Healthcare without walls
A framework for delivering telehealth at scale

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Project Researcher - Eleanor Winpenny
Eleanor studied Natural Sciences at Clare College, Cambridge University, graduating in 2006. She then went on to complete a PhD in Developmental Neuroscience at Cambridge, looking at the growth of new neurones in the brains of mice. Eleanor has taken a step away from medical research and into the world of healthcare policy and delivery, focussing on how improvements and efficiencies in health and care provision can improve patient outcomes.

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‘HealthCare without Walls: A framework for delivering telehealth at scale’ is an independent report designed to inform the future NHS strategy for telehealth.

This idea developed from our recent report ‘Fixing NHS IT: A plan of action for a new government’ in which we identified that the NHS had yet to exploit telehealth and other related tele-technologies well.

In this report, we look at the rapidly developing problem for the NHS in treating people with long term conditions and how this can be improved by telehealth technology. International evidence tells us that telehealth has a key role to play in systemic improvements to healthcare by reducing unplanned hospital admissions, making best use of scarce clinical resources and empowering individual patients. This report makes recommendations for government, the NHS and industry more broadly.

Our work reflects on interviews with over 60 varied organisations from governmental, NHS and council stakeholders to professional bodies and charities as well as industry. 2020health would like to thank all those who engaged with us during the work, whether for interviews, workshops or through our on-line campaign. This report would not have been possible without their expertise and insight.

This study was made possible through unrestricted, educational grants from Accenture, BT, iSoft, Medtronic, Pfizer Health Solutions, Tunstall, TPP and Vodafone. 2020health are very much indebted to them for their support.

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One of the greatest strategic issues facing our NHS is how we manage patients with long term conditions – such as chronic obstructive pulmonary disease, heart failure and diabetes. The NHS already spends 70% of its budget on the 15m people who have one or more of these conditions. With our ageing population, patient numbers are expected to grow by 23% over the next 20 years.

Our current approach to the delivery of care to people with long term conditions (LTCs) is unsustainable both in terms of cost and quality of care. Moreover, with our national finances now severely constrained for the foreseeable future, the current, largely reactive approach to chronic condition management is no longer appropriate. The ever-rising demands for emergency visits to hospital, the many hand-overs from professional to professional, the inconsistency of home-care and the pressure on specialist clinicians all indicate that to go on in this way is in no one’s best interests – least of all the patients and their carers.

Elsewhere in the world, telehealth and related technologies are being used at scale to support patient care ‘at a distance’, especially for people with LTCs. Telehealth can and does transform these people’s lives, allowing patients to take more control of their own health. By monitoring the stability of the patients’ condition, proactive interventions can be made to prevent unnecessary emergency hospital admissions, optimise clinicians’ caseloads and hence scale back secondary care capacity.

Telehealth is not a single, uniform type of technology; rather it is a targeted approach appropriate to the individual’s needs, combining process, organisational and responsibility changes supported by monitoring and collaboration technologies, for example:

- for patients with complex or multiple conditions, who are already on a community matron caseload and are frequently hospitalised, telehealth services would be ‘full function’ and embedded into the care pathway. By this we mean interventional telehealth, where alerts built into the system use data from the patient to trigger interventions using remote technology, complemented by traditional visits / appointments, for better management of the condition – by and with the patient;

- for patients living with a lower level of disease, ‘simple telehealth’ with say mobile or call centre-based applications and services can prompt patients towards improved levels of compliance, for example around medication reminders and lifestyle recommendations.

Through a comprehensive redesign of care pathways, international and local evidence suggests that ‘full function’ telehealth can enable an incredible 40% reduction or more in the level of unplanned hospital admissions.

The Department of Health is running a large randomised control trial, the ‘Whole System Demonstrator programme’ with a view to gathering robust evidence and learning lessons for implementing telehealth at scale. There is an expectation that the programme will generate evidence for a convincing business and clinical case for telehealth during 2011.

Properly scaled up, the use of telehealth across the NHS could lead to up to £1 billion in annual savings with hundreds of thousands of patients’ lives improved significantly. However, despite many pilots and pockets of interest around the NHS, there is as yet no strategic drive for telehealth at scale.

The Coalition Agreement, the publication of the NHS White Paper “Equity and Excellence – Liberating the NHS” and the outcome of the 2010 Comprehensive Spending Review all signal vast changes to our NHS and public services. They point towards a smaller state, more devolved decision-making by the front-line, with people encouraged to take more responsibility for their own health and well-being.

In response to this rapidly changing environment, 2020health believed that a more proactive approach to telehealth was needed to galvanise the NHS into action. Based on a thorough analysis of the relevant evidence and of related organisational, delivery and technology factors - this report considers how best the NHS should now exploit the potential of telehealth.

In many ways, the White Paper creates the environment in which the demand for telehealth-enabled services can be fostered, for example:

- through personal health budgets, patients will see telehealth as a tool for better self-care – provided they are aware of it;

- local commissioning strategies require more coherent and coordinated strategy across public health, social care and NHS commissioning – telehealth can help as a cross-cutting technology, potentially relevant at all levels of the wellness/illness agenda;
• there are increasing numbers of clinicians including GPs who are interested in telehealth and will want to know where to find robust evidence. They will want to be able to commission the appropriate level of telehealth support according to the patient’s condition and levels of need;

• managed clinical networks could drive the uptake of telehealth and related technologies to drive care delivery improvements around specific conditions across wide communities;

• with hospitals facing pressures and penalties to avoid emergency readmissions within 30 days of discharge, acute trusts will increasingly look towards home-based community and social care services backed up by telehealth monitoring;

• private or social enterprises may take on whole pathways of care for specific patient populations with chronic diseases through an outcomes-based payment model, with telehealth as a key enabling technology.

All these are important stimulants to the market. Taken collectively, however, they are not enough for the market to scale up and make the impact it could. Indeed, whilst some current commissioning bodies (PCTs and Councils) are showing firm leadership in their approach to long term condition management using telehealth, many are citing the impending shift in power to the GP commissioning consortia as a reason for inertia.

On a wider basis, it is 2020health’s firm belief that the government will not achieve its vision for “a better NHS that...is less insular and fragmented, and works much better across boundaries...” without joined-up IT and telehealth technologies and processes. Telehealth should sit as a part of a nationally recommended suite of enablers that if integrated through local business change and service delivery, will underpin the transformation outlined in the NHS White Paper. This requires linking social care capacity to primary and secondary healthcare in the community, and aligning the relevant incentives and budgets.

With NHS savings of £20bn to achieve within the next three years, an ageing population increasingly living with ill health, and adult social care budgets under threat, this is an issue that requires firm strategic leadership from the Coalition to enable the NHS to deliver better care for less. It cannot rely on a hope that local communities will work it out for themselves. This would mean that the fractured, small, uncoordinated market that has emerged in the past few years perpetuates, and the benefits of scale, interoperability and cooperation are squandered.

In our opinion, a prevailing view that initiatives such as this can be left to the market to sort out will lead to a slower roll-out with much more duplication and higher costs instead of rapid efficiency savings. Our report therefore recommends specific action by the Coalition Government and others to create the right conditions for an innovative, telehealth market to thrive and be of sufficient scale to make a genuine impact. Key amongst the actions that only government can take will be to align the incentives and tariffs that will encourage local NHS commissioners and providers to embrace telehealth.

Detailed across our report are also a series of recommendations to other key stakeholders, in particular:

• the Local NHS - the local organisations who will drive the telehealth-enabled services that their patients require, using telehealth as a catalyst for whole system redesign around the treatment of long term conditions.

• the National NHS – the new National Commissioning Board and its support organisations will need to provide a crucial strategic framework for local action.

• industry - large scale exploitation of telehealth will need a vibrant supplier community, inspired by the potential of telehealth and incentivised to invest, take risks and become fully engaged. They will need to work together in partnerships to deliver end-to-end innovative telehealth services.

Table 1.1 overleaf brings together the key recommendations made across our report for each of these four stakeholder groups.

Implemented effectively, telehealth can improve the patient’s quality of life by reducing the need for hospital visits and admissions through better self-care in the home setting. Deployed at scale, telehealth can lead to lower acute utilisation through reduced hospital admissions and so help to alleviate pressure on long term costs. This report sets out a compelling framework to realise these benefits.

If we get this right now, we can improve the quality and affordability of patient care around the management of long term conditions for the next generation.
### Table 1.1 - Summary of recommendations
(The references relate to specific recommendations in the sections within the main body of the report)

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<thead>
<tr>
<th>Theme - by report section</th>
<th>Local NHS</th>
<th>National Commissioners</th>
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<td><strong>3. Policy the need for action</strong> - the NHS White Paper; the role of a consumer market</td>
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<td><strong>4. Business Case &amp; Commissioning</strong> - the case for telehealth; how it should be commissioned and funded</td>
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**3. Policy the need for action**

**3.C** Ensure the Whole System Demonstrator (WSD) results are acted upon across the commissioning spectrum, by demanding local action plans exploit the evident benefits of large scale telehealth-enabled programmes and demonstrators e.g. “every new individual LTC care plan should consider the role of telehealth”

**3.B** Provide evident policy commitment, leadership and guidance for telehealth on the back of the WSD results

**3.A** Work towards a pricing model applicable to a consumer market, particularly for level 1 and level 2 LTC patients in the Kaiser ‘pyramid of need’ model

**4. Business Case & Commissioning**

**4.C** (Providers) Embed telehealth capabilities into community-based discharge services, as part of TCS developments

**4.E** (Commissioners) Develop business cases based around best practice and prioritised based on local needs — adopting a robust approach to patient population risk stratification

**4.H** Prioritise key telehealth-enabled services into an easy to use catalogue from which local commissioners can ‘order’

**4.A** Rapid publication of WSD results

**4.B** Gather better evidence around the value of low cost, high volume telehealth services for level 1 and level 2 LTC patients in the Kaiser ‘pyramid of need’ model, including the impact of improved self-care and well-being

**4.G** On the back of WSD results and other relevant evidence, prepare a full cost-benefit analysis around the national potential from scaling up telehealth

**4.K** Amend tariffs / incentivisation schemes to recognise and reward telehealth- and teleconsultation-enabled services on a consistent basis across the NHS based on applicable outcome measures

**4.L** When fully available, ensure personal health budgets can be applied to telehealth-enabled services

**4.D** Industry players/partnerships need to be capable of providing cost effective end-to-end system and service solutions to match the emergent commissioning requirements

**4.F** Adopt innovative commercial approaches to large scale delivery to achieve in-year benefits for the NHS through collaborative partnerships

**4.I** Embrace the opportunity to address different diseases and to move down the Kaiser pyramid of need – through different technology and communication approaches more appropriate for lower cost, higher volume services
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<td>5. Care Redesign - telehealth as an enabler of care redesign; the patient experience; and clinical engagement</td>
<td>5.A Recognise fully the scale and costs of change management around implementing new telehealth-enabled services - and the capacity needed to operationalise the service 5.C Design integrated care pathways to take full advantage of relevant telehealth solutions - with patient groups and all clinical stakeholders involved - and using the skills and experience of industry partners 5.D Involve patients in the selection of technology for the home 5.H Create improved public education around telehealth and its ability to enable greater self-care - engaging closely with key patient stakeholder groups and associations – including to the new health and well-being boards once established 5.G As the National Commissioning Board is established, ensure one of its senior clinical directors has national advocacy responsibility for telehealth-enabled services and those of related technologies</td>
<td>5.E Create improved public education around telehealth and its ability to enable greater self-care – engaging closely with key patient stakeholder groups and associations – including to the new health and well-being boards once established</td>
<td>5.B Provide evident policy support for care plans and pathways which interoperate across all sectors, reflecting an ‘integrated system behaviour’ 5.F Reinforce the choice agenda by ensuring that patients are made aware of all the options available in the management of their long term conditions</td>
<td>5.E Create commercial and delivery models that can provide scalable deployment and triage services</td>
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<td>6. Service Delivery - a workforce enabled for telehealth; service delivery models; and governance frameworks</td>
<td>6.C Ensure adequate formal training and assessment of all telehealth and call centre staff, regardless of public or private provision 6.F Pursue models of telehealth delivery (based on national good practice) capable of scaling by adoption of layered and separable services – while fitting the local need and circumstances</td>
<td>6.D Replicate successful large scale programme service delivery around telehealth-enabled services in a set of framework standards through CQC / NICE / SCIE 6.M Create clear clinical and information governance frameworks around telehealth services so that local NHS organisations do not have to start from scratch each time a telehealth-related project is launched</td>
<td>6.A Ensure telehealth / IT – and related change management and pathway redesign skills - are appropriately built into clinical education at undergraduate and CPD levels 6.B Develop and accredit core competencies for the workforce that can be used to demonstrate providers have the capability to deliver high quality telehealth enabled care 6.G Corral relevant stakeholders together with industry to create a viable telehealth service code of practice 6.I Address need for CQC ‘light touch’ accreditation of all telehealth service providers 6.K Establish information governance guidelines for telehealth systems at home which balance security considerations with usability needs for older people</td>
<td>6.L Work collectively with customers and other stakeholders around the practical implementation of the Medical Device Directive for telehealth products and services</td>
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<td>7. Enabling Scale - through sharing of expertise; better procurement; improved industry readiness; adoption of interoperability standards</td>
<td>7.G In selecting telehealth technology products, ensure the monitoring capabilities provide a platform for further growth in size and scope as the in-home technology evolves</td>
<td>7.A As the WSD evaluation publishes its reports, consider how best practice may be shared and in what areas template deliverables should be shared – e.g. commissioning models, project toolkits, pathway redesign templates, model business cases, template service specifications</td>
<td>7.C Undertake continuous improvement of the telehealth, telecare and telecoaching procurement framework over time as driven by NHS needs and market maturity – towards mandating minimum service, interoperability and technical standards – as an enabler for lower priced products and services and to enable ready comparisons between offerings</td>
<td>7.I Offer rapid innovation around the technology to support large scale service delivery through improved chips, implants, intelligent software combinations</td>
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<td>7.K Where appropriate, consider innovative, low cost ways of delivering telehealth at scale</td>
<td>7.F Where feasible, use shared infrastructure, procurement/service models, and common standards – to avoid lock in to proprietary technology</td>
<td>7.B Where appropriate, consider innovative, low cost ways of delivering telehealth at scale</td>
<td>7.O Embrace and roll-out national interoperability standards and the ITK, enabling integration between telehealth and patient records (both telehealth and patient record suppliers)</td>
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<td>7.P Where feasible, use shared infrastructure, procurement/service models, and common standards – to avoid lock in to proprietary technology</td>
<td>7.E Pool and share expertise in telehealth commissioning, particularly during the transition phase as local commissioning responsibility is transferred from PCTs to GP consortia</td>
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*Table 1.1 - Summary of recommendations (continued)*

(The references relate to specific recommendations in the sections within the main body of the report)
2 Introduction

2.1 Aim
The aim of this study is to consider how best the NHS should exploit the transformational potential of telehealth, based on best practice in the UK and elsewhere, and to recommend what action the Coalition Government should take. We also give guidance on key issues such as the investment case; on how the NHS can exploit the technology and adapt their care processes; and how industry can best enable more widespread adoption.

2.2 Background
The White Paper “Equity and Excellence – Liberating the NHS” charts out a course to transform the NHS around patient outcomes and local commissioning. 2020health sees IT and in particular ‘tele’ technologies – by which we mean the use of technology to support remote delivery of patient care – as an indispensable prerequisite to meeting the aims of the White Paper. It can lead to the delivery of services more focused around the patient or service user, with more efficient and effective use of scarce clinical resources, and much lower levels of admissions for patients with long term conditions (LTCs). The promise of these technologies has been apparent for some time.

The tele-technologies include the following:

- ‘telehealth’ - remote capture / relay of physiological measurements from the home for clinical review & early intervention;
- ‘telecare’ – a range of alarms and sensors in the home to enable independent living, linked to a call centre;
- ‘teleconsultations’ - video consultations and routine surveillance appointments between clinicians and patients

While telecare is well established with a mature market and the teleconsultations market exhibits many of the conditions needed for national roll-out, huge decisions are faced on the other hand around exploiting telehealth better nationally. By enabling telehealth to scale, health outcomes can be radically improved within a whole system approach to care redesign. For this reason, telehealth has been the predominant focus of our report. Appendices A and B respectively provide supporting information, evidence and case studies around telecare and teleconsultations respectively. Appendix C provides other related examples of telehealth at scale.

We have also looked at the potential of ‘mHealth’ – the delivery of healthcare involving the use of mobile phone technology – as an enabler of telehealth. Most of the focus of this report is around enabling telehealth to scale. Since call-centre health services such as NHS Direct are now relatively mature, we have not considered them in this report other than for their potential role in supporting telehealth services.

Table 2.1 provides a summary of the different tele-technologies we have considered, describing their purposes, use examples, a summary of the market state and key issues / prerequisites.
### Table 2.1 – Summary of key tele-technologies addressed in this report

<table>
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<th>Purpose</th>
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<th>Telehealth</th>
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| Enables continued independent living through a system of sensors and alerts in the home. These are connected to a central monitoring centre or can be used to alert carers or relatives. | Allows patients to monitor their own health using electronic devices in the home. This enables patients with a long term health condition to self-manage. The device is installed in the patient’s home and typically connected to their telephone line or broadband service so that data collected can be transferred to a central monitoring centre. Readings are often taken daily but the frequency can vary and is determined by consultation between patient and clinician. | Teleconsultation technology allows patients or clinicians to communicate with remote clinicians through a video conference link. This improvement in access to expertise improves equality, access and clinical outcomes through:  
- facilitating rapid consultation;  
- overcoming challenges of distance;  
- reducing unnecessary travel;  
- accessing managed clinical networks;  
- delivering education and training for staff and the citizen.  
In the long term, and irrespective of reimbursement, the aim is a model that matches up supply and demand, e.g. ‘ask the next available expert’ mode. |

| Examples | Initially developed for use by the elderly and infirm. Increasingly extended to other user groups e.g. dementia, learning disabilities. Examples of telecare technology include:  
- sensors that can detect floods, fire, gas leaks, falls, intruders, property exit and bed/chair occupancy,  
- Personal satellite locators  
- Door monitors  
- Lifestyle monitoring systems  
- Personal injury alarms | The patient uses the system and accompanying device (e.g. digital thermometer, weighing scales, blood pressure cuff, oxygen reader, pulse reader) to take readings such as blood pressure, oxygen levels, weight and temperature, which are sent automatically to a central monitoring centre. If the readings show any signs of the patient’s condition deteriorating, a doctor or nurse is alerted to contact the patient. Early intervention, to change medication doses for example, can then prevent an exacerbation. | There are a range of examples where teleconsultation is of major benefit:  
- where patients are limited in their ability to travel – e.g. in prisons (Airedale) or nursing homes;  
- where specialist acute opinion is needed urgently for medical diagnosis but may not be readily physically available, such as out of hours stroke care, burns management;  
- where specialists cover a wide geographic area, where a combination of teleconsultation and telecoaching (e.g. of an attending primary care practitioner) may be appropriate;  
- patient convenience (e.g. consultations in mental health). |
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<td>With the assistance of government technology grants and social care funding streams, local councils have been actively deploying telecare for some years and there are now 1.6m service users across the country. Although the majority of devices are pendant alarms, around 300,000 of these installations are sensor-based systems using personal and environmental monitors.</td>
<td>While there are over 100 telehealth projects around the NHS, there are estimated to be less than 10,000 patient units deployed. The majority of these projects are small-scale, many are known not to be well integrated into healthcare systems. The largest projects fall under the Whole System Demonstrator (WSD) programme discussed in Section 3.</td>
<td>Experience from Scotland is that it is clinical networks which have most effectively driven the uptake. In paediatrics for example, teleconsultations enable scarce specialist resources to provide a safe and effective remote service which minimises patient inconvenience. Clinicians are increasingly comfortable with the technology because of its wide use in clinical education.</td>
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<td>The Department of Health established and funded three large WSDs of telehealth and telecare, with a national evaluation due to be published in spring 2011 (see Section 3)</td>
<td>As well as the ‘full function’ telehealth model that the WSD projects have pursued, there is also a developing view of simple to use, low cost solutions for less complex conditions, for example for those patients in levels 1 and 2 of the Kaiser ‘pyramid of care’ model. The solutions themselves may involve high levels of automation using more pervasive platforms and infrastructure (such as Smartphones and TV set-top boxes), enabling rapid roll-out.</td>
<td>The level of video quality required will vary according to the clinical need. To be effective during teleconsultations, clinicians must have access to a shared electronic patient record. Depending on the consultation, access may also be required to: Picture Archiving and Communications (PACS) image sharing capabilities and remote diagnostics (e.g. ECG).</td>
<td></td>
</tr>
</tbody>
</table>
Other countries and health systems (notably Spain, Italy, Japan, the US - Veteran Health Affairs and New South Wales) have developed a more strategic approach to this area, leading to significantly greater levels of adoption in some cases. They have followed more radical approaches with telehealth being part of a full service redesign or used to support preventive healthcare and self-care.

In this regard, the EC sent a Communication in 2008 to European organisations including the European Parliament on telemedicine (aka ‘telehealth’) for the benefit of patients, healthcare systems and society (summarised in Appendix D). It concluded that:

“Telemedicine can improve access to specialised care in areas suffering from a shortage of expertise, or in areas where access to healthcare is difficult…

Telemedicine will only realise its full potential if Member States engage actively in integrating it into their health systems”.

2.3 Approach

Our work took place over a fascinating and intense four month period until November 2010 and involved the following broad stages:

1. literature review - a wide ranging review of the best available national and international evidence and practice around the subject;

2. interviews - with representatives from those groups that might be expected to have an informed view on the issues: clinicians, managers and project leads from current and planned telehealth programmes; SHA innovation leads and CIOs; the Department of Health; patient and clinical groups’ representatives (noting that regrettably we found it difficult to get meaningful engagement with most patient groups); suppliers of point solutions and systems integrators; and other independent experts and opinion formers in the UK and internationally. In total, we conducted about 60 interviews with relevant stakeholders and industry specialists (see Appendix E);

3. on-line engagement – 2020 health contracted with a specialist consultancy Clever Together LLP to run an on-line ‘crowd sourcing’ exercise to tap the wisdom and insights of the very wide range of stakeholders involved with telehealth. This exercise proved most informative and we have added anonymised quotes from participants throughout this report to add colour to our findings and recommendations (more detail is given in Appendix F).

4. three workshops – with leading European representatives, industry and customer stakeholders – were used to look at the themes, emerging findings and recommendations.

The timing of the report was such that the full implications of the NHS White Paper’s impacts and those of the 2010 Comprehensive Spending Review were only starting to become evident. It coincided with the first consultation stages associated with the White Paper, to which the government has yet to respond with the anticipated Health Bill. In particular, the associated programme of re-organisation and restructuring of health care commissioning and provision is just beginning, especially around the creation of GP commissioning consortia.

1. COM(2008) 689
2.4 This Report

Building on the recommendations of our earlier ‘Fixing NHS IT’ report (published in March 2010), the work has explored a number of key issues covered in the following sections of our report:

- **section 3: Policy context – the need for action:** national policy drivers including the NHS White Paper;

- **section 4: Commissioning and funding:** the evidence; investment, funding and reimbursement options and preferred recommendations;

- **section 5: Care redesign:** how telehealth can be moved beyond ‘pilot-itis’ towards mainstream care provision, including organisational change best practice, the patient experience and stakeholder engagement;

- **section 6: Service delivery:** alternative service models, education and training, legal and ethical considerations;

- **section 7: Enabling scale:** implications for national and local infrastructure (both public and NHS), and standards; integration with core patient record systems, at a national and local level; market readiness.

In addition there are several supporting appendices, including a glossary of terms (Appendix G).

In framing an action plan for national and local implementation, we have embedded our recommendations within each section. These have been categorised into four distinct groups to provide a cohesive framework for action:

- **local NHS** – to drive forward the changes enabled by telehealth that the local health community requires, taking best advantage of wider NHS capabilities and best practices;

- **commissioned (national)** – We envisage that the vast majority of telehealth services would be delivered on a localised basis although this should be facilitated by systematic sharing of best practice to avoid ‘reinvention of the wheel’. In this regard, commissioning is a powerful lever for driving change and cohesion. By using the crucial strategic role and authority of the new National Commissioning Board, capabilities and standards can be specified consistently to GP consortia that all NHS-approved providers must meet – retaining local decisions over the specific providers, technologies etc;

- **corporate (central)** – some central government action is needed to provide relevant policy support, deliver economies of scale for telehealth or related IT capabilities that need consistent design or implementation (“do once”), or to optimise NHS purchasing power and reduce purchasing overheads through using common procurement frameworks that NHS commissioners will commit to use;

- **industry** – working together to industrialise end-to-end processes, develop and promote appropriate standards, and create a vibrant market around innovative products and services.
This section places the policy around the need for telehealth services into context, introduces a framework for considering the levels of need for patients with long term conditions (LTCs) and outlines the Whole System Demonstrators that were established to gather robust evidence for the use of telehealth.

3.1 NHS White Paper
The NHS is being driven by ever growing demand from an ageing population and increasingly sophisticated, complex and costly treatments. While NHS funding has been ring fenced by government, the net effect will be flat or relatively reducing resource levels in the medium term. Consistent with wider government policies, the White Paper “Equity and Excellence – Liberating the NHS” sets out a future landscape involving the following changes of particular relevance to the subject of this report:

- a greater focus on outcomes and quality standards rather than process through the NHS Outcomes Framework;
- greater patient choice with “no decision about me without me”, including: the patient’s right to choose any provider, wherever relevant; encouragement for patients to take more responsibility for their care; much greater availability of information; control over their own care records; and increasing use of personal health budgets especially for those with long term conditions;
- freeing up existing NHS providers, with all in time becoming Foundation Trusts. More competition is envisaged around the principle of ‘any willing provider’. Moreover, acute providers will be expected to face financial penalties in the event of a patient being readmitted for emergency treatment within 30 days of discharge;
- an emphasis on clinician-led decision-making, especially in relation to the local commissioning of services through GP consortia;
- reduced management costs in the NHS, with SHA and PCT bodies being eliminated over time;
- local authorities taking on the function of joining up the commissioning of local NHS services, social care and health improvement - with the aim of coherent and coordinated local commissioning strategies across public health, social care and NHS commissioning, for example in relation to mental health or elderly care.

The government has also reiterated a vision for “a better NHS that...is less insular and fragmented, and works much better across boundaries...”. It is 2020health’s firm belief that the government will not achieve this vision nor the wider objectives of NHS reform without joined-up IT and telehealth technologies and processes. This requires linking social care capacity to primary and secondary healthcare in the community, and aligning the relevant incentives and budgets.

3.2 Long Term Conditions
Of paramount influence in future health and social care provision is the treatment of people with LTCs. The scale of the problem facing the UK is severe as the following statistics\(^2\) testify:

- 15.4 million people in England, or almost one in three of the population, have an LTC;
- three out of every five people aged over 60 in England have a LTC;
- due to the ageing population, the number of people in England with an LTC is set to rise by 23 percent over the next 25 years.
- five percent of patients with one or more LTCs account for 49 percent of all inpatient hospital bed days;
- patients with LTCs are intensive users of healthcare services. Those with LTCs account for 31 percent of the population, but use 52 percent of all GP appointments and 65 percent of all outpatient appointments;
- it is estimated that the treatment and care of those with LTCs accounts for 69 percent of the primary and acute care budget in England.

