A review of telehealth, telecare and telemedicine in Wales
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Executive summary

Purpose

This review delivers a summary of the telehealth, telemedicine and telecare activities taking place across Wales, providing a platform from which a determined drive by the Mid Wales Healthcare Collaborative for greater use of technology enabled care capacity can be launched.

Findings

24 of the 30 organisations (22 local authorities, seven health boards and the Welsh Ambulance Service Trust) approached provided data on their telehealth, telemedicine and telecare activities for this review.

It is widely accepted that technology solutions that are implemented without a clear connection to a problem, that all stakeholders recognise and acknowledge, are unlikely to deliver benefits quickly or for the long term. Furthermore, developing technology enabled care is best progressed when seen as a part of broader service redesign and pathway development, rather than a standalone area or process.

Therefore, the findings of the review have focused on the priorities identified in the Mid Wales Healthcare Study and detailed in the Mid Wales Healthcare Collaborative Innovation Group work plans; access and transport, cardiology, dermatology, falls prevention, innovative psychological therapies, management of long term conditions, obstetrics & gynaecology, palliative care and professional clinical networks. This approach is intended to assist the identification of schemes for deployment with the confidence that they are linked to problems that are recognised and accepted by patients and clinicians in the Mid Wales area.

32 activities were identified across the aforementioned priority areas, including nine services running business as usual, 19 time-limited projects in progress; and four ideas in development. This report describes these activities in detail, including technologies, benefits, barriers and costs, where available, as well as supplementing this activity data with a selection of published evidence, experience and examples. This information provides a resource for service improvement and pathway development initiatives that will enable the identification of those activities that could be enhanced or expanded.

An additional 26 activities were identified across other healthcare areas including integrated care, unscheduled care, care of the elderly, primary care, cancer, neurology, T&O, physiotherapy and imaging.

All the local authorities that responded to the data request reported on their telecare services and a further eight projects in process and five ideas in development were described. The report includes a comparison of the telecare provision across the three local authorities working within the Collaborative framework i.e. Powys, Gwynedd and Ceredigion county councils. This information provides the basis for further discussions between members of the Collaborative on how telecare services can be enhanced or expanded through joint working.

One of the main technologies deployed across Wales is video conferencing. Data collected by NHS Wales Informatics Service shows that overall utilisation of this infrastructure, over the 12 month period to 30th September 2015, never exceeded 5%. There appears to be significant scope for the utilisation of the infrastructure to be reviewed and improved, particularly as a number of schemes
cite the lack of dedicated, suitable video conferencing equipment as a barrier to implementation and sustainability.

The review identified common barriers to the success of technology enabled care activities; lack of project management resources, clinician and patient engagement and infrastructural issues.

Research indicated that the characteristics of successful services and projects centred on being clear about what the problem is that needs to be solved, ensuring that the scheme is creating a sustainable business model and then progressing in incremental steps e.g. with pilots.

Next steps

The findings of this project have highlighted a number of suggested next steps, to be led by the Mid Wales Healthcare Collaborative Telehealth Innovation Sub Group.

- **Keeping the findings of this review up to date and useful for the future:**
  - Gather and Integrate outstanding data
  - Maintain the activity database
  - Design user-friendly access and maintenance of the evidence database
  - Consider the establishment of a network of resources that could provide service redesign and project management expertise and guidance related to deployment of technology enabled care services to teams across Wales

- **Priority activities identified for immediate investment:**
  - Reorganise the existing videoconferencing infrastructure across Hywel Dda, Powys and Betsi Cadwaladr health boards in order to unlock additional capacity for use by those schemes that have cited lack of dedicated VC access as a barrier to deployment
  - Consider immediate investment and project management support to:
    - secure the sustainability of the Paediatric Telecardiology service for Mid Wales; and
    - support the Powys County Council business case to train their Reablement Team in assessing for telecare packages.

- **Identifying further activities for enhancement or expansion in 2016**
  - Compile business cases for enhanced and/or expanded technology enabled care services available to the population of Mid Wales through a patient, clinical and staff-led pathway mapping process of the priority areas and telecare services
  - Plan and resource additional analysis of activities outside the Mid Wales priority areas in order to identify opportunities for extending services in other parts of Wales

![Figure 1 - Identifying activities than be adopted or upscaled](image-url)
Background

The Welsh Government’s Health and Social Services Group has devolved responsibility for leading on the development and implementation of policy in relation to health and social care provision within Wales. The Healthcare Innovation Division holds the Efficiency through Technology Fund to support initiatives that seek to invest in innovative practice to improve quality and safety, reduce cost, improve efficiency and access to health services.

The Welsh Government commissioned the Welsh Institute for Health and Social Care (WIHSC) to explore the options for the provision of high quality, sustainable, safe and accessible healthcare services in Mid Wales. The different needs of rural communities and the cross-boundary challenges of this region suggested the need for a review of the system. The study team explored the views of people right across Mid Wales including clinicians, Health Boards, professional bodies and many others, and reviewed the lessons from elsewhere in the UK and internationally where similar challenges have been addressed. Their report, the Mid Wales Healthcare Study, was published in September 2014.

In response to the report recommendations, health bodies serving Mid Wales have established the Mid Wales Healthcare Collaborative (MWHC). One of the key innovation themes to be addressed by the Collaborative is telehealth.

Several specific recommendations were made in relation to developing telehealth in the short and long term:

• There should be a coordinated effort by all three Health Boards to identify the opportunities for much greater use of telehealth capacity and a determined drive to hasten its implementation.
  • Supporting a shift towards more home-based or local care in the community – minimising the need to travel to hospital unless absolutely necessary;
  • Increased opportunity to work collaboratively within health (between primary and community care with secondary care) and across with social care;
  • Supporting improved communication between staff, including videoconferencing and sharing of timely information to support decision making;
  • Empowering people to take increased responsibility for their own health; and
  • Supporting efficient working practices to enable right treatment at the right time in the right place.

• Six key areas for development were identified in the long term:
  • There is a need to ensure that NHS staff who work in rural communities have an opportunity within their training to obtain experience of telemedicine, so that they are aware of its potential and comfortable with the technology.
  • It is essential that staff will be able to communicate and share information across distance. Academic institutions involved in training staff for the NHS need to be involved.
  • Patient awareness of telemedicine needs to be increased because, as consumers of the services, they will be important to its development. Media reporting of the successful applications of telemedicine could play a major role in public awareness.

1 Mid Wales Healthcare Study http://wihsc.southwales.ac.uk/media/files/documents/2014-10-
• Health Boards should be encouraged to include telemedicine in their strategic intent.
• Research and evaluation of new projects and service delivery using telemedicine to confirm cost benefits, client acceptability etc.
• Encourage closer working between telemedicine as provided by the NHS and telecare as provided by social services.

This project seeks to begin to address the recommendations by identifying a benchmark position and the opportunities for maximising the use of technology to deliver care.

The recommendations of this report should be read alongside a number of key policy documents relating to the delivery of technology enabled care, specifically “Informed Health and Care: A Digital Health and Social Care Strategy for Wales” (Welsh Government, 2015) and “Achieving Prudent Health in NHS Wales” (Public Health Wales, 2014).
Project aims & objectives

The project aimed to

• conduct a structured benchmarking exercise of telehealth, telecare and telemedicine activity across Wales; and

• investigate activities that present opportunities for adoption or expansion in Hywel Dda, Powys and Betsi Cadwaladr health board geographical areas²

with the objective of

• providing a platform from which a determined drive by the Mid Wales Health Collaborative for greater use of telehealth capacity can be launched.

² Involving all participating organisations i.e. the aforementioned health boards plus Welsh Ambulance Service Trust, Gwynedd County Council, Ceredigion County Council and Powys County Council
**Definitions**

“The terms **telemedicine**, **telehealth**, and **telecare** are sometimes used interchangeably.

**Telemedicine** can be defined as the use of technology, such as interactive audio, visual, and data communications, to support delivery of healthcare at a distance including diagnosis, consultation and treatment, as well as health education and the transfer of medical data.3 Telemedicine can be divided into three broad categories:4

- **Direct patient care** – diagnosis and treatment obtained by means of communication devices, although a doctor and a patient are geographically apart
- **Teleconsultation** – transmitting expert knowledge to non-specialists in order to support medical care, through communication among doctors or between doctors and other related personnel
- **Distance learning** – providing the most up-to-date information to the doctors and/or other health professionals with geographical disadvantages

**Telehealth**, also referred to as telemedicine, is the remote monitoring of people living with a chronic condition to support self management and delivery of care.5 It covers the monitoring of physiological data e.g. temperature and blood pressure that can be used by health professionals for diagnosis or disease management. Examples of telehealth devices include blood pressure monitors, pulse oximeters, spirometers, weighing scales, and blood glucometers. Telehealth also covers the use of information and communication technology for remote consultation between health professionals or between a health professional and a patient e.g. providing health advice by telephone, videoconferencing to discuss a diagnosis, or capturing and sending images for diagnosis.

**Telecare** is the continuous, automatic, and remote monitoring of real time emergencies and lifestyle changes over time, in order to manage the risks associated with frailty and independent living.6 It is more widely used in social care with a combination of alarms, sensors, and other equipment, usually in the home environment, to help people live more independently by monitoring for changes and warning the people themselves or raising an alert at a control centre. Examples of telecare devices include personal alarms, fall detectors, temperature extremes sensors, carbon monoxide detectors, flood detectors, and gas detectors.”

*Mid Wales Healthcare Study, 2014*

For the purposes of this review, the term “**technology enabled care services**” will be used as a collective term for the use of telehealth, telecare, telemedicine and other technology-led approaches for delivering care, in providing care for patients that is convenient, accessible and cost-effective.

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3 *Rural Health Implementation Group (2011a, 2013a)*
4 *Takahashi (2001)*
5 *Rural Health Implementation Group (2011a)*
6 *Ibid*
Method

Activities across Wales

A data collection template was designed in partnership with stakeholders in Hywel Dda, Betsi Cadwaladr and Powys health boards.

Data was requested from 30 organisations; seven NHS Wales health boards, the Welsh Ambulance Service Trust and 22 Welsh local authorities. Each template was tailored to include any existing information gathered from the Rural Health Implementation Group (RHIG) work concluded in 2013 and the Assistive Technology Returns compiled in 2014.

While this approach intended to gather data on the majority of activities across Wales, there are schemes missing. This will be because many of the main health board contacts for the review were based in the informatics teams who would not necessarily know about all the service redesign or pathway development work being undertaken in clinical teams. Furthermore, some organisations provided limited information due to lack of resources to complete the task; or in some cases failed to provide any information at all.

In order to mitigate this gap in understanding the totality of activity, projects funded by the Health Technology and Telehealth Fund in 2014/2015 have been cross checked against the returns to fill in some of these gaps. Furthermore, submissions to the Efficiency through Technology Fund have also been referenced. There are also some specific projects that have been researched individually due to their national and international profile.

An additional source of information has been the NWIS videoconferencing utilisation reports, which has been used to determine whether there are opportunities to improve the efficiency of the use of this infrastructure.

Published evidence

The references included in this report are sourced from evidence searches commissioned specifically for this project from Bronglais Library, Hywel Dda University Health Board and Library and Archive Services, Welsh Government. The search strategies and full set of results are available.

Furthermore, the evidence base compiled by NHS England for their Technology Enabled Care Services Resource for Commissioners7 was also used.

It should be noted that while the use of published evidence has a role in providing assurance for decision making, in this context there is a tension between the rapid pace that technology develops and the delay in getting evidence from formal studies published.

Experience and examples

There is a wealth of material to draw on, both within Wales and the wider UK; and further afield around the world, from experience of implementing these technologies in health and social care settings.

A number of specific contacts from the Welsh health and social care system were interviewed to capture their experience and views on what can be learnt from previous and current deployment projects in Wales.

7 https://www.england.nhs.uk/ourwork/qual-clin-lead/tecs/
Furthermore, representatives from NHS England, NHS Scotland and the Public Health Agency in Northern Ireland were contacted to provide insight into their experience and examples of implementing innovative technologies to enhance health and social care delivery.

Case studies on the latest innovations and learning from across Europe have been gathered from the European Telemedicine Conference in Odense, Denmark\(^8\) (2015).

\(^8\) [https://www.eiseverywhere.com//ehome/113922](https://www.eiseverywhere.com//ehome/113922)
Findings

Data was returned by 24 organisations; five NHS Wales health boards, the Welsh Ambulance Service Trust and 18 local authorities. These returns were largely made electronically, with a handful of organisations providing information verbally.

There was a wide variety in the level of detail provided and where possible additional information was gathered, particularly from MWHC organisations, to provide the most complete picture as possible.

The range and variation of data gathered in this review has made reporting challenging. It is necessary to present the results in a way that tells a cohesive story from which conclusions and recommendations can be made, specifically activities that can be adopted or upscaled at pace; and those that present opportunities in the longer term.

It is widely accepted that technology solutions that are implemented without a clear connection to a problem, that all stakeholders recognise and acknowledge, are unlikely to deliver benefits quickly or for the long term. Furthermore, developing technology enabled care is best progressed when seen as a part of broader service redesign and pathway development, rather than a standalone area or process.

Therefore, this report has been organised in a way that connects activities to the priorities identified in the Mid Wales Healthcare Study and detailed in the MWHC Innovation Group (IG) work plans in the first instance. Activities in other areas of care are reported in less detail. Full transcripts of all data returns are available.

This approach is intended to assist the identification of schemes for deployment with the confidence that they are linked to problems that are recognised and accepted by patients and clinicians in the Mid Wales area.

