Nottinghamshire Heart Failure Traffic Light Guidelines

Red – Cardiology Care

Amber – Care shared

Green – Primary Care/Non specialist

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The Heart Failure Nottinghamshire Lights

Scope and Purpose
The purpose of the Heart Failure Nottinghamshire Lights is to provide local clinical and service guidance for General Practitioners and practice-based staff on the management of people diagnosed with heart failure. The Heart Failure Nottinghamshire Lights supports the QIPP workstream on the integrated care pathway for heart failure with recommended quality markers developed by the Nottinghamshire Coronary Heart Disease Network Heart Failure Group based on clinical evidence.

The Nottinghamshire Heart Failure Lights denote the colours Green, Amber and Red which indicates the clinical/therapeutic and service classification of patients’/carers journey along and between an integrated care pathway for heart failure and recommendations for treating heart failure (NICE 2010). The heart failure traffic light classification is a simple means of classifying patients into the various potential health sectors delivering heart failure, recognising that patients will move between the different sectors at different stages of their journey. The Heart Failure traffic light classification differs from the APC classification but is to be used in conjunction with NICE (2010) guidelines.

**PATIENTS MAY BE REFERRED DIRECTLY TO HEART FAILURE CLINICS AT NUH or KMH**

**GREEN** – defines patients with a CONFIRMED aetiological diagnosis and clinically stable and/or no unscheduled heart failure admissions in previous 6 months and on baseline medical therapy. Baseline medical therapy is defined by NICE and includes ACE inhibitors, beta blockers and diuretics. In patients intolerant of ACE inhibitors Angiotensin II receptor blockers (ARBs) are considered an alternative. Combination therapy with hydralazine and nitrates should be considered as an alternative baseline therapy in Afro-Caribbean patients.

**GREEN PATIENTS MAY BE MANAGED IN PRIMARY CARE BUT CONSIDER REFERRAL TO A SPECIALIST FOR CONFIRMATION OF AETIOLOGY.**

**AMBER** – classify if clinically unstable patient and/or 1-2 unscheduled admissions in previous 6 months and taking intermediate medical therapy. Intermediate medical therapy will include patients intolerant of baseline therapy and those requiring spironolactone or eplerenone in addition to baseline treatments. Ivabradine requires consideration in patients in sinus rhythm with heart rate > 75 bts/minute and ejection fraction <35% despite treatment with beta blockers and optimal baseline therapy. Ivabradine may also be considered in patients intolerant of or unable to take betablockers. Consider cessation of ACE inhibitors or ARB and switch to sacubitril/valsartan (Entresto®) in patients with LVEF<35% who remain symptomatic (NYHA II-IV).

**AMBER PATIENTS WILL USUALLY NEED A COMBINED CARE APPROACH BETWEEN PRIMARY AND SPECIALIST CARE. THIS MAY INVOLVE THE HEART FAILURE MULTI-DISCIPLINARY TEAM WITH THE SUPPORT OF SPECIALIST HEART FAILURE NURSES.**

**RED** – classify if clinically unstable patient and/or more then 2 unscheduled heart failure admissions in the previous 6 months on advanced medical therapy. Advanced medical therapy consists of either digoxin (particularly for patients in AF) and/or an ARB and/or prescribed metolazone or bendroflumethiazide therapy added to baseline/intermediate therapy.

**RED PATIENTS SHOULD BE CONSIDERED FOR REFERRAL TO CONSIDER PALLIATIVE OR ADVANCED STRATEGIES E.G. BIVENTRICULAR PACING, DEFIBRILLATOR IMPLANTATION.**

Approved by Nottinghamshire APC March 2017 Review Date March 2019 Authors : Dr John Walsh (johh.walsh@nuh.nhs.uk) and Notts Heart Failure Group
**Green**

**CLINICAL**
Stable with diagnosis confirmed by Echo, and/or no unplanned HF admissions in the previous 6 months

**THERAPY**
Baseline therapy:
- ACE or ARB if ACE intolerant or
- Hydralazine with nitrate if ACE and ARB intolerance or Afro-Caribbean
- Beta-blocker
- Diuretic (if fluid retention)

**Amber**

**CLINICAL**
Unstable and/or 1-2 unplanned HF admissions in the previous 6 months

**THERAPY**
Intermediate therapy:
- Failed baseline therapy or
- On-going baseline therapy AND Spironolactone or Eplerenone added
- Consider addition of Ivabradine if HR >75 beats per minute and ejection fraction <35%
- Consider sacubitril/valsartan (Entresto®)