It is not just the elderly who are suffering from chronic disease. Many of the young obese could develop diabetes, heart disease, arthritis etc. in their 30’s. This will increase the burden even more and also reduce the effective workforce at the same time.

The huge challenge around the management and costs of LTCs is one facing all developing countries, and action is being considered at the highest levels in the EU. For example, as part of the current Belgian Presidency of the Council of the European Union, a Ministerial Conference on Innovative Approaches for Chronic Illnesses in Public Health and Healthcare systems was held in October 2010. A report is due to be tabled in December 2010. Furthermore as part of the European Commission’s “Innovation Union” announcement in October 2010, the EC announced an innovation partnership in the field of active and healthy ageing (see Appendix D).
A familiar model for NHS and social care organisations in the strategic planning for LTCs is the Kaiser ‘pyramid of care’ model, with three identified levels in ascending order of severity and complexity.

- **Level 1: Supported self care** - collaboratively helping individuals and their carers to develop the knowledge, skills and confidence to care for themselves and their condition effectively.

- **Level 2: Disease-specific care management** - providing people who have a complex single need or multiple conditions with responsive, specialist services using multi-disciplinary teams and disease-specific protocols and guidelines.

- **Level 3: Case management** - requires the identification of the very high intensity users of unplanned secondary care, with life limiting conditions. Care for these patients in the community is traditionally managed using a community matron or other professional using a case management approach, to anticipate, co-ordinate and join up health and social care.

“The recognition that face-to-face services are under significant pressure - even before you take into account the financial challenges of the years ahead - is reason enough to promote less resource intensive ways of delivering high quality evidence-based chronic disease management. The trick is deploying simple protocol driven care, mechanising it where possible BUT at the same time ensuring the design both empowers the patients who are able to take responsibility for their own health, recognising there are some patients and a spectrum of disease which does not lend itself to an assured positive outcome.”

Table 3.1 below illustrates the link between levels of patient or service user need (as defined in the ‘pyramid of care’ model) and emerging treatment approaches using telehealth and other technology-based approaches to complement more traditional approaches.

### Table 3.1 – Kaiser Pyramid of Care

<table>
<thead>
<tr>
<th>Level</th>
<th>‘Traditional’ approach</th>
<th>Additional features of technology-enabled approach</th>
</tr>
</thead>
</table>
| **1: Supported self care**   | Encouraging people to be active participants in their own care, living with and managing their conditions, to prevent complications, slow down deterioration and avoid getting further conditions. | Promotion of concept of ‘expert patient’, supported by:  
- use of consumer market devices in the home to assist the patient to improve their levels of wellness and monitor any disease trends  
- web-based remote health coaching to stimulate and sustain the adoption of health promoting behaviour  
- interactive educational programmes and information prescriptions – potentially via personalised content-rich information available through multiple channels (web, TV, YouView, mobile...)  
- self monitoring and electronic reporting for specific periods, e.g. titration medication regimes in newly diagnosed patients.  
  Basic Telecare providing 24hr support |
| **2: Disease-specific care management** | Multidisciplinary teams providing high quality evidence-based care through proactive management of care, following agreed protocols and pathways for managing specific diseases. | ‘Light touch’ remote mentoring and coaching to support improved self-care, e.g. telephone-based remote health coaching (e.g. “care coordinators”, “care navigators”) – use of motivational interviewing skills.  
“Simple telehealth” – e.g. limited levels of automated support adapted to personal needs, driven by rules engines and smart phone apps.  
Telecare packages of care |
| **3: Case management**       | Personalised care planning to address the individual’s whole needs, setting out who is responsible for what, including who sees and interacts with the patient record  
  Key worker (often a community matron) actively managing and joining up care for these people. Patients tend to have frequent, unplanned hospital admissions unless well managed. | “Full function” telehealth – involves redesigning the way care is delivered through proactive daily monitoring of the patient’s condition through telehealth leading to more effective management in the community, and reducing unplanned service utilisation, especially in hospital.  
The richer information provided through the systems enables better clinical decisions. Telecare packages of care |
Underlying such a layered framework is an important philosophical change with the patient being more in control of their own care rather than accepting a traditional view around “the doctor knows best”. A key factor in managing LTCs is in enabling the patient to make lifestyle choices which cannot be delivered by prescription. It also relies on a view that patient populations with chronic diseases should be stratified according to risk (ideally using predictive modelling tools that anticipate the future use of health services at both an individual and population level) and offered focused support commensurate with that risk.

The following illustrates a care redesign approach being taken to improve the management of long term conditions. This will form the basis for future use of telehealth and related technologies.

**Case Study 3.1 - Yorkshire & the Humber SHA “Care Planning”**

Care planning supports the “Better for less” programme and the QIPP agenda and is a service innovation. It involves personalised care planning and proactive management of patients with long term conditions to improve the quality and efficiency of care. The process allows better micro and macro commissioning of services.

**Service Background**

LTCs are currently managed in a reactive and semi-structured way in primary care. Patients with multiple LTCs attend the primary clinic up to 15 times for different elements of their care. This leads to greater outpatient service usage and admissions for hospital care. There is room for significant improvement in quality and efficiency of care provision.

**Solution**

- Identification of all patients with LTCs in primary care.
- Segregation into one or more LTCs - 40% of practice population have LTCs and 25% have two or more LTCs.
- Care planning done for all LTCs in one appointment rather than many through the year.
- Patient directed goal setting and linked to enhanced commissioning of services.
- Tailored information prescriptions can be printed off and a personal plan for self care can be produced for the patient.
- Link to tool to identify real time hospital admissions to focus on areas of greatest need.

**Top Tips**

- Important to get practice engaged.
- A challenge is to identify/profile LTCs patients via accurate registers, booking appointments and recalls.
- Training the staff in care planning and a different way of working.
- Educating patients about changes.
- A detailed shared care record provides an essential prerequisite.

**Benefits**

1. More active self caring patients.
2. Improves patient access.
3. Reduced service utilisation costs including primary care attendance, A&E attendances, outpatient attendances and acute admissions.
4. Reduced emergency admissions due to proactive management and point of contact in the practice.
5. Improves the clinician/patient relationship and is educational for both.
6. Holistic proactive care which is less prescriptive. This approach works well with shared records to enable integrated primary and secondary care, e-consultations, telemonitoring and telemedicine.

*(Reproduced by kind permission of Dr Shahid Ali, GP telehealth coordinator, Y&H SHA)*

“By definition many patients are ‘expert patients’ as they in some cases have had the condition for a period of time. We’ve observed that when patients are more involved and the pathways reflect some of their views then the motivation to participate increases as well as the feeling of empowerment.”

Indeed, as the Department of Health commented in 2009 “Transforming the care and lives of those with long term conditions and delivering truly integrated, efficient and people-centred community services has the potential to improve the quality of millions of people’s lives. It will also release annual savings of up to £2.7bn by enabling people to better manage their own conditions, treating them closer to home and avoiding unnecessary hospital visits.”

At this stage, the Government has yet to whole-heartedly endorse the use of telehealth to facilitate the improved management of people with long term conditions. The White Paper noted that “work has started on implementing what is required, for example... through the use of new technologies for people with long-term conditions”, as part of the “Quality, Innovation, Productivity and Prevention (QIPP) initiative, (which) is identifying how efficiencies can be driven and services redesigned to achieve the twin aims of improved quality and efficiency.” QIPP is addressing two innovations of particular relevance to this report:

- shortening hospital stays (e.g. through early supported discharges) – which is of primary interest to acute providers;

- avoiding admissions – which are of primary interest to commissioners.

The potential value of assistive technologies such as telehealth was also identified in the recently published “Information Revolution” consultation document (para 2.30).

“We know savings and personalisation are two of the key benefits from telehealth, especially from our experience from COPD demonstrators. However, there are so many people stuck in ways of working and so much resistance to the NHS’s constant need for change that the only way to really get anything changed is to drive it from policy.”

As strategies for the management of people with LTCs develop, more policy clarity involving the value to be gained from telehealth enablement would be greatly welcomed (perhaps on the back of the growing body of evidence and the WSD evaluation in 2011). This could be from central policy on the management of long term conditions, and through future publications such as the National Lung Strategy, and future plans and papers around social care.

“Developments in telehealth should be user and service led, not technology-led. A telehealth system without an appropriate service wrapped around it will be of little or no value. Offering ‘appropriate technology’ is key - some patients will need sophisticated telemonitoring or videoconferencing kit; some will do just as well with access to a phone. We should offer responsive, patient-centred services, not just the blanket deployment of technology.”
3 Policy Context
the need for action

Other drivers towards telehealth-enabled services
The other driving factor towards lower cost telehealth services for those patients in levels 1 and 2 of the Kaiser ‘pyramid of care’ model comes from the wellness market, with the ready availability at high street pharmacies of measuring devices (e.g. electronic scales, blood glucose monitors and blood pressure monitors) at a mass market consumer price level. In the US, there is a greater drive towards person wellness because of employers’ and health insurers’ desire and responsibility for better health of their member populations. In some European countries such as Italy, some health insurers already give a discount on premiums to members if the individual agrees to be monitored through telehealth.

While most health insurance packages here in the UK do not cover treatment associated with chronic conditions, a model such as this could develop in relation to travel-related health insurance for those with LTCs. Other possibilities could be for consumers to pay for a subscription – perhaps as part of a mobile phone tariff – to some form of telehealth service.

In the long term, one could foresee some form of co-pay model whereby the state funds some part of the telehealth cost and with the consumer/patient paying the other (this already happens with telecare). Personal health budgets may well be an added driver here. There are however significant regulatory issues affecting potential developments here, for example concerning the classification of equipment and applications as medical devices which fall under EU regulatory regime. This issue is discussed further in Section 6.

Recommendation 3.A Industry -
Work towards a pricing model applicable to a consumer market, particularly for level 1 and level 2 LTC patients in the Kaiser ‘pyramid of care’ model
3.3 Whole System Demonstrators
The WSD programme is a research project funded by the Department of Health to find out how technology can help people manage their own health while maintaining their independence. Its vision is “principally to establish person-centred integrated health and social care, with advanced telecare and telehealth technologies acting as an additional mechanism to support and complement the care package within a home-setting”. Its objectives are to develop understanding to what extent the WSD model of care:

• promotes individuals long term well-being and independence;
• improves individuals and their carer’s quality of life;
• improves the working lives of staff;
• is more cost effective;
• is more clinically effective;
• provides an evidence base for future care and technology models.

In short, the demonstrators are intended to deliver robust NHS evidence at scale through a Randomised Control Trial (RCT), which will be DH’s largest evaluation of assisted living ever. Among many other facets, the evaluation is considering the impact on services, planned and unplanned care pathways, measurable patient quality of life and independence improvements, impact on carers, clinical impact and job satisfaction.

The £31M project covers three WSD sites – Newham (representing an urban environment), Cornwall (a rural environment often with large distances between places of care), Kent (a mixed environment). The project started in 2007 and covers approximately 6,000 patients with telecare and telehealth services in roughly equal numbers. The LTCs addressed are COPD, heart failure and type 2 diabetes.

As a clustered randomised control trial, participants are randomly allocated to either a control or intervention group with the unit of randomisation being the GP practice. In this way, it was the GP practice that an individual belongs to that determined whether they were allocated to the control or intervention group and have the equipment installed at the outset or 12 months later.

The formal academic evaluation is due to report in Spring 2011, when its outcomes will be announced. That said, Cornwall has decided in April 2010 to operationalise the service8. Kent and Newham have also subsequently decided to mainstream it.

Recommendation 3.B Centre - Provide evident policy commitment, leadership and guidance for telehealth on the back of the WSD results

It is evident that the sites will contribute much useful learning, which we have drawn from throughout this report. From our own visits to the WSD sites, we would observe the following points, which are amplified upon in the relevant later sections of this report.

• The level of funding enjoyed is unlikely to be available to other sites. In part, this has been necessary because of the understandable administrative overhead associated with the running of the RCT. As decisions are made to operationalise the service, the sites have had to look at a more streamlined operational model to ensure service viability. The long term objective must be a system which is self-sufficient, providing an evidence-based platform for all manner of telehealth services. For example:

  • Cornwall is looking at additional services around step-up / step-down from acute care as well as services beyond the geographical boundaries.

  • Kent is planning to integrate TH technology into clinical care pathways for the same disease groups as WSD and for other LTC pathways where TH technology has yet to be considered.

• The general approach around triage has been for both technical and clinical triage to be done by the central telehealth teams. Other telehealth projects have sought to embed the clinical triage process within the day to day duties of the responsible clinician, often the community nurse who owns the case load. Cornwall uses a hybrid of both approaches for clinical triage and the central team for technical triage.

3 Policy Context
the need for action

- Patient recruitment and retention was challenging. A significant effort arose from the requirement to get the GP practice on board first in the absence of already available evidence. Some patients also felt they would be inconvenienced by the RCT requirements. Other non-WSD sites have found patient recruitment easier through proactive marketing of the service and because many initial referrals are from community matrons or nurses. These are often the clinical group that most benefits from and is enthusiastic towards telehealth.

- Designing the care delivery and service models must be driven around local needs and parameters. Changed ways of working can be threatening to staff and needs approaching with care and thoroughness, as in any significant change management exercise. The service can also have unforeseen benefits, for example when travel is limited in winter due to adverse weather conditions and in summer due to holiday traffic congestion. And in time, telehealth data can be linked in with predictive modelling about the impact of potential events or service changes.

In summary, the evaluation work will need to set the scene for a national view around a much wider roll-out of telecare / telehealth services, based on the demonstrators’ clinical outcomes, cost effectiveness, service satisfaction levels, and financial and non-financial impact on the healthcare system more generally.

Recommendation 3.C National NHS - Ensure the WSD results are acted upon across the commissioning spectrum, by demanding local action plans exploit the evident benefits of large scale telehealth-enabled programmes and demonstrators e.g. “every new individual LTC care plan should consider the role of telehealth”
In this section, we address commissioning and funding considerations associated with the implementation of services enabled by telehealth, and in particular consider these factors:

- **evidence and the business case**: robust evidence of clinical and economic benefits;
- **local business cases**: key factors in preparing a business case for telehealth-enabled services;

- **national business case**: is there a national business case for telehealth?

- **funding and reimbursement**: availability of funds; appropriate reimbursement tariffs.

We start by illustrating in Table 4.1 some of the key benefits (and possible drawbacks) to be gained by each stakeholder group through the adoption of telehealth:

**Table 4.1 – Summary of Telehealth benefits and drawbacks**

<table>
<thead>
<tr>
<th>To the patient</th>
<th>To primary care</th>
<th>To secondary care</th>
<th>To the system</th>
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</thead>
<tbody>
<tr>
<td><strong>Benefits</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improved motivation and more effective daily self care</td>
<td>Better medication compliance</td>
<td>Reduction in non elective admissions</td>
<td>Meeting LTC growth within available £</td>
</tr>
<tr>
<td>Increased satisfaction with quality of care</td>
<td>Reduction in unnecessary GP contacts</td>
<td>Reduction in A&amp;E visits</td>
<td>Predicting demand and planning supply – richer information to base decisions upon</td>
</tr>
<tr>
<td>Improves quality of life for carers</td>
<td>Promotes proactive case management - early intervention and prevention</td>
<td>Reduction in ambulance call outs</td>
<td>Engineering quality into the process rather than fixing the problems that arise</td>
</tr>
<tr>
<td>Less travel and disruption for routine check-ups</td>
<td>Reduction in unnecessary nursing visits to patients’ home</td>
<td>Supports early discharge</td>
<td>Personalisation to provide appropriate care</td>
</tr>
<tr>
<td>Retention of dignity</td>
<td>Increased case management potential (greater case load per nurse)</td>
<td>Efficient tool to help drive integration of community services</td>
<td>Green – through reduced travel and emissions</td>
</tr>
<tr>
<td>Fewer stressful, unplanned admissions</td>
<td></td>
<td>Reduction in readmission rates</td>
<td></td>
</tr>
<tr>
<td>Empowerment to manage own health</td>
<td></td>
<td>Reduction in outpatient appointments</td>
<td></td>
</tr>
<tr>
<td>Reduced levels of anxiety</td>
<td></td>
<td>Reduction in unnecessary travel</td>
<td></td>
</tr>
<tr>
<td><strong>Drawbacks</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional levels of training to patients and service users to gain familiarity with the new service</td>
<td>Identification of unmet need (a short term effect that could require additional resources in primary and community care)</td>
<td>Possible loss of income and reduction in capacity</td>
<td>Need to confront NHS’s traditional resistance to technology enabled change improvements</td>
</tr>
</tbody>
</table>
4.1 Evidence

In the absence of the WSD results, we have found that the most current and definitive summary of the evidence for telehealth comes from the exciting work done on the largest NHS telehealth project now underway in North Yorkshire and York (NYY) PCT. This draws on the comprehensive collection of evidence available through the Kings Fund WSD Action Network Evidence Database.

The jointly produced evidence paper\(^9\) between NYY, Tunstall and Ernst & Young summarised the situation (with which 2020health is in agreement):

“There are over 100 Telehealth projects currently running across NHS organisations in England (c. 5,000 systems deployed)… to address severely-ill patients with heart failure, COPD and diabetes. These projects have been successful in demonstrating positive outcomes but have generally remained small-scale proof-of-concept studies (typically <100 patients enrolled).

“In 2007, the Department of Health established the Whole System Demonstrator Programme (6,000 participants across three pilot sites in England) to evaluate, in a randomised controlled trial, the effectiveness of Telehealth and Telecare. The findings are due to be reported in Spring 2011.

“Elsewhere, particularly in the US, Telehealth is widely adopted (>130,000 systems deployed in the US) through several large-scale mainstream programmes. These include deployments through home health care agencies, disease management organisations and the US Department of Veterans Affairs, Care Coordination/Home Telehealth Programme serving 30,000 individuals and scaling to 50,000 by 2011.

“Despite the different care settings and scale of the Telehealth implementations, the outcomes reported by small-scale and large-scale deployments are comparable and a compelling evidence base is now emerging. Telehealth has been shown to reduce hospital admissions (24%–54% reduction across heart failure, CHD, COPD and Diabetes), total bed days of care, ambulance call-outs, outpatient attendances, patient visits to the General Practitioner (GP) and nurse home visits.

“Telehealth improves quality of life (QoL) and clinical outcomes for heart failure, COPD, CHD and diabetes:

- It reduces patient anxiety and improves patient confidence to self-manage
- It generates comparable or better health-related QoL versus ‘usual’ care
- Telehealth provides better glycaemic control (lower glycosylated haemoglobin, HbA1c, levels) for diabetics (mean difference 0.21)
- Telehealth reduces heart failure and CHD mortality rates by ≥30%
- It creates greater patient (and carer) independence and improves the ability to manage activities of daily living
- Telehealth improves medication compliance and the management of complex drug regimens
- Patients also report high levels of satisfaction (>85%) with, and compliance (>90%) to, Telehealth”

“There is considerable variation in the magnitude of the outcomes reported. This is likely to reflect similar variation in local implementation and supporting response infrastructure for Telehealth in these projects, and the extent to which the technology is embedded within care delivery and working practices. Patient risk profiles will also have a significant bearing on health service utilisation outcomes and projects often adopt different criteria for patient inclusion within a Telehealth programme. Consequently, NHS North Yorkshire and York, Tunstall and Ernst & Young believe that maximum benefit will only be achieved if the solution incorporates a comprehensive service transformation across the health economy with redesign of specific care pathways and associated service models such that they are fully compatible with the deployment of Telehealth technology. This includes a thorough review of the patient identification and referral process for Telehealth services.”

The WSDs provide the opportunity to demonstrate unequivocal NHS business and clinical evidence for telehealth. A summary of the wider evidence we have gathered in relation to telehealth is described in Appendix H.

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9. Report available on request from Kerry Wheeler, Assistant Director of Strategy, North Yorkshire and York PCT
On the other hand, the evidence base for the use of lower-cost telehealth services is relatively limited and there is a need to sponsor further evaluations in this area.

**Recommendation 4.B Centre** - Gather better evidence around the value of low cost, high volume telehealth services for level 1 and level 2 LTC patients in the Kaiser ‘pyramid of care’ model, including the impact of improved self-care and well-being

### 4.2 Local Business Cases

From our interviews and consultations, it is evident that there is significant — but far from uniform - interest around the NHS in telehealth.

In many cases, telehealth-enabled developments are being driven by PCTs, representing their current role as commissioner and historic role as provider of community services. The degree to which momentum is being maintained with the pending organisational changes from the White Paper is variable.

On the one hand, some PCTs such as NYY are pushing ahead through active engagement with GP practices (see section 5). In other cases (such as in West Midlands), telehealth developments are being jointly sponsored by the local authority and PCT.

However, anecdotally we are also hearing of other PCTs who have decided already to defer project decisions until the GP consortia are in place.

There are a number of potential conflicting objectives faced by local commissioners and others concerning the development of telehealth business cases:

- business cases need to encompass the transformation of services that is enabled by telehealth, not just telehealth on its own. Such cases should be aimed at achieving a defined set of clinical and business outcomes based on a defined service capability;

- it is worth noting that better outcomes leading to improved life expectancy and quality of life may actually increase total costs to the NHS in the long term. And cash has not been released because the services have taken up the capacity saved to serve others. Business cases should not be aimed solely at saving money, but at getting best value for the investment;

- from a commissioner’s point of view, telehealth only makes economic sense when it results in a lower level of acute utilisation (e.g. fewer admissions into the most expensive part of the NHS) leading to the need for fewer wards, or removing workload from front-line clinicians. This in itself would require a commitment to decommissioning some services based on the revised pathways, always a challenging task. Realistically this can only occur when telehealth is done on a large scale, as small scale pilots can never enable this. Moreover, this assumes that the commissioner could renegotiate provider contracts to reflect the lower level of activity and that the payment by results tariff system would enable the savings to be taken out of the system;

- from a provider viewpoint, a business case for telehealth would make sense when lengths of stay could be shortened and the tariff system would enable the provider to realise the saving. Those trusts that now have the local community provider arms vertically aligned with acute services through the Transforming Community Services (TCS) programme may be in a strong position here. This incentive will be strengthened by the new plans to refuse any additional payments to acute Trusts (and even issue active penalties) should patients require emergency re-admission within 30 days of discharge; this is likely to drive hospitals to establish home and rehabilitation care supported by telehealth, thus enabling the continuing monitoring and management of patients’ conditions.

**Recommendation 4.C Local NHS** - (Providers) Embed telehealth capabilities into community-based discharge services, as part of TCS developments
Ideally, any business case for telehealth would take a full “value-based” approach taking account of the socio-economic impacts of an intervention, such as quality of life for patient and carer, reduced travel costs, environmental impact, and so on. Inevitably, the current financial stringencies are forcing consideration of short term economic (i.e. cost cutting) benefits to take priority over longer term advantages.

Benefits must be appropriate for all stakeholders, with the benefit to commissioners in particular being abundantly clear.

“Change will only happen if we make telehealth less dry and more real. We implemented a COPD trial and only got buy-in when we stopped talking about savings and started focusing on the benefits for the patient experience. This took a complex and integrated design approach. If using telehealth to redesign services, we must make it real for those involved. Dry ideas turn people off.”

Clear leadership is needed if the need for workforce reduction emerges as a consequence of telehealth. For example, part of the rationale for investing in remote electronic monitoring for heart failure is to allow a much increased workload to be met without increasing the numbers of consultants and physiological cardiac technicians. In the context of a doubling of demand over the next few years, similar arguments are likely to be made for the management of other long term conditions to include the use of telehealth.

Greater understanding is needed around the sustainability of savings – according to where the patient lies in the Kaiser ‘pyramid of care’ model – and whether there is a plateau on the disease pathway where no more savings will be generated. The emerging view is that for COPD and heart failure patients in level 3 of the Kaiser model (i.e. under case management), the business case should look carefully at ‘full function’ telehealth for those qualifying patients, as part of an integrated redesign of care models.

The general experience is that most (but not all) COPD patients benefit greatly from telehealth, while patients with heart failure show similar improvements, if not quite to the same extent. However, the business case for diabetes is harder to justify and different models from simple home-based monitoring units need considering.

There is further potential for short-term use for newly diagnosed patients, those undergoing changes to medication or after discharge from hospital. And whilst there is widespread use of telecare for the frail elderly, there remain opportunities which have yet to be fully realised for telehealth such as for use with people with dementia, mental health needs, children and adults with disabilities, for expectant mothers with high risk pregnancies, and for palliative care.10 And there is the possibility to provide telehealth in different contexts other than the home for example, in nursing homes.

10. see http://www.ncbi.nlm.nih.gov/pubmed/20813893
From a cost point of view, the equipment and annual service costs remain expensive: up to £2,000 in up-front costs per unit, and £1,000-£2,000 per patient per year depending on the level of service specified. To this must be added significant indirect costs in terms of project leadership and capacity, training, change management, back fill costs etc; these could in turn increase total costs by up to one third.11

To recoup such an investment requires patient selection to be driven around enabling a material reduction in the level of expensive acute care. To date, the telehealth payback period has been in the range of 18-24 months for level 3 patients.

However, although offering a good return on investment (RoI) against traditional markers, the current tight financial environment in the NHS means that a different economic model may be required. ‘Invest to save’ may no longer be viable as soft funds are harder to find locally, especially as outcomes improvement does not always equate with cost efficiencies (i.e. reducing costs). There is anecdotal evidence that PCTs are now demanding economic payback in year, which is only achievable through some, purely commercial models that are not linked to health improvement.

Recommendation 4. F Industry - Adopt innovative commercial approaches to large scale delivery to achieve in-year benefits for the NHS through collaborative partnerships

One participant commented on how telehealth technology could support a palliative care model: “[i] Telecare alarms could open a call direct with someone who could help, such as an on-call palliative care nurse who would know who was calling and have access to their personal palliative care plan; [ii] simple video conferencing to make that contact much better - and there is simple through-the-TV technology available now; and [iii] telehealth monitoring might help expand the range of patients who could be supported to return home for their final weeks/days”.

“The short term cost curve for healthcare dictates that a large proportion of the cost of ill health is incurred through those patients with existing long term and complex conditions. If we can utilise telehealth to support these patients remotely and consequently reduce the cost of ill health now, we will go a long way towards supporting improved efficiencies in healthcare.

However, the medium and long term cost curve for healthcare is influenced heavily by those people who currently have a high propensity for complex disease and long term conditions but aren’t yet known to the service. These are typically people who would benefit from remote health coaching to support increased levels of fitness and overall wellness.

In this sense we should be seeking to “treat the cause and not the symptom” of complex long term conditions and use ‘telehealth coaching’; as a means of supporting those people with the highest propensity for future illness (in the most cost effective way), to avoid the downstream costs of ill health.

Good current examples include Points4life (Manchester), Fitbug, Intelligent Health - however the evidence case for impact and sustainability is poorly supported. Indeed there is evidence from other behaviour change programmes such as weight loss that positive long term outcomes are elusive.”

11 The US Veteran Health Affairs found that the cost of their coordination and telehealth service was $1,600, compared to the direct cost of VHA’s home-based primary care services of over $13,000 per annum.

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4.3 A national business case?
Various commentators have suggested models implying that the NHS could make huge savings annually through wide-spread investment in telehealth-enabled services. A number of critical assumptions (at least some of which are well supported by evidence) underpin these views, for example:

- a reduction in unplanned hospital admissions by 50% for a majority of patients in Level 3 of the Kaiser ‘pyramid of care’ model (approx 790,000 people in this category);

- an estimated cost saving of £2,000 per patient, allowing for the external equipment, set-up and running costs (referred to earlier).

