Using telehealth to monitor patients remotely:
an RCN guide on using technology to complement nursing practice
For information
The term health care practitioner is used throughout this document to include all practitioners who deliver health care services across health and social care settings: clinicians, nurse practitioners, registered nurses, health care support workers.

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Patients and health care providers have been communicating remotely for decades. Telegrams, post and radio communications are early examples of how guidance, advice and health care have been delivered quickly over a distance. Telehealth is a contemporary approach that involves using a digital network to provide automated monitoring and care delivery to a patient who is in a different physical location to the health care professional providing treatment. Remote patient monitoring can range from simple communications such as emails sent between patients and providers, to complex procedures such as remote surgery or diagnosis via video conferencing (Wooton & Craig, 1999).

All tele systems involve the use and transmission of information between people at a distance using electronic technology. The most common technological methods used to monitor care remotely include the use of the telephone, video conferencing and home monitoring devices. For example, patients with diabetes are able to transmit their blood glucose levels to their nurse or doctor via a telephone line or mobile device from their location.

The language and terminology used in telehealth across health and social care professions is both varied and specific, often determined by the workplace and the user. This is acknowledged in the glossary, which provides the range of definitions used.

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2. Your guide to using telehealth in health care

What telehealth is not
Telehealth is not a new technology or branch of medicine, nor is it the only solution to delivering health services. Equally, telehealth is not a substitute for clinical consultation, but should complement existing health care where face-to-face interaction does not make social, clinical or economic sense.

Types of remote monitoring
Remote monitoring includes:
- interaction between the client and the expert
- information being transmitted such as emails, text messages or web-chat
- a clinician available to interpret and respond to information.

The type of interaction where the patient seeks advice, diagnosis and or treatment from the health care expert involves three broad areas.

Technology at the point of care: hospital or primary care emergency centre
This takes place either in a hospital or primary care emergency centre. It refers to the use of mobile devices that can be taken to the patient/service user's bedside to facilitate:
- video links
- the transfer of medical data and/or record interaction with a health professional. For example, using clinical assistant software to access the most up-to-date patient/service user records.

Technology at the point of care: home
This refers to the use of monitors/devices to collect and monitor the vital signs of a patient with a known health condition such as chronic obstructive pulmonary disease (COPD). A range of devices can be used to collect the patient’s vital signs such as blood pressure cuff, pulse oximeter, weighing scales, peak flow meter, glucometer etc. This information is then transmitted via a standard telephone connection or Bluetooth/GPRS device (see figure 1).

Figure 1: home monitoring

Copyright Tunstall, 2011
Technology at a distance

This is the process of remote monitoring using the approaches described above and incorporating the use of telephone, video conferencing and home monitoring devices. For example, a minor injury nurse discusses a patient’s assessment and x-ray result with an orthopaedic consultant remotely using video conferencing facilities (see figure 2).

Figure 2: video conferencing

This is an example of video conferencing. Copyright Scottish Centre for Telehealth & Telecare (SCTT)
Pre-recorded data

Pre-recorded health data involves the exchange of information that is already recorded and stored before being forwarded on to another person (Della Mea, 2005). This approach is useful because the person recording and the person receiving do not need to do this simultaneously. This method has proved useful in the management of hospital waiting lists following initial assessments.

There are a variety of types of pre-recorded information that can be stored and forwarded. These include:

- audio eg ultrasound recordings
- data and text eg electronic health record, electrocardiographm (ECG)
- still images eg dermatological conditions and x-rays
- moving images eg video.

Real time data

Real time data involves the exchange of information between two or more parties at the same moment in time (Harnett, 2006). Pre-recorded information can also be used to facilitate discussion or consultation. Video conferencing and the telephone are good examples of real time data transfer.

Seven essential components for remote monitoring

The seven essential components of remote monitoring are:

1. distance
2. type of data. For example, pre-recorded or live
3. agreed criteria for type and range of data to be recorded
4. telecommunication network
5. receiver of information
6. ability of experts to interpret the data
7. agreed response protocol.

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4. Benefits of remote monitoring

Remote monitoring is a contemporary way to deliver fast efficient health care to a large population of patients with specific long-term conditions. It offers the potential to help the NHS deliver a range of clinical services more efficiently and effectively, and manage increasing demands on services.

Several studies have shown that it reduces travel time for both patients and health professionals. It reduces waiting times and hospital admissions, patients can receive a quicker diagnosis, and the patient experience is extremely positive (NHS North Yorkshire and York, 2011; Darkins et al, 2008).

It is important to add that, for some patients, remote monitoring provides a service that might not have otherwise been available (Scottish Government, 2009; DH, 2011).
5. Designing a remote monitoring service: guidance for leaders and managers

Building on existing services

Introducing telehealth to clinical practice is not about replacing existing services, but instead using technology to enhance, improve access, triage and offer a wider range of choice in the services provided for patient care (RCN, 2011).

Service redesign to include telehealth is one approach to improving clinical outcomes and efficiency in the NHS. The key to a successful project redesign is about using existing resources and keeping the design simple. Scotland Telecare provides some good practice examples (www.jitscotland.org.uk/publications-1/telecare).

