**Introductory statement**

This pathway has been developed in line with the document ‘Tackling CHD in Wales: Implementing Through Evidence’ to support healthcare professionals involved in the management of heart failure patients and has been based upon recently published NICE and European Society of Cardiology guidelines. We strongly recommend that these internationally recognised guidelines are referred to for more detailed information where necessary.

The SEWCN recognises the overwhelming importance of audit in directing the implementation of this pathway. Key audit outcomes in the management of heart failure have followed the document ‘Tackling CHD in Wales: Implementing Through Evidence’ and we would also anticipate that the ‘Wales Quality Requirements for the Care of Patients with Chronic Heart Failure’ will further strengthen the framework for undertaking appropriate audit in this field.

The development of a pathway to support the management of patients requiring palliative care are ongoing.

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2. Core management aims - applicable to all those involved in the care of heart failure patients.


4. Diagnosis and identification of CHF patients (pathway 1).

6. Referral process and inclusion in local heart failure service (pathway 2).

7. Involvement of specialist nurse-based care (pathway 3).

8. Pharmacological therapy for left ventricular systolic dysfunction (pathway 4).

9. Further management within heart failure service (pathway 5).

10. Tertiary heart failure services (pathway 6).
Core Management Aims

1. Establish that the patient has CHF in accordance with following definition:
   (a) Symptoms of heart failure (at rest or during exercise), and
   (b) Objective evidence of cardiac dysfunction (at rest), and
   (c) Response to treatment directed towards heart failure
   ((a) and (b). should be fulfilled in all cases).

2. Ascertain presenting features: pulmonary oedema, exertional breathlessness, fatigue, peripheral oedema.

3. Assess severity of symptoms.


5. Identify precipitating and exacerbating factors.

6. Identify concomitant diseases relevant to heart failure and its management.

7. Estimate prognosis.

8. Anticipate complications.

9. Counsel patient and relatives.

10. Choose appropriate management.

11. Monitor progress and manage accordingly.
Heart Failure Pathway Version June 2006
Review Date June 2008

**Process Map**

**Management of Chronic Heart Failure**

Identification of patients with chronic heart failure in primary care *(Pathway 1)*

Identification and management of patients with acute heart failure: refer to European Society of Cardiology

Referral to local heart failure team (LHFT) *(pathway 2)*

**Optimise heart failure management**

Pharmacological therapy *(pathway 4)*

Initiation of specialist nurse-based care *(pathway 3)*

Consider Further investigations and invasive strategies *(pathway 5)*

Consider Referral to tertiary heart failure team (THFT) *(pathway 6)*

Consider Referral to palliative care team

**Discharged from heart failure clinic**

Open access re-referral
Pathway 1
Identification of patients with chronic heart failure in primary care

Clinical findings suggest diagnosis of chronic heart failure

Blood tests
ECG, CXR

ECG abnormal?
eg Q waves, LBBB, AF

CXR suggests cardiac failure?
eg pulmonary congestion

Blood test for BNP/NTProBNP - elevated?

Heart failure likely
Refer to local heart failure service/cardiologist

Echocardiogram

Heart failure due to left ventricular systolic dysfunction extremely unlikely - consider alternative diagnosis. Discuss with local heart failure team if high suspicion of heart failure persists

No/inconclusive/not known

Yes

Yes

No
1. **Clinical findings**

   **History**
   Symptoms: Breathlessness - orthopnoea, PND, NYHA classification. Fatigue.
   Ankle swelling
   Clues to underlying aetiology: CHD and risk factors for this. Hypertension. Alcohol excess. Valvular heart disease. Family history

   **Examination**
   Peripheral oedema
   Inspiratory crackles at the lung bases
   Tachycardia
   Third heart sound
   Displaced apex beat
   Elevated JVP

2. **Blood tests for patients presenting with heart failure**

<table>
<thead>
<tr>
<th>Test</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>FBC</td>
<td>- anaemia may precipitate/exacerbate</td>
</tr>
<tr>
<td>U/E</td>
<td>- renal failure cause/consequence of heart failure</td>
</tr>
<tr>
<td></td>
<td>- monitoring of drug adverse effects</td>
</tr>
<tr>
<td></td>
<td>- prognostic significance</td>
</tr>
<tr>
<td>Glucose</td>
<td>- detect diabetes mellitus</td>
</tr>
<tr>
<td>LFTs</td>
<td>- alcoholic cardiomyopathy</td>
</tr>
<tr>
<td></td>
<td>- prognostic significance</td>
</tr>
<tr>
<td>TFTs</td>
<td>- hyper/hypo may exacerbate heart failure</td>
</tr>
<tr>
<td>Lipids</td>
<td>- in patients with CHD to guide treatment</td>
</tr>
</tbody>
</table>

3. **12-lead resting ECG**

   LVSD is unlikely in the presence of a completely normal ECG.
   Changes in the ECG may provide clues to the aetiology.
   Presence of AF has a major bearing on management.

