Recommendations on the Delivery of Community Echocardiography in Wales

June 2006
1 Background

“Community echocardiography” is defined as an echocardiography service provided specifically for patients referred directly from Primary Care. The development of Community Echocardiography (CE) is recognised as an important step in the management of patients with suspected or established heart failure.

The demand for out-patient and in-patient echocardiography to diagnose heart failure and other cardiac conditions, already far exceeds the capacity of current services, which are based in secondary and tertiary care settings. This demand is increasing, in accordance with guidelines on the management of heart failure (1) coronary heart disease (2), arrhythmia (3) and the new GMS contract. There is a local and national shortage of suitably trained echocardiographers and it is important to develop new models of delivery of echocardiography services for primary care (i.e. CE) in close conjunction with, and not to the detriment of, secondary and tertiary care hospitals.

These recommendations on the provision of “Community Echocardiography” (CE) in Wales have the aim of ensuring that CE is founded on the best possible principles and quality requirements. They offer explicit recommendations to both commissioners and providers of services based on guidance and consensus statements.

They were developed initially by a multi-disciplinary group of clinicians and managers of services from across Wales and chaired by Dr Navroz Masani under the auspices of the Cardiac Workforce Group which is a sub group of the Cardiac Networks Coordinating Group. (Appendix 1). They were approved by the Cardiac Reference Group in June 2006.

The group adopted the “Community Echocardiography for Heart Failure” consensus statement from the representatives of the British Society of Echocardiographers, The British Heart Failure Society, the CHD Collaborative and the Primary Care Cardiovascular Society as the basis for their recommendations (4). The group were also committed to the Welsh National Service Framework for Coronary Heart Disease (2) and to the recently developed “Quality Requirements for the Care of Patients with Chronic Heart Failure” (5).

The recommendations will be updated on a regular basis. Any queries relating to them should be directed in the first instance to:

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2 Introduction

Echocardiography is pivotal to the management of heart failure, enabling the clinician to make the diagnosis of heart failure, determine the aetiology and plan treatment.

A Community Echocardiography service is integral to locally developed services for those with heart failure. The Cardiac Networks Co-ordinating Group has agreed quality requirements for the care of patients with chronic heart failure in Wales. These are based on a pathway of care for patients with heart failure, which assumes that most patients will present initially to their general practitioner, who will undertake or organise various diagnostic tests according to locally agreed guidelines.

It is important to note that CE also has a place in the investigation of those with atrial fibrillation, heart murmur and hypertension.

Estimated need for echocardiography in heart failure

The most recent study, the Heart of England Screening study (6), suggests that more than 3% of people aged 45 and over in the UK have definite or probable heart failure. From these prevalence rates it is estimated (7) that there are about 363,000 men aged 45 and over living in the UK with definite heart failure, and 299,000 women, giving a total of around 662,000. If probable cases of heart failure are included, there are an estimated 489,000 men and 403,000 women, a total of 892,000 people aged 45 and over who have heart failure in the UK today. Prevalence of heart failure increases steeply with age, so that while around 1% of men and women aged under 65 have heart failure, this increases to about 7% of those aged 75-84 years and 15% of those aged 85 and above.

The estimated need for echocardiography in heart failure is as shown in Table 1.

Table 1 (Source: British Cardiac Society, www.bcs.com)

<table>
<thead>
<tr>
<th>Description</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>After abnormal BNP* level</td>
<td>3.6-6 per 1,000 population per annum</td>
</tr>
<tr>
<td>After a change in clinical state</td>
<td>4 per 1,000 population per annum</td>
</tr>
<tr>
<td>Screening in high – risk groups</td>
<td>1.6 per 1,000 population per annum</td>
</tr>
</tbody>
</table>

*BNP = Brain natriuretic peptide
Applying well established criteria (prior to the availability of BNP as a screening tool), the Birmingham Heart Failure Steering Group (8) made the following calculations of the demand for echocardiography in high priority heart failure cases only in a typical DGH serving a population of 350,000:

<table>
<thead>
<tr>
<th></th>
<th>Annual Estimated Demand</th>
<th>Weekly Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Cases from Primary Care – Out-Patients</td>
<td>2100</td>
<td>42</td>
</tr>
<tr>
<td>Hospital In-Patients</td>
<td>2860</td>
<td>55</td>
</tr>
<tr>
<td>Total Demand</td>
<td>4960</td>
<td>97</td>
</tr>
</tbody>
</table>
3 Echocardiogram Definitions

The methodology, scope and detail of an echocardiographic study can be loosely divided into a number of groups. The type of study is mainly determined by the clinical question, which in turn determines the level of experience of the operator and the quality of equipment required.

3.1 Standard Echocardiogram

This is a comprehensive diagnostic study; it is known as a standard transthoracic study and is the “traditional” echocardiogram. It takes between 30-40 minutes to perform; it is considered a formal cardiology procedure and leads to archived material and a formal report. It is indicated for:

- Detection and quantification of LV systolic dysfunction
- Change in condition of a patient with known heart failure
- Assessment of aetiology
- Diagnosis of conditions which mimic heart failure (e.g. myxoma)
- Diagnosis of significant valve disease amenable to surgery
- Exclusion of severe obstructive valve disease as a relative contraindication to using an angiotensin converting enzyme inhibitor.

3.2 Limited Echocardiogram

This is also known as a “focused” or “point of care” echocardiogram. It is directed at answering specific clinical questions such as: has there been a change in wall motion of a patient with an exacerbation of known heart failure? The procedure takes 5-10 minutes and should also lead to archived material and a formal report. It should always be stated that it is a limited rather than a standard echocardiogram that has been performed. Characteristics of this investigation are:

- Requested only by a clinician aware of the clinical context of the case.
- Responsibility taken for only performing a limited study as opposed to a standard study
- A baseline standard study will usually have already been performed.

3.3 Screening Echocardiogram

This is similar to the limited echocardiogram but may take longer e.g. 10-15 minutes. It must lead to a report incorporated in the clinical notes and archiving should take place. It differs from a limited echocardiogram in important ways:
• It is usually undertaken in an emergency setting
• It is usually undertaken to exclude pathology
• There is usually no baseline standard study
• If abnormal it should lead to a standard study.

**Complex echocardiograms** include dobutamine stress studies, contrast echocardiogram or a detailed haemodynamic assessment. They can only be performed by highly specialised echocardiographers and their use does not fall within the scope of this document.

“Ultrasonic stethoscope” examination (handheld ultrasound) can be used as an extension of the clinical examination but has no role in a heart failure service as it uses low resolution equipment and there is no archived material.
4 Quality requirements in the provision of echocardiography

- A “Standard Echocardiogram” is required for all patients with suspected heart failure and is the required quality standard for CE.

- Echocardiograms should be performed on high quality equipment: this should include high-resolution 2-D imaging, tissue harmonic imaging, full spectral Doppler and colour flow mapping (and ideally, tissue Doppler capability).

- The recommended lifespan of echocardiography scanners is 5-7 years.

- Echocardiography should be performed and reported by operators trained to the standards set by the British Society of Echocardiography i.e. they should hold Accreditation in Adult Transthoracic Echocardiography or Adult Community Echocardiography.

- Echocardiographic images and data should be recorded and archived – ideally, this should be a digital system (DICOM compatible) that enables telemedicine links.

- Clinical interpretation of the technical echocardiogram report is provided by an appropriate clinical specialist (i.e. cardiologist or GpwSI (Cardiology).