On this basis, the argument is made that a ‘positive payback would be gained within 1-2 years and £1 billion saved annually across the NHS’. We agree that this is possible but it relies on telehealth being delivered at full scale. In addition to this must be added the proven benefits from telecare (see Appendix A). This month the Local Government Association (LGA) has suggested a national cost saving of £270M through adopting best practice.

In the rest of this report, we have outlined a series of recommendations which taken collectively would make this possible. Larger scale should bring down prices over time, in suppliers’ product, deployment and support costs, but risk sharing outcomes-based payment models should be considered to encourage investment.

Once the results of the WSDs are known, there is the opportunity to validate at a macro level the total potential savings from embracing telehealth nationally. Other large IT-enabled business cases (e.g. the Care Records Service) across the NHS have faltered on over-optimistic assumptions and it is crucial that the same mistakes are not replicated. We urge particular attention to the following:

- the benefits are derivable only through wholesale pathway redesign at a local level. This in itself is a costly change management exercise. Simply tacking telehealth onto existing pathways will not deliver the savings sought.

The publication of the WSD evaluation in 2011 provides the opportunity for a wider evidence-based view around the costs and benefits for nation-wide uptake. Any large scale roll-out of telehealth can only be driven by a multitude of local projects, not a single large national one.

**Recommendation 4.G – The Centre**

On the back of the WSD results and other relevant evidence, prepare a full cost-benefit analysis around the national potential from scaling up telehealth

There is no ‘one size fits all’ approach to telehealth. There are different needs for different conditions in different contexts, and good guidance is needed about what approach might best suit for what, which local commissioners should interpret according to their local requirements.

In particular, there is a need for models and good practice guidelines for the development of local business cases for telehealth, taking into account the different types of patient condition (e.g. COPD and the most common comorbidities). Such business cases need to be locally based so that telehealth can be appropriately embedded into the local health economy.

The West Midlands telehealth project toolkit is the best example we have seen of a common approach to business case development, and ideally this should be shared more widely on a national level.
In one vision for the future, referring GPs would be presented with a menu of available evidence-based choices involving a range of telehealth services, according to their patients’ individual needs. They would simply make a referral, and the ‘back office’ would process the order to establish the service for the patient. "Every person with a long term condition will be offered appropriate technology to enable them to better self manage". This may mean technology that is used by health or social care, patients and or their carers. It cover the following steps:

**Step 1:** Identifying needs - What are the telehealthcare needs? What will be the impacts and implications? What telehealthcare initiatives should we pursue?

**Step 2:** Establishing buy-in - Who are the stakeholders for telehealthcare? What are their needs for involvement? What involvement activities are needed?

**Step 3:** Considering technology - What telehealthcare technologies do we need? How can we work with others to lower cost & risk? What technology standards and plans do we need?

**Step 4:** Workforce requirements - How will telehealthcare impact the workforce? What training and change management? How will the workforce be consulted?

**Step 5:** Designing evaluation - What evaluations will be needed? Review medical, technical, users & organisation? What plans are needed for evaluation?

**Step 6:** Planning implementation - How will we implement telehealthcare? What programme governance and organisation? What are the risks and how to mitigate them?

**Step 7:** Business case - What is the business case? How can it be funded and justified? What procurement is needed?

**Step 8:** Sharing Best Practice - How can we identify shareable practices? What channels will we use to share? Can we gain recognition and awards?"

Source: Joanne Harding, Head of LTC programme, West Midlands SHA

### Recommendation 4.I – Industry
Embrace the opportunity to address different diseases and to move down the Kaiser ‘pyramid of care’ model – through different technology and communication approaches more appropriate for lower cost, higher volume services (e.g. mobile devices / platforms, set-top boxes, smart metering)
4 Commissioning and Funding

4.4 Funding / Reimbursement
To date, most of the capital funding for telehealth has come from regional innovation funds (e.g. QIPP SHA funds) topped up by available local funds or other ‘soft’ funds. The ready availability of such pump-priming funding for creating new distance models of working will no doubt be harder in the future.

In this case, two alternative methods of financing present themselves to cover the up-front equipment and change management costs:

- for industry to build them into the running costs, either on a pay as you go basis or by a risk-reward model.
- or by using some form of social enterprise funding for pump-priming.

Community services have been notoriously difficult to measure with funding generally at the block contract level. Currently the payment by results tariff is quite limited in terms of its appropriateness to telehealth.

There is a clear direction amongst NHS leadership that tariff issues should not stifle innovative approaches such as telehealth. The appropriate tariff needs to encourage appropriate whole system behaviour change. For example, work in Yorkshire is underway around a tariff for eConsultations and equally this will need to be developed into the telehealth / teleconsultation field. One possibility is a ‘year of care’ tariff for LTCs. The Commissioning for Quality and Innovation (CQUIN) payment framework could also provide a means for commissioners to incentivise local providers for innovative services. And the introduction of personal health budgets could be a valuable stimulus for telehealth services.

"Most telehealth projects are started on soft monies, non-recurring or limited development or research funding. These fledgling services either end or wither on the vine when the funding stream runs out. There is the need to support the clinical champions with a strategic context that may better secure long term funding for a specific service."

The commissioning changes in the NHS White Paper “Liberating the NHS” will have a substantial impact around telehealth and related technologies. On the one hand, moves towards joint commissioning particularly in the public health area will encourage a holistic view to be taken across all assistive technologies with further moves towards converging telecare and telehealth. The West Midlands experience is consistent with this.

Recommendation 4.K Centre - Amend tariffs / incentivisation schemes to recognise and reward telehealth- and teleconsultation-enabled services on a consistent basis across the NHS - based on applicable outcome measures

Recommendation 4.L Centre - When fully available, ensure personal health budgets can be applied to telehealth-enabled services

Recommendation 4.J Local NHS - Where feasible, join up telehealth/telecare initiatives through joint commissioning, exploring opportunities for common logistics and supply chain management
As an illustration of some of the difficulties arising, the following describes some of peculiarities arising from a lack of a national tariff around the existing remote monitoring and follow up services for patients with implantable devices for cardiac rhythm disease management:

- PbR provides for a cardiology outpatient appointment tariff, generally between £70 and £100;

- some centres receive this for their remote monitoring clinics, others get no reimbursement (determined by local commissioners);

- other commissioners use the PbR tariff for non face-to-face checks of around £25. However, this is intended for quick phone calls rather than detailed analysis of data as in a remote monitoring clinic;

- what is needed here is a fair and consistent tariff approach that reflects provider’s appropriate costs.
In this section, we address how well understood and proven telehealth is as an integral part of care redesign, and in particular look at three factors:

- **Care delivery model**: the presence of defined care processes integrated around telehealth;
- **Patient experience**: patients' experience in identification and referral through risk stratification, their adoption and response to the technology, future involvement;
- **Clinical engagement**: the extent of active clinical support and championing, locally and nationally.

### 5.1 Care Delivery Model

**The importance of care pathway redesign**

Pathway redesign is critical to the successful implementation of telehealth, without which there is a danger that telehealth will become a bolt-on rather than a trigger for larger scale service redesign. Given the current challenge of growing numbers of the population developing LTCs, it is no longer an option simply to continue delivering the current model whose cost is unsustainable. Failure to redesign will only add additional costs and will not deliver better patient outcomes.

Pathway redesign around LTCs affects all members of the population receiving treatment for the condition(s) in question. The benefits are far greater than those enjoyed by the small number who will be supported by technology.

**Case Study 5.1 – North Yorkshire & York PCT**

Across the large county of North Yorkshire, the County Council have long been a leader in the deployment and use of telecare capabilities. On the back of this, the local PCT (NHS North Yorkshire and York – NYY) were encouraged to begin work in 2009 with several Practice Based Commissioning GP consortia to trial the use of telehealth with 120 units.

Its aim was to reduce unplanned episodes of care both in the primary and secondary care, including A&E attendances and admissions and emergency GP appointments and OPD attendances. York Health Economics Consortium (YHEC) undertook an independent evaluation of the project and the early results revealed a 40% reduction in non-elective hospital admission and a further drop of 28% in A&E attendances since the arrival of Telehealth.\(^\text{12}\)

As a result, the PCT took the view that if care pathways for COPD, heart failure and diabetes were fully redesigned and enabled by telehealth, this level of savings and improvements to patients’ lives could be achieved on a much wider scale.

Using data based on “frequent flyers” into secondary care, the focus was around the top 5-10% of service users since it is easier to predict expenditure on high risk patients and make more robust assumptions regarding the impact telehealth will have. These 20,000 patients are estimated to cost the PCT £18-19m per year in consequent acute activity. The PCT was clear that things could not stay the same without costs spiralling out of control and pressure on acute services escalating.

As a result, the PCT decided to invest £3.2M of its 2009/10 capital to invest in 2,000 telehealth units, and after a competitive exercise, they awarded the contract to Tunstall, assisted by Ernst & Young. Monitoring and intervention are key elements of the current treatment programme, but future developments will include coaching and education of the moderately unwell who do not currently qualify for telehealth.

The success of the programme has centred on a process of whole pathway redesign, across primary, community and acute sectors, assessing where telehealth can be used as an enabler to improving outcomes. This has created a greater understanding of the importance of the pathway and has highlighted some difference in service provision, helping to start the transformation of community services.

The time and energy required to effect the transformation has been considerable, but there have been tangible improvements in understanding between providers of care and an increased ability to work together across boundaries.

The importance of pathway redesign carried out by clinical teams using highly engaged leaders was stressed throughout the review. Repeatedly the message is that telehealth in and of itself is not the answer, but that successful pathway redesign using telehealth is absolutely key. New care delivery systems that improve outcomes and quality of life for patients and improve the working life of staff need to be developed and mainstreamed. Telehealth must become an integral part of the armoury of health care givers.

Clinical engagement and leadership has been challenging. To address the natural anxiety and reluctance to change, nurses within the community have acted as ‘clinical advocates’. The geographical spread across the county and the numbers of people to engage made it necessary to scale up the use of champions to obtain greater coverage. Inevitably this incurs backfill costs but engagement has to take place locally and be reinforced to achieve the desired outcomes.

At the time of writing, the success of NYY’s considered approach has been that all but one of the 30 GP practices visited to date have expressed an interest in telehealth and will shortly start referring patients to the programme. The aim is for the first 1,000 units to be deployed by the end of 2010/11.

Kerry Wheeler, the NYY Assistant Director of Strategy and the Telehealth Project Director said, “only by taking the time on service redesign and ensuring we have the full support of all stakeholders, can we be sure that telehealth services will go to the right patients and improvements delivered in a sustainable way.”

The limitations around pilots
As noted above, many of the telehealth-related projects now around the NHS were established as pilots, often for very valid reasons around developing stakeholder engagement. However, while easier to carry out because of their small scale, locally sponsored pilots often hit a glass ceiling and fail, forcing in technology that may add simply an additional layer on current clinical pathways.
Smaller pilots do not require the full pathway redesign that needs to be achieved to scale up, a ‘whole system’ impact may be avoided, training is made easier and containable, standards do not need to be rewritten, and upfront costs are reduced. While easier to get off the ground, these limitations mean that any significant benefits are unlikely to be realised.

Systems and processes need to change too for the technology to be used successfully at scale. If GPs are only using it for small numbers of patients, the drive to change pathways is lacking.

Some balance needs to be found. On the one hand, the successful implementation of telehealth will not be possible if it is seen to be used as the driver for a complete re-organisation of service models within community care. On the other hand, the slower the take-up and implementation of service redesign enabled by telehealth, the greater is the drop in efficiency savings. The best approach would seem to be one where the change is broken down into manageable pieces without completely disrupting services.

“Small scale pilots are now almost worthless. They generally only serve to ‘prove’ a new proprietary solution.”

Recommendation 5.B Centre - Provide evident policy support for care plans and pathways which interoperate across all sectors, reflecting an ‘integrated system behaviour’ – possibly represented through the Map of Medicine – and pushing through forcefully related NICE and Social Care Institute for Excellence (SCIE) guidance

Key Success Factors

1. The patient must be put at the heart of the pathway redesign, regardless of structures and current service provision.

2. Accepting one size does not suit all is important in achieving the required change. Local clinical leaders must feel in control of how they shape services, with local innovation not stifled by heavy national overlay.

3. Front line staff must remain in control to ensure maximum coverage and adoption.

4. Mining high quality data from detailed shared care records (if available), QOF (Quality and Outcomes Framework) and SUS (Secondary Uses Service) sources is an integral part of the process to support the understanding of current pathways and redesigning new ones. The often poor quality of some data adds to the complexity of the task, making it more difficult to determine where best to place time and effort. Data cleansing effort can also add cost and delay to any implementation.

5. Technology support can help manage and sustain compliance to evidence-based pathways.

6. The understandable fear must be addressed amongst some clinicians that any changes will lead to increased workloads or redundancy. Clear leadership is essential. For example, GPs are often worried about increasing workloads from taking more direct management of patients (see next section).

7. Taking time out to redesign pathways needs up-front investment, and involves backfilling and logistics to get everyone together. Furthermore, local capacity for change management support is often limited and external support may be required.

8. Making best use of available national resources is a good starting point – with new advances quickly incorporated into recommended practice – such as the introduction of NICE and SCIE guidelines, the use of Map of Medicine, Royal College guidelines and standards for pathway development, and the future NHS outcomes framework as it takes on board what NSF’s used to provide. These all take time to develop and it is important that momentum is not lost while national or international guidance is awaited.

9. There is a need to ensure good clinical governance and process assurance throughout, with clear boundaries of professional responsibility defined.

**Recommendation 5.C Local NHS** - Design integrated care pathways to take full advantage of relevant telehealth solutions - with patient groups and all clinical stakeholders involved – and using the skills and experience of industry partners.
5.2 Patient experience

“Telehealth means to me – peace of mind, free of anxiety.”

“I’m really pleased to have TeleHealth. It felt like we were on our own before. Combined with the Community Matrons it has given us a lot of confidence as before it felt like the Doctors had just given up on us.”

“The machine saved my life. The matron picked up a deterioration in my condition immediately and I was rushed to hospital for life saving surgery.”

“I woke up recently with a burst blood vessel in my eye and was very worried as I had recently had a stroke. I used the web cam facility to take a photograph of my eye and sent it through the machine to my Doctor. It was very reassuring when the Doctor rang back to say everything was ok and I had nothing to worry about.”

“Before telehealth I used to spend at least eight to ten months per year as an inpatient in hospitals. My GP used to visit me at home on a regular basis and district nurses used to come to my home every other day to take my blood pressure. …

Since being on telehealth my blood pressure is monitored twice a day. Telehealth gives me peace of mind as I can be assured that if there were any concerns regarding my blood pressures or blood sugar levels it can be addressed instantly.

Home visits from the GP and district nurses are not so frequent as they used to be…most importantly my hospital admissions as an inpatient have reduced, in the last 31 months I have spent 10 days as an inpatient compared to eight to ten months a year. Being on telehealth has given me full control of my life and independence…

I am part of Kent Telehealth network support group. It gives me a chance to help new telehealth clients with any problems they may have with telehealth equipment and to communicate and support one another.”

[All above quotes from “Promoting and sustaining independence in a community setting.” Sept 2010 Kent Telehealth Evaluative Development Pilot]

“Since I have had telehealth I have not had to go to hospital or visit our patient services… I feel safe; telehealth is the best thing that’s ever happened to me.”

[From Case Study: Managing Long-Term Conditions at Swindon Primary Care Trust]

“I think everyone should have telehealth. If you could possibly benefit from it, get it.”

“Before I started the trial I ate and drank anything… now with telehealth I can literally see the importance of a healthy lifestyle.”

“TeleHealth is really great for a person with an illness. Someone is always looking out for me and that is a big support.”

[From http://www.newhamwsdtrial.org/case-studies/telehealth/]
In exploring the patient experience, several issues were raised as imperative in ensuring that telehealth/care brings about real benefits to those using it, be they patients/clients or carer. These were:

- understanding of the patient/client needs;
- patient ability to adopt technology;
- cultural change required by patients/clients and carers.
Understanding the patient/client needs
During our review there was a consistent message around understanding where telehealth could best be applicable in supporting the care of patients. While a variety of risk stratification models are available, they rely on good quality data, information and communication between providers of care. Where feasible, risk stratification should be carried out on detailed care records in health and social care.

This is often not the case, and QOF (Quality and Outcome Framework data) and SUS (Secondary Uses Service), which are the primary and secondary care mechanisms used for assessing where patients are within their condition process, were often found incomplete or inaccurate. If the identification of patients suitable for support and management by telehealth is dependent on full QOF and SUS data, much greater emphasis will be needed on ensuring the accuracy and completeness of records.

While the completeness of the record is important, it is also clear that communication regarding patients and their management needs to be integrated and co-ordinated. Not only is this needed across teams and individual professionals, but also with the patient and their informal carers where necessary, and possibly the voluntary sector too. To ensure that this information is available a number of conditions need to be in place:

• a clear understanding of who is intervening and why;
• good record keeping;
• interoperability of systems used to communicate information regarding the condition and management of patients and clients (see Section 7).

While these conditions must apply in the management of all patients and clients, it becomes especially essential when care is being delivered more remotely and the face to face contact is reduced, not only between patients and professionals but between professionals themselves. Commissioners will need to pay particular attention to this when commissioning from ‘any willing provider’ including external call centres, which could alter the dynamics between teams caring for patients.

The use of personal health records such NHS HealthSpace and commercial products such as Microsoft HealthVault is one method by which patients and carers could pass on information updates on progress or seek help and support. Certainly for those requiring less intervention or a light touch approach there was an enthusiasm for exploring its use further. Issues such as security, provenance of data, use of interoperability standards, and integration with care systems and patient identification also arise.

Furthermore, social network self-support communities14 will also become increasingly important for LTC self care, and could interact with the healthcare system – perhaps the NHS could provide such tools.

The review identified that good telehealth needs proactive referral mechanisms to recruit patients. At present when patients are seen by their doctor or nurse or are admitted to hospital, telehealth is not automatically considered as an option and subsequently they are not referred. This may be due to a lack of staff awareness of what is available to use or concerns over the amount of clinical time that delivering good telehealth requires.

Sheffield PCT has placed great emphasis on clarity of understanding of who exactly should be treated and why, identifying ‘market segmentation’ for both outcomes and cost savings.

Assessing the suitability of patients for telehealth and the objectives to be achieved through its introduction needs to be embedded into integrated care pathways. Telehealth may be required at low levels and for determined specified outcomes which - when achieved - determine the withdrawal of the intervention or it may well be an intervention that continues for life. Decisions will change as the patient progresses along the disease pathway, which will need to be clearly understood by all those involved in delivering care and receiving it.

Learning is still developing around patient selection and the length of time patients with different conditions need a telehealth service. Some community services are developing exit criteria for telehealth technology, for example for 6 weeks after hospital discharge.

14 For example, http://www.patientslikeme.com/
Patient adoption of telehealth

In considering its adoption, a number of positive outcomes were striking:

• The Newham WSD identified that patients had developed an interest in their own health and found the positive feedback from those monitoring them to be reassuring.

• The NYY pilot reported positive feedback for carers who then developed confidence to go out knowing that those they cared for were fit enough to be left alone. Peace of mind for carers and patients was a well reported outcome. Feeling in control of the management of their care was another benefit identified by patients.

As introduced in Section 2, simple solutions are essential for good adoption. While some patients are technology minded and many appear to have adopted it even when clinicians thought they could not, it is clear that the over-complexity will not encourage use. If this is the case, and the user requires a high level support, contact time will increase, in turn creating more burden on support structures.

Equally, patient dependency can be of concern. In some cases, withdrawal of telehealth caused some distress to patients who became anxious that no-one was monitoring them. The emphasis on clear objectives and communication with patients is therefore essential as is support though a withdrawal process. It would appear that thought needs to be given to withdrawal protocols and the availability of step-down options.

Telehealth should not contribute to creating a sicker society by getting patients too worried but should have a focus on improving or managing health. Conversely there have been some negative patient views which indicate that some people may be reluctant to adopt the technology. This is much harder to overcome. For example “I am not sick enough to need this” or “I don’t want to be reminded that I’m ill”. There may also be cultural / demographic differences in acceptability.

And speedy delivery and implementation of telehealth equipment after the referral needs to be as easy as getting a prescription dispensed. Currently, in some cases, the speed with which telehealth is introduced after referral can be seen as too long. The patient can become worse during this time or the delay causes anxiety and breaks trust, or they simply lose interest and an opportunity is lost.

“I can see the role of technology in supporting wellness and I think this is possibly one of the most accessible and useful places to start considering using it. A difficulty with all technologies that provide information is that they need to be updated regularly and they need to be personalised and targeted. There is little use having generic videos of people walking up a hill if the person watching is wheelchair bound.

I can see a lot of potential benefit with using technologies to support and provide assistance to self-care but this is resource intensive if done properly. If done slapdash it will cost more in the long term as a wasted resource.”
In considering solutions, privacy is essential. e.g. there were reported concerns regarding teleconsultation through the TV, as some people do not want it in their lounge as it feels like an invasion of privacy and people might be able to ‘see in’! Clearly thought will need to be given on the perceived intrusiveness of some models and this should be taken into consideration when adopting telehealth. This does not only apply to the technology but likewise concerns were expressed over access to notes, records and results by carers.

More experience is needed about when patients will not be receptive to telehealth referral. Sometimes a patient may not feel like they need it or wish to be stigmatised – they don’t feel ill enough. Likewise, consideration needs to be given about how to keep a long term patient on telehealth engaged. Being asked repeatedly the same questions day after day can be rather irritating. In this case, a step-down from ‘full function telehealth’ to the type of ‘simple telehealth’ introduced in Section 2 - or perhaps telecare services - might be appropriate.

5.3 Clinical Engagement

Professional leadership both on a local and national level is an imperative if telehealth is to be encouraged and adopted at scale, be demonstrated effective in improving care for patients and clients, and provide service users and deliverers with a model that supports the achievement of high quality outcomes. In all discussions it is evident that the current lack of a national clinical leader able to advocate telehealth services is seen as one of the barriers to making progress and should be considered.

Engagement of GPs is seen as problematic, for several reasons: questions about the evidence from telehealth at scale in an NHS environment, which it is hoped the outputs of the WSD will provide; the perception of an increase in workload; the lack of an incentive scheme; and reluctance to change. However, this is not universal and there are examples of GPs who have embraced the agenda. Sheffield reported excellent clinical leadership from GPs through the telehealth clinical advisory board and from colleagues in acute trusts where the pilot was driven from. Likewise West Midlands have experienced good clinical engagement. The WSD programme has some active GP champions in each of the three sites.

Individual GPs’ ability to influence colleagues can be limiting. We heard of one GP chair of the local Practice based Commissioning group who, despite his own favourable view of telehealth, was unable to get it implemented in his practice, because the “senior partner won’t allow it”.

Recommendation 5.G National NHS - As the National Commissioning Board is established, ensure one of its senior clinical directors has national advocacy responsibility for telehealth-enabled services and those of related technologies.

Furthermore, engagement of the managed clinical networks at a regional basis is also essential since they overlook the pathway perspective across care settings. They can be essential in creating the case and impetus. Local ownership at executive and senior clinical management level is essential to ensure that all staff are aware of the benefits of any system for patients and clinicians, and to lessen the amount of disruption to workflows caused by the implementation of new ways of working. Without board-level leadership and clinical engagement, the uptake will continue to be patchy and Telehealth will not be used to its full capacity. PCTs should look to provide this leadership through current structures, and thought needs to be given for the future within GP consortia.
Whilst financial incentives may provide a solution, they do not tackle the heart of the issue of clinical leadership and engagement. There are genuine difficulties faced when implementing new schemes which are not immediately seen as of clinical use or improving the quality of the patient’s experience.

The experience with remote monitoring of large numbers of patients with implanted devices has demonstrated that clinical engagement using technology can be highly successful. Word of mouth helped as clinicians reported reduced workload in outpatient clinics and confidence in the technology to deliver high quality care.

The engagement of acute clinicians may become less problematic with the introduction of the 30 day discharge guarantee, giving encouragement to consultants to consider using telehealth. Acute Trusts may also look towards telehealth as a means to cope with operational difficulties in A&E and bed management particularly during winter time when pressures on beds increase.

Finding sufficient clinical champions and releasing them to carry out the task is vital given: the geography of the services; the scale and complexity of the service being managed; the scale of the task in redesign; and the requirement to cross health and social care boundaries.

Whilst leadership from the medical professions is key for the uptake of this new approach to healthcare delivery, it is no less important that nurses and other professionals are equally as engaged. The focus on nurse champions i.e. specialist nurses, community matrons, or community nurses, is seen as key in delivering the changes in both primary and secondary care. All the WSD pilot sites and other project sites reported that success was often due to inspiring nurse leaders who saw the benefits to their patients.

NYY emphasised the need for large numbers of champions (‘clinical advocates’) to drive through the changes. This is costly in staff time and requires backfilling which staff are naturally anxious will not materialise. Furthermore, the costs of backfilling in Yorkshire have meant that staff can only be released for short amounts of time. At the beginning of the process it could be argued that more time spent with clinical teams is likely to increase the speed of uptake. However 1 or 2 champions per organisation are not sufficient, as seen in some EPR implementations. Without champions the case for telehealth cannot be made locally and without making the case it seems difficult to attract champions.
Slow progress, delays in implementation, constant piloting and negative feedback were highlighted as issues to be addressed to prevent negative attitude prevailing. As the demand and appetite for telehealth gains momentum, so enthusiasm will grow.

 Whilst a national champion’s scheme is laudable, it would be effective for standards to be agreed nationally through the Royal Colleges or national bodies so that the design and implementation of telehealth systems is guided by clinically-led standards from the very beginning, providing best practice as well as a sense of ownership.

 A decentralised approach, guided by the use of standards, would allow clinicians to work within a set framework whilst feeling more able to take the lead in choosing and implementing new ways of working.

 Through all our discussions, the overwhelming conclusion reached is that encouragement and engagement of staff is essential to the uptake of telehealth. There is agreement that it needs a ‘hearts and minds’ approach, which is not directly related to scale. To engage successfully clinical leaders, they need to be assured that the following conditions are in place:

- commitment to the programme by the DH - it is not just another new idea that will disappear in the medium term;
- clear strategy and objectives to provide context;
- good clinical evidence and evidence of patient satisfaction:
- funding will continue, with permanent staff appointments made showing this is not a start/stop programme that ends when the money runs out;
- there is sufficient capacity and money to redesign the pathways;
- it is no more time consuming than current ways of working;
- that it is not about reducing posts and cutting costs for immediate gain, but an essential investment for the future to cope with rapidly rising workloads.

**Recommendation 5.H Local NHS - Create clear clinical leadership around telehealth, supported by ‘clinical advocates’**

- Through all our discussions, the overwhelming conclusion reached is that encouragement and engagement of staff is essential to the uptake of telehealth. There is agreement that it needs a ‘hearts and minds’ approach, which is not directly related to scale. To engage successfully clinical leaders, they need to be assured that the following conditions are in place:

  - commitment to the programme by the DH - it is not just another new idea that will disappear in the medium term;
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  - good clinical evidence and evidence of patient satisfaction:
  - funding will continue, with permanent staff appointments made showing this is not a start/stop programme that ends when the money runs out;
  - there is sufficient capacity and money to redesign the pathways;
  - it is no more time consuming than current ways of working;
  - that it is not about reducing posts and cutting costs for immediate gain, but an essential investment for the future to cope with rapidly rising workloads.
Finally there are concerns that the re-organisation of PCTs and new commissioning arrangements will see the loss of good individuals who have built strong relationships with clinicians and are supporting them in making the changes. New teams starting from scratch and having to identify the champions and build new relationships was also of concern.