**Red**

**CLINICAL**
Unstable and/or 2 unplanned HF admissions in the previous 6 months, advanced care or palliation to be considered

**THERAPY**
Advanced therapy:
- Addition of Digoxin if AF or on-going symptoms despite intermediate therapy
- Addition of ARB to intermediate therapy
- Thiazide therapy required in addition to loop diuretics

**CLINICAL / THERAPEUTIC CLASSIFICATION**

**SERVICE CLASSIFICATION**

- Open Access Echocardiogram
- Primary Care
- Specialist Nurse

- General Medical or Cardiology Clinics
- HF Multidisciplinary Team
- Inpatient Decompensated HF

- Palliative Therapy Multidisciplinary Team
- Cardiologist
- GP
- HF Specialist Nurses
- Community Nurses
- Patient & Carers

- Diagnosis for planning of Management & periodic review
- HF Clinics follow up +/- HF specialist nurse

- Advanced Heart Failure team
Detailed history and a clinical examination lead to suspicion of heart failure.

### Assessment of probability

1. **Clinical History - 4 features**
   - History of CAD (MI, PCI, CABG)
   - Hypertension
   - Use of diuretics
   - SOB—orthopnoea and PND

2. **Physical Examination - 4 findings**
   - Crepitations
   - Bilateral ankle oedema
   - Heart murmur and/or displaced apex beat
   - Elevated JVP

3. **ECG - Any abnormality but especially the following 4:**
   - Previous MI or IHD
   - LVH
   - AF
   - Bundle branch block

### Brain natriuretic peptides (BNP)
- **High Levels** — >400 (2000) pg/ml
- **Raised levels** — ≥100-400 (400-2000) pg/ml
- **Normal levels** — < 100 (400) pg/ml

### Cardiac causes of elevated BNP
- Heart failure
- ACS
- PE
- Myocarditis
- LVH
- Hypertrophic/restrictive CM
- Valvular heart disease
- Congenital heart disease
- Arrhythmias
- Cardioversion
- ICD shock
- Post cardiac surgery

### Non cardiac causes of elevated BNP
- Elderly
- Ischaemic stroke
- Subarachnoid bleed
- Renal dysfunction
- Liver dysfunction
- COPD
- Severe infection
- Severe burns
- Anaemia
- Metabolic — Diabetes (DKA)
- Thyrotoxicosis

### Initial investigations — CXR, BNP and baseline bloods
- i.e. FBC, U&E (GFR), LFTs, Thyroid function, Lipids, Glucose (HbA1c), Ferritin, TIBC.

### One or more present

#### Abnormal BNP levels high or raised
- Diastolic impairment
- Dilated atria/ventricles

#### Echocardiogram

#### HF with reduced ejection fraction (HFrEF) - LVEF <40%
- Determine aetiology and start treatment
- Consider cardiology referral

#### Valve disease or other structural abnormality

#### No echocardiographic abnormality

#### Normal BNP levels

#### HF with preserved or midrange ejection fraction
- HFP EF or HFmEF
- LVEF >40%

#### Manage comorbidities
- BP, CAD and diabetes
- Consider referring to cardiology if symptoms persist
- see diagnosing heart failure (2)
Diagnosing heart failure (2) — Diastolic dysfunction

Suspect heart failure with preserved (HFpEF) or mid range ejection fraction (HFmEF)

Diagnosis*

1. Symptoms and signs of cardiac failure
2. LVEF >40%
3. Elevated BNP > 100pg/ml *
4. AND at least one additional criterion:
   a) Relevant structural heart disease (LVH, dilated atrium)
   b) Diastolic dysfunction reported on echo

*Normal BNP means HF unlikely but does not completely exclude the diagnosis

Diagnosis confirmed

DIURETICS
(see heart failure medication summary)

AND

FLUID MANAGEMENT
Optimise and treat REVERSIBLE contributory pathology

Increase diuretic (one titration step*)
- Increase in daily weights >2kg over 2 days
- Increased breathlessness
- Increased oedema

