutes acceptable evidence.

Ethical and legal issues

The potentially intrusive nature of telecare has often been noted. Many of the potential beneficiaries of telecare may have mental frailty and collecting consent from them may be difficult. Ethical guidance needs to be developed, although this may emerge by default because new pilot schemes generally need to obtain approval of local ethics or research governance committees. A telecare service can involve a complex supply chain. There will need to be clarity over the legal liability of each organisation involved, especially in the event of a failure to deliver the service.

Technology development

Much of the emphasis has been on the development of improved sensors for monitoring home safety and security, certain vital signs (especially those associated with diabetes, COPD, congestive heart failure) and falls. There have been advances in size, battery length, signal range and inter-operability. Some questions of reliability still remain (e.g. over the sensitivity of fall detectors), but these can be expected to disappear over the next few years.

The principal technical challenges now relate to the development of systems for monitoring activities of daily living (ADL). This requires tools for interpreting data from individuals and intelligently informing decisions about changes in patterns of activity. How much data is collected, how frequently it is collected and how this can be used for safety or preventative purposes is partly a medical question (which conditions require near continuous data monitoring v. periodic sampling?), but also requires knowledge of that individual's domestic and housing circumstances. Research funded by EPSRC and others is underway to explore these questions.

Another area where development is needed is in the human interface with certain technologies. The bulk of telecare sensor systems are passive, requiring no or limited input from the individual concerned. The provision of care advice and support through the electronic delivery channels involves the recipient much more closely with technologies. Whilst there is some use of PC / web based 'interactive health communication applications' – support mechanisms for those with specific medical conditions – and of home teleshopping systems for housebound people, widespread use of these forms of telecare, which could do much to help meet government goals for increasing self-care and the 'expert patient, will require greatly improved user interfaces.

Finally, concerns need to be raised over the lack of integration between the Connecting for Health agenda, notably the creation of electronic patient records, and the parallel development of locally held patient records within

telecare monitoring centres. Currently there are some 300 community alarm monitoring centres in the UK and these (following some rationalisation) could become a backbone for a national telecare system. No steps are being taken to explore the benefits or practicalities of integrating the potentially rich data held at this level with electronic patient records.

Possible developments within the 10-15 year horizon

It is entirely possible that a national telecare system could emerge by 2015-2020. The various elements to make this happen are already in place – an industry supplying the various technologies, an infrastructure linking individuals to monitoring centres and those providing a response, a more integrated health, social care and housing service able to assess individuals, and a range of policy goals. The problems are largely those of service re-engineering, overcoming cultural and organisational barriers and developing appropriate business models. In my view mainstreaming telecare will occur on two fronts. First, the expansion of existing small scale schemes (largely based around home safety and security monitoring) and those that emerge following the government's pump priming funding. Second, through the involvement of major private sector companies in policy programmes to target chronic disease management. These might include companies such as Kaiser Permanente or United Healthcare collaborating with global whole-system technology suppliers such as GE being brought in to manage, for example, the population of diabetics in a strategic health authority. Some moves in this direction are already underway.

Potential impacts on the care system by 2015-2020

If telecare develops according to the trends described above, it may help to radically transform care services to a wide range of patient groups as well as other stakeholders involved in care provision:

Patient group	Role of telecare
Chronic disease	Provide facilities to self-manage care at home but allow patients to stay in contact with carers
Increasing frailty	Provide facilities to allow people to remain at home for longer
Disabled people	Increase home safety and security, share risk of independent living
People with learning difficulties	Increase home safety and security, share risk of independent living
Palliative care	Provide facilities to manage end-of-life debility at home

Stakeholder	Key benefits to stakeholder
Individual	Quality of life – access to care in the location of choice, reduction in anxiety, providing reassurance, sustaining independence
Informal carer	Quality of life – reduction in anxiety and stress, providing reassurance
Professional carer	Additional options for care, better information on progress and outcomes for individual users and across professional communities, reduction in the volume of inappropriate work
Statutory services	Better management across populations, better resource

(NHS, social services)	management, avoidance of hospital admission, fewer delayed transfers of care, prompt discharge, development of self-care and prevention
Private care and specialist housing providers; alarm service providers	New market opportunities
Industry (telecommunication and equipment suppliers	New market opportunities
Government	Modern, responsive care service; better co-ordination between different departments involved in care delivery; better resource management