The re-organisation is seen as impeding implementation as staff focus on other concerns and clinical leaders worry over their own future roles. These fears will need to be addressed so that work continues during the re-organisation.

**Case Study 5.2 – Orchard Medical Centre, Bristol**

“We started with telehealth in 2007 with a very small project but have been working to see how it could work in a ‘real GP surgery’. We had funding for some backfill from a private source and are currently looking to convince the PCTs to go large with their commissioning, having experienced the benefits.

In essence we have 17 monitors in use, mainly patients with CHF but also some patients with COPD. I have audited the impact on doctors’ time as part of the review.

I set the service up using the district nursing team to triage the alerts, and have written simple protocols on how to escalate the alerts and in what timeframe…this was the key to them confidently managing the alert system…this could then be managed by relatively low level staff and a lot of the work was led by an Health Care Assistant in the team who was good with computers!

I subsequently measured the impact on doctor time which is probably the most expensive and closest to the heart of many GPs. Initially, there was a learning curve I had with the first few patients which required a deal of input from me personally. So this shows that there may well be an increase for a short period of time but it quickly settles back to an average.

I would note that there is a level of increased overall activity, and this is at the triage level and DOES NOT need to include the GP or community matron. All GPs remember the gut wrenching anger when you get a call from a patient at 6pm saying Aunty Flo has had a fall and her Piper alarm has triggered…! think she is fine but can you visit just in case!!! A well triaged service will prevent this poor kind of referral from telehealth systems but GPs should continue to be cautious about systems that require highly skilled clinicians to do relatively simple tasks and if done poorly may well increase the demand on GPs…ensure good simple triage and the impact on GPs and community matrons will be positive in terms of helping with patient management, whilst at the same time reducing admissions. The key to success is the quality of the triage management.”

(by kind permission of Dr Richard Berkeley from the Orchard Medical Centre, Bristol)

Now, comparing life before and after introducing telehealth for patients, there is a trend towards reduced visiting, increased telephone and possibly an overall net effect in numbers of no real change. Clearly a visit takes a lot longer than a telephone call so it probably represents a reduction in GP time required.

Finally there are concerns that the re-organisation of PCTs and new commissioning arrangements will see the loss of good individuals who have built strong relationships with clinicians and are supporting them in making the changes. New teams starting from scratch and having to identify the champions and build new relationships was also of concern.
In this section, we address the service delivery issues needed for telehealth to operate at scale. We address three factors:

- **education and training**: Workforce enabled for technology transformation;
- **service model**: Defined technical and clinical triage service model;
- **clinical governance**: Established clinical governance and ethical agreements.

### 6.1 Education and Training

Education and training of the workforce is a key component for the successful uptake and use of telehealth. There is a need to equip the current and future workforce to manage and exploit new and yet more sophisticated technology, and the supporting changes around working practice and role redesign.

The healthcare worker of the future will need to manage the design and implementation of new ways of working in the delivery of care more easily and speedily than at the present time. Thought needs to be given at national level as to how we train staff in the adoption of new technology and the supporting change management that surrounds such adoption.

While technology is an important feature of providing telehealth, the real impact is through the redesign of pathways and the introduction of new models of care. The healthcare worker of the future will need to manage the design and implementation of new ways of working in the delivery of care more easily and speedily than at the present time. Thought needs to be given at national level as to how we train staff in the adoption of new technology and the supporting change management that surrounds such adoption.

Although reference was made regarding the training of staff, and its importance recognised overall it appeared that strategic thinking re training, accreditation, role and workforce redesign was not well developed.

**Current education and training - clinical staff**

While undergraduate training provides for the education of staff in technologies applicable to their future carers and role, these inevitably appear to focus on equipment. In the future, undergraduate training needs to embed an understanding of how to use technology intelligently to support patient care, for example the use of electronic patient records systems in hospital. While many learn these on the wards or within the work environment, embedding it in the core curriculum appears patchy and uncoordinated. The cost and time of training around new systems is often prohibitive. Staff are therefore not developed to enable them to maximise information to support clinical decision making.

If teaching on the adoption and use of technology in its broadest form is limited, teaching skills for change management within the core curriculum is even less apparent. Time constraints are inevitably an issue as all curriculums are large, but given that all those qualifying will at some point be involved in change either making it or being subject to it, it would seem sensible to provide a module and course work that has a focus on making change and the leadership role within it.

"The introduction of new telehealth and telemonitoring requires new skills and inevitably new ways of working that will change roles and responsibilities and create new groups of staff."

While technology is an important feature of providing telehealth, the real impact is through the redesign of pathways and the introduction of new models of care. The healthcare worker of the future will need to manage the design and implementation of new ways of working in the delivery of care more easily and speedily than at the present time. Thought needs to be given at national level as to how we train staff in the adoption of new technology and the supporting change management that surrounds such adoption.

Although reference was made regarding the training of staff, and its importance recognised overall it appeared that strategic thinking re training, accreditation, role and workforce redesign was not well developed.

"Nurses worry about being replaced by technology. They don’t see it as a tool. Most will argue they joined up for the face to face care which of course will still exist. I believe marketing type skills are essential to any delivery team implementing telehealth or a change programme."

I also believe that skills and knowledge need to be part of the qualification and training with competencies forming part of the job descriptions. That starts at grass roots just like learning how to take a blood pressure does. How can we implement change if we don’t review all aspects of the job and include technology at all appropriate stages?"

Lastly clinical staff may not be well informed about local services and how they can be accessed and used. There is little formal training on how to assess what service or technology is appropriate.
Post graduate training inevitably provides for a more focused and formally assessed use of technologies with additional qualifications or accreditation in place. These are usually taught within the workplace and formal assessment made using national or local standards and guidelines and observation of practice. Re-accreditation is usually a component, to ensure the employee can continue to practice safely. Accreditation schemes are audited to ensure they are fit for purpose. The large amount of governance in place that ensures staff are adequately trained to use equipment and the Care Quality Commission (CQC) assessments gives impetus to compliance. Furthermore, the risk of litigation if staff are allowed to use equipment or practice without training is ever present.

Leading and managing change is covered by a large number of targeted courses from the Royal Colleges as well as the Kings Fund. These require funding and can take the clinician out of the work environment for periods of time that need to be backfilled. All of these courses are well reviewed and useful. However access is often through self selection. Organisations or a group of organisations offer their own local courses, but this requires economies of scale to ensure value for money.

Experience shows that some staff returning from such courses are required to motivate themselves to engage in change management activities as managers can sometimes see the training as an end in itself. Personal objectives and goals do not always reflect the need to carry training through to practice. This could be addressed through the formal appraisal system, the use of Personal Development Plans and well constructed job plans with dedicated sessional commitments and job descriptions, integrating banding points.

**Recommendation 6.A Centre - Ensure telehealth / IT – and related change management and pathway redesign skills - are appropriately built into clinical education at undergraduate and CPD levels**

**Training programmes**

Throughout our discussions, there was a prevailing sense that all that was required was for staff to have training on the equipment, which was quite simple. Regardless of this, professionals will need to develop a number of new skills, which could be included in job descriptions and so form the foundation for appraisal of performance and identify skills gaps. In some cases, basic IT skills need to be learned. More specifically, some new skills will be needed:

- the ability to triage and assess patients for suitability of telehealth and at what level that should be;
- sound clinical decision making skills to be able to monitor patients remotely and determine when an intervention is required and what form that will take;
- an increased ability to provide non-face to face contact that enables sound decision making and inspires trust from the patients;
- improved coaching, motivational and reassurance skills using remote mediums;
- good teleconferencing skills to ensure the patient is confident that they have the clinicians full attention;
- ability to redesign work flows to enable responses to be timely and appropriate.

All of these skills will need to be embedded in the future training of all healthcare professionals. Many of these skills are currently utilised and formally taught at NHS Direct, where remote management and advice is its core reason for existence. Furthermore, PRIMIS+ already has 600 skilled IT facilitators in the field trusted to work with GP practices and PCTs.

A number of strategies were suggested, or are in place for training of current staff and these included:

- shadowing staff already trained in the system;
- formal training to use the technology supported by assessment;
- learning as they go, which during the pilot schemes has appeared to be the preferred method and the most pragmatic given the numbers involved;
• awareness days and additional training in assessment and management by specialist nurses;
• providing computer-based training for the likes of GPs who find it difficult to be out of the workplace.

As telehealth scales up, it will become increasingly important that the skills required are integrated into undergraduate and post graduate training, using formal accreditation and assessment, supported by sound clinical audit.

Reshaping the workforce
Given the increase in patients with LTCs and the ageing workforce, it is clear that there needs to be a radical reshaping of the workforce to enable patients’ needs and expectations to be met. Doing it as we do now is not an option. Looking for systemic improvements that free up clinical time to focus energies where they are needed is imperative. Nurses and doctors may not see so many patients face to face, but they will need to know when and how to intervene and assess the impact of their actions.

Using non-clinical staff to support clinical staff will become critical as caseloads will become larger yet differently and more efficiently managed or/and monitored. For example, non-clinical staff could be locally employed and accredited to assess patients and train them in the use of telehealth, and in addition to coach them during the first stages of use, through visits and remote contact.

A significant part of monitoring is essentially a data quality process, e.g. chasing missing readings, requesting repeat readings where gross anomalies occur. This does not require clinical judgement but can be time consuming.

“How does the public know what technologies are best for them? A website is not going to help as this will be a personal decision.

We need to ensure that staff are trained to advise and signpost people in a “whole of market” strategy whilst providing the real important elements of a device and the pros as well as cons. I suspect that until we have convergence of protocols, we are also in a position that providing advice is almost impossible to ask of most professionals.

Moreover there is no training available; there are no processes or procedures and no long term strategy to enable potential users to find out the information they require.”

As workloads increase it may not be possible to offer the coaching and well being monitoring that will ensure patients stay healthy. The introduction of long term condition support workers (trained in telehealth) operating locally or remotely is an option.

Recommendation 6.B Centre - Develop and accredit core competencies for the workforce that can be used to demonstrate providers have the capability to deliver high quality telehealth enabled care
Measuring staff performance was identified as key in ensuring telehealth was embedded; particularly in the community where measuring systems for staff effectiveness is difficult. Some suggestions included:

- assessing time spent on coaching;
- measuring the number of acute exacerbations prevented;
- reductions of admissions or unplanned contacts;
- numbers of case load on telehealth.

All of these would need to be benchmarked and as yet that information is not available given the number of users and the unknown outputs of the WSD.

Finally the banding of job descriptions was identified as important in supporting the development of new and changing roles, to ensure that the correct skills are in place and that any additional responsibilities or expectations are appropriately remunerated.

**Telehealth call centres’ training**

Throughout the review, the issue of call centres, their management, skills set and governance were recurring themes. Response centres where no clinical staff are present were identified as an area of concern. The importance of interpreting the results correctly or making decisions for which they were not trained was also raised. In addition, call centres may be more remotely placed geographically from both the patient and the professional, emphasising the importance of excellent communication skills and the opportunity for benefit from sharing of detailed care records.

The importance of good standard operational procedures and well defined escalation was stressed. When utilising private sector providers, good service specification and contract management were highlighted to ensure staff were properly trained, continuously assessed and well supervised. NHS Direct operates such a model. Nearly all those involved in telehealth call centre management had come to the conclusion that as the usage of telehealth increases, nurses and doctors would be unable to respond to the number of escalated issues and therefore clinical triage processes would become inevitable (see next section 6.2). This would require properly trained, competent, highly skilled staff.

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**Recommendation 6.C Local NHS**

Ensure adequate formal training and assessment of all telehealth and call centre staff, regardless of public or private provision.

**6.2 Service Model**

Organisations will need to consider different monitoring models and decide which model, or combinations of models, is right for them. Will readings be monitored by community matrons, GPs, dedicated call centres, other frontline professionals, or a mix of these?

**Recommendation 6.D National NHS**

Replicate successful large scale programme service delivery around telehealth-enabled services in a set of framework standards through CQC / NICE / SCIE.
“We can learn a lot from the American experience. What they call Care Co-ordinators we may call Community Matrons - it is evident from my experience that the technology is only one half of the story there needs to be an appropriate and timely response to an alert. In America this is probably speaking to a hospital doctor here it is activating a management plan and supporting the patient where possible at home.”

“Assistive technology is a useful tool both to monitor for deterioration in condition and for health promotion. Telehealth as a tool is only one half of the coin. When a change in condition is detected there needs to be a timely and appropriate response. To assist this we have developed:

- Clinical Management Plans - details the examination and diagnosis required, sample collections, and the drugs and doses to be prescribed (our community matrons are independent prescribers) - plan developed in consultation with the GP/Consultant

- Patient Management Plans - details the actions the patient will take.

- Social Action Plans - details what social support is required.

All plans are held in the patient’s notes and at our out of hours facility to ensure a consistent and timely approach. The patient is considered a partner in this relationship.”

Table 6.1 on the next page summarises the functions involved in the delivery of a telehealth-based service model, what skills may be involved and the implications in terms of configuration:
### Table 6.1 – Overview of telehealth service delivery model

<table>
<thead>
<tr>
<th>Function</th>
<th>Skills required</th>
<th>Implications</th>
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| **Service Desk** (single point of access) | • Pre-Service Delivery  
• Referral & Registration  
• Ongoing Service Support  
• Review & De-registration  
• Information Reporting | Service administration and finance  
General help desk | Could be in-house or outsourced  
Slick procedures to ensure no undue delays |
| **Installation and Training**     | • Assessment of patient / service user needs  
• Equipment ordering, distribution and management  
• Installation and test in patients’ homes  
• Training of patients / carers | A range of health workers could provide the assessment and device training, provided they themselves are trained in specific telehealth skills  
Technical installation to cover installation and configuration of the devices and hubs, establishing connectivity between devices/hubs, hub to centre etc | Requires visits and initial support to patient’s home – to cover both technical installation and initial training on the use of the equipment. The patient may need significant help over the first few days.  
Slick supply chain management required – working towards an Amazon-type delivery model |
| **Technical Triage**              | • Compliance monitoring  
• Qualifying or validating Data  
• Assessing alerts & Escalation as required | Non-clinical skills to monitor readings within prescribed levels of alerts  
Call handling and escalation | May be done in-house or outsourced |
| **Clinical Triage**               | • Clinical Assessment  
• Review v Patient Record  
• Patient Contact  
• Determine Response  
• Information Reporting | Clinical triage - healthcare support workers, nursing and GPs | May either be located as part of the response centre (‘telehealth nurses’) or community nurses / specialists as part of their normal case load.  
Clinical triage services fall under the need for CQC accreditation  
Technical triage services might fall under the need for CQC accreditation as part of an overall care-providing service |
| **Relevant Clinical Intervention**| As prioritised and prompted by clinical triage:  
• Home visits by health professional  
• Telephone advice  
• Referral  
• Other intervention | Clinical triage - healthcare support workers, nursing and GPs | May be done in-house or (in time) outsourced  
Sharing of a detailed care record to support the patient journey |
There is also a debate to be had about the relative merits of telehealth services provided by GPs, hosted in Acute Trusts or provided via community services. Telehealth will need organisations with a strong information infrastructure capability – which may suggest that acute Trusts are a good candidate, particularly if they now have vertically integrated community service arms as a result of the Transforming Community Services programme. But as discussed in Section 4, the key issue is whether a suitable tariff arrangement can be established to drive adoption by acute and community organisations.

One of the features of the WSD sites is that almost all of the service responsibilities were done in-house. This can result in a relatively expensive service. In seeking long term cost savings, a scalable managed service – certainly covering service desk and technical triage activities – would be beneficial. In large scale deployments internationally, there is segregation of services which enables different layers to be contracted to different partners thereby delivering cost benefits.

On the other hand, sites such as NYY are very keen to progress down a route of the clinical triage services being provided by the referring clinicians. It is they who know their patients best and can judge best the severity of a clinical alert, they can use the daily telehealth readings as a means to prioritise visits to the patients most in need and there is no dispute about the clinical governance responsibilities.

**Codes of practice**

Those currently engaged in delivering telehealth stressed the need for the introduction of standards and statutory codes of practice; these would need to apply to a range of areas including:

- installation services with standards for responding to calls regarding broken or non-functioning equipment, reliability of the product, these standards will then be built into the procurement process;
- monitoring centres and call centres be they with or without the NHS must have robust standards of care, particularly important for managing complex cases. The need for standards concerning escalation processes was seen as a high priority;
- guidelines for decommissioning or withdrawing services from individuals so that safety, quality and litigation are built into the development of pathways for using telehealth;
- since delegates of the supplier whose equipment is being installed will have to be in direct contact with the patients, some regulation may be needed to avoid illegal advertising or coercion to use additional services that may not be funded;
- for patients and clients who are already vulnerable, protection and safety in their own home is vital, therefore any supplier of services will need to be regulated to ensure that the patient/client is not exposed to any malicious or harmful action;
- upward and downward version product and software compatibility, so suppliers are obliged to maintain fully their legacy products;
- the interoperability of all systems used to deliver telehealth and telecare.

**Recommendation 6.E Industry** - Create commercial and delivery models that can provide scalable deployment and triage services

The arguments for a remote versus local clinical triage service are more finely balanced. In the largest telehealth installations in the US VHA, the term used is ‘care coordinators’ who provide a centrally run clinical triage service supported by a shared detailed care record. This model was adopted in most of the WSD sites, partly because of resource limitations with community nursing in the field. The NHS Direct Telehealth pilot in SE Essex used Health Care Assistants for this role.

**Recommendation 6.F Local NHS** - Pursue models of telehealth delivery (based on national good practice) that are capable of scaling by adoption of layered and separable services – while fitting the local need and circumstances
It has been suggested that CQC will need to have all remote care services registered with a telehealth code of practice. Telecare already has a universal code but telehealth does not. A code of practice with clear guidelines and statutory duties needs developing nationally to assist commissioners in developing local guidelines and standards.

**Recommendation 6.G Centre - Corral relevant stakeholders together with industry to create a viable telehealth service code of practice**

### 6.3 Governance and regulatory matters

Clinical governance is the “system through which all healthcare organisations are accountable for ensuring continuous improvement and outcomes in the quality of their services and safeguarding high standards of care, by creating an environment in which clinical excellence will flourish.”

Related to this is information governance, which is a “framework for handling information in a confidential and secure manner to appropriate ethical and quality standards.”

Inevitably monitoring and measuring compliance must take place at local level and commissioners must have sufficiently robust performance management systems in place to ensure both the delivery of a high quality service and value for money. A practical and pragmatic approach is needed. If parameters are rigidly adhered to, the system would get overloaded. The clinician needs to take a judgement based on the telehealth readings but also related factors to the patient’s condition.

It is clear that as telehealth increases, organisations will need to establish legal frameworks that allow information sharing and governance around telehealth to be established.

Several legal and ethical questions have arisen during our work that support this belief and these are explored below.

#### Responsibility and accountability

In exploring telehealth, one of the major areas of concern focused on the responsibilities, accountabilities and liabilities of staff in the safe delivery of the service.

Legal responsibility for the management of the patient at all times was a consistently identified issue, needing careful consideration and clarity before embarking on large scale programmes. For example, concerns were expressed regarding the legal liability of GPs where a pathway is contracted out and monitoring and intervention is by a third party: who has responsibility for the patient and under what circumstances?; what happens if the patient is harmed?

Many of the issues have already been addressed when putting into place the subcontracting of patient care to private suppliers. Negotiation of these contracts includes robust due diligence processes to ensure compliance with regulations, the training and management of staff, organisational capability and evidence of robust clinical governance protocols. This approach could be adapted to telehealth suppliers.

One model for call centres, monitoring centres or teleconsultation centres supplying pathway management and medical or nursing services with a responsibility to directly intervene in the patient’s treatment might be that supplying organisations must assure themselves that:

- employees are sufficiently trained and skilled to carry out those roles;
- competence has been tested;
- sufficient information and access to records to enable sound clinical decision making;
- good communication pathways exist with the patient’s GP to ensure that interventions are discussed or communicated at the earliest opportunity.

Private and social enterprise suppliers would be required to demonstrate that their internal governance is as sound as NHS providers of care. Commissioners of care would retain the responsibility to assure themselves that service providers are of the required standard at all times.

GPs are responsible for the care they provide their patients except during a hospital admission when the
relevant consultant assumes that responsibility, or when responsibility is delegated to an Out of Hours (OOH) service. This is especially important because Telehealth is generally a non-urgent response service. Clear accountability for patients with multiple co-morbidities is especially important.

OOH call centres already operate effectively providing a range of services and are supported by clinical guidelines and pathways designed and specified by doctors, usually signed off by medical and nursing directors. However, OOH services have been the subject of much debate following incidents where the patient has come to harm. In these cases, the liability has fallen to the clinician making the intervention and the body commissioning the care.

Organisations will need to be very clear where responsibility lies; where the patient is under the care of a GP, the practice must assure itself that the processes and procedures are in place such that the patient is caused no harm. As GPs become the local commissioners, further clarity will be needed.

Where services are not contracted out, it would seem appropriate that the GP and/or nurse assume their normal responsibilities and accountabilities for the patient’s care, reacting to information in a timely and appropriate manner. Telehealth is supporting tool and should not alter the accountabilities and liabilities of clinicians.

Another challenging area concerns the moving of patients through technologies and possibly out of them, by providers who have ‘bought out a case load’ or supply total pathway management. Commissioners will need to assure themselves that there is equity of access and that non-essential or over-complicated telehealth technologies are not put in place.

Likewise, mechanisms need to be put in place to ensure against under-use or under-provision of the service to save money or paper over workforce shortages. The tariff will need to discourage perverse behaviours in installing complex kit, with over-monitoring and excessive levels of support. Consideration should be given to benchmarking, which may be needed to provide assurance that patients are being correctly assessed, supplied and monitored.

Generally speaking the clinical governance rules are clear when they are provided by existing NHS bodies. All such bodies are regulated by the CQC and there is a clear understanding of accountability and limitations of liability. What may be a greyer area is where (some of) the clinical triage services are externally provided or outsourced. The organisation would need appropriate regulation under CQC.

**Recommendation 6.1 Centre - Address need for CQC ‘light touch’ accreditation of all telehealth service providers**

Another issue that arose concerned the delivery of telehealth from outside the EU, where EU law does not apply. This would effectively preclude the delivery of telehealth services from offshore, non-EU locations. Given that Telehealth is in its infancy, the use of non-EU providers seems premature, but guidance should be provided as the market will open up and become more competitive with new suppliers entering the market place offering new solutions.

**Informed Consent**

Although slowing up the implementation process by requiring additional input in terms of an explanation to patients, the WSD required informed consent as part of its ethics approval process. Other programmes and projects appear to have gone down the informed consent route to varying degrees. The general consensus appears to be that informed consent is desirable. Patients should be given the option to opt out.

If this is so, at what point should its use become mandatory? A patient may refuse any form of telehealth, but its use may be considered vital for their well being. There will be times when informed consent could be required from a carer due to a person’s mental capacity. This may be particularly relevant when considering the use of remote monitoring or support for Alzheimer’s sufferers.

Equally, from an ethics point of view, is it fair for one patient to be offered telehealth services, while another with almost identical presenting conditions, is not? This concern has particular resonance where the technology available may serve to exclude some patients through language, IT literacy, sight or other ability.
Information Governance

Some concerns were expressed over information governance and security of access to confidential, identifiable information as it moves between providers of services, some of which will not reside within the NHS and N3 e.g. call centres, private healthcare and social care providers. Yet the NHS has regularly used private providers in a number of settings including mental health, provision of community care and has regularly accessed private healthcare for waiting list reductions. Where this has occurred NHS organisations will have managed these issues. Likewise GPs share information with other agencies when children are on the at-risk register.

That said, it is vital that proper consideration is given to the security implications of sharing patient information particularly electronically. The level of choice given to patients concerning who reads their records and the potential for security breaches of either local or national databases must be addressed to ensure patients and clinicians are confident that the system is secure.

It would appear that obtaining patient consent to share records with other providers would be a solution and that patients should understand the scope of that consent and the security surrounding its confidentiality. They must be made aware of the benefits of telehealth to support their decision.

Ensuring the security of the link between home and monitoring centre has been a key consideration. This has driven the implementation of one-way data uploads, but excludes some of the richer possibilities of record access where patients could call up data to see trends etc. There is no ‘NHS Smartcard’ for patients, and even if there were, current processes are probably unusable by large proportions of Level 3 / older patients.

All staff handling patient information must be made aware and trained in the importance of handling confidential patient information. This applies to internal passing of information between NHS providers as much as referring to external providers such as call centres or installation services.

If good governance is already in place within NHS organisations, these practices should form the basis of any contract with private providers. The concerns will be realised where NHS organisations themselves have a less than robust approach to information governance.

Recommended 6.K Centre - Establish information governance guidelines for telehealth systems at home which balance security considerations with usability needs for older people

Information governance is not and should not be a barrier to the implementation of telehealth.

Medical Device Directive

An important matter is the interpretation of whether a telehealth device falls under the medical device regulation. Medical device regulation requires manufacturers to demonstrate that their systems are safe. Currently, even for Class 1 devices, the regulations mean that to limit their liability vendors need end-to-end control of the entire system.

The Medical Device Directive (MDD) - the regulatory framework applicable across the European Union - has recently updated the definition of a medical device so that it now encompasses software in its own right (previously software had been thought of only as a component of a device).
On that basis, the UK’s Medicines and Health Regulatory Agency (MHRA) has informed Intellect (the suppliers’ trade association) that telehealth solutions – and the related software - are likely to be considered as medical devices and Intellect is coordinating work around the practical implications of this. Even within the EU there is uncertainty, as the legal framework emerged under the draft Directive on “safe, high-quality and efficient cross-border healthcare”.

If a clinician has recommended use of a particular device, our (layman’s) view is that it would fall under the medical device regulation. If on the other hand, the patient or consumer chooses themselves a particular device or monitoring tool (e.g. use of a Smartphone app for blood pressure monitoring), it is not so governed. Discussion with colleagues representing several European countries gave a view that a harsh interpretation of the medical device directive could radically slow down any consumer developments in this area.

There are probably two extremes in the debate on what this means. At one end is the Canadian and Swedish view that all health software should be a medical device and controlled accordingly. This is leading to testing regimes akin to aircraft software, where each and every variable component is tested and proved. At the other end of the debate is the NHS, which has recently adopted the IEC80001 standard (via DSCN14/09 and 18/09). This recognises that the risks of interoperability can only be managed by effective in-service management, so shifting some of the regulatory effort from pre-market device approval to post market regulation of service operators and their procedures. A world where patients buy or get their own devices, take readings and send them into whichever NHS organisation needs them requires an opening up of the current systems based on standards for interoperability.

Summary

Although a good strong governance framework is essential to the delivery of safe and appropriate care, some believe that the NHS can over-engineer governance, making it very costly and time consuming. This can be a real block to quick change and an excuse not to do anything; for those working within the NHS and with the NHS it can be seen as the barrier to the solution. To avoid slowing down telehealth implementation unduly, some centralised action will need to be taken with a strong framework, clear guidelines and protocols that NHS organisations can ratify with confidence.