There are nine priority areas highlighted in the Mid Wales Healthcare Study, translated into the work plans of the MWHC IG, that could be supported by the use of technology enabled care pathways. These are:

- Access and transport
- Cardiology
- Dermatology
- Falls prevention
- Innovative psychological therapies
- Management of long term conditions
- Obstetrics & Gynaecology
- Palliative Care
- Professional clinical networks

The data returns and additional information searches showed 32 activities across these priority areas:

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9 At the time of writing, the following organisations had not supplied a data return for the review Aneurin Bevan UHB, Caerphilly, Angelsey, Newport and Denbighshire. Powys THB provided a data return too late for analysis and inclusion, and is available to review separately. Please see recommendations for suggested next steps relating to outstanding data returns.
• 9 are services running business as usual (BAU)
• 19 are time-limited projects in progress
• 4 are ideas in development

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Cardiology</th>
<th>Dermatology</th>
<th>Obstetrics and gynaecology</th>
<th>Management of long term conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Betsi Cadwaladr UHB</td>
<td>2</td>
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<td></td>
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</tr>
<tr>
<td>Hywel Dda UHB</td>
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<tr>
<td>Cwm Taf UHB</td>
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<td></td>
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<tr>
<td>Cardiff &amp; Vale UHB</td>
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</tbody>
</table>

Figure 2 - IG Priorities – Services (Business as usual)

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Access and transport</th>
<th>Cardiology</th>
<th>Dermatology</th>
<th>Innovative psychological therapies</th>
<th>Palliative Care</th>
<th>Management of long term conditions</th>
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</thead>
<tbody>
<tr>
<td>Betsi Cadwaladr UHB</td>
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<tr>
<td>Hywel Dda UHB</td>
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<td>6</td>
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<tr>
<td>Aneurin Bevan UHB</td>
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</tr>
<tr>
<td>Abertawe Bro Morgannwg UHB</td>
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<tr>
<td>Cwm Taf UHB</td>
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<tr>
<td>Cardiff &amp; Vale UHB</td>
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<tr>
<td>Powys THB</td>
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<tr>
<td>Welsh Ambulance Service Trust</td>
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</tbody>
</table>

Figure 3 - IG Priorities – Projects

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Access and transport</th>
<th>Falls prevention</th>
<th>Innovative psychological therapies</th>
<th>Palliative Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hywel Dda UHB</td>
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<tr>
<td>Welsh Ambulance Service Trust</td>
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Figure 4 - IG Priorities – Ideas

It should be noted that the use of videoconferencing to support clinical networks through training, MDTs and meetings is a part of many of the schemes collected by this review. However, they have not been reported as distinct services or projects in their own right.
Each of the remaining eight priority areas are discussed in turn in the subsequent sections, with the aim of:

- outlining the activities that are currently taking place across Wales; and
- presenting a summary of related published evidence, experience and examples.
Access and transport

Activities reported

<table>
<thead>
<tr>
<th><strong>ABMUHB01P</strong>&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Video diagnosis to care homes &amp; ambulances</th>
<th>Organisation: Abertawe Bro Morgannwg University Health Board</th>
<th>Project duration: Commenced 1&lt;sup&gt;st&lt;/sup&gt; April 2015. Date of completion not available.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Locations:</strong></td>
<td>15 Care homes Bridgend, Neath Port Talbot and Swansea and 10 ambulances</td>
<td><strong>Technology:</strong> iPads running Cisco Jabber software</td>
<td><strong>Partners:</strong> WAST and private care homes</td>
</tr>
<tr>
<td><strong>Evaluation:</strong></td>
<td>Not available</td>
<td><strong>Benefits:</strong> The pilot is to prevent unnecessary A&amp;E admissions keeping elderly residences in their homes and providing medical support for care home nursing staff.</td>
<td><strong>Barriers:</strong> Pilot has lost steam due to the project manager being moved to another project.</td>
</tr>
<tr>
<td><strong>Budget:</strong></td>
<td>Not available</td>
<td><strong>Contact:</strong> Not available</td>
<td><strong>Potential for MWHC:</strong> Every 2 prevented unnecessary admissions paid for the iPad. When the project was still under management there were many prevented unnecessary admissions.</td>
</tr>
</tbody>
</table>

The Welsh Ambulance Service Trust (WAST) has confirmed their involvement in ABMUHB01P described above (WAST01P).

Furthermore, they have provided the following additional information about a potential future project (WAST04I) which would involve the development of a vehicle to provide wider care. WAST currently utilises two occupational health mobile units geographically based, one in the north one in the south. These currently provide flu immunisations, occupational health referrals and general health and wellbeing support. Future intention is that the vehicles will also provide health surveillance and support the general health and wellbeing of all staff across the trust.

**Published evidence**

Ambulance-based telemedicine of the third generation is safe, feasible and reliable but further research and development, especially with regard to high speed broadband access, is needed before this approach can be implemented in daily practice. (Yperzeele L, Van Hooff RJ, De Smedt A, Valenzuela Espinoza A, Van Dyck R, Van de Casseye R, Convents A, Hubloue I, Lauwaert D, De Keyser, JBruons R. 2014)

A Korean study equipped twenty ambulances in the Busan area were with a telemedicine system. Three-lead electrocardiogram, blood pressure, and pulse oximetry data from the patient and audiovisual input from the scene were transferred to a server. Consulting physicians used desktop computers and the internet to connect to the server. Both requesting Emergency Medical Service (EMS) providers and consulting physicians were asked to fill out report forms and submit them for

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<sup>a</sup> Please note that activity codes are comprised of an abbreviation of the organisation’s name, the number of the scheme followed by S (services), P (project) or I (idea)
analysis. The study did not find any significant advantage of implementing telemedicine over the use of voice calls in delivering on-line medical control. More user-friendly, smaller devices with clear advantages over voice communication would be required before telemedicine can be successfully implemented in pre-hospital patient care. (Cho SJ; Kwon IH; Jeong J. 2015)

Factors that influence the use of telemetry by Emergency Medical Technicians (EMTs) in ambulances included patients' clinical factors, as well as complex organisational and environmental factors surrounding the EMTs' occupational environments. This suggests that the rapid use intention and dissemination of such systems require EMTs to be supported at both the technical and organisational levels. (Hwang JY; Kim KY; Lee KH. 2014)

The Health Foundation is currently working with the London Ambulance Trust on a study that aims to anonymously link data from ambulance services with data from hospital emergency departments, to enable the tracking of outcomes and quality. The linked data will focus on:

• response times and patient outcomes
• referrals to the ambulance service from health care professionals
• mortality in emergency departments
• hospital diagnoses given to patients conveyed by ambulance.

The project brings together experts in research and data analysis from Swansea University, Kingston University, the Nuffield Trust and St George’s, University of London. The team will explore ways of routinely linking data, including the technical feasibility of different approaches. They will also identify indicator sets that can support the improvement of healthcare delivery within the ambulance service and across the wider health care system, and consider how these indicator sets could inform commissioning. Anticipated outcomes include quality improvement in existing health systems and the development of more effective care pathways and protocols for pre-hospital interventions. The project is due to be completed in early 201711.

A review of telemedicine applications in the pre-hospital environment (Amadi-Obi A, Gilligan P, Owens N, O'Donnell C. 2014) found limited conclusive studies for the effectiveness of telemedicine in emergency medicine. The best evidence is in stroke management where conclusive evidence of the significant positive effect of telesroke on clinical outcome has led to its recommendation for stroke management. Telemedicine appears to have a significant impact on the quality of ECG interpretation, but there is as yet no conclusive evidence that telemedicine affects clinical outcome in myocardial infarction. The review found very few studies that critically analysed telemedicine use in the prehospital care of trauma. Studies have demonstrated that burns assessment using telemedicine was as accurate as face-to-face assessment.

**Experience and examples**

The Scottish Centre for Telehealth and Telecare has explored point of care testing with the Scottish Ambulance Service.12

Curt Bashford is the President and CEO of General Devices, an American company specialising in medical devices, with a focus on voice and data communications, information management and telemedicine systems for Emergency Medical Services (EMS) and Emergency Departments (ED). He

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wrote an article in 2011 entitled “Thinking about EMS Telemedicine?” which contains a number of interesting reflections on his experience and views on the possibilities of technology enabled care in patient emergency transport. He talks about that despite the absence of solid evidence supporting the efficacy, utility or cost-effectiveness of any EMS telemedicine application, there are several uses that might be appropriate and worthwhile:

- Recorded refusal: clear documentation of the evaluation of the patient, what the patient was told regarding risks and benefits and the patient’s declining of care.
- Stroke assessment: Linking pre-hospital acute stroke care to ED physicians and stroke experts would allow earlier recognition, support and triage of patients before hospital arrival. Current communications and imaging technologies make this possible. Using these technologies could also help speed the use of thrombolysis, as well as making greater use of pre-hospital data. This should result in improved outcomes and reduced costs.
- Treat and release: Enabling more patients to be cared for at home rather than transported to hospital, by linking to a remote ED physician.
- Burn assessment: Because of the limited experience most clinicians have with burn injuries, the extent and quality of burns can be deceiving for most pre-hospital and hospital emergency care providers. An EMS telemedicine system could address this problem by having a burn specialist view and discuss the patient’s injuries and offer assistance at many levels of the decision-making process. Telemedicine is one way to help ensure those who need specialised burn care are routed directly to a burn center.
- Disaster response: EMS telemedicine has an important role in the challenging and austere environments found in disaster settings because of its ability to improve both triage and the quality of care by 1) making the knowledge of the specialist available to the provider in the field, and 2) as a ‘force multiplier’ for maximising limited treatment and transport resources. It can also provide distant observers with a coherent set of objective information.

A review of telehealth, telecare and teledicine in Wales

Cardiology

Activities reported

CVUHB08S & HDUHB07S
Paediatric Cardiology Telemedicine
Organisation: Cardiff and Vale University Health Board
Service start date: 2005

This is the only service for acute diagnosis of congenital heart disease and supporting colleagues in emergencies in Peripheral Hospitals in Wales. Furthermore the service runs Telemedicine Facilitated Teaching Ward Rounds for Welsh Paediatric Cardiovascular Network every Wednesday morning with 2-4 centres participating each week. Palliative Medicine, Renal, Respiratory, SALT, cardiothoracic surgery teams also utilise this service for delivering counselling, MDT, training and teaching on weekly basis.

Locations: University Hospital of Wales, Department of Paediatric Cardiology is the main unit and two units have been donated by the lead clinician, Dr Uzun, to Singleton Hospital Paediatrics department and Carmarthen Hospital Paediatric Department.

Technology: Polycom. We utilise echocardiography, ECG, Xray and other diagnostic modalities in the system. There is a control panel to switch between computers, Overhead projector, video etc but there is no maintenance contract therefore the switch box is now not useable.

Partners: Dr Orhan Uzun, Consultant Paediatric Cardiologist and Ken Pile have established the system and Dr Uzun served as adviser for the Welsh Assembly and Informing Health Care

Evaluation: Service presented its activities as audit, scientific paper, and RCPCH approved CPD activities. This service was finalist for NHS innovation award. Service have acted as advisory for similar services to be developed in Devon/Cornwall Neurology, Adult Cardiology, Cardiac Surgery, Respirology, General Paediatrics, Dermatology in the UK, and in the world such as Romania, Australia and Turkey.

Benefits: Only service in Wales used for Diagnostic purposes of sick children with heart disease. counselling patients, MDT meetings, CPD meetings and Teaching doctors and nurses.

Challenges: Lack of support, lack of funding to maintain, lack of maintenance contract, lack of provision to update the service.

Budget: None, no funding is allocated. South Wales Cancer Network purchased VC for Swansea (approx £17,000 in 2007). Used existing HB VC equipment for Carmarthen and Aberystwyth. Bids for additional equipment for Bronlais failed. Service needs immediate access to £500 to arrange a survey by Pinacl Solutions to determine the investment required to repair the existing VC infrastructure.

Contact: Dr Orhan Uzun, Consultant Paediatric Cardiologist at UHW

Potential for MWHC: Making the service available to patients in the MWHC area and the need to invest in the infrastructure to secure the sustainability of the service. Furthermore, the consultant is of the view that the service can also be used to improve standards of care in Obstetric Medicine to help sonographers and obstetricians to manage pregnant women carrying a foetus with congenital heart disease and be extended to counselling pregnant women.

Teaching and training can be expanded to standardise services across all hospitals and discussion forums can use the system to develop guidelines.
### CVUHB03S

**e-Advice in Cardiology**

**Organisation:** Cardiff and Vale University Health Board  
**Service start date:** Summer 2015

**Location:** Cardiology department (plan to extend to 5 other specialities in Jan 2016)  
**Technology:** Virtual Clinic  
**Partners:** GPs  
**Evaluation:** Will measure % uptake  
**Benefits:** Prudent HealthCare  
**Challenges:** Moving a 100% uptake  
**Contact:** Gareth Bulpin  
**Potential for MWHC:** Not stated

### WAST03P

**3G capability for fleet of Corpuls Defibrillators**

**Organisation:** Welsh Ambulance Service Trust  
**Project duration:** TBC - Scheduled to start in 2016

This will allow ambulance crews to upload ECG readings to a web portal that is accessible to specialists at Cardiac Unit. It is hoped that the early transmission of patient data from the scene will give the specialist the opportunity to advise crews of the most appropriate clinical response and also allow the hospital the opportunity to optimally prepare for the arriving patient.

**Location:** Not stated  
**Technology:** 3G mobile technology  
**Partners:** Not stated  
**Evaluation:** Not stated  
**Benefits:** Not stated  
**Challenges:** Not stated  
**Contact:** Aled Williams, Head of ICT, WAST  
**Potential for MWHC:** Not stated

### BCUHB02P

**Virtual clinics**

**Organisation:** Betsi Cadwaladr University Health Board  
**Project duration:** March 2015 to March 2016

**Locations:** Ysbyty Gwynedd initially with remote clinics at community hospital sites
### Technology: Video conferencing, Remote spirometry, digital auscultation

### Partners: NWIS service desk (WHVS support)

### Evaluation: Ongoing work to capture number of clinics supported, patient / staff travel saved.

### Benefits: Providing care closer to home for rural communities

### Challenges: Upgrading bandwidth provision on all sites. Negotiating responsive SLAs.

### Budget: Capital costs of approx £120k to provide VC units across 17 locations plus £10k peripherals plus £70k to upgrade wi-fi network infrastructure (shared across several projects)

### Contact: christine.couchman@wales.nhs.uk

### Potential for MWHC: to be assessed

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### Activities identified from other sources

Abertawe Bro Morgannwg University Health Board submitted a bid to the Health Technology and Telehealth fund in 2014/15 for a project (ABMUHB02P) looking at the Assessment of remote heart rhythm sampling to screen at-risk population for Atrial Fibrillation.

