

Welcome from Paul Rice

Health and social care providers face a tremendous challenge to provide comprehensive care and support to increasing numbers of people with complex care needs in advancing old age. We have to start by giving people the means to look after themselves more effectively. We then need to ensure that clinical and social care expertise is available ahead of any crisis and targeted to the most vulnerable. Also ensure it is focused on prevention, avoiding hospitalisation except when that's the right place for a person to be.

Technology has transformed other parts of our lives; not by substituting for human contact but by enhancing it, and making key information available to the people I choose, when I choose and for the purposes that I choose. Redesigning care processes to make the best use of telehealth technologies is a quality and economic imperative.

This Toolkit is designed to support emergent commissioners, provider organisations and individuals. It allows them to quickly access the essential information required to move forward with

confidence to introduce new service models incorporating technology primarily for people with long term conditions.

It includes "warts and all" accounts from some of the innovators and early adopters in Yorkshire and the Humber who have accepted the good enough evidence base that this stuff changes patient experience and professional practice positively and irresistibly.

It will be refreshed periodically as more innovative practice and the insights and learning from users, carers, health and social care professionals and the Telehealth industry become available.

Please feel free to use the contact details in the toolkit to provide us with comments, critique and most importantly references and resources that you wish to share with others to help them move forward more quickly and effectively than would otherwise be the case.

Paul Rice, December 2010

What does the toolkit contain?

Resources, tools and evidence to support those considering telehealth deployments:

- [Quick overview of telehealth](#)
- [Local case examples \(video case studies\)](#)
- [Other telehealth video case examples](#)
- [Telehealth service models](#) for:
 - [Tele-coaching](#)
 - [Tele-monitoring](#)
 - [Tele-consultation](#)
- Key success factors for deployment:
 - [Governance](#)
 - [Change management](#)
 - [Interoperability](#)
 - [Evaluation](#)
- [Other telehealth toolkits & resources](#)
- [A repository of telehealth service documents from Yorkshire and the Humber](#)

Navigating the toolkit?

You can use both the navigation buttons at the bottom of the screen and the navigation keys on the PC (Page Up – Page Dn – Home)



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Menu

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Welcome from Paul Rice (2)

How might you use the toolkit?

The toolkit is designed to be modular allowing people to use only those parts that meet their needs. It is also very economical with words and uses bullet points throughout. This aims to make its use as time efficient as possible.

The toolkit also uses links to selected telehealth resources. Some links are to documents and other information within the toolkit. Other links are out onto the internet to use resources published on the web such as videos, research papers and other collections of telehealth resources.

The toolkit is developing and is created by practitioners. It is presented here as a pdf and PowerPoint based toolkit and will be available from the web. The aim in using these formats is to make it available to as many people as possible. Functionality and design are compromised for availability.

Different roles will find different parts of the toolkit useful:

Telehealth Project Managers

- Service models ([Link1](#)) ([Link2](#)) ([Link3](#))
- Business cases ([Link1](#)) ([Link2](#)) ([Link3](#))
- Change management ([Link](#))

- Evaluation ([Link](#))
- Wider telehealth resources ([Link](#))
- Document repository ([Link](#))

Patients and the Public

- Video cases ([Link](#)) ([Link](#))
- Impacts on healthcare ([Link](#))
- Wider telehealth resources ([Link](#))

Clinicians

- Impacts on healthcare ([Link](#))
- Service models ([Link1](#)) ([Link2](#)) ([Link3](#))
- Evidence ([Link](#)) ([Link](#)) ([Link](#))

Healthcare Managers & Commissioners

- Video cases ([Link](#)) ([Link](#))
- Impacts on healthcare ([Link](#))
- Business cases ([Link1](#)) ([Link2](#)) ([Link3](#))
- Governance ([Link](#))
- Evaluation ([Link](#))

Technologists

- Video cases ([Link](#)) ([Link](#))
- Technical platforms ([Link](#)) ([Link](#)) ([Link](#))
- Interoperability ([Link](#))

Researchers and Students

- Video cases ([Link](#)) ([Link](#))
- Evidence ([Link](#)) ([Link](#)) ([Link](#))
- Wider telehealth resources ([Link](#))

What help is included?

- [General information on toolkits](#)
- [Theory underlying this toolkit](#)
- [Definitions of terms used](#)
- [Help page](#)
- [FAQs](#)

Further information on toolkit?

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Adding resources to the toolkit

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Quick Overview of Telehealth

What Is It and Is It Worthwhile?

Telehealth is the use of a range of assistive and information technologies to deliver health and social care services in new and innovative ways. In essence, its the healthcare equivalent of internet banking, call centres, mobile apps, tele-conferencing and on-line communities – areas we are all increasingly using and taking for granted. Telehealth has the same role of improving the services we all need, in often quite profound ways.

Internationally, a quite staggering number of telehealth trials, pilots and demonstrators have accumulated a complex picture that has increasingly made the case for telehealth solutions such as tele-coaching, tele-monitoring and tele-consultation. The strongest cases, economically, are for long term conditions such as CHD, COPD and Diabetes and for the support of vulnerable adults in their homes, labelled telecare.

"It telehealth) stops me from going into hospital! Yesterday my blood pressure was slightly high and by half past nine they had rung (me) up because they had seen it in the data."

Telehealth patient in NHS East Riding of Yorkshire

2010 was a bit of a watershed year when the evidence became very compelling. Few informed commentators – whether Health Ministers, clinical leaders in this field or health economists seriously doubt the importance of telehealth. The debate has moved to where and how best to exploit this and onto the real challenges of doing it well.

Across the UK there are over 1 million people benefitting from some form of telecare, perhaps 50,000 being supported through tele-coaching services and over 10,000 tele-monitoring units in use in peoples' homes. International experts forecast that around the world telehealth deployments will grow by around 50% per year throughout the next decade. In the UK growth is currently broadly of this magnitude.

"Technologies like telecare and telemedicine are already increasingly used to help people stay safe in their own homes. When I was in Northallerton, talking to North Yorkshire County Council, they told me about their programme of telecare services. This was established over three years ago. They put it very simply: "For every hour someone is on the floor, it's an extra 24 hours in hospital." They've shown the investment paid off. North Yorkshire has saved over a million pounds"

R H Andrew Lansley, Secretary of State for Health, Speech to NCAS Conference on 5th November 2010.

Quick Overview of Telehealth (2)

What is Driving the Role of Telehealth in Chronic Care?

A moment's thought is all that is needed to identify the drivers:

- All advanced economies are already experiencing the growing health needs of an aging population. The number of over 65 year olds in the UK will rise by more than 5 millions over the next 20 years. Across England over 14 million people already have chronic conditions
- Healthcare resources of staff and finance are now heavily constrained and will be throughout the current parliament. Productivity increases of 4% per annum or the equivalent of £20bn of efficiency improvements are needed to be able to meet healthcare demands
- People are asking for a different form of healthcare delivery. Increasingly voiced is the demand for care in people's homes rather than hospital based care or care homes. Awareness is growing of the need for self management of health and wellness – people want to manage their conditions in partnership with healthcare professionals

This "perfect storm" of rising demand for chronic care, severely limited resources, particularly clinicians in the community and rising aspirations from people to be active in health decisions about them is at the centre of the growth in telehealth.

Telehealth offers one of the most promising ways that healthcare can address this rising demand on the NHS. It promotes self management, takes away some of the burden of monitoring and coaching patients, increases efficiencies in service delivery and accumulates the data for managing trends in individual cases and across populations.

"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..."

Patient in the Kent telehealth pilot

Quick Overview of Telehealth (3)

New Service Models for Long Term Conditions Management

The introduction of new service models to comprehensively and proactively manage vulnerable patients with long term conditions requires a diverse range of complementary approaches.

Telecare and telehealth are necessary but not sufficient elements of more effective care pathways. They have also developed to date in line with condition-specific approaches to the management of patient care, in a world where increasing numbers of patients live with multiple co-morbidities and cognitive impairment. Self management, care planning, risk stratification and predictive modelling, effective local integrated working amongst and between health and social care professionals will all play a part alongside assistive technology, telecare and telehealth in delivering optimal outcomes.

The challenge that service models incorporating assistive technology face is to increasingly meet the challenges of the lived experience of those requiring support, independence and control.

"Integration at the micro level encompasses a diverse range of approaches, many of which seek to improve care co-ordination for individual patients and carers. These approaches include care planning, case management, patient-centred medical homes, virtual wards, personal budgets, IT, telehealth and telecare."

Clinical and service integration: The route to improved outcomes by Natasha Curry and Chris Ham, King's Fund, 2010

Local Case Studies

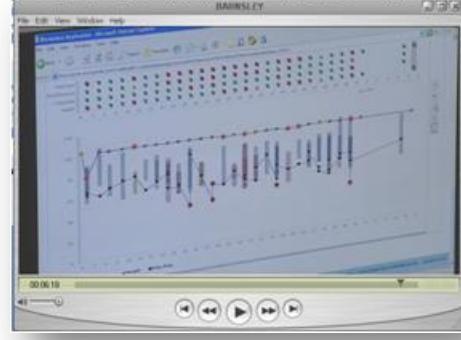
A set of video cases has been produced from the pioneering work within Yorkshire and the Humber.

These case studies are all local examples of telehealth deployments. Within them you will hear, from the people involved, the story of what they have accomplished, how it was achieved and the learning from their hard won experience.

Other local telehealth experts to contact:

- [**Dr Shahid Ali**](#), GP & Clinical Lead, NHS Yorkshire & the Humber
- [**Joanne Crewe**](#), Head of LTCs, NHS Kirklees
- [**Shiela Dilks**](#), Director of Patient Care, NHS Kirklees
- [**Sarah Ferguson**](#), Head of Business Development & Investment, Airedale Hospital Trust
- [**Richard Pope**](#), Medical Director, Airedale Hospital Trust
- [**Julie Ryan**](#), Telehealth Project Manager, NHS North Yorkshire & York
- [**Kerry Wheeler**](#), Assistant Director of Strategy, NHS North Yorkshire & York

NHS Barnsley



NHS Doncaster



Contact: [**Brian Hughes**](#), Director of Business Development & Innovation,

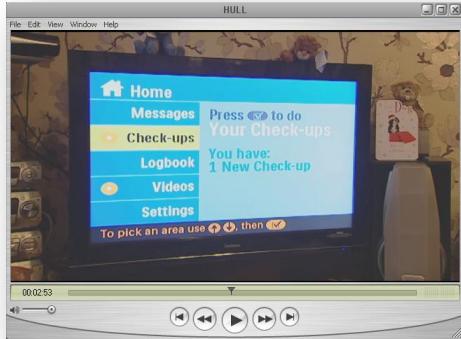
NHS East Riding of Yorkshire



Contact: [**Alex Seale**](#), Director of Joint Commissioning,

Contact: [**Sarah Harrison**](#), Service Improvement Manager, LTCs,

NHS Hull



Contact: [**David Barrett**](#), Nurse, Lecturer in Telehealth, University of Hull,

Other Video Cases

Tele-coaching

-  [Birmingham Own Health \(6mins\)](#)
-  [Boston – Health Dialog Research on Telephone Based Health Coaching \(4mins\)](#)
-  [SMART system being developed at the University of Sheffield – helps patients self manage their LTC \(3 mins\)](#)

Tele-monitoring

-  [Newham Whole Systems Demonstrator - CHD, COPD, Diabetes & Co-Morbidities, Telecare \(14 videos of 3 to 9mins\)](#)
-  [Kent Telehealth Project \(WSD\) - CHD, COPD, & Diabetes \(8mins\)](#)
-  [Cornwall & Scilly Isles \(WSD\) - Telehealth and Telecare \(4mins\)](#)
-  [NHS Scotland – Telecare \(22mins\)](#)
-  [Stoke on Trent – Florence, mHealth Monitoring for COPD \(6mins\)](#)
-  [Milton Keynes – Telecare Alarm Service and Tele-monitoring \(2mins\)](#)
-  [NHS Lothian – Remote Monitoring for COPD \(3mins\)](#)
-  [Dudley Telecare Service \(8mins\)](#)
-  [Patient Voices on Telehealth](#)
-  [Grand Rapids \(USA\) CHD \(2mins\)](#)

Tele-consultation

-  [Airedale Tele-consultation Service to Prisons \(6mins\) and \(7mins\)](#)
-  [Outer Hebrides – Various conditions \(16mins\)](#)
-  [Veterans Association \(USA\) – Remote consultation for COPD & tele-psychiatry \(9mins\)](#)
-  [Chorleywood GP Practice – Leading edge telehealth \(17mins\)](#)
-  [Queen Victoria Hospital in East Grinstead – tele-consultation for plastic surgery services \(2 mins\)](#)
-  [National Hospital for Neurology and Neurosurgery in London uses tele-consultations through remote clinics \(4 mins\)](#)

Service Models

Introduction

This is the core part of the toolkit and covers the key service models for telehealth. These service models allow health organisations to:

- Discuss and debate how best to deploy telehealth services and adapt to local needs and practices
- Determine how telehealth integrates into existing LTC services
- Combine evidence and case examples to help create compelling business cases and implementation plans

Using the Telehealth Matrix

Review the service models by selecting the required cell in the matrix below.

Scope of the Service Models

Telehealth has potential applications across a huge range of medical conditions. This toolkit currently focuses on those long term conditions (LTCs) that have the most significant impact on the NHS. It covers COPD, CHD, diabetes and the frail elderly.

The technologies and methods for telehealth are also wide ranging and probably bounded only by imagination. But this toolkit focuses currently on the three core telehealth modes of tele-coaching, tele-monitoring and tele-consultation.

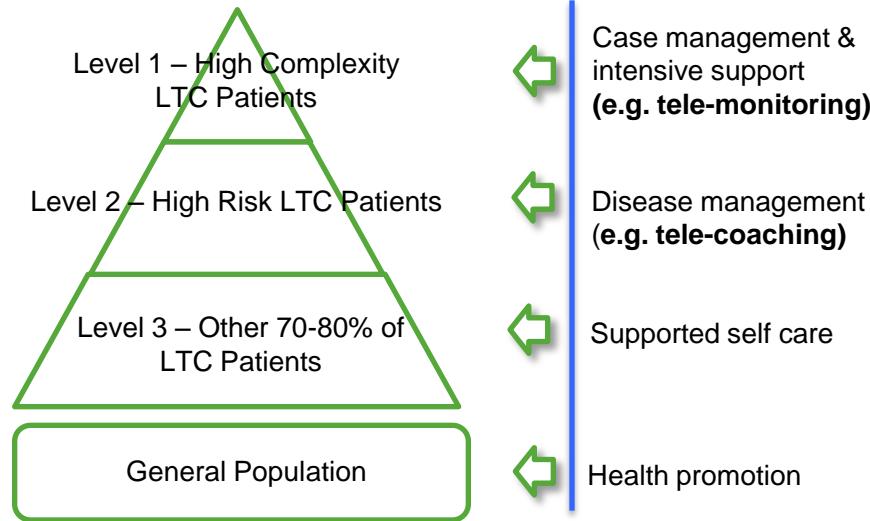
For individual conditions within tele-coaching and tele-consultation the research evidence and published case is not sufficient for a robust treatment so these two modes of telehealth are addressed generally.

		Condition				
		General	COPD	CHD	Diabetes	Frail Elderly
Service Model	Tele-coaching					
	Tele-monitoring					
	Tele-consultation					

Hypothesis: The Potential Core Role of Tele-coaching within LTC Management

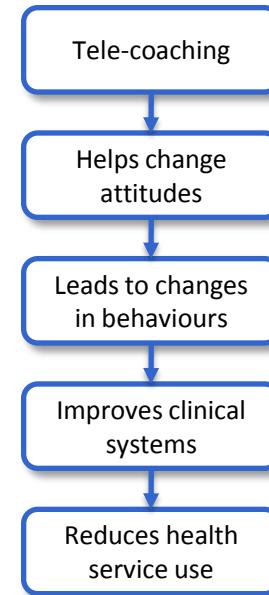
The Kaiser Permanente Triangle – the Role of Tele-coaching

- This model proposes three levels of severity for Long Term Conditions (LTCs) within a population. Different care regimes are needed for these three levels along with health promotion for the rest of the population. This model is based on the [Chronic Care Model](#)
- Tele-coaching has tended to be used for level 2 LTC patients whose condition requires management and general support but who have not progressed to a level of severity where they are experiencing crises and need intensive support
- For level 1 patients, tele-coaching and tele-monitoring have been combined with good outcomes



Why Does Tele-coaching Work?

