MANAGEMENT IN HEALTH CARE PRACTICE A Handbook for Teachers, Researchers and Health Professionals	
Title	**NEW POTENTIALS OF TELECOMMUNICATION TECHNOLOGIES IN THE HEALTHCARE SERVICE FRAMEWORKS**
Module: 3.5	**ECTS (suggested): 0.2**
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Keywords	Telecare, elderly, domiciliary help, personal response system, carephone
Learning objectives	• To understand how new technologies can be used to contribute to the quality of life of older people • To increase awareness of the fact that some healthcare services can be provided remotely • To demonstrate the merits of an existing telecare solution intended to help older people live independent lives at home environment rather being institutionalised
Abstract	Telecare is a new means of providing healthcare and social support at home where telecommunication technologies are the medium for service provision. It uses a public telephone network and provides a means of getting help, notably for people who are at risk of falling, sudden illness, fits or seizures. Sensors added to a carephone are introduced monitor the user's environment and health condition and alert a response centre when there is a threat to their health or well-being. Personal response systems operate in all western European countries and also, more recently, in Slovenia. Experiences gathered when establishing a pilot network of carephones and a response centre in the capital city of Ljubljana are presented along with a discussion of the efforts made to create a national network. A personal response system as a telecare application used primarily by vulnerable older people with response centres having the capacity to serve 30.000 potential users. Obstacles to their development are discussed.
Teaching methods	Ex catedra with exercises
Specific recommendations for teachers	Demonstration of a call from a carephone to a response centre initiated by a fall detector or a pendant. Required equipment is available via the first author.
Assessment of students	Seminar paper, oral and/or written exam.

NEW POTENTIALS OF TELECOMMUNICATION TECHNOLOGIES POTENTIAL IN THE HEALTHCARE SERVICE FRAMEWORKS

Drago Rudel, Malcolm Fisk

THEORETICAL BACKGROUND

The potential for new telecommunication technologies to introduce changes to healthcare

Because of the reducing cost of information and communication technologies (ICT), they are increasingly available to a wide range of people, including many with lower incomes and limited disposable wealth. The configuration of such technologies means that they can be particularly useful to people with physical and sensory impairments or health related problems. The technologies are media through which health and support services can be provided. Importantly, as such technologies penetrate into ordinary homes; the scope for such services to embrace everyone from the city to the remote village is enhanced.

Technologies have, along with white coats and ranks of beds, been a defining feature of hospitals and clinics. They have, in many ways, symbolised the power, authority and expert knowledge that is accorded to doctors, surgeons, clinicians and other medical staff. They have been instrumental in re-enforcing hospital and clinical settings as the locus for medical care (rather than our homes and communities).

The communications revolution, however, begins to change this since at least some of those technologies that were to be found in the hospital or clinic can now be offered within people's own homes. And together with the use (where needed) of healthcare auxiliary staff, the technologies in question can facilitate healthcare treatment in ways that would, in the past, have required hospital admission.

Underpinning this potential for change is the capacity of communications technologies to permit (with great speed) the transmission and exchange of visual images, data and speech. To date, much of such transmission and exchange has been between doctors, consultants and clinicians. It generally took place within hospitals and clinics, often excluding the patient. Now such transmission and exchange can begin to include the patient, whether in a hospital or "at home". Lengthy, expensive and often repeated trips to hospitals and clinics might be obviated through the use of such technologies in assisting diagnoses and monitoring the effects of courses of treatment.

A 2006 European Commission report (1) has suggested that:

> "*...the way healthcare is presently delivered has to be deeply reformed… The situation is becoming unsustainable and will only worsen in the future as chronic diseases and the demographic change place additional strains on healthcare systems around Europe.*"

They call for a:

> "*… new healthcare delivery model based on preventative and person-centred health systems. This new model can only be achieved through proper use of ICT, in combination with appropriate organisational changes and skills.*"

Nowadays there are a growing number of technological approaches to support predominantly people with long term conditions for instance vital sign monitoring technologies, lifestyle monitoring, reminder systems, telephone based care management programmes, kiosks for health and well-being, and others.

Telemedicine and telecare

The practice of health and medical care at a distance using ICT is known as "telemedicine". Some speculation is taking place as to whether the term 'telemedicine' may be usurped by "telehealth" as more holistic approaches to patient care are taken.

The home environment is very important to health. It can present a threat to health or it can be a context within which independent living and participation is facilitated. The advantages for healthcare and medical services at home may be summarised as offering:

1. the ability for the patient to remain in his/her preferred environment;
2. the ability for the patient to benefit from the informal support provided by family members and others;
3. a reduction in the risk of cross-infections (that is often present in hospitals); and
4. the possibility of obtaining better physiological measures (notably cardiogram and blood pressure measures) to assist in his/her treatment.

