Rural Health Telemedicine

A working paper produced for the Rural Health Implementation Group in support of the Welsh Rural Health Plan

March 2011
1. Introduction

Telemedicine has been in routine use in Ceredigion for the last ten years. The main aims were to keep care local as much as possible, reduce travelling for patients and health professionals, and to improve the quality of care.

Telemedicine was first used to support cancer multidisciplinary team meetings by using videoconferencing technology, linking Bronglais Hospital at Aberystwyth to the Cancer Centre at Singleton Hospital, Swansea. The success of the pilot study was such that the South West Wales Cancer Network appointed a Telemedicine Project Manager and a Telemedicine Board was established and there are now established videoconference links across South Wales.

As a result of experience in the field of oncology it became possible to extend the original scope of the project of developing videoconferencing to create a Telemedicine Service which introduces innovative approaches to addressing the challenges of delivering and sustaining healthcare services in rural areas of West Wales. The service includes teleneurology, teledermatology, paediatric cardiology, teleophthalmology, teleradiology, telepathology and electronic chemotherapy prescribing linking Bronglais to centres of excellence within Wales and beyond. The results of these pilot studies have resulted in numerous presentations at the annual International Telemedicine Conference held in London. A more detailed list of projects is available in section 3. Examples of Telemedicine Applications.

The success of these studies would suggest that there are opportunities to extend this technology throughout Wales with particular emphasis on rurality.

The videoconferencing units are registered with the Welsh Health Video Service. Point to point or multisite calls are made using Public Sector Broadband (PSBA) Telecommunications Network. This enables high quality, encrypted transmission of data such as radiology or pathology images between the hospitals. As the calls are made via IP network there is no associated cost to the calls.

The Welsh Health Video Service ‘bridge” can also facilitate connection between the Welsh PSBA network and England’s N3 network enabling videoconferencing between hospitals across the border (currently limited sites, but has scope for expansion). Access via ISDN is also possible to organisations not registered on the directory and recent developments include the provision of hi-definition bridge to allow hi-definition videoconferencing. The Welsh Health Video Service also provides support providing troubleshooting and advice to users. Provision of this support is essential to ensure a robust and sustainable Welsh Health videoconferencing service.

Despite the apparent abundant number of videoconference equipment throughout NHS sites in Wales, there is a great deal of under-utilization. In our experience this can be attributed to a number of reasons including accessibility to facilities - historically videoconferencing equipment was installed in board rooms/meeting room and compete with bookings for non-videoconferencing meetings - with no priority given to videoconferencing meetings. This, together with the lack of training, awareness of the potential of videoconferencing uses, reluctance to use technology and availability of local support contributes to equipment not being used to its maximum potential.

It is doubtful whether there is sufficient bandwidth to allow videoconferencing being available in primary care sites. A feasibility study on bandwidth is currently being undertaken through the Rural Health Implementation Group.
Below is a summary of telemedicine applications (information taken from Executive Summary, South West Wales Cancer Network Telemedicine Report January 2009 http://howis.wales.nhs.uk/sites3/page.cfm?orgid=361&pid=13513), based on experience within Hywel Dda Health Board and the South West Wales Cancer Network. All the projects have undergone evaluation and brief outline of impact is included in the summary below:

### 3.1 Existing Telemedicine Applications (proven):

**VIDEOCONFERENCING Evaluation of environmental impact of using videoconferencing at one site during one month in 2007:**

**Impact/Outcome:**
- Approximately 48 trees a year to absorb amount of $CO_2$.
- £5,100 saved in travelling expenses in one month at one site.

**PATHOLOGY TELEMEDICINE:**

**Impact/Outcome:**
- Facilitation of rapid and secure transmission of pathology images both within and outside the South West Wales Cancer Network.
- Provide support to single-handed clinicians in remote sites.

**CHEMOTHERAPY ELECTRONIC PRESCRIBING:**

**Impact/Outcome (anticipated):**
- Reduced prescribing errors on chemotherapy.
- Improved information (availability and access) for satellite sites.

**CANCER NETWORK INFORMATION SYSTEM CYMRU (CaNISC):**

**Impact/Outcome:**
- Facilitate Local Health Boards and Trusts in meeting targets and standards through full use of the system.
- Provide an electronic summary of the patient pathway for cancer patients.
- Enable Local Health Boards and Trusts to participate in National Healthcare Commission Audits.
- Help to improve the quality and accuracy of the information collected.