- Tele-coaching adds to the care management of people living with LTCs in the higher risk category. It provides further contact, support, information and advice. Typically it is provided by a nurse or other health professional who has expertise in LTCs along with specialist training. This training includes motivational interviewing techniques which tailors advice to patients' readiness to change their attitudes and behaviours



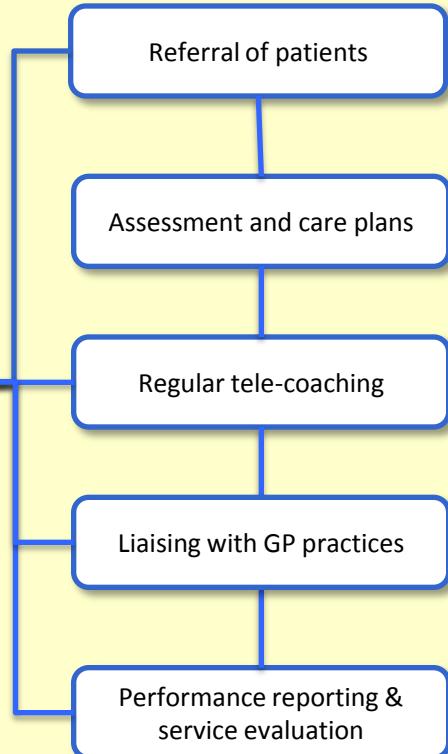
Hypothesis: Where Tele-coaching Enables a High Performance Chronic Care System?

Reviews of research by Professor Chris Ham proposed ten characteristics of a high performing chronic care system ([link](#)). This table suggests where **tele-coaching** promotes these characteristics:

Characteristics of high performance LTC system	Where tele-coaching provides support to high performance	Illustration of this support
1. Ensuring universal coverage of care	Not directly	-
2. Care is free at the point of use	Not directly	-
3. Focus on the prevention of ill health	Medium levels of support	Focus of tele-coaching is on patients at risk of critical episodes and helping to avoid deterioration into ill health
4. Priority given to patients' self-management of their condition	High levels of support	Care plans and ongoing coaching, advice and information enable patients to achieve better levels of self management
5. Priority is given to primary care	Lower levels of support	By providing additional on-call advice tele-coaching helps avoid patients turning to emergency or secondary care
6. Population management is emphasised (e.g. through risk stratification)	Medium levels of support	Tele-coaching uses - explicitly or implicitly - risk stratification to target patients with higher risk of experiencing crises
7. Care is integrated to enable primary care teams to access specialist support when needed	Not directly	-
8. Exploits the potential of IT	Medium levels of support	Initial care plans and advice are supported by evidence based software support. IT supports the scheduling of tele-coaching
9. Care is effectively co-ordinated	High levels of support	Tele-coaching nurses add to GP services to help advise patients and to co-ordinate care services, when needed
10. Improvements managed as a coherent whole	Not directly	-

General Service Model

- Key**
-  Document
 -  Evidence
 -  Tool
 -  Template
 -  Checklist



Information

Policies, guides & systematic reviews

- [DH Policy on Long Term Conditions](#)
- [2010 "The Ten Characteristics of the High Performing Chronic Care System" by Chris Ham](#)
- [RCN Guidance on Telephone Support for LTCs](#)

Key case studies

- [Birmingham OwnHealth tele-coaching service](#)
- [Report on Learning from First Year of Birmingham OwnHealth](#)
- [West Kent PCT Tele-Coaching Service](#)
- [East Surrey CareCall](#)
- [Dundee Healthy Living Initiative](#)
- [Stoke-on-Trent Simple Telehealth](#)
- [Veterans Health Administration \(Telehealth & Care Co-ordination\)](#)

Video case studies

- [Birmingham Own Health](#)
- [Yorkshire & Humber Studies](#)

Regional experts for further advice

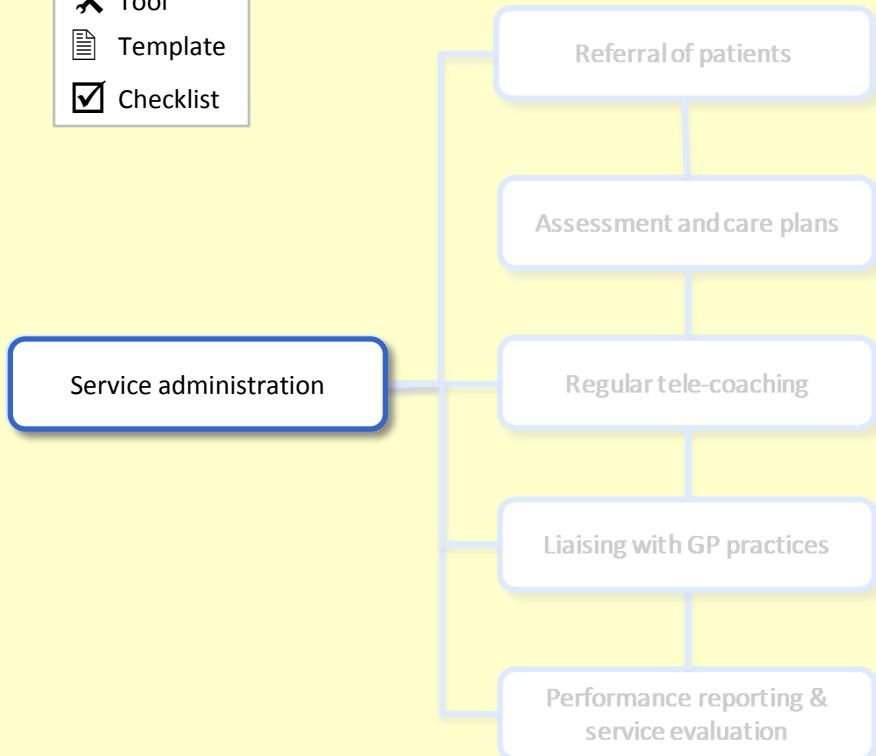
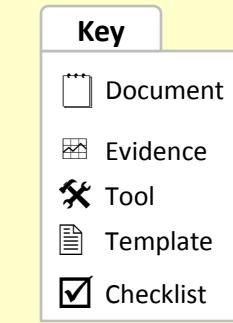
- [Dr Paul Rice, NHS Yorkshire & Humber](#)

Tele-coaching
technology model

Tele-coaching
evidence

Tele-coaching
business case

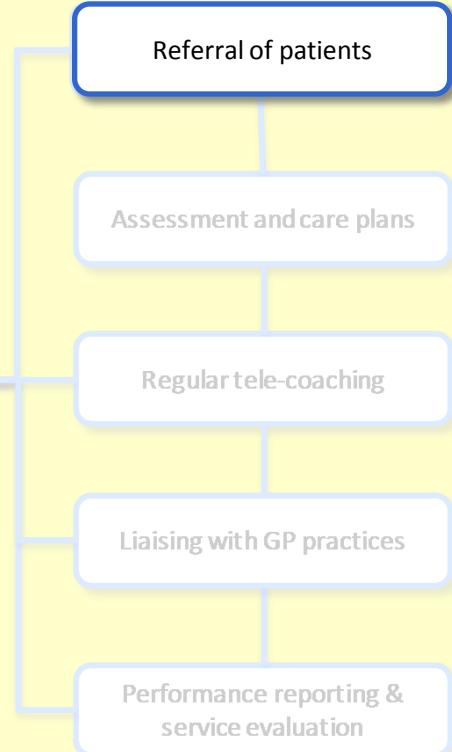
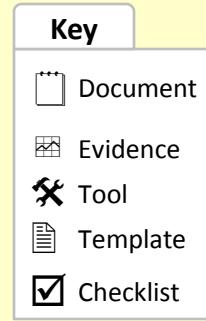
General Service Model



Administration

- Recruiting GP practices to the tele-coaching service
- Development of care management software
- General management of tele-coaching service
- Service promotion, PR and public liaison

General Service Model



Referral

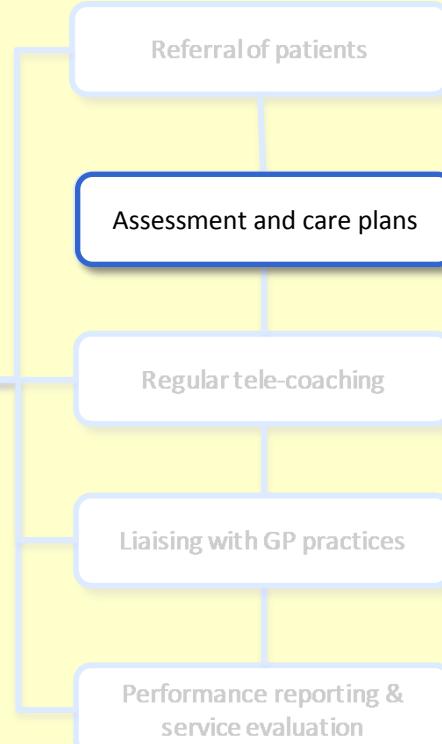
Protocol for referral to tele-coaching service is maintained

GPs (or other health professionals) refer to tele-coaching service using criteria agreed in protocol

Tele-coaching service monitors patterns of referral

General Service Model

- Key**
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Assessment

Care manager contacts referred patient and gains consent for enrolment

Initial needs assessment is carried out by care manager

Patient details entered onto care mgt system

Decision support tools generate recommendations for support, education & referrals

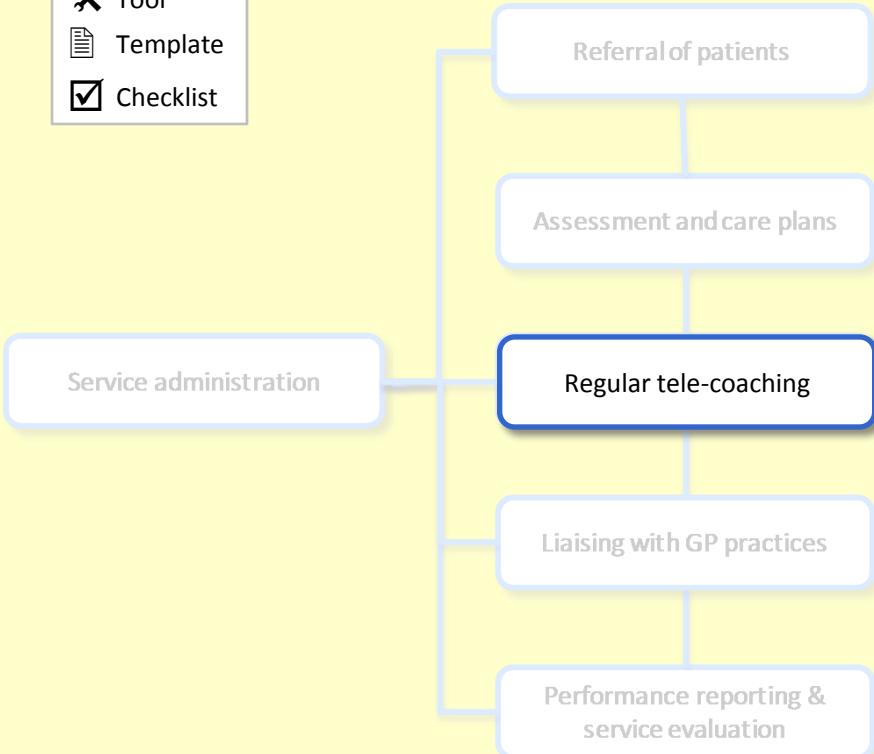
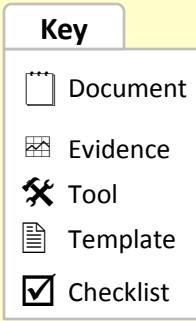
Care plans are co-developed with patient

1

Care plan booklet is sent to participant printed in their normal language

Booklet is used to record appointments with GPs and other care professionals

General Service Model



Tele-coaching

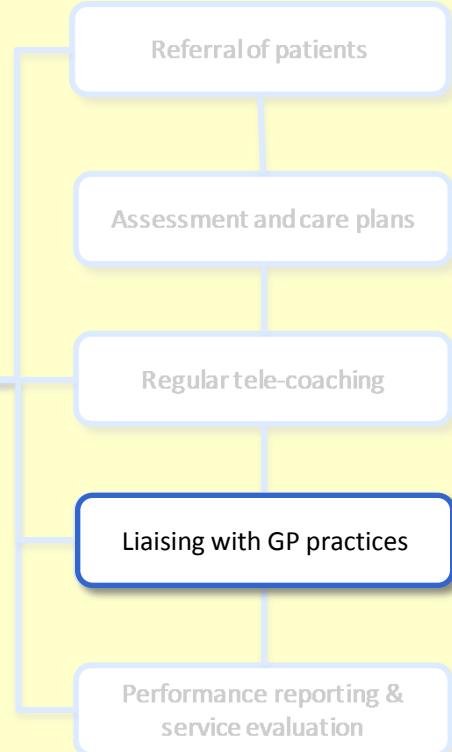
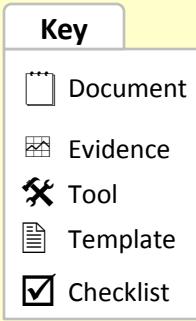
Telephone coaching arranged in line with care plans

Tele-coaching sessions provide information, support and coaching

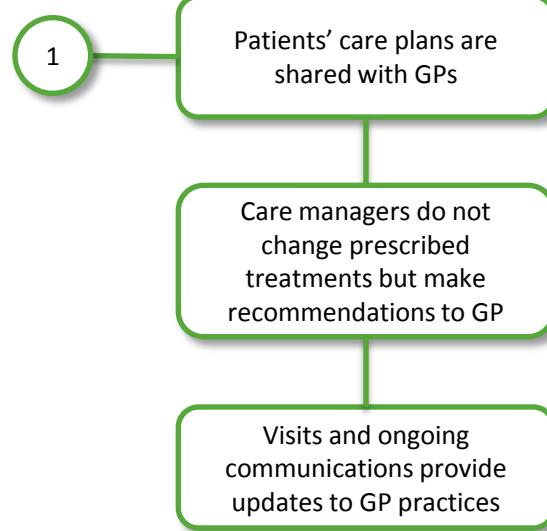
Patients coached on goals for behaviour modification using motivational techniques

Patient calls for additional coaching as needed

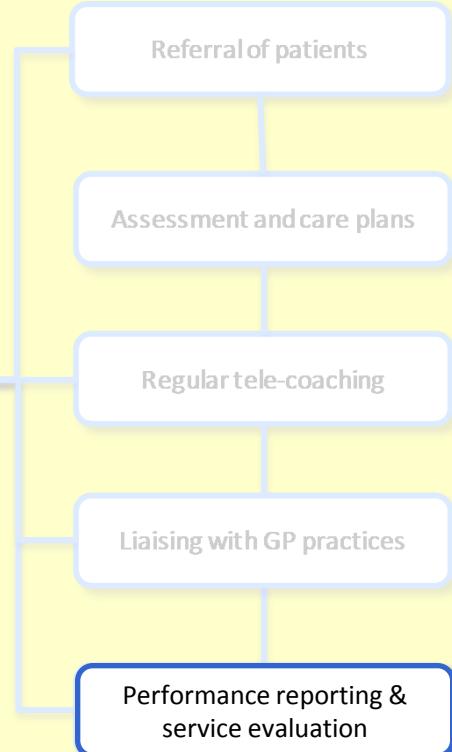
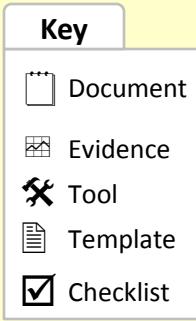
General Service Model