4. **Chest X-ray**

   Does not give direct evidence of cardiac dysfunction, therefore limited value in diagnosis of the syndrome of heart failure.
   Cardiomegaly may imply significant cardiac disease but LV dysfunction also occurs in the absence of cardiac enlargement.
   Chest X-ray may also show pulmonary congestion and other abnormalities in the lung fields eg bronchial carcinoma.
   SOLVD registry 61% had CTR > 0.5.

5. **BNP**

   The use of BNP as a screening test for LVSD has been evaluated and has been available in areas of the SEWCN. There is an ongoing audit of its clinical effectiveness.
Pathway 2

Establish point of referral

Identify eligible patients - screening system
Inclusion
Documented diagnosis of CHF, patients must reside within the service catchment area

Exclusion
Unwilling to receive the intervention, impaired cognitive ability (relative contraindication), other life-threatening illness requiring palliative therapy

NO
Refer back to Consultant/GP with covering letter

YES
Refer to Lead Heart Failure Nurse in LHFT/THFT

From Point of Referral (1-4)
(record time to initial patient/ family contact)

Baseline Documentation
Demographic details, extent of LVSD, duration of CHF, no of previous admissions for HF, active medical and social problems, contributing factors related to the current/ most recent hospitalisation

See/ contact the patient and ascertain willingness to accept the intervention

If appropriate
Provide education based on individual need - eg. supplement with a patient information booklet detailing diagnosis, crisis management and contact details

Document additional information in the heart failure case records: medication, NYHA class, BP, heart rate, rhythm, weight, signs of oedema, biochemistry

Develop a preliminary clinical management plan (CMP) addressing pharmacological and non-pharmacological management in the short term

Provide a copy of the CMP for the medical notes, the GP and offer a copy for the patient

Arrange the date/ time/ place of the baseline assessment (patient’s home, outpatient clinic or cardiac rehabilitation) - see pathway 3
Pathway 3
Baseline Assessment - LHFT

Assess functional capacity
NYHA class
Assess functional performance (if appropriate 6-min walk test, maximal exercise test)

Assess fluid status
Changes in body weight, lung crackles and hepatomegaly, extent of peripheral oedema, and lying and standing blood pressure

Define cardiac rhythm
12 lead ECG
QRS duration

Review haematology and biochemistry
Urea, electrolytes, creatinine - essential
Consider thyroid function, haematology, liver function, level of anticoagulation

Assess general health status
Level of co-morbidity (e.g. renal dysfunction, arthritis, respiratory disease - baseline spirometry)
Quality of life (quality of life questionnaire)

Review prescribed and ‘over the counter’ (see pathway 4)
Optimal medication
Optimal dose
Side effects
Inappropriate medication

Evaluate social circumstances
Living alone
Marital status
Psychosocial support
Education level
Age

Evaluate self management issues
Symptom management
Drug counselling
Rest and exercise
Dietary and social habits
Vaccinations
Travel

Clinical Management Plan (CMP)
Recommended components of care - use a multidisciplinary approach, increase access to healthcare, optimise drug therapy, early attention to a change in signs and symptoms, flexible diuretic regimen, intense education and counselling, attention to compliance and behavioural strategies.
In partnership with the patient and family discuss and agree future treatment options.
Copy of the agreed CMP in the patients medical notes, to the GP and offered to the patient.
Give handheld record

Clinical Assessment
Drug Therapy
Psychosocial

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Pathway 4

Pharmacological therapy for left ventricular systolic dysfunction (adapted from ESC guidelines 2005)

<table>
<thead>
<tr>
<th></th>
<th>ACEI</th>
<th>ARB</th>
<th>Diuretic</th>
<th>Beta blocker</th>
<th>Aldosterone antagonist</th>
<th>Digoxin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asymptomatic LV dysfunction</td>
<td>Indicated</td>
<td>If ACEI intolerant</td>
<td>Not indicated</td>
<td>Post-MI</td>
<td>Recent MI</td>
<td>With AF</td>
</tr>
<tr>
<td>Symptomatic CHF (NYHA II)</td>
<td>Indicated</td>
<td>Indicated with or without ACEI</td>
<td>Indicated if fluid retention</td>
<td>Indicated</td>
<td>Recent MI</td>
<td>(a) with AF (b) when improved from severe HF in sinus rhythm</td>
</tr>
<tr>
<td>Worsening CHF (NYHA III-IV)</td>
<td>Indicated</td>
<td>Indicated, with or without diuretic therapy</td>
<td>Indicated, combined (under specialist care)</td>
<td>Indicated</td>
<td>Indicated</td>
<td>Indicated</td>
</tr>
<tr>
<td>Severe CHF (NYHA IV)</td>
<td>Indicated</td>
<td>Indicated with or without ACEI</td>
<td>Indicated, combined diuretic therapy</td>
<td>Indicated</td>
<td>Indicated</td>
<td>Indicated</td>
</tr>
</tbody>
</table>

(ACEI=angiotensin converting enzyme inhibitor, ARB=angiotensin receptor blocker)

Refer to local protocols for optimisation and titration of heart failure medications and WeMeReC Bulletin vol.8 no.5 2001.

