WSD Action Network

Sustaining innovation in telehealth and telecare

WSDAN briefing paper

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This paper, the first in a series of WSDAN briefing papers, looks at how telehealth and telecare innovations are being used in health and social care. It considers the range of innovative approaches that have been developed, giving some practical examples. We identify some of the key challenges to the adoption of technology-based approaches to care, and suggest some strategies to overcome these challenges, so that telehealth and telecare innovations may be sustained. The 'References' and 'Resources' sections at the end of the paper provide useful links to key documentation, innovations and evidence.

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Key points

- Telehealth and telecare innovations have the potential to improve quality of life for users and to reduce unnecessary hospital and care home admissions, though robust information on costs and outcomes is lacking.

- Between 1.6 million and 1.7 million people in England benefit from telecare services, and the number is growing. England takes the lead among European countries in trialing new products and services.

- In contrast, telehealth services are comparatively under-developed, with around 5,000 users. Many of these people receive services through the Department of Health's Whole System Demonstrator (WSD) Pilot Programme – the largest randomised control trial of its type ever carried out.

- There is an identifiable 'chasm' between early adoption and the wider uptake of telehealth and telcare innovations.

- Key barriers to the wider adoption and diffusion of innovation include:

  - a lack of robust evidence for the cost-effectiveness of telecare and telehealth associated with the current high cost of deploying some of the technology 'at scale' within the context of a cold financial climate

  - the implications for professionals and organisations in adjusting to new ways of working when adopting technology-supported care

  - the lack of a consumer market

  - the lack of interoperability and minimum standards for the technology.

- The adoption and diffusion of telehealth and telecare innovations depends on a number of key factors, including:

- leaders, champions and entrepreneurs to empower and persuade key partners and funding agencies to invest in innovation

- clarity of organisational goals, including the proactive involvement of providers, users and carers in identifying service redesign opportunities

- strong commissioners who can decommission some services and embrace new strategies that support health, well-being and prevention

- evaluation and audit to regularly reflect on progress and outcomes.

- While there is considerable interest and policy momentum behind the adoption and diffusion of telecare and telehealth in the UK, more evidence is required to convince service commissioners and providers of the full potential of these innovations.

1 Introduction

With an ageing population and the ever-increasing prevalence of both chronic and long-term illnesses, the commissioning and delivery of integrated health and social care has become a significant challenge (Goodwin 2009). The need for new care models and technologies – such as telehealth and telecare – to support long-term care has never been greater. There is a need to promote such innovations as they challenge the system to focus on preventing ill health, supporting self-care, and delivering care closer to people's homes.

As of May 2010, it is estimated that between 1.6 million and 1.7 million people in England have some form of remote monitoring support, primarily in the form of telecare (WSDAN 2010a). There is also a growing interest in telehealth solutions for managing long-term conditions such as heart failure, chronic obstructive pulmonary disease (COPD) and diabetes. It is estimated that more than 5,000 people in England are benefiting from home-based vital signs monitoring, and many others are using telephone-based support (WSDAN 2010b).

Evidence from the UK and worldwide suggests that these services have the potential to support significant numbers of people with remote monitoring, leading to better health and social care outcomes as well as possible cost savings through fewer admissions to hospitals and care homes. Many countries are looking to the UK to learn from our experience of utilising telecare and telehealth technology, as there are many good examples of progress. However, as a recent King's Fund report showed, there are significant barriers to innovation and the adoption and diffusion of new technology (Liddell *et al* 2008). Service innovation can sometimes take longer than product innovation, and many organisations find the combination of adopting new technology and redesigning services very challenging.

This briefing paper summarises the emerging evidence base for telecare and telehealth and explores the challenges around sustaining innovation in both products and services. It also discusses what the research tells us about innovation, and presents some practical examples of telecare and telehealth innovation from around the UK.

2 Telehealth and telecare in context

Telehealth and telecare innovations in health and social care have been developed in a context of supporting system redesign within a cold financial climate. The policy focus has been on meeting the increasing demand for health care by improving productivity and eliminating waste, without compromising on quality. An innovation agenda is also prevalent in housing and social care policy, to enable individuals and families to get the care and support they need to remain living independently in their own home for as long as possible.

Telehealth and telecare innovations have been promoted in the UK in recent years as part of a wider strategy to redesign health and social care systems. For example, between April 2006 and April 2008, local councils received £80 million in the form of preventative technology grants. The aim was to help them set up telecare innovations to support people to remain independent in their own homes while reducing avoidable admissions to hospital and residential care (Department of Health 2006b). More recently, the White Paper *Building the National Care Service* promoted the use of new technologies in housing and social care policy, describing telecare and telehealth as 'technological innovations that can provide the care and reassurance people need to allow them to remain living in their own homes' (Department of Health 2010 p 158).

Lord Darzi's *NHS Next Stage Review* heralded telehealth as a 'core' preventive service in supporting people with long-term chronic conditions (Department of Health 2008). Following on from this, the Department's Quality, Innovation, Productivity and Prevention (QIPP) programme has sought to create an NHS in which a culture of innovation, change and improvement could flourish, as well as to provide staff with the tools, techniques and support they need to embrace innovation and make sustained quality improvements. Telecare and telehealth play an important role in the delivery of QIPP, particularly in devising new ways to prevent ill health and promote self-care and the management of long-term conditions.

Since early 2009, references to telecare and telehealth have appeared in a wide range of policy reports, including the national dementia strategy *Living Well with Dementia*, *Transforming Adult Social Care*, and the Social Care Green Paper (Department of Health 2009a, 2009b, 2009c) and, most recently, *Building the National Care Service* (Department of Health 2010). This points to an emerging policy consensus on the future of a redesigned health and social care system that uses telehealth and telecare services routinely.

This support for deploying new technologies as part of a strategy to deal with some of the big issues in health and social care should also be seen within the context of emerging trends in the development of the technology itself. Although there has been considerable progress from first-generation telecare through to Global Positioning System (GPS) monitoring and sophisticated vital signs trend analysis, it has not yet been fully matched by service innovation such as large-scale telehealth deployment, regional monitoring and remote caseload management.

The planning and purchasing of innovative new technologies will require close

scrutiny of their ability to lever efficiency savings as well as deliver high-quality care – issues that are discussed further in our forthcoming briefing paper on commissioning. To get the best from new technologies, health and social care commissioners will need to move from a traditional 'contracting' approach to innovative and flexible arrangements that support the following.

- Care closer to home and independent living choices.

- A range of long-term conditions, including dementia and end-of-life care.

- Individual care plans with self-directed support and personal budgets (including personal health budgets).

- Preventive approaches, self-care and upstream or early interventions.

- Hospital discharge, intermediate care and re-ablement programmes.

- Stakeholder engagement in service development.

- Quality standards for equipment and services, including device interoperability.

- Improved data sharing and connectivity across organisations, with user consent.

- Individual choice and a range of service providers.

- A new balance between face-to-face user/patient contact and remote monitoring support.

- Housing options that use technology and provide 24/7 care.

- Mobility – ensuring that people can live as independent a life as they choose within their local communities, with technology-supported services.

- Monitoring and response services that are timely and appropriate.

- Value for money for the public purse.