The experience of Medtronic in relation to implementing acute-based remote monitoring services (Carelink) for patients with implanted pacemakers or cardiac defibrillators is highly relevant. Their experience across 90 hospitals is that all the hurdles associated with clearing matters such as reimbursement, legal, IT, Caldicott guardian, IT Governance, and contract generally takes 2-3 months. In one case, the process has taken more than 2 years. In each new Trust, the process starts from scratch and it is evident that some national guidance could be very helpful to avoid reinvention of the wheel.


Recommendation 6.L Industry - Work collectively with customers and other stakeholders around the practical implementation of the Medical Device Directive for telehealth products and services

Recommendation 6.M National NHS - Create clear clinical and information governance frameworks around telehealth services so that local NHS organisations do not have to start from scratch each time a telehealth-related project is launched
Earlier sections have concentrated on the customer-side actions needed to scale up telehealth. We believe the market will only work for telehealth if it is scaled up, and in this section we consider the following four factors relevant to the question of scale.

- **Best practice sharing**: How learning around the NHS may be shared for the benefit of all.

- **Procurement model**: Easy to follow procurement framework and guidance.

- **Industry readiness and disruptive innovation**: Mature industry offerings and commercial models

- **Technical prerequisites**: Interoperable devices, hubs, patient record integration; the need for sound national and local IT infrastructure.

"The NHS needs to embrace telehealth now at a scale that means that services would have to be considered in some way mainstream. Comments elsewhere point to issues of a ‘pilot mentality’ and low volumes driving high costs of service and making commercial investment difficult. While it is probably not ready to become a ‘universal’ entitlement, there is enough evidence that it can make a cost-effective difference for those with life limiting LTCs such as COPD and CHF."

Too many services are delivered by very small teams, which means that issues of service standards, training etc are not addressed at a level that would generate a broader capability. While PCTs may be ‘old currency’ it is useful to think in those terms. A typical PCT covers 300,000 people, and 1/3 will have some condition. Perhaps 10% would fall within the life limiting bracket. Yet telehealth is mostly deployed at under 50 patients - roughly equivalent to a single community matron’s caseload. There is a need to go up a couple of orders of magnitude - get people thinking about services for 500-1000 patients in a PCT, and use that to build capability and capacity to go on to reach more of the 100,000 potential users."
7.1 Sharing of best practice

SHAs currently have had a statutory responsibility for enabling innovations locally and, through the QIPP programme, considerable attention has been paid to telehealth.

"The COPD pathway is a prime example of a great target for redesign for using telehealth tools, but how can we be sure what to use and what works best when there isn’t really a decent repository of trustworthy case studies or evidence? We need a national repository of evidence and case studies."

From our work, there are two SHAs (West Midlands and Yorkshire & the Humber) who are undertaking significant work around creating a common agenda which offers the potential for scaling up telehealth across their local health communities.

Table 7.1 on the next page compares and contrasts their respective approaches:

Other SHAs are leading a variety of initiatives around telehealth, some focusing on infrastructure-level developments, others looking at specific use cases. Strong examples of these are mentioned elsewhere in this report.

In addition, a wider network of interested NHS bodies and Local Authorities exists to share experience and learn lessons around the WSD programme, called the WSD Action Network (WSDAN)\(^\text{16}\). It aims to “combine research, educational and experiential learning opportunities to examine the progress and impact of telecare and telehealth in enabling long-term conditions management”.

We understand that WSDAN is only funded until 2011. This breakpoint presents an opportunity to consider how best practice can be shared as the NHS moves beyond the demonstrator and pilot stage into mainstreaming telehealth. For example, modern IT collaboration tools such as crowd sourcing enable efficient and wide coverage to share lessons and promulgate good practice.

Recommendation 7. A National NHS - As the WSD evaluation publishes its reports, consider how best practice may be shared and in what areas template deliverables should be shared – e.g. commissioning models, project toolkits, pathway redesign templates, model business cases, template service specifications

With the impending phasing out of SHAs and PCTs, there is a risk that much valuable capacity and learning for the taking forward of telehealth-enabled services will be dissipated. In Scotland, the Scottish Centre for Telehealth has performed a valuable advisory and expert role in facilitating telehealth and teleconsultations north of the border. We regard some national capability like this as essential for telehealth to move beyond ‘pilotitis’ into mainstream NHS operations.

\(^{16}\) http://www.wsdactionnetwork.org.uk/
Table 7.1 Key SHA activities around the scaling of telehealth

<table>
<thead>
<tr>
<th>West Midlands</th>
<th>Yorkshire &amp; the Humber</th>
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| • Strategic focus around LTCs involves addressing these priorities:  
  Risk stratification  
  Prevention  
  Self management  
  Personalised care planning  
  Integration  
  Tele-healthcare  
  Workforce planning  
  • Directory of available technology, searchable by disease/symptom also offering product comparison  
  • Predictive modelling / risk stratification on a regional basis  
  • Assessment of required workforce skills and competency, and training requirements  
  • Organisational infrastructure / governance created across all PCTs to create readiness and build business cases for the adoption of telehealth  
  • Regional innovation funds used to fund programme management support to PCT-based projects to develop regional capability  
  • Business cases being finalised around a general SHA stance that PCTs should be looking to medium-large telehealth rollout or adoption of fully managed telehealth service  
  • Consideration towards cluster-based procurements for scaling up across PCTs  
  • Development of a regional commissioning & evaluation toolkit provides reference materials, best practice guidance, business case templates and evaluation methodologies  
  • Regional innovation funding for rollout at scale of 'Simple Telehealth' (see below)  
| • Provision of a bespoke telehealth toolkit for commissioners, developed from the West Midlands product  
  • Predictive modelling/risk stratification tools to identify high risk/high volume users  
  • Accelerated, intelligent procurement framework with “risk sharing/incremental cost” models developed with suppliers  
  • Procurement of Local/Sub-Regional telehealth hub/centre(s) to allow PCTs to join patients to proven service models at incremental per-patient cost.  
  • Regional co-ordinating centre acting as umbrella to co-ordinate change management, learning and support  
  • Consistent evaluation methodologies/ research education training and workforce development collaboration  
  • Technical Interoperability to ensure incorporation of telehealth information and “end to end” patient care record/plan  
  • Credible ROI Models to enable “cash releasing” savings (beds and workforce) to be identified and secured  
  • Protocols for eConsultations –between GPs and specialists – using detailed care record sharing with the patient’s consent |
With the current financial restrictions and government policy to devolve functions, it may be out of vogue to suggest a central team around telehealth for the future, but fashion should not overrule what is necessary for success. The most practical approach would be to create a small virtual national team working to the National Commissioning Board – perhaps created and staffed from across the current DH LTC policy, QIPP and DH Informatics Directorate (DHID) teams, with industry support through secondments.

In October 2009, responsibility for the then existing framework agreement was transferred to Buying Solutions (a cross-government purchasing agency) and consideration given to a new framework agreement from June 2010 onwards.

The new framework agreement was constructed to address a revised set of needs and a greater understanding of the market, and following an EU compliant procurement process, the new framework agreement and its associated catalogues were established in August 2010. It enables contracting authorities to call-off goods and services across six different lots using standard terms and conditions. One of the major new developments of the framework agreement was the addition of new services such as telecoaching as well as a new lot for ‘managed services’ enabling a one-stop shop for a turnkey telehealth service.

Successfully appointed suppliers went through an EU compliant procurement process, involving demonstrating their capabilities to meet the requirements.

Using the framework agreement, contracting authorities are able to place orders directly with a chosen supplier or follow a further competition process. Guidance regarding the options is available via the Buying Solutions website. Given that authorities generally have standing financial instructions requiring them to demonstrate competition and evidence for best value for money, almost all new procurements are expected to follow the further competition process.

Buying Solutions actively manage the framework agreement so suppliers are required to demonstrate and report on their performance and sales activities regularly. The framework has been let on the basis of a 2 +1 +1 year agreement, enabling Buying Solutions considerable flexibility to respond to changing customer needs and market developments. Individual contracting authorities may place a call off contract of up to 4 years.

**Recommendation 7.B National NHS - Pool and share expertise in telehealth commissioning, particularly during the transition phase as local commissioning responsibility is transferred from PCTs to GP consortia**

**7.2 Procurement model**

In 2005, at the request of the Department of Health, the then NHS Purchasing and Supplies Agency (PASA) were approached to establish a framework agreement allowing public bodies to call-off telecare and telehealth products and services from a catalogue of approved suppliers. The framework agreement was successfully awarded in May 2006. The framework agreement ran for four years and during its time some £90M of business was ordered through the catalogue, mostly in relation to telecare purchases, in part driven by the Preventive Technology Grant.

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17. http://www.buyingsolutions.gov.uk/categories/ICT/telecare/
The framework agreement clearly provides a head start for market progress, however there are some constraints and issues:

- In following a further competition process, a contracting authority has two options:

  1) Invite all suppliers within the designated Lot to respond to a ‘capability assessment’. The result allows the contracting authority to shortlist just those suppliers capable of providing their requirement. At this stage the shortlisted suppliers will be given a more detailed specification relating to their requirement.

  2) Invite all suppliers from the Lot directly to the further competition stage by providing a more detailed specification relating to their requirement without going through a “capability assessment”. In some lots, there are more than 30 suppliers (e.g. in the case of Lot 4 – telehealth services) so leaving potentially much work by the procurer to get to a manageable list size – as well as long bidding odds for suppliers.

- Will the framework agreement really establish the much lower price points needed for telehealth to happen at scale? The framework assumes that significant lower prices for large volumes of users will generally need establishing through individual procurements at scale.

- On legal advice, adherence to standards on the framework is only defined where they have been nationally adopted (i.e. British Standards standards). This means that adherence to interoperability standards defined through the Continua Health Alliance (see below) or European IEEE is not specified, or even indeed those message standards defined and agreed by DH Informatics Directorate. Buying Solutions understands that suppliers are working on conformance to these interoperability standards.

Finally, in procuring services that involve the transfer of service provision for the management of the whole of the pathway, commissioners will need to ensure that service redesign is completed before the transfer of services and that processes are already ‘lean’, with value added activities removed. This will enable the NHS to benefit from the savings accrued. In procuring services, commissioners will need to consider carefully the volumes and complexity at which they contract to ensure that failure to achieve scale or under commissioning is avoided, leading to additional payments.

As indicated above, the Buying Solutions framework agreements may not provide the step-jump needed for the market to respond proactively by moving on the maturity of telehealth services market and level of innovation to the degree needed. There is a risk that capabilities are fixed around the current level of solution innovation. Some consideration of a model more akin to the GP System of Choice (GPSoC) contract, with some minimum requirements and the ‘levels of compliance’ approach that allows suppliers some choice around when they implement more advanced capabilities, and to help buyers to understand what they should be asking for.

Recommendation 7.C Centre - Undertake continuous improvement of the telehealth, telecare and telecoaching procurement framework over time as driven by NHS needs and market maturity – towards mandating minimum service, interoperability and technical standards – as an enabler for lower priced products and services and to enable ready comparisons between offerings.

“Standards are the key to scale. Professional as well as technical. What is crucial is that procurement is used to drive standards - otherwise there will be a continued stand-off with suppliers; with 'market leaders’ content to exploit a proprietary trap which adds costs and prevents new innovations entering the market.”
Now

In many ways, the market is at a ‘chicken and egg’ point. It has clearly moved well beyond the cottage industry environment of recent times, but has yet to mature. It remains as a rapidly emerging market where ‘proven solutions’ may well be overtaken, where new partnerships develop rapidly and one could expect that a very diverse and small supplier base would see some consolidation over time. As countries across the world grapple with the LTC issue, industry faces many of the same opportunities and challenges elsewhere. This needs appropriate political and clinical collaboration internationally.

Some of the UK market characteristics include the following:

- at the product and device end, there is heavy competition. Many of the players are relatively small, coming from a world of largely proprietary standards (especially around telecare);
- as the sector develops, a fair amount of consolidation can be expected.
- traditionally the hub provider also controls the health management triage software platform. Third party platforms are now under consideration which enables connectivity of multiple hub / equipment providers while offering a single portal to clinicians and patients;
- the market is increasingly international with large global manufacturers in the hub space – e.g. Intel, Bosch, Philips, Honeywell, Siemens etc. – now prominent in the UK market. They have deep pockets to invest and innovate, provided they have a clear line of sight on the market;
- the managed service end of the market is quite immature, with a whole range of new suppliers interested19, supported by a wide range of sub-contractors e.g.:
  - global IT service providers (Accenture);
  - mobile and fixed telecoms providers (BT, Vodafone UK);
  - health IT software and service providers (iSOFT, TPP SystmOne);
  - dedicated telehealth/telecare suppliers (Tunstall);
  - through to specialist care management providers (Pfizer Health Solutions);
- the level of industry capacity available to support a rapid scaling up of the market is unclear. One leading supplier told us they could support up to 10 large telehealth projects concurrently;


"The industry is stuck in a catch 22 situation. With so many telehealth initiatives still at pilot stage, suppliers’ unit costs and therefore charges remain high. If initiatives were at a larger scale, suppliers would be able to spread their costs better and so unit costs would fall."
Some NHS organisations are looking to be commercial providers to other parts of the NHS, especially in relation to technical and clinical triage services (e.g. Airedale NHS Trust, NHS Direct) and are on the Buying Solutions framework agreement. These types of providers already provide 24/7 skills and coverage, with clinical governance rules established;

Large consulting practices such as KPMG, Ernst & Young and PA Consulting are actively involved in providing change management skills and technical capability;

Connectivity between the home environment and the service centre may need to use a variety of connectivity options – including ‘plain old telephone services’ (POTS), broadband and mobile connectivity – ideally reusing the existing connectivity in the home.

Customers who have recently gone through procurement processes anecdotally commented to us on their relative disappointment with the level of innovation and technology currency from suppliers, and at the relatively high prices of the product and services.

In the course of our discussions with suppliers, it was evident that they are looking at significant developments in the near term to offer products and services at scale and therefore at a lower price point. What is also critical is that their design and approach be driven by what the patients really want. For example, developments we heard about included:

**Hubs and devices:**
- multi-user and multi-purpose hubs – e.g. to support use in nursing homes, or housing associations – some form of identity management solution is required;
- multi-lingual patient questionnaires, configurable for multiple conditions;
- migration from fixed home hubs to mobile ones (especially useful for conditions such as diabetes);
- lower cost alternatives to Bluetooth for wireless connectivity between devices and home hub within the home network - e.g. Zigbee;
- highly intuitive devices and hubs, also able to support videoconferencing;
- lower software costs – highly flexible software, updatable and remotely managed with no local server, operated on a ‘software as a service’ basis;
- exploration of next generation home/user hubs based around standard platforms – e.g. Smartphone, iPads, new TV set-top boxes.

**Connectivity**
- cost savings by avoiding need for a dedicated broadband connection for every patient or by reusing existing patient broadband infrastructure;
- use of powerline adaptors to enable the home hub to be sited wherever the patient wants;
- use of large scale telecoms engineering and other large service organisations for installation of home hubs and equipment;
- exploiting community worker mobility solutions that are being rolled out – e.g. BT’s Mobile Health Worker solution optimised for a range of leading community software solutions; CSC’s ‘patient in your pocket’ providing Blackberry access to TPP’s SystmOne.

**Lower cost of ownership**
- creation of managed service infrastructure – able to cope with a whole variety of devices and hubs – into a common health management service platform;
- easy reuse of equipment to enable telehealth to be offered to patients for short bursts, e.g. rehabilitation after hospital; or even for pharmaceutical companies to use hubs for clinical trials and reuse equipment;
- easily deployed products and services, appropriate to a consumer market;
- lower training requirements – ease of use with colour wipeable touch screen;
- use of interactive voice service capabilities of large call centres for technical triage;
- telehealth providers targeting low cost offerings around the consumer market – to ensure the data from consumer purchased home/personal monitoring devices is not lost;
7 Enabling Scale

- equipment depreciated over 7 years, sealed unit with no serviceable parts.

**Patient engagement**
- ability for the patient to access their own readings through a portal;
- easy reuse of existing NHS and third sector content resources to channel to the patient;
- mixture of dynamic (e.g. weather conditions/pollen count - important for COPD sufferers) and static content feeds;
- social networking peer to peer support;
- videoconferencing to care professionals, GPs, Pharmacists etc;
- video educational content.

**Recommendation 7.G Local NHS** - In selecting telehealth technology products, ensure the monitoring capabilities provide a platform for further growth in size and scope as the in-home technology evolves.

**Recommendation 7.H Centre** - Work with industry to encourage and promote innovation and enable the UK to take a lead in providing the global market with appropriate technology and solutions.

**Recommendation 7.I National NHS** - Define solution markets to enable industry to target opportunities for development, so encouraging collaboration around well defined boundaries.

**Recommendation 7.J Industry** - Offer rapid innovation around the technology to support large scale service delivery through improved chips, implants, intelligent software combinations.

*‘Game changers’ - such as mHealth*

By ‘game changers’ we mean innovative developments fitting very much into the mode of ‘disruptive innovation’. These can be products and services (normally consisting of technologies deployed within new business models) that reshape and transform the markets into which they are launched. For example, Apple’s iPhone and more particularly its apps have transformed how people use mobile phones, and how individuals consume information. The model has also dropped the price point for software to pocket money levels.

Appendix I provides further information about the potential applicability of disruptive innovation to telehealth. This was prepared by Clever Together LLP (who ran our on-line engagement) following a facilitated discussion at our stakeholder group workshop.
As well as the ‘full function’ telehealth model that the WSD projects have pursued, there is also a developing view of simple to use, low cost solutions for less complex conditions, for example for those patients in levels 1 and 2 of the Kaiser ‘pyramid of care’ model. The solutions themselves may involve high levels of automation using more pervasive platforms and infrastructure (such as Smartphones and TV set-top boxes), enabling rapid roll-out. Indeed it is this type of model that Kaiser Permanente themselves are adopting around the management of their patient members who suffer from high blood pressure (1/3 of their member population).

Recommendation 7.K Local NHS - Where appropriate, consider innovative, low cost ways of delivering telehealth at scale

An NHS example of this is now illustrated:

Case Study 7.1 - West Midlands SHA
“Simple telehealth”

The SHA plans to take forward a ‘simple telehealth’ service based on work done by Stoke PCT and has allocated 2010/11 innovation funds for the programme.

Here the telehealth interacts with patients through text messages to help them to manage their condition and increase their independence. The system supports patients with advice though automatically generated text messages and provides direct feedback when the patient sends in a reading on say their blood pressure. Clinicians are able to review patients’ readings and change treatments without the patient having to regularly visit a surgery.

Such as model can be appropriate to a wide set of conditions (hypertension, diabetes, mental health) and potential uses (e.g. medication reminders; appointment reminders; blood monitoring reminders; physical health monitoring; behavioural change; social inclusion; ‘feel good’ messages). The service is much cheaper to run, perhaps only a tenth of the ‘full telehealth’ service model and with none of the expensive investment required in devices and home hubs.

The effectiveness of such a service does need proving, but it offers the potential to scale rapidly (the West Midlands service is aimed to support up to 150,000 patients). Referrals could come from a number of sources, including self-referral. The system can also be used to support carers, although this is yet to be developed.

20. See http://www.westmidlands.nhs.uk/LinkClick.aspx?fileticket=kWVPuEF2r%3D&tabid=1215 and http://www.westmidlands.nhs.uk/LinkClick.aspx?fileticket=Mop0grxIgP0%3D&tabid=1215
The creation of the National Commissioning Board also offers the opportunity to consider national low cost, telehealth capabilities for some nationally commissioned services (e.g. maternity - high risk pregnancies) or indeed other single issue, high impact needs (e.g. high blood pressure, aspects of diabetes care).

**Recommendation 7.1 National NHS -**
Identify telehealth capabilities that can be rolled out across the country as part of nationally commissioned services or other single issue needs

Much of the current focus around mobile health (mHealth) in the NHS has been around providing community health workers with connectivity back to base (e.g. remote read and update of patient records), and with scheduling and planning capability. However, the ubiquity of mobile phones – especially Smartphones - amongst the general public makes it an obvious platform for future telehealth applications – ‘anytime, anyplace, anybody’. Indeed by 2013, Gartner have estimated globally that more web pages will be accessed through mobiles than through PCs.

The following illustrates how and in what direction mHealth could develop, based on input from a global expert and leader in the field:

“There are reputed to be at least 6,000 medical and healthcare Smartphone applications now available for download. Within 2-4 years, the mobile platform may represent the best platform for 24/7 coordinated care, with the prospect of personalised educational care available to use through a single user friendly Smartphone screen for simplicity and access.

“And in terms of access to knowledge and educational materials, there is a general consumer preference towards video rather than printed materials, with Cisco estimating that 66% of mobile traffic by 2013 will be video.

Apart from its public popularity, the video format (as a complement to conventional print and verbal instruction) has already been proven to increase patient understanding and associated health outcomes in a variety of treatment environments ranging for heart failure to prostate cancer.²¹

As web (and mobile web) based video of wide ranging quality is already a leading source of public medical information from user generated media sites such as YouTube, the NHS establishment would be wise to adapt to these public preferences by utilising compliant, understandable and authoritative video to more consistently enhance patient understanding of medications, health conditions, and medical procedures. Videos that educate, instruct and coach toward the actualisation of more well informed and more appropriately motivated ‘expert patients’. Expert patients that better self-manage their health conditions between clinician visits and better manage the escalation of their disease related costs.”

(reproduced by kind permission of Rob Dhoble, President, Diversified Agency Services Healthcare, Omnicom Group and Founder, Adherent Health, LLC)

However, for the mobile Smartphone to take off as the omnipresent telehealth platform, some more clarity around the circumstances of when a monitoring application does or does not fall under medical device regulations is needed (see Section 6). Such regulatory distinctions should appreciate the context that many such mobile health status monitoring tools are extensions of patient health education and health status monitoring platforms that currently exist via web-connected desktop and laptop computers. And furthermore, the applications need tying into some form of a service, along the lines of the ‘Simple Telehealth’ service covered above.

“Would telehealth commissioning be accelerated if a ‘cloud’ based solution was provided centrally? If the main service providers and clinician system vendors came together to offer a solution where you purchase the most suitable service for the patient, the technical and medical triage is done centrally, patient management is local via community matrons and social care, and data is integrated into each respective clinician’s system? This provides an ‘off the shelf’ solution with a shopping list of features. It removes the need for commissioners to set up expensive contracts, and be locked in to single providers for years on end.”

Finally, there is the long term prospect of a cloud-based solution to provide an enabling platform to cope with any scale of GP consortium as a low cost delivery mechanism, with pre-accredited monitoring applications ready for download. There would need to be some clarity around the issue of ‘where is the data hosted?’ There would also be the need for open standards so that data can be imported and exported between systems to avoid vendor lock-in.

Future industry directions?
Related to this, several national and international bodies aim to stimulate more innovative technology solutions in the assisted living and telehealth market. Within the UK, the following bodies are instrumental and have significant current programmes on-going:

- 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) – brings together partners from all sectors to develop the next generation of devices and services based around the connected home and mobile/wireless environment. It is also looking at developing new business models for telecare and telehealth.

- the Wellcome Trust supports new health innovation, working with the Department of Health.22

- the NHS National Technology Adoption Centre has looked at models around remote monitoring for heart failure.

At the EU level, various initiatives exist, notably around FP7 (the Seventh EU Research Framework Programme - the EU’s main instrument for funding research through to 2013) and the related Ambient Assisted Living Programme (i.e. where technology is hidden in the walls). As part of its newly announced European Innovation Partnership, the EC’s pilot project in the field of active and healthy ageing will be highly influential in the longer term (see Appendix D).

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. For example, in the area of diabetes care, implanted products such as for insulin pumps and glucose monitoring may become the norm with ever smaller devices meaning fewer complications. In time these may be extended into pulmonary diseases such as COPD. These devices have the potential to generate huge amounts of data, so clarity is needed about what should be done with it.

There are also developments in non-skin contact devices, built in mattresses and also thermal imaging devices that can detect pulse rates, breathing rates etc. There is a contact lens in development that can measure various vital signs.

Another possibility concerns the use of smart infrastructure and metering as a means to collect and transmit care and health measurements, without the need for additional external devices and hubs. Indeed by exploiting smart metering we were told that signs of early onset dementia could be identified through daily monitoring of patterns of utilities’ consumption.

7.4 Technical prerequisites

Interoperability and Integration

By “interoperability”, we mean the ability “to allow different technological solutions to communicate with each other, allowing patients and clinicians to exchange clinical information across healthcare settings, and across borders, even if they use different devices (medical software, computer, phone, medical equipment) or ICT providers (broadband provider etc.).”

The Department of Health has recently emphasised the importance of interoperability in health by advocating a ‘connect all’ strategy. In the particular case of telehealth, solutions need to be interoperable:

• for the patient’s safety, mobility and ability to exercise choice;

• to facilitate the integration of the work of healthcare professionals;

• to remove barriers (i.e. borders) for the deployment of telehealth at the scale required to benefit both patients and the health economy.

“One of the main things missing in a patient-centric care pathway is a patient record that can be shared easily between different clinical professionals, e.g. community matrons, GPs and acute providers. Telemonitoring would also benefit from feeding data in to the shared record so that GPs could also view telehealth data when they see their patient’s record. Telecare could benefit from a patient record, parts of which could also be shared with the local care services, helping care professionals to understand their patient’s condition.”

“For me this is fundamental. In a world where the National programme is at best faltering and at worst effectively stopped - what is needed are joined up “local health records” (on a ‘connect all’ strategy rather than ‘replace all’) that can be easily integrated with telehealth systems across smaller (more local) boundaries. In turn these, more incremental, systems changes should be paralleled with local/incremental service change within pathways.”

“An observation we’ve come across is that very few of the telehealth systems interoperate with each other. The devices and their central system appears to be a ‘walled garden’ i.e. data is put in to configure the systems, data generated and data exported e.g. vital signs to patient record systems. Many systems use the same peripherals for weight, BP Pulse OX but the market today is definitely one of ‘single source vendor’ as opposed to software, hardware, clinical and non clinical services being supplied by different vendors promoting competition.”
As KPMG commented, "Information should be shared or integrated with patient care records, enabling care managers to record details and access data, which should improve real-time monitoring and decision-making. Data from telehealth systems should be used with workforce scheduling tools to help professionals organise their patient workloads more effectively. It should be linked with handheld devices such as a BlackBerry or Smartphone, giving greater, quicker access to detailed, accurate, up-to-date patient data for professionals.”

Without an interface with the patient record, the GP needs extra time to visually cross-check information from the telehealth system with the patient’s healthcare record. It is potentially a risk to patient safety and an inhibitor to scalability.

The increased demand (more surviving longer with more LTCs) on dwindling resources (cash/people) will be a big driver for telehealth adoption. However creating plans based upon patient data locked away in disparate systems that are hard to access and update is adding complexity. We need good integration. If I’m an attending paramedic, when there is an inflexion point in patient health I need clinical management plans, patient management plans and social action plans to be accessible from MY system at the time of need - this goes for all data. Being able to access historical telehealth data as I drive to the call may help with treatment - I then need to transfer site/historical readings to acute care systems before admittance to support efficacious care upon arrival.”