GP Liaison



General Service Model



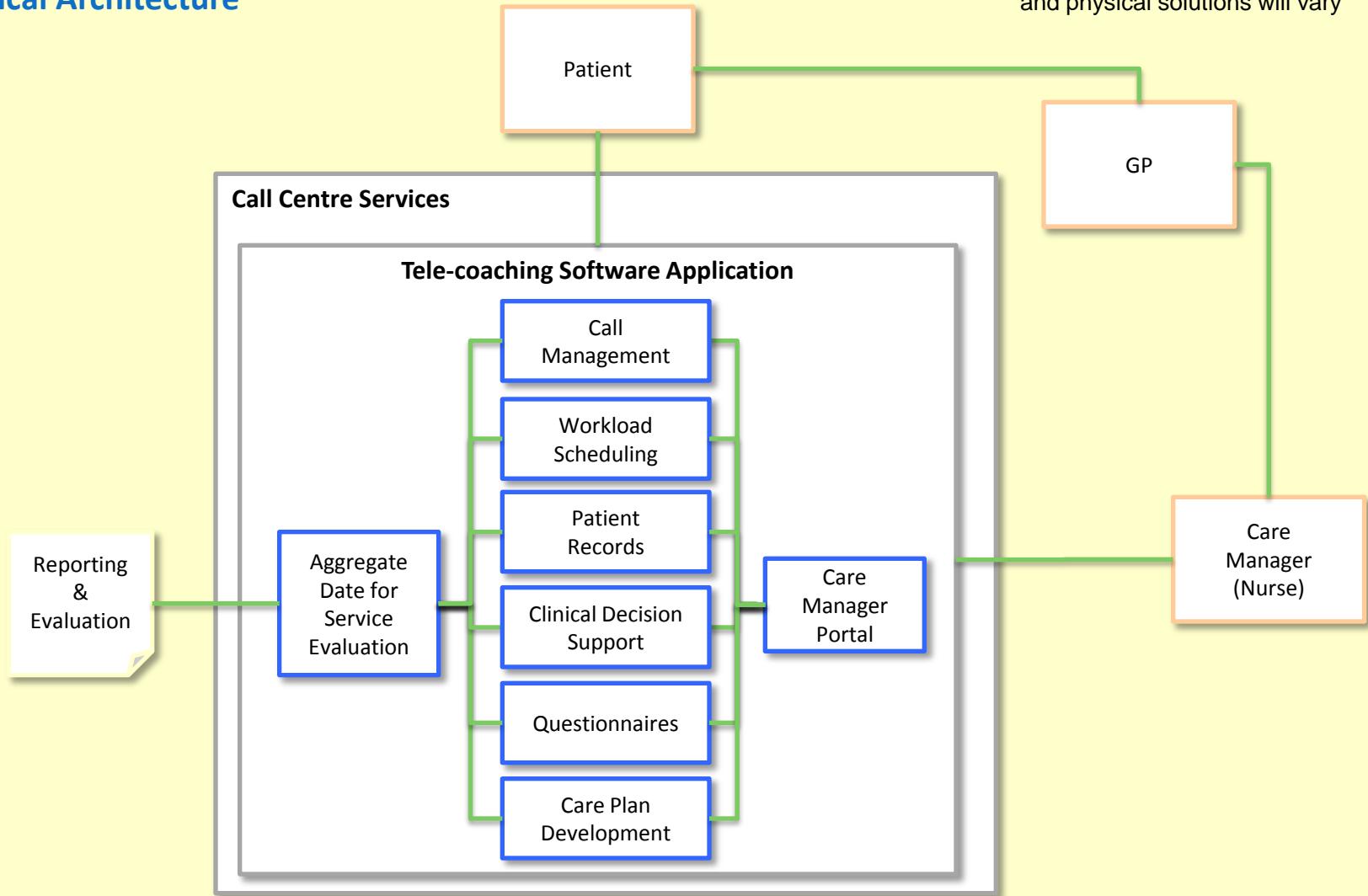
Evaluation

Care management system aggregates data

Reports generated for service evaluation

Technical Architecture

Note: This is a generalised model and physical solutions will vary



Tele-coaching Evidence & Business Case

Tele-coaching Generally

Research Evidence

- [2010 A randomised trial of a telephone care-management strategy by Wennberg et al \(large RCT in USA\)](#)
- [2009 "Care Coordination/ Home Telehealth at the Veteran's Association in the USA \(Informatics, Telehealth and Disease Management\)](#)

COPD

Systematic Reviews of Research Evidence (recent)

- [2010 Home telehealth for chronic obstructive pulmonary disease: a systematic review and meta-analysis by Polisena et al.](#)
- [2005 Review of effects on self efficacy of nurse telephone support for COPD by Wong, et al.](#)

CHD / CHF

Systematic Reviews of Research Evidence (recent)

- [2010 Cochrane Review for tele-monitoring for CHF by Inglis et al.](#)
- [2009 Systematic review for telehealth for secondary prevention of CHD by Neubeck et al.](#)

Other Research Evidence

- [2005 DIAL Trial \(Argentina\), BMJ](#)

Diabetes

Systematic Reviews of Research Evidence (recent)

- [2009 systematic review and meta analysis of research on telehealth for diabetes by Polisena et al.](#)

Other Research Evidence

- [2007, PEACH study \(Australia\)](#)

Business Case for Tele-Coaching

The benefits case for tele-coaching is that it provides a range of improvements to services and outcomes:

Clinical

- Improved clinical outcomes for people with CHD, COPD, diabetes, asthma, depression and frail elderly
- Improved compliance with medication and care plans
- Provision of more timely support and information

Economic

- Reduces the use of primary and secondary care services including reduced hospital admissions
- Improvements in satisfaction with health services generally

Additional Patient Benefits

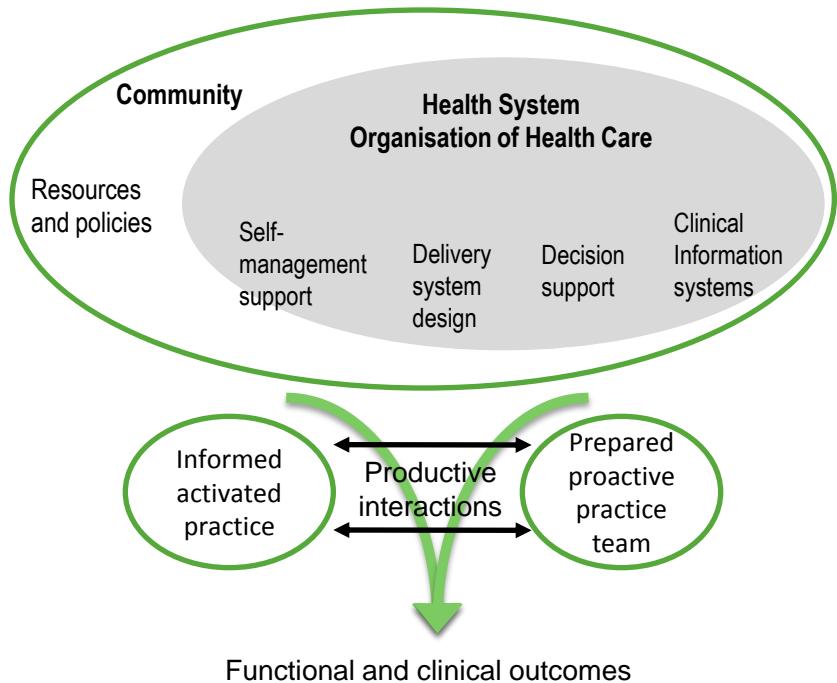
- Improvements in self management of conditions and self efficacy
- Leads to significant improvements in healthy living through greater awareness and improved willingness to change – includes exercise, smoking and diet improvements

The costs of providing tele-coaching have not been formerly published. And vary.

Hypothesis: The Potential of Tele-Monitoring for LTC Management

The Chronic Care Model – the Role of Tele-monitoring

- Perhaps the most respected model for [chronic care](#) was proposed by Dr Ed Wagner, Director of the MacColl Institute for Health Care Innovation in the USA. This model has become the foundation for LTC policy in most developed countries (ref. [Professor Chris Ham](#)). This model proposes the concepts that can be changed to improve LTC management



Potential for Tele-monitoring within LTC Management

- The following table proposes how the different areas within the chronic care model are improved by tele-monitoring:

Areas within chronic care model	Potential contribution of tele-monitoring
Self-management support	Enables patients to monitor own condition on a daily basis. Promotes communication of concerns
Delivery system design	Can be used to prioritise care - visits, interventions, medication
Decision support	Monitoring vital signs remotely can inform decisions and clinics
Clinical information systems	Data collected becomes part of care record and is available for research
Informed activated patient	Typically patient feels more in control
Prepared proactive practice team	Vital signs information can be used to prepare for visits and clinics
Productive interactions	Typically patients feel more supported by the health system as a whole
Functional & clinical outcomes	A range of patient, functional and clinical benefits arise (link)

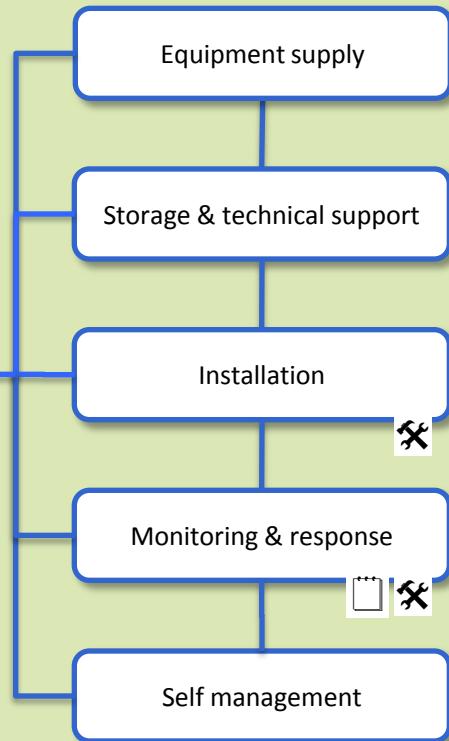
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Reviews of research by Professor Chris Ham proposed ten characteristics of a high performing chronic care system ([link](#)). This table suggests where **tele-monitoring** promotes these characteristics:

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1. Ensuring universal coverage of care	Not directly	-
2. Care is free at the point of use	Not directly	-
3. Focus on the prevention of ill health	High levels of support	Tele-monitoring alerts case managers to problems before, or as they are occurring, allowing them to triage their support
4. Priority given to patients' self-management of their condition	High levels of support	Tele-monitoring provides patients with ongoing engagement with measures of their condition promoting self management
5. Priority is given to primary care	Medium levels of support	Helps to prevent people living with LTCs from needing to use emergency services and unscheduled secondary care admissions
6. Population management is emphasised (e.g. through risk stratification)	High levels of support	Allows case managers to focus on patients with complex LTCs and to triage these to focus on those needing greatest support
7. Care is integrated to enable primary care teams to access specialist support when needed	Low levels of support	By identifying when conditions are deteriorating and specialist support is needed
8. Exploits the potential of IT	High levels of support	Tele-monitoring exploits IT for communications, to generate data continuously and to monitor remotely with automated alerts
9. Care is effectively co-ordinated	Medium levels of support	Alerts and reviews of vital signs allow case managers to co-ordinate visits and the provision of services
10. Improvements managed as a coherent whole	Not directly	-

General Service Model

- Key**
-  Document
 -  Evidence
 -  Tool
 -  Template
 -  Checklist



Information

Policies, guides & systematic reviews

- [DH – Whole Systems Demonstrators \(WSD\)](#)
- [Pare et al. "Systematic Review of Home Tele-monitoring for Chronic Diseases: The Evidence Base", 2007](#)
- [Garside, "Lessons from the US: using technology and homecare to improve disease management", 2010](#)

Key case studies

- [North Yorkshire Telecare](#)
- [NHS North Yorkshire and York](#)
- [Kent County Council Pilot](#)
- [East Essex Pilot \(COPD only\)](#)
- [Doncaster Pilot](#) [Cornwall WSD](#) [Newham WSD](#)
- [Eden & Carlisle \(Cumbria\) Tele-monitoring Pilot](#)
- [Argyll & Bute \(Scotland\) – Telehealthcare Programme](#)
- [Chorleywood Health Centre](#)

Video case studies

- [Newham WSD](#) [West Lothian](#)

Regional experts for further advice

- [Dr Paul Rice, NHS Yorkshire & Humber](#)

Alternative tele-monitoring models

Tele-monitoring technology model

Tele-monitoring evidence

COPD

CHD

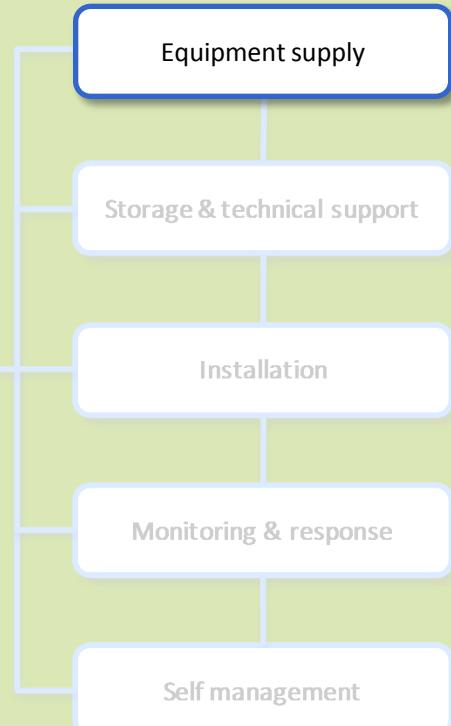
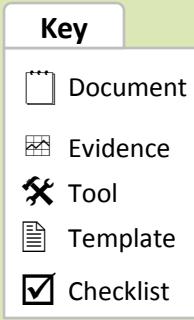
Diabetes

Frail
Elderly

Business
cases



Generic Service Model



Supplier(s)

Manufacture equipment and peripherals

Deliver equipment to order

Provide technical support & repair

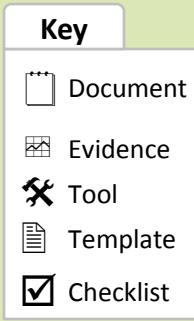
Train technical support staff on installation

Train clinical teams on usage, reviewing, parameters & alerts

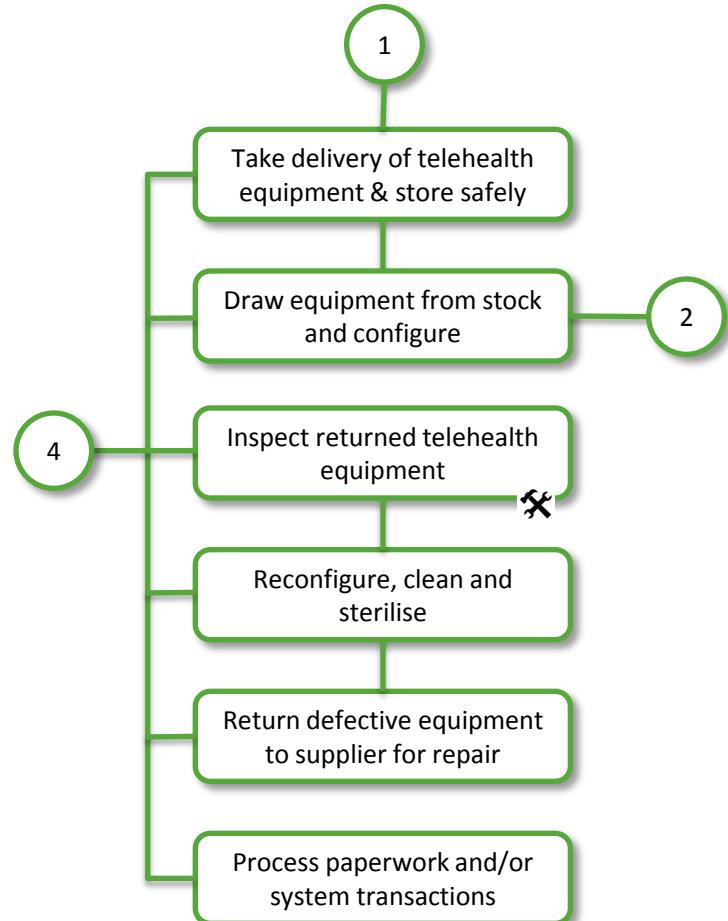
Provision of patient monitoring system

1

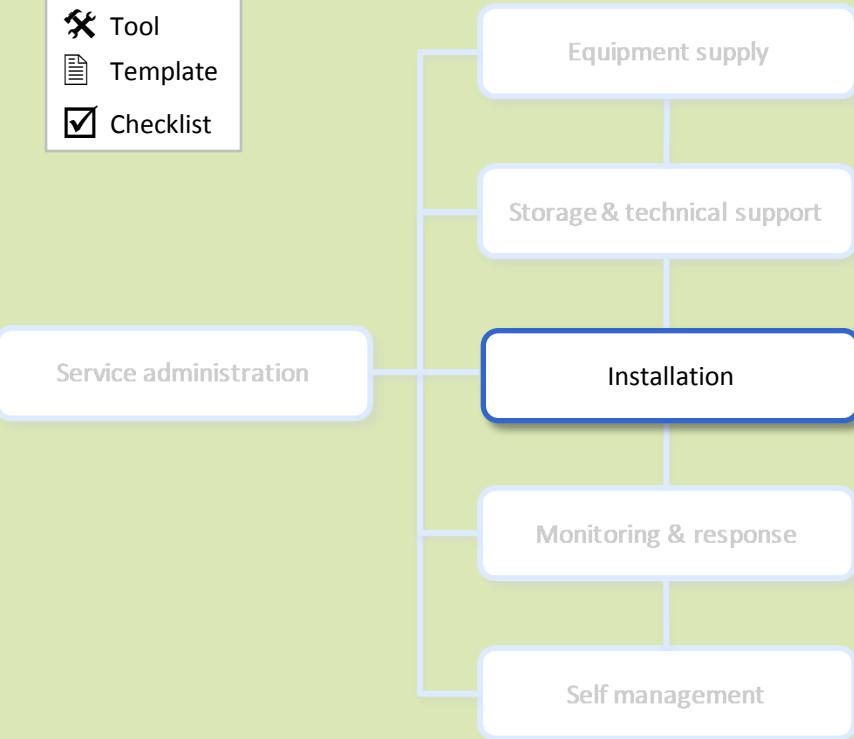
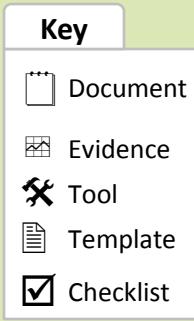
General Service Model