The context of these requirements suggests a need for greater joint commissioning and delivery of services. Closer working between health, housing and social care organisations provides an opportunity to adopt innovative and personalised technology-based solutions as part of formal, integrated care pathways – thus moving away from the current patchwork of projects, pilots and limited service mainstreaming.

Using innovative and customised approaches that match remote monitoring with timely data sharing and response services between professionals, there is the potential not only to deliver better outcomes for users and patients but also to release savings for further service investment, through fewer admissions to hospitals and care homes.

The next section looks at the growth of telecare and telehealth services in England and discusses some of the key challenges that need to be addressed for the adoption and diffusion of new technologies to be successful and sustained.

3 The growth of telecare and telehealth in England

Interest in using home-based technology to support housing, social care and, more recently, health care packages has grown significantly in recent years. The Whole System Demonstrator Action Network (WSDAN) estimates that, as of May 2010, between 1.6 million and 1.7 million people in England are using some form of telecare (WSDAN 2010a). Although these are predominantly pendant alarms, it is thought that around 300,000 of these installations are sensor-based systems using personal and environmental monitors. More than 300 organisations in England are currently providing direct or signposted access to telecare services, although the level of service is variable. Using a broad definition of telecare, to include both pendant alarms and sensor-based systems, it is generally considered that the UK is the world leader in adoption of this new technology.

In addition to the recent growth in telecare services, there are now more than 5,000 people in England benefiting from home-based telehealth remote monitoring for heart failure, COPD and diabetes (Type 1 and 2). Around a third of the 152 primary care trusts (PCTs) in England are using telehealth, with another third expressing an interest in this approach (WSDAN 2010b).

Telecare and telehealth as innovation

Telecare and telehealth are innovations, as they provide new opportunities to support care closer to home and to promote independent living. Evaluations and audits generally report high levels of user and patient satisfaction with the technology.

The technology itself has progressed through a number of iterations, or 'generations', from early pull-cord and pendant alarms that required user interaction to a broader range of specialist sensors and passive monitors used alone or together to meet individual care plan goals. At the moment, telehealth devices require user interaction to collect daily vital signs data, but there is rapid progress towards wearable and skin-contact devices using mobile and wireless technologies. A number of cardiac devices (e.g. pacemakers and defibrillators) and insulin pumps use active embedded or implanted components that also provide monitoring.

Convergence is becoming more of a reality as interoperability develops. In addition, there is considerable interest in consumer devices using television, computers and smartphones to support health and well-being, from educational content about diabetes to text prompting for medication. Innovation in this field will continue apace, and commissioners and providers of health and social care services need to be aware that the telehealth and telecare environment is both complex and dynamic, with new innovations and potential solutions emerging from a wide range of technological fields.

The emerging evidence base for adopting telecare and telehealth innovation

The growth in the adoption of telecare has been well documented through case studies and local evaluations (DH Care Networks 2008). Studies of the piloting of telecare in Kent and similar innovations to support care for older people in West

Lothian (Alaszewski and Cappello 2006; Bowes and McColgan 2006) demonstrate the benefits of technological innovation for users, carers and other stakeholders. However, the cost-effectiveness of sensor-based monitoring at scale and its use in early-stage prevention programmes still needs robust independent evaluation to provide the evidence to convince some of the sceptics and late adopters of these products and services. This explains why PCTs in some areas of the country have not yet adopted the technology.

The evidence base for telehealth, particularly the remote management of people with long-term chronic illness, is similarly under-developed, and this has contributed to slow uptake of the technology in England. However, there is considerable evidence of its benefits from the Veterans Health Administration (VHA) in the United States. Its Care Coordination/ Home Telehealth (CCHT) programme – the most advanced telehealth programme in the world – aims to improve co-ordination of care for veteran patients with chronic conditions and avoid their unnecessary admission to long-term care. It has achieved better outcomes for individuals and has reduced system costs (*see* box below), thereby attracting much interest from the UK.

Case study: the VHA's Care Coordination/Home Telehealth programme

What is the VHA?

The Veterans Health Administration (VHA) implements a medical assistance programme for US veterans through outpatient clinics, hospitals, medical centres and long-term health and social care facilities.

What is CCHT?

The Care Coordination/Home Telehealth (CCHT) programme was developed as part of the VHA's efforts to provide non-institutional care services to cater for the rising number of elderly veterans with chronic care needs. The aim was to improve co-ordination of their care and avoid unnecessary admission to long-term institutional care.

First introduced in 2003, CCHT is now a routine service that uses home telehealth and disease management technologies in care management. It is designed to support veteran patients (over 65 years); 95 per cent of users are male.

What conditions does it cover and how is care co-ordinated?

The main conditions managed are diabetes mellitus, hypertension, congestive heart failure and COPD, with a smaller number of veterans currently being treated for depression.

A dedicated group of care co-ordinators, usually nurses or social workers, receive specific training for the role. Each care co-ordinator manages between 90 and 150 patients, and eligible patients are offered the choice to receive CCHT-based care.

When a patient is enrolled, the care co-ordinator selects the appropriate home health technology, gives the required training to the patient and caregiver, and continuously reviews telehealth monitoring data and provides active care or case management.

What technologies are used?

The most commonly used technology is a messaging/monitoring device (85 per cent), followed by videotelemonitors (11 per cent) and videophones (4 per cent). Messaging devices present disease management protocols that contain text-based questions for patients to answer and so help assess their health status and disease self-management capabilities. Biometric devices record and monitor vital signs data. Videophones and videotelemonitors support audio-video consultations into the home.

Promoting patient self-management is a fundamental component of the CCHT model and the messaging devices are key to this. Each patient is risk-stratified daily according to pre-set thresholds, with alerts presented if there are any significant changes in the patient's symptoms, knowledge and health factors that may require proactive recognition and management. Care co-ordinators intervene as necessary (e.g. help patient to self-manage by phone, institute care/case management, and so on) in accordance with such alerts.

What impact has CCHT had?

Serving more than 30,000 patients, CCHT is probably the largest and most integrated example of home telehealth in the United States and internationally.

Analysis of data obtained from a cohort of 17,025 CCHT patients shows:

- a 25 per cent reduction in the number of bed days of care

- a 19 per cent reduction in the number of hospital admissions

- a mean satisfaction score rating of 86 per cent.

The cost of CCHT is $1,600 per patient per year, 'substantially less' than the $13,121 per year for VHA's home-based primary care service and the $77,745 per year for private nursing home care.

Home telehealth services are now being adopted across the VHA as an appropriate and cost-effective way of managing chronic care patients in both urban and rural settings.

Sources: Darkins A et al (2008); ICT & Ageing (no date)

Given the potential of innovations such as those developed by the VHA to enable service redesign, the Department of Health established the Whole System Demonstrator (WSD) Programme in England in May 2007 to pilot new models of telehealth and telecare. The programme's centrepiece is what is thought to be the world's largest randomised controlled trial of telecare and telehealth, with more than 6,000 participants in three pilot sites. The evaluation seeks to provide evidence to support the commissioning and delivery of technology-supported programmes by providing results of such statistical significance that a 'proof of concept' is achieved - rather than the current reliance on small-scale pilots, case studies and expert opinion.