Several other particular requirements have been noted:

- GPs will need to decide how they want to interact with telehealth data. Increasing thresholds for raising a clinical alert may wish to be set, from a low one for the community matron to a higher one for a GP;
- for wide-scale adoption, it is essential that the GP record (or other recipient’s record) is not automatically overloaded with telehealth data. Any data transferred should comply with a pre-defined specification that supports the local care protocols and service design;
- as shared triage services are developed across organisations or regions, common interfaces (both graphical and data integration) will be needed to include a range of different products that the triage services can support at scale;
- without considerable care, data that has been transformed many times from one form to another can be highly risky, for example from device to aggregation hub, to personal health record, to professional health record. For example, safety critical data such as medication must not get different interpretations depending on application.

The ‘Information Revolution’ consultative document highlights the benefits to patients of shared detailed care records: “One of the cornerstones of safe, high quality care is the account of the dialogues over time between the patient or service user and his/her clinician or care professional”.

In the case of teleconsultations, the availability or visibility of shared care records are essential. This has been a key reason why its use has taken off rapidly in Kaiser Permanente. Here in the UK, access to the shared care record in TPP SystmOne has been pivotal to the rapid roll-out of Airedale’s teleconsultation service to 18 prisons (see Appendix B).

Recommendation 7.M National NHS - Develop and promulgate an understanding of the benefits and best practice of shared detailed care records for use in telehealth and telemonitoring
More generally, such a situation is unlikely to happen nationally, so there is a need to build an architecture that supports that diversity, allowing acute, community, mental health and GP systems to exchange information, and the Coalition Government’s commitment to continuing the Summary Care Record becomes important in this context.  

As discussed below, the strategic direction and pace around telehealth interoperability is being set through the Continua Health Alliance at a global level, with the NHS taking a full part through DHID. Specifications have been developed to which suppliers will want to conform. All this takes time to build into product development plans and deploy.

**Continua Health Alliance**

The Continua Health Alliance, an international industry organisation formed in 2006, is working to develop interoperable standards that will allow more affordable personal connected health solutions. Its vision is to enable a “personal health eco-system that empowers individuals and families to better manage their own health and wellness across the continuum of life and care methods”.

The Alliance has brought together more than 230 leading healthcare and technology companies and organisations (spanning industry, academia and customer organisations) to develop guidelines for a system of personal connected healthcare solutions. DHID joined early on and they and other large customers have helped to shape its agenda from purely being industry led.

The Alliance is defining “personal connected health use cases and creating design guidelines based on open industry standards to provide a framework for the development, certification and implementation of personal connected health solutions”. It draws from the expertise and core competencies of its members to outline how to use existing standards to establish interoperability guidelines to build upon. “The standards ensure that Continua Certified™ devices are interoperable, allowing for seamless data exchange and communication between individuals and physicians”.

It is actively pursuing solutions to three major barriers:

- **Technical solutions** - designing guidelines to support interoperable sensors, platforms and services, and a logo and certification program to signify the promise of interoperability to the customer.

- **Regulatory solution** - working with regulatory agencies to safely and effectively manage diverse vendor solutions.

- **Financial solution** - working with leaders in the healthcare industries to develop new ways of addressing the costs of providing personal telehealth systems, such as new reimbursement models and co-pay solutions.

Inevitably, tensions can arise in defining the Continua programme - reflecting differing priorities across different countries. For example, in the US, the wellness agenda is driven by health insurers and employers. And the UK representatives have successfully included telecare now into the scope of work, reflecting its large prominence here in the UK.

In the long term, we should aim towards an Amazon-type model with a pick and mix evidence-based collection of appropriate devices that fit within an established care pathway. The devices arrive ‘shrink wrapped’, automatically configure themselves and integrate together back to link into a cloud-based triage service.

**NHS progress on interoperability**

Through the use of interoperability standards, the NHS-wide aim is to ensure that customers do not get tied into proprietary technology which prevents user choice, offering the flexibility to expand or change the products used to provide care.

Such choice and flexibility is expected to reduce the overall cost of telehealth for the NHS. It will introduce the principle of a ‘one time’ investment for suppliers, reducing the time suppliers take to deploy new systems by avoiding having to develop piecemeal interfaces. It will also encourage product innovation and new entrants into market. The strategy is to encourage the adoption of industry standards with global relevance rather than an NHS specific standard.

Working with all three WSD sites and other early adopter trusts across the NHS, DHID undertook substantial work

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with stakeholders to analyse the potential data flows, use cases and messages that might be required around telehealth. The outcome was to build on Continua’s version 1 standard for a “Personal Health Monitoring Report” (PHMR) message format, to enable telehealth data to be shared with patient record systems for the purposes of informing or alerting clinical triage, GPs or integrated care teams. In particular, the core Continua PHMR message was extended and supplemented, to allow for NHS uses in particular for integration with the Spine. The extensions identified are now being fed back to Continua for adoption within future standards and guidelines.

The work has also defined a range of additional interactions and progressed to define detailed requirements for a “clinician’s response” message which would close the loop with telehealth services, enabling electronic referrals to GPs or others, and getting results and instructions for changes to monitoring regimes back.

Over time other work, such as health and social care integration, will add more in terms of care plans. The summary care record has already been demonstrated as a means of sharing complex palliative care plans and has good potential for long term conditions.

A ‘proof of concept’ implementation of this message was developed in partnership with Newham WSD and their local suppliers. This was implemented as a uni-directional interface from their telehealth hub to the common GP system used in Newham. This message standard is now being modified to be a ‘universal PHMR’ standard to allow for non-Spine connectivity and is intended to form part of the new release of Interoperability Toolkit (ITK). This ‘universalisation’ will permit rapid local implementations of the messaging standard until integration via spine services becomes viable.

In the meantime, some suppliers have developed a variety of piecemeal interfaces on a case by case basis, for example with out of hours services or with specific GP systems.

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**Recommendation 7.O Industry** - Embrace and roll-out national interoperability standards and the ITK, enabling integration between telehealth and patient records (both telehealth and patient record suppliers)

As stated in our earlier “Fixing NHS IT” report, the ongoing need for a central design authority function around infrastructure and standards remains critical. In the new world, GP consortia will be looking for easy to follow advice and guidance about infrastructure matters. DHID has already produced two useful guides to support NHS buyers of telehealth solutions and services – a ‘Telehealth Technical Buyers Guide’ and a ‘Good Practice Guide’.  

**Infrastructure**

For large scale telehealth, issues of infrastructure have been largely addressed by adopting standardised N3 approved hosting and security principles.

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**Recommendation 7.P Local NHS** - Where feasible, use shared infrastructure, procurement / service models, and common standards – to avoid lock in to proprietary technology

As discussed in Section 2, the availability and investment in suitable infrastructure is critical, especially around the video consultation world.

For example, the model of ‘asking the next available expert’ requires a centralised management system for booking and automated call handling through collaborative use of internet protocol (IP) based and other open platforms.

In Denmark, an “IP Call Centre” service is being established which use the same concept but in relation to call centre telephony. And Scotland is establishing a separate central gatekeeper for the routing of video traffic. They have also found that clarity is needed around the use of Virtual Private Networks (VPN) and their potential conflicts with NHS firewalls.

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**Recommendation 7.N Centre** - Encourage market towards a more consistent use of standards and common infrastructure – e.g. systems integrators and telehealth product providers

In the meantime, some suppliers have developed a variety of piecemeal interfaces on a case by case basis, for example with out of hours services or with specific GP systems.

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25. Documents are available to NHS and public sector employees at www.pspg.nhs.uk
A video-conferencing service using N3 was recently announced, which provides a guaranteed video quality and an assurance of service delivery, as well as providing the management systems for booking and managing calls to avoid awkward user intervention. Most of the expected initial uses are around non-patient facing requirements, but the service can be used for booked teleconsultations if a high level of video quality is required. The service can also coexist with other video services on a ‘best efforts’ basis.

An N3 teleconsultation demonstrator into the patient’s home will shortly be trialed for speech and language therapy reviews. DHID is also currently working towards interconnectivity with other government environments such as Janet and GSI leveraging the recent deployments of gateways between N3 and these infrastructures.

Some SHAs and health communities (notably Lancashire) are investing in their own high speed networks and management systems so that a cost effective, high quality service can be provided locally.

Other video approaches may be adopted for urgent consultations, which depending on the service quality requirements may be internet-based. For example, there is also a growing uptake around the NHS Web Conferencing services such as Microsoft Live Meeting and Cisco WebEx. These services provide voice, video and data sharing and can be convened on an ad hoc. Whilst video provided by such services is low quality, the combination of voice, video and data sharing on demand between fixed and mobile users provides opportunities for more flexible real-time delivery of patient care. Standards in this area are weak, which DHID is addressing through working with vendors to develop advice and guidance for NHS consumers.

As noted in Section 2, for many teleconsultations, PACS image sharing capabilities will also be required. As part of the NPfIT PACS programme, some degree of image sharing across sites is now possible in many parts of the NHS. As part of its on-going PACS contracts in the North East and East, Accenture has now developed with the NHS sophisticated remote image viewing capabilities which do not rely on high bandwidths traditionally associated with image transfer.
Conclusion

This report has described the potential of telehealth and set out a series of recommendations to enable telehealth-enabled services to make a dramatic impact in the management of patients with long term conditions. This impact will result primarily in improvement to patients’ quality of life, in the NHS’s capacity to cope with the ever-increasing numbers of cases and in the associated economic costs.

"The question around telehealth is not whether, but how and at what pace.”

Telehealth is not a single, uniform type of technology; rather it is a targeted approach appropriate to the individual’s needs, combining process, organisational and responsibility changes supported by monitoring and collaboration technologies.

The White Paper “Equity and Excellence – Liberating the NHS” creates the environment in which the demand for telehealth-enabled services can be fostered. Telehealth should sit as a part of a nationally recommended suite of enablers that if integrated through local business change and service delivery, will underpin the transformation outlined in the NHS White Paper.

Our work has highlighted several key success factors to its scaling:

- the need for clinical leadership, locally and nationally;
- projects must be treated as a change initiative, with the focus being around the redesign of care pathways enabled by telehealth solutions;
- project roll-out can only occur at the local level;
- only once projects reach a certain threshold (perhaps 500 units plus), are the organisational and infrastructure issues fully confronted;
- the need to build on successful pilots to create scaled up projects;
- the need to build on and establish more momentum while SHAs still remain and hold an innovation remit; and where PCTs can offer the change management and leadership capacity;
- the importance of available support, expertise and capability;
- the critical importance of data quality from a range of data sources, in correctly risk stratifying patient populations to ensure quality referrals;
- the need for greater publicity amongst the patient and client populations to raise awareness;
- the significant effort involved in getting all stakeholders involved;
- the possibility of a total contracting out of the management of a pathway of defined patients with specific LTCs.

Throughout the report, we have raised a series of issues that collectively demonstrate the need for firm strategic leadership here from the Coalition, together with key enabling actions under the authority of the National Commissioning Board.

We hope that this report will be a useful contributor to the national debate around the future of our NHS and the crucial role that technology will take in delivering better care for less.
Appendix: Telecare developments

This appendix provides a brief review of the use of and benefits from telecare, and also considers its future interaction with telehealth.

Telecare enables independent living through assistive technology – primarily for the elderly, but increasingly so for other user groups e.g. those with dementia, learning disabilities and so on. Its origins go back several decades to basic community alarms and now cover a multitude of potential sensors and devices.

Mostly these have been delivered through local councils through government technology grants and social care funding streams. There are now said to be 1.6M clients. Although many are using predominantly pendant alarms, it is thought that around 300,000 of these installations are sensor-based systems using personal and environmental monitors and some examples are listed below:

- Personal satellite locators where carers can monitor the location of someone with dementia. This allows people who are often fit in body to continue going for much-loved walks without fear of being lost.

- Location buzzers which go off if the service user strays too far from the carer.

- Door monitors to remind you to take keys before leaving the house.

- Lifestyle monitoring system where carers can monitor a person’s activities via the internet and view a chart of their activity in each room.

- Sensors to detect floods, fire, gas leaks, falls, intruders, property exit and bed/chair occupancy, all connected to relatives or central monitoring centres.

- Special plugs which stop flooding if taps are left on.

- Bed sensors to detect epilepsy and wet beds.

- Personal injury alarms – both activated by the wearer, or self-activating following an accident.

- Automatic pill dispenser which make tablets available on a timer and prompts users to take them.

In November 2010, David Rogers, chairman of the Local Government Association's (LGA) Community Wellbeing Board, commented that “investing in technology has been proven to reduce the need for hospital admission, GP referral, home help, day care and residential care.” The LGA also said that increasing the use of technology to delivering health care could save councils £270m per year. As well as saving money, telehealth and telecare could give extra years of independence and dignity for citizens.
Like many telecare projects, North Yorkshire County Council started with a pilot of less than 50 people in 2005, however it was quickly realised that telecare should be part of mainstream referral, assessment and care management systems.

Today telecare services are provided to 12,000 users and are available for all individuals needing Adult and Community Services support. A key factor of the programme’s success in bringing telecare into mainstream practice was the instigation of four dedicated telecare coordinators to support the embedding of processes and procedures into Directorate practice. Their role is to ensure performance monitoring systems are in place, to assist with assessments, and to raise awareness, knowledge and skills for telecare. Other important issues in mainstreaming were strong leadership, comprehensive staff training and good working relationships with housing providers, police, and fire & rescue services.

Derek Law, Corporate Director, Adult and Community services, has commented: “Telecare is now consolidated as a key component of our commissioning agenda. We have a significant range of training tools and case studies which highlight the positive outcome for individuals and we expect that all social care assessments will consider if its use could create a personalised package of care to safeguard the individual.”

The benefits of telecare have been both in terms of cost savings, and client outcomes. Whilst a large initial investment of funding was needed, there is now an estimated 38% cost saving by comparison to traditional care packages. Evaluation work showed that this saved an average of £3,600 per person per year.

In addition there is a high client satisfaction with telecare services, which enable people to remain living independently at home in safety. Telecare has been successfully implemented, not only for the frail and elderly, but also for those with mental illnesses, learning disabilities, and for carers.

Building on the success of its telecare programme, North Yorkshire County Council is further developing telecare as a standard consideration for all people who need support from Adult Social Care. Additionally all its staff who conduct assessments have received telecare awareness training to enhance their professional workforce skills and to ensure that the evidence of telecare’s positive outcomes is out there. Further work is underway to increase the number of people benefiting from telecare, in individual homes, for care home residents, reablement and prevention services. They are also working together with North Yorkshire and York PCT to join-up telecare with telehealth provision, collaborating to provide a complete system of telehealthcare.

26 http://www.tunstall.co.uk/assets/Literature/Case%20Studies/innovation_choice_control_nycc_case_study.pdf
The LGA has also given a series of further examples:27

- **Staffordshire County Council** offers telecare services to more than 1,000 residents. It found £100 pill dispensers coupled with the £20-per-month pharmacy management fees saved £19.50 for every pound spent because of reduced hospital admissions, GP and nurse time, medication efficiency and home care. Its use of personal locators has delayed admission to long-term care and supported increased use of community facilities. They cost £300 each and then £5 a week to monitor, compared to day care costs of £50 a day.

- **Blackpool Council's Vitalize service** is one of the country's most advanced 24-hour telehealth monitoring and response centres and provides care, reassurance and protection to thousands of residents. Specialist equipment has been installed in homes to monitor vital signs such as blood pressure levels, weight, oxygen saturation and blood sugar monitoring. The initial pilot saw a 75 per cent reduction in hospital admissions, 43 per cent reduction in Community Matron visits and a 85 per cent reduction in GP contacts.

- **Brighton and Hove City Council** provides telecare services to 5,000 users and receives about 500 alarm calls per day. These include bed and chair occupancy detectors, and door and flood sensors.

- **Stockton Council's community alarm service, Care Call,** provides 24-hour support at the touch of a button, together with the services of mobile officers to more than 6,000 residents. Latest statistics show the control centre answers 96 per cent of calls within 30 seconds and 98 per cent within 60 seconds. For 97 per cent of these calls, the Council has an officer on site within 30 minutes. It also has 376 Telecare users. Last year, sensors resulted in 24,904 calls and officers found 211 clients on the floor, 54 outside their property at ‘at risk’ times, 19 cases where gas was left on.

The industry is relatively mature with an established industry association and code of practice. However many of the response centres are small scale run by the local council. There is considerable potential for some rationalisation and consolidation.

In our work, we considered telecare’s potential convergence with telehealth. With different commissioning models and funding criteria, and lying at opposite ends in terms of numbers of deployed units, the two have largely been driven quite separately to date.

With the direction of travel announced in the White Paper towards joint commissioning between councils and the NHS especially around adult social care, it can be expected that greater convergence will develop between telecare and telehealth. For example, patient reablement will increasingly become important as health relies on social care to ensure patients can be discharged in a timely manner and telecare / telehealth services will be important enablers here.

While accepting that telecare is an urgent response service in contrast to telehealth which is based around monitoring of longer term trends, some of the required logistical support is common (first line monitoring, equipment installation and maintenance, call centres, and assessment).

The WSDs found questionable overlaps for end users of telecare and telehealth (e.g. 75-85 year old sometimes frail users as against 55-65 year old heart failure sufferers). However the WSD target population included those with very complex needs. Trial patients needed to have high intensity use of health and social care. In many cases individuals have high intensity use of one service and lower intensity use of the other. The overlap further down the needs triangle may be greater.

The issue of convergence between telecare and telehealth comes back to cost and reducing the number of ‘touch points’ for the patient. Many of us now get our electricity and gas from the same supplier - makes sense and generally results in cost savings - why not here? There should be one number to call if things go wrong, one service provider etc. reduces support issues. Yes these should converge and with money being allocated to patients rather than services, won’t this be accelerated?

No doubt that the line between telehealth and telecare is becoming increasingly blurred. Dementia care is a prime example - most interventions for people with memory problems are deemed ‘telecare’, even though they are suffering with a long-term and progressive health problem. Future service delivery should be about what we do - not what we call it.

There are some with a vested interest in convergence, others who remain to be convinced. I believe there is some common ground for clients (aka frail older people who are also likely to have a LTC), and logistics (first line monitoring, equipment logistics). However, the ‘social care’ philosophy is generally one of responding quickly, while the health proposition only really works as a coaching/self care proposition. This means the services have divergent drivers and there are dangers in assuming convergence will happen early. There are also risks that in a declining financial climate, ‘converged’ services would be a dumping ground between health and social care.
Indeed projects in Scotland, West Midlands, Barnsley and Milton Keynes are already looking at future strategies towards ‘telehealthcare’:

**Case Study A.2 - Telecare and telehealth converge at Milton Keynes**

Having begun with a community alarm service in 1986, telehealthcare provision in Milton Keynes has been evolving quickly over recent years. The latest telehealthcare project in Milton Keynes involves collaboration between Milton Keynes Council and Milton Keynes Community Health Services (PCT), working together to deliver integrated health and social care remotely using Tunstall as the technology provider. This initiative is part of the CommonWell project, which aims to overcome the divide between health and social care provision in the European Union, and is funded under the European Commission’s CIP programme.

The Milton Keynes arm of the project involves the use of telehealth for COPD to reduce unnecessary admissions to hospital as well as facilitate early supported discharge after a hospital visit. The project allows for the installation of 100 units in patients homes, which will be left for 9 months. About 40% of the patients selected for telehealth already have telecare equipment in place in their homes, and a community alarm is installed in the homes of any new telehealth service users who do not already have one. This allows them to alert the telecare control room at any time. The data from the two arms of telehealthcare are integrated and used to deliver a more joined up service. This allows telehealth nurses to see if the patient has had a telecare alert during the night, and so allow for how this might affect the patients telehealth readings.

Telecare in Milton Keynes developed from sheltered housing provision and the community alarm service. The move to a unitary authority in 1997 gave the council additional responsibility for social services and allowed the move into telecare provision. Telecare was developed from this time onwards, with the council working together with community support workers to trial which kit worked best for patients and providing feedback to the equipment manufacturers. The greatest successes have been seen in the areas of falls, dementia and intermediate care. Now that telecare has been widely implemented people often self-refer for the service, having seen the equipment used by their friends or neighbours.

Telehealth pilots began at the end of 2006, initially through the use of telehealth kit for a COPD project that was already being run from a health centre. The control centre at Milton Keynes council is responsible for assessment of patients for appropriate telehealth kit as well as kit installation and maintenance. The alerts generated are processed first by a technical triage through the telehealth team at the council, and then remaining red alerts are passed to community nurses. Telehealth is now part of the COPD care pathway, and is used to support patients when they leave hospital. A telehealth device on the hospital ward allows patients to get used to the device before leaving hospital so that they are already familiar with it before they are required to use it on their own.

Although many benefits are seen from the use of telehealth, these are often very long-term. Benefits include patient reassurance, self-management, and the improvement of collaborative working with other family members for support of the patient. Those working at Milton Keynes would like to see a greater emphasis on the use of telehealth for mental healthcare in the future.

Reproduced by kind permission of Sandra Rankin, Milton Keynes Council

Our expectation is that as and when telehealth gets to the mass market, telecare will become a feature of it. As a first step, joint work should focus around the common logistics, assessment processes and consolidation of response centres.
Appendix: Teleconsultation developments

This appendix provides a brief review of the use of and benefits from adopting teleconsultation.

Teleconsultation technology (often refer to as “telemedicine”) is not new, indeed telephone-based services such as those provided by NHS Direct represent its most common use. In this appendix, we consider teleconsultations by video and also by email (‘eConsultations’).

**Video**

Here the aim is to improve access to expertise in many ways through:

- facilitating rapid consultation with a range of health professionals, for example, to share limited expertise regionally or to get an urgent opinion quickly;

- overcoming challenges of distance;

- reducing unnecessary transfers and the need for travel to major cities and hospitals to receive care and treatment;

- facilitating new processes of care to reduce waiting times;

- supporting managed clinical networks;

- delivering education and training for staff and the citizen.

Its effective usage requires access to: video (the level of quality can depend); Picture Archiving and Communications (PACS) image sharing capabilities; remote diagnostics (e.g. ECG); and the patient record (considered more in Section 7).
Appendix: Teleconsultation developments

Case Study B.1 - Airedale NHS Foundation Trust

Airedale NHS Foundation Trust has developed capabilities to use teleconsultations for remote healthcare delivery within the prison sector over the last five years and they now provide this to over 18 UK Prisons. This includes all categories of prisons and both male and female prisoners. The work has significantly reduced the cost of bedwatch and escort costs incurred by the prison whilst significantly improving the care delivered to prisoners. They now provide a range of services across 18 specialties and this now includes the applied professional services.

The case for change:

- The majority of episodes involve the use of two escorting officers at any one time – this rises to three for a high security prison.
- The majority of escort episodes are completed within four hours. The majority of bed watch episodes are completed within four days.
- Prisons with 24-hour health care cover are subject to a significantly higher proportion of escort and bed watch episodes outside of office hours.
- The average cost per escort episode (including mental health transfers) is £350.
- The average cost per bed watch episode is £3,731

Operation

Telemedicine has enabled the prison medical team to receive prompt advice from skilled A&E consultants in acute medical situations. This has been extremely beneficial to the prison, often removing the need for offenders to be taken out of prison, which incurs large costs and potential security risks to prison staff and the public. It offers nursing staff support and advice in managing individuals, confirms the nursing diagnosis or gives a differential diagnosis based on the “expert assessment” within a remote video based consultation. Treatment can be planned in the form of an agreed care pathway or via prescription of medication which is out of the range of the nurses’ ability to issue under Patient Group Directives.

The support to the prison GP ranges from providing a range of specialist advice from hospital consultants to assistance with making a diagnosis, monitoring the patient’s condition using secondary care expertise, providing remote treatment advice to monitor and support the patient’s condition without the unnecessary disruption of transferring prisoners to hospital under prison and police escort. The range of services is growing rapidly and they now provide both secondary and allied professional services including physiotherapy and dietetics.

The main benefits seen are:

- Improve offender health and reduce health inequalities
- Increase the range and scope of care delivery
- Reduce the cost of service delivery
- Improve access to specialist opinions
- Support the in house nursing and medical team
- Reduce risks and disruption to the wider community
- Drive up the quality of the service provided

Key lessons learnt:

- Many specialties are appropriate for teleconsultations – especially dermatology, diabetes, cardiology, endocrinology etc.
- The use of a shared care patient record accessible at both ends of the consultation is an essential prerequisite (in this case, the using TPP SystmOne Prison detailed care record)
- They operate to the following rule: ‘it is not for every patient, and not for every consultant’
- The equipment involves a high end video conferencing equipment with fixed cameras at each end which the consultant can take control of – the physician can zoom in to see patient very close up, or look at data.
- A high resolution detachable camera can be used to look more closely at the patient and can take still images
• Airedale NHS Foundation Trust with NHS Litigation Authority has decided that during teleconsultation the consultant carries the legal risk, in the same way as if they were actually with the patient. They must be qualified for the specialist area and ensure a contemporaneous record is kept at both sides. This encourages the use of teleconsultations but ensure where necessary a patient is transferred to hospital.

“Using telemedicine provides a safe, secure, decent and cost-effective way of managing many of the healthcare issues and needs of offenders who are held in a prison setting. Access to different clinical pathways is enhanced whilst the operational impact and cost of transporting prisoners to outside hospital is greatly reduced. The gains are numerous and, whilst telemedicine does not completely take away from the more traditional management of offender’s medical needs, it presents a whole range of different options and opportunities in improved service delivery.” Gareth Sands, Contract Director HMP Lowdham Grange

(Reproduced by kind permission of Sarah Ferguson, Business Development Manager, Airedale NHS Foundation Trust)

Around the NHS, we found many other examples where a teleconsultation approach was in use or was being planned. While in some cases these have been driven by cost savings, the more significant drivers seem to be equality, access and improved clinical outcomes. These cover use cases such as:

• where patients are limited in their ability to travel – e.g. prisons, nursing homes;

• where specialist acute opinion is needed urgently for medical diagnosis but may not be readily physically available, such as out of hours stroke care, burns management;

• where specialists cover a wide geographic area, where a combination of teleconsultation and telecoaching (e.g. of an attending primary care practitioner) may be appropriate;

• patient convenience (e.g. web-based consultations in mental health in North Lincolnshire, NHS Fluline).

In addition, videoconferencing is increasingly being used for multi-disciplinary team meetings and educational purposes. In rural situations where distances are an overwhelming constraint, its use for clinical purposes is becoming business as usual.

With increasing specialisation, patients are increasingly being drawn to centres of excellence. The development of teleconferencing capabilities by such Trusts provides one way of avoiding large amounts of travel by patients or specialists, as explained below by Great Ormond Street Hospital for Children. This also shows the importance of a sound technical infrastructure in place across the enterprise:
Case Study B.2 - Great Ormond Street Hospital

(GOSH) is an international centre of excellence concentrating on children. Half our patients travel from outside London. The guiding principles at GOSH are to deliver excellent patient service and continually improve outcomes with no waits, no waste and no harm. GOSH must thus strive for:

- Reliable, scalable and mobile IT, leading to …
- Improved clinical effectiveness …
- Characterised by increased time with patients, requiring …
- Mobility - Any device, anytime, anywhere - supporting …
- Access to data - Right data, right time, right place.

Whilst there are many factors contributing to success, key are those of mobility and communication, enabled by effective data, voice and video infrastructure. The right technical infrastructure supplemented with the right enterprise architecture (business process management with workflow and a services based approach) can and will transform both the patient and parent/carer experience.