Consider clinical need for the following drugs with relative contra-indications in heart failure: 1) class I and class III anti-arrhythmics with the exception of amiodarone (reduced contractility, proarrhythmia), 2) calcium channel blockers with the exception of amlodipine and felodipine (reduced contractility and/or neurohormonal activation), 3) minoxidil (fluid retention), 4) doxazosin (fluid retention suggested), 5) corticosteroids (salt and water retention), 6) non-steroidal anti-inflammatory agents (sodium and water retention, antagonism of diuretic activity, increased systemic vascular resistance), 7) metformin (risk of lactic acidosis; especially in NYHA class III/IV and/or renal impairment), 8) thiazolidinediones (fluid retention), 9) tricyclic anti-depressants (postural hypotension, reduced contractility, pro-arrhythmia), 10) itraconazole (reduced contractility), 11) carbenoxolone (fluid retention), 12) macrolide antibiotics (pro-arrhythmia).
Pathway 5

‘Specialised’ investigations following diagnosis of CHF and invasive management strategies

The decision to proceed to further investigations and invasive strategies should be individualised and led by the local heart failure team based on the findings gathered from the pathway for identifying CHF patients and the initial assessment. Specific tests and management strategies will depend upon the suspected/known aetiology and may require involvement of tertiary heart failure team.

The main tests and treatment strategies that should be considered are listed below:

<table>
<thead>
<tr>
<th>Likely aetiology and investigation</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dilated cardiomyopathy</strong></td>
<td></td>
</tr>
<tr>
<td>Ferritin - ?haemachromatosis</td>
<td>Referral to appropriate specialist eg haematology, rheumatology, medical genetics</td>
</tr>
<tr>
<td>Viral titres - ?myocarditis</td>
<td></td>
</tr>
<tr>
<td>Autoantibodies - ?connective tissue disorder</td>
<td></td>
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<tr>
<td>Assessments for HIV, cardiac amyloidosis, Fabry disease etc.</td>
<td></td>
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<tr>
<td>Genetic studies</td>
<td></td>
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<tr>
<td><strong>Coronary artery disease</strong></td>
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<tr>
<td>ETT</td>
<td>Revascularisation</td>
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<tr>
<td>Nuclear study/stress echocardiography</td>
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<tr>
<td>Coronary angiography</td>
<td></td>
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<tr>
<td>Viability assessment</td>
<td></td>
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<tr>
<td>(stress echo, nuclear studies, cardiac MRI)</td>
<td></td>
</tr>
<tr>
<td><strong>Valvular and LV cavity disease</strong></td>
<td></td>
</tr>
<tr>
<td>Transoesophageal echocardiography</td>
<td>Valve annuloplasty, repair/replacement LV reduction surgery</td>
</tr>
<tr>
<td>Cardiac catheterisation</td>
<td></td>
</tr>
<tr>
<td><strong>Arrhythmia suspected</strong></td>
<td></td>
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<tr>
<td>Ambulatory ECG monitoring and/or cardiac event recorder</td>
<td>Permanent pacemaker AICD</td>
</tr>
<tr>
<td>VT stimulation studies</td>
<td>Electrophysiology opinion</td>
</tr>
<tr>
<td><strong>Dysynchrony Assessment</strong></td>
<td>Cardiac resynchronisation therapy</td>
</tr>
<tr>
<td>Tissue Doppler velocity echocardiography</td>
<td></td>
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</tbody>
</table>
Pathway 6

‘Tertiary Heart Failure Services’

The decision to refer to the tertiary heart failure team should be individualised and based on clinical evaluation led by the local heart failure team to identify patients who may benefit from tertiary heart failure input.

Local Heart Failure Team
identification of suitable patients

Consider Referral to Tertiary Heart Failure Team
Additional investigations (where necessary): 24hr ECG, coronary angiogram, right heart studies, tissue Doppler echo, 6 min walk test, peak VO$_2$, QoL assessment

Device Therapies
- NYHA class III/IV symptoms
- Optimal medical therapy
- Ejection Fraction <30%
- Resting QRS >120msec

Surgical Therapies
- Cardiac transplant
- Ventricular assist devices
- LV reduction surgery
- Valvular heart surgery

BiV ppm/ICD Implant
Objective post-implant review
- Improved: ➔ local HF team ➔ 1$^\text{st}$ care
- Not improved: 3$^\text{rd}$ heart function clinic

Liaison with surgical unit at UHW and transplant unit at QEII (Birmingham) and plan long term management