The results of the full evaluation of the WSD trial are expected in 2011. In the meantime, WSDAN has been disseminating information on progress on recruitment into the trial, and building a national evidence database to support commissioners and service providers in making their local business decisions. The programme includes a series of regional events that have featured a range of service innovations together with the progress made under the Technology Strategy Board's Assisted Living Innovation Platform (ALIP) (*see* 'Resources' section for further information).

Some PCTs have also carried out evaluations of their telehealth projects. NHS Barnsley, for example, is carrying out a small, randomised controlled trial to find out whether the use of telecare technologies reduces the frequency of hospital admissions for people with chronic heart failure. Where progress and evaluation reports have been published, such innovations and developments are being captured, regularly updated and mapped on WSDAN's series of 'Google Maps' (*see* 'Resources' section).

The lack of robust evidence on the cost-effectiveness of telehealth innovations in the UK largely accounts for the limited uptake of the technology to date. Many PCTs feel that they have to prove their own business case for telehealth in order to adopt the technology locally, rather than accept findings from elsewhere. Generally speaking, the idea of providing remote monitoring support to carefully selected individuals has now been extensively tested in England, with more than 5,000 units in place (some for as long as three years). What has become more challenging for PCTs is turning the local findings from 30- to 50-unit pilots into a business case at a much larger scale, supporting 1,000 or more users. The process of scaling telehealth services remains a barrier to innovation, technology adoption and service transformation.

The opportunities for telehealth and telecare innovation

Countries on every continent are exploring the potential of telehealth and telemedicine, with projects ranging from the US Economic Recovery Plan to mapping malaria outbreaks in Africa by smartphone. Many of these countries have been closely watching the UK's experience with telecare since there is growing interest in Europe, North America and the Far East in sensor-based configurations and so-called 'smart home' technologies. As in the UK, this growth in interest has been fuelled by changes in the demographic burden of age and disease, including: increases in the number of older people (particularly those with long-term conditions); the scarcity of qualified practitioners in important health and care disciplines; and concerns about support for care in hard-to-reach areas such as rural and developing communities.

The latter issue has prompted considerable interest from global companies looking to invest in remote technology solutions. These depend on national telephone systems and wireless/broadband links to carry home alerts, vital signs data, images and other information to experts who can make important clinical and other decisions from a distance. Interestingly, a number of organisations are researching low-cost technological solutions in developing countries that may be later transferred into Europe and the United States. This could include public health initiatives using mobile phones in Africa and India, where landline telephone networks are not available.

One of the main drivers of interest in telehealth and telecare solutions is their potential to realise savings from reducing unnecessary care home and hospital admissions. There is also growing interest in using technology to promote well-being and support healthy lifestyle choices. For instance, the NHS recently launched a smartphone application for people wanting to give up smoking (NHS Choices website), and there have been similar applications for exercise and tracking blood pressure. There is now a wider awareness of home-based technology that also includes an extended range of assistive technologies and the possible use of set-top boxes and smart metering to carry secure data for remote monitoring.

The UK's considerable local achievements and research initiatives are drawing an international audience, including major technology companies, universities, small and medium enterprises (SMEs) and social enterprises. The Technology Strategy Board's Assisted Living Innovation Platform (ALIP) - a funding agency bringing together the Department of Health, the Technology Strategy Board, the Engineering and Physical Sciences Research Council (EPSRC) and the Economic and Social Research Council (ESRC) – has been responding to this work by bringing together partners from all sectors to develop the next generation of devices and services based around the connected home and mobile/wireless environment.

Since October 2009, the procurement of telehealth and telecare services and products in the UK has been done through the public sector's national procurement organisation, *Buying Solutions* (previously the NHS Purchasing and Supply Agency (PASA)). From 1 June 2010, a revised national framework agreement for telehealth and telecare will provide new scope for vendors to provide a wide range of offerings, including telecare and telehealth products and services, as well as new areas such as telecoaching and managed services. This innovative approach builds on the previous framework and reduces tendering costs for local authorities and PCTs. The framework review has also been amended to enable new offerings to be made available more quickly to purchasers, and there is scope for a wider range of innovative SMEs to be involved, as well as larger organisations.

The key challenges for telehealth and telecare innovation

The effective adoption and systematic diffusion of innovation is a key driver for improving quality and/or for unlocking (cash releasing) savings. In general terms, successful diffusion of innovation can rely on overcoming several key challenges, including: poor access to evidence, data and metrics; commissioners that lack the tools and capability to drive change; insufficient recognition and reward for innovation; and a leadership culture and organisational infrastructure that fails to support it.

While telehealth and telecare offer tremendous potential, overcoming challenges such as these in order to see more widespread adoption are a fundamental concern. In particular, the levels of evidence required by health care practitioners and NHS commissioners to support and invest in telehealth services appears to be substantially higher than that for housing and social care, who are currently the main providers of telecare services. A key sticking point is the lack of evidence for return on investment and the potential for telehealth and lifestyle monitoring to identify unmet needs that may lead to a short-term, but upward, impact on costs (e.g. through the need to undertake more diagnosis and assessment of people with hypertension, Type 2 diabetes or dementia). The search for more evidence, however, could constrain technology development and the benefits of 'learning from experience'.

The role of incentives to drive telehealth and telecare innovation is a key issue, and given the lack of evidence, an 'outcomes-based' approach has its limitations and needs to be considered carefully. For example, some of the technology (particularly telehealth) is considered too costly to deploy 'at scale' at this time. New procurement models and risk sharing will be necessary to support local business cases unless there is significant take-up through the consumer market, which could reduce the price of equipment.

Another important issue relates to the way telehealth and telecare technologies are applied in practice. We know that replacing face-to-face contact with remote technology support can be a significant issue for both professionals and users, as it challenges their expectations about health and social care services. Overcoming the barriers associated with existing professional and organisational cultures to provide technology-supported services at scale is important, especially if telecare and telehealth are to become key offerings within future personalisation programmes such as resource allocation systems, self-directed support and personal budgets. Also, it may not be possible to adopt larger telehealth caseloads within current service configurations based around home visits. Parallel working may be required in the initial stages to develop new operating protocols based on higher caseloads and reduced visits.

A further challenge to the diffusion of innovation is that the technology itself has not yet attracted a wider consumer market. Pendant alarms, telehealth units and falls monitors may be rejected by some people on the basis of stigmatisation, wearability and problems with visual displays. The affordability to individuals of telecare products (the charges that local authorities make for such services) are known to be important constraints for people, especially those on low incomes. Technical, informatics and connectivity issues are also significant in this regard. These include device standards and interoperability, telecommunication network updates which affect device functioning, and data sharing. There are currently no mandatory minimum standards for telecare or telehealth services. There is a trade association code of practice, but no national clinical standards (*see* 'Resources' section).

Finally, the adoption of telecare and telehealth into the mainstream requires recognition of these as part of the core service that health and social care offers. Service champions and strong local leadership are necessary to drive through innovation, particularly when there are competing local priorities for funding and a reluctance to try unproven new approaches. For telehealth and telecare to survive and thrive in a cold financial climate, the use of such technologies needs to be

integrated into commissioning plans and local area agreements rather than being stand-alone programmes or pilots.

These challenges act as barriers to large-scale adoption, and organisations involved in implementing telecare and telehealth services need to develop strategies and plans that seek to overcome these challenges in the planning or early deployment stages.

4 Sustaining innovation

What is innovation?