#### ABMUHB01P

**Assessment of remote heart rhythm sampling to screen an at-risk population for Atrial Fibrillation**

**Organisation:** Abertawe Bro Morgannwg University Health Board

**Duration:** Unknown, planned to conclude in September 2016

AliveCor heart rhythm monitoring provides a device which when fitted to the back of a mobile device measures a patient’s heart rhythm. This is then sent to a clinician for assessment.

**Location:** TBC

**Technology:** AliveCor heart rhythm monitoring & mobile device

**Partners:** Swansea University

**Evaluation:** Project in progress

**Benefits:** This project aims to provide this to patients specifically to screen at risk population for Atrial Fibrillation which will enable early intervention.

**Barriers:** Progress report indicates that recruitment of suitable patients to participate is proving difficult

**Budget:** £462,186

**Contact:** Professor Julian Halcox is leading this project with the delivery body as Swansea University.

**Potential for MWHC:** Not stated
Time for Medicine has approached the MWHC to establish proof of concept by introducing, in Cardiology, a cloud based, patient data collection platform to facilitate triaging of patients on outpatient waiting lists\(^\text{14}\).

<table>
<thead>
<tr>
<th>A cloud based, patient data collection platform to facilitate triaging of patients on outpatient waiting lists in Cardiology</th>
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<tbody>
<tr>
<td><strong>Organisation:</strong> Time for Medicine</td>
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<td><strong>Planned duration:</strong> 10 months</td>
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To establish proof of concept by introducing to the Mid Wales Healthcare Collaborative, in Cardiology, a cloud based, patient data collection platform to facilitate triaging of patients on outpatient waiting lists. The goal would be the expediting (or improving the efficiency) of outpatient clinics, facilitating remote patient diagnosis and treatment and ultimately the reduction in hospital waiting lists, with a view to broadening deployment across Wales and, and potentially in other clinical specialties.

**Locations:** Not stated  
**Technology:** Cloud-based store and forward platform  
**Partners:** Time for Medicine  
**Expected benefits:** The goal would be the expediting (or improving the efficiency) of outpatient clinics, facilitating remote patient diagnosis and treatment and ultimately the reduction in hospital waiting lists, with a view to broadening deployment across Wales and, and potentially in other clinical specialties.  
**Cost:** £196K  
**Contact:** Clive Minihan, Time for Medicine  
**Potential for MWHC:** Not stated

**Published evidence**

Telecardiology is one of the fastest growing fields in telemedicine. The advancement of technologies and Web-based applications has allowed better transmission of health care delivery. The impact of telecardiology consultation continues to evolve and includes many promising applications with potential positive implications for admission rates, morbidity, and mortality. (Raikhelkar J, 2015)

Successful patient engagement in a national, remotely delivered behavioral health intervention can reduce medical utilisation in a targeted cardiac population. A restored focus on tackling barriers to behavior change in order to improve medical health is an effective, achievable population health strategy for reducing health costs in the United States. (Pande, Morris, Peters, Spettell, Feifer, & Gillis, 2015)

**Paediatric Cardiology**

A study based on C01S reported above found that the implementation of a simple telemedicine service demonstrated the feasibility of transmitting echocardiography images via videoconferencing equipment for diagnosis and second opinions. (Lewis D, Morris S, Uzun O, Tranter G. 2010)

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\(^{14}\) This scheme is not coded as it is not a current project or idea adopted by a particular organisation. It is included for information.
Telemedicine in Paediatric Cardiac Critical Care was associated with lower Cardiac intensive care unit and hospital length of stay in a US study of a Columbian system. (Lopez-Magallon, Otero, Welchering, Bermon, Castillo, Duran, Castro, Munoz. 2015)

A Brazilian study found that access to an echocardiography machine with remote supervision by a cardiologist improves the detection of congenital heart disease by neonatologists; virtual outpatient clinics facilitate clinical management; the use of internet technology with simple screening techniques allows resources to be allocated more efficiently. (Sandra da Silva Mattos et al. 2015)

**General Cardiology evidence**

Other recent publications on the topic of cardiology and cardiac care through technology include:


**Experience and examples**

Following a successful completion and favourable evaluation of a Telemedicine project (2003-6), the Scottish Paediatric Telemedicine Service is now playing a significant role in supporting and complementing paediatric service provision in Scotland. Currently supported by the National Delivery Plan for Specialist Children’s Services in NHS Scotland, the service incorporates innovative use of technological advancements to:

- deliver a service in remote or rural areas which would otherwise be unsustainable for cost or population density reasons
- allow primary care clinicians to consult specialists remotely to avoid unnecessary referrals and travel
- support clinical and educational networks to reduce professional isolation, share best practice amongst peers and enhance continued professional development efforts.

With funding from the National Delivery Plan, video conferencing systems are supporting a range of services within each of the specialist children’s hospitals.
Furthermore, a pilot trialling a dedicated on-call paediatric consultant service, providing decision support to fourteen rural general and community hospitals across the north of Scotland found that rapid remote specialist support via VC improves local care management and decision making in remote areas.

Dr Alessandro Taddei (Gabriele Monasterio Tuscany Foundation & National Research Council Clinical Physiology, Italy) was a speaker at the European Telemedicine Conference in Denmark, 2015. His presentation entitled “Telemedicine for Collaborative Diagnosis and Care of Heart Malformations” outlined how FTGM Heart Hospital in Massa, Italy linked with Paediatric and Gynaecology Centers in Croatia, Bosnia Herzegovina, Albania and Romania to provide specialist cardiology opinion from Italy and enable training and development of specialists in the other sites. The service and the technological solution and challenges are well documented in an article published online.²⁵

Dermatology

Activities reported

**BCUHB02S**
Teledermatology
Organisation – Betsi Cadwaladr University Health Board
Service start date: 2012

Store-and-forward Teledermatology through GP practices.

**Location:** Pan-BCUHB

**Technology:** Digital cameras, Welsh Clinical Communications Gateway (WCCG)

**Partners:** None stated

**Evaluation:** MSc study on the service completed in 2013

**Benefits:** Secondary care consultants were able to divert 14% of patients to surgical specialties for assessment based on the image provided by the GP, thereby reducing the pressure on Dermatology waiting lists and avoiding unnecessary steps or delays in patient pathway

**Barriers:** Lack of feedback loop within WCCG can be problematic in driving up quality of imaging. Patients cannot be diverted to more appropriate setting, all referrals still have an outpatient appointment.

**Budget:** Setup Approx £25k for cameras across BCU area – no recurrent costs reported

**Contact:** christine.couchman@wales.nhs.uk

**Potential for MWHC:** Low cost technology and ensures patients are assessed appropriately. Has recently been scaled up to cover most practices across BCUHB

**BCUHB03S**
Teledermatology
Organisation - Betsi Cadwaladr University Health Board
Service start date: 2000 (with MS Outlook and has moved to eceptionist more recently)

Store-and-forward Teledermatology through GP practices.

**Location:** Ysbyty Gwynedd (referrals from Pwllheli and North Angelsey GP surgeries)

**Technology:** eceptionist

**Partners:** None stated

**Evaluation:** Evaluation undertaken of activity in 2009/10 showed 48% of cases referred did not need an appointment. Use of technology in Dermatology at Medway NHS Trust reported as a case study.

**Benefits:** Medway case study reported 60% of referrals were returned to the GP with advice, 20% were booked directly into a minor surgery appointment and 20% went on to see a

16 [http://www.eceptionist.com](http://www.eceptionist.com)
A review of telehealth, telecare and telemedicine in Wales

CVUHB02S
Teledermatology
Organisation: Cardiff & Vale University Health Board
Service start date: 2006

Store and Forward Teledermatology through GP practices (Dermatology Images attached to an email). Currently achieving 45% uptake of GPs taking a Derm Photo, being migrated to e-Advice.

Technology: Digital Cameras and Email (migrating to e-Advice)
Partners: Dermatology department and GPs
Evaluation: Paper reviewing 2009/10 activity provides clear outcomes, benefits and lessons learnt

Benefits: More than 30% of referrals not requiring an Outpatient Appointment. 2009/10 paper outlined that 70% of referrals were returned to the GP with advice for primary care management, with the remaining 30% being offered outpatient appointments. 40% of those referred on were given urgent appointments for suspected malignant neoplasms. GPs reported patient management and educational benefits.

Barriers: Moving a 100% uptake
Contact: Gareth.Bulpin@wales.nhs.uk
Potential for MWHC: Not stated

HDUHB08P
Teledermatology
Organisation: Hywel Dda University Health Board
Project duration: 6 months (Currently awaiting approval, but expected to start early in 2016)

Cloud based diagnostic and triage Teledermatology service
Location: North Ceredigion GP Cluster
Technology: Time for Medicine cloud-based store and forward platform
A review of telehealth, telecare and telemedicine in Wales

**Partners:** Time for Medicine

**Evaluation:** Project not started. Evaluation framework has been well defined.

**Anticipated benefits:** Improve access to quality health care for patients; Reduce waiting times for specialist opinion meeting waiting time targets; Inform GPs of their patient diagnosis as quickly as possible; Be more cost effective for patients in terms of travel and/or waiting time; Enhance links between primary care, community and acute hospitals and Educate GPs in managing patients with dermatological problems reducing the number of referrals.

**Known Barriers:** TBC

**Budget:** £24,151.50

**Contact:** Sue.Fish@wales.nhs.uk

**Potential for MWHC:** To be determined following project evaluation

**Activities identified from other sources**

Aneurin Bevan University Health Board (ABUHB) has submitted a bid to the Efficiency Through Technology Fund to expand their Teledermatology service that has been running since 2013. Part of this proposal includes extension of the service to Powys (ABUHB01P).

**Published evidence**

An assessment of the cost-effectiveness, safety of referral and patient satisfaction of a teledermatology service offered by a general practice with 6500 registered patients in suburban Greater London concluded that teledermatology has been shown to be cost-effective, with referrals identified correctly when employed in this general practice setting. Satisfaction with the service was high. (Livingstone J. Solomon J. 2015)

Mobile teledermatology is an efficient, safe and well-accepted tool among patients with high-need acne constituting at least a valuable adjunct to outpatient care services. (Fruhauf J; Krock S; Quehenberger F; Kopera D; Fink-Puches R; Komerricki P; Pucher S; Arzberger E; Hofmann-Wellenhof R. 2015)

A 24-month before and after comparative evaluation of a teledermatology service was undertaken involving four non-randomly allocated intervention practices and 18 control practices found that while service was very popular with patients and clinicians and clinicians highlighted the significant educational benefit, there was not any evidence that teledermatology reduced secondary care referral rates. In fact in this small pilot, it increased referrals in the short term. (Ford, John A; Pereira, Augustine. 2015)

Primary care providers’ have been found to be highly satisfied with mobile app-based, store-and-forward teledermatology and believe teledermatology offers synergistic educational benefit. (Barbieri J.S. Nelson C.A. Bream K.D. Kovarik C.L. 2015)

A Dutch study looked at the use of teledermatology between secondary and tertiary care and found that the following conditions that could lead to successful implementation were indicated: (1) a national Tertiary Teledermatology (TTD) system including all dermatologists indexed according their subspecialty, (2) ability to send the TTD consultation to a dermatologist personally, (3) ability to discuss a case with multiple dermatologists, (4) connections to electronic health records, and (5)

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change in policies of tertiary centers or health insurers, where they would stimulate the use of TTD consultation for all referrals and questions. However, although quantitative results indicate that TTD can be used to improve triage between secondary and tertiary centers and dermatologists perceived advantages of TTD, the motivation to use TTD in this setting was lacking as current work processes were easier to use. (van der Heijden, Job P; de Keizer, Nicolette F; Witkamp, Leonard; Spuls, Phyllis I. 2014)

Compared with standard hardware, new-generation mobile devices reduce the cost of videoconferencing, increase the versatility of teledermatology, and decrease general practitioner investment time. (Duong T.A. Cordoliani F. Julliard C. Bourrat E. Regnier S. De Pontual L. Leroy C. Gallula S. Aparicio C. Legendre N. Bagot M. Guibal F. 2014)

Telemedicine in the U.S. military has provided valuable dermatology support to providers in remote locations by delivering appropriate and timely consultation for military service members and coalition partners. In addition to avoiding unnecessary medical evacuations, the program facilitated appropriate evacuations that may otherwise have been delayed. (Hwang JS; Lappan CM; Sperling LC; Meyerle JH. 2014)

The use of teledermatology in remote areas results in a shorter time to biopsy than traditional referral methods as a result of improved triaging measures. (Kahn E. Sossong S. Goh A. Carpenter D. Goldstein S. 2013)

Research indicates that physician providers communicate with similar style and content whether using teledermatology or in-person. (Edison, Karen E; Fleming, David A; Nieman, Elizabeth Lewis; Stine, Kendra; Chance, Louanne; Demiris, George. 2013)

Other recent publications on the topic of dermatology care through technology include:


Experience and examples

The Welsh Government published “The Application of Operational Research Techniques to Service Improvement – Teledermatology” in 2014\(^\text{18}\). Overall, the study was able to conclude that

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teledermatology offers significant advantages, some of which would be particularly valuable to patients living in rural areas, since it offers patients:

- Reduced travel time and distance and therefore cost, with some patients saving as much as 85 miles per appointment and anything up to two hours of travelling time;
- A shorter waiting time for an appointment; and
- A shorter elapsed time in the system - on average a patient in this study spent three months in the system under teledermatology compared with approximately seven months using the outpatient approach.