**CaNISC Multidisciplinary Teams Meeting Module:**

**Impact/Outcome (anticipated):**
- Facilitated clinical care through more robust multidisciplinary team discussion.
- Improved data collection and entry.
- Accurate cancer information.

**ELECTRONIC REFERRAL URGENT SUSpected CANCERS:**

**Impact/Outcome:**
- Standardised templates improved quality of referral information.
- Rapid and secure system for transmission of Urgent Suspected.
- Lessons learnt used to inform National electronic referral project.

**PIGMENTED SKIN LESION TELEDERMATOLOGY (North Ceredigion to Carmarthenshire):**

**Impact/Outcome:**
- Improved local access to quality healthcare for patients from remote areas.
- Reduce waiting times for specialist opinion.
- Improved process for referral of pigmented skin lesions.
NEUROLOGY TELEMEDICINE CLINICS
(Aberystwyth to Swansea):

Impact/Outcome:
• Improved local access to quality healthcare for patients from remote areas.
• Reduced waiting times for specialist opinion.
• New service model implemented.

PAEDIATRIC CARDIAC TELEMEDICINE SERVICE (Swansea to Cardiff):

Impact/Outcome:
• Quicker diagnosis and treatment plan for the patient.
• More efficient use of specialist staff.

PALLIATIVE CARE TELEMEDICINE SERVICE
(Across South West Wales Network):

Impact/Outcome:
• Improved communication flow between different healthcare delivery organisations.
• More efficient use of scarce resources and specialist staff.
• Increased staff participation in education meetings.

INTERNET AND INTRANET WEBSITES:

Impact/Outcome:
• Improved availability and dissemination of information to primary/secondary care staff across Network (intranet) and to patients and non NHS Wales staff (internet).

TELERADIOLOGY

• Digital radiology systems should allow easy access and sharing of reporting across sites/health board and should be included in National PACS project.

3.2 Current and emerging developments

Current videoconferencing activities include:
• Hywel Dda virtual nutritional multidisciplinary meetings - held weekly across three sites and include dieticians and consultant gastroenterologists.
• Educational videoconference link to Regional Stroke meetings - held weekly across multiple sites in Wales and enables clinicians at Aberystwyth to participate in clinical discussion about complex or interesting cases, with an opportunity to present their own patients, share radiology images and participate in discussion with colleagues at Cardiff and North Wales.
• Videoconference link to Regional Interstitial Lung Meetings - enables clinician at Aberystwyth to participate in clinical discussion about complex or interesting cases with an opportunity to present own patients and share radiology images, participating in the discussion with colleagues throughout Wales.
• Assorted clinical meetings held by videoconference which encourage clinicians to network with their colleagues across Hywel Dda (paediatrics, gastroenterology). Potential to develop these meetings to include presentation of cases etc.
• Minor Injury Units (MIU) - MIU units in Cardigan Hospital and Tywyn Hospital videoconference link to Accident and Emergency Department at Bronlais for consultant advice or patient videoconsultations.
• Teleophthalmology - Patient videoconsultations between Tywyn Hospital and Bronlais Hospital.
- Paediatric Academic Educational sessions - virtual programme of educational sessions enabling the consultant paediatrican and team to link into academic programme on weekly basis.

Videoconferencing activities in pilot or planning stages:

- Teleophthalmology - Retinal scanning undertaken at Tywyn Hospital transmitted to specialist units for reporting and diagnosis at Bronglais Ophthalmology Department, Aberystwyth. Plans to expand by developing retinal scanning service in other community hospitals which could be viewed centrally at Bronglais Ophthalmology Department.

- Speech and Language therapy patient videoconsultations for patients diagnosed with Head and Neck cancer.

- Tissue viability clinic - virtual assessment of inpatients at Bronglais Hospital, Aberystwyth by specialist nurses via videoconferencing from Carmarthen or Withybush.

- Expansion of teledermatology referrals beyond the current service assessing pigmented skin lesion to include other cutaneous conditions, for example rashes.

- Expansion of existing teledermatology service in North Ceredigion to all sites across Hywel Dda.

- Develop teledermatology service for advice for inpatients at Bronglais Hospital, Aberystwyth.

- Development of full teledermatology service to include nurse-led clinics undertaking patient videoconsultations to support Hywel Dda dermatology service in more rural areas of region, for example North Ceredigion.