Innovation can be regarded as the successful implementation of new ideas, commonly divided into three stages: identification (or 'invention'), growth (including adoption, testing and evaluation), and diffusion (or spread). Without innovation, public services costs tend to rise faster than the rest of the economy – the inevitable pressure to contain costs can then only be met by forcing already stretched staff to work harder.

In health, housing and social care, innovations in the way services and systems are designed are likely to be just as important (and probably more so) than any specific innovative product or service. It is important to consider telecare and telehealth innovations as 'services', as the devices have limited or no functionality on their own. The largest performance gains from these innovations are likely to come from service reconfiguration or through changes in skill-mix and role specialisation that could, for example, promote technology-assisted remote triage and caseload management as a way of reducing costly admissions and promoting client independence. The key innovation is the ability to provide a personalised and customised service that meets the needs of users, patients and carers. The telehealth or telecare technology provides a tool for enabling the innovation to happen.

Innovation can apply to simple, incremental changes or more radical developments within organisations, systems and processes, products and services. Innovation occurs when an idea or the result of a creative process (e.g. a brainstorming session or an efficiency programme) is successfully implemented in practice. An important aim and outcome of innovation is that the user and service provider experience a change for the better. For individuals receiving health care services, this could be reassurance, peace of mind, better management of a respiratory problem, or fewer hospital visits.

In economic terms, there is an important link between innovation and increased productivity, which means that innovation is a key factor in the development and, in some cases, survival of organisations. In the tougher financial climate that lies ahead in the UK, public sector organisations will need to find innovative solutions that maintain or improve quality at lower overall costs (i.e. 'invest to save').

The adoption and diffusion of innovation

As well as being generally well received by users and carers, telecare and telehealth have the potential to provide efficiencies for further service investment. Yet, as discussed earlier, a key constraint to adopting telecare and telehealth is that they have not moved from a project or pilot phase to the mainstreaming or diffusion of their innovation, often despite evidence of successful early outcomes.

Everett Rogers (1983) defines diffusion as '*the process by which an innovation is communicated through certain channels over time among the members of a social system'.* He categorises the five stages as: knowledge, persuasion, decision, implementation, and confirmation (*see* box opposite).

Everett Rogers' five stages of diffusion of innovation, as applied to telehealth and telecare

1. Knowledge

Awareness, understanding and the provision of information is important in the initial stages of any programme advocating the use of telehealth or telecare. Unless there is a particular external driver (e.g. grant funding or performance requirements), individuals will have varying levels of interest. Indeed, some individuals may be actively resistant to the key messages of innovation as this involves changes to the status quo.

2. Persuasion

In this stage, individuals are more likely to actively seek out information when, for example, a care manager identifies that a user's needs could be better or more cost-effectively met with a set of telecare sensors. Leaders, visionaries and opinion formers can have an important influence in building momentum. There are many examples of high-level leadership commitments to telecare and telehealth, as well as service 'champions' who have implemented projects and programmes through persuading colleagues and partners of the benefits.

3. Decision

In this stage, discussions about the advantages and disadvantages of telehealth and telecare come into focus - for example, on key issues such as costs, impact and scale. Evidence becomes crucial: will users and patients benefit? Is the technology cost-effective? Has data been collected to demonstrate improved outcomes and efficiencies?

Other drivers and constraints also become highly relevant - for example, the innovation's fit with national and local policy priorities and the availability of local resources. These key drivers and constraints will affect decisions about the scale of the innovation and the prospects for roll-out.

4. Implementation

In this stage, there is a better understanding of the local barriers and challenges to working at scale. There is likely to be some ongoing audit and evaluation to determine the value of the innovation to stakeholders over the longer term.

5. Confirmation

In this stage, the organisations involved finalise their decision to continue using the innovation. A decision may be made to start to use the innovation to its fullest potential (i.e. mainstreaming), at which point telecare and telehealth services would become fully embedded within mainstream service delivery.

The rate of innovation adoption - defined by Rogers as the 'relative speed with which members of a social system adopt an innovation' - is usually measured by how long it takes for a certain percentage of people to adopt an innovation. The rates of adoption for innovations are determined by an individual's 'adopter category' (*see* Figure 1). In general, individuals who first champion an innovation - the 'early adopters' - require a shorter adoption period than those coming to the innovation at a later stage.

Figure 1 The Technology Adoption Lifecycle
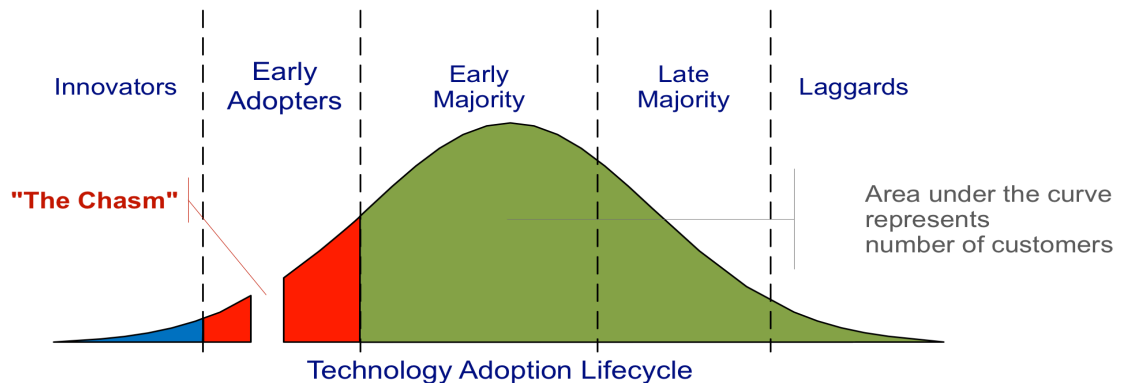
Sources: adapted from Rogers (1983) and Moore (1991).

The adoption of telecare and telehealth is affected by the numbers of stakeholders involved, compared with, say, the adoption of a consumer product. For instance, users, patients and carers may be keen to adopt technology solutions, but progress may be blocked by practitioners who need to be convinced of the benefits (it could equally be the other way around, of course). Within the rate of adoption, there comes a point at which an innovation reaches critical mass (called 'the early majority'). This is when enough individuals have adopted an innovation for its continued adoption to be self-sustaining. Many organisations in the UK providing telecare services have reached this point.

There is also an identifiable 'chasm', as described by Moore (1991), in which the search for supportive data and evidence for the innovation can lead to a chasm between the innovators/early adopters and subsequent groups. The chasm represents a point in the adoption of new technologies where there is not enough momentum to justify a 'leap of faith'.

In July 2005, *Building Telecare in England* identified that there were 1.4 million people who mainly had pendant alarm configurations (Department of Health 2005). There were a number of early adopters of sensor-based systems (for example, in Durham, Sandwell and Northamptonshire) who had been piloting telecare with relatively small numbers of users. Using the £80 million preventative technology grants, steps were taken to build infrastructure for sensor-based systems and work towards an additional 160,000 older people benefiting from telecare (Department of Health 2006b).

Over the past five years, this number has now risen to an estimated 1.7 million people, of which around 300,000 have sensor-based systems. For telecare, the consensus is that we are well into the 'late majority' phase as services become increasingly mainstreamed by commissioners and providers.

