Focus on technology and home care

Introduction

New technologies such as telehealth and telecare have been hailed as the solution for managing long-term health conditions, enabling independent living for an increasingly older population and helping to combat social isolation among older people (Hawley, 2013).

Technological developments have the potential to transform home care, avoiding hospital admission for older people and delaying the need for long-term residential care. A recent article in the Guardian noted how 2013 could be a watershed year for telehealth in the UK (The Guardian, 2013). However, current evidence on the efficacy of telecare and telehealth provides mixed results.

This edition of the CARDI “Focus on ...” series examines the evidence relating to new technologies for assisted living.
Key findings

- The findings from a large UK randomised, controlled trial on telecare and telehealth conducted between 2008 and 2009 showed that:

Telehealth
- was associated with lower mortality and emergency hospital admission rates (Steventon, et al., 2012).
- did not improve quality of life or psychological outcomes for patients with chronic obstructive pulmonary disease, diabetes, or heart failure over 12 months (Cartwright, et al., 2013).
- Is not a cost effective addition to standard support and treatment when measured on quality-adjusted life year¹ (Henderson, et al., 2013).

Telecare
- Had no statistically significant impact on the duration of domiciliary care, admissions to care homes, admissions to hospitals and length of stay, or general practice contacts (Steventon, et al., 2013).

- Technological developments will see wireless sensors and internet access technologies becoming cheaper and more widely accessible. This may lead to easier retro-fitting of existing dwellings for telecare, telehealth and ambient assisted living (Lewin et al., 2010).

- Advances in telecare and telehealth may lead to widespread access for older people to augmented reality devices, sophisticated health monitoring and new technologies in the home for assisted living (ZD Net, 2013).

- The positive effect of new technologies will depend on the way they are introduced and integrated into wider forms of support, including informal carers, social workers, general practices and physicians (Steventon, 2013).

- A comparison of US and UK technology in home care published in 2010 noted that while technology has a part to play in home care, people are still crucial in managing patients. Technology must be made to fit into the care process, rather than care being based on available technologies (Garside, 2010).

¹ Quality-adjusted life year (QALY) is a measure of disease burden, including both the quality and the quantity of life lived. It is used in assessing the value for money of a medical intervention.
New technologies in home care

Telehealth

Telehealth has been defined by the UK Department of Health as a service that uses equipment to monitor people’s health in their own home, including the monitoring of vital signs such as blood pressure, oxygen levels or weight (Department of Health, 2009). Older people can use telehealth equipment to measure the vital signs that would normally be measured by a health care professional. This can help to reduce the frequency of visits to the GP surgery and reduce unplanned hospital admissions by identifying changes in health status. The data is transmitted to a monitoring centre which flags any changes in health status for action (Davies & Newman, 2011).

Telehealth includes remote patient monitoring in which sensors and electronic questionnaires are used to monitor vital health signs and symptoms remotely. Telehealth aims to benefit patients by helping them to manage their conditions in their own home and in reduced dependence on traditional primary or secondary care outpatient services, elective and non-elective hospital admissions (Parker & Hawley, 2013).

An article on telehealth in the Guardian noted that, when it comes to an environment of joined-up healthcare delivery “Telehealth is particularly well suited to providing quality care in this environment. It equips patients with the tools they need to learn how to self-care, and enables co-ordinated care to be delivered through a team of professionals, including the GP, community nurse, dietician and physiotherapist directly into the home” (The Guardian, 2013).

Today, telehealth services are focussed on providing better and more cost efficient management of common chronic conditions, using a combination of sensors, hubs and remote servers. Developments in technology may mean the range of conditions that can be monitored could be broadened, monitoring could be extended to outside the home and the monitoring could be linked to real-time drug administration (Lewin, et al., 2010).

Telecare

Telecare has been defined by Davies & Newman (2011) as combining monitoring equipment with a monitoring service, and is most frequently used in the home. “A telecare user may activate their own alarm if they use a pendant. For those users with passive monitoring equipment, their behaviour patterns are monitored, and changes outside of their normal behavioural parameters are flagged for action (e.g. not getting out of bed at the usual time, exiting the house at night). This monitoring is intended to support people and enable them to continue living in their own home, independently or with the assistance of carers, for as long as possible” (Davies & Newman, 2011).

Telecare focuses on the social aspects for independent living. A European Commission report in 2009 defined three generations of telecare:
• First generation systems, including personal alarm systems and emergency response telephones, designed to reduce anxiety among older patients and reduce the use of primary healthcare services.

• Second generation telecare involves the enhancements of a basic alarm model with the addition of sensors for monitoring falls or temperature.

• Third generation telecare involves more advanced systems that gather large amounts of information from the person and home in order to support pro-active care service interventions (Cullen et al., 2009).

