1. INTRODUCTION

In December 2006 the Ceredigion Telehealth Project Board were invited by members of the Ceredigion Waiting List Management Group to look at the feasibility of using telemedicine clinics (patient videoconsultations) for Neurology and/or Neurosurgery services.

A project group was formed comprising representatives from the two NHS Trusts involved as listed below:

**Ceredigion & Mid Wales NHS Trust**
- Outpatients Manager
- Consultant Physician/Clinical Director Medical Directorate
- Telemedicine Project Manager

**Swansea NHS Trust**
- Consultant Neurologist
- Neurosurgery Service Manager
- Divisional Manager – Cancer and Tertiary Services

The aim of the study was to look at the feasibility of using telemedicine clinics (patient videoconsultations) with agreement to focus on Neurology Services. This was on behalf of Ceredigion Waiting List Management Group who had been tasked to review and modernise the neurology service provided by Swansea tertiary centre in line with Access 2009 referral to treatment times, EWTD, patient/client needs and access to services in line with the Welsh Assembly Government’s Strategy ‘Designed for Life’.

The information gathered and outcome of the feasibility study would provide useful information to Ceredigion & Mid Wales NHS Trust and Swansea NHS Trust when considering the future development of neurology services.

2. BACKGROUND TO NEUROLOGY SERVICE

The neurology outpatient clinic is held every three months at Bronglais General Hospital, Aberystwyth and requires a Consultant Neurologist to travel from Swansea to Aberystwyth (156 miles return journey, approximately 4 hours). Ceredigion & Mid Wales NHS Trust is constantly looking to improve services to patients and in this case the service being provided for neurology patients. One of the options under consideration was to increase the frequency of these clinics by introducing telemedicine clinics (patient videoconsultations) and reducing the travelling time of Consultant Neurologist.

This would require the introduction of a new method of undertaking neurology consultations. Videoconferencing equipment would be set up in Bronglais and Swansea. The Consultant Neurologist (instead of traveling from Swansea to Aberystwyth) would stay in Swansea and use the videoconferencing equipment to undertake the consultation. However, at this time evaluations of the use of this technology and impact on users were not widely available so it was agreed to assess the feasibility and practicalities of using this technology for patient videoconsultations.
3. **METHOD/PREPARATION**
   - Meetings of project group held via videoconferencing.
   - Project plan drawn up.
   - Key objectives identified:
     - Determine type of equipment required.
     - Agree clinical guidelines and pathway for neurology patient videoconsultations.
     - Survey patients (follow up) on waiting list regarding telemedicine clinics.
     - Trial of patient videoconsultation.
     - Patient satisfaction of telemedicine clinic.
     - Recommendations.
   - Audit of neurology clinic undertaken to establish activity within consultation—positive results, 34 patients seen with only 5 having physical examinations during consultation.
   - Questionnaires with information packs sent to follow up patients on waiting list—positive results (37 returned) with only 4 negative—three of which refused neurology appointment at all regardless of telemedicine.
   - Agreement to proceed with trial telemedicine videoconsultation.
   - Consultant Neurologist at Morriston Hospital selected 14 patients from waiting list (follow up).
   - Information packs and appointment letters sent to patients.
   - Videoconferencing equipment booked at both sites:
     - Polycom iPower Medlink Cart - Outpatients Department Bronglais Hospital
     - Dell laptop with Logitech web camera and Polycom PVX software - Consultant neurologist at Morriston.
   - Test link undertaken week prior to clinic date to establish connectivity and test audio/video quality.
   - First telemedicine clinic with patient videoconsultation undertaken 22 February 2008 - 14 appointments, 13 attended, 1 Did Not Attend.
   - Satisfaction questionnaires completed by patients and staff at clinic.

4. **OUTCOMES**
   - Full details, results and patient/staff comments are available in Attachment 1 ‘Results Of Trial Patient Videoconsultations In Neurology - Patient And Staff Perceptions’.