As regards telehealth, however, with around 5,000 units deployed in the UK, there is evidence to suggest that its adoption has not breached the 'chasm' and that progress remains limited within the 'early adopters' phase. Moving into the 'early majority' phase would require significant new resources and better evidence on cost-effectiveness. This phase would be characterised by scaled up services of, say, 1,000 units or more per PCT.

A number of strategies could help in reaching a critical mass. These include:

- having an innovation adopted by a respected individual within an organisation or social network – many telecare and telehealth initiatives have been championed by cabinet members and service directors

- creating an instinctive desire for a specific innovation – this can prove more difficult in public sector services as many service users or patients have only moved on to telecare after a health or social care crisis. This has not yet happened with patients with long-term conditions

- providing an innovation to a group of individuals who would readily use it – for example, occupational therapists are familiar with assistive technologies and developing practical solutions for users, and they have been strong advocates of telecare; service users with physical disabilities are often familiar with environmental control systems

- carrying out early audits or evaluations and obtaining stakeholder feedback – many local authorities and PCTs have built some form of audit, evaluation or feedback into their projects and programmes. Video and written case studies can prove very compelling in understanding the potential benefits offered by these new technologies.

In the UK, there are geographical differences in the adoption of telehealth compared with telecare. This appears to be partly due to the prioritisation of support for telehealth through strategic health authorities (SHAs) as a result of the Darzi review (Department of Health 2008). While most regions now have active telecare programmes, this is not yet the case for telehealth.

There are various ways in which diffusion of innovation can occur. For instance, media coverage about a new service can significantly raise awareness and demand, and lead to a launch to a wider population. This is particularly evident with smartphones and games consoles. For telecare, announcements have been made recently in Essex and Newcastle for 'free' services, with a significant amount of marketing to engage potential service users (*see* 'Resources' section).

Diffusion also occurs when initially expensive products (such as LCD and plasma screens) become cheaper and more accessible. In this case, the adoption process is driven by market volumes, so there is an 'investment-return' cycle. One might predict how this may start to happen with software applications (or 'apps') for smartphones that can, for example, support self-care for people with diabetes or high blood pressure. With personal budgets for social care and potentially health care, individual users may be more exposed to consumer products that support well-being, better management of long-term conditions, and environmental monitoring.

A change in the network infrastructure that handles telecare and telehealth messaging may also support uptake of these innovations. For example, next generation networks (NGNs) and faster broadband speeds are likely to replace

existing technologies with a wider range of featured products and services. This could include, for example, tailored health content and telecoaching to support self-care or to help in the case and care management of individuals and their carers.

The new Buying Solutions telecare framework will support a range of such 'managed care' options, including telecoaching. The new framework is likely to help stimulate innovation uptake as it provides opportunities for commissioners to procure 'end-to-end solutions' based on a package of services and the delivery of agreed outcomes. For example, it may become possible to stipulate within service agreements targets related to the reduction in hospital and care home admissions for a specific long-term condition such as COPD, or to base delivery on key markers in improving the quality of life for individuals and carers.

There are, therefore, a number of ways in which adoption and diffusion of telehealth and telecare can be encouraged in the future. However, the rate of technology diffusion is likely to vary across the UK. According to Rogers (1983), this can be influenced by:

- the perceived advantage or benefit of the product or service

- quality, safety and fitness for purpose

- conformance with standards

- risks associated with purchase

- ease of use, accessibility

- immediacy of benefits

- observability

- trialability

- price

- extent of behavioural changes required

- return on investment (ROI).

This checklist provides a helpful set of characteristics for the adoption and diffusion of telehealth and telecare.

Key challenges in the adoption of new technology

There are some benefits (and some disbenefits) of being an early adopter of telehealth and telecare in terms of the levels of support, product availability and cost. Suppliers marketing their innovations will get valuable feedback about issues such as usefulness and reliability which they can use to further develop their products and services. There are, however, also opportunities for early adopter organisations such as PCTs and local authorities to develop a team of 'user champions' who can promote telecare and telehealth to potential new users.

Innovation can be challenging and will often have a disruptive effect as it affects traditional and well-established ways of working. Organisational resistance to innovation will need to be overcome if new processes, products and services are to be successfully adopted. For the public sector, embracing innovative approaches like telehealth and telecare requires leadership, vision and a drive for change in order to

build momentum towards a 'tipping point' where a critical mass of support to embed new technologies means that a return to the previous system is highly unlikely.

Change that involves new technology seems to bring additional challenges, as it implies different ways of working – for example, through fewer face-to-face visits, a shift in skill-mix (e.g. to more nurse-led care) and bigger caseloads. Users, patients, carers and other stakeholders need to be consulted and involved in the transition process to ensure sufficient buy-in. In particular, key professionals need to be convinced by new technologies – to see that they are easy to use, can help improve care processes, and reduce rather than add to administrative burdens. This implies that key care professionals need to work in a more integrated structure, such as in multidisciplinary teams, taking shared responsibility. But the history of integrated care working tells us that this can be time-consuming and difficult to achieve (Goodwin 2006). All of these factors will affect the rate of adoption and diffusion.

In commercial organisations, innovation goals will be closely linked to bottom-line turnover, risk management, business plans, corporate growth, market position and long-term profitability. In public sector organisations, innovation goals have not been as closely tied to performance and outcomes, and it is only recently that innovation has been more closely linked with drivers and incentives (for example, in the NHS, through the QIPP programme and world class commissioning initiatives). This is changing as government departments initiate policy and strategy to transform local services. SHAs currently have a legal duty to innovate, and there are some examples of 'Investing in Health' programmes that include telecare and telehealth (NHS West Midlands 2010).

The process of innovation

In commercial organisations, there is a fairly well-understood innovation process from generation of ideas and invention, feasibility and proof of concept, and product and service testing, through to the adoption and wider diffusion (or 'commercialisation') of innovative products and services. Traditionally, manufacturers and entrepreneurs have been the most likely source of innovation. The development of telecare products and services over the past 50 years has been dominated by suppliers to the home security industry. In recent years, however, public sector service innovation has also been a driver for change – for example, through social care direct payments, self-directed support, and personal health budgets.

Innovation can be 'supply-pushed' through technological advances (often supported by venture capitalists and other external funders) or 'demand-led' to meet user and patient needs. It might also involve a combination of supply and demand, as the best of technology advances with clear benefits for the user (for example, non-invasive 'keyhole' surgery, which reduces the risk of infection, complications and recovery time).

Within health and social care, the process of innovation is not well understood. But as the public sector is now operating in a much tougher economic climate, it is vital to unlock the potential for innovation, as quality and productivity can only be improved through new services and ways of working. Commissioners, for example, will need to carefully consider the capacity of local health and social care systems to implement realistic telecare and telehealth programmes at scale from relatively small-scale pilots.

The process of adopting innovations often requires organisations to develop new partnerships and joint ventures. There are many ways in which inventors,

innovators, entrepreneurs have combined to develop and market new products and services. Networks and intermediaries are actively involved in bringing people together to facilitate the development of new initiatives, while commissioners and suppliers have begun to broker longer-term partnerships to their mutual advantage. A number of regional organisations and networks also exist to support technology innovation in the public sector in the UK (*see* 'Resources' section).