In 2009, the UK government stated that a key objective of telecare was improving quality of life, keeping people safe in their homes and inspiring confidence (HM Government, 2009). In 2011, CARDI funded a research project on the potential benefits of telecare for carers. One of the findings of the project was that there had been very little work done up to that point on how telecare works in practice, i.e. the impact of telecare implementation on existing roles and responsibilities not just in terms of formal health and social care services, but also informal/family carers and social networks of older people (CARDI, 2011).

In 2012, the UK Department of Health established the Whole System Demonstrator Project to examine what telecare and telehealth were capable of. The aim was to show how new technology supports people to live independently, take control and be responsible for their own health and care (Telecare Services Association, 2013).

**The impact of home care technology**

**Telehealth**

The Whole System Demonstrator Project in the UK has been described as the “largest randomised trial of telehealth in the world”. 3,230 people with diabetes,
chronic obstructive pulmonary disease, or heart failure were recruited from GP practices between May 2008 and November 2009.

Results from the trial showed that telehealth is associated with lower mortality and emergency admission rates. Participants using telehealth had 20% fewer hospital admissions. There were fewer deaths among telehealth participants when compared to the control group – 4.6% vs. 8.3%. The length of hospital stay was also shown to be shorter for patients who were using telehealth than the length of stay for the control group (Steventon, et al., 2012).

On the other hand, an assessment of the cost-effectiveness of telehealth interventions published in 2013 states that “Telehealth does not seem to be a cost effective addition to standard support and treatment” (Henderson, et al., 2013). Further analysis of the findings published in 2013 found that second-generation telehealth monitoring was not effective compared with usual care only. Telehealth did not improve quality of life or psychological outcomes for patients with chronic obstructive pulmonary disease, diabetes, or heart failure over 12 months (Cartwright, et al., 2013).

Telecare

The findings regarding telecare from the Whole System Demonstrator Project were published in 2013. These results showed that there was no statistically significant difference between the group receiving telecare interventions and the control group when it came to health and social care service use. Telecare was shown to not lead to a significant reduction in service use (Steventon, et al., 2013). When compared to patients receiving traditional care only, there was no convincing impact of telecare found on the duration of domiciliary care, admissions to care homes, admissions to hospitals and length of stay, or general practice contacts (Steventon, 2013).

One qualitative analysis of the findings from the Whole System Demonstrator project identified several important barriers to the implementation of telecare, outlined in Table 1.

| 1. The requirement for technical competence in operating the equipment |
| 2. Threats to identity, independence, positive ageing, self-reliance and self-care |
| 3. Expectations and experiences of disruption to services |
| 4. Misunderstandings that special skills were needed to operate the equipment |
| 5. Views that interventions could undermine self-care and coping |
| 6. The potential disruption to highly valued existing services |

(Sanders, et al., 2012)

Research shows that a high level of education attainment, a high income and good health can help older people overcome barriers to the use of new
technologies in general (Tacken et al., 2005). However, people with low incomes or low educational attainment can be at a disadvantage.

In 2013, US researchers identified the factors that influence willingness to use new information technology. These factors were a perception that the new technology will be high in relative advantage, low in complexity and ease of use, and high in the extent to which a new product can easily be tried and tested (Conrad, Michalisin, & Karau, 2012).

**Ethical considerations**

There are some ethical considerations with regard to older people and new technology, particularly technologies which closely monitor people in their day to day lives. There is a fine line between technology that promotes independence and technology that threatens individual freedom. The development of assistive technology for older people’s independent living such as telehealth, telecare, fall monitors or dementia tagging calls into question the balance of an individual’s privacy. Can this be overridden to ensure the health, safety and independence of that person, relative or friends? It is important that ethical concerns around privacy, identity, independence and self-care are not ignored as new technologies become more widespread (Borges, 2008). For example, one study on location tracking devices in the UK found that older people had concerns including privacy, usefulness and visibility when asked to participate in a trial using the technology (Thomas et al., 2013).

**Future developments in technology**

Many new technologies have been introduced or are being developed that could assist older people to live independently now and in the future. Easy to use smartphone apps can help older people to monitor conditions such as diabetes or high blood pressure or assist in keeping track of medication schedules. There are smartphone apps that can assist older people with poor vision, including magnifiers, flashlights and dictation apps (Mother Mature Network, 2013).

Augmented reality technology may in the future be able to provide contextual information to people who have cognitive disabilities (ZD Net, 2013). One example of a future use in telecare is Google Glass, an augmented reality pair of glasses that could track gait and identify mobility problems, provide medication reminders, assist with prompts for people with dementia, and provide communication with friends as family as well as in emergencies (ZD Net, 2013).

An Ofcom report in 2010 identified three major trends that will impact the development, availability and use of assisted living services and technologies over the next decades:

1. With greater processing speed, memory and lower power usage, equipment such as wireless sensors and internet access technologies will become much cheaper and more widely available.
2. Broadband communication will be available to all.
3. Devices such as smartphones and tablets will continually move to mass market, and independent companies will continue to design specialist apps for them (Lewin, et al., 2010).
The result of these trends will be that telehealth, telecare and other assisted living technologies will become more affordable. It will also be easier to retrofit houses with new technologies. However, it is important that new technologies do not replace human contact, and that they are of actual benefit to the people using them. The benefits of telehealth, telecare and other technologies are likely to be the greatest for those living in remote locations, where providing traditional care is more challenging (Lewin, et al., 2010).