*One titration step = 40mg furosemide or 1mg bumetanide

Decrease diuretic (one titration step*)
- Decrease in daily weight to < 1kg of dry weight maintained over 2 days
- No breathlessness for 4/52**
- No oedema for 4/52**
- Symptoms of dehydration (eg thirst, dizziness, hypotension)

** Aim to reduce dose one titration step if stable symptoms

Heart failure definition

Heart Failure with
- Reduced ejection fraction (HFrEF) - LVEF<40%
- Mid-range ejection fraction (HFmEF) - LVEF 40-49%
- Preserved ejection fraction (HFpEF) - LVEF>50%

Heart failure definition

Systolic impairment and EF

Severe reduction—EF <35%
Moderate reduction—EF 35-39%
Mild reduction—40-49%
Normal—EF<50%
Treatment of Chronic Heart Failure

Heart failure due to left ventricular systolic dysfunction (HFrEF)

First line treatment

Offer both an:
- ACE inhibitor licensed for heart failure
  ⇒ Consider an ARB if patient is intolerant to an ACE inhibitor
  ⇒ Consider hydralazine with a nitrate if intolerant to ACE inhibitor and an ARB
- A Beta-blocker licensed for heart failure

If symptoms PERSIST despite stable first-line treatment seek specialist advice and consider second-line treatment.

Second line treatments for consideration of adding to current therapy in patients with LVEF<35%:
- Spironolactone or second line Eplerenone (especially in moderate to severe heart failure or MI in the past month)
- Ivabradine (only if HR>75 beats per minute, and in combination with standard therapy including beta-blocker therapy, ACE inhibitors and aldosterone antagonists and ejection fraction <35% or where beta-blockers are contraindicated or not tolerated)
- Consider cessation of ACE inhibitors or ARB and switch to sacubitril/valsartan (Entresto®) in patients with LVEF<35% who remain symptomatic (NYHA II-IV) despite taking a stable dose of ACE inhibitor or ARB.
- An ARB licensed for heart failure in addition to ACE inhibitor
- Add hydralazine with a nitrate (especially in people of African or Caribbean origin with moderate to severe heart failure)

If symptoms persist despite 2/12 of optimal therapy consider:
- Biventricular pacing (CRT especially if LBBB and /or QRS>130msec)
- ICD when LVEF<35% where appropriate
- Digoxin (in patients with AF)
- Thiazide diuretics

If symptoms despite advanced therapies consider:
Heart Failure Medication Summary - for use with Nottinghamshire Heart Failure Traffic Lights

ACE Inhibitors

All patients with HFrEF should receive an ACE inhibitor unless contraindicated. **Target Dose** — titrated at intervals of at least two weeks until target dose is reached or until significant side effects occur (in which case, maximum tolerated dose should be maintained).

<table>
<thead>
<tr>
<th>Medicine</th>
<th>Dosage Increments</th>
<th>Target Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ramipril</td>
<td>1.25mg OD; 2.5mg OD; 5mg OD; 10mg OD</td>
<td>10mg a day</td>
</tr>
<tr>
<td>Perindopril</td>
<td>2mg OD; 4mg OD</td>
<td>4mg a day</td>
</tr>
<tr>
<td>Lisinopril</td>
<td>2.5mg OD; 5mg OD; 10mg OD; 15mg OD; 20mg OD; 30mg OD; 35mg OD</td>
<td>35mg a day</td>
</tr>
<tr>
<td>Enalapril</td>
<td>2.5mg BD; 5mg BD; 10mg BD; 15mg BD; 20mg BD</td>
<td>10 - 20mg BD</td>
</tr>
</tbody>
</table>

**NB.** Potassium sparing diuretic should be stopped and substituted with a loop diuretic if appropriate prior to initiating an ACE inhibitor. **Monitor U&Es, creatinine and BP prior to each dose increase.**

Angiotensin II Receptor Blocker (ARB)

Some ARBs are licensed as an alternative to ACE inhibitors, where the patient has to discontinue ACE inhibitors because of persistent cough. **Only to be used when the patient is intolerant of ACE Inhibitors** **Monitor U&Es, creatinine and BP prior to each dose increase.**

<table>
<thead>
<tr>
<th>Medicine</th>
<th>Dosage Increments</th>
<th>Target Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Losartan</td>
<td>12.5mg OD; 25mg OD; 50mg OD</td>
<td>150mg OD</td>
</tr>
<tr>
<td>Candesartan</td>
<td>4mg OD; 8mg OD; 16mg OD; 32mg OD</td>
<td>32mg OD</td>
</tr>
</tbody>
</table>

Loop Diuretics

Indicated in patients with signs and symptoms of decompensating heart failure, such as evidence of oedema, worsening breathlessness, orthopnoea or paroxysmal nocturnal dyspnoea. **AIM FOR MINIMUM MAINTENANCE DOSE**

**Target doses for loop diuretics**

Patients’ signs and symptoms should be reviewed three days after the dose is increased or decreased and if the dose is sustained U+Es checked thereafter.