The GOSH 2013 vision in the ICT Strategy describes the transformation of the patient experience in the Trust using portal technology, process management and workflow. So for example, using the soon-to-be video-enabled network, longer term patients with parents staying in the patient hotel can talk to each other over a video link, particularly useful in cases of isolation. The capability need not be restricted to the patient hotel, wherever an IP connection is possible, a video link can be made using WebEx, Skype or other similar technologies. The patient experience will be greatly improved.

Not only will video transform the patient experience, but also the clinician experience. Video conferencing will be increasingly used for multidisciplinary team meetings. Clinicians will be able to join remotely using the same high quality video links and management technology and the same technology can also be used to monitor theatre sessions from whichever desk you are at and also to deliver assistance or training.

Taking this strategy a step further, these technologies can be used to save patient and clinician journeys.

Using advanced technologies where high definition video could be supplemented by approved medical devices, the possibility of high quality video-based remote consultations can become a reality. GOSH clinicians and patients currently travel large distances to clinics. The strategy for GOSH is to use this technology to reduce the need for travel where possible, especially where regular remote clinics are currently held or it would be viable to be held. Using this technology also promotes information and knowledge transfer between clinicians in the specialist centres and local services.

Telehealth also provides important opportunities for specialist Trusts such as GOSH. Reducing lengths of stay through the ability to accurately and easily monitor patients at home not only helps the patient – being at home can provide so many benefits – but a Trust that is heavily in demand can increase throughput, protecting income levels whilst offering GOSH excellence to more patients. If patients can enter their own state of health in to GOSH datastreams, then it should be possible to reduce both unnecessary outpatient and inpatient visits, making healthcare cheaper and delivering a better experience for the family. And pro-active telemonitoring can reduce episodes at the Trust, with a high probability of planned, rather than emergency visits.

Using video capture technology in theatre and across the Trust, the value of eLearning can be considerably enhanced. Both internally and to the benefit of patients via an extranet type setup, and the wider community, a ‘YouTube’ style asset can be created. Subject to appropriate governance, such an asset will provide major benefits to patients, families, clinicians and the wider Trust staff, principally making it easy for all to keep up to date.

(reproduced by kind permission of Mark Large, ICT Director.)
Experience from Scotland is that it is the clinical networks which have most effectively driven the uptake of telehealth solutions. In paediatrics for example, teleconsultations enable scarce specialist resources to provide a safe and effective remote service which minimises patient inconvenience. Clinicians are increasingly comfortable with the technology because of its wide use in clinical education.

In the long term, and irrespective of reimbursement, the aim should be towards a model that matches up supply and demand (i.e. away from a purely ‘hub and spoke’ model). In this way, a teleconsultation could be on the basis of an ‘ask the next available expert’ model - so it would be as easy to access a specialist in Doncaster as in Kent, say. The approach could similarly be applied it to other disciplines – e.g. in Odense, Denmark an intelligent infrastructure has been created to support an ‘ask the next available interpreter’. This has significant technical infrastructure issues, discussed in Section 7.

The Ontario experience\textsuperscript{29} is that telemedicine must be integrated into the everyday work of clinicians and into the eHealth ecosystem. In 2009, by which point the service was reasonably mature, the Ontario Telemedicine Network supported about 100,000 clinical events – yet this is only 0.1% of the total number of physician visits! Their experience is that even though there may be a shared infrastructure lying behind the service, it needs to be positioned as a personal service to get reasonable buy-in from clinicians and patients.

In this regard, project success goes well beyond simply installing and making best use of the equipment. It also requires expertise in service/care pathway design, change management, procurement, business case development, evaluation and technical interoperability. As the service gets main-streamed, there is a need to integrate technology into workflow management, realigning rewards/incentives and addressing clinical governance issues.

For example: care is needed in managing the logistics and workflow at both ends of the teleconsultation; clinical behaviour is critical for the patient to gain trust (i.e. maintaining eye contact over the video screens, clear summaries etc); and a well-trained ‘telehealth nurse’ (or often a health care assistant) needs to assist the patient during the consultation.

\textsuperscript{29} Ontario Telemedicine Network – http://www.otn.ca/
Case Study B.3 - Telemedicine in Stroke

Telemedicine, when used in stroke care, is a real-time audiovisual conferencing system that allows specialists in stroke care to remotely assess patients and to view their CT brain scan images. This enables the remote stroke consultant to advise the clinical teams in local hospitals on the patient’s suitability for thrombolysis.

Telemedicine in the treatment of stroke is being used both nationally and internationally to improve patient access to recommended treatments for acute stroke. The use of telemedicine technology for the care of stroke has been successfully established in Networks across the country most notably in Scotland (Scottish Telestroke Programme), Guy’s and St Thomas’ NHS Foundation Trust, East Kent Stroke Network, and the East of England Stroke Network and is being developed across Yorkshire and the Humber, East Midlands and Cumbria and Lancashire.

National guidance\(^30\) now exists around the governance for the use of telemedicine in acute stroke. It may be used to support effective 24 hour stroke specialist advice either at single sites, or across networked sites working in collaboration, within or across trusts. Primarily it exists “to enable assessment of people presenting with acute stroke by a remote specialist in stroke care, to determine eligibility for thrombolysis with alteplase”.

A systematic review of the literature in 2006 identified 17 non randomised studies and concluded that telemedicine systems can be feasible, acceptable and reliable in acute stroke management, and was associated with improved delivery of thrombolysis with alteplase, when compared with conventional systems.

In acute stroke, the video camera captures real-time clinical signs from the patient, enabling a remote consultant to receive images remotely and hence undertake a remote presence consultation. In addition, brain scan image transfer, typically via PACS and broadband technology, enables the remote consultant to assess images on the same patient. Local medical teams and clinicians with the patient employ specialised mobile telecarts, typically provided in A&E or acute stroke units. The current product licence for alteplase extends to 3 hours after stroke onset.

Furthermore, new diagnostic quality video streaming techniques are being employed in a series of early adopter Trusts in the East Midlands to allow rapid referrals and access by clinicians to medical images when they need them, where they need them. This can avoid the need for expensive equipment by effectively ‘virtualising’ the medical imaging process and avoiding expensive and time consuming image transfer.

The service, being introduced by Accenture, has already demonstrated very significant reductions in the time taken to get diagnoses from specialist clinicians - from 2 or 3 hours to 3 or 4 minutes, improving patient care and reducing cost.

As well as its potential use in stroke diagnosis, this is expected to have a positive impact in areas such as multi-disciplinary Team meetings, specialist emergency care, out of hours care, and improving home working access for clinicians.

\(^{30}\) http://www.improvement.nhs.uk/stroke/ and NICE guidance http://www.nice.org.uk/CG68 specifies that “Assurance that the telemedicine facility, and its usage in the delivery of thrombolysis for eligible patients, is fully integrated within a comprehensive, effective and safe stroke service”.

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In the long term, teleconsultation approaches will no doubt extend beyond a traditional medical specialist model to one where video conferencing takes place from GP practices or other community hubs and potentially into patient homes as part of wider telehealth devices. However, developments like this needs to be considered not as an add-on service, but as part of a step-change in the model of care.

**eConsultations**

To date there has been limited uptake in the NHS of eConsultations (by phone or web) for patient-clinician consultations, in part driven by security and privacy considerations.

In other healthcare systems, there is wide use of email/web for patient-doctor consultations. It is for example an integral part of Kaiser Permanente’s environment. In Hawaii this was found to lead to a reduction of 26% in hospital visits through a significant increase in telephone consultations and use of secure messaging between patient and clinician.31

In speaking with international telehealth leaders during our work, some surprise was raised that that the NHS has yet to embrace eConsultations. In the NHS White Paper the Coalition gave a commitment to making it happen.

The following represent some examples already underway in the NHS:

- **Yorkshire**: traditionally, GPs referred patients to a nephrologist for review and advice. However, using an eConsultation, GPs can now call upon specialist expertise if necessary, by detailed care record sharing from GP to specialist (through TPP SystmOne). This is providing a feasible alternative to traditional hospital referral, enabling GPs to manage patients with mild-to-moderate chronic kidney disease in the community. As a result, the number of inappropriate referrals can be reduced and specialist resources directed towards supporting patients with more complex needs.32

- **North Lincolnshire**: a trial project offered access to mental health support and treatment through an online NHS therapy clinic, with the aim of increasing access to psychological therapies, extending the reach and availability of help for those who need it. The “e-clinics” phone and web-based service provided low intensity psychological interventions for people in primary care who have depression, anxiety, panic attacks and phobias, via the medium of live dialogue on the internet.

It is also important to note that the NHS HealthSpace ‘communicator’ facility enables patients with an advanced account on the NHS Summary Care Record to consult with their GP in a secure, electronic fashion.

32. http://qshc.bmj.com/content/early/2010/06/15/qshc.2009.038984.abstract
33. http://nldp.net/
Appendix: Other NHS examples of telehealth at scale

In this Appendix, we provide two further case studies of how telehealth-related technology is being used to support healthcare services in the UK on a widespread basis:

**Case Study C.1 - Remote monitoring in an acute environment - patients with implants**

Most leading NHS cardiac centres already use remote monitoring and follow up for patients with implantable devices for cardiac rhythm disease management.

These include pacemakers and defibrillators, devices which allow those with cardiac arrhythmia to lead normal lives. Per million population there are currently 700 pacemakers and 90 implantable cardiovascular defibrillators deployed in the UK, however this proportion is likely to increase. This is substantially lower than in comparable developed health economies. Once implanted these products require regular follow-up and with 400,000 patients currently in follow-up across the UK and a growth of 40% every year, this places a significant burden on clinics and clinicians.

To manage this problem, Medtronic have developed a system for remote follow-up of implanted devices, known as CareLink. 9,000 patients are currently registered with CareLink, and 3,500 more are being added every year.

Not all patients are suitable for this, but at one leading centre in the South that we visited, over 75% of such patients are on remote follow-up. Significant benefits are to enable the limited number of trained cardiac physiologists to cope with the volume of demand; and patients no longer have to visit hospital on a routine 3 month basis. Care pathways have had to be redesigned to take advantage of the technology and outpatient clinics redesigned to run on a remote basis.

The system consists of a monitor which is kept in the patient’s home, and a website where clinicians can view the collected data. The monitor collects data from the implanted device and transmits it, via the telephone line, to a secure website where it can be viewed by a hospital clinician. Recent developments allows data to be transmitted at any time, even when a telephone line is not available. Following collection, the data can also be shared with the patient’s local nurse, and if required, the patient as well. This reduces the frequency of visits that the patient must make to the hospital, saves clinician time and reduces cost.

The frequency of data collection and the type of data collected varies between devices. The pacemaker records the average data per month, for example the average heart rate, and can also transmit a sample ECG, from the time of data transmission. By contrast the defibrillator records data during a ventricular fibrillation episode and transmits this to the clinicians. Data can either be collected as part of a scheduled check-up, arranged previously with the patient, or may be triggered by an alert. For example if the device battery is low, or if a defibrillation occurs, there is an automatic send of information through the CareLink system.

The clinicians in the hospital run virtual clinics where they look at the data from several different individuals. This process is much simpler and cheaper than requiring the patient to attend an appointment, and all the necessary parameters can be checked remotely. Following the virtual clinic, a letter is sent to the patients with the results of the check-up. Reports of the data can be printed out and stored in the patient’s file and systems are being developed whereby these reports can be integrated into the patient’s electronic health record.

The use of remote monitoring for pacemakers compared to standard in-office care has been formally evaluated on several occasions and further studies are planned for the future. They point towards a reduction in hospitalisation rates of 52% and a return on investment of less than 1 year.

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55. (on next page) http://www.beaches.bham.ac.uk/related-work.shtml
Case Study C.2 – ‘OwnHealth’ projects in Birmingham and Nottingham

- A partnership between NHS Birmingham East & North, Pfizer Health Solutions and NHS Direct in Birmingham, and in Nottingham between NHS Nottingham City, NHS Direct and Pfizer Health Solutions
- Specially trained Care Managers delivering telephone based interventions, and working with patients with LTCs in the development of good self – management techniques
- Focus around patients in ‘disease management’ and ‘supported self – care’ groups – not those in ‘case management’
- Has alleviated demand on primary and acute care resources
- More than 12,000 patients have used the service in Birmingham to date, with the project also in ramp-up phase in Nottingham (approx 600 patients so far)
- Referral management and data quality are issues
- Some parallel developments eg Barnsley – “care navigation” service – around 1000 patients

The Birmingham OwnHealth programme focuses on a telephone-based care management and support service aimed at people who live in east and north Birmingham and have long-term conditions, including diabetes, coronary heart disease, heart failure, chronic obstructive pulmonary disease (COPD), high blood pressure, stroke or TIA (“mini stroke”) and chronic kidney disease. It also helps people who are aged over 65 and has the potential to be utilised in supporting people suffering from a range of conditions.

The aim of the service is to help people make positive changes to their health and lifestyles and learn how to manage their conditions better. Health professionals are designated to each member and working with them over the telephone provide them with one-to-one healthcare. The service is delivered in several languages, and where the member has a language outside the range offered, translation services are utilised.

Birmingham OwnHealth is delivered through a partnership of NHS Birmingham East and North, UK Pfizer Health Solutions and NHS Direct. Pfizer Health Solutions is a department within Pfizer Limited. An evaluation of the service by the University of Birmingham showed that the service helped people to take greater responsibility for their health and make positive changes to their health behaviours. In turn, this had a positive impact on both their clinical measures and use of other health services. The results of this evaluation showed:

- increased levels of exercise, improved diet and reduced levels of smoking in members
- improved clinical measures including reductions in cholesterol, blood pressure and HbA1C blood glucose levels (for patients with diabetes)
- members of the service report reductions in hospital admissions, A&E visits and GP visits
- high levels of satisfaction amongst members (96% were satisfied with the quality of the service)

The service is delivered over the telephone by a team of Care Managers – health professionals employed by NHS Direct, who have undergone a comprehensive evidence based training package provided by Pfizer Health Solutions – enabling people to get the best from the treatment already recommended by their GP and/or healthcare professional. The Care Managers build and maintain ongoing relationships with members, providing motivation, support and knowledge.

The service is aimed at those in the level 1 and 2 of the Kaiser Permanante pyramid of need.

Challenges
Levels of engagement with Primary Care have been variable, and in some cases the result has been insufficient information sharing between Birmingham OwnHealth® and General Practices.

The introduction of a service that has at its core the empowerment of individuals to take greater ownership of and involvement in the management of their condition is a challenge to the clinical model of healthcare the NHS has historically provided. Many professionals have seen this as a challenge and convincing them of the benefits that can be realised through improved self-care is an ongoing process, despite the strengthening evidence base for its effectiveness.
Appendix: Relevant EC Communications

This Appendix provides key extracts from two important EC communications, the first concerning telemedicine, the second concerning a pilot European Innovation Partnership in the field of active and healthy ageing.

European Communication on Telemedicine (COM(2008) 689)

“Telemedicine encompasses a wide variety of services. Those most often mentioned in peer reviews are teleradiology, telepathology, teledermatology, teleconsultation, telemonitoring, telesurgery and teleophthalmology. Other potential services include call centres/online information centres for patients, remote consultation/e-visits or videoconferences between health professionals.

European citizens are getting older and are increasingly living with chronic diseases. Their health condition often requires enhanced medical attention. Medical support may not be available in remote areas and for certain specialities as easily or as frequently as their health condition would require.

Telemicine can improve access to specialised care in areas suffering from a shortage of expertise, or in areas where access to healthcare is difficult.

Telemonitoring can improve the quality of life of chronically ill patients and reduce hospital stays. Services such as teleradiology and teleconsultation can help to shorten waiting lists, optimise the use of resources and enable productivity gains.

Despite the potential of telemedicine, its benefits and the technical maturity of the applications, the use of telemedicine services is still limited, and the market remains highly fragmented. Although Member States have expressed their commitment to wider deployment of telemedicine, most telemedicine initiatives are no more than one-off, small-scale projects that are not integrated into healthcare systems.

Telemonitoring is a telemedicine service aimed at monitoring the health status of patients at a distance. Telemonitoring is particularly useful in the case of individuals with chronic illnesses:

- It can contribute to re-organisation and re-deployment of healthcare resources, for instance by reducing hospital visits, thus contributing to the greater efficiency of healthcare systems.
- It has proven to increase quality of care for patients, in particular chronically ill patients. In the context of an ageing population and an increasing burden of chronic diseases, the benefits its wider deployment can provide are crucial.
- It requires a coherent approach and partnership involving patients, health professionals, healthcare providers, payers and the industry, to ensure sustainability of the services.

Most telemonitoring services are still limited to the status of temporary projects without clear prospects for wider use and proper integration into healthcare systems. Member States are responsible for the organisation, provision and funding of national healthcare. The leadership of their health authorities in achieving wider deployment of telemedicine is essential. Collecting evidence and sharing good practice on implementation of telemedicine services and reimbursement schemes are therefore critical in order to secure the necessary acceptance and commitment on the part of the health authorities.”
European Communication on “European Innovation Partnership – a pilot in the field of active and healthy ageing” (SEC(2010) 1161)

The Partnership aims, by 2020:

“to enable our citizens to live longer independently in good health by increasing the average number of healthy life years by 2, and, in achieving this target, to improve the sustainability and efficiency of our social and healthcare systems, and to create an EU and global market for innovative products and services with new opportunities for EU business.”

In particular, the new partnership will have “demonstration, pilots and large scale trials involving the elderly, patients, carers, health care facilities, community and home care facilities, ICT infrastructure, etc. to test out solutions of sufficiently large scale in a coordinated way across countries and different contexts”.

“Accelerating the creation of the necessary framework conditions and demand will need to include... ensuring interoperability and setting standards and reference specifications for new equipment and services for telemedicine and independent living”

“This would translate into a limited number of work packages proposing actions that aim to achieve... developing new innovative policies and business models for more integrated health and social care systems for the elderly, improving home-based and self-care; as well as tailoring and deploying on a large scale new innovative (including ICT-based) solutions for long-term care of the elderly such as chronic disease management... Promoting the development and introduction of innovative solutions, including ICT-based and other technologies, for products, devices and services specifically suitable for the elderly, to help them lead more active and independent lives, such as alarm and safety systems, daily living support, fall prevention, prevention, social interaction services and home robotics, and specific access to the internet.”
Appendix: List of Contributors

The following lists the contributors to the work through face to face interviews or workshop attendees.

**Steering Group**

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Scotland Joint Improvement Team Moira Mackenzie
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N Ireland Fold Telecare Kevin McSorley
2020health engaged a specialist consultancy, Clever Together (www.clevertogether.com), to run an on-line ‘crowdsourcing’ exercise to tap the wisdom and insights of the very wide range of stakeholders involved with telehealth.

2020health decided to follow this route on the basis that Clever Together’s approach is particularly useful when running wide scale consultations, across geographically dispersed and time constrained communities of interest. Their approach has been proven to deliver increased levels of buy-in to future recommendations and business changes by quickly building a weight of opinion within large groups.

The www.2020telehealth.org campaign itself had three primary objectives:

• To enable a wider audience, than would normally be possible using traditional consultation methods alone, to contribute to the development of 2020health’s recommendations to government on the ‘Future of Telehealth’;

• To establish a conversation between participants around the ‘Future of Telehealth’, to encourage insight and consensus to be developed amongst the telehealth community;

• To test ideas and opinion, and gain insight within a number of telehealth centred themes, a number of challenge questions were set.

• In the future, what technologies can support you remotely to improve your own health?

The 2020telehealth campaign was launched on 13th September 2010 and was concluded on 1st October 2010. Key statistics included:

• our population of invitees totalled 133 people – all respondents’ comments and observations were anonymous to others;

• 90 (68%) of those invited visited the site;

• 65 (72%) of the above visitors became participants by logging in and exploring the site;

• 20 (31%) of participants became ‘active users’, making more than one contribution to the portal;

• 13 (65%) of the active users became our ideas people, submitting multiple ideas.

However, our audience was a group of dispersed individuals where few had any direct connections with each other. Given this backdrop, the conversion ratio achieved was highly satisfactory, and the results have significantly added to the insights and recommendations we have developed in this report.

• What convincing evidence is there for the value of telehealth (e.g. clinical efficacy, patient experience or economic value)?

• What are the commissioning implications of using telehealth solutions to deliver effective healthcare?

• What are the challenges with designing patient-centric care pathways and how can these be overcome using telehealth solutions?

• How best can patients and clinicians be supported to embrace telehealth and realise its benefits?

• What are the other known challenges to deliver telehealth effectively at scale and how best can these be addressed?
# Appendix: Glossary

## Definitions:

**Telehealth:** the capture of physiological measurements in the home which are then relayed for clinical review and early intervention.

**Telecare:** a range of alarms and sensors in the home, linked to a call centre, aimed at supporting continued independent living.

**Teleconsultation:** video consultations and routine surveillance appointments between clinicians and patients at a distance.

**mHealth:** the use of mobile telephones for healthcare.

## Abbreviations:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>A&amp;E</td>
<td>Accident &amp; Emergency</td>
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<td>ALIP</td>
<td>Assisted Living Innovation Platform</td>
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<td>ARS</td>
<td>French Regional Health Authority</td>
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<td>BDOC</td>
<td>Bed days of care</td>
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<td>BS</td>
<td>Buying Solutions</td>
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<td>Chronic conditions management</td>
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<td>CEO</td>
<td>Chief Executive Officer</td>
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<td>CHF</td>
<td>Chronic heart failure</td>
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<td>CIP</td>
<td>Competitiveness and Innovation Framework Programme</td>
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<td>Chief Information Officer</td>
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<td>Content Management System</td>
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<td>CPD</td>
<td>Continuing professional development</td>
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<tr>
<td>COPD</td>
<td>Chronic Obstructive Pulmonary Disease</td>
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<td>CQC</td>
<td>Care quality commission</td>
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<td>CQUIN</td>
<td>Commissioning for quality and innovation payment framework</td>
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<td>DH</td>
<td>Department of Health</td>
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<td>Department of Health Informatics Directorate</td>
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<td>EC</td>
<td>European Commission</td>
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<tr>
<td>ECG</td>
<td>Electrocardiogram</td>
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<tr>
<td>EHR</td>
<td>Electronic Health Record (straddles across health organisations)</td>
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<td>EPR</td>
<td>Electronic Patient Record (to support treatment within an organisation)</td>
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<td>EPSRC</td>
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<td>ESRC</td>
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<td>General Management Training Scheme</td>
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<td>GP</td>
<td>General Practitioner</td>
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<td>GPSoC</td>
<td>GP Systems of Choice</td>
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<td>HL7</td>
<td>Health Level 7 interoperability standard</td>
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<td>ICT</td>
<td>Information Communications Technology</td>
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<td>IEEE</td>
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<td>Abbreviation</td>
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<td>National Institute for Clinical Excellence</td>
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<tr>
<td>NPIT</td>
<td>National Programme for Information Technology</td>
</tr>
<tr>
<td>NSF</td>
<td>National Service Framework</td>
</tr>
<tr>
<td>NVQ</td>
<td>National Vocational Qualification</td>
</tr>
<tr>
<td>NYY</td>
<td>North York and Yorkshire PCT</td>
</tr>
<tr>
<td>OJEU</td>
<td>Official Journal of the European Union</td>
</tr>
<tr>
<td>OOH</td>
<td>Out of hours</td>
</tr>
<tr>
<td>PACS</td>
<td>Picture Archiving &amp; Communications System</td>
</tr>
<tr>
<td>PAN</td>
<td>Personal Area Network</td>
</tr>
<tr>
<td>PASA</td>
<td>NHS Purchasing and Supplies Agency</td>
</tr>
<tr>
<td>PbR</td>
<td>Payment by results</td>
</tr>
<tr>
<td>PC</td>
<td>Personal computer</td>
</tr>
<tr>
<td>PCT</td>
<td>Primary Care Trust</td>
</tr>
<tr>
<td>PHRM</td>
<td>Personal Health Monitoring Report</td>
</tr>
<tr>
<td>POTS</td>
<td>Plain Old Telephone Service</td>
</tr>
<tr>
<td>PRIMIS+</td>
<td>Primary Care Information Services</td>
</tr>
<tr>
<td>QIPP</td>
<td>Quality, Innovation, Productivity and Prevention</td>
</tr>
<tr>
<td>QOF</td>
<td>Quality and Outcomes Framework</td>
</tr>
<tr>
<td>QoL</td>
<td>Quality of life</td>
</tr>
<tr>
<td>RCT</td>
<td>Randomized controlled trial</td>
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<tr>
<td>ROI</td>
<td>Return on Investment</td>
</tr>
<tr>
<td>RTNI</td>
<td>Remote Telemonitoring</td>
</tr>
<tr>
<td>SCIE</td>
<td>Social Care Institute for Excellence</td>
</tr>
<tr>
<td>SCR</td>
<td>Summary Care Record</td>
</tr>
<tr>
<td>SCT</td>
<td>Scottish Centre for Telehealth</td>
</tr>
<tr>
<td>SGHD</td>
<td>Scottish Government</td>
</tr>
<tr>
<td>SHA</td>
<td>Strategic Health Authority</td>
</tr>
</tbody>
</table>
Healthcare without walls

Appendix:
Summary of Key Evidence

Given the wide variety of authoritative sources who have already collated databases of evidence on telehealth, telemedicine and telecare, we came to the view that it was not the best use of our limited time to replicate this work. Below, we provide pointers to other collections of evidence, as well as some of the major studies which we have found informative.

Sources of telehealth information

**WSD Action Network**
www.wsdactionnetwork.org.uk
The Network is run by The King’s Fund and DH Care Networks and is funded by the Department of Health.

**Telecare Services Association**
www.telecare.org.uk
The representative body for the telecare industry within the UK

**Telecare Aware**
www.telecareaware.com

**The Foundation for Assistive Technology (FAST)**
www.fastuk.org
FAST works with the AT community to support innovation in product development and good practice in service provision.