5. **CONCLUSION**
   The trial of the first Neurology Telemedicine clinic demonstrated that it was feasible to use telemedicine clinics for Neurology with 100% positive feedback for audio and video quality. Despite some comments all patients (100%) were satisfied with their consultation, happy to use the technology again and were not put off by the technology with two positive comments of “very happy” and “very satisfied”. Only one patient had responded “don’t know” to finding it easy to talk to clinician but had responded positively to remaining questionnaire. 100% positive feedback from staff with useful comments. (See attachment 1 – ‘Results Of Trial Patient Videoconsultations In Neurology - Patient And Staff Perceptions’ for full details of patient and staff comments).

As a consequent of the positive outcomes, agreement was reached to increase the frequency of the clinics to 6 - 8 weekly clinics (booked a year in advance) which will be a revenue neutral option for Bronglais and an improved service for the patients.
6. **RECOMMENDATIONS**

In view of the successful evaluation to date, the project was signed off by the Ceredigion Telehealth Board on 4 April 2008 and handed over to the stakeholders (Outpatients Manager, Bronglais General Hospital and Consultant Neurologist, Morriston Hospital) with following recommendations:

**Recommendation 1** - based on the first clinic it is feasible to undertake neurology clinic via telemedicine

**Recommendation 2** - due to the small number of participants, for proper evaluation, the telemedicine clinic should be repeated and evaluated until 50 patients have been seen before telemedicine clinic is established.

When telemedicine clinic is repeated/implemented the recommendations made in the ‘Results Of Trial Patient Videoconsultations In Neurology - Patient And Staff Perceptions’ (attachment 1) should be noted, including:

- Alternative equipment to web camera to be used at Morriston. The problems experienced with the audio (echo feedback and voice/video synchronisation) would be resolved by Morriston using alternative videoconferencing equipment to the web camera (PVX) technology.
- Positioning of videoconferencing equipment at Bronglais to be altered.
- Appointment slots to be increased to 20 minute slots.
- Nursing staff to have training in videoconference equipment to enable telemedicine clinic to be managed in-house by outpatients staff.

As a consequence of the positive outcomes, agreement was reached to increase the frequency of the clinics to 6 - 8 weekly clinics (booked a year in advance) which will be a revenue neutral option for Bronglais and an improved service for the patients.
Results of trial patient videoconsultations in neurology - Patient and staff perceptions

CEREDIGION TELEHEALTH PROJECT

Report by: Delyth Lewis, Telemedicine Project Manager

1. PURPOSE

This report demonstrates the results of the first Neurology Telemedicine clinic in Ceredigion & Mid Wales NHS Trust on 22 February 2008. This clinic was undertaken as part of a study looking at the feasibility of using telemedicine clinics for Neurology.

2. BACKGROUND

The Ceredigion Telehealth Project Board was asked by the Waiting List Management Group to look at the feasibility of using telemedicine clinics (patient videoconsultations) for Neurology.

The neurology outpatient clinic is held every three months at Bronglais General Hospital, Aberystwyth and requires a Consultant Neurologist to travel from Swansea to Aberystwyth. Ceredigion & Mid Wales NHS Trust is constantly looking to improve services to patients and working with Swansea NHS Trust in particular, the service being provided for neurology patients. One of the options under consideration was to increase the frequency of these clinics by introducing telemedicine clinics (patient videoconsultations).

Telemedicine/Videoconferencing (Patient videoconsultations)

Telemedicine is the use of technology for medical diagnosis and patient care when the clinician and patient are separated by distance. In this situation the technology is videoconferencing. Videoconferencing is the use of equipment to allow two or more people to see and hear one another while being in different locations. It involves the use of special equipment and a small video camera at each location and enables information to be shared, eg pathology slides, radiology images and documents etc.