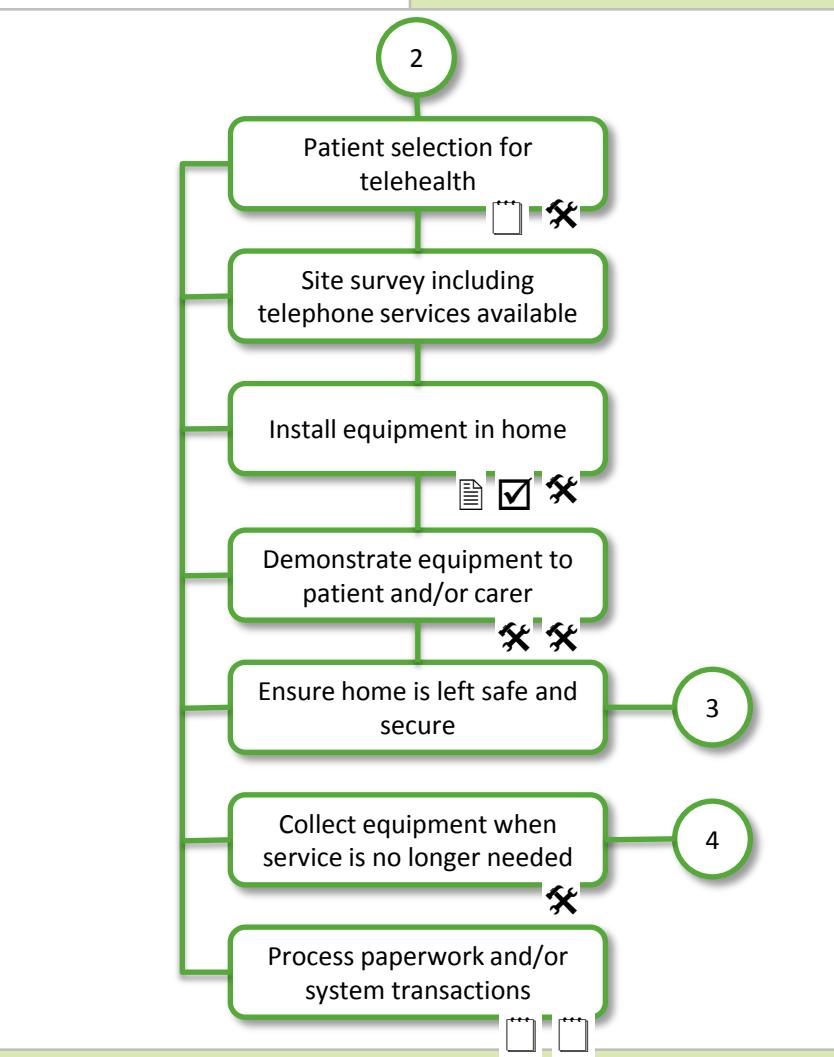
Technical Support



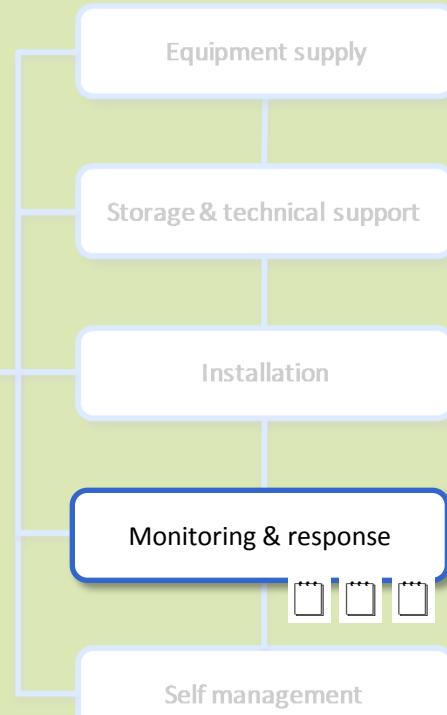
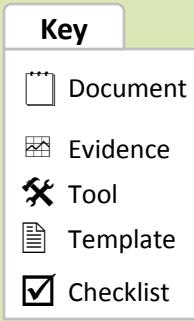
General Service Model



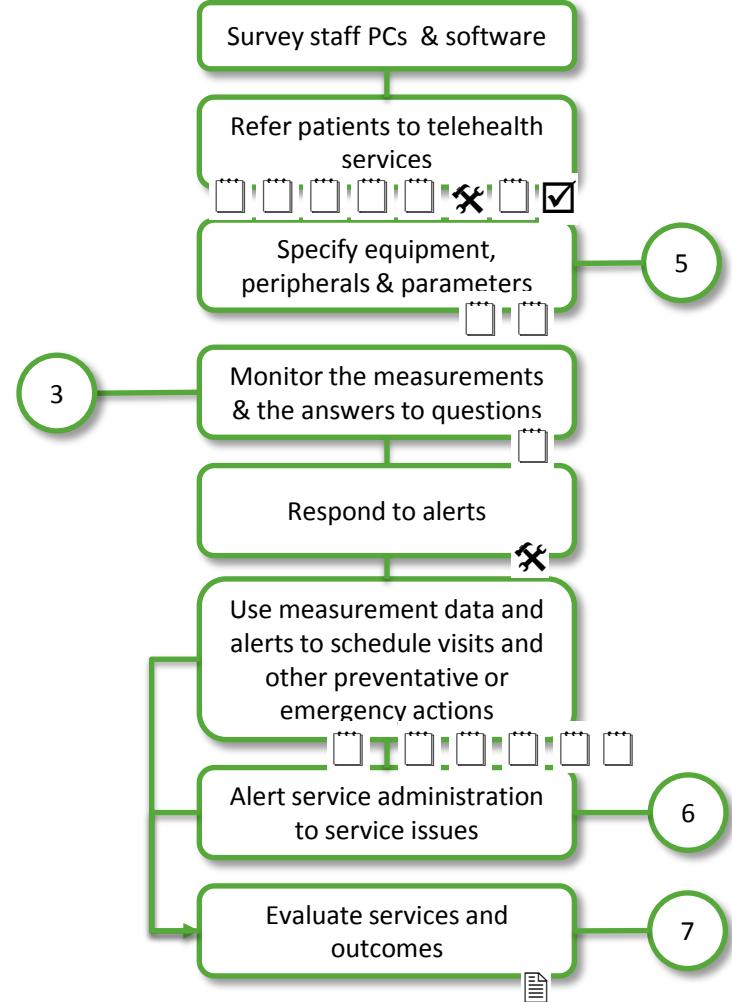
Installation



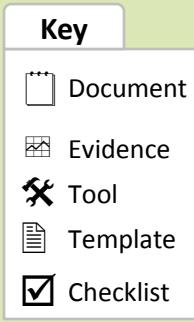
General Service Model



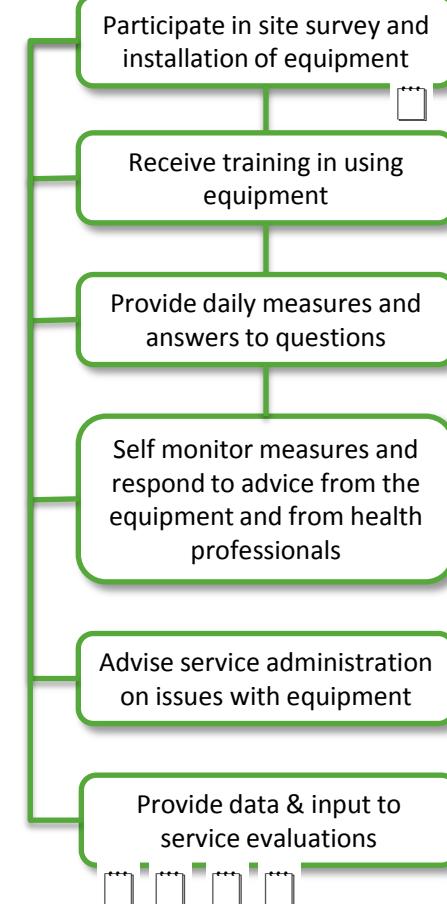
Monitoring & Response



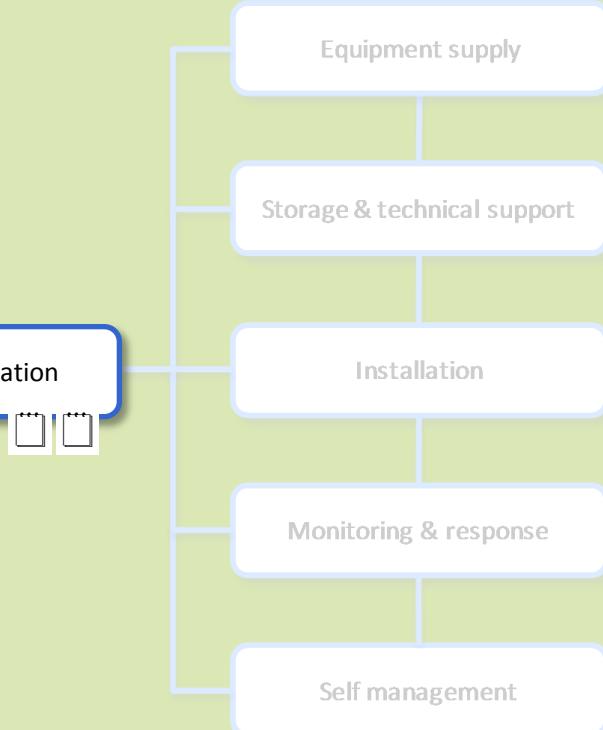
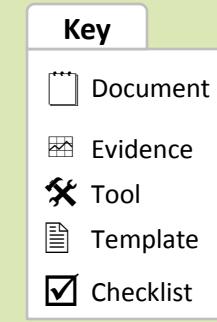
General Service Model