**The Telecare Learning and Improvement Network**
www.dhcarenetworks.org.uk/IndependentLivingChoices/Telecare
Includes telehealth and telecare maps
## Selected UK projects

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Project Type</th>
<th>Conditions Addressed</th>
<th>Dates</th>
<th>No. of Patients</th>
<th>Organisation</th>
<th>Cost Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole System Demonstrators</td>
<td>Telecare and</td>
<td>COPD, Heart failure, Diabetes</td>
<td>2008-2011</td>
<td>6,000</td>
<td>Kent, Cornwall and Newham</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Telemonitoring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><a href="http://www.wsdactionnetwork.org.uk">www.wsdactionnetwork.org.uk</a></td>
<td></td>
</tr>
<tr>
<td>South West Surrey Safe at Home</td>
<td>Telecare and</td>
<td>Various</td>
<td>2006-2007</td>
<td>120</td>
<td>Guildford and Waverley Borough Councils</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Telemonitoring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference</td>
<td></td>
<td></td>
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<td></td>
<td><a href="http://portal.surrey.ac.uk/pls/portal/docs/PAGE/EBHMS/RESEARCH/SPECGROUP/CRNME/PUBS/PROJREP/GUILDFORD%20FINAL%20REPORT%20GM.PDF">http://portal.surrey.ac.uk/pls/portal/docs/PAGE/EBHMS/RESEARCH/SPECGROUP/CRNME/PUBS/PROJREP/GUILDFORD%20FINAL%20REPORT%20GM.PDF</a></td>
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</tr>
<tr>
<td>Telecare in Kent</td>
<td>Telecare</td>
<td>Various</td>
<td>2004-2005</td>
<td>100</td>
<td>Kent County Council</td>
<td></td>
</tr>
<tr>
<td>Reference</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><a href="http://www.kent.ac.uk/chss/docs/telecare_final_report.pdf">http://www.kent.ac.uk/chss/docs/telecare_final_report.pdf</a></td>
<td></td>
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<tr>
<td>Telehealth in Kent</td>
<td>Telehealth</td>
<td>Long term conditions</td>
<td>2005-2007</td>
<td>250</td>
<td>Kent County Council</td>
<td>60-75% reduction in acute care costs</td>
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<tr>
<td>Telehealth Project, Norfolk</td>
<td>Telemonitoring</td>
<td>COPD, Heart failure</td>
<td>2007-2008</td>
<td>28</td>
<td>Norfolk County Council, evaluated by UEA</td>
<td></td>
</tr>
<tr>
<td>Reference</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><a href="http://www.norfolk.gov.uk/Adult_social_services/Support_at_home/Assistive_technology/NCC061537">http://www.norfolk.gov.uk/Adult_social_services/Support_at_home/Assistive_technology/NCC061537</a></td>
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<td>Aberdeenshire Telecare Project</td>
<td>Telecare</td>
<td>Elderly</td>
<td>2007-2008</td>
<td>31</td>
<td>Aberdeenshire Council</td>
<td>Saving of £329,050</td>
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<tr>
<td>Assistive Technology for</td>
<td>Telecare</td>
<td></td>
<td>2005-2006</td>
<td>24</td>
<td>Barnsley Hospital NHS Foundation Trust</td>
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<tr>
<td>Independence (AT4I)</td>
<td></td>
<td></td>
<td></td>
<td>tele-care vs 28 control</td>
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<td></td>
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<tr>
<td>’At home, not alone’ COPD</td>
<td>Telemonitoring</td>
<td>COPD</td>
<td>April 2009 -</td>
<td>28</td>
<td>NHS South East Essex with NHS Direct</td>
<td>Estimate net saving of £1,210.174 over 3 years, based on pilot data</td>
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<tr>
<td>Telehealth Project</td>
<td></td>
<td></td>
<td>Feb 2010</td>
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<td>Telediagnostic ECG Service</td>
<td>Tele-consultation</td>
<td>Patients with ECG equipment</td>
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<td></td>
<td>NHS East of England</td>
<td>Estimated return on investment of 550%.</td>
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<tr>
<td>Reference</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><a href="http://www.eoe.nhs.uk/page.php?page_id=1138,Number">http://www.eoe.nhs.uk/page.php?page_id=1138,Number</a> 6</td>
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<tr>
<td></td>
<td>health</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Swindon COPD</td>
<td>Telemonitoring</td>
<td>COPD</td>
<td>2007</td>
<td>11</td>
<td>Swindon PCT</td>
<td>£300,000 saving from 11 patients</td>
</tr>
<tr>
<td>Reference</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><a href="http://www.publicnet.co.uk/features/2009/02/06/telehealth-keeps-patients-out-of-hospital/">http://www.publicnet.co.uk/features/2009/02/06/telehealth-keeps-patients-out-of-hospital/</a></td>
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<tr>
<td>Smart technology and community</td>
<td>Telecare</td>
<td>various</td>
<td>2001-2005</td>
<td>57</td>
<td>West Lothian council</td>
<td>Reduced weekly cost compared to care home</td>
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<tr>
<td>care for older people</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>accommodation, however increased cost from</td>
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<td>innovation in West Lothian</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>sheltered housing</td>
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<td>Scotland</td>
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<td></td>
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<tr>
<td>Reference</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><a href="http://www.dass.stir.ac.uk/documents/.../file/Smart%20Technology.pdf">www.dass.stir.ac.uk/documents/.../file/Smart%20Technology.pdf</a></td>
<td></td>
</tr>
</tbody>
</table>
### Project Name

NHS North Yorkshire and York Telehealth Pilot

### Conditions Addressed

Mainly COPD, also some heart failure and diabetes

### Dates

2009-2010

### No. of Patients

48

### Organisation

NHS North Yorkshire and York

### Cost Benefit

Hospital expenditure reduced by 24.8%, a saving of £19,354

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### Project Name

An Assessment of the Development of Telecare in Scotland

### Conditions Addressed

various

### Dates

2006-2010

### No. of Patients

29,000

### Organisation

The national Telecare Development Programme (TDP) for Scotland

### Cost Benefit

Efficiencies of £48.4 million over the period from 2006-2010


### Key International Evidence

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Project Type</th>
<th>Conditions Addressed</th>
<th>Dates</th>
<th>No. of Patients</th>
<th>Organisation</th>
<th>Cost Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veteran Health Affairs</td>
<td>Telemonitoring</td>
<td>Diabetes mellitus, Congestive heart failure, Hypertension, Posttraumatic stress disorder, COPD, depression</td>
<td>July 2003-Oct 2007</td>
<td>43,430</td>
<td>Veteran Health Affairs</td>
<td>88% saving compared with home-based care services</td>
</tr>
</tbody>
</table>


### Key Journal Papers


Appendix: Disruptive Innovation

Telehealth: Viewed Through the Lens of Disruptive Innovation
(Dr. Peter Thomond – Clever Together LLP)

Research into the dynamics of private sector innovation over the last 15 years shows us that innovations can be categorised as sustaining or disruptive.

Sustaining innovations maintain the ‘rules of the game’, whether incremental or radical they sustain the direction of improvement set by market leaders. Disruptive innovations can be thought of as ‘game changers’, products and services (normally consisting of technologies deployed within new business models) that reshape and transform the markets into which they are launched.

As telehealth makes ‘game changing’ promises, the subject of disruptive innovation can be used to shed light on the dynamics that are likely to support its scaling from niche to mainstream. This paper aims to present some of the key high-level insights into the dynamics of the two main types of disruptive innovation: low-end and new market.

Low-end disruption occurs when market leaders over-supply their customers’ needs with excess technological capability or services they do not entirely need. Over-supply creates a vacuum within low-end market niches where simpler products and services with different performance characteristics, often considered inferior by traditional market leaders, enable low-demanding customers to achieve their objectives at much lower cost. As a worked example, consider here, the development and disruption of the mainframe and mini-computer industry through the 1970’s and 1980s (Figure 1).

Line 1 illustrates that through competition and pursuit of higher margins the industry’s products improved to the point where they offered customers much more performance and capability than they needed or indeed could use (customer needs are represented by lines A-C, with most at the centre of the normal distribution). When introduced, the personal computer’s performance characteristics were perceived as significantly substandard. However, a niche of low-end customers valued the simpler performance characteristics of these machines and with time, and reinvestment, their technological performance improved along the trajectory of Line 2. Initially the established mainframe/mini computer industry was happy to walk away from the low-margin, low-end customers (indeed, it freed up resources to focus on their most demanding customers). However, at point Z, the technological performance of the PC equalled that demanded by average mainstream customers of mainframes/mini-computers and they switched – causing the disruption that led to the collapse of many incumbents.

New-market disruption (Figure 2) occurs when a new niche of customers is created by a new product or service which makes it easier for people to do something that would have previously required too much skill, knowledge or inconvenience. The growth of the new markets is often ignored by established companies as they are usually considered too peripheral and small (and low margin) compared to business as usual. Just as with low-end disruption, new market disruptors improve their offerings, grow their niche and begin to attract customers away from established products and services. By the time the incumbents begin to notice the defection it is too late for them to respond effectively and significant disruption is underway, with the new products or services having permanently reshaped the existing market.
For example, incumbent leaders of the European airline industry in the early 1990s, such as British Airways, decided that the opportunities afforded by a low-cost, point-to-point no frills strategy, such as that introduced by the newly formed Ryanair, was an unlikely threat to their established high-revenue core market of regular business flyers. By the mid-1990’s, other newcomers such as easyJet had followed Ryanair’s example, pioneering a new ‘low cost’ niche market of customers who had previously not been regular flyers. Quite soon the low-cost, no frills approach started to attract increasing numbers of business travellers who were switching from the high-cost airlines to the rapidly improving services provided by the low-cost pioneers. The no-frills airlines have permanently reshaped the European airline industry, with many of the old incumbents having to downsize their operations as they continue to lose market share.

The dynamics of low-end and new market disruption can help us consider the scaling of telehealth:

<table>
<thead>
<tr>
<th>Disruptive innovations...</th>
<th>Therefore, prudent telehealth proponents ought to...</th>
</tr>
</thead>
<tbody>
<tr>
<td>...are usually technologically straightforward; they recombine existing technology into new platforms with new business models that challenge the established economics. Indeed, they usually enable a larger population of customers to do things in a more convenient setting (including at a cheaper price).</td>
<td>...the most successful widespread telehealth applications are likely to be those not based upon complex new technologies. Instead they are likely to be those that recombine existing technologies into new platforms, which enable service innovation to deliver care in more convenient ways.</td>
</tr>
<tr>
<td>...do not initially satisfy the prevailing demands of established core markets (both customers and service providers/manufactures). However, they do offer attributes valued by niche markets of customers considered unimportant to mainstream incumbents. Whether low-end markets or new markets emerging on the periphery, these niches consist of people seeking to achieve specific objectives in specific contexts.</td>
<td>...avoid the core activities of the NHS and seek fertile grounds with initial niches of people who are overlooked or over-served, especially those who the core NHS providers are happy to not own. These niches will be defined by both their conditions and their context. For example, teenage diabetics whose condition can easily get out of control, want to be highly mobile and may react well to text-based prompts on the move through ‘simple telehealth’</td>
</tr>
<tr>
<td>...consolidate ‘foothold’ markets and drive industry transformation by showing patience for growth but impatience for profit/benefits through a niche-by-niche attack.</td>
<td>...build upon their success by consolidating the clinical niche they have served, either within their region or across the country. Once consolidated, the niche will act as a foothold from which to leverage success into neighbouring niches. For example, if telehealth providers consolidated a foothold niche of around teenage diabetics, they could leverage this experience into serving other teenager health needs or diabetes in other contexts. By being impatient for benefits and patient for growth, the mainstream organisational DNA of the NHS will not reject the emergence of telehealth.</td>
</tr>
</tbody>
</table>
This appendix summarise key international experience around telehealth. Much of the information comes from published sources, and it was also augmented by visits and telephone discussions with several leaders among the international telehealth community, with a view to learning lessons for the NHS in England.

Those that we investigated specifically included Wales, Scotland, Northern Ireland, France, Denmark, and the US. (We also include Scotland, Wales and Northern Ireland as ‘international’, as their health systems are run and funded separately to the English NHS). Clearly this is but a small subset of many, many initiatives across the globe.

Of the various countries we have investigated, there are several that are running or are currently initiating plans for the development of telehealth at scale. Typically this compromises a national programme, with telehealth projects coordinated by a ‘Centre for Telehealth’, as is seen in Scotland and Norway. A central body appears to be of benefit, both in driving telehealth programmes and coordinating the ongoing analysis of projects and collection of evidence of best practice.

Several countries have highlighted the way in which their telehealth strategy is based around the use of an electronic patient record. In the US, both the Veterans Health Administration, and Kaiser Permanente make use of an electronic patient record, and an Individual Health Record is being developed in Wales.

Many of those we have spoken to feel that an EHR is essential so that all health and care services, including telehealth can be integrated, and to enable the wide variety of healthcare practitioners who will be involved with a patient in a teleconsultation scenario, to be able to see the same patient information.

Some international examples are now presented:

Scotland

Compared with many countries the development and implementation of telehealth and telecare is relatively far advanced in Scotland. Around 19% of those aged 65 and over have community alarm systems, 3.5% use more sophisticated telecare packages, and 1% benefit from telehealth packages.

The development of telehealth in Scotland was supported by the establishment of the Scottish Centre for Telehealth (SCT) in 2006. The SCT works across boundaries with industry, academia, local authorities and NHS Boards to develop recognised models for redesigning care. The roles of the centre included:

- disseminating best practice;
- providing practical support, both clinical and technical;
- co-ordinating the evaluation of projects;
- evaluating the impact of telehealth on service redesign;
- developing inter-operable standards and protocols.

In August 2009, the Scottish Government Health Department (SGHD) published a review of the work of Scottish Centre for Telehealth. The report recognised the successes of the SCT in various discrete areas of healthcare and supported the continuation of a ‘centre of expertise’ to exploit Telehealth across NHS Scotland. However they recommended that the SCT focus on a small number of clinical areas, moving on from pilots to national implementation. At this stage the SCT was also repositioned within NHS24, to allow SCT to be part of a national delivery organisation.

Currently the SCT is focussed on delivery of national telehealth solutions across four clinical areas – Stroke, Paediatrics, COPD and Mental Health. Initiatives include:

- establishment of the Scottish Telesstroke Network;
- the Aberdeen A&E video booth pilot, which enables patients to receive a remote teleconsultation and use various medical devices that upload information directly into electronic medical records;
- the development of a Paediatric Telemedicine Network that links facilities without specialist paediatric units with Scotland’s 4 children’s hospitals;
- a COPD tele-rehabilitation service for patients living in rural areas of Perth and Kinross who find it difficult to get to the Perth Royal Infirmary.
Alongside the development of telehealth in Scotland, there has been a concomitant development in the use of telecare, funded through the Telecare Development Programme. A 2010 assessment of telecare in Scotland, by Newhaven Research (An Assessment of The Development of Telecare in Scotland 2006-2010), showed that, since 2006, over 29,000 people had received a telecare service through Telecare Development Programme (TDP) funding. It was also reported that an initial investment of £13 million had produced efficiency savings of approximately £48.4 million over the period 2006-10.

The current focus of telehealth and telecare is around the integration of these two disciplines. The national Telecare Programme Board has become the National Telehealthcare Programme Board and has published an action plan for Telehealthcare in Scotland, up to 2012. The convergence of telecare and telehealth into telehealthcare will allow the further development of telehealth solutions such as falls monitoring and remote LTC monitoring.

The aim is for telehealthcare to be seen as a routine option to help people meet their health and social care needs: “Telehealthcare should be seen as an intelligent, proactive, integrated and holistic solution for health care and social care, available to everyone.” The National Telehealthcare Programme Board will enable this vision to be taken forward, providing strategic leadership, helping to develop service infrastructure, and identifying further opportunities for efficiencies for service delivery, service innovation and data integration.

Wales
Telehealth is being developed in Wales within the CCM (Chronic Conditions Management) Demonstrator programme, set up by the Welsh Assembly in 2007. It involves three CCM demonstrator sites in Cardiff, Carmarthenshire and north Wales (Gwynedd). They have been carrying out advanced testing of the CCM Model and Framework (CCM&F) with the programme completing in March 2011.

The programme is nationally co-ordinated which includes an extensive programme to gather evidence, and wide ranging communications work to share and disseminate demonstrator learning and experiences across Wales.

As part of this programme the use of telehealth and technology solutions for better community care is being tested, together with other strategies such as the development of self care, the use of the PRISM tool for risk stratification, and the use of virtual clinics.

Northern Ireland
In the development of a telehealthcare system, Northern Ireland has the advantage of one integrated health and social care agency with responsibility for the planning, delivery, finance and regulation of health and social care.

In January 2008 the European Centre for Connected health was launched by Health Minister Michael McGimpsey. Its aim was to promote improvements in patient care through the use of technology in health and social care. The European Centre for Connected Health is currently leading a procurement process for the Remote Telemonitoring Northern Ireland (RTNI) Managed Service on behalf of and in partnership with the five Health & Social Care Trusts in Northern Ireland. The plan is for the RTNI to install a remote telehealth system throughout the region, providing care to all eligible patients. The initial focus will be on three chronic disease areas: heart failure, COPD and diabetes, with an initial plan for 3,000 patients.

Outside of the European Centre for Connected Health, provision of telecare and telehealth has been developed separately by the Fold Group. Fold started as a housing association, providing sheltered and supported housing, but over time introduced telecare technology both for its tenants and as a service for other social housing or health and social care providers to position telehealthcare as a first line support for people in their own homes.

France
In January 2009, President Sarkozy declared telemedicine a national priority, and a cross-government commission under Mr Pierre Lashbordes was established. In its final report "La télé santé: un nouvel atout au service de notre bien être" (Telemedicine a new tool for our well-being) to the government, the paper documents 15 recommendations that will guide the realisation of a five-year eco-sustainable plan.

The envisaged telemedicine plan involves cross-cutting work across the health and social relations ministries, as well as a wide range of other ministries.

Appendix: Some international experience

The paper identifies five preconditions to be satisfied in order to develop a sustainable telemedicine model.

1. Ethical supervision by the relevant bodies
2. A high speed, secure Internet network
3. Workstations allowing access to Internet and to secure messaging
4. A minimum EHR and health communication system
5. A standard evaluation framework

The 15 recommendations of the paper address the following issues:

- The organisation of healthcare services, highlighting the need to reduce the divide between health and social care, support continuity of care, and implement telehealth for home support, after release from hospital, in prison and for the disabled and frail elderly.

- A financial and regulatory framework that clarifies the financial and legislative issues to be addressed as soon as possible.

- Stakeholder engagement, highlighting the importance of training and higher education programs for staff. In order to create awareness of opportunities created by telemedicine, the report encourages opening a portal of information, both for public and for health staff and launching a national communication plan to generate interest and confidence in telemedicine services.

- The need for an "industrialisation" of telemedicine, going beyond the "pilot nature" of currently implemented projects.

The Lasbordes' report estimates an envelope of funding around €6.5 billion. A significant part is likely to be included in the "grand loan" investment strategy that the French government is also evaluating.

This telehealth project will be based on national specifications and implemented locally through new regional health agencies.

Denmark

As part of its integrated approach to eHealth coordinated nationally by Medcom, Denmark has a long history in promoting and adopting telehealth and telemedicine solutions. Odense University Hospital is a leader in this field and some example projects are now illustrated:

- A healthcare interpretation service was developed providing an intelligent infrastructure to locate the next available interpreter. This is now being rolled across the country and relies on an "IP call centre" which also contributes to the national infrastructure for video conferencing.

- In cooperation with Odense University Hospital, the company Medisat has developed a “Patient Briefcase”, to assist those suffering from chronic obstructive pulmonary disease (COPD). As part of the discharge process from hospital, the patient receives the briefcase which provides biometric and video-conferencing capabilities to remain in active communication with the hospital. It has been found to shorten patients’ stays in hospital, lower the readmission rate, releasing the resources of hospital beds and nursing care for other patients, and increases their feeling of security after discharge.

Whilst the Patient Briefcase was initially developed for use with COPD, and in a hospital discharge setting, additional applications are now being looked into, including expanding to physical rehabilitation, the treatment of heart failure, and other LTCs. It also has possible uses in areas where healthcare is difficult to access, e.g. ships, oil-platforms, prisons, natural disaster zones, homecare centres and private hospitals.
• A more widespread scheme, coordinated in Denmark, is R-Bay, an eMarketplace where radiology services can be bought and sold. Whilst the traditional teleradiology service uses point-to-point connections between clients and providers, R-Bay provides a “many-to-many” solution, facilitating the viewing and consultation of images across many organisations and cross-border. Using this solution, providers are able to make their services available and the customers will buy the services via a trusted and secure network. A pilot project, which ran between 2007 and 2009 had eleven partners from eight European countries.

United States - Kaiser Permanente

Kaiser Permanente (KP) has approached the adoption of telehealth not as a technology project but as an enabler of improved healthcare across their members and as a means to creating a more satisfying practice for their clinicians.

KP starts with the huge advantage of having KP HealthConnect (a unified electronic health record - EHR) in place providing a platform for telehealth and teleconsultations. All KP providers have access to this central record, allowing information on allergies, drug interactions and patient preferences to be accessible at the point of care. KP HealthConnect also allows more joined-up healthcare, as all the healthcare providers that come into contact with a patient are able to give the patient reminders about other aspects of their care, thus reinforcing positive health management messages.

Patients can also access KP HealthConnect through a web portal - My Health Manager. They can already use this secure system to email their doctors, view lab results and order prescriptions. In the second quarter of 2010, KP clinicians received over 2 million emails from patients from all over the world. The use of e-mail and patient portals in reducing member travel and procurement of supplies may also have a significant impact on reducing our CO2 footprint.

A key focus of the telehealth programmes has been around the use of simple but effective approaches for example related to the management of high blood pressure, common to one third of the member population. Similar trials were made in the diabetes area but these proved more complex and less clearly suited to home-based monitoring.

Across KP’s regionally-based structure, various teleconsultation programmes have been taken forward such as in Georgia, Colorado and California, driven by the aim of improved health outcomes.

Veterans Health Administration

The Veteran Health Administration (VHA) is part of the United States Department of Veterans Affairs. It provides a full medical programme to all US veterans, including preventative, outpatient and inpatient services and operating outpatient clinics, hospitals, medical centres and nursing homes.

The Telehealth programme at VHA comes under the Care Coordination Services, and is run in three streams; General (Real-Time) Telehealth, Home Telehealth and Store-and-Forward Telehealth.

General Telehealth equates to teleconsultations, and involves the patient travelling to a local outpatient clinic, rather than to a hospital or medical centre, where a consultation with a specialist can occur, aided by video consultation equipment. This reduces the cost and time spent travelling by the patient.

Home Telehealth is used for long-term health conditions such as diabetes, chronic heart failure, chronic obstructive pulmonary disease (COPD), depression or post-traumatic stress disorder. Care coordinators identify the appropriate technology for the patients, which might include videophones, messaging devices, biometric devices, digital cameras, or telehealth devices. These devices increase the opportunity for veterans to continue living independently in their own home for longer.

Store-and-Forward Telehealth is a method for acquiring and storing clinical information (e.g. data, image, sound, video) and then forwarding it to another site for clinical evaluation. Store-and-Forward telehealth allows the opportunity for Teledermatology, Teleretinal Imaging, and Teleradiology where images can be forwarded to a specialist for remote assessment.

The use of telehealth by a large organisation such as the VHA has produced a wealth of evidence covering the clinical and cost effectiveness of such interventions. One such study, Darkins et al. 2008, investigated the use of telemonitoring for such conditions as diabetes, hypertension, congestive heart failure, chronic obstructive pulmonary disease, depression, and post-traumatic stress disorder. 33% of these patients suffered from multiple conditions.

Appendix: Some international experience

Healthcare without walls

Hospital admission data for patients during the year prior to enrolment into CCHT was compared with the data for the six months after enrolment.

This showed a 20% reduction in hospital admissions and a 25% reduction in bed days of care (BDOC) following enrolment into the programme. In addition, the cost of CCHT was significantly lower than other forms of care - $1,600 per patient per annum (pppa,) compared to $13,121 pppa for the direct cost of VHA's home-based primary care services and an average of $77,745 pppa for nursing home care rates.

It should be noted that the VHA targeted high-utilisation patients, mostly male, who were amenable to telehealth and there was a significant 'rural factor' to selection which impacted on travel costs.

Moreover, a key factor to the success of VHA's approach is the extent of integrated working across the care continuum. Indeed, the VHA consider that a key to success of the initiative has been a 'systems approach' to its design including the 'standardisation of the clinical, educational, technical, business, and organisational elements of CCHT based upon experience gained from piloting it prior to its widespread implementation'.

At the time of the above report, in December 2008, a total of 43,430 patients were enrolled in program.

Given the success of studies such as this the VHA is now scaling up its approach to reach over 100,000 patients by 2011.

In Andalucía, FASS, a non-profit organisation of the Andalucía Government, is responsible for the provision of social care and independent living services, and operates the largest telecare service in Europe. FASS works together with EPES, the Andalucían emergency health service provider, allowing patients to push an alarm button in their home, and when necessary be provided with a fast response, through the EPES service. EPES provides a 24/7 service dealing with calls from healthcare emergencies and providing health-related information and advice.

A more recent EU-sponsored project, CommonWell, will integrate with Tunstall the information from both emergency and social care services into one common platform, enabling citizens with social care needs identified by EPES to be easily put in contact with the appropriate social services.

Nationally, telephone consultations are available via the Regional Health Councils. They are publicly funded and free of charge. These services have only recently been developed and it is expected that provision will continue to expand. Online consultations are available, however they are more focused on providing information and medical appointments than on achieving a diagnosis.

In addition the Avanza Plan aims to help further develop the ICT infrastructure for health and other sectors across the country. This is co-ordinated in each autonomous region in accordance with their own Regional Strategy for the development of these services.

Spain

Telehealth development in Spain is dependent upon the region, however strong development of telehealth solutions is seen in both Catalonia and Andalucía. Hospitals in Catalonia have developed hospital-in-the-home services, and in particular the CARME study, managed by the Spanish Hospital Germans Trias i Pujol Heart Failure Clinic over a 12 month period, has shown strong benefits to patients suffering from chronic diseases. The project provided educational support to heart failure patients via their television. By comparing clinical outcomes 12 months prior to enrolment with the results obtained during the study, the study revealed a 73% reduction of days spent in hospital and a significant improvement in patients perception of quality of life.
In the West Midlands, our strategic vision is that assistive technologies to support our workforce and the wider population living with long term conditions must be led by consumer need, whether that be health or social care professionals or patients and their carers. Technology has the ability to support people to better look after themselves, increase staff productivity by making contact a more meaningful encounter for staff and patients alike.

I would urge people to be ambitious in their plans, include clinicians in the planning, implementation and evaluation process from the start and be sure that the solution matches the need required. This ‘new’ way of providing and planning care for people requires a massive mindset and cultural shift that the NHS as a whole must embrace if the use of technology is to be as big a success as we think it can.

This report is very timely in that it provides a set of recommendations in order to support mainstreaming use of tele-healthcare to support people with LTCs. It encourages bold ambitions and is a useful resource for commissioners to help inform their investment decisions.

Joanne Harding, Programme Lead, Long Term Conditions, NHS West Midlands

"Addressing the strategic challenge of the rising tide of people with long term conditions lies in patient centred care. Personalising care with care planning, integrated working by sharing the medical record and introducing immediacy using telehealth monitoring and telemedicine will transform patient care, improve outcomes and achieve more for less. This report adds considerable value to the debate on how services can be transformed using telehealth in the future."

Dr Shahid Ali, GP and Clinical Lead Primary Care, NHS Yorkshire and the Humber

"There is now a real sense that telehealth is on the brink of mainstream adoption. This is not a foregone conclusion. This report from 2020health gets to the root of the issues and provides a clear and very practical way forward. Telehealth is a rapidly evolving field that needs to grow with locally driven service innovation coupled to industry-wide technology enhancements that will ensure today’s solutions can become tomorrow’s scalable services that will truly empower people to manage their own health.”

George MacGinnis, Director, PA Consulting and User Group Chair, Continua Health Alliance

"Across Scotland, telehealth and telecare capabilities are crucial elements in our strategy to modernise healthcare for the benefit of all. We’re delighted to have been involved in the 2020health work and see this report as making a very valuable contribution to mainstreaming telehealth. It provides a platform for strong on-going collaboration between Scotland and England in the future.”

Iain Hunter, General Manager, Scottish Centre for Telehealth

"We see telehealth as key to improving healthcare for those people living with long term conditions. We welcome this report with its informed, comprehensive analysis and emphasis on partnership working. Government would do well to take its recommendations seriously.”

Christine Hancock, Director, C3 Collaborating for Health and Former RCN General Secretary