Added to these is the fact that (with patients being in what will usually be their preferred environment) recovery can be quicker, and the revenue costs of medical and nursing care reduced.

Exploitation of the potential to support independent living needs, however, to be considered alongside a new means of providing healthcare and social support in the home. That new means is called "telecare".

Telecare

There already are support services that use established communications technologies in the homes of some people. These use the telephone network and provide a means of getting help, notably for people who are at risk of falling, sudden illness, fits or seizures. The technologies in question are known by different names in different countries, viz. social alarms, safety alarms or "personal response systems" (PRS).

The changing capabilities of PRS are such that there is increasing recognition of their potential in relation to healthcare. When it comes to the potential role of communications technologies in healthcare within people's own homes a convergence between PRS and telemedicine can be observed (Figure 1). Together, and when relating to their role in people's own homes, these communications technologies comprise telecare. PRS can be considered as a good example of telecare application.

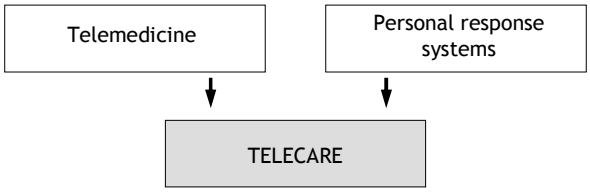

Figure 1. Telecare combines telemedicine and personal response systems.

Personal response systems

PRS operate in all western European countries. They are primarily used by vulnerable older people (2).

The systems are designed to enable people to call for help even if they cannot reach the call unit - the carephone. Carephones have, therefore, become a rather common technical device among older people living at home.

Personal response systems:

1. enable people to stay at home;
2. enable people to maintain their social and support networks;
3. provide a means of obtaining help when needed; and
4. provide reassurance to the user, their relatives and carers.

Unfortunately, such systems, and the services of which they are part, are poorly developed in South Eastern Europe. They may, however, have the potential to form the basis of new community based service frameworks that could bring both healthcare and practical support to people in their own homes. This is because they:

1. are less costly than support alternatives; and
2. can be a useful way to complement or underpin other services.

Long-term experiences in several developed European countries (3) show that a care network supported by a PRS can significantly improve home-based care efficiency in terms of quality, quantity and co-ordination (4,5,6,7,8). Facilitating independent living and greater levels of participation can mean a reduction in the cost (to state institutions) of health care, especially of those costs arising from the provision of institutional forms of accommodation (nursing and/or care homes). PRS could, in other words, reduce the necessity for additional capital and revenue investment in institutions (such as hospitals and clinics) that provide environments for the intensive provision of medical or nursing care.

How do Personal Response Systems Operate?

The typical PRS comprises a carephone (Figure 2) which links to (or replaces) the telephone in a person's home. He/she may wear or carry a personal trigger pendant device that, when pressed, activates the carephone. A staffed monitoring and response centre is contacted (Figure 3). The call-receiving unit automatically identifies the caller and displays his/her personal data record on a computer screen. A two-way speech path is opened. The person in need is then able to tell the operator of the nature of his/her problem and the operator is then able to give advice or reassurance and, depending on the circumstances, contact relatives, neighbours or the relevant emergency services (9).

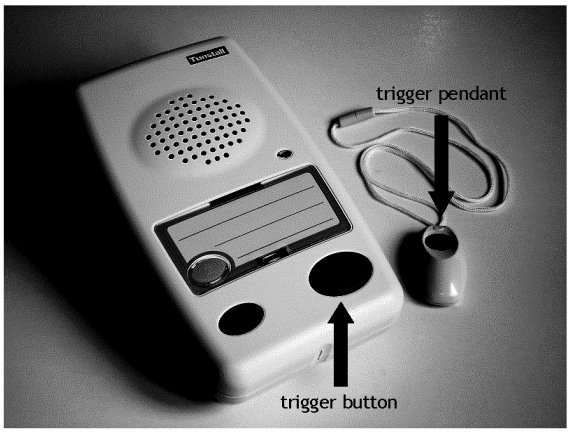

Figure 2. An alarm unit with a neck worn triggering pendant (Tunstall Group, United Kingdom) is a basic element of a personal response system. The unit is installed in the home of an elderly person together with an ordinary telephone.