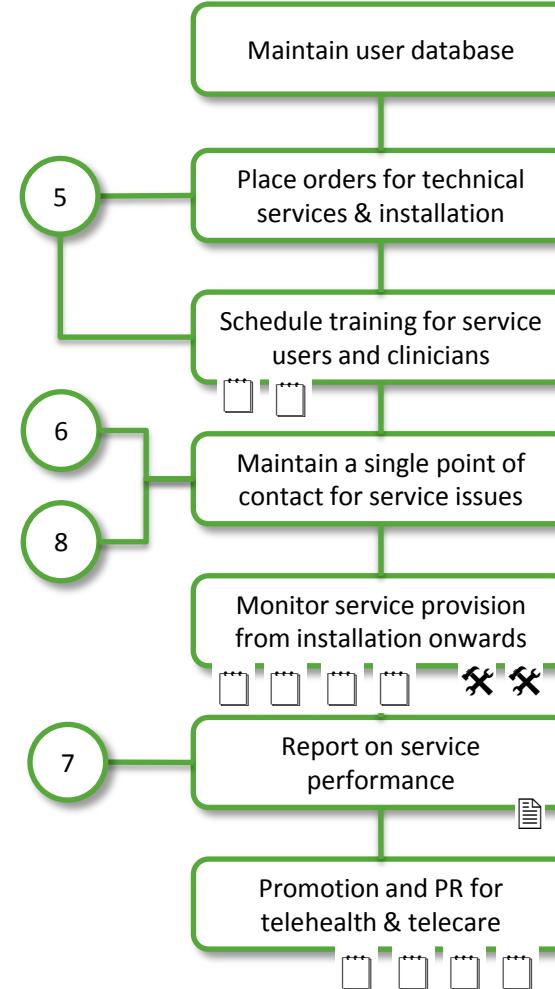
Self Management



General Service Model



Service Administration

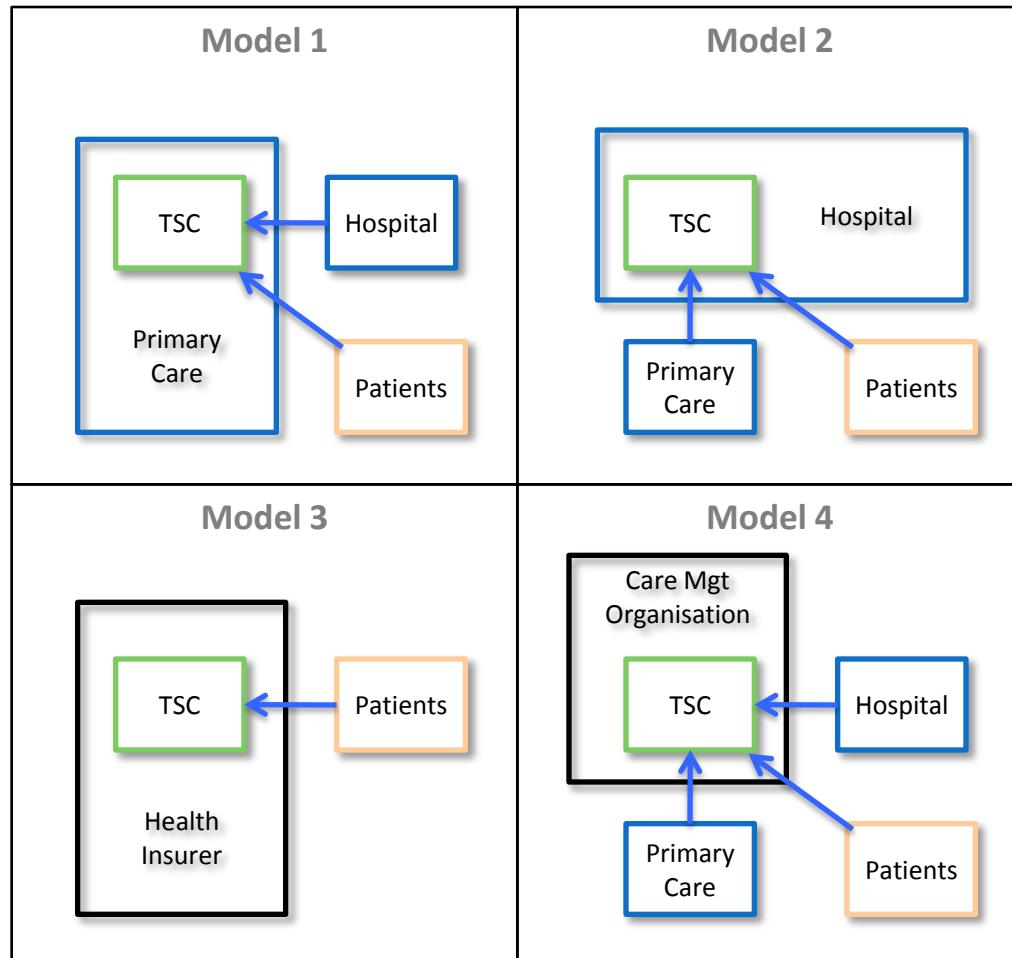


Alternative International Service Models

Four Models

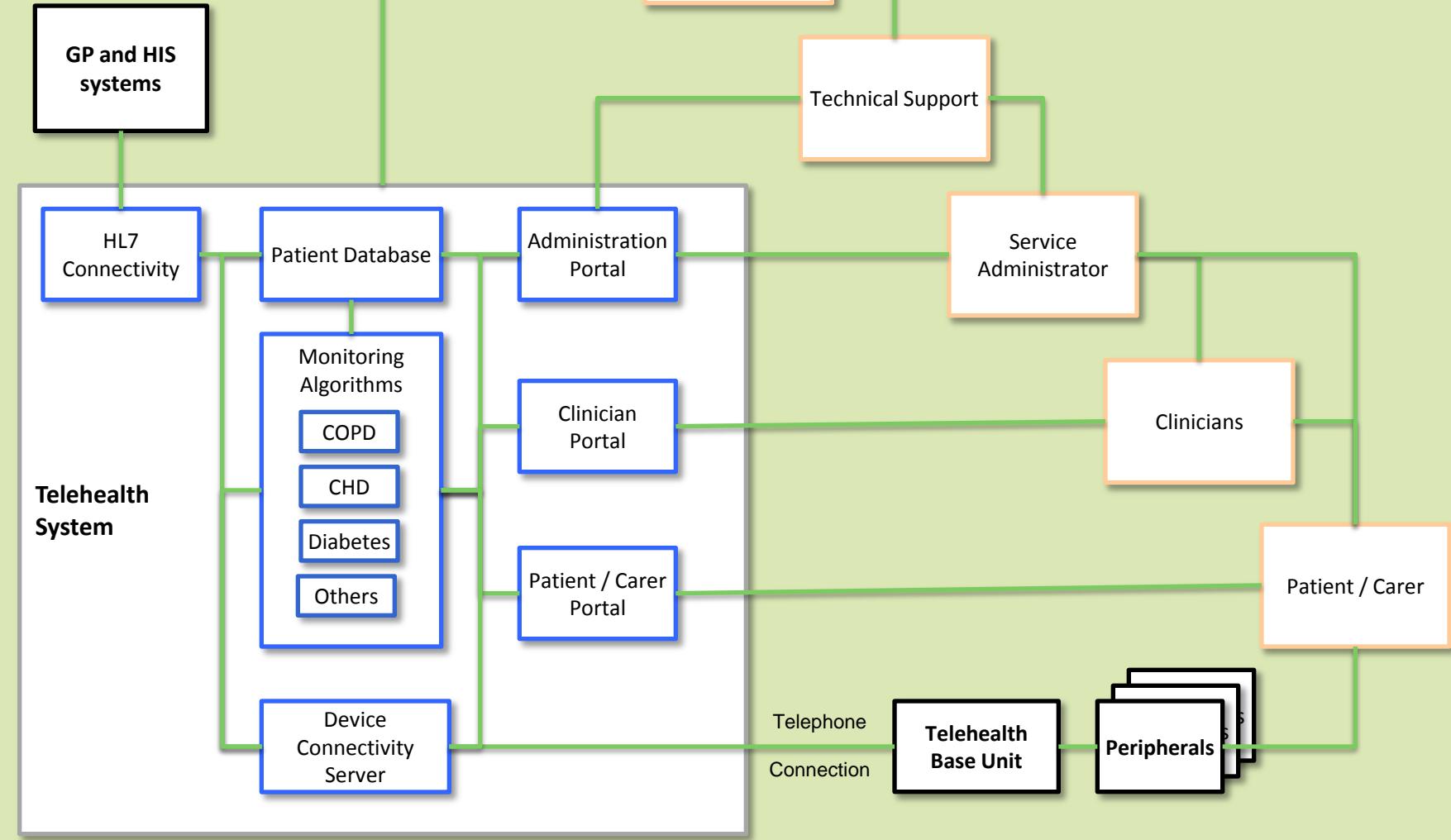
Different models have been adopted around the world due to differences in their national health systems. In the main, the differences relate to which part of the healthcare system carries out the monitoring of patients' data and responds to alerts and trends:

1. Primary care clinicians monitor telehealth collected vital signs and respond. The UK is adopting that model
2. Hospital based clinicians monitor vital signs, alerts and organise responses. An example is medication adherence in heart failure patients at [Nyack Hospital](#) in New York
3. Health insurance case managers monitor telehealth data and organise responses. This model is being used in pilots in the USA by [Humana](#)
4. Specialised telehealth functions within care management organisations. This model is exemplified in the UK by NHS Direct playing this role in the [South East Essex pilot](#)



Technical Architecture

Note: This is a generalised model and physical solutions will vary



COPD Tele-monitoring Service Models

Core Tele-monitoring Service Model for COPD

- Selection of patients based on spirometry (e.g. FEV < 50%) and risk of exacerbations
- Home tele-monitoring unit combining:
 1. Biological measures:
 - Blood pressure (BP)
 - Pulse Oximetry (e.g. SPG2 – saturation of peripheral oxygen)
 - Pulse
 - Temperature
 - Spirometry (FEV 1 – Forced expiratory volume)
 2. Answers to patient questions:
 - Tiredness
 - Condition of sputum
 - Activity levels
 - Others, e.g. attendance at pulmonary rehab
 3. Remote monitoring by clinicians of:
 - Results from measures and questions
 - Trends
 - Significant changes
- Monitoring used for self management by patient and carer
- Community nurse/case manager uses monitoring information to triage and prioritise COPD patients

Other COPD Tele-monitoring Models

- Simpler telehealth:
 - Self assessment of lung function and send to service centre with telephone counselling provided
 - E-mail reporting, internet or web phone transmission of spirometry readings onto a website
- Rural telehealth:
 - Monitoring equipment in communal venues for remote communities
 - Remote monitoring hub for patients in rural locations
- Remote pulmonary rehab (PR):
 - Teleconference based PR
 - Gaming technologies for PR
- COPD on-line education:
 - Internet based COPD education materials (alone or combined with tele-monitoring)
- Video conferencing for tele-consultation based on tele-monitoring of COPD measures
- Remote monitoring measures & questions enhanced with:
 - Patients' own judgements on signs of exacerbations
 - External factors like weather and temperature

CHD Tele-monitoring

Core Tele-monitoring Service Model for CHD

- Selection – most deployments to date have recruited patients with left ventricular systolic dysfunction
- Educational materials are provided – usually written or clinician coaching
- Tele-monitoring is usually combined with some level of telephone support
- Home tele-monitoring unit usually requires the daily monitoring (sometimes twice daily) of:
 1. Biological measures:
 - Electrocardiogram
 - Oxygen saturation
 - Blood pressure
 - Temperature
 - Weight
 - Respiratory rate
 2. Compliance:
 - Monitoring of medication compliance
 3. Answers to questions:
 - Tailored to individual's CHD symptoms
 - Relating to anxiety and depression level
- Periodic (e.g. daily) nurse monitoring with alerts based on parameters. Responses to alerts and monitoring is based on clinicians' expertise

Other CHD Tele-monitoring Models

- Internet based education materials
- Expert remote cardiologist reviews of electrocardiograms
- Additional motivational interventions such as:
 - Medication reminders
 - Surveys
 - Personalised plans
 - Motivational messages
- Periodic calls (e.g. monthly) to maintain contact
- Visits scheduled because of nurse reviews of monitoring
- Reports of measures from tele-monitoring created for regular clinic visits
- Video consultations either via monitoring units with this functionality or separately

Diabetes Tele-monitoring

Core Tele-monitoring Service Model for Diabetes

- Selection – patients needing to attain management of blood glucose levels. Common types of patients needing this can be young people, older persons and pregnant women needing to achieve glycaemic control
- Remote monitoring of blood glucose is usually combined with telephone support from a nurse or dietitian
- Home tele-monitoring unit (or mobile phone based transmission) conducted daily of:
 - Blood glucose levels – HbA1C (from glucometer)additional measures can include:
 - Blood pressure
 - Cholesterol
- Weekly monitoring by a nurse leads to telephone consultation by nurse or dietitian with parameter driven alerts for problems
- Common additions to core service include:
 - Veterans Association in the USA have integrated diabetes tele-monitoring into other care – labelled “care co-ordination”
 - Web based education materials
 - SMS or telephone reminders for glucose measurement and/or medication and/or appointments

Other Diabetes Tele-monitoring Models

- Measures have an important role in self management
- Combining tele-monitoring with tele-coaching and/or tele-consultation by telephone or video-conferencing
- Motivational telephone support can be designed into the telehealth care regime either from nurses or peers (nurse support is valued more)
- Even when not indicated by monitoring, periodic telephone contact can be provided
- Home visits have also been included from nurse educator or dietician to enhance compliance with diet and exercise plans
- More recently, the use of glucometer linked to mobile phone by Bluetooth wireless links for submission of blood glucose measures for monitoring

Tele-monitoring of Frail Elderly

Core Tele-monitoring Service Model for Frail Elderly

- This area is often included within the term “telecare”
- Selection in the UK is based upon assessment of need by care or health professionals. Some questionnaire based criteria have been used in research in the USA
- A monitoring call centre provides continuous support to the elderly person and maintains information on the person, carers and relatives to contact
- Monitoring devices vary from simple alarms to sophisticated smart houses
- There is a large range of monitors but the most common are:
 - Self-activated alarms worn as pendants or similar
 - Fall detectors which automatically notify of a fall
 - Sensors aiming to detect problems with the person such as bed, chair, door, enuresis, PIRs, etc. These send alerts and data to the monitoring centre
 - Sensors aimed at detecting environmental dangers in the person’s home such as fire, gas and flood detectors and intruder alarms
- It is also common for frailty to be accompanied with one or more long term condition, in which case tele-monitoring for those conditions can also be added (but usually to a different monitoring arrangement)

Other Tele-monitoring Models for Frail Elderly

- Health Smart Home is a concept of monitoring for safety, tele-monitoring for health conditions and home automation to enable elderly people to be as secure and comfortable in their homes as technically possible. Such homes are only currently available as demonstrators

Evidence

COPD

Systematic Reviews of Research Evidence (recent)

- [2010 Home telehealth for chronic obstructive pulmonary disease: a systematic review and meta-analysis by Polisena et al.](#)
- [2009 Systematic review of telemedicine services for patients affected by chronic obstructive pulmonary disease \(COPD\) by Bartoli et al.](#)

Other Research Evidence

- [Key Report - 'At home, not alone' COPD Telehealth Project Final Evaluation – February 2010 , NHS Direct](#)
- [Summaries of robust telehealth research studies at WSDAN \(King's Fund\)](#)

CHD / CHF

Systematic Reviews of Research Evidence (recent)

- [2010 Cochrane Review for tele-monitoring for CHF by Inglis et al.](#)
- [2010 Overview of systematic reviews for CHD by Schmidt et al](#)
- [2010 Systematic review and meta analysis for CHF by Polisena et al.](#)
- [2009 Systematic review of telehealth for CHF by Ditewig et al.](#)
- [2009 Systematic review for telehealth for secondary prevention of CHD by Neubeck et al.](#)

Research Evidence

- [Summaries of robust telehealth research studies at WSDAN \(King's Fund\)](#)
- [DH Whole Systems Demonstrator will report in 2011 on large scale RCT](#)

Diabetes

Systematic Reviews of Research Evidence (recent)

- [2009 Systematic review and meta analysis of research on telehealth for diabetes by Polisena et al.](#)
- [2008 Systematic review of the cost effectiveness of telehealth \(including for diabetes\) by Rojas & Cagnon](#)

Research Evidence

- [Summaries of robust telehealth research studies at WSDAN \(King's Fund\)](#)
- [DH Whole Systems Demonstrator will report in 2011 on large scale RCT](#)
- [Veteran Affairs deployment to 17,000 veterans - half with diabetes](#)

Frail Elderly

Systematic Reviews of Research Evidence (recent)

- [2008 systematic review by Barlow et al. at York University](#)
- [2008, Telecare: A Rapid Review of the Evidence 2005-2008 by Iestyn Williams at Birmingham University for WM NHS](#)
- [2006, Care Services Improvement Partnership \(CSIP\), Building an evidence base for successful telecare implementation](#)
- [DH – Review of Evidence Base on Telecare](#)

Research Evidence

- [Summary of robust telehealth research on telecare at WSDAN \(King's Fund\)](#)

Tele-monitoring Business Cases

COPD

- There is a good body of research and cases for COPD. Whilst some are inconclusive, the majority are showing various benefits. The economic case is not yet well addressed in research
- A key study in S.E. Essex used tele-monitoring with NHS Direct nursing staff and has reported very positive outcomes both clinical and economic. This large deployment is well reported and is being extended. The report concluded that *"If this service was extended to more patients with COPD there would be significant potential financial savings for the local healthcare economy"*
- Service reconfiguration is needed and training of staff in equipment has proven difficult in some case examples
- Benefits being reported are:

Clinical

- Overall significant reduction in exacerbations
- Improved self management of condition
- Improved coping with symptoms reported

Economic

- Reduced hospitalisations
- A&E visits reduced
- GP visits reduced
- 999 calls reduced
- Reduced nurse/case manager visits

Additional Patient Benefits

- QOL inconclusive generally but strongly improved in SE Essex
- Reductions in mortality are not reported in studies or in the SE Essex project, so are best excluded as a benefit

- The SE Essex project has increased the case for a strong ROI available through reduced use of a number of health services, particular hospital and emergency services

CHD

- Growing number of studies including many RCTs. Note that some studies do report no improvements but most are reporting a range of improved outcomes over normal care. Several systematic reviews confirming this
- Where the economic case has been measured then substantial cost savings reported. Benefits being reported are:

Clinical

- Lower one year mortality rates
- Lower levels of hospitalisation
- Shorter lengths of stay when hospitalised
- Earlier detection of post cardiac surgery complications
- Improved clinical judgements
- Improved compliance with medications

Economic

- Reduced use of secondary care
- Reduced patient visits to surgery and shorter nurse visits
- Good telehealth patient acceptance

Additional Patient Benefits

- Improved self management of condition – BP, cholesterol, medications, exercise, smoking
- QOL not so conclusive but some positive studies
- Economic ROI seems positive and substantial and robust. Reduced deaths appear significant, as do hospitalisations

Tele-monitoring Business Cases

Diabetes

- Good body of evidence of improved management of diabetes from telehealth
- Includes substantial number of RCTs and several in USA are large scale deployments with largest at 27,000 patients
- Large body of UK case studies including Birmingham Own Health and DH Whole Systems Demonstrator
- Studies that have included the economic case are consistently positive with benefits greater than costs
- Benefits being reported are:
 - Significantly improved self-management of blood sugar levels (HbA1C)
 - Improvements in cholesterol and blood pressure
 - Better adherence to blood monitoring and exercise routines
 - Better adherence to retinal and foot examinations
 - Lower use of A&E
 - Lower admissions to hospital and bed days
 - Lower prescribing cost
 - Lower care visits
 - Improved service user satisfaction levels
 - Improvements in health related QOL
- Costs are not reliably available. But studies that have reported economic case are showing reduced costs of care exceeding additional costs of tele-monitoring services. Positive but low ROIs available

Horizon Scanning: Flo from Stoke-on-Trent NHS

Simple Telehealthcare

Flo (or Florence, after Florence Nightingale) has been developed at Stoke on Trent since January 2009. It uses a simpler set of technologies based on smart phones to provide cheaper tele-monitoring service. A lot more reliance is placed on automatically generated messages and on the patients inputting their own vital signs. It is generally accepted that Flo is a different service model from the more general model of a monitoring device in peoples' homes. Being very new and innovative , the formal evaluation of Flo is still not available but early trials are promising. Initial cost estimates suggest that Flo is around 10% of the cost of conventional tele-monitoring.