The process of innovation is also likely to occur as innovators from different technological fields learn from each other. The history of telecare innovation was linked to home security, while telehealth was linked to using simple vital signs monitoring. As mentioned previously, both these approaches could benefit from innovations in consumer products such as computer games and smartphones.

Disruptive innovation

Clayton Christensen, a Harvard Business Professor, established the term 'disruptive innovation' more than 10 years ago using examples where less expensive technologies had completely changed the industry's landscape (for example, computer data storage, and the replacement of film with digital camera technology) (Christensen *et al* 2008). In recent years, Christensen has used these approaches to examine the challenges of providing health care differently. He observed that establishing new approaches to health care that challenged the mainstream – that were disruptive – was particularly problematic within a health care organisation, as it had to simultaneously maintain its day-to-day operations. Consequently, new ways of working often failed to embed themselves as core business. Rather, gathering evidence through pilot projects has been the preferred approach, making it difficult to build momentum towards scaling and mainstreaming.

Christensen's view is that innovation can only occur within organisations when separate, parallel running structures are set up to establish the new ways of working. When successfully established, these new ways of working are then transferred back into the organisation, increasing productivity. In other words, in adopting innovation, health care organisations would need to accept a degree of 'double running costs' in the process of implementing change. But this raises the question, for instance, of how much an existing long-term condition nursing caseload could be increased as part of traditional working methods compared to a new team that operates with an entirely new technology-supported caseload.

Double-running costs

Making the case for change can be problematic when it implies the need for up-front investment, or the acceptance of additional costs. The lack of evidence on the cost-effectiveness of telehealth may be a key reason why it has failed to progress beyond the 'early adopter' phase. Public sector organisations are often said to be 'risk averse' and less open to innovations because of their responsibility to use taxpayers' money wisely.

Because of the uncertainty and risk associated with innovation, new approaches to care must inevitably be piloted to establish the likelihood of success prior to a roll-out. There have been numerous local pilot projects testing telecare and telehealth products and services in England, as local authorities and PCTs try to find out whether these approaches fit with their own strategic commissioning agenda and

are a cost-effective way of meeting customers' needs and expectations. However, more could be done to review and to trust validated outcomes from similar projects elsewhere, both to avoid duplication of effort or, in the worst cases, having to terminate innovations at the end of the pilot because the implications for roll-out have not been sufficiently considered.

Commissioners need a certain level of evidence to adopt a new approach to care, particularly when they may have to decommission or redesign an existing activity to accommodate it. This requires sophisticated systems for assessing population needs and making appropriate commissioning and decommissioning decisions. Additionally, organisations require a particular mindset to be comfortable with innovation as the norm – continually reinventing activities with the acceptance of occasional failure, but ensuring rapid learning to make significant and continuous improvements in performance. It has been reported within the WSD Pilot Programme that a rigorous project and programme management approach is necessary to mainstream successful innovations and manage them in the longer term to maintain their effectiveness (Harburn and Carter 2009).

Evidence is also emerging about the importance of working with local partners to support the adoption of innovation. The business case for supporting innovation could be better developed by working across geographical boundaries – for example, the development of national and regional telehealth/telemedicine resources to provide expert triaging and interpretation of clinical data, as well as providing first responses to telecare alerts. Before regionalisation can occur, there is a need for the different partners involved to agree the accepted norms and standards for the services. This will include clinical protocols, key aspects of care pathways such as referral processes, technical requirements for integration of data, and service quality standards. As yet, the potential for efficiency and productivity gains in commissioning and procurement of telecare and telehealth across geographical boundaries has not been realised.

Failures of innovation

By its nature, innovation involves uncertainty and risk, so failure is inevitable in a significant percentage of projects and programmes. Failure can have a particularly negative impact on staff motivation and morale, making people reluctant to work with new innovations in future. This can be particularly challenging when there is downward pressure on resources, and can sometimes lead to retrenchment and acceptance of under-performing programmes.

It is important to understand why innovations fail. In some cases, the concept may have been sound but failure may have resulted from implementation issues. Measurement and evaluation of progress and performance is important. This enables learning from experience which can lead to a change in direction to improve the chances of a more successful outcome.

Sustaining innovation by managing organisational change

Innovation can come from:

- leaders
- policy-makers

- independent thinkers

- inventors

- entrepreneurs

- people working within organisations at the 'user interface' – care managers, nurses, control centre staff.

Many innovations come from within organisations (for example, from frontline staff) but it often takes vision, leadership and resources to change the organisation's culture to implement and sustain the innovation. Many innovations have to go through testing, evaluation or regulatory processes to meet safety requirements and to demonstrate effectiveness and efficiency at scale. For some innovations, there are issues around intellectual property rights. This could include, for instance, disease management algorithms and educational materials for telecoaching.

The need for change is fundamental to the management process, and the extent to which organisations can sustain new innovations is related to how well change is managed. Service managers need to adapt processes in the face of new technologies so that systems are efficiently managed and performing well in terms of quality and cost-effectiveness. There is a considerable literature on approaches to change management, most of which focus on understanding key concepts such as strategic priorities, the potential need for change to occur, the adoption of assessment models to predict impact, and strategies to promote learning and overcome resistance to change (Iles and Sutherland 2001; Goodwin *et al* 2006).

In terms of overcoming resistance to change, a simple but useful pocket tool is Beckhard's (1969) 'change equation' (*see* box below). It considers three key factors: dissatisfaction with how things are now; a vision of what is possible; and first steps that can be taken to achieve that vision. If the combined product of these factors is greater than the potential for resistance to change, then it is more likely that change will happen.

The change equation

$$D \times V \times F > R$$

D = Dissatisfaction with how things are now
V = Vision of what is possible
F = First, concrete steps that can be taken towards the vision

If the product of these three factors is greater than **R** = Resistance, then change is possible.

Because of the multiplication of D, V and F, if any one of the three is absent or low, then the product will be low and therefore not capable of overcoming the resistance.

Source: Beckhard (1969)

Vision and leadership are important aspects of organisational change, and the change equation can be applied at all levels of an organisation to help understand the issues faced by different teams implementing new programmes. If the leadership's vision is not shared right across the organisation, then that vision may not be translated into practice. The same is true of a bottom-up innovation, where support needs to be provided by the top team to ensure that the innovation spreads through the whole organisation.

For successful adoption of telecare and telehealth, there needs to be a combination of leadership and vision, effective implementation, and some level of dissatisfaction with the current position in care delivery. Often, one or more of these dimensions – and sometimes all three – are absent, and so lead to poor outcomes during the implementation phase. For example, a recent study tour report on using technology to support homecare in the United States found that Kaiser Permanente had to abandon home monitoring for cardiac patients due to a lack of clinical support from cardiologists who were resistant to the disruption caused by its introduction (Garside 2010). The report concluded that in order to achieve a 'step change', both clinical and management teams at all levels needed to be fully engaged and committed to the project's objectives, while patients and carers need to feel educated and empowered to trust the technology.

5 Practical examples of innovation in telehealth and telecare

The Whole System Demonstrator (WSD) Pilot Programme is one of the most innovative approaches to the promotion and adoption of telecare and telehealth in the world. The programme is using a 'gold standard' randomised controlled trial to evaluate the clinical effectiveness and cost-effectiveness of telecare and telehealth within an integrated care setting. The trial is thought to be the largest of its type in the world.