The response centre can be a resource centre for home-based care in a community. It is staffed 24 hours a day, seven days a week. The operator who responds to the calls must be experienced in communication and skilled to help in case of an emergency. The operator's main tasks are to:

1. be there if and when help is needed;
2. organise appropriate help by contacting informal or formal care providers; and
3. co-ordinate care providers' services.

A model of how community help providers are engaged is shown in Figure 4. If a call for help comes from a client in a community where a response centre exists (community 1) and help is needed at the caller's home, the operator in the PRS centre asks informal or local formal carers to go and help. Where a response centre has its own mobile staff, the operator may, depending on the circumstances, send one of them to help. If a call comes from outside the community where the response centre is located (e.g. from the community 4), an external care provider is engaged (with help is co-ordinated from the response centre).

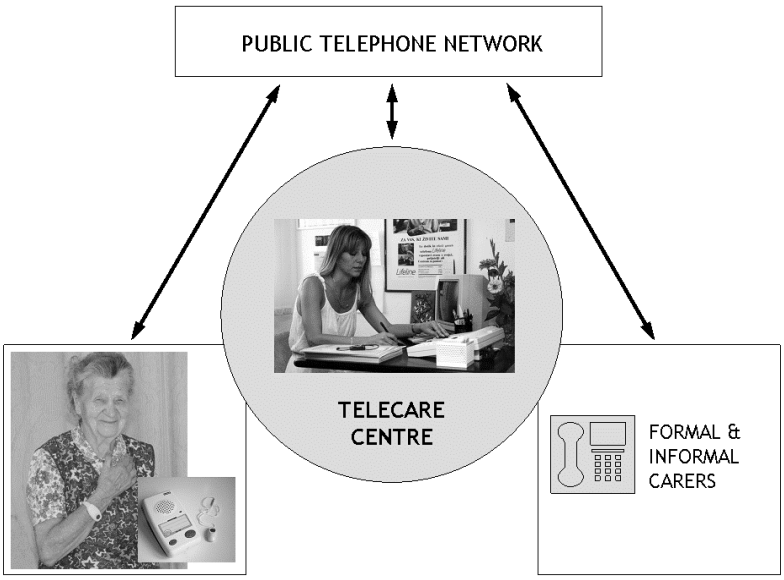

Figure 3. Block diagram of a personal response system based on a public telephone network. The system serves clients with carephones as well as others calling the centre using ordinary telephones. A control centre operator processes a call and arranges suitable help.

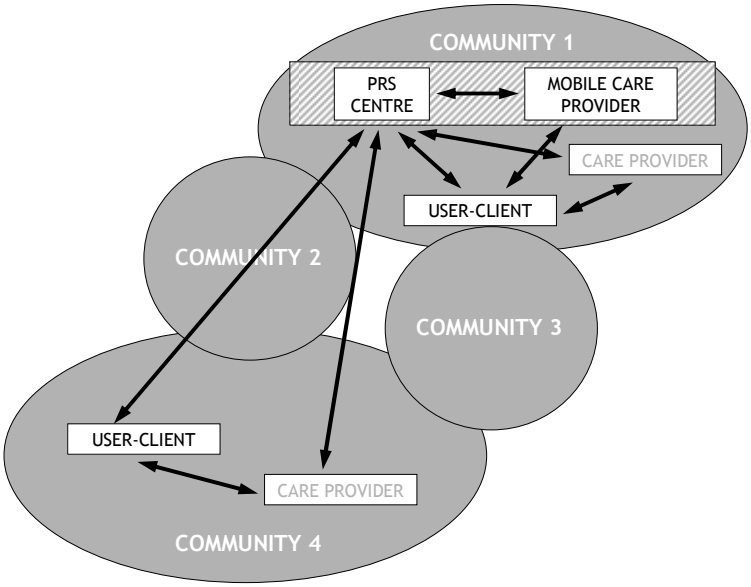

Figure 4. Organisational model of care providing in different areas. LEGEND: PRS = Personal Response System.

Telecare in the future

The majority of PRSs currently operating around the world are of the first and the second generation. They are limited by the need for the user to take some action (normally pushing a button) in order to call for assistance. Only by this means can contact with a response centre be established.

A common phenomenon, however, is one where the user is unwilling to take such action for a complex range of reasons (5,6). These include the user thinking that the condition (such as pain, breathlessness, dizziness or bleeding) will cease or the user being unwilling to disturb others (whether staff at the response centre or someone who would, as a consequence of the call, visit their home).

New systems are, however, being developed which can automatically monitor an older person's well-being (8). This means that, for many situations, the response centre can be alerted automatically if problems arise (such as the older person falling or becoming inactive). Such systems, in incorporating greater inter-activity, are being described as 'second generation'. Insofar as they increasingly permit the provision of care at home the services associated with them can be embraced by the broader term "telecare".