The major difference with Flo is that the patient takes their own readings and sends them into a central system using a mobile phone. The system then responds to the latest readings with advice or by sending an alert to a clinician.

As at December 2010 Flo has received additional funding and the project is being expanded. Flo has been the recipient of several awards.

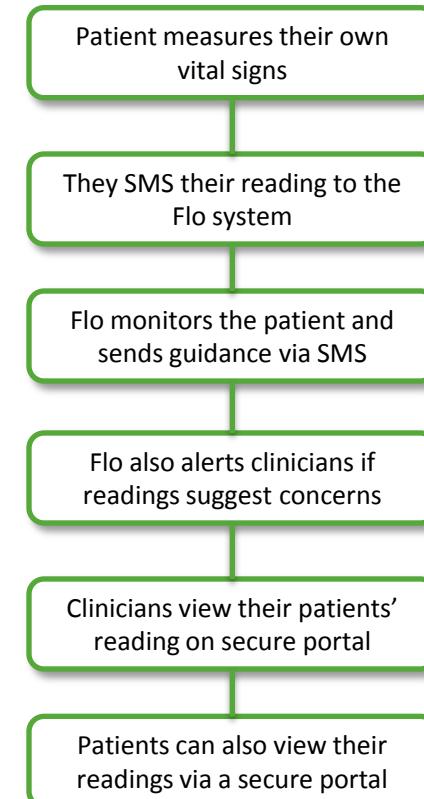
Contact for Flo is:

Phil O'Connell
Telehealth Project Manager, NHS Stoke-on-Trent
e-Mail: phil.oconnel@stoke.nhs.uk

Video description of Flo at <[link](#)>

Presentation by Phil O'Connell in Oct 2010 <[link](#)>

Core Components of Service Model



Hypothesis: The Potential of Tele-consultation for LTC Management

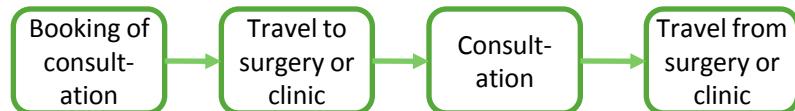
Process Improvement – the Role of Tele-consultation

- Teleconferencing has a wide range of applications across the healthcare system. In general all have a common role of allowing people to interact face to face from different locations. The advantages over telephone alone include the ability of people to see each other and to receive body language, gestures, non verbal cues and see demonstrations
- Its core role is the removal of barriers to communications and has the potential to improve healthcare processes by:
 - Making accessing people easier
 - Making accessing people quicker
 - Reducing distance and travel
 - Improving consultation and collaboration
 - Increasing the availability of rare expertise to other locations
 - Allowing the real-time sharing of decisions with others
- The cost of teleconferencing which typically needs high definition screens, cameras, audio and high bandwidth telecommunications has restricted the situations where tele-consultation is practical and cost effective. But improvements to equipment and reductions in costs are rapidly expanding the situations where it may be applied
- Research on tele-consultation broadly demonstrates that the quality of the consultation is not generally lessened
- Tele-consultation is less useful for specialities using a physical examination or specialist, expensive testing equipment

Key Process Simplifications in LTC Management

Removing the Travel Needed for Physical Consultations

Generic simplified “As Is” process:

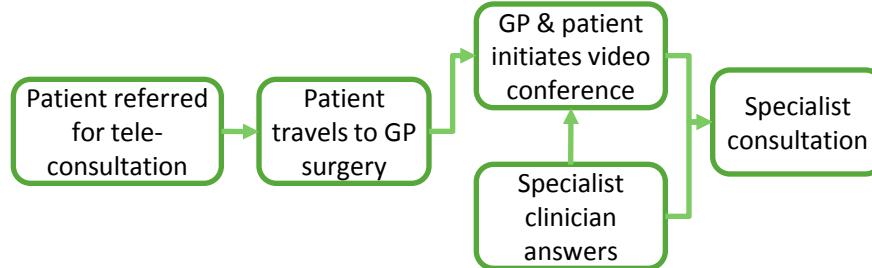


Generic simplified “To Be” process:



Accessing Specialist Consultations from within Primary Care

Generic simplified “To Be” process:



Hypothesis: Where Tele-consultation Enables a High Performance Chronic Care System?

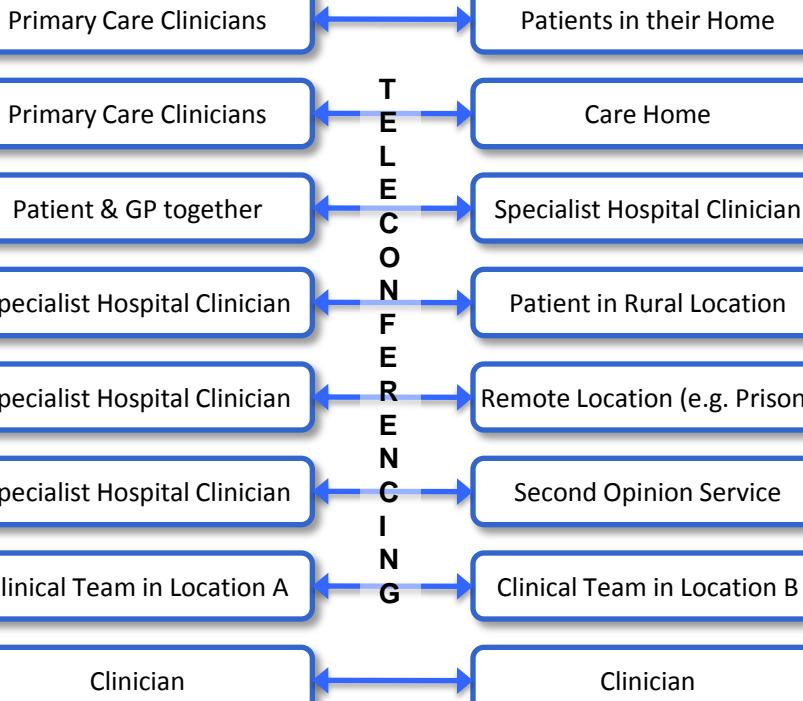
Reviews of research by Professor Chris Ham proposed ten characteristics of a high performing chronic care system ([link](#)). This table suggests where **tele-consultation** promotes these characteristics:

Characteristics of high performance LTC system	Where tele-coaching provides support to high performance	Illustration of this support
1. Ensuring universal coverage of care	High levels of support	Increases the level of access for a range of patient types. For example disabled, rural, prisoners or remote locations
2. Care is free at the point of use	Medium levels of support	For some groups like rural poor the societal costs of travel (financial and time) can be reduced
3. Focus on the prevention of ill health	Not directly	-
4. Priority given to patients' self-management of their condition	Not directly	-
5. Priority is given to primary care	Medium levels of support	Allows specialist clinical services to be accessed from primary care locations like the GP surgery
6. Population management is emphasised (e.g. through risk stratification)	Not directly	-
7. Care is integrated to enable primary care teams to access specialist support when needed	High levels of support	Having GPs in tele-consultations with specialist hospital clinicians increases learning and collaboration
8. Exploits the potential of IT	High levels of support	Video-conferencing costs are falling quickly and options like computer webcam conferencing are opening new possibilities
9. Care is effectively co-ordinated	Medium levels of support	Has the potential to improve care and service co-ordination
10. Improvements managed as a coherent whole	Not directly	

General Service Models for Tele-consultation

Key

-  Document
-  Template
-  Evidence
-  Checklist
-  Tool



Information

Policies, guides & systematic reviews

- [2010 – A Systematic Review of Economic Analyses of Telehealth Services Using Real Time Video Communications by Wade et al.](#)

Key case studies

- [Airedale Hospital – Prison Telemedicine Service](#)
- [Bradford – CKDEAS \(Chronic Kidney Disease Electronic Advisory Service\)](#)

Video case studies

- [University of Texas– Correctional Managed Care of CHD](#)
- [Yorkshire & Humber Case Studies](#)

Regional experts for further advice

- [Dr Paul Rice, NHS Yorkshire & Humber](#)

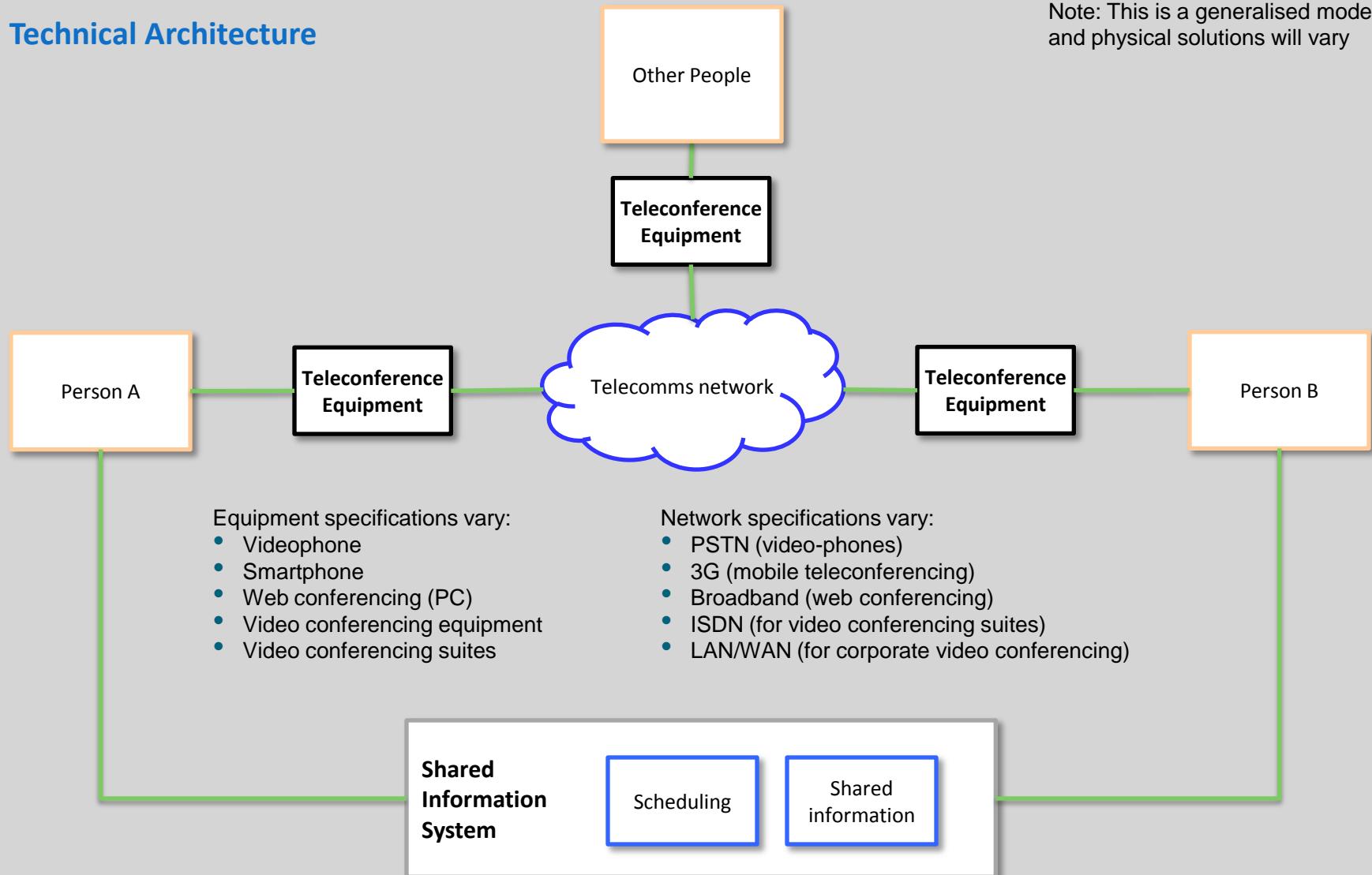
Tele-consultation
technology model

Tele-consultation
evidence

Tele-consultation
business case



Technical Architecture



Evidence & Business Case

General

Systematic Reviews of Research Evidence (recent)

- [2010, A systematic review of economic analyses of telehealth services using real time video communications \(USA\) by Wade et al.](#)

Other Research Evidence

- [2010, A Multi-period Study of the Evolution of Collaboration in Telemedicine by Paul , D \(USA\)](#)
- [2009, Teleconsultation service to improve healthcare in rural areas \(Italy\) by Zanaboni et al.](#)
- [2006, Patients' perceptions of joint teleconsultations: a qualitative evaluation by Harrison et al.](#)
- [2004, Virtual outreach: A randomised controlled trial and economic evaluation of joint teleconferenced medical consultations by Wallace et al. \(NHS HTA R&D\)](#)
- [2000, Systematic review of studies of patient satisfaction with telemedicine \(i.e. tele-consultation\) by Mair and Whitten \(BMJ\)](#)

Specific Evidence for Long Term Conditions

COPD

- [2010 Nurse tele-consultations with discharged COPD patients reduce early readmissions by Sorknaes et al. \(Denmark\)](#)

CHD/CHF

- [2003 An IT Approach to Cardiovascular Care based on Primary Care by Clarke & Jones \(NHS Chorleywood Health Centre\)](#)

Business Case

Evidence

- Increasing body of knowledge often for specialist services like tele-dermatology
- RCT studies less influential than case studies with largest body of work in other geographies (e.g. USA, Malaysia)

Robustness

- Business case is changing as technologies become more pervasive and costs change – typically being a rapidly reducing capital and ongoing costs

Business Models

- New business models for healthcare are emerging based on tele-consultation. Notable are tele-consultations to remote locations like prisons, tele-consultations to homes using video phones and tele-monitoring equipment, clinician to clinician collaboration (and for multi-disciplinary team) and on-call tele-consultation services

Costs

- Costs of teleconferencing suites can be substantial if using high definition screens, high band-width telecoms and integration with clinical systems
- Costs need to include physical premises and health professionals' time
- Health system costs can rise if clinician time is increased

Benefits for Tele-consultation with LTC Patients

- Accessibility
- Timeliness of service delivery
- Ability to bring in other clinicians including specialists
- Reduced societal costs of travel
- Typically, increased satisfaction of patients with services

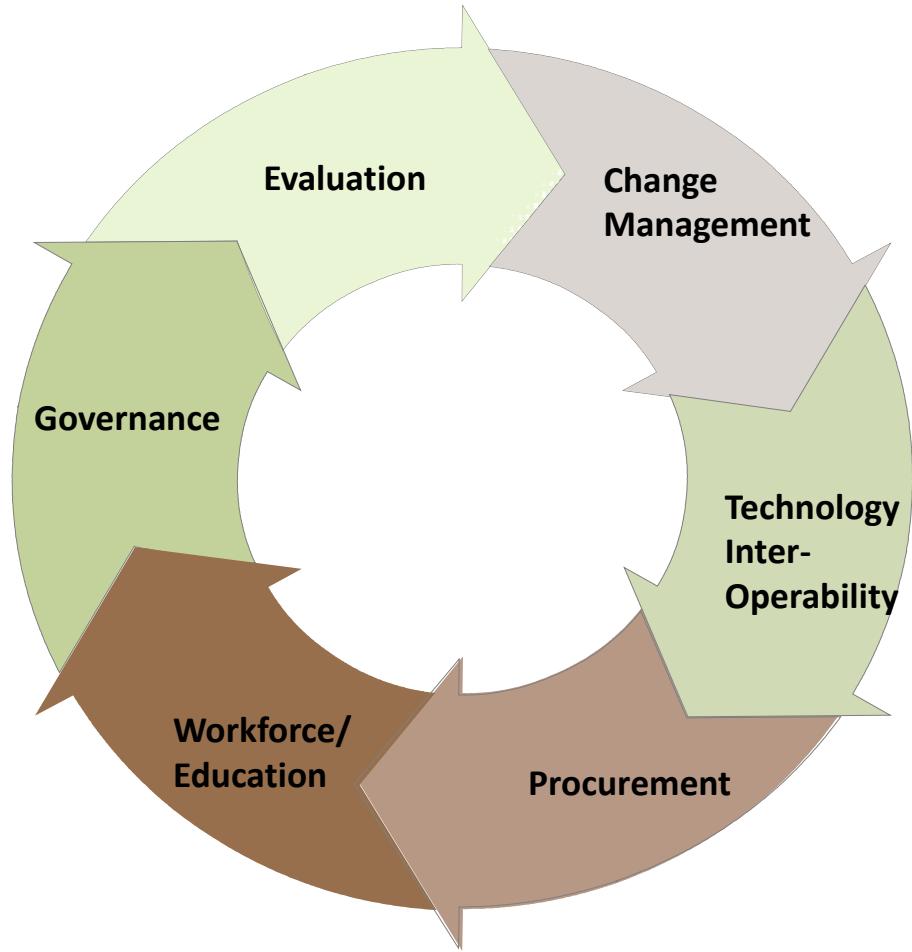
Deploying Telehealth

Introduction to Deployment Challenges

- In addition to understanding the basic service models that have been developed to incorporate the benefits of telehealth, it is important that due attention is paid to the core change management, programme management and project management principles underpinning any successful service transformation. In the next section of the toolkit we identify the particular challenges and the emergent best practice for positively implementing a new service model.