3. METHODOLOGY

Prior to clinic date:

1. Consultant Neurologist at Morriston Hospital selected 14 follow up patients
2. Information packs and appointment letters sent to patients.
3. Videoconferencing equipment booked at both sites:
   - Polycom iPower Medlink Cart - Outpatients Department Bronglais Hospital
   - Dell laptop with Logitech web camera and Polycom PVX software - Consultant neurologist at Morriston.
4. A test link was undertaken the week prior to clinic date to establish connectivity and test audio/video quality.
Telemedicine Videoconsultation:

1. On arrival, patients were escorted to a vacant clinic room by an outpatient nurse and asked to complete consent forms. Consent forms were subsequently filed in patient’s health record.

2. Clinic set up:

<table>
<thead>
<tr>
<th>Staff</th>
<th>Resources</th>
<th>Staff</th>
<th>Resources</th>
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<tbody>
<tr>
<td><strong>Staff</strong></td>
<td><strong>Resources</strong></td>
<td><strong>Staff</strong></td>
<td><strong>Resources</strong></td>
</tr>
<tr>
<td><strong>Bronglais site:</strong></td>
<td></td>
<td><strong>Morriston:</strong></td>
<td></td>
</tr>
<tr>
<td>Outpatient nurse - <em>helped with patient consent form and questionnaire</em></td>
<td>Outpatient Clinic Room 2</td>
<td>Consultant Neurologist</td>
<td>Seminar Room, Clinical school</td>
</tr>
<tr>
<td>Consultant Physician</td>
<td>Outpatient Clinic Room 3</td>
<td>Clinical school staff - <em>equipment set up only</em></td>
<td></td>
</tr>
<tr>
<td>Telemedicine project manager – <em>operating videoconference equipment</em></td>
<td>Patients/carers</td>
<td></td>
<td>Outpatient department waiting area</td>
</tr>
<tr>
<td>Patients/carers</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td><strong>Outpatients Charge Nurse – Duty nurse</strong></td>
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</tbody>
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3. Process flow:

1. Videoconferencing call was placed from Bronglais to Morriston made via the Welsh Health Video Service using the DAWN2 Telecommunications Network.
2. Each patient case study was discussed by both clinicians prior to appointment as the patient health records were located in Bronglais.
3. When each patient (and carer) was brought to the clinic room they were shown the preferred seating in front of the monitor and camera. The Consultant Neurologist was visible on the monitor and the patient was also visible in a smaller square. (The picture of the patient could be removed if causing patient unease).
4. The Consultant Neurologist introduced himself and conducted the consultation with the patient, their carer and the Consultant Physician at Bronglais. The consultant Physician’s role included assisting as/when necessary with information from the health records, undertaking physical examinations, explanation or writing test requests, for example x-rays, bloods.
5. When the consultation had been completed and the patient and carer had left the room, clinic outcome and treatment was discussed between clinicians.
6. Consultant Neurologist dictated letter (tape sent to Bronglais for typing as per normal procedure).
7. Patient was escorted to adjacent clinic room and asked to fill in a patient satisfaction questionnaire.
8. Staff at Bronglais and Morriston were asked to complete a questionnaire on their experience of the whole clinic (not per patient).
4. FINDINGS

Technical evaluation

Good video quality was established and maintained throughout the whole clinic (3 hours). Audio quality at Bronglais site was suboptimal with slight delay between video and voice synchronisation. Audio feedback was also experienced for the first two patients, which caused an ‘echo’ effect, but this did not seem to interfere with the comprehension or participation in conversation. The echo feedback improved simultaneously and was maintained for the duration of the clinic. The audio echo and lip synchronization delay was attributed to the web camera technology being used at Morriston.
No other technical difficulties were experienced.

Patients/Carer feedback

13 questionnaires were handed out and 11 (85%) questionnaires completed.

Of the 2 (14%) which were not completed - one was taken away with patient to be completed at a later stage and one patient did not have time to wait to complete the form as the clinic was running late.