- CE services should be linked to a local hospital-based echocardiography department (see below). A local Quality Assurance system should be developed.
5 Service Models

The service models available for the delivery of an echocardiography service for patients with suspected heart failure referred directly from primary care can be categorised in the following ways:

- Open access echocardiography service based in a hospital cardiology department
- Open access echocardiography service based in a Community hospital, clinic or GP surgery
- Mobile echocardiography service operating peripatetically
- Echocardiography service as part of a Rapid Access Heart Failure clinic

Whilst the first three categories distinguish between the physical locations of the investigation, this does not imply that echocardiography can be delivered as an isolated investigation. The CE service must always be considered in the context of the whole patient pathway for those with suspected heart failure i.e. they should form an integral part of a local Heart Failure Service in accordance with all Wales Quality Requirements (5). Services should extend between hospital and community bases as part of a continuum of care irrespective of organisational barriers.

5.1 Open Access Hospital based

This model has been tried in many hospital settings with varying degrees of success – and failure. Support for service redesign in Bro Morgannwg NHS Trust Cardiology Department has resulted in the development of an effective service, details of which are attached as Appendix 2.

- The model receives referrals direct from General Practitioners, as part of a locally developed Heart Failure service (see Appendix 2 & 3).
- The existing Echocardiography department provides the echocardiography service.
- Increased capacity of the hospital echocardiography dept is required i.e. an additional allocated provision of echocardiographers, cardiologists and ultrasound equipment.
- Existing infrastructure is utilised.
- The service will be delivered by a BSE accredited echocardiographer and a cardiologist.

The majority of echocardiograms undertaken in this setting will be Standard studies. Complex studies are performed in the main hospital department.

Recommendations on the essential characteristics of such a service are:

- The department should be BSE accredited.
• A structured, protocol based referral process built on effective communications between Primary and Secondary Care, as defined by existing recommendations (appendix 3).
• Clinical input is provided by a cardiologist/specialist, over and above the technical echocardiography report.
• Clinical backup if urgent clinical problems are identified by echocardiography.
• Integration with main echocardiography department in terms of quality assurance and staff training and CPD.

5.2 Open Access Community Based

This type of service can be located in a community hospital, clinic or GP surgery. The service needs to be established in addition to existing hospital based provision and agreement reached with the commissioners on how this is funded.

Recommendations on the essential characteristics of such a service are:

• This service must be an integral part of the overall approach to the delivery of heart failure services in a health community. There is no place for isolated stand alone open access echocardiography.
• The service should be delivered by an operator who is BSE accredited.

The operator could be a GP with Special Interest (GPwSI) or a Practitioner with a Special Interest (PwSI). Guidance on the development of GPwSI in Cardiology has been developed to complement the Welsh Health Circular on GPwSI (9). This guidance has been endorsed by the Cardiac Networks Co-ordinating Group but is not yet for formal distribution (10) Some GPs are already experienced expert echocardiographers who have not received BSE accreditation. Provision of services by such practitioners should be considered on an individual basis.

Further details of training provision are in Appendix 3

• A structured, protocol based referral process built on effective communications between Primary and Secondary Care. An example of this is included in Appendix 2 & 3.
• Structured reporting arrangements that ensure information is available to both primary and secondary care providers. This requires the technical report to be given within the clinical context and an example of such a report is included in Appendix 2.
• The service should not be used for established patients requiring secondary care follow up.
• Links to the hospital based service (preferably electronic) for second opinions and clinical backup.
• Links to the hospital based service to ensure quality assurance.
• Links to the hospital based service to allow for training and CPD for staff.

5.3 Mobile Service

“Mobile echocardiography” is the description generally used for a service provided by a third party (other than existing primary or secondary care providers), usually a private company. The term mobile refers to the mobility of the staff and equipment that can service demand across a large geographical area. Whilst the service may be provided literally from a mobile facility, it may equally be provided in a Community Hospital, clinic or GP surgery.

Portable systems vary in quality and must be matched to the type of echocardiograms performed. Standard echocardiograms require high quality imaging, including second harmonics together with colour mapping and both pulsed and continuous wave spectral Doppler. Archiving is essential.