- Chemotherapy telemedicine - scoping potential for use of mobile phone technology to provide support to patients undergoing chemotherapy treatment.

The summary above serves to provide a sample of potential of telemedicine applications and represents known activity within the Mid and South West Wales region. Other successful telemedicine applications across Wales include:

- North Wales teledermatology service in Betsi Cadwaladr University Health Board in North Wales (http://www.northwestwales.org/WiSSCMS-en-240.aspx).

- South Wales Teledermatology - GPs in Bridgend locality issued with cameras to take Polaroid photographs to accompany teledermatology referrals to specialist centre.

- North Wales Nurse led Minor Injury Service.

- Virtual Cancer Multidisciplinary team meetings for example North Wales with England and across South Wales sites.
4. Areas for early development

- **Teledermatology**
  - Numerous studies have demonstrated that 70% of dermatology referrals can be successfully undertaken by “store and forward” technology. The North Ceredigion Pigmented Skin Lesion Teledermatology utilises this method where digital images are taken by dermatology specialist nurses at centres close to the patient’s home and stored on a secure server together with a referral proforma. The referral is immediately available via secure portal to view by consultant dermatologists in Carmarthen who provide a report which is then actioned by the specialist nurse. An alternative model is where General Practitioners are provided with digital cameras to take Polaroid images of the lesions which accompany the referral letter to the Specialist Dermatologist.

- **Rehabilitation**
  - In speech and language therapy - patients travel long distances to specialist centres for rehabilitation which often results in non-take up of appointments and further rehabilitation. It has been demonstrated by the South West Wales Cancer Network’s Speech and Language Head and Neck service that telemedicine can be an effective tool in overcoming this problem.

- **Mammography**
  - Retinal imaging undertaken by specialist nurses at community hospitals which can be reported centrally by specialist units.

- **Paediatric Cardiac Telemedicine**
  - Transmission of live and video echocardiography ultrasound images to specialist centre for diagnosis and second opinion.

- **Teleophthalmology**
  - Use videoconferencing technology to provide advice/supervision between community hospitals and specialist units.

- **Minor injury units**
  - Linking minor injury units in community hospitals to accident and emergency units of district general hospitals, to enable patient videoconsultations for consultant and specialist opinion.

- **Primary Care Web camera trial**
  - Undertake a feasibility study in the use of web camera videoconferencing at four general practice sites to collect evidence on the use of videoconferencing on existing primary care bandwidth and its impact on the network provision.

- **Palliative care**
  - Linking staff in rural areas (primary care, hospices and community hospitals) to specialist palliative care teams for educational and clinical purpose.
• Establish direct network links between outside organisations, eg University, Academic Institutions, non-NHS Wales organisations etc.

• Exploit videoconferencing
  - Consideration should be given to enable staff to link into training sessions, educational sessions, best practice seminars as well as management/administration meetings via videoconferencing. This would support recommendations made in the working paper Delivering Rural Health Care Services which identifies the need for training especially in the community. Using videoconferencing would enable all staff to participate in training sessions regardless of their location. Organisers of training and education seminars should also be encouraged to ensure that the option of linking via videoconferencing is considered when choosing a venue. This would reduce the time and amount of miles travelled to/from meetings.

Telehealth Group saved over eighteen hours of travel time, 602 miles, £240 travelling expenses and 265kg CO$_2$ by using videoconferencing for two meetings.

• Partnership with national organisations
  - It is important to continue and establish partnership with national organisations to ensure telemedicine continues as an ongoing service and fits in with national IT infrastructures. These include:

• NHS National Informatics Service (formerly Informing Healthcare) - Information sharing and integration with projects, eg Welsh Clinical Portal, Welsh Clinical Communication Gateway Projects, All Wales PACS, Electronic patient records etc.

• NHS National Informatics Service Welsh Health Video Network - Partnership working and continued partnership with support team to ensure robust helpdesk is available and information regarding developments.

• Staff from Information Management and Technology departments at all the relevant organisations (primary and secondary care) to ensure compatibility and avoid duplication in work.