The use of different sensor devices alongside carephones now means, however, that such they can offer what has been described as a "dynamic method of monitoring and detecting medical, social and environmental problems" (16,17).

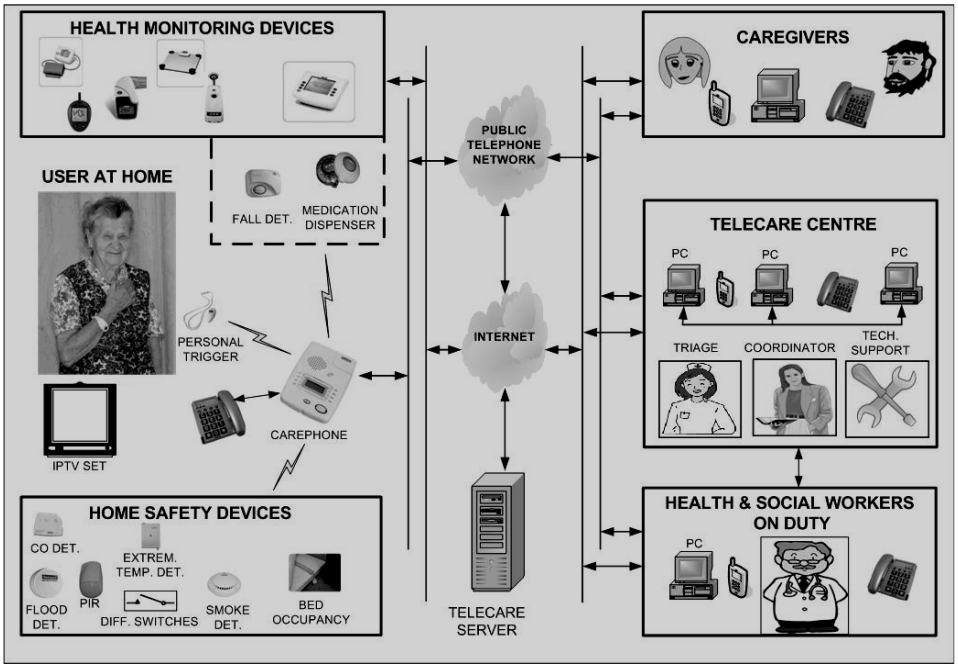

Figure 5. A general model of a telecare system through which carers could respond to the user's wellbeing needs.

But sensors alone are not enough if the needs of growing numbers of frail older people are to be met. The systems within which they operate must be able to both respond to certain conditions or circumstances (the user falling, low dwelling temperature, etc.) and to recognise and remember the user's normal pattern of living. Any significant deviation from that normal pattern can then be recognised and the response centre can contact the user to establish if there is a problem. Such intelligent

systems (Figure 5) mean speedier interventions in the event of medical or other emergencies, a reduction in care costs, and significant psycho-social benefits for users.

CASE STUDY: THE SLOVENE EXPERIENCE - THE "LIFELINE" TELECARE SERVICE FOR OLDER PEOPLE

Slovenia and the older population

Slovenia, as a new independent state with 2 million inhabitants, has a moderate living standard. The population is getting older. About 13% (220.000) are aged 65 years and over. Projections show that there will be another 100.000 people joining them within the next 20 years. The increasing number of older people presents a challenge to the system of social and health care. Only 3.8% of older people live in care homes or other institutions, but a disproportionately high amount of money is spent for their social and medical care. Institutions are owned by the government. This means that there are considerable costs to the government as residents cover only 41% of them. Government policy, however tends to restrict spending on social and medical benefits and reduced investment in institutional care is planned. As a consequence investment in new care homes is insufficient to cover growing needs. This is resulting in long waiting lists (and over 2 years waiting time). Government plans to 2005 are to provide only 1000 new beds in homes while over 3.000 are currently required.

The situation suggests that the predominant model of institutional care currently in place should be complemented by alternative solutions such as home-based care. However, while there is some effort being given to keeping people in their own home by providing a range of domiciliary services, the level of home based care differs from region to region. The services in question are organised and co-ordinated by local social welfare and medical staff.

Personal response systems in Slovenia

A telecare system called Lifeline network already exists in Slovenia (9,10,11,12). There are currently two response centres based at and administered by homes for older people. The first centre was established in Ljubljana in 1992. Lifeline equipment manufactured in United Kingdom was installed. Clients were recruited randomly and equipped with Lifeline carephones. Currently the system is used by 100 older and disabled persons on a revolving system. The response centre recruits formal or informal carers.