Recommendations on the essential characteristics of such a service match those for a community-based service; these recommendations are:

• This service must be an integral part of the overall approach to the delivery of heart failure services in a health community. There is no place for isolated stand-alone open access echocardiography.
• The service should be delivered by an operator who is BSE accredited.
• A structured, protocol based referral process built on effective communications between Primary and Secondary Care.
• Structured reporting arrangements that ensure information is available to both primary and secondary care providers. This requires the technical report to be given within the clinical context.
• The service should not be used for established patients requiring secondary care follow up.
• Links to the hospital based service (preferably electronic) for second opinions and clinical backup.
• Links to the hospital based service to ensure quality assurance
• Links to the hospital based service to allow for training and CPD for staff. Recruitment of staff to third party providers should avoid depletion from existing services and destabilisation of local provision.

5.4 Rapid Access Heart Failure Clinic

This is seen as the favoured model of care with echocardiography as part of a Heart Failure “one stop shop” where specialist secondary care based staff offer diagnosis and initial treatment whilst liaising with Primary Care staff for ongoing care and with Tertiary staff for specific specialist advice. The following recommendations for this service model arise from the Heart Failure Quality Requirements for Wales (5) and are that:
• An echocardiogram forms an essential part of the assessment of a patient with suspected heart failure. This is in addition to a clinical assessment, and ECG, BNP and Chest x-ray.
• Diagnostic heart failure clinics at which a consultant cardiologist / physician with a special interest in heart failure and heart failure specialist nurse are both present should be held at least weekly with echocardiography available during the clinic times.
• It is acceptable for a standard study conducted as part of
  a) an open access hospital based service
  b) a community based service
  c) a mobile echocardiography service
to supply the echocardiographic information as part of the Heart Failure clinic assessment provided the study has been conducted under BSE accredited conditions.
• The local heart failure team should have access to echocardiography according to agreed referral guidelines, with reports available within four weeks.
• All echocardiographs should be performed and reported by an appropriately trained and experienced member of staff.
• Each member of staff performing echocardiography should normally carry out at least 100 tests per year.

Service Model Summary

<table>
<thead>
<tr>
<th>Aspects of Service</th>
<th>Open Access Hospital based</th>
<th>Community based</th>
<th>Mobile</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infrastructure</strong></td>
<td>Exists</td>
<td>Facilities may exist</td>
<td>Provided</td>
</tr>
<tr>
<td><strong>Equipment</strong></td>
<td>Exists</td>
<td>Some equipment may exist. Would require QA</td>
<td>Provided. Would require QA</td>
</tr>
<tr>
<td><strong>Workforce</strong></td>
<td>Partially required. Expansion of hours or numbers</td>
<td>Fully required</td>
<td>Provided * * Concerns re depletion of NHS workforce</td>
</tr>
<tr>
<td><strong>Training</strong></td>
<td>Trainees Required</td>
<td>Trainees required</td>
<td>Provided</td>
</tr>
<tr>
<td><strong>Capacity</strong></td>
<td>Current Waiting List. Dependent on commissioned activity</td>
<td>Dependent on commissioned activity</td>
<td>Provided Dependent on commissioned activity</td>
</tr>
<tr>
<td><strong>Rapid Access Clinics</strong></td>
<td>Hospital based</td>
<td>Community based</td>
<td>Could be community based or mobile</td>
</tr>
</tbody>
</table>
6 Training and Workforce Planning

The provision of echocardiography services, regardless of their setting, must link with staff training and CPD, which in turn informs workforce planning. The recommendations in this document endorse the BSE accreditation and re-accreditation process (11).

In summary, it takes a minimum of two years to train a practitioner to BSE accredited standards, whether they are a cardiology registrar, a cardiac physiologist, a GPwSI, a new entrant echocardiographer, a heart failure specialist nurse or other Practitioner with a Special Interest (PwSI).