A comparison of US and UK technology in home care published in 2010 noted that while technology has a part to play in home care, people are still crucial in managing patients. Technology must be made to fit into the care process, rather than care being based on available technologies. While technology can offer a way for patients to become engaged and empowered, it is unlikely to provide the whole answer or solution in home care (Garside, 2010).

**Case study: Great Northern Haven, Dundalk**

A positive example of ambient assisted living working for older people is the Great Northern Haven in Dundalk. This is a set of 16 purpose-built apartments designed specifically to provide a sheltered environment where independent living is assisted by technology. Each apartment has more than 100 sensors, connected televisions, touch screen devices and a core network infrastructure throughout. Data is being continuously gathered from the participating residents with the aim of improving quality of life through technology assisted living (CASALA, 2013). While the Great Northern Haven is purpose-built housing, as technology such as sensors becomes cheaper in the future, retro-fitting existing properties for ambient assisted living may be increasingly possible (Lewin, et al., 2010).

**Policy in Northern Ireland**

In 2008, the Minister for Health, Social Services and Public Safety in Northern Ireland (NI) announced £1.5 million for pilot projects to promote the development of new technologies to assist people to live at home over the following two years (CARDI, 2011). In March 2010, five HSC Trusts signed a contract with the consortium TF3 for the provision of a telemonitoring service. As of March 2013, over 1,500 people have had the service installed in their homes (DHSS&PS, 2013).

*Caring for carers,* the NI strategy for carers recommends that information technology solutions be used to keep carers informed. It recognises that the health and well-being of carers is important, as is reducing the stress of caring. The strategy also recommends that information technology solutions be used to keep carers informed about the latest information on caring as well as advice and tips on carrying out their role (DHSS&PS, 2006). However, research conducted by Suzanne Martin for the NI Housing Executive viewed the lack of a telecare strategy as a significant barrier to bringing telecare into the mainstream of care for older people (Martin, 2010).

A Centre for Connected Health and Social Care was established under the auspices of the Public Health Agency in 2011. Its aim is to promote improvements in patient care through the use of technology, and to supervise the introduction of new products and innovation to the Health and Social Care...
system in NI. The centre is also working toward the development of a Connected Health and Care Strategy for NI Health and Social Care Services (European Centre for Connected Health, 2008).

In 2012, the UK Health Secretary Jeremy Hunt announced plans to make telehealth available to 100,000 more people in 2013. A government target has been set to make telehealth available to 3 million people across England by 2017. Seven 'pathfinders' - comprised of the NHS and local authority organisations such as clinical commissioning groups are awarding contracts to industry suppliers and the aim is that technologies and services will be provided at no upfront cost. (Gregory, 2012). A 2012 policy analysis of telecare by the UK Strategic Society Centre recommended that telecare take-up be increased to two or three times current levels and the NHS should play a central role in commissioning and funding telecare services (Lloyd, 2012).

Policy in the Republic of Ireland

In the Republic of Ireland (ROI), the positive influence of telecare and telehealth on carers and those they care for was recognised with the 2012 publication of The National Carers’ Strategy: Recognised, Supported, Empowered. As the strategy states: “The positive role of telehealthcare (telehealth, telecare and telemedicine) in supporting carers is being increasingly recognised. It can improve the experience of care for the care recipient and carer by reducing the need to travel to receive care and treatment and by facilitating better prevention, anticipatory care and earlier intervention. This use of such technology is particularly useful in remote and rural areas for both redressing isolation and for alleviating the sense that the carer must assume sole responsibility all of the time for care recipient” (Department of Health, 2012).

The Positive Ageing Strategy in ROI, launched in 2013, noted the potential of new technologies for supporting older people to live independently at home. The strategy also noted that technologies can play an important role in chronic illness or disability prevention as well as in the management of health conditions (Department of Health, 2013).

Conclusion

Future technological developments may see telecare, telehealth and other assistive technologies advance to such a degree that older people may have access to devices in the home to assist with monitoring and daily chores or augmented reality devices that can provide them with instant access to information in real-time. The potential advantages are apparent to people with cognitive difficulties, physical limitations and disabilities and chronic illnesses that require close management. New technologies may help older people to remain independently living in their own homes for longer. However, it is important that concerns of older people on issues such as privacy, self-reliance, independence and threats to existing services are addressed with advances in technology.
Bibliography


CARDI. (2012). *Building balance with video games.* Belfast: CARDI.


Sanders, C., Rogers, A., Bowen, R., Bower, P., Hirani, S., Cartwright, M., et al. (2012). Exploring barriers to participation and adoption of telehealth and
telecare within the Whole System Demonstrator trial: a qualitative study. 
*BMC Health Services Research*, 12:220.