• NHS National Informatics Service (formerly Health Solutions Wales) - Involvement in national strategies, eg Public Sector Aggregate Project, where plans are currently being discussed for cross sector conferencing between organisations with collaboration between Welsh Health Video Network (used by NHS) and Welsh Video Network (used by academic) facilitating easier videoconferencing links.
Despite the number of videoconference equipment available in many hospitals in Wales, especially in rural areas, there is often under-utilization. In our experience this can be attributed to a number of reasons including accessibility to facilities - historically videoconferencing equipment were installed in board rooms/meeting room and compete with bookings for non-videoconferencing meetings - no priority given to videoconferencing meetings. This, together with the lack of training, awareness of the potential of videoconferencing uses, reluctance to use technology and availability of local support contributes to equipment not being used to its maximum. There is an assumption that the technology requires specialist technical skills, but this is not so, as with the correct information, the equipment is now user friendly.

- Many clinicians are sceptical and suspicious of the technology. There is a need to identify an enthusiast at each site in order to convince the sceptics.

- Lack of awareness of the potential.

- Teaching establishments in Wales should introduce telemedicine techniques into the curriculum to prepare doctors and nurses and other allied health professionals for working in a rural community.

- Finance - There is an assumption that telemedicine equipment is extremely costly. This is no longer the case and the potential saving in reduced travel costs, travel time and efficiency results in significant savings.

- Lack of evidence as to whether there is sufficient bandwidth to allow videoconferencing being available in primary care sites (feasibility study on bandwidth currently being undertaken).
6. What needs to be done

6.1 Short Term

Representatives of the Telemedicine subgroup have already arranged meetings with Medical Directors, Directors of Planning and IM&T Managers of Hywel Dda, Powys and Betsi Cadwaladr Health Boards. There is a need to establish current telemedicine activity and to identify areas where telemedicine can resolve access to specialist services from rural communities. It is likely that this will result in better use of community hospitals by linking the local service to the specialist centre.

The three identified Health Boards should be encouraged to:

- Nominate a member of senior management with telehealth responsibility to liaise with the Telemedicine Subgroup.
- Identify “super users” at local sites to provide assistance, basic troubleshooting help and advice regarding variety of videoconferencing calls and cascade training to users.
- Identify enthusiastic clinicians to become lead clinicians in telemedicine to develop telemedicine solutions in conjunction with the Rural Health Telemedicine Subgroup.
- Discuss connectivity issues between their organisation and providers of specialist services to include cross border issues.

Table 1 (pages 10-12) outlines proposed objectives based on current knowledge and information provided by Rural Health Telemedicine Subgroup and resources available.
Table 1 – Proposed objectives

<table>
<thead>
<tr>
<th>1.</th>
<th>Hywel Dda Health Board</th>
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<tbody>
<tr>
<td><strong>Project/Service Development:</strong></td>
<td><strong>Milestones:</strong></td>
</tr>
<tr>
<td>Teledermatology Pigmented Skin Lesion</td>
<td>• Meet Consultant Dermatologist to discuss development (for example appointment of specialist nurses). • Contact GP portal developers (Abertawe Bro Morgannwg University Health Board) to discuss development. • Meet with NHS Wales Informatics Service regarding potential of inclusion in electronic referral project. • Provide costings for expansion (procurement of equipment and developer costs).</td>
</tr>
<tr>
<td>GP audio links to Dermatology Cancer Multidisciplinary Team meetings</td>
<td>• N/A Already available to Expert GPs.</td>
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<tr>
<td>Email protocol for safe transmission of images via email for opinion</td>
<td>• N/A Already available.</td>
</tr>
<tr>
<td>Rehabilitation Services</td>
<td>• Arrange training session with Head of Physiotherapy, Occ Therapy and Speech Therapy. • Set up virtual meetings with service leads. • Cascade use to staff meetings and educational sessions. • Meet with Speech and Language Therapy Services (Abertawe Bro Morgannwg University and Hywel Dda Health Boards) regarding development of telemedicine services including patient videoconsultations. • Meet with MS specialist Nurse and MS Society to scope feasibility of using telemedicine.</td>
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| Paediatric Cardiac Service (transmission of echocardiography ultrasounds) | • Work with Associate Dir Manager to implement Hywel Dda Telehealth project to test and evaluate concept using existing facilities (funded by charitable funds) - aims detailed in proposal.  
• Bronglais and Carmarthen hospitals transmitting echo ultrasounds (video and/or live).  
• Withybush participating in networking meetings with other sites. |  |
| Teleophthalmology (community retinal scanning) | • Meet with clinician and team to discuss options for development of community retinal scanning.  
• Scope potential benefit of vc procurement at Ophthalmology Dept (Bronglais North Road). |  |
| Teleophthalmology: remote image reporting | • Investigate use of teledermatology system for ophthalmology image reporting. |  |
| GP web camera trial | • Procure and install web cameras at 4 GP practices.  
• Collaborative partnership with primary care to carry out expert testing. |  |
| Minor Injuries Unit | • Meet with A&E Clinician and MIU nurse Cardigan to discuss current service.  
• Meet with A&E Leads to discuss implementation at Carmarthen and Pembrokeshire. |  |
Table 1 – Proposed objectives