In addition to the advantages to the patient, reduced patient travel may have a benefit to the environment.

The Primary Care Commission published Quality Standards for Teledermatology using ‘Store and Forward’ images in 2013. The Scottish Centre for Telehealth and Telecare – NHS 24 ensured the standards were relevant to practice in Scotland, both by developing the standards and through stakeholder engagement during the consultation phase. The document contains a useful and comprehensive set of guidelines for building high quality teledermatology pathways of care\(^\text{19}\).

A case study of Eceptionist implementation for Medway dermatology pathways found that 60% referrals returned to their general practitioner with a course of treatment, 20% went directly onto a minor surgery waiting list, and 20% were invited to a consultant consultation. Since April of 2005, the Trust has increased the number of patients seen using the Eceptionist service on a monthly basis by an average of 17% when compared to the previous periods. The benefits to the patients are obvious: less waiting time and faster treatment. Problems that could pose serious health threats if left undiagnosed are caught earlier.

\(^{19}\text{http://www.pcc-cic.org.uk/sites/default/files/articles/attachments/telederm_report_aw_web4.pdf}\)
Falls prevention
Activities reported

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<th>HDUHB03I</th>
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<tr>
<td>Falls Prevention Programme</td>
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<tr>
<td>Organisation: HDUHB</td>
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<td>Planned Duration: Unknown</td>
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**Technology:** Unknown

**Partners:** Secondary Care - Care of the Elderly Team

**Aim:** Initial discussion with Care of the Elderly consultant only as yet. Aim is Falls prevention in elderly. Current best practice needs identifying first.

**Cost:** Unknown

**Contact:** Dr A. Gupta

**Potential for MWHC:** TBC

Published evidence

A systematic review of the evidence around the effectiveness of fall detection devices and their use with older adults (Chaudhuri S, Thompson H, Demiris G. 2014) found:

- 57 projects that used wearable systems and 35 projects using non-wearable systems, regardless of evaluation technique.
- Non-wearable systems included cameras, motion sensors, microphones and floor sensors.
- Of the projects examining wearable systems, only 7.1% reported monitoring older adults in a real world setting.
- There were no studies of non-wearable devices that used older adults as subjects in either a lab or a real world setting.
- In general, older adults appear to be interested in using such devices although they express concerns over privacy and understanding exactly what the device is doing at specific times.

The review concluded that there exists a large body of work describing various fall detection devices. The challenge in this area is to create highly accurate unobtrusive devices. From this review it appears that the technology is becoming more able to accomplish such a task. There is a need now for more real world tests as well as standardisation of the evaluation of these devices.

The use of home-based technologies coupled with teleassistance service significantly reduced the incidence of primary indoor falling needing GP intervention or attendance at an emergency room among elderly people with Alzheimer's disease and mild-to-moderate dementia. (Tchalla, Achille E; Lachal, Florent; Cardinaud, Noelle; Saulnier, Isabelle; Rialle, Vincent; Preux, Pierre-Marie; Dantoine, Thierry. 2013)

ActiveLifestyle is an example of a training app that runs on a tablet and assists, monitors, and motivates older people to follow personalised training plans autonomously at home. A study concluded that this app assisted and motivated independently living and healthy older people to autonomously perform strength-balance exercises over 12 weeks and had low dropout rates. The social motivation strategies were more effective to stimulate the participants to comply with the training plan and remain on the intervention. The adoption of assistive technology devices for
physical intervention tends to motivate and retain older people exercising for longer periods of time. (Silveira, Patricia; van de Langenberg, Rolf; van het Reve, Eva; Daniel, Florian; Casati, Fabio; de Bruin, Eling D. 2013)

A total of 153 community-dwelling people aged 65+ years took part in an international, multicentre, randomised controlled trial to determine the effectiveness of an ICT-based system called iStoppFalls to predict and prevent falls. (Gschwind Y.J. Eichberg S. Marston H.R. Ejupi A. Rosario Hd. Kroll M. Drobics M. Annegarn J. Wieching R. Lord S.R. Aal K. Delbaere K. 2015) Intervention group participants conducted the exercise program for 16 weeks, with a recommended duration of 120 min/week for balance exergames and 60 min/week for strength exercises. All intervention and control participants received educational material including advice on a healthy lifestyle and fall prevention. Assessments included physical and cognitive tests, and questionnaires for health, fear of falling, number of falls, quality of life and psychosocial outcomes. The study concluded that the exercise program reduced physiological fall risk in the study sample. Additional subgroup analyses revealed that intervention participants with better adherence also improved in postural sway, stepping reaction, and executive function.

Experience and examples

In Scotland there is a multi—agency approach to the problem of falls. Health and social care services are working with partners in the third and independent sectors, the Scottish Ambulance Service and Scottish Fire and Rescue to improve the prevention and management of falls.

The Falls Information Zone, developed by the Scottish Government’s National Falls Programme, working with NHS 24, Academia, Health and Social Care and the Third Sector, has been created on Scotland’s national health information website NHS inform (http://www.nhsinform.co.uk/falls/ ). The Falls Information Zone has been created on Scotland’s national health information website NHS inform (www.nhsinform/falls). It has been developed by the Scottish Government’s National Falls Programme, working with NHS 24, Academia, Health and Social Care and the Third Sector. The Zone contains a wealth of advice and information on a range of related topics including:

- About Falls
- Keeping Well
- Safety At Home
- Dealing with a Fall
- Help and Support

The Self Assessment Tool, Care Coordination Diary and Person Held File have been developed as part of the SmartCare programme, led by NHS 24 Scottish Centre for Telehealth and Telecare and working in partnership with seven local health and care partnerships in Ayrshire & Arran, Lanarkshire, Renfrewshire and East Renfrewshire. SmartCare is a £1.6 million programme jointly funded by the Scottish Government and the European Commission and is part of the Digital Health and Care Innovation Partnership (DHCIP). Working with local communities, third sector, industry and health and care providers, SmartCare has co-designed and developed its innovative digital tools that can be accessed via familiar technology such as tablets and smart phones to support falls management and prevention (https://portal.livingitup.org.uk/campaign/smartcare-0 ).

- **Person Held File:** This electronic file will enable the person to hold their own health and social care information. He or she will decide which key professionals or support agencies their information can be shared with.
• **Falls Assistant – Self Assessment Tool:** This online tool will enable older people, or their carers, to assess a person’s risk of falling. The Falls Assistant will then provide tailored advice to reduce future risks of a fall.

• **Care Coordination Diary:** An electronic diary which will enable the person receiving care, and their carer, to organise appointments straight to their diary from, for example, their GP, dentist or podiatrist.

• **Community Connections:** Developed in partnership with Living it Up – a digital self management hub for over 50s in Scotland, providing information, tools and advice to support healthier living.

The Scottish Telehealth and Telcare Community portal provides information, resources and education for NHS Scotland, local authority and voluntary sector staff about telehealth and telecare services

Other interesting reading includes “Telehealthcare and falls. Using telehealthcare effectively in the support of people at risk of falling.” produced by the University of Stirling and the Joint Improvement Team and Dementia Services Development Centre in 2011. The book outlines how telehealthcare can contribute to improved outcomes for people at high risk of falling. It includes sections on: definitions of telehealthcare (along with the related concepts of telecare, telehealth, assistive technology and environmental controls); the causes, consequences, prevention and management of falls; the importance of good needs and risk assessments; ethical dilemmas and how these can be resolved; how the risk of falls and the resultant harm they cause can best be reduced and managed using telehealthcare as part of a package of risk assessment, management, prevention, care and support; issues particular to carers; and case examples and an outline training programme.

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Innovative psychological therapies

Activities reported

**CVUHB04P**
Veteran's Mental health Services
Organisation: Cardiff & Vale University Health Board
Project duration: Commenced Spring 2015 and due to complete Winter 2015

Location: cross-Wales

Technology: Video conferencing

Partners: Staff based in all other HB's in Wales

Evaluation: no

Benefits: reduced staff travelling; better team communications

Barriers: lack of consistency in HB's approaches to video conferencing; lack of implementation resource.

Budget: £0

Contact: Gareth Bulpin

**Potential for MWHC:** Not stated

**HDUHB04I**
Use of technology to support the patient through the mental health care pathway
Organisation: Hywel Dda University Health Board
Planned duration: Dec 2015 - Initial Discussions

Aim: Improved access to care for patients on mental health pathway

Benefits: Unknown

Barriers: Unknown

Budget: Unknown as yet

Contact: Libby Ryan-Davies Mental Health Director HDUHB

**Potential for MWHC:** Current best practice needs identifying first

Activities identified from other sources

A direct request to a member of the Mental Health IG from PTHB has also revealed involvement in the Mastermind project, which was widely discussed at the European Telemedicine Conference 2015.

**PTUHB01P**
Mastermind
Organisation: Powys Teaching University Health Board
Project Duration: commenced in March 2014

Project has 2 work streams: implementing and delivering computerised Cognitive Behavioural Therapy (cCBT) and collaborative care through the use of Video Conferencing (cCVC) in rural
areas for patients suffering with mild to moderate depression. For cCBT we use the online programme Beating the Blues. Beating the Blues consists of eight, approximately 1-2 hour sessions recommended to be completed weekly. The programme is interactive. During sessions there are video clips to watch, exercises to complete and CBT techniques to learn and use that can help with depression and anxiety. For cCVC we are using Skype for Business to hold the video conferencing sessions, currently this has been introduced in the North Crisis team so a patient will sit with a healthcare professional from the Crisis Team and they have a video conferencing session with the Consultant Psychiatrist. We went ‘live’ with Beating the Blues in April 2015 and started with the video conferencing in October 2015.

Locations: Beating the Blues can be accessed from any device with an internet browser and that has access to the internet whether it be at patient’s homes, libraries or anywhere else to the patients convenience. Alternatively, we have set up community sites where people can access this programme. The 2 video conferencing sessions we held were from different health board sites in North Powys, where patient A was present with a member of the CRISIS team at site1 and they participated in a consultation via VC with the consultant psychiatrist who was located health board site2.

Technologies: Beating the Blues (Procured via a 3rd party service provider) for cCBT and Skype for Business (All Wales NWIS/Powys tHB provided service) for cCVC.

Partners: Currently for cCBT, referrals are being received by the LPMHSS teams, Pain Management and Occupational Health. The next step is to look at introducing this into CMHT/CRHTT teams, Psychology departments and GP direct referrals.

Evaluation: Requirements are set out by the EU with regards to the qualitative and quantitative data collection. We are only just starting with the data collection aspect of the project. Feedback is received through pre and post treatment questionnaires for both patients and healthcare professionals. We will also be holding focus groups towards the end of the project to gain feedback. We also hope to measure its success through patient waiting time, reduction in costs etc.

Benefits: The benefits we hope to achieve are reduced waiting times for patients, reduced travelling time and costs for healthcare professionals, reduced ‘dead’ time of healthcare professionals (time spent travelling so not working), easier access to services for patients, provide more patient centred care at the home where possible, reduced waiting times for patients needing to see a consultant psychiatrist.

Challenges: The main issues currently are resistance from some healthcare professionals, poor broadband/internet connections in areas, BtB does not currently work on Ipads/Tablets/Smartphones, Drop-outs from the programme.

Budget: Not stated specifically - Skype for Business was rolled out through NWIS therefore there were no direct costs to us for this. For Beating the Blues, we had a one off fee for unlimited access licences for the 3 years that the project will run. This will need to be renewed if this is rolled out as a mainstream service after the project ends. If Beating the Blues is to become a mainstream service, the costs will be for the licenses and the staff members who will deal with referrals and monitor patients during the programme (1Band 4 WTE admin currently holds this position on a fixed term contract up to Feb 2017). The scale and scope of this would require review if we were to embed this solution into our service post the initial project.

Contact: Harold Proctor (Project SRO) – Harold.Proctor@wales.nhs.uk
Potential for MWHC: This service is currently still part of the project, if/when it becomes a mainstream service this can be implemented in more service areas to deliver maximum benefit. The same programme is currently used within 6 health boards in Scotland under NHS24. Although they are also part of the MasterMind project, they have had Beating the Blues in place as a service within 2 health boards for approximately 9 years. Within each health board they have a service coordinator (Band 4 WTE) who deal with the referrals and monitor patients, they also have a service development manager who is responsible for promoting the service and implementing this in the different health boards.

Review of the Health Technology and Telehealth Fund 2014/2015 projects shows one mental-health related scheme at Cwm Taf University Health Board (CTUHB02P), partnering with NWIS. LHB’s and LA’s to provide a Care Assurance and Performance System to deliver real-time monitoring and intelligence within Mental Health Services of a patient's journey through a care system. This provides a proactive, clear focus for clinicians to support independence. The project budget is £441K.

Furthermore, Aneurin Bevan University Health Board has submitted a bid to the Efficiency through Technology Fund for a rapid evaluation project using videoconferencing technology to deliver service interventions to groups of service users, carers and professionals in the areas of Eating Disorders and Autism (ABUHB02P).

Published evidence

A rapid review of E-mental health literature (Lal S, Adair CE. 2014) identified e-mental health applications addressing four areas of mental health service delivery:

- information provision
- screening, assessment, and monitoring
- intervention
- social support.

Applications were most frequently aimed at adults with depression or anxiety disorders. Some interventions had demonstrated effectiveness in early trials. Many believe that e-mental health has enormous potential to address the gap between the identified need for services and the limited capacity and resources to provide conventional treatment. Strengths of e-mental health initiatives noted in the literature include:

- improved accessibility
- reduced costs (although start-up and research and development costs are necessary)
- flexibility in terms of standardisation and personalization
- interactivity
- consumer engagement.

The review concluded that E-mental health applications are proliferating and hold promise to expand access to care. Further discussion and research are needed on how to effectively incorporate e-mental health into service systems and to apply it to diverse populations.