Finding a place to start

Asking the right questions to determine the sort of remote monitoring service you want is vital. You can also look at the RCN’s eHealth a video facilitation tool: www.rcnhca.org.uk/ehealth

• Determine what it is you wish to monitor? And why?
• How are you monitoring the patient’s condition at present? What works for this individual and patient population?
• Keep it simple.
• Look for good practice examples, visit and talk with them.
• The type of product to use for monitoring is essential – will it meet all of your and the patient’s needs?
• Cost/budget.

• Number of patients/service users involved.
• Will this solution involve carers? What are their requirements
• Will this solution involve social care staff?
• Can the infrastructure support it?

Who to involve?

• Patient, carer and user groups.
• NHS management or other management structure.
• IT (in-house).
• External company – if using home monitoring devices or computer systems to gather and analyse data.

Type of technology

• Mobile device with peripheral products eg monitor and BP cuff.
• Mobile phone application.
• Telephone.
• Computers.
• Email.
• Camera/video camera.
• Implantable device.
• Wearable sensors.
• Wireless sensors.
• Interoperability of equipment between NHS/company/patient’s home.

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Principles of service redesign

• Clinically-led and supported by relevant departments/support services.
• Involve all stakeholders (i.e. clinical staff, senior management, patients and IT) to determine how success is defined.
• Use the patient’s journey or pathway as a template to explore improvements in their experience and clinical outcomes.
• Consider alternative evidence-based approaches to care delivery (i.e. remote monitoring).
• Use the media channels that work best for the patient, and the technology the patient has available to them.

Clinical requirements: important points to consider

• When to use pre-recorded or real time exchange of information, i.e. the benefits to the patient and health professional.
• Hold patients forums or conduct patient surveys to evaluate what they would want from this kind of service.
• Education of the patient to use equipment.
• Compression and storage issues – take advice from your IT support about whether you have equipment to capture and display information at each site, including the patient/service’s home.
• Telecommunications network to transmit and receive information between sites.
• Installation, maintenance and repair of equipment.
• Interoperability of equipment between NHS/company/patient’s home.
• Any cost to the patient?

Five important steps in redesign

1. Getting started: define scope; set objectives; set terms of reference; build team; and develop communication strategies.
2. Current situation: map existing pathways; analyse current processes; identify best practice; assess needs of customer and service provider; and identify unmet needs.
3. Visioning: create new concepts; seek novel solutions; design new process; define infrastructure changes.
4. Piloting: develop implementation plan; develop support mechanisms for implementation; disseminate new concepts and processes; review the pilot and respond to feedback.
5. Implementation: roll out innovations; provide support; monitor benefits and provide feedback; sustain benefits. (NHS Scotland, 2011)
What makes a successful telehealth monitoring program?

- Clinical buy-in and enthusiasm.
- Patient involvement.
- An ambitious implementation plan.
- Good leadership and management.
- Technology is reliable, compatible and cost effective.
- Equipment is simple and easy-to-use with intelligent software to flag early warning signs.
- Technical support is essential to ensure initiative is sustainable. (Audit Scotland, 2011)

Privacy and security

The secure transfer, access and storage of health care data is essential. This must be a key concern when redesigning services (Kara, 2001). Ethical principles and standards should inform the governance and risk structures of the services (JIT, 2007).

Education and training

Education and training involves the patient, carer and health professional in the following broad areas:

- generic understanding of the rationale for the use of this technology
- prepare patient and or carer to use equipment
- develop a knowledge and understanding of equipment
- professional guidance about information governance applies equally in tele-scenarios
- support competency/professional development of staff group.

Financial

- Cost-benefit analysis.
- Equipment.
- Set up costs.
- Education costs (staff and patients).
- Call costs.
- Ongoing maintenance.
6. Evaluating and measuring success

Evaluating and measuring the success of your remote monitoring programme can range from being simple to complex, depending on the needs of your health care provider. There is extensive literature on the effectiveness of small scale pilots looking at ideas for using remote monitoring across all areas of health care and disciplines. Policy and guidance is now moving in the direction of large scale evaluation using action research to ensure that changes are introduced and measured with a view to sustaining the lifetime of the intervention (Tunstall, 2010). Patient satisfaction with remote monitoring and using technology to access health assessment, treatment and follow up is extremely positive across the UK (NHS North Yorkshire and York, 2011; Darkins et al, 2008).

Research and evaluation to date has focused on the following broad areas:

- user experience (lived experience; usability and acceptability of the technology)
- type of intervention and its application
- technology
- comparisons between health care practitioners, doctors and unqualified staff
- sharing expertise (diagnosis, disease aetiology, treatment, options and outcomes)
- cost effectiveness.
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Remote monitoring and using *tele* systems are just two of the many options available to health providers to complement and enhance the delivery of existing services. The decision to adopt new technologies and *tele* systems should involve all relevant health personnel and managers to ensure effective buy-in and roll-out of the approach. The key to a successful *tele* or remote monitoring project is to use existing resources and to keep the design simple. Strategies and processes to support the development and commitment from staff are vital to the success of remote monitoring, together with regular review and dissemination of findings to support evidence-based practice.
8. References


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Joint Improvement Team and Scottish Centre for Telehealth (2010) *A strategy for education and training 2010-2012*, Edinburgh: JIT/SCT.


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