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| Palliative Care | • Meet with Palliative Care Board to discuss telemedicine including development of patient vc.  
• Scope proposals received with view to implementation. | |
| Neurology | • Meet with Neurology Lead clinician to scope feasibility of development throughout Health Board. | |
## Table 2

<table>
<thead>
<tr>
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<th>Milestones:</th>
<th>Progress/Update:</th>
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<tbody>
<tr>
<td>Teledermatology Pigmented Skin Lesion</td>
<td>• Meet Health Board to scope current service provision.</td>
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<tr>
<td>GP audio links to Dermatology Cancer Multidisciplinary Team meetings</td>
<td>• Meet Health Board to scope potential/feasibility.</td>
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<tr>
<td>Email protocol for safe transmission of images via email for opinion</td>
<td>• Meet Health Board to scope potential/feasibility.</td>
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| Rehabilitation Services | • Provide support to Speech Therapist in Newtown to establish and develop use of videoconferencing for staff meetings and educational sessions.  
• Scope feasibility of acquiring ‘specialist’ input for educational sessions.  
• Meet with head of therapies to scope potential of using videoconferencing.  
• Meet with MS specialist Nurse and MS Society to scope feasibility of using telemedicine. | |
<p>| Teleophthalmology (community retinal scanning) | • Meet Health Board and HDd teleophthalmology lead to scope potential/feasibility. | |
| Teleophthalmology: remote image reporting | • Meet Health Board and HDd teleophthalmology lead to scope potential/feasibility. | |
| Minor Injuries Unit | • Meet Health Board to scope potential/feasibility. | |</p>
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| Palliative Care               | • Meet Health Board to scope potential/feasibility.  
                                 • Meet with Director of Planning to discuss proposal submitted for Hospice at Home Telemedicine Programme. |                  |
<p>| Mental Health                 | • Meet Health Board to scope potential/feasibility. |                  |</p>
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<tr>
<td>Teledermatology Pigmented Skin Lesion</td>
<td>• Meet with Health Board to update on current teledermatology service and any actions.</td>
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<td>GP audio links to Dermatology Cancer Multidisciplinary Team meetings</td>
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<tr>
<td>Rehabilitation Services</td>
<td>• Meet Health Board to scope potential/feasibility.  • Meet with North Wales TeleRehab Project.</td>
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<tr>
<td>Paediatric Cardiac</td>
<td>• Meet Health Board to scope potential/feasibility.</td>
<td></td>
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<tr>
<td>Teleophthalmology (community retinal scanning)</td>
<td>• Provide support to establish connectivity between OCT machine and videoconferencing equipment.  • Meet Health Board to scope potential/feasibility.</td>
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<tr>
<td>Teleophthalmology remote image reporting</td>
<td>• Meet Health Board to scope potential/feasibility.</td>
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<tr>
<td>Minor Injuries Unit</td>
<td>• Meet Health Board to update on current service.</td>
<td></td>
</tr>
<tr>
<td>Palliative Care</td>
<td>• Meet Health Board to update on current service.</td>
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There is a need for the Telemedicine Subgroup to engage with national organisations for example NHS Wales Informatics Services (Informing Health Care, Health Solutions Wales, Welsh Health Video Network) to ensure telemedicine continues as an ongoing service and fits in with national IT infrastructures.

Anticipated Outcomes
- Improved local access to healthcare for patients in rural areas.
- Quicker diagnosis and treatment plan for patients.
- Equality of healthcare service to patients in rural areas.
- Reduce waiting times for specialist opinion.
- Reduce travelling time and expenses of staff attending meetings.
- Increased opportunity for staff participation in education meetings, resulting in more people with broader range of experience.
- Increased educational sessions and sharing good practice.
- Lower cost of service delivery due to reduced costs of accessing specialist opinion.
- Reduced CO₂ emissions.

6.2 Long Term
- There is a need to ensure that NHS staff who work in rural health communities have an opportunity within their educational 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 so that 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.
- 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.