More recently, a literature review of the use of Telepsychiatry in acute settings (Salmoiraghi A; Hussain S. 2015) concluded that the use of telepsychiatry seemed to be a viable and relatively inexpensive option for use in places where access to emergency services is difficult. This review found that:

- patients had a positive attitude toward the technology and show a high level of satisfaction with telepsychiatry
the use of telepsychiatry is correlated with decreased admissions to psychiatric inpatient units
the quality of clinical interaction in telepsychiatry is similar to that in face-to-face care
telepsychiatry seems to be cost effective.

There is a vast pool of more current published evidence relating to the use of computerised Cognitive Behavioral Therapy for the treatment of a range of mental health and physical health conditions. Examples relating to Veterans, Eating Disorders and Autism are described in more detail below.

Blending online and face-to-face sessions in an integrated depression therapy is viewed as a positive innovation by patients and therapists. Following a standard blended protocol, however, would be difficult in secondary mental health care. A database of online modules could provide flexibility to tailor treatment to individual patients, which asks motivation and skills of both patients and therapists. (van der Vaart R, Witting M, Riper H, Kooistra L, Bohlmeijer ET, van Gemert-Pijnen LJ. 2014)

Veterans

- The delivery of a wide range of mental health services into the homes and other non-clinic settings of rural veterans via webcam, secure and encrypted software and veteran-owned personal computers is feasible and safe, with high levels of satisfaction and perceived safety reported by users. Other benefits suggest fewer no-show appointments in home-based telemental health compared to clinic-based telemental health. (Shore, Goranson, Ward, Lu. 2014)
- A small study looking at differences in reported barriers to treatment completion associated with telemedicine vs. in-person delivery of evidence-based treatment for PTSD in combat veterans found that there was no difference in rate of dropout between modalities. A greater proportion of participants receiving in-person exposure therapy reported difficulties with logistical aspects of care (e.g., parking), whereas a greater proportion of participants receiving telemedicine therapy reported difficulty tolerating certain stressful aspects of treatment; however, those receiving telemedicine delivered treatment completed more sessions before dropping out. (Hernandez-Tejada, Zoller, Roggiero, Kazley, Acierno. 2014)
- A study of 780 veterans meeting the criteria for major depressive disorder, over the age of 58, found that telemedicine-delivered psychotherapy for older adults with major depression is not inferior to same-room treatment. This finding shows that evidence-based psychotherapy can be delivered, without modification, via home-based telemedicine, and that this method can be used to overcome barriers to care associated with distance from and difficulty with attendance at in-person sessions in older adults. (Egede LE; Acierno R; Knapp RG; Lejuez C; Hernandez-Tejada M; Payne EH; Frueh BC. 2015)
- While delivery of treatment via video telehealth can expand availability of treatment and be equally effective as in-person treatment, barriers to establishing telehealth services remain, including both provider acceptance and organisational obstacles. A prospective study of external facilitation as an implementation strategy for telehealth for veterans found that external facilitation is an effective and acceptable strategy to support providers as they establish clinics and make complex practice changes, such as implementing video telehealth to deliver psychotherapy. (Lindsay JA, Kauth MR, Hudson S, Martin LA, Ramsey DJ, Daily L, Rader J. 2015)

Eating disorders

• Internet-based approaches can be considered as useful for enhancing motivation to change in eating disorders and for yielding initial symptomatic improvement. (Hotzel K. von Brachel R. Schmidt U. Rieger E. Kosfelder J. Hechler T. Schulte D. Vocks S. 2014)

• Although the effects for the Internet versus group intervention are similar, a study of 107 college students with body dissatisfaction suggests that the effects faded more quickly for the Internet intervention. However, the Internet intervention produced large weight gain prevention effects, implying that it might be useful for simultaneously preventing eating disordered behaviour and unhealthy weight gain. (Stice E. Durant S. Rohde P. Shaw H. 2014)

• Women with more severe eating disorder pathology and depressive mood had a higher likelihood of dropping out from a Web-based motivational enhancement program. Interventions such as ours need to address the specific needs of women with more severe eating disorder pathology and depressive mood and offer them additional support to prevent them from prematurely discontinuing treatment. (von Brachel R. Hotzel K. Hirschfeld G. Rieger E. Schmidt U. Kosfelder J. Hechler T. Schulte D. Vocks S. 2014)

• Findings of the four randomized controlled trials are consistent with the earlier reports indicating that guided eTherapy interventions of a cognitive behavioural nature are acceptable to (female) adults with a binge eating problem and that a subgroup improves substantially. More effective interventions are required and their use in different healthcare settings needs to be investigated. Direct eTherapy interventions have the potential to increase access to effective forms of treatment and, in younger cases, they might serve as a form of secondary prevention. (Fairburn C.G. Murphy R. 2015)


**Autism**

• Behaviour consultants can conduct functional analyses effectively and efficiently via telehealth. (Wacker DP; Lee JF; Dalmau YC; Kopelman TG; Lindgren SD; Kuhle J; Pelzel KE; Waldron DB. 2013)

• A small study investigated clinicians’ ability to assess autism via telemedicine and results indicated adequate clinician agreement and parent satisfaction regardless of observational condition. (Reese R.M. Jamison R. Wendland M. Fleming K. Braun M.J. Schuttler J.O. Turek J. 2013)

• Practitioners should use caution when teaching academic skills to individuals with ASD using technology-based interventions. (Knight V. McKissick B.R. Saunders A. 2013)

• Although many studies illustrate the tremendous promise of computer assisted technologies (CAT) to enhance skills of individuals with ASD, most lack rigorous, scientific assessment of efficacy relative to non-CAT approaches. (Ploog B.O. Scharf A. Nelson D. Brooks P.J. 2013)

• Families in rural or remote areas have limited access to evidence-based intervention for their children with autism. Parents can increase their knowledge and implementation of Applied Behaviour Analysis strategies and concepts, as well as save travel time and distance by using web-based training and telemedicine technology. (Heitzman-Powell L.S. Buzhardt J. Rusinko L.C. Miller T.M. 2014)

• Children living in rural and underserved areas experience decreased access to health care services and are often diagnosed with autism at a later age compared to those living in urban or suburban areas. Video conferencing may be a viable method to increase access to autism diagnostic
services, and ultimately early intervention, for families in rural and underserved areas. (Reese RM; Jamison TR; Braun M; Wendland M; Black W; Hadorn M; Nelson EL; Prather C. 2015)

- Understandings of how Facebook is used to seek social support could impact supporting and maintaining effective communication among parents and/or caregivers of children with ASDs. This information could also improve approaches used by health professionals in developing, improving and evaluating social support systems for parents/caregivers. (Mohd Roffeii S.H. Abdullah N. Basar S.K.R. 2015)

**Other papers of interest**

- Collateral outcomes in e-mental health: A systematic review of the evidence for added benefits of computerized cognitive behaviour therapy interventions for mental health. (Musiat, P; Tarrier, N. 2014)

- Psychological therapies (remotely delivered) for the management of chronic and recurrent pain in children and adolescents (Fisher E, Law E, Palermo TM, Eccleston C. 2015)

- The Assessment of Treatment Integrity in a Cognitive Behavioral Telephone Intervention Study With Dementia Caregivers. (Schinköthe D, Wilz G. 2014)

- Qualitative feedback from a text messaging intervention for depression: benefits, drawbacks, and cultural differences. (Aguilera A; Berridge C. 2014)

- Personalized drinking feedback: A meta-analysis of in-person versus computer-delivered interventions. (Cadigan JM; Haeny AM; Martens MP; Weaver CC; Takamatsu SK; Arterberry BJ. 2015)

- Patient Smartphone Ownership and Interest in Mobile Apps to Monitor Symptoms of Mental Health Conditions: A Survey in Four Geographically Distinct Psychiatric Clinics. (Torous J; Chan SR; Yee-Marie Tan S; Behrens J; Mathew I; Conrad EJ; Hinton L; Yellowlees P; Keshavan M. 2014)

- Breaking Open the Black Box: Isolating the Most Potent Features of a Web and Mobile Phone-Based Intervention for Depression, Anxiety, and Stress. (Whitton AE; Proudfoot J; Clarke J; Birch MR; Parker G; Manicavasagar V; Hadzi-Pavlovic D. 2015)

- A randomized trial comparing live and telemedicine deliveries of an imagery-based behavioural intervention for breast cancer survivors: reducing symptoms and barriers to care. (Freeman LW; White R; Ratcliff CG; Sutton S; Stewart M; Palmer JL; Link J; Cohen L. 2015)


**Experience and examples**

As mentioned in the aforementioned section, NHS Scotland plays a key role in the Mastermind project and has been using technology to deliver psychological therapies for many years.

The NHS Choices website describes computerised CBT as follows:

“A number of interactive software programmes are now available that allow you to benefit from CBT with minimal or no contact with a therapist. The main programme currently approved for use by the

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A review of telehealth, telecare and telem Medicine in Wales
NHS is Beating the blues\textsuperscript{21}, which is approved for treating mild to moderate depression. However, there are many similar computerised CBT (CCBT) packages that may also be effective. Some people prefer using a computer rather than talking to a therapist about their private feelings, although you may still benefit from occasional meetings or phone calls with a therapist to guide you and monitor your progress.”

Jordi Cusido Roura, CEO of HealthApp SL, Spain presented at the European Telemedicine Conference 2015 on his avatar-based app for supporting patients with eating disorders\textsuperscript{22}. HealthApp are looking for partners to progress a pilot roll out of their technology following their inclusion in the 2015 NHS Test Bed programme\textsuperscript{23}.

\textsuperscript{21} \url{http://www.beatingtheblues.co.uk}
\textsuperscript{22} \url{http://www.bcnhealthapp.com/tcapp/}
\textsuperscript{23} \url{https://www.england.nhs.uk/ourwork/innovation/test-beds/}
### Management of long term conditions

#### Activities reported

| HDUHB09S | Chronic Obstructive Pulmonary Disease telehealth monitoring post exacerbation  
Organisation: Hywel Dda University Health Board  
Duration: Service commenced March 2014  
Technology: Docobo landline technology and Simple Telehealth Text messaging service via patients own phone  
Partners: Community COPD / Respiratory Specialist Nurse Team Docobo, Simple Telehealth  
Evaluation: European Research Results  
Benefits: Awaiting research result data  
Barriers: Provision of Telehealth Lead, Ongoing funding for telehealth and lead person and technological support availability  
Budget: Set up Simple Telehealth Licence fee and Community Membership charge is used for all services that utilise the patient text messaging service: Annually - £2000 Licence Fee & Annually - £5500 Community Membership fee Docobo: Equipment reused from prior study; £25584 annual monitoring charge: Equipment repair costs £4020  
Contact: Sarah Hicks, Clinical Lead for Telehealth HDUHB  
Potential for MWHC: Unknown until research results available March 2016 |
| --- |

| CVUHB01S | Cystic Fibrosis Unit  
Organisation: Cardiff and Vale University Health Board  
Duration: Service commenced in 2005  
Locations: CF unit, UHL  
Technology: video conferencing  
Partners: Harefield Transplant unit; patients across Wales  
Evaluation: User uptake  
Benefits: reduced travelling for staff; reduced travelling for patients; better communications with Harefield site;  
Barriers: None stated  
Budget: £1K-£2K to set up. No ongoing cost as based on continued use of NWIS Lync  
Contact: Bryn Harries  
Potential for MWHC: None stated |
| --- |

| CVUHB01P | Florence Simple Telehealth  
Organisation: Cardiff & Vale University Health Board |
| --- |
Duration: Unknown, commenced February 2015
Locations: UHW Diabetes Service; Station Road GP practice
Technology: 2-way sms
Partners: none
Evaluation: no
Benefits: better patient management and understanding of LTCs
Barriers: lack of implementation resource.
Budget: £12,000
Contact: Bryn Harries

HDUHB02P
United for Health – COPD
Organisation - Hywel Dda University Health Board
Duration: January 2013 to 31st March 2016

Locations: Patients recruited from 4 Acute Hospitals in Hywel Dda but are monitored in the community
Technology: two separate systems available depending on availability of wifi signal - either WHZAN or Docobo
Partners: Hywel Dda is a partner in a multi-national pan European, European Commission funded project
Evaluation: Yes - ongoing, analysis currently in train
Benefits: to be determined post data analysis
Barriers: Infrastructure; change management; engagement; patient recruitment
Budget: Matched funding between the project and the Health Board - approx 750,000 euros over 3 years
Contact: daniel.warm@wales.nhs.uk
Potential for MWHC: Unknown until research results available March 2016

HDUHB03P
Foodwise monitoring post 6 week dietetics programme
Organisation – Hywel Dda University Health Board
Duration: July to December 2015

Location: Pembrokeshire County
Technology: Patient own mobile phone and Simple Telehealth
Partners: Dietetics Department HDUHB
Evaluation: No
| **Benefits:** | Improved weight control post dietetics programme |
| **Barriers:** | Patient engagement |
| **Budget:** | Currently funded from European Research budget for United4Health |
| **Contact:** | sarah.hicks@wales.nhs.uk |
| **Potential for MWHC:** | Awaiting evidence of weight control data compared to comparator data. If successful plans to scale up to include all of HDUHB |

**HDUHB04P**  
**Obesity Management post 6 week dietetics programme**  
**Organisation – Hywel Dda University Health Board**  
**Duration: November 2015 to April 2016**  
**Technology:** Patient own mobile phone and Simple Telehealth  
**Partners:** Dietetics Department HDUHB  
**Evaluation:** No  
**Benefits:** Improved weight control post dietetics programme  
**Barriers:** Patient engagement  
**Budget:** Currently funded from European Research budget for United4Health  
**Contact:** sarah.hicks@wales.nhs.uk  
**Potential for MWHC:** Awaiting evidence of weight control data compared to comparator data. If successful plans to scale up to include all of HDUHB  