Results – 11 completed questionnaires

![Age range chart]
<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Could you see the doctor clearly?</td>
<td>100% (11) Yes</td>
</tr>
<tr>
<td>Could you hear the doctor clearly?</td>
<td>100% (11) Yes</td>
</tr>
<tr>
<td>Did you feel the doctor was easy to talk to using the video link?</td>
<td>91% (10) Yes, 9% (1) Don't know</td>
</tr>
<tr>
<td>Are you satisfied or unsatisfied with your consultation?</td>
<td>100% (11) Satisfied</td>
</tr>
<tr>
<td>Would you be happy to use telemedicine for your consultation again?</td>
<td>100% (11) Yes</td>
</tr>
<tr>
<td>Were you put off by the technology?</td>
<td>100% (11) No</td>
</tr>
<tr>
<td>Which would you prefer?</td>
<td></td>
</tr>
<tr>
<td>A consultation using videoconsultation conducted close to home?</td>
<td>91% (10) Close to home, 9% (1) left blank</td>
</tr>
<tr>
<td>Travel to Carmarthen for in-person consultation?</td>
<td></td>
</tr>
<tr>
<td>Don't Know</td>
<td></td>
</tr>
</tbody>
</table>

1: Don't know - commented “felt uncomfortable with screen. Used to face to face consultation”
2: Left blank - commented “no particular issues today, but if I had I would prefer face to face consultation”

**Views of the Nursing Staff/Consultant Physician**

Of the four staff at Bronglais:
- 100% felt they could see the consultant at Swansea clearly.
- 100% felt they could hear the consultant at Swansea clearly.
- 100% felt they could establish a good rapport between the patient, the consultant (Swansea) and themselves.
- 100% were not put off by the technology but added comments including:
- 100% were satisfied with the consultation but added some comments:
Consultant Neurologist feedback

The Consultant Neurologist comment was:

"Time slots were too short. 15 minutes which are normally allocated for our follow up appointments are for patients in a face-to-face consultation and therefore, I would expect the time slots to be at least 20 minutes. Otherwise, the clinic went well and there seemed to be very little problems in terms of communication, except for the slight delay due to the technology used at Swansea end."

Telemedicine Project Manager comments

- Suggest additional network point in clinic room to accommodate pc and videoconference equipment so blood results can be accessed via pc.
- Four patients had physical examination undertaken by clinician at Bronglais (leg/eyes; arms, face/head/arms, head/eyes), one requiring the examination couch.
- Consent forms to be supplied with punch holes to facilitate filing in case notes.

5. CONCLUSIONS

The trial of the first Neurology Telemedicine clinic demonstrated that it was feasible to use telemedicine clinics for Neurology outpatients clinics. There was 100% positive feedback for audio, video quality. All patients were satisfied with their consultation, happy to use the technology again and were not put off by the technology with two positive comments of “very happy” and “very satisfied”. Despite one comment of “Difficult to continuously concentrate on issue”, only one patient responded “don’t know” in relation to how easy it had been to talk to clinician.

This evaluation will be included in the feasibility study outcomes. However, due to the small number of participants in the first trial it is recommended that the telemedicine clinic should be repeated and evaluated until 50 patients have been seen, This is subject to Trust/Clinician approval.

6. RECOMMENDATIONS

- The telemedicine clinic to be repeated to increase number of participants for evaluation.
- Nursing staff to have training in videoconference equipment to enable telemedicine clinic to be managed in-house by outpatients staff reducing the number of staff in clinic room.
- Appointment slots should be increased to 20 minute slots to accommodate signature of patient consent form and clinical discussion pre consultation.
- Equipment at Bronglais to be moved further back from patients (ref patient comment “glare on eyes, would be better sat further back from screen”).
- The problems experienced with the audio (echo feedback and voice/video synchronisation) would be resolved by Morriston using alternative videoconferencing equipment to the web camera (PVX) technology. List of available equipment at Morriston has been forwarded to Neurosciences Service Manager for reference.