In addition to the WSD Programme, there are a growing number of practical examples of the successful use of telehealth and telecare, which we review briefly below. The 'Resources' section at the end of this briefing paper provides the references and links to these examples.

Telecare innovations

Following the implementation of the preventative technology grant between 2006 and 2008, the Commission for Social Care Inspection (now the Care Quality Commission) obtained responses from 150 social care authorities on outcomes from their telecare implementation programmes, as well as their plans to mainstream the innovations and make them sustainable. The responses provide a useful set of practical examples of the adoption of telecare, and are available in profile and themed report formats.

As well as improving the quality of life for users and carers, local authorities have started to identify telecare's potential for realising efficiencies – in particular, fewer care home and hospital admissions through using telecare alongside personal care, intermediate care and re-ablement programmes. In addition, many authorities reported the value of using telecare for short-term assessment and lifestyle monitoring to improve care planning. Some authorities have successfully replaced overnight support with remote monitoring in consultation with users and their carers and families.

Examples of innovations within the telecare field include the following.

1. **Free telecare for users**: the Essex Pledge announced during 2009/10 provides free telecare for the first year to everyone aged 85 and over. In addition, both Tower Hamlets and Newcastle have offered free telecare services to users.

2. **Demonstration facilities**: many local authorities have provided a demonstration facility for awareness training and, in some cases, user assessment. In Croydon, where the local authority and PCT are working with third sector partners, the facility is provided on an Older People's Bus that stops at various locations through the week. An assistive technology support unit at Croydon's Aztec Centre also provides expert telecare support, including information on a wide range of telecare services.

3. **Innovation Houses**: in West Bromwich, an innovative i-House developed by Medilink (West Midlands) provides extensive, state of the art telecare, telehealth and other assistive technologies in a refurbished Victorian end-of-terrace house. In June 2009, an Innovation House at the NHS Innovation Expo provided a similar experience within a major conference setting attended by more than 5,000 people.

4. **New partnerships and integrated working**: in Croydon, pioneering work on telecare to support people with dementia and their carers and families is being undertaken with the South London and Maudsley Mental Health Trust. In Hull, the local telecare and telehealth programme is being co-ordinated by a board with representatives from the local authority, PCT, mental health trust, university, and third sector organisations.

5. **Investment**: in one of the largest programmes in England, Wirral Council has agreed an £8.9 million 'invest to save' bid over three years covering telecare and aspects of telehealth.

6. **Single-access telephone support**: in London, telecare services have been integrated for many years and carry out co-ordinated marketing using a single access phone number. A quarterly meeting of representatives provides an opportunity to share information and lessons learned across the services involved.

7. **Personal budgets**: Oldham Council has pioneered the use of personal budgets for social care, and 1,000 people have benefited from assistive technology as part of their personal budget. During 2009, the council fitted 591 dispersed alarms/pendants and 150 pieces of equipment, including carbon monoxide, falls and seizure monitors, CCTV and carer alerts.

Telehealth innovations

While the slower uptake of telehealth has meant there are fewer practical examples of innovation, over one-third of PCTs in England have implemented telehealth projects, with a further third planning a programme (DH Care Networks 2010b). Examples of telehealth innovations include the following.

1. **Field trials**: in addition to the WSD Programme, a small randomised controlled trial is under way in NHS Barnsley to test whether the use of telehealth technologies reduces the frequency of hospital admissions for people with chronic heart failure.

2. **System-wide programmes**: in 2005, Kent County Council initiated a telehealth programme with local PCTs following a visit to the United States. The initiative remains one of the largest outside of the WSD Programme, with more than 250 patients using telehealth on a regular basis. Results include: fewer unplanned hospital admissions for less complex cases; patients with complex co-morbidities are reported as staying in their homes and away from hospital for longer; and acute care costs are down by more than 60 per cent in some patient groups.

3. **The development and testing of new products**: the Technology Strategy Board's Assisted Living Innovation Platform (ALIP) has a number of projects under way to develop future products and services. Consortia of suppliers, PCTs, local authorities, third sector organisations and universities are developing these innovations with users, patients and carers.

4. **Training and education**: West Midlands Strategic Health Authority has appointed telehealth project managers in the region to support PCT programmes and develop their business cases. With their partners, they are

also building a database of effective products and services, providing training and support for key stakeholders, and developing tools for commissioning and evaluation.

5. **Case studies and public information**: as part of the WSD Programme, Newham (the local authority and PCT) have produced a range of informative case studies and videos. These have proved very effective in raising awareness among staff, patients, users and carers. Stakeholders are very much involved in Newham's WSD Programme.

Other resources

From June 2010, a new Buying Solutions framework will be in place that builds on the previous contract from 2006. As well as telecare and telehealth (products and services), the new framework includes telecoaching and managed services. This provides a flexible framework for local authorities, PCTs and other organisations procuring goods and services, and should reduce overall tendering costs.

A range of internet news websites provide daily updates on new products and services, while the Department of Health's Telecare Learning and Improvement Network (LIN) Newsletter gives a monthly update on telehealth and telecare news stories from around the world. Examples include:

■ social networking websites (e.g. Facebook) to support users with long-term conditions

■ text prompts, email and other messaging services (e.g. medication reminders)

■ video conferencing and webcam consultations (telemedicine applications)

■ mobile and smartphone applications

■ implanted cardiac monitoring devices

■ telephone-based disease management approaches (e.g. NHS Direct)

■ wearable sensors (e.g. embedded in clothing, stick-on plasters).

6 Managing and sustaining innovation: key lessons

From the research and the discussions in this briefing paper, we can conclude that the success or failure of telecare and telehealth innovations depends on a number of factors. Focusing on the following key areas will help organisations to ensure smoother and quicker adoption of innovative telecare and telehealth services.

- **Leadership and vision –** leaders, champions and entrepreneurs can empower and motivate individuals and teams. Leaders need to create a supportive culture across their organisation to innovate and change current working practices that fit within national and local policies. Telehealth and telecare champions need to develop strong leadership and negotiation skills if they are to persuade key partners, particularly funding agencies, to invest in these innovations, particularly in the cold financial climate that lies ahead.

- **Clarity of organisational goals –** service and programme goals need to be clear to obtain collective buy-in from the full range of stakeholders: professionals and practitioners, commissioners and service providers, users, carers and patients. With new services, and particularly with innovations in information technology, it is particularly vital that team managers and team members are clear about their roles and that service recipients – users and carers – are proactively involved in the process.

- **Organisational structure and processes –** training, awareness, infrastructure, record management systems, data sharing and operating protocols are all important in enabling the uptake of new technologies. Telehealth and telecare are tools that can support service redesign, but this also requires a willingness to embrace new ways of working.

- **Strong commissioning skills –** the sustainability of telehealth and telecare depends on longer-term financial support for deployment of the new technologies. World class commissioning requires commissioners to embrace new strategies to promote good health and well-being and prevent ill health. But strong commissioning skills will be needed to decommission services that are no longer appropriate, and to improve the quality and cost-effectiveness of care through service redesign.

- **Governance and accountability –** there need to be clear lines of responsibility for the delivery of high-quality services within a robust performance framework. In particular, patient safety and ethical considerations need to be clearly articulated.