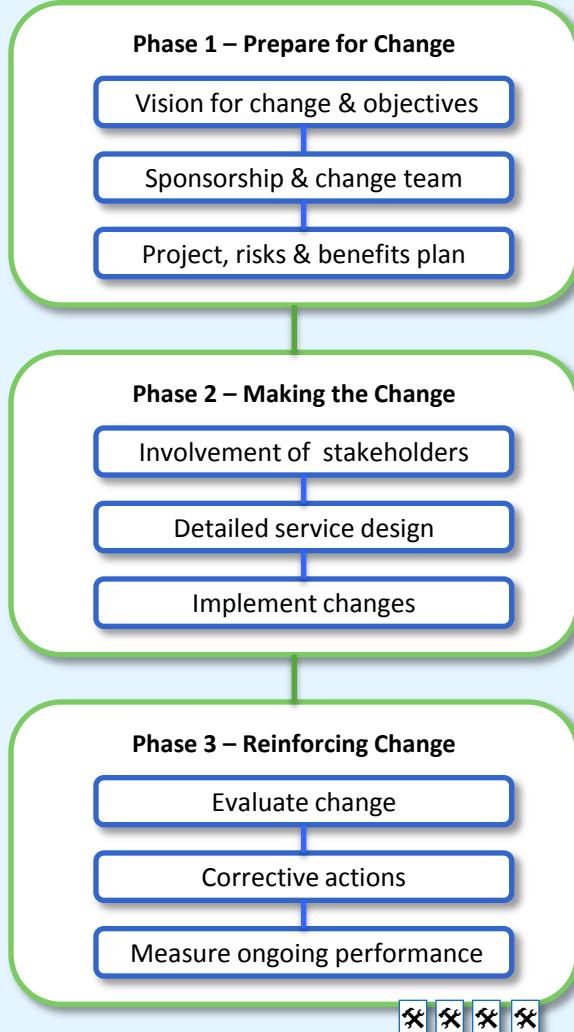
"Telehealth can and does transform people's lives, allowing patients to take more control of their own health. By monitoring the stability of the patients' condition, proactive interventions can be made to prevent unnecessary emergency hospital admissions, optimise clinicians' caseloads and hence scale 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..."

From the Healthcare Without Walls Report by the think tank 2020 Health



Change Management

- Key**
- Notes
 - Evidence
 - Tool
 - Template
 - Checklist



Information

Aims

- Change management ensures that the changes needed to implement telehealth have been carefully considered and carefully planned
- Structured change management leads to higher levels of success
- Typically, senior decisions makers will not approve change without evidence of careful change planning and management

Input

- Change readiness assessment

Staff Involved

- Sponsor and project or change manager (accountable)
- Project or change team (involved)
- Executive team and board (approve)
- Key stakeholders (communicated with)

Outputs

- Compelling vision to guide change
- Current & future state service models define the change
- Project plan and benefits plan to guide implementation
- Risk management to help overcome difficulties
- Evaluation plans and change monitoring

Knowledge Base – Good sources of further information

- [DH - Roadmap for Transformational Change](#)
- [NHS Institute - Academy for Large Scale Change](#)
- [Developing Change Management Skills by NIHR SDO Programme](#)

Governance

Key

- Notes
- Template
- Evidence
- Checklist
- Tool

Area of Governance	Objectives of Governance
Board of Accountable Organisation	Assure clear strategy, organisation & accountabilities
Sponsor	Accountable for outcomes SRO for escalation
Project Manager	Ensures effective project management
Clinical Governance	Clinical effectiveness Risk management Audit Education and development Patient & public involvement
Financial	Financial planning & control Proper use of assets Audit
Information Governance	Ensure personal information is used legally and appropriately
Project governance	Project controls and reviews Project board for review & steering

Information

Aims

- Governance aims to ensure that change has a rigorous structure of accountabilities for the major areas involved in the change
- Good governance helps ensure success and makes sure that issues are surfaced and addressed ethically and effectively
- It is key that the investment in governance is aligned with risks and norms applied to other similar initiatives

Input

- Governance policies and norms from those organisations involved

Staff Involved

- Sponsor and project manager to design governance
- The Board or other super-ordinate committee to approve
- Change team members to apply governance

Outputs

- Design for the governance of the telehealth change & service
- Structure of:
 - Accountable people
 - Boards & Committees with terms of reference
 - Key decisions and decision makers
 - Governance reports
 - Escalation paths for critical incidents and urgent issues
 - Applicable local & national policies and standards
 - Audits or reviews
 - Clarity on clinical and professional liabilities

Knowledge Base – Good sources of further information

- [OGC Guidance on Governance](#)
- [Information Governance Assurance Framework](#)

Interoperability

Key

- Notes
- Template
- Evidence
- Checklist
- Tool

Telehealth Technology Component	Source of Interoperability
Vital signs devices and home hubs	Continua Health Alliance has defined standards for device interoperability 
Applications and server software on telehealth hubs and call centres	These tend to be proprietary. Therefore standards-based functionality is needed to integrate with other systems
Telehealthcare data and messaging to other systems	Continua has a standard. NHS Technology Office has also developed standard message formats for telehealth (NHS PHMR)
Desktop and laptop PC standards (for staff to access telehealth systems)	Ideally will follow the IT standards for the host organisations to minimise support costs
Browser and desktop software	Ideally will follow the IT standards for the host organisations
Mobile devices accessing telehealth	Standards are difficult to define at this time, as is providing support

Information

Aims

- To ensure the telehealth equipment is compatible with existing equipment and should be compatible with future technologies
- To enable data to be shared with other health information systems
- To keep to the minimum the need for staff to learn new systems
- Remain within wider technical standards and policies

Methods

- Create a technical architecture (i.e. model) for the telehealth services today and into the medium and longer term
- Ensure architecture achieves the level of interoperability needed
- Liaise with experts in local and national IT & telehealth organisations for advice and validation of local proposals

Staff Involved

- Telehealth and technical staff

Outputs

- Technical architecture for telehealth
- Policies and standards for interoperability

National Expertise

- DH DHID Technology Office - [Richard Trusson](#) and [Michael Dillon](#)
- [Newham WSD – Interoperability by Dr Kumar, Clinical Director](#)

Knowledge Base – Good sources of further information

- [Nov 2010 – DH Interoperability standards](#)
- 2004 – ISO Standards for Telehealth Interoperability - [16056 1:2004](#) [16056 2:2004](#)

Evaluation

Menu of Evaluation Options for Telehealth ¹	Examples of Specific Evaluations
Usage of telehealth equipment and services	<ul style="list-style-type: none"> • Numbers of referrals • Numbers of users • Key operating parameters
Reductions in health service utilisation	<ul style="list-style-type: none"> • Change in unplanned admissions • Change in use of 999 services • Earlier discharge to home • Changes to GP & nurse home visits • Changes in use of OOH services
Patient experience	<ul style="list-style-type: none"> • Changes to quality of life (QoL) • Participation in self management • Changes in anxiety & depression • Satisfaction with health services
Carer experience	<ul style="list-style-type: none"> • Changes to carers' quality of life
Improvements in clinical effectiveness	<ul style="list-style-type: none"> • Changes in QOF indicators • Changes in clinical outcomes • Changes in benefits from prescribing
Commissioning quality	<ul style="list-style-type: none"> • Changes in patient referrals • Efficiency of services commissioned
Improved clinician experience	<ul style="list-style-type: none"> • Changes in job satisfaction • Increases in collaboration
Financial Performance	<ul style="list-style-type: none"> • Actual ROI from service redesign • Options to scale project • Meeting of unmet needs

Information

Aims

- Evaluation of any new project is important
- Given the developing nature of evidence for telehealth, Clinical Directors will need evaluation of any such initiative
- Aim to evaluate those objectives that are important for success
- Should be linked to the benefits arising from evaluation
- For research, the evaluations will reflect research norms

Input

- Objectives for the telehealth initiative
- Needs of different stakeholder groups for evaluation of outcomes

Methods

- Evaluation is complex to perform and often uses a combination of methods – observation, systems data, documents, questionnaires, interviews, workshops

Staff Involved

- Sponsors and project board to agree the wider evaluations needed
- Clinical Director(s) for design of clinical evaluations needed

Outputs

- Robust evaluations and reporting
- Followed by the corrective action
- Dissemination of outcomes for others to employ

Knowledge Base – Good sources of further information

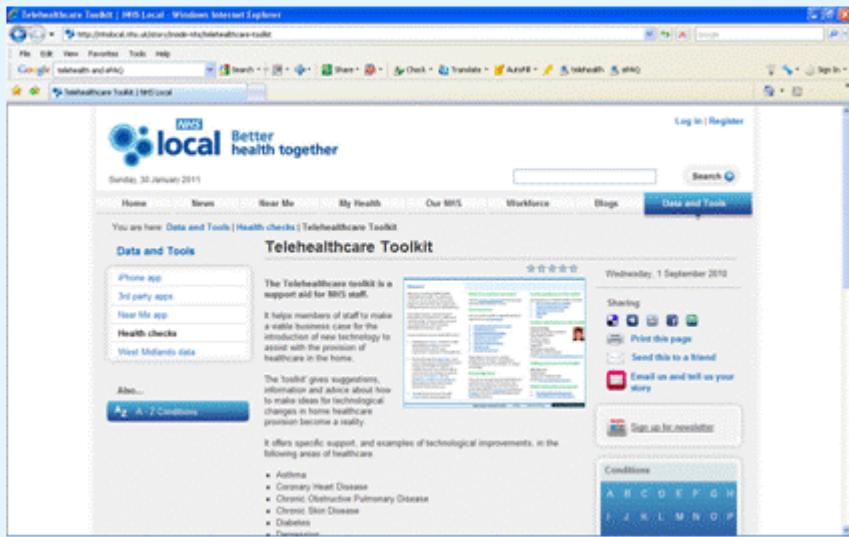
- [Evaluation regime used by the DH Whole Systems Demonstrator](#)
- [Case Example: Evaluation of Argyle & Bute Telehealth Project](#)
- [Case Example: Evaluation of Cumbria Telehealth Project](#)

1. Based on work on evaluating telehealthcare developed by NHS Stoke-on-Trent



Menu

West Midlands NHS Telehealthcare Business Case Toolkit & Others



[Link to the West Midlands Telehealthcare Business Case Toolkit](#)

West Midlands Commissioning & Evaluation Toolkit

- Developed in 2010 by Jo Harding the LTC Lead for WM NHS
- Aims to support commissioners of telehealth
- Provides an 8-step method for creating telehealth business cases
- Contains around 150 tools
- Includes extensive reviews of the evidence – both research and quality case studies (grey literature such as articles is excluded)
- Available in PowerPoint and PDF formats
- A short overview document is also available as a PDF
- Could be combined with Y&H toolkit to provide business case support for locally developed telehealth service models

Other Toolkits

- [NHS Scotland Clinical eHealth Toolkit](#)
- [Carers Scotland Carers and Telehealthcare Training Toolkit](#)
- [COCIR Telemedicine Toolkit \(European Coordination Committee of the Radiological, Electromechanical & Healthcare IT Industry\)](#)
- [Audit Commission Telecare Business Case Planning Model \(2005\)](#)
- [Home Re-Ablement Toolkit from the DH Care Services Efficiency Delivery \(CSED\)](#)
- [Telehealth Resources at the Royal College of Nursing](#)

UK Telehealth Sites

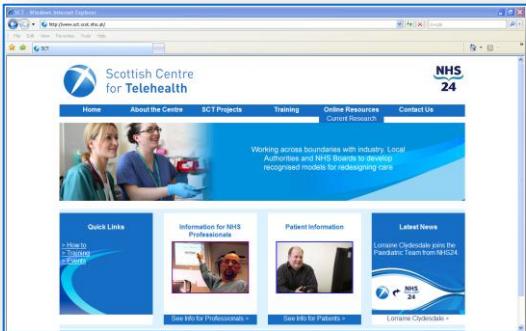
Buying Solutions

The telecare, telehealth and tele-coaching framework agreement



Scotland Centre for Telehealth

Site providing information on telehealth projects in Scotland along with general resources



Whole Systems Demonstrator Database

Sources of evidence reviewed by clinical librarians at the King's Fund



NHS Wales Chronic Condition Management Demonstrator Outcomes of Welsh demonstrators



UK Telehealth & Telecare Evaluations

Projects currently underway depicted within a (Google) map of the UK



Telecare Aware

UK's major news site for telecare and telehealth developments



International Telehealth Sites

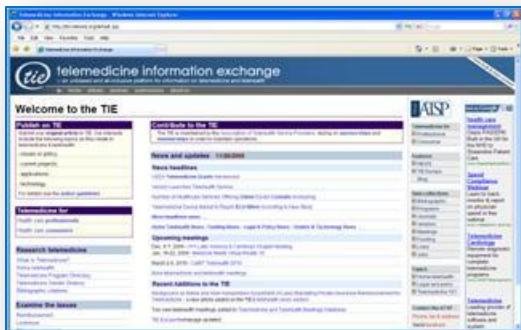
EU's Medetel Library

EU perspective on telehealth and telecare evidence



USA's Telemedicine Information Exchange (TIE)

USA database of telemedicine evidence



Cochrane Library – Special Collection on Telemedicine

Collection of research reviews on telehealth



American Telemedicine Association

Headquartered in Washington DC and promotes telemedicine developments



European Connected Health Campus

Not-for-profit organisation for the development of Connected Health markets across Europe



Centre for Connected Health

Develops programs to move care from the hospital or doctor's office into the day-to-day lives of people



Miscellaneous Telehealth Areas

Outstanding General Reports on Telehealthcare

- [2010 - Lessons from the US: Using Technology and Homecare to Improve Chronic Disease Management, by Pat Garside at Judge Business School, Cambridge University](#)
- [2010 – Switch On: The Case for Telehealthcare by Mark Britnell at KPMG](#)
- [2010 - Healthcare without Walls: A Framework for Delivering Telehealth at Scale by John Cruickshank of the 2020 Think Tank](#)

Telehealth Learning & Development

- [Competency framework for telehealthcare support staff \(NHS Scotland\)](#)
- [Telehealthcare in Scotland – Education and Training Strategy 2009-12](#)
- [Centre for Telehealth at University of Hull – Telehealth & Telecare](#)
- [University of Coventry – MSc in Assistive Technologies](#)

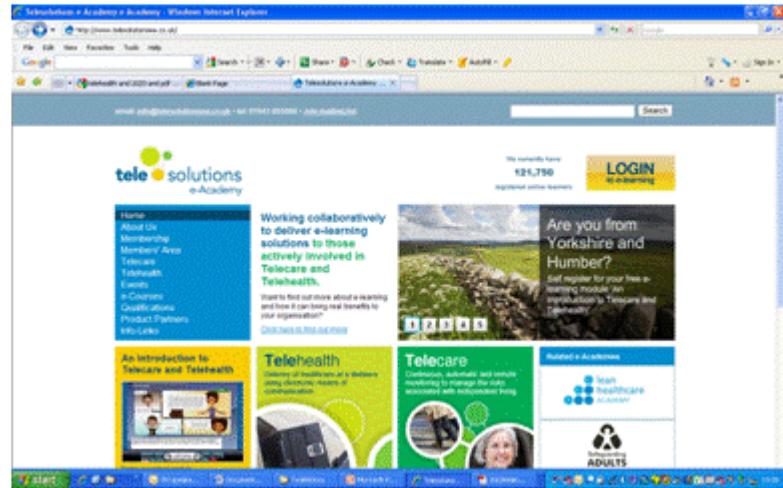
General Innovations

- [Web tools that NHS organisations could consider using](#)

Ethical Issues in Telehealth

- [Addressing preferences for privacy](#)

Education Courses on Telehealth



The introductory e-learning module, "An Introduction to Telecare and Telehealth" has been developed in partnership with subject matter experts from the Advanced Digital Institute, Yorkshire and the Humber Health Innovation and Education Cluster, the University of Hull and Sheffield Hallam University. The module aims to raise awareness of the potential for telecare, telehealth and its associated pathways (for example telemedicine and tele-monitoring) to improve the quality and diversity of service provision, whilst reducing diagnostic and care costs. The module is FREE OF CHARGE to individuals and organisation in the Yorkshire and the Humber region.