**HDUHB05P**  
**COPD Video Prescriptions**  
**Organisation: Hywel Dda University Health Board**  
**Duration: July to December 2015**  
**Locations:** GP's in Primary Care (3 surgeries in Ceredigion currently testing)  
**Technology:** LittleFox Communications, Patients own computer systems / wifi  
**Partners:** Primary Care surgeries x3  
**Evaluation:** No  
**Benefits:** Improved patient knowledge and empowerment of Long Term Condition  
**Barriers:** Primary Care engagement, Patient lack of technology / wifi  
**Budget:** Currently no cost as paid for by Littlefox Communications but ongoing cost will be £20,000 Licence Fee for all LTC videos (not just COPD). £8-12,000 for development of further LTC videos  
**Contact:** Claire.Hurlin@wales.nhs.uk
### Potential for MWHC: Awaiting research results but can be scaled up to include any service diagnosisng LTC's

<table>
<thead>
<tr>
<th>HDUHB06P</th>
<th>Type 2 Video prescriptions</th>
<th>Organisation - Hywel Dda University Health Board</th>
<th>Duration: July to December 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Locations:</strong> GP's in Primary Care (3 surgeries in Ceredigion currently testing)</td>
<td><strong>Technology:</strong> LittleFox Communications, Patients own computer systems / wifi</td>
<td><strong>Partners:</strong> Primary Care surgeries x3</td>
<td><strong>Evaluation:</strong> No</td>
</tr>
<tr>
<td><strong>Benefits:</strong> Improved patient knowledge and empowerment of Long Term Condition</td>
<td><strong>Barriers:</strong> Primary Care engagement, Patient lack of technology / wifi</td>
<td><strong>Budget:</strong> Currently no cost as paid for by Littlefox Communications but ongoing cost will be £20,000 Licence Fee for all LTC videos (not just Diabetes). £8-12,000 for development of further LTC videos</td>
<td><strong>Contact:</strong> <a href="mailto:Claire.Hurlin@wales.nhs.uk">Claire.Hurlin@wales.nhs.uk</a></td>
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</table>

### HDUHB07P
Providing self management skills to patients unable to get to local venues e.g. Working people and housebound

<table>
<thead>
<tr>
<th>Organisation – Hywel Dda University Health Board</th>
<th>Duration: November 2015 to December 2016</th>
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<tbody>
<tr>
<td><strong>Location:</strong> HDUHB area</td>
<td><strong>Technology:</strong> Unknown until Patient Pathway mapped and background research on patient preferences done</td>
</tr>
<tr>
<td><strong>Partners:</strong> Education Programme for Patients (EPP)</td>
<td><strong>Evaluation:</strong> No</td>
</tr>
<tr>
<td><strong>Benefits:</strong> Increased numbers of people completing Self Management Course</td>
<td><strong>Barriers:</strong> Identification of technical service providers, D Patient engagement</td>
</tr>
<tr>
<td><strong>Budget:</strong> £20,000</td>
<td><strong>Contact:</strong> <a href="mailto:sarah.hicks@wales.nhs.uk">sarah.hicks@wales.nhs.uk</a></td>
</tr>
</tbody>
</table>

### Potential for MWHC: No, but plans to scale up to all of Wales by EPP if successful
Published evidence

There is potential for mHealth tools to better facilitate adherence to chronic disease management, but the evidence supporting its current effectiveness is mixed. (Gee P, Egger G, Hamine S, Gerth-Guyette E, Faulx D, Green BB, Ginsburg AS. 2015)

NHS England compiled an evidence base on technology enabled care as a resource for commissioners in 2014. (https://www.england.nhs.uk/ourwork/qual-clin-lead/tecs/strategic-planning/) This resource has specific sections on COPD, diabetes and heart failure. The subsequent sections lead with the conclusions of the key paper from each of these resources first, supplemented with evidence published in 2015 from the additional searches undertaken for this review.

Analysis that will be helpful to those deciding on areas where implementation of information and communication technology-enabled person-centred care may be warranted is contained in the paper entitled “Information and Communication Technology–Enabled Person-Centered Care for the “Big Five” Chronic Conditions: Scoping Review.” (Wildevuur SE, Simonse LW. 2015)

**COPD**

In COPD, telehealthcare interventions can significantly reduce the risk of emergency department attendance and hospitalisation, but has little effect on the risk of death. (McLean S, Liu JLY, Pagliari C, Car J, Sheikh A. 2012)

The use of telehealth technologies to remotely monitor patients suffering chronic diseases could trigger the initiation of timely treatment, thereby potentially reducing exacerbation severity and recovery time and improving the patient’s health. (Mohktar M.S. Redmond S.J. Antoniades N.C. Rochford P.D. Prettö J.J. Basilakis J. Lovell N.H. McDonald C.F. 2015)

Telehealth, when provided as a service within a standard care pathway, seems to decrease hospital admissions and A&E visits. (Odeh B; Kayyali R; Nabhani-Gebara S; Philip N; Robinson P; Wallace CR. 2015)

Home-based supervised training and counselling via video conference is safe and feasible and telemedicine can help to ensure more equitable access to supervised training in patients with severe COPD. (Rosenbek Minet L; Hansen LW; Pederssen CD; Titlestad IL; Christensen JK; Kidholm K; Rayce K; Bowes A; Mollegard L. 2015)

Home-based, unassisted, daily use of a mHealth platform is feasible and acceptable to people with COPD for reporting daily symptoms and medicine use, and to measure physiological variables such as pulse rate and oxygen saturation. (Hardinge M; Rutter H; Velardo C; Shah SA; Williams V; Tarassenko L; Farmer A. 2015)

Telecare can lead to patients and families taking a more active role in self-management, however strongly positive patient and staff experiences and attitudes can complement and contrast with small or non-significant quantitative changes in outcomes. It is likely that subgroups of patients benefit in ways that are not measured or visible, especially feelings of safety and being cared-for. (Kenealy TW; Parsons MJ; Rouse AP; Doughty RN; Sheridan NF; Hindmarsh JK; Masson SC; Rea HH. 2015)

A study comparing the costs and cost-effectiveness of telemonitoring vs usual care for patients with chronic obstructive pulmonary disease (COPD) on a cohort of 256 patients found that it seemed unlikely that a telemonitoring service of the kind that was trialled would be cost-effective in providing care for people with COPD. (Stoddart, Andrew; van der Pol, Marjón; Pinnock, Hilary; Hanley, Janet; McCroach, Lucy; Todd, Allison; Krishan, Ashma; McKinstry, Brian. 2015)
Another study looking at a total of 110 patients with moderate to severe COPD recruited from a specialist respiratory service in Northern Ireland found that while the telemonitoring was effective in improving health-related quality of life and anxiety, but was not a cost-effective intervention. (McDowell, Janet E; McClean, Sally; FitzGibbon, Francis; Tate, Stephen. 2015)

A telemedicine model of initiated phone calls by a health-care provider had a negative effect on health status and resource use in primary and secondary care, in comparison with usual care and therefore cannot be recommended in COPD patients in its current form. Telemedicine has the potential to improve continuity of care, increase efficiency of outpatient management and prevent deterioration of health status in COPD patients. However, the effectiveness of telemedicine is still under debate. This study demonstrated that telemedicine alone, without any form of education, pulmonary rehabilitation or training, had no benefits for COPD patients at all. (Berkhof F.F. Van Den Berg J.W.K. Uil S.M. Kerstjens H.A.M. 2015)

**Diabetes**

In general, home telehealth had a positive impact on the use of numerous health services and glycaemic control. More studies of higher methodological quality are required to give more precise insights into the potential clinical effectiveness of home telehealth interventions. (Polisena J, Tran K, Cimon K, Hutton B, McGill S, Palmer K. 2009)

Information technology based interventions combined with the usual care are associated with improved glycemic control with different efficacy on various clinical outcomes in diabetic patients. (Riazi H, Larijani B, Langarizadeh M, Shahmoradi L. 2015)

A review of fifteen studies looking at the impact of diabetes self-management education interventions designed for patients living in rural areas on glycemic control and other diabetes outcomes found that telehealth and face-to-face diabetes interventions are both promising strategies for rural communities. Effective interventions included collaborative goal-setting. (Lepard MG, Joseph AL, Agne AA, Cherrington AL. 2015)

Patients monitored by telecare showed significant improvement in glycemic control in type 2 diabetes when compared with those monitored by routine follow-up. (Huang Z, Tao H, Meng Q, Jing L. 2015)

A Whole Systems Demonstrator trial comparing telehealth with usual care among 3,230 patients with long-term conditions in three areas of England found that telehealth modestly improved glycaemic control in patients with type 2 diabetes over 12 months. The scale of the improvements is consistent with previous meta-analyses, but was relatively modest and seems unlikely to produce significant patient benefit. (Steventon A, Bardsley M, Doll H, Tuckey E, Newman SP 2014)

Pharmacist-provided diabetes management via telemonitoring resulted in a significant improvement in glycosylated haemoglobin in federally qualified community health centres in Utah compared with usual medical care. Telemonitoring may be considered a model for providing clinical pharmacy services to patients with diabetes. (Shane-McWhorter L. McAdam-Marx C. Lenert L. Petersen M. Woolsey S. Coursey J.M. Whittaker T.C. Hyer C. LaMarche D. Carroll P. Chuy L. 2015)

Several use cases for Glass-enabled chronic disease care are outlined in a paper entitled “How Google Glass could support patients with diabetes mellitus in daily life.” (Hetterich C. Pobiruchin M. Wiesner M. Pfeifer D. 2014)

Online social networking services provide a novel, feasible approach to improving glycaemic control, particularly in patients with Type 2 diabetes. Further mechanistic and cost-effectiveness studies are
required to improve our understanding of SNS and its efficacy in diabetes care. (Toma T. Athanasiou T. Harling L. Darzi A. Ashrafian H. 2014)

HypoAware is a brief and partly web-based psycho-educational group intervention for adults with type 1 and insulin-treated type 2 diabetes and problematic hypoglycaemia. Currently undertaking a cost-effectiveness randomised controlled trial and is planned for inclusion in Dutch care pathway once cost effectiveness proven.

Heart Failure

Structured Telephone Support, Human-to-Human contact and Telemonitoring with medical support provided during office hours showed beneficial trends, particularly in reducing all-cause mortality for recently discharged patients with heart failure. Where ‘usual’ care is less good, the impact of remote monitoring is likely to be greater. (Pandor A, Gomersall T, Stevens JW, Wang J, Al-Mohammad A, Bakhai A, Cleland JGF, Cowie MR, Wong R. 2013)

A total of 15 systematic reviews published between 2003 and 2013 identified five main types of non-invasive telemonitoring technologies for patients with chronic heart failure:

- video-consultation, with or without transmission of vital signs
- mobile telemonitoring
- automated device-based telemonitoring
- interactive voice response
- Web-based telemonitoring.

Of these, only automated device-based telemonitoring and mobile telemonitoring were effective in reducing the risk of all-cause mortality and HF-related hospitalizations. More research data are required for interactive voice response systems, video-consultation, and Web-based telemonitoring to provide robust conclusions about their effectiveness. (Kitsiou S et al 2015)

Further reading on heart failure includes:

- Comparative effectiveness of different forms of telemedicine for individuals with heart failure (HF): A systematic review and network meta-analysis. (Kotb A et al. 2015) [http://www.ncbi.nlm.nih.gov/pubmed/25714962]

Experience and examples

The Scottish Centre for Telehealth and Telecare has a number of schemes documented for Heart Failure. The NHS England TECS scheme has details of two case studies relating to the management of long term conditions with technology enabled care. Furthermore, the commissioner toolkit outlines the following ways that technology enabled care can support the management of long term conditions:

- Self-care apps to promote understanding of condition and better self-management
- Health and care focused social networking for people with similar conditions
- Carer support apps and web portals to reduce carer burden

24 [http://sctt.org.uk/programmes/health/cardiac]
• Telehealth for LTCs (initial diagnosis, titration of medication for newly diagnosed/ unstable patients, annual reviews for stable patients)
• Telecare to help people remain independent in their own homes
• Teleconsultation between primary and acute settings
• Secure messaging for selected patients to their care team
• Telecare for at-risk groups e.g. fallsmonitor, pendantalarms, environmental controls/ alarms

Obstetrics & Gynaecology
Activities reported

CTUHB01S
Maternity telehealth (since October 2014)
Organisation: Cwm Taf University Health Board
Service commenced in October 2014

CTG monitoring in the home for high risk mothers. The mothers apply the monitors themselevs then in real time transmit the CTG to the hospital based midwives who can advise whether it's OK to stay at home or they need to come in

Location: Prince Charles and Royal Glamorgan Hospital

Technology: application specific app on windos Mobile phones blue toothed to the CTG device and transmitted to the hospital servers in real time

Partners: none

Evaluation: Number of mothers who are able to stay at home and not have to come into hospital for monitoring

Barriers: Technically it's quite a complex application to deliver and it required considerable collaborative working with the supplier, mobile phone providers and NWIS to set up the service.

Budget: Setup - £350,000; Recurrent - £19,000

Contact: karen.winder@wales.nhs.uk

Potential for MWHC: Yes, it allows monitoring of mothers real time without the stress of having to come to hospital. Better care, more efficient use of the midwives frees up hospital beds

Published evidence

In 2009 the Virginia High-Risk Obstetrics Telehealth Program was created with the support of state and federal grants. Operated through the University of Virginia, the network was developed to improve access to specialised prenatal care for women with high-risk pregnancies in communities with maternal-foetal specialty shortages, and included partners from five rural counties. Over the course of three years, the program had seen a reduction in missed appointments and preterm deliveries by 25 percent. There have also been reductions in the number of NICU days from approximately 22 to 13 days.