Over a period of 6 years users have made 20.000 calls using the Lifeline carephones. Of those calls, 1.8% was emergency calls for a medical assistance. In the same period almost the same number of calls to the centre was made by people using ordinary telephones. All carephone users reported positive psychological effects, this having been confirmed in an evaluation (13).

All response centre clients pay a monthly monitoring fee. Carephones can be leased from the response centres for what the clients are charged additionally. Service charges vary. The amount charged depends on the financial resources of the older person and the particular range of services he/she receives. Services charges vary from nothing to over 18 Euros a month. A carephone purchased from a local distributor costs up to 650 Euros. Two health insurance companies offer carephones through their health insurance plans.

Lifeline programme – Personal response system implementation

Based on the Ljubljana Lifeline network experience a national plan for the dissemination of the system was prepared. A part of it was adopted also in the government programmes on social care of older people in Slovenia (14,15). A concept of a network consisting of several regional response centres was accepted to meet needs of 30.000 potential users. The reasons for a decentralised system were:

1. the traditional regional distribution of Slovenia's population;
2. the national preference for decentralised systems;
3. organisational reasons that suggest that help organised and co-ordinated very locally improved co-ordination among service providers; and
4. positive experiences of similar provision in other countries.

Some regions have already prepared their local programmes in collaboration with their initiative group and local initiative boards. The most important issues studied in the programmes have been the:

1. potential management and administration of a response centre;
2. needs for domiciliary care in the region;
3. availability of carer services in the region; and
4. attitude of local politicians and professionals towards the initiative

It is believed that the implementation of the programme would have manifold positive effects in the communities. These include:

1. frail people living alone in their own homes being provided with sufficient support to stay there instead of being institutionalised;
2. extended and improved exchange of information between those being cared and those who care in a region;
3. better co-ordination of care provided by professional workers and/or volunteers; and
4. more economical spending of government funds to achieve agreed social welfare and medical standards.

At the current stage support for the introduction of a Lifeline programme at a national level is mostly moral and verbal. Most politicians being responsible for advances in health and social care sectors agree that the proposed programme has substantial merits and is therefore important for Slovenia. Nevertheless the programme has not, as yet, been systematically supported. However, some end-users would accept the programme if it is paid for by social and health insurance. Two health insurance agencies have included the service into their optional insurance schemes.

Obstacles to a dissemination process

Technology transfer related problems

The Lifeline community response system is a new technology in Slovene society. Having a different system of social welfare and health care from that in United Kingdom there has been a problem of technology transfer. Consequently, Lifeline as a technical innovation has not yet fully been accepted (11).

Lack of cooperation

Successful implementation of the Lifeline system demands co-operation, communication and interaction between politicians, professional bodies and individuals. Waiting for the

other party to make the first move has characterised behaviour in many regions. There has been, furthermore, a historical legacy of non co-operation between professionals. Additionally, the reorganisation of municipalities into tiny local communities has almost precluded regional initiatives. At all levels, however, there has been moral support for the implementation of the system.

Lack of funds

Although an initial capital investment in any new care network is required, the resulting service would be expected to enable considerable savings on national residential care costs. To introduce services Slovenia would need a system that would enable potential providers to develop their services and potential user to get services through different insurance systems or through a welfare system. The law on compulsory long-term care assurance is a hope for all interested, but it has been preparation since 2004 without a promise to be ready in few years. So providers of telecare and potential users in Slovenia have to use other means and take other ways. The government is willing to cover 30% of the response centre infrastructure costs. Some local communities subsidize telecare services for their locals and give some funds for purchasing of carephones, workforce costs and the response centre facilities.

Conclusion

The question now is not whether the telecare system will be implemented in Slovenia nationally, but rather, how long will it take to disseminate the programme throughout the country?

EXERCISES

Task 1

Demonstration of telecare system operation

1. Organize demonstration (a telecare centre could be outside your country!)
2. Demonstrate how system operates making calls to a telecare centres initiated by different trigger devices.
3. Each student should imitate a telecare user making a call to the telecare centre.

Task 2

Discuss in the group the experiences you learnt.

Task 3

Answer the following questions:

1. Do similar applications and services exist in your country?
2. If YES, how are they accepted by politicians, professionals, users?
3. If YES, how do they fit within frameworks of healthcare and/or social welfare?
4. If NO, is there a need for such systems? Why do you consider that there is or is not a need?
5. If NO, are such solutions known to professionals who may facilitate their introduction to your country?

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RECOMMENDED READINGS

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