Document Repository

Description of Contents

This repository presents by themes the documents and tools embedded within the tool kit. The toolkit team would like to thank the authors for gifting their work for others to use.

NOTE: These documents are constantly being updated, so please contact the authors directly if you need the very latest version.

Repository

Title
Service Specifications and Operations
Outline Telehealth Service Specification from NHS East Riding
Telehealth Operational Guidelines from NHS East Riding
Telehealth Service Specification from NHS Doncaster
Telehealth Work Flow and Alerts from Leeds
Telehealth Process Map from NHS NYY
Triage Interventions Report for Phase 1 of NHS NYY Project
Telephone Line Suitability Checklist from Leeds
Telehealth Checklist from NHS NYY
Telehealth Installation Satisfaction Form from Leeds
Tele-monitoring Service Models from NHS Barnsley
Title
Summary of Key Dimensions for Telehealth from NHS Kirklees
Sequence of Actions for Community Matrons from NHS Kirklees
FAQs for Telehealth from NHS Kirklees
Care Pathways
Key Changes to Care Pathways by NHS NYY
COPD Care Pathways by MHS NYY
Diabetes Care Pathways by NHS NYY
Heart Failure Care Pathways by NHS NYY
Heart Failure Pathway: Post Diagnosis Management of LVSD (Left Ventricular Systolic Dysfunction) in the Community
Long Term Conditions & Telehealth in North Yorkshire & York, 2010
Managing Patients with COPD using Telehealth – Guide from NHS NYY
Managing Patients with Heart Failure using Telehealth – Guide from NHS NYY
Process Models
Process Model for Accessing Telehealth from NHS Kirklees
Process Model for Monitoring and Alerts from NHS Kirklees
Process Model for Alert to No Data Received from NHS Kirklees

Document Repository (2)

Title**Algorithms**

[Vital Signs and Symptoms Algorithm Planner from NHS Hull & East Yorkshire Hospitals](#)

[Telehealth Anxiety & Depression Algorithm from NHS Hull & East Yorkshire Hospitals](#)

[Telehealth Blood Pressure Algorithm from NHS Hull & East Yorkshire Hospitals](#)

[Heart Failure Telehealth Service Summary Form from NHS Hull & East Yorkshire Hospitals](#)

[Telehealth Heart Rate Algorithm from NHS Hull & East Yorkshire Hospitals](#)

[Telehealth Weight Monitoring \(Decreasing\) Algorithm from NHS Hull & East Yorkshire Hospitals](#)

[Telehealth Weight Monitoring \(Increasing\) Algorithm from NHS Hull & East Yorkshire Hospitals](#)

Patient Information

[Telehealth Patient Information Leaflet from East Riding](#)

[Public Advice & Information Web Page on Telehealth by NHS NYY](#)

[Telehealth FAQ Document by NHS NYY](#)

Title**Patient Selection and Referral**

[LTC Patient Selection Criteria for Telehealth from NHS NYY](#)

[Guidance for Referral of Patients into Telehealth](#)

[Telehealth Referral Form from NHS East Riding](#)

[Telehealth Referral Amendment Form from NHS East Riding](#)

[Criteria for Selecting Patients from NHS Kirklees](#)

[Form to GP Advising of Telehealth for a Patient from NHS Kirklees](#)

[Form for Referral for Telehealth from NHS Kirklees](#)

[Form for Patient Assessment for Telehealth from NHS Kirklees](#)

[Form for the Parameters for Tele-Monitoring from NHS Kirklees](#)

[Form to Request Installation of Equipment from NHS Kirklees](#)

Patient Consent

[Telehealth Consent Form for Processing of Personal and Medical Data from NHS Barnsley](#)

[Telehealth Referral and Consent Form from NHS NYY](#)

[Amendment to Referral and Consent Form from NHS NYY](#)

[Telehealth Patient Consent Form from East Riding](#)

[Telehealth Patient Consent Form from NHS Kirklees](#)

Document Repository (3)

Title**Informatics and Information Governance**[Telecare Information Sharing Protocols from NHS Newham](#)[Recording of Telehealth Information in the Patient Record by NHS NYY](#)[Data Entry for Patient Enrolment in Telehealth Service from NHS Hull & East Yorkshire Hospitals](#)**Evaluation**[Telehealth Service Evaluation from NHS Doncaster](#)[Telehealth Evaluation Forms from NHS East Riding](#)[Evaluation Methods used by the DH Whole Systems Demonstrator](#)[Patient Questionnaire on the Use of Telehealth from NHS Kirklees](#)[Patient Questionnaire on Using the Equipment from NHS Kirklees](#)[Patient Questionnaire on Returning the Equipment from NHS Kirklees](#)**Managing Staff & Change**[ADKAR Model of Change: Managing the Human Dimensions of Change](#)[Successfully Managing Change by Tracy Coffin, NYY NHS](#)[Staff Survey for Telehealth from NHS East Riding](#)**Training**[Telehealth Staff Training Needs Analysis from Leeds](#)**Title****Telehealth Business Case**[Training Guide on Telehealth Question Trees from NHS NYY](#)[Toolkit for Business Cases for Telehealth from NHS West Midlands](#)**Telecare Posters**[Poster - Barnsley Metropolitan Borough Council](#)[Poster – City of Bradford](#)[Poster – Calderdale Council](#)[Poster – Doncaster Metropolitan Borough Council](#)[Poster – East Riding of Yorkshire Council](#)[Poster – Kirklees Council](#)[Poster – Leeds City Council](#)[Poster – North East Lincolnshire Care Trust Plus](#)[Poster – North Lincolnshire Council](#)[Poster – North Yorkshire County Council](#)[Poster – Rotherham Metropolitan Borough Council](#)[Poster – Sheffield City Council](#)[Poster – Wakefield Council](#)[Poster – City of York Council](#)

Toolkits

History of toolkits

Many toolkits have been created to support a wide range of NHS activities. The analogy of a toolkit describes several of their characteristics. Like a toolkit they provide a set of useful resources that can be used to get a task done. Like tools generally, these resources make the tasks easier to perform and also enable good practices. These tools should ideally help both the experienced and inexperienced.

Economic rationale

Across healthcare many organisations face similar challenges. Whilst there will be important local differences, much of the core activities will be similar, or even identical sometimes. A toolkit reflects this by assembling the resources once and then providing them to many people to use. This seeks to avoid everyone having to start from scratch and develop their own tools.

Philosophy of this toolkit

Most toolkits use the vehicle of a document to describe their resources. This makes them similar to a guidebook or textbook. This toolkit extends this vehicle by also using the flexibility of hypertext to link in resources and loosely link issues and knowledge bases together. This is intended to allow the toolkit to grow and adapt to change. It should also allow people to adapt the toolkit locally to their preferences.

The toolkit structure reflects three core bodies of knowledge:

1. Research into the implementation of major strategic change in organisations that shows that success is higher if the change addresses comprehensively the different dimensions of change. The toolkit focuses on telehealth service models and the major dimensions that need to be considered to adopt them
2. Research into personality preferences of people which shows they vary. Some personalities are pragmatic and want pithy actions to follow, others are quite different and want to explore the issues and reflect, etc. The toolkit allows quick pragmatic actions whilst providing routes into more in-depth materials
3. Techniques for modelling processes which represent them as flows of related activities

A note on the research grounding for the telehealth content

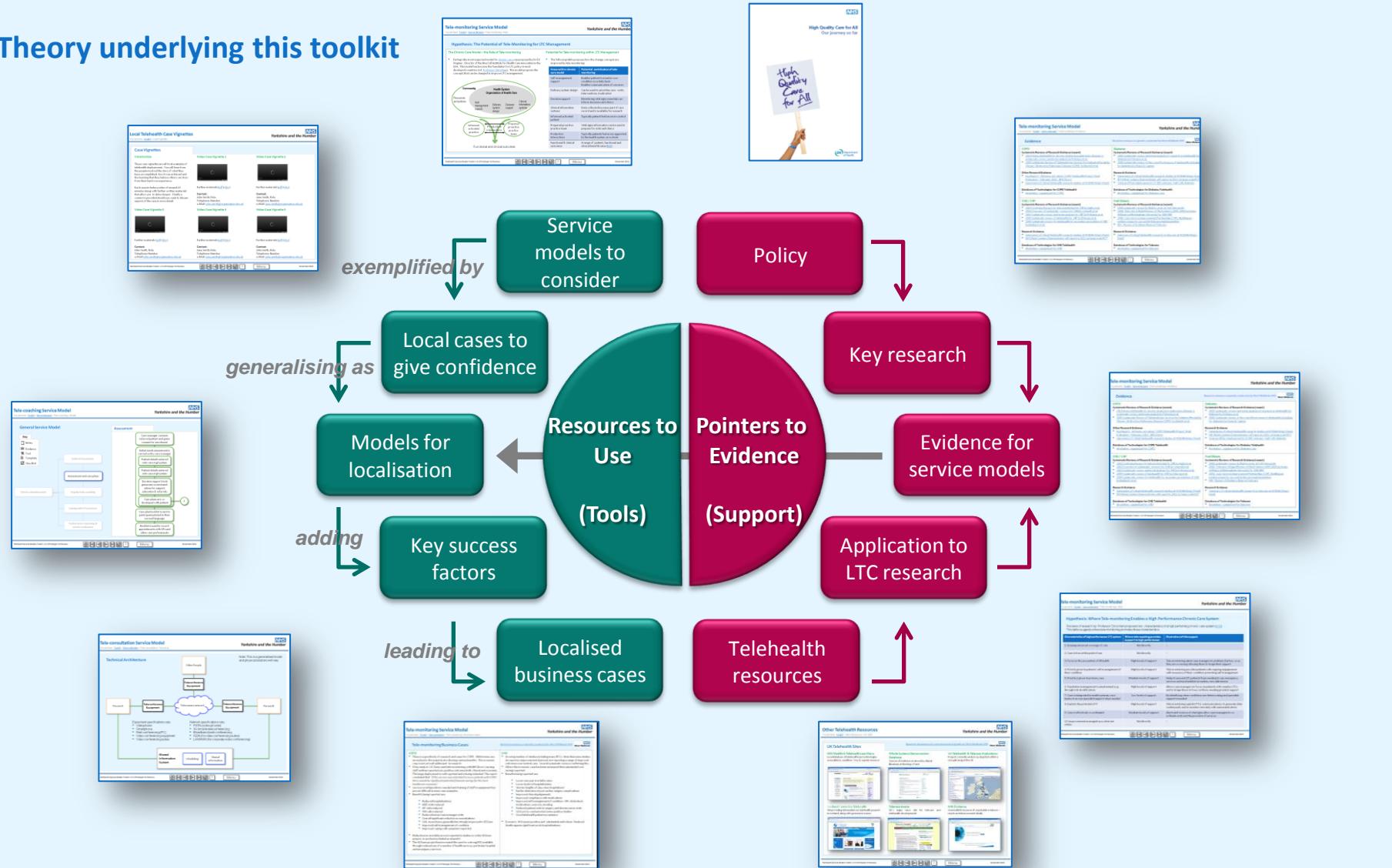
The stage of development of the research on telehealth makes authoritative statements that evaluate its clinical and economic outcomes still open to debate as the research findings – particularly from large scale deployments – continue to be built up. The toolkit routes you into authoritative materials on telehealthcare for your own evaluation rather than proposing a single evaluation for you to adopt.

Acknowledgements

This toolkit has built upon prior work at West Midlands NHS within their [Telehealthcare Commissioning & Evaluation Toolkit](#).



Theory underlying this toolkit



Definitions of terms used

Telehealth	Information and communication technologies used locally and at a distance, combines health telecommunication, information technology and health education to improve the efficiency and quality of healthcare
Telecare	The deployment of alarms and sensors into peoples' homes that are linked to a monitoring or call centre. These devices enable people to continue living independently in their homes but safely and with support available if needed.
Teleconsultation	The use of video conferencing to provide a consultation between a patient and clinician at a distance. This can be facilitated by a clinician to assist the patient in the use of equipment.
m-Health	The fast developing field of employing mobile phone technologies for health applications. The recent developments of smart phones such as the i-phone and mobile laptops and tablets have opened up new possibilities for using mobile technologies to improve healthcare processes and deliver health information and services to patients.
Toolkit	A collection of resources brought together to support people in a task or process, comprising guidance, tools, techniques, examples and access to research and sources of relevant evidence
Service model	Representation of the components of a service and the dynamic relationship between them in a simplified and generic way
Risk stratification	Arranging patients according to the severity of their illness with a view to predicting outcomes from a given intervention or service change. Contemporary risk stratification employs the recent availability of patient and population data in electronic formats to exploit the power of computers, analytical software and cheap data storage
Stakeholders	Those groups and communities with a stake in the outcome of a change or situation
Evaluation	The activity of synthesising generalisable outcomes for the usage of telehealthcare that includes the full range of contributing factors to the value (positive or negative) of its deployment and use
Business case	An explanation of how a new initiative will affect an organisation and what is required to be successful. It presents the arguments and evidence for why resources should be allocated

Help Page

Short term support

Support is being provided by Dr Alan Warr of Tribal Health who can be contacted on 07900 607249 or by e-mail on alan.warr@tribalgroup.com

Aim of the toolkit

The toolkit aims to support those involved in the commissioning or development of telehealth through the provision of support for developing service models by providing:

- Case studies and examples
- Generic service models and tools for localising them
- Evidence on the clinical and economic case for telehealth

Do I need to follow the toolkit?

The toolkit is for support, so it is aiming to provide a reasonable, generic approach. But tailoring to other local methods or improving on what is provided is fine. If improvements are made, then it would be good to upgrade the toolkit by adding them in as an additional pathway or additional resources

Structure

This toolkit is focused on local case studies, telehealth service models, an exemplar commissioning model and key success factors for deployment. The toolkit also acts as a location for resources that would help those involved in the deployment of telehealth.

Symbols used

	Evidence	Evidence is quantitative or qualitative sources of data or validated research or best practice (including policy)
	Documents	Additional guidance on the activity
	Tools	Tools are a variety of resources comprising mainly models and analysis frameworks that could be used to explore issues
	Templates	Templates are documents that would be produced for telehealthcare but without the specific content for the organisation in question. Typically these contain the section headings and advice on the contents for the sections
	Checklists	A general list of things that would typically have been considered or included within an activity

FAQs

Using the toolkit with PowerPoint 2003-2005?

This version of the toolkit should work fine with PowerPoint 2005 and 2003, if the current Service Packs have been installed. If this is not the case, then contact the support for the toolkit and a version for PowerPoint 2003-5 can be provided which has the same functionality.

Requests from the operating system to accept content

These should be accepted for all the content coming from the toolkit and located on the site on which the toolkit has been deployed. **For Internet content, the sites selected are all safe sites but do not accept unless your security software is up to date.**

Using the toolkit without an Internet connection?

The toolkit makes extensive usage of links to resources available via the Internet and is designed for use from a PC or laptop whilst connected to the Internet. So these links will not work if run from a PC or laptop without an active Internet connection.

Can it be used on PDAs and Smartphones?

No, the toolkit is designed for a standard PC or laptop and the amount of content on a screen will mean it is not suitable for devices with small screens.

Is this toolkit available as a single document?

A shorter overview document will be developed summarising the toolkit that can be used as a stand alone guidebook for developing telehealth service models.

What if we do not have PowerPoint?

The toolkit will be made available both as a pdf document, as a PowerPoint file and as a web-site on the NHS Yorkshire and the Humber HIEC web server.