Prenatal care is a relative newcomer to the spectrum of health care provided via telemedicine. Perinatologists and Advanced Practice Nurses collaborated to provide high-risk prenatal care in rural Virginia communities. The study found that Nursing Practice Collaborative care through telemedicine is an effective method for providing high-risk prenatal care to women who live in rural communities.
When compared with traditional care, telemedicine is associated with improved access to care and similar rates of important outcomes. (Veith ST, Chisholm C, Novicoff W, Rheuban K, Cohn W. 2014)

Women exhibited positive views regarding mHealth for the promotion of a healthy lifestyle in antenatal care. Conversely, health professionals expressed a much wider variation in attitudes and were more able to identify potential risks and barriers to development and implementation. (Willcox JC; van der Pligt P; Ball K; Wilkinson SA; Lappas M; McCarthy EA; Campbell KJ. 2015)

Maintaining high levels of readiness for neonatal resuscitation in low-risk maternity settings is challenging. The neonatal resuscitation program (NRP) algorithm is a community standard in the United States; yet training is biannual, and exposure to enough critical events to be proficient at timely implementation of the algorithm and the advanced procedures is rare. Evidence supports hands-free leadership to help prevent task saturation and communication to promote patient safety. Telemedicine for neonatal resuscitation involves the addition of remote, expert NRP leadership (a NICU-based neonatal nurse practitioner) via camera link to augment effectiveness of the low-risk birth center team. Unanticipated outcomes to report include faster times to transfer initiation and neuroprotective cooling. The positive impact of remote NRP leadership could lead to use of telemedicine to support teams at birthing centers throughout the United States as well as around the world. (Scheans P. 2014)

Experience and examples

An article published on Obgyn.net in 2011 outlined a range of applications for technology enabled care in obstetrics and gynaecology, including telemammography, telecolposcopy and telepsychiatry. With regards telemedicine in pregnancy, the article outlines opportunities around remote monitoring of blood glucose in diabetic pregnancies leading to improved foetal and maternal outcomes. Telemedicine in foetal monitoring is also discussed, describing how home monitoring for preterm labour has now become widespread throughout Asia, Europe and America. Monitoring for preterm labour is now considered routine in high-risk obstetrical patients in many centres, other programmes have moved on to remote active monitoring of the fetus itself in these high-risk patients. The article concludes with details of where telesurgical and ultrasound consultation from the United States was used to assist in performing an operative fetoscopy in Santiago, Chile, for the correction of birth defects in a pregnancy involving an acardiac twin. “Examples such as this demonstrate that telemedicine does indeed offer substantial value and benefits in the provision of health care to women and will undoubtedly continue to expand and defy the limits of our imagination.”.

27 [http://www.obgyn.net/infertility/telemedicine-women’s-health-care](http://www.obgyn.net/infertility/telemedicine-women’s-health-care)
## Palliative Care

### Activities reported

| BCUHB05P | Remote working for Palliative Care staff  
Organisation: Betsi Cadwaladr University Health Board  
Project duration: Started March 2015 until March 2016 |
<table>
<thead>
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<tbody>
<tr>
<td><strong>Locations</strong>: Remote working - staff based across all sites</td>
<td></td>
</tr>
<tr>
<td><strong>Technology</strong>: Laptops with remote VPN tokens, App developed in-house</td>
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<tr>
<td><strong>Evaluation</strong>: Baseline data recorded staff time and attitudes - to be continued</td>
<td></td>
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<tr>
<td><strong>Benefits</strong>: Recording palliative care activity at the point of care and ability to update remotely without returning to the office</td>
<td></td>
</tr>
<tr>
<td><strong>Barriers</strong>: Negotiating remote access to the CANISC database</td>
<td></td>
</tr>
<tr>
<td><strong>Budget</strong>: Approx £80k laptops / app development</td>
<td></td>
</tr>
<tr>
<td><strong>Contact</strong>: <a href="mailto:christine.couchman@wales.nhs.uk">christine.couchman@wales.nhs.uk</a></td>
<td></td>
</tr>
<tr>
<td><strong>Potential for MWHC</strong>: To be assessed</td>
<td></td>
</tr>
</tbody>
</table>

| HDUHB01 | Use of VC on laptops to provide palliative care/oncology patients on chemotherapy access to psychosocial support via VC from home  
Organisation: Hywel Dda University Health Board  
Duration: Pilot planned for 6 months – awaiting approval for proposal |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location</strong>: Ceredigion</td>
<td></td>
</tr>
<tr>
<td><strong>Technology</strong>: Laptops with VC software - possibly loaned from University PhD project</td>
<td></td>
</tr>
<tr>
<td><strong>Partners</strong>: University of Wales Aberystwyth</td>
<td></td>
</tr>
<tr>
<td><strong>Evaluation</strong>: Patient and staff satisfaction</td>
<td></td>
</tr>
<tr>
<td><strong>Benefits</strong>: Improve patients' access to palliative and oncology support, reduce travelling times and cost for patients and carers, improve patients' choice by increasing options for accessing support, reduce travelling and cost for staff to provide support, psychosocial benefits to patients as evidenced in PhD research study</td>
<td></td>
</tr>
<tr>
<td><strong>Barriers</strong>: Support of HB to participate and agreement regarding ownership of laptops. Lack of funding to support project costs and administrative support. Connectivity NHS to patient's home</td>
<td></td>
</tr>
<tr>
<td><strong>Budget</strong>: Travel expenses for technical set up in patients' home; Administrator for patient contact/appointments, 2 web cameras (£40 each). 8 secure laptops with VC software and licences.</td>
<td></td>
</tr>
<tr>
<td><strong>Contact</strong>: <a href="mailto:Gudrun.Jones@wales.nhs.uk">Gudrun.Jones@wales.nhs.uk</a></td>
<td></td>
</tr>
<tr>
<td><strong>Potential for MWHC</strong>: Yes evidence of benefits outlined in PhD study</td>
<td></td>
</tr>
</tbody>
</table>
Published evidence

A systematic literature review found no randomised controlled trial studying the effects of eHealth interventions in palliative care. Studies tended to be observational, non-controlled studies, and a few quasi-experimental studies. Overall there was great heterogeneity in the types of interventions and outcome assessments; some studies reported some improvement on quality of care, documentation effort, cost, and communications. The most frequently reported information need concerned pain management. The review concluded that there is limited evidence around the effectiveness of eHealth interventions for palliative care patients, caregivers, and health care professionals. (Capurro D et al. 2014)

A systematic review of the case for home based telehealth in paediatric palliative care found that while studies generally identified benefits of using home telehealth in palliative care, the utilisation of home telehealth programs was limited by numerous challenges. (Bradford N et al. 2013)

Experience and examples

The Association for Children’s Palliative Care produced a key standard for telehealth:

“Telehealth should be considered as a viable mechanism to support access to 24 hour care and support for children with complex health conditions, particularly when they are at their end of life. Embedding new communication technologies and associated practices may enhance the provision of children’s palliative care, and supports continuous symptom assessment, review and control. It may also support better access to specialist advice.

Goals to help achieve the standard

- Telehealth should be considered as an enabling element to complement or enhance a prescribed care package, and to deliver appropriate services wherever a child and family live.
- Telehealth should be recognised as an important supportive tool for generalist and specialist children’s palliative care.
- Telehealth should be used as a way of offering more choice on how and where life-limited children and their families receive care and support - particularly at end of life.
- All those who are expected to work with telehealth applications should receive training. This training should enable users to acquire the skills to operate as competent and safe users.
- Technical support should be made available for all telehealth users (both service users and providers) at all times to ensure a robust and reliable service is being delivered.
- Key issues relating to information governance such as information sharing and confidentiality as well as other ethical issues concerning telehealth practice should be embedded in on-going clinical and professional education.”
Other health activities

Activities reported in the returns extended beyond the scope of the MWHC IG priorities and covered a further 26 schemes across the following additional areas:

- Integrated care
- Unscheduled care
- Care of the Elderly
- Primary care
- Cancer
- Neurology
- T&O
- Physio
- Imaging

<table>
<thead>
<tr>
<th>Health Board</th>
<th>Integrated Care</th>
<th>Unscheduled Care</th>
<th>Care of the Elderly</th>
<th>Primary Care</th>
<th>Cancer</th>
<th>Neurology</th>
<th>T&amp;O</th>
<th>Imaging</th>
<th>Physio</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCUHB</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>HDUHB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WAST</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CVUHB</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>CTUHB</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Figure 5 - Other health activities

Details of these schemes are available in the data collected for this review.

The evidence searches undertaken for this review will also contain published papers around all of these areas.
Social care activities

18 of the 22 local authorities responded to the request for data, which showed a total of 32 reported schemes, including 8 projects and 5 ideas in the development phase.

<table>
<thead>
<tr>
<th>Local Authority</th>
<th>Telecare services</th>
<th>Projects</th>
<th>Ideas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceredigion</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gwynedd County Council</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Powys County Council</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Blaenau Gwent</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Bridgend County Borough Council</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Carmarthenshire County Council</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>City and County of Swansea</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>City of Cardiff Council</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Conwy County Borough Council</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flintshire</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Merthyr Tydfil County Borough Council</td>
<td>1</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Monmouthshire</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neath Port Talbot CBC</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pembrokeshire County Council</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rhondda Cynon Taf</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Torfaen County Borough Council</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Vale of Glamorgan</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Wrexham County Borough Council</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19</strong></td>
<td><strong>8</strong></td>
<td><strong>5</strong></td>
</tr>
</tbody>
</table>

Figure 6 - Social care activities

<table>
<thead>
<tr>
<th>Local Authority</th>
<th>Changes to telecare service</th>
<th>Telehealth</th>
<th>Just checking</th>
<th>Vega watches</th>
<th>My home helper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powys County Council</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blaenau Gwent</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bridgend County Borough Council</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carmarthenshire County Council</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>City of Cardiff Council</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Merthyr Tydfil County Borough Council</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rhondda Cynon Taf</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Torfaen County Borough Council</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vale of Glamorgan</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wrexham County Borough Council</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6</strong></td>
<td><strong>3</strong></td>
<td><strong>2</strong></td>
<td><strong>1</strong></td>
<td><strong>1</strong></td>
</tr>
</tbody>
</table>

Figure 7 - Social care projects and ideas

Details of all these schemes are available in the data collected for this review.
Mid Wales social care activities

In order to understand the provision of telecare activities in Mid Wales, the returns from the three local authorities that are members of the MWHC are described in more detail below.

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Packages of telecare</th>
</tr>
</thead>
</table>
| Ceredigion County Council  | • Self referrers have a choice of basic Lifeline package and a range of telecare sensors direct from Careline  
• Service users referred in for assessment only have access to standalone environmental sensors and devices that do not require monitoring by Careline  
• Just checking [http://www.justchecking.co.uk](http://www.justchecking.co.uk) |
| Gwynedd County Council     | • Basic package (Lifeline box, pendant button and two smoke alarms)  
• Fully assessed package (bespoke equipment and devices) |
| Powys County Council       | • Choice of basic Lifeline package and a range of telecare sensors |

Figure 8 - Social care activities - MWHC organisations – Packages of telecare

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Access</th>
<th>Charging policy</th>
<th>Installation</th>
<th>Monitoring</th>
</tr>
</thead>
</table>
| Ceredigion County Council  | Self referral or through social services | Under review, but no more than £5.50/week – equates to no more than £286 p.a. | Careline (if equipment connected to monitoring centre)  
In-house if standalone device | Careline (service under review and access to service currently limited due to delays in Tunstall providing updated software) |
| Gwynedd County Council     | Self referral or Case Coordinator (Telecare Coordinator may assist if complex) | Free if assessed by Case Coordinator  
Self referrals £3.25/week (offered a basic package only) – equates to £169 p.a. | Care and Repair (if equipment connected to monitoring centre)  
In-house team if standalone device | Galw Gofal Care Connect |
Ceredigion County Council is the only local authority in the area that has implemented the Just Checking package. This scheme appeared in other returns from LA’s across the rest of Wales, either as a service or a project/idea.

The evidence searches undertaken for this review contain published papers around telecare and are available for further interrogation. A key paper, entitled “Improving later life: services for older people: what works” from Age UK includes a section on home telecare in practice. Key messages from this paper are:

- Telecare works best if it is part of a wider social network.

• Telecare systems anticipate an ‘active user’ who is able to follow instructions/rules, so are not suitable for people with high level or complex needs.
• There are many care tasks that telecare cannot do. Contrary to many expectations, it creates additional work, introducing new tasks, skills and responsibilities.

Furthermore in 2013, the Telecare Services Association, in partnership with Scottish Centre for Telehealth and Telecare, Joint Improvement Team and the Scottish Ambulance Service, produced the TSA Good Practice Guide. This paper contains a guidelines for telecare service providers.

Video conferencing infrastructure

One of the main technologies deployed across Wales is video conferencing.

Data collected by NWIS shows that overall utilisation of the infrastructure, over the 12 month period to 30th September 2015, never exceeded 5%.

![Video conferencing infrastructure chart](image)

The tables below show the most and least utilised end point for the MWHC organisations for September 2015. Again, utilisation never exceeds 37%.

![Table: Video conferencing utilisation](image)

---

30 Report covers only those systems that participated in at least one call, with duration greater than 5 minutes. Utilisation calculation assumes 8 hour working days, and 22 working days in the period.

---

A review of telehealth, telecare and telemedicine in Wales 55
A review of telehealth, telecare and telemedicine in Wales

There appears to be significant scope of the utilisation of the infrastructure to be reviewed and improved, particularly as a number of schemes cite the lack of dedicated, suitable video conferencing equipment as a barrier to implementation and sustainability.