BSE accreditation in community echocardiography began in October 2004 and will qualify a GPwSI or a PwSI in standard echocardiography. It is equivalent to the BSE adult accreditation process but reflects a community-based rather than a hospital-based case mix. The process involves a written examination and a logbook of 200 cases.

The BSE is currently discussing “Certification in Screening Echocardiography” under the auspices of a local BSE accredited echocardiography department.

The CHD National Workforce Competence Framework (12) can be used in a variety of ways to underpin the role of those undertaking imaging to inform the assessment of individuals with suspected CHD.

**Summary of training Implications**

<table>
<thead>
<tr>
<th>Cardiac Physiologists</th>
<th>Echocardiographers</th>
<th>GPwSI</th>
<th>Specialist Nurse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expand workforce in/out hospital</td>
<td>Expand workforce in/out hospital</td>
<td>Reduces medical workforce</td>
<td>?other duties</td>
</tr>
<tr>
<td>4 year training</td>
<td>2 year training</td>
<td>2 year p/t training at 1 day p/wk plus cardiology training</td>
<td>2 year p/t training at 1 day p/wk</td>
</tr>
<tr>
<td>Easy to organise training</td>
<td>Would need to be organised</td>
<td>Courses available but locum cover required</td>
<td>Courses available but needs to fit in with other duties</td>
</tr>
<tr>
<td>Not echo focussed – requires additional echo training but has advantage of expanding overall cardiac diagnostic capacity</td>
<td>Echo focussed; expands this specific diagnostic capacity</td>
<td>Facilitates integration of primary and secondary care and integration of rapid access HF clinics</td>
<td>Facilitates integration of rapid access HF clinics</td>
</tr>
</tbody>
</table>
7 Conclusions

The overall recommendations of the development group who have prepared this document are:

7.1 Although there is a crisis in the recruitment of staff that are trained and competent in performing and interpreting echocardiograms, the need and demand for echocardiography should not compromise quality. Quality Assurance is of paramount importance in the delivery of all echocardiography services including those where patients are directly referred from Primary Care.

7.2 BSE accreditation is mandatory for those performing Community Echocardiography. Where experienced operators do not have accreditation, this needs to be reviewed on an individual basis.

7.3 All of the models outlined above should link into a BSE accredited Hospital department; this is necessary to accommodate increased demand, to meet quality assurance, training and CPD needs, as well as to ensure continuity of patient care. There is no place for stand-alone services.

7.4 Structured, protocol based referral and reporting processes must form part of the services and should be built on effective communications between Primary and Secondary Care.

7.5 Provision should be subject to regular audit and/or peer review.
References

1) National Institute for Clinical Excellence, 2003, Chronic Heart Failure: Management of Chronic heart Failure in adults in Primary and Secondary Care – NICE Guidelines, NICE, London

2) The National Assembly for Wales, 2001, Tackling Coronary Heart Disease in Wales: Implementing through Evidence, NAW, Cardiff


4) The British Society of Echocardiography, 2004, Community Echocardiography for Heart Failure: A consensus statement from representatives of the British Society of Echocardiographers, The British Heart Failure Society, the CHD Collaborative and the Primary Care Cardiovascular Society, BSE, London

5) Cardiac Networks Co-ordinating Group (2005) Wales Quality Requirements for the Care of Patients with Chronic Heart Failure


8) Heart Failure Service Blueprint, 2003, Produced by the Birmingham Heart Failure Steering Group, Birmingham


10) Cardiac Networks Co-ordinating Group (2005) Recommendations for GPwSI in Cardiology


Appendix 1:  Membership of Development Group

Chair
Navroz Masani, Consultant Cardiologist, University Hospital of Wales, Cardiff

Matthew Dymmock  GP and Primary Care lead, North Wales Cardiac Network

Alan Edwards,  GP, Caerphilly LHB

Jonathan Goodfellow, Consultant Cardiologist, Princess of Wales Hospital, Bridgend