- **Project and programme management –** actions and performance reporting need to be aligned to goals and regularly communicated to stakeholders, including user and community groups.

- **Communication –** from raising awareness to technical expertise, from monitoring to response, the ability to communicate openly and clearly across key partners (and in language that is accessible to all) can enable sustained commitment and understanding.

- **Staff and patient empowerment –** giving staff the autonomy to improve quality and productivity in their own areas – and to find new solutions

to problems – can help embed and foster new innovations. Clinical and management teams at all levels need to be fully engaged in and committed to change. Patients need to be educated and feel they can trust the technology.

- **Sharing information and knowledge –** competence and performance can be improved through effective communication of guidance or good practice.

- **Evaluation and audit –** regularly reflecting on progress and outcomes is an essential element for a sustainable telehealth or telecare project. This does not necessarily mean investing in a 'gold standard' approach, but does require tracking progress using key outcome measures. This facilitates reflective thinking and identifies any adjustments that need to be made to enable continuous improvement.

7 Conclusions

Telecare and telehealth services are now benefiting up to 1.7 million people in England. These innovative approaches to health and social care have been delivered by local authorities, health authorities and trusts, housing associations, third sector organisations, commercial providers and equipment vendors, in many cases working in partnership.

In the telecare field, services in England and the UK are among the best in the world. There is also considerable interest in the potential of telehealth (particularly home-based remote monitoring) to support people with long-term conditions. There is continuing momentum to embed telecare in mainstream care pathways and to scale up telehealth, and further evidence from the WSD Programme, due to be published in 2011, will support this momentum.

However, service commissioners and providers need to address the challenges to further technology adoption to realise the full potential of these innovations. There is considerable potential for further collaboration across organisations and sectors in the assistive technologies field to help find solutions to overcome these challenges. The WSD Action Network will continue to contribute up-to-date information on progress from projects across the country to support greater uptake of these innovative approaches to care.

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Resources

We have developed this resource guide to provide you with useful websites and information on telecare and telehealth. WSDAN is not responsible for the content of external websites.

The **Whole System Demonstrator Action Network (WSDAN)** provides news, features and regular updates on the WSD Programme, as well as an evidence database on the use of telecare and telehealth in the management of long-term conditions. It is available at: www.wsdactionnetwork.org.uk

WSDAN's Google Maps provide an online resource mapping innovations and examples of telehealth and telecare across the UK, including links to appropriate websites and documents. The maps are continually updated and the evaluation map provides information on local trials and audits.

- **Telecare Services Map** Available at:
  http://maps.google.co.uk/maps/ms?hl=en&ie=UTF8&msa=0&msid=100406857045032193451.0004540c223f16f2d1c9d&ll=52.842595,-1.867676&spn=8.339986,18.676758&z=6

- **Telehealth in England Map** Available at:
  http://maps.google.co.uk/maps/ms?hl=en&ie=UTF8&msa=0&msid=100406857045032193451.00047bfad6341183c8523&ll=54.329338,-1.604004&spn=8.052625,18.676758&z=6

- **Telecare and Telehealth Evaluation Map** Available at:
  http://maps.google.co.uk/maps/ms?hl=en&ie=UTF8&msa=0&msid=100406857045032193451.000481bfda3b6cc58babe&ll=52.66972,-1.955566&spn=8.373034,18.676758&z=6

The Telecare Learning and Improvement Network (LIN) provides a range of resources and briefings:

- **Telecare outcomes** provides performance reports from social care authorities, available at: www.dhcarenetworks.org.uk/telecareoutcomes

- **Telecare services** provides information on the range of telecare services in England, available at www.dhcarenetworks.org.uk/telecareservices

- **Telecare LIN Newsletter**, produced monthly, provides links to news stories on telecare and telehealth worldwide. Available at: www.dhcarenetworks.org.uk/telecarenewsletters

Practical examples of innovation:

The Essex Pledge announcing free telecare to everyone aged over 85, available in the publication entitled Supporting Vulnerable People: Essex telecare pledge. Available at:

www.essexcc.gov.uk/vip8/ecc/ECCWebsite/dis/guc.jsp?channelOid=120888&guideOid=131737&guideContentOid=131745 (accessed on 31 March 2010).

Newcastle's pilot of free telecare for the over-85s, available at:

www.24dash.com/news/Housing/2010-02-04-Peace-of-mind-at-the-touch-of-a-button-Newcastle-pilots-free-Telecare-for-the-over-85s (accessed on 31 March 2010).

Tower Hamlets' free telecare scheme, available in the document Telecare: peace of mind at the push of a button, at: www.towerhamlets.gov.uk/news/east_end_life/1_march/telecare_peace_of_mind.aspx (accessed on 13 April 2010).

Croydon POP Bus initiative, available at: www.croydonpop.org.uk/ (accessed on 31 March 2010).

Croydon's Aztec Centre providing expert telecare support and information, available at www.croydon.gov.uk/healthsocial/homecare/careline/ (accessed on 31 March 2010).

Medilink (West Midlands) i-House providing state of the art telehealth and telecare, available at: www.medilinkwm.co.uk/news/display.php?id=314 (accessed on 31 March 2010).

The Innovation House from the 2009 NHS Innovation Expo, available at: www.wsdactionnetwork.org.uk/news/features/nhs_innovation_expo.html (accessed on 27 April 2010).

NHS Barnsley's randomised control trial, available from WSDAN Google Map at: http://maps.

google.co.uk/maps/ms?hl=en&ie=UTF8&msa=0&msid=100406857045032193451.00047bfad63 41183c8523&ll=54.329338,-1.604004&spn=8.052625,18.676758&z=6

Kent County Council's telehealth programme, available from the NHS Institute for Innovation and Improvement publication, Telehealth in Kent: What's behind its success? Available at: www. viterion.com/web_docs/TelehealthInKent.pdf (accessed on 31 March 2010).

 Other useful websites and links:

AT Dementia, a national information resource on assistive technology for people with dementia, available at: www.atdementia.org.uk/

Buying Solutions - Telecare Framework, available at: www.buyingsolutions.gov.uk/ frameworks/contract_details.html?contract_id=808 (accessed on 31 March 2010).

Healthtech and Medicines Knowledge Transfer Network, available at:

https://ktn.innovateuk.org/web/healthktn/ (accessed on 13 April 2010).

Internet news sites

- Telecare Aware: www.telecareaware.com

- e-Health Insider: www.e-health-insider.com/

- Mobile Health News: http://mobihealthnews.com/

NHS Institute for Innovation and Improvement. Available at: www.institute.nhs.uk/innovation/ innovation/introduction.html (accessed on 31 March 2010).

Technology Strategy Board's Assisted Living Innovation Platform (ALIP). Available at: www. alip-healthtechktn.com/remository/R-and-D-Projects/ALIP1---User-Centred-Design-and-Home-Based-Systems/ (accessed on 31 March 2010).

Telecare in Scotland Joint Improvement Team. Available at: www.jitscotland.org.uk/action-areas/telecare-in-scotland/ (accessed on 13 April 2010).

Telecare in Wales Social Services Improvement Agency. Available at:

www.ssiacymru.org.uk/index.cfm?articleid=2035 (accessed on 13 April 2010).

Telecare Services Association. Available at: www.telecare.org.uk/