<table>
<thead>
<tr>
<th>System Name</th>
<th>System Type</th>
<th>Owner</th>
<th>Calls</th>
<th>Minutes</th>
<th>Ave Duration</th>
<th>Utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>H&amp;D GGH Board Room</td>
<td>Room</td>
<td>Hywel Dda Health Board</td>
<td>35</td>
<td>2,099</td>
<td>59.98</td>
<td>15.85%</td>
</tr>
<tr>
<td>H&amp;D MO Board Room</td>
<td>Room</td>
<td>Hywel Dda Health Board</td>
<td>19</td>
<td>1,828</td>
<td>96.21</td>
<td>37.31%</td>
</tr>
<tr>
<td>H&amp;D Withybush Renal Unit Semi</td>
<td>Room</td>
<td>Hywel Dda Health Board</td>
<td>13</td>
<td>1,716</td>
<td>133.97</td>
<td>10.25%</td>
</tr>
<tr>
<td>H&amp;D Withybush Seminar Room</td>
<td>Room</td>
<td>Hywel Dda Health Board</td>
<td>34</td>
<td>1,510</td>
<td>307.84</td>
<td>14.30%</td>
</tr>
<tr>
<td>H&amp;D Withybush PDM Room</td>
<td>Room</td>
<td>Hywel Dda Health Board</td>
<td>22</td>
<td>1,500</td>
<td>68.18</td>
<td>14.20%</td>
</tr>
<tr>
<td>H&amp;D Human Resources Department</td>
<td>Room</td>
<td>Hywel Dda Health Board</td>
<td>16</td>
<td>1,467</td>
<td>92.94</td>
<td>14.08%</td>
</tr>
<tr>
<td>H&amp;D PPH Breast Centre</td>
<td>Room</td>
<td>Hywel Dda Health Board</td>
<td>25</td>
<td>1,338</td>
<td>53.94</td>
<td>12.07%</td>
</tr>
<tr>
<td>H&amp;D NWG Blue Room</td>
<td>Room</td>
<td>Hywel Dda Health Board</td>
<td>14</td>
<td>1,201</td>
<td>85.80</td>
<td>11.36%</td>
</tr>
<tr>
<td>PortableS/CHWSDavidson/CMDesktop</td>
<td>Personal</td>
<td>Hywel Dda Health Board</td>
<td>12</td>
<td>1,158</td>
<td>95.87</td>
<td>11.35%</td>
</tr>
<tr>
<td>H&amp;D Corp Off Board Room</td>
<td>Room</td>
<td>Hywel Dda Health Board</td>
<td>15</td>
<td>1,117</td>
<td>74.46</td>
<td>10.58%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>System Name</th>
<th>System Type</th>
<th>Owner</th>
<th>Calls</th>
<th>Minutes</th>
<th>Ave Duration</th>
<th>Utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>H&amp;D Cardigan Palliative Care</td>
<td>Room</td>
<td>Hywel Dda Health Board</td>
<td>1</td>
<td>42</td>
<td>41.73</td>
<td>0.40%</td>
</tr>
<tr>
<td>H&amp;D WGH Physio Outpatients</td>
<td>Room</td>
<td>Hywel Dda Health Board</td>
<td>2</td>
<td>82</td>
<td>41.00</td>
<td>0.76%</td>
</tr>
<tr>
<td>H&amp;D Withybush Rehab Day Unit</td>
<td>Room</td>
<td>Hywel Dda Health Board</td>
<td>1</td>
<td>95</td>
<td>95.07</td>
<td>0.99%</td>
</tr>
<tr>
<td>H&amp;D PPH Postgrad Lecture Theatre</td>
<td>Room</td>
<td>Hywel Dda Health Board</td>
<td>3</td>
<td>105</td>
<td>34.84</td>
<td>0.99%</td>
</tr>
<tr>
<td>H&amp;D Glangwili Stroke Cart</td>
<td>Room</td>
<td>Hywel Dda Health Board</td>
<td>2</td>
<td>105</td>
<td>52.30</td>
<td>0.99%</td>
</tr>
<tr>
<td>H&amp;D Tregaron Meeting Room</td>
<td>Room</td>
<td>Hywel Dda Health Board</td>
<td>1</td>
<td>105</td>
<td>105.16</td>
<td>1.00%</td>
</tr>
<tr>
<td>H&amp;D BSH CAMHS Ty Helyg</td>
<td>Room</td>
<td>Hywel Dda Health Board</td>
<td>1</td>
<td>109</td>
<td>54.40</td>
<td>1.09%</td>
</tr>
<tr>
<td>H&amp;D GGH A&amp;E</td>
<td>Room</td>
<td>Hywel Dda Health Board</td>
<td>2</td>
<td>116</td>
<td>38.51</td>
<td>1.09%</td>
</tr>
<tr>
<td>H&amp;D MHPD Central Services</td>
<td>Room</td>
<td>Hywel Dda Health Board</td>
<td>3</td>
<td>124</td>
<td>41.30</td>
<td>1.17%</td>
</tr>
<tr>
<td>H&amp;D Haven Way Day Hospital</td>
<td>Room</td>
<td>Hywel Dda Health Board</td>
<td>2</td>
<td>130</td>
<td>64.90</td>
<td>1.23%</td>
</tr>
</tbody>
</table>

10 systems or less were found. Most and Least Utilized shown in sorted order above.

**Figure 13 - HDUHB video conferencing utilisation – source NWIS**

**Figure 14 - PTHB video conferencing utilisation - source NWIS (Least utilised data not available)**
Key characteristics of successful models

The Seven Steps of Telehealth Planning, which is adapted from a paper published in 2006 by Samuel C Burgiss PhD\(^3\), are a useful and clear summary of the key characteristics of successful schemes. These are:

- Identify the problem that may be solved using telehealth
- Itemise what can be done given the current environment
- Analyse costs, revenues and risks to create sustainable business models
- The needs of the program drive the technology
- Training must be comprehensive and include peripheral parties
- Roll out the program initially with pilots
- To measure success, collect the necessary data to support the investment

According to Christian Milaster, President of Ingenium Telehealth\(^3\), an American company that partners with innovative healthcare organisations to establish, grow, and improve transformative telehealth services, it is the combination of multiple strategies that will ensure success\(^3\):

- alignment with the overall strategy of the organisation.
- Designing the use of technology should around the needs of the patient and clinicians not around the needs of the technology.
- Adopt an Agile development approach (http://agilemethodology.org) “What’s the simplest thing that could possibly work?” Starting simple and small allows you to get up and running very fast — which quickly provides ample opportunities to gain real experiences and insights.
- Rigorous project management paying particular attention to communication with all stakeholders and the proper management of all project risks
- Treat the launch of services and pathways involving new technology as an organisational change management project by proactively preparing to minimise and address the inevitable resistance.
- “Every system is perfectly designed to get the results it gets” While attention must be paid to ensure that the technology is reliable and user friendly, the majority of your effort should be spent on making sure that the processes are aligned with the users’ reality and that the processes are well communicated.
- Start with Sustainability in Mind: make sure there is a designated operational manager as early as possible to ensure smooth transition from project to business as usual, including paying attention to financial sustainability, sustainable change (how much more “new stuff” can staff handle?), sustainable energy of early adopters and sustainable tech support.
- Establish Strategic Measurements, like a simple dashboard approach (green/yellow/red) that looks at utilisation, satisfaction, financial performance and clinical efficacy plus any other metrics that measure progress towards meeting the strategic objectives.

Curt Bashford’s article “Thinking about EMS Telemedicine?” referenced in the previous section on Access and Transport also outlines his views on some of the issues that must be addressed to give a project the best chance of success:

\(^3\) http://199.237.254.34/pubs/pdf/Telehealth.pdf

\(^3\) http://ingeniumtelehealth.com

\(^3\) http://www.handsontelehealth.com/past-issues/192-8-essential-strategies-for-sustainable-telehealth
• **Buy-in by stakeholders** - Identifying each participant’s needs and making them stakeholders is the best way of getting buy-in.

• **Defining specifications, goals, objectives and metrics** - These should be clearly defined at the beginning to ensure all the participants get what they expect and the results will be measurable.

• **Funding and finances** - Securing sound funding sources for initial and ongoing costs should be addressed in early planning, as should the opportunities for cost savings.

• **Installation and training** – this can often be complex and requires careful planning

• **Ongoing system testing and maintenance** - Given the distributed nature of the system, managing all this is not a simple task and should be worked out in advance.

• **Internal policies and procedures** - Clear policies regarding when these systems are to be used, who is given access to the information, how information is stored and who has overall responsibility, in addition to training and maintenance issues. While this is sure to be an evolutionary process, including this in the initial planning may avoid problems later.

• **System phase-in** - When planning deployment it may be advisable to introduce it gradually (in phases), beginning with the applications of lowest risk and highest reward.

Additional reading that may be useful is an article from 2011 in Computer Weekly canvassed a broad range of NHS contacts to understand views on how to extend the use of telehealth[^34].

Lessons learnt from unsuccessful models

The following common barriers emerged from discussions at the European Telemedicine Conference 2015:

- Legal: no legislation, limited legislation
- Seeking clinical & economical evidence: will we wait forever or move in incremental steps?
- Hospitals: lack of recognition that the proportion of money spent in the community (or on tools that support care outside of hospitals) needs to increase
- Physicians: have to change their culture and think differently – pull down silos – follow the whole pathway
- Leadership: thinking of next year’s budget, efficiency – when we need leaders thinking 3-4 years hence supported by long-term view of politicians – need investment and commitments to test out whole system demonstrators that extend beyond one political term
- Project vs deployment: lack of project, change and operational management resource to ensure the transition from project to business as usual
- Infrastructure and interoperability: slow paced, rigid, lack of strategic commitment

Some of the themes arising from the data collection included:

- Lack of project management resource leading to implementation “losing steam”
- Insufficient funds
- Lack of clinician engagement
- Lack of patient engagement
- Infrastructural issues e.g. lack of suitable VC resource, bandwidth and mobile signal

In his article “Thinking about EMS Telemedicine?” Curt Bashford also outlines some additional pitfalls to avoid:

- No clear objective: A successful program needs to address real medical or financial needs, as well as the needs of the other stakeholders.
- No initial stakeholders: Need, organisation and funding come first - the system comes later.
- Ignoring the opposition: All the players (clinicians, managers, IT, patients) must be in agreement and see a benefit, or the risk of failure is heightened. Sound planning and buy-in from meaningful stakeholders are essentials.
- “Let’s build it ourselves!”: Unless you are interested in just the basics (which in fact may be a good way to get started), a full-function telemedicine system is very complex and technically sophisticated.
Conclusions

“In formal logic, a contradiction is the signal of defeat, but in the evolution of real knowledge it marks the first step in progress toward a victory.”

Alfred North Whitehead (Mathematician and philosopher, 1861-1947)

This review has covered a vast range of activities, experience, evidence and opinions. It is not a surprise that this analysis contains a number of contradictions and tensions. The recommendations of this review should therefore be read within the context of the following paradoxes.

If we embark on projects rapidly, without a clear sense of how invested our potential users (e.g. patients, citizens or staff) are in the problem, in an effort to achieve some “quick-wins”, there is a risk that we find take-up and engagement is poor. Despite best efforts to deliver masterful change and project management, the schemes are destined to fail. To give projects the best chance of succeeding, they should deliver solutions that are designed around problems that are defined by users.

Another key theme is that we should aim to design and deliver precision care, where we deliver solutions that enables care to be tailored for the individual where required, not always relying on a one size fits all solution. This is particularly important when it comes to technology in care, as users’ appetite and ability to engage with technology varies widely. It is also true is that health and social care is delivered in a system that demands standardisation as a means to ensure efficiency, effectiveness and safety. Our challenge when embarking on projects is to deliver customisation against a backdrop of standardisation.

Defining what “delivering at pace” means in the context of telehealth, telemedicine and telecare is important. Case studies reviewed in this project appear to indicate that the best way to achieve the quickest change is incrementally, rather than a “big bang” approach, and even then “quick” might be 12-18 months.

Finally, this review has focused on the priorities of the MWHC IGs, as defined by the MWHS, are the natural starting point for the increased deployment of technology to enable care. This does not diminish the contribution or importance of the schemes that exist beyond that remit, e.g. the excellent work around Telestroke. This review provides the foundation from which work on both the priority areas and the remaining schemes can be developed. There is a question about who will lead on any work outside the MWHC scope that is deemed to be a priority by other stakeholders.
Recommendations

The findings of this project have highlighted the following suggested next steps, to be led by the MWHC TISG.

- **Integrate outstanding data**: Adding the PTHB return to the analysis as well as any additional outstanding information that is deemed to be necessary to progress particular projects
- **Maintain the activity database**: Agree how and who will be responsible for keeping the activity database up to date
- **Design user-friendly access and maintenance of the evidence database**: Agree how and who will be responsible for converting the multiple search results into a useful tool for further service development, including ongoing maintenance to keep it up to date
- **Optimise video conferencing capacity**: Reorganisation of the existing videoconferencing infrastructure across Hywel Dda, Powys and Betsi Cadwaladr health boards in order to unlock additional capacity for use by those schemes that have cited lack of dedicated VC access as a barrier to deployment
- **Identify projects for delivery in 2016**:
  - **Paediatric Telecardiology** is supported by documented evaluations and/or published evidence and appear to meet a clearly defined and well-accepted need in the local population. It is recommended that this schemes be prioritised for consideration of investment and project management support to secure the sustainability going forward.
  - The Powys County Council has provided a business case for funding to train their **Reablement Team** in assessing for telecare packages. It is recommended that this is reviewed and discussed once the Powys Teaching Health Board return has been integrated into the analysis to determine whether this scheme should also be prioritised.
  - In order to identify **further activities** that present opportunities for adoption or expansion in the **MWHC area**, it is recommended that each MWHC IG contribute to the compilation of business cases for implementing those technology solutions that solve identified problems in each of the nine clinical priority areas. This will involve a number of preparatory steps including:
    - Mapping the patient pathway
    - Identifying problems
    - Reviewing the findings of the project to identify suitable technology solutions

![Figure 15 - Identifying activities than be adopted or upscaled](image)

- Convene a **meeting of telecare leads** from the MWHC local authorities in order to identify opportunities to improve the quality of telecare available to the population of Mid Wales through collaboration and joint working, following the same steps described above for healthcare activities
• Plan and resource additional analysis of **activities outside the MWHC priority areas** in order to identify opportunities for extending services in other parts of Wales

• **Establish a TECS Network of Champions**: Consider the establishment of a network of resources (possibly coordinated in the Centre of Excellence for Rural Health) that could provide service redesign and project management expertise and guidance to teams across Wales considering the development and implementation of technology enabled care pathways.