Nicola Jenkins, Cardiology Business Manager, Royal Gwent, Newport

Lynda McGurk, Chief Cardiac Physiologist, University Hospital of Wales, Cardiff

Kathryn Roberts, Specialist Nurse, Morriston Hospital, Swansea

Jan Vaughan, Associate Director (Workforce) Greater Manchester and Cheshire Cardiac Network

Report facilitated by Elizabeth Gould          CNCG Co-ordinator

Appendix 2:  Bro Morgannwg Model

(Attached separately)

Appendix 3:  Community Echocardiography Referral Form

(see below)
## Community Echocardiogram Referral Form

<table>
<thead>
<tr>
<th>Patient Details</th>
<th>Referring GP Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Name</td>
</tr>
<tr>
<td>Hosp. No.</td>
<td>Address</td>
</tr>
<tr>
<td>D.o.b.</td>
<td>Tel.</td>
</tr>
<tr>
<td>Address</td>
<td>Fax.</td>
</tr>
<tr>
<td>Tel.</td>
<td>GP code</td>
</tr>
</tbody>
</table>

### Symptoms/signs

<table>
<thead>
<tr>
<th>Heart Failure</th>
<th>NYHA class</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP</td>
<td>/ mmHg</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR</td>
<td>______/min</td>
<td>SRA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart murmur</td>
<td>I</td>
<td>II</td>
<td>I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chest crackles</td>
<td>I</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Treatment

- ACE I/ARB
- B blocker
- Diuretic
- Calcium blocker
- Nitrate
- Digoxin
- Warfarin
- Aspirin
- Other

### Cardiac History (give details and duration)

- Angina
- MI
- CABG/PCI etc.
- Hypertension
- Valve disease
- Other relevant details

### Essential Investigations (please circle - must be completed before referral)

1. Abnormal ECG no / YES (please enclose ECG or report).
2. Chest X ray no / YES (please enclose report).
3. FBC no / YES normal? yes / no
4. U&E, Creat no / YES normal? yes / no
5. Thyroid FT’s no / YES normal? yes / no

### Indication for Echocardiogram

- Suspected Heart Failure
- Atrial Fibrillation
- Hypertension
- Cardiac murmur

GP Signature ........................................................................... Date ..........................................................
Appendix 4: Training Provision

Courses

Bradford City Teaching PCT: Postgraduate Diploma in Cardiology for Primary Care practitioners with a Special Interest

Appendix 5: Workforce levels

There is no definitive source of information on workforce levels needed to provide echocardiography services. However, The British Cardiac Society report (June 2005) Cardiac Workforce Requirements in the UK (13) suggests that each acute hospital has a Consultant Cardiologist with a special interest in heart failure who spends two programmed activities per week (one programmed activity for a medical consultant = 4 hours) directly leading to the management of patients with heart failure including diagnosis and monitoring.

In addition the report suggest that 2.1WTE non consultant specialists per million population (nurse, physiologist, GPwSI, non Consultant medical) are needed to provide diagnostic services for patients with heart failure and 14.6 WTE per million population to provide monitoring services.

Appendix 6: Guidance on development of GPs with a Special Interest in Cardiology

This guidance supports the development of GPs with a special interest in cardiology (GPwSI(C)) in Wales. It has been prepared by the Director of Cardiac Services for Wales in discussion with Network Clinical Leads and other clinical colleagues. It is intended to complement WHC (2005) 047 “Guidance for developing GP with Special Interest Services in Wales” (1).

The guidance is structured as follows:

- The background to the guidance, including the service need to deliver the NSF for CHD.
- The underpinning principles.
- Suggested clinical areas for development.
- Training and Appraisal.
- Summary and Recommendations for Implementation.

The guidance can be accessed on the Cardiac Networks website at the following addresses:

Intranet: http://howis.wales.nhs.uk/cardiacnetworks
NSF Website: http://www.wales.nhs.uk/sites/home.cfm?ORGID=334