**Increasing Furosemide**

<table>
<thead>
<tr>
<th>Current dose:</th>
<th>Increase to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>40mg OD</td>
<td>80mg OD</td>
</tr>
<tr>
<td>80mg OD</td>
<td>120mg (80mg am; 40mg pm)</td>
</tr>
<tr>
<td>120mg (80mg am; 40mg pm)</td>
<td>160mg (80mg BD) Consider initiating Spironolactone / Metolazone if symptoms persist.</td>
</tr>
</tbody>
</table>

**Increasing Bumetanide**

<table>
<thead>
<tr>
<th>Current dose:</th>
<th>Increase to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1mg OD</td>
<td>2mg OD</td>
</tr>
<tr>
<td>2mg OD</td>
<td>3mg (2mg am; 1mg pm)</td>
</tr>
<tr>
<td>3mg (2mg am; 1mg pm)</td>
<td>4mg (2mg am; 2mg pm) Consider initiating Spironolactone / Metolazone if symptoms persist.</td>
</tr>
</tbody>
</table>

**An increase in diuretic should be considered when:**

- Increase in daily weights of ≥2kg (approximately 4lbs) over 2-3 days
- Increased dyspnoea.
- Increased oedema.

**A decrease in diuretic should be considered when:**

- Decrease in daily weight to 1kg less than dry weight sustained over 2/3days.
- No symptoms of dyspnoea
- No oedema
- Symptoms of dehydration (eg thirst, dizziness, hypotension).

Hydralazine / Nitrate combination

Evidence suggests that the AfroCarribean population tend to have a less active renin-angiotensin system and less bioavailable nitric oxide than Caucasians. NICE (2003) recommend that Hydralazine / Nitrate combination may be prescribed in patients who are intolerant of ACE inhibitors and ARBs or in addition to these agents in AfroCarribean patients who remain symptomatic (Scottish Intercollegiate Guidelines Network (SIGN), 2007).

<table>
<thead>
<tr>
<th>Medicine</th>
<th>Start Dose</th>
<th>Maintenance Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydralazine</td>
<td>25mg TDS – QDS</td>
<td>50-75mg QDS</td>
</tr>
<tr>
<td>Hydrochloride</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isosorbide</td>
<td>20mg BD or 30mg MR OD</td>
<td>120mg per day (divided doses)</td>
</tr>
<tr>
<td>Mononitrate</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Approved by Nottinghamshire APC March 2017

Review Date March 2019
**Aldosterone Antagonists**

**Spironolactone**
Indicated in those patients with ongoing symptoms (NYHA II - IV) despite other medical therapy. Before initiating spironolactone any potassium supplements should be discontinued.

**Eplerenone — second line aldosterone antagonist if spironolactone is not tolerated**
Eplerenone has evidence of benefit in patients with LVSD post myocardial infarction if started within 3-14 days of MI, in a secondary care setting. Patients with CHF in NYHA II-IV may also benefit from aldosterone antagonism with eplerenone (EMPHASIS 2011).

Monitoring for patients taking aldosterone antagonists.

**Renal function and potassium to be rechecked after:**
- 1 week
- 4 weeks
- 8 weeks
- 12 weeks
- 3 monthly for the first year
- 6 monthly thereafter

Actions required based on monitoring show in table opposite

<table>
<thead>
<tr>
<th>Criteria for review or discontinuation</th>
<th>Recommended action</th>
</tr>
</thead>
<tbody>
<tr>
<td>K+ ≥ 6.0 mmols/L</td>
<td>Discontinue aldosterone antagonist</td>
</tr>
<tr>
<td>K+ 5.5-5.9 mmol/L or creatinine to &gt;200 µmol</td>
<td>Decrease aldosterone antagonist to 25mg alternate days</td>
</tr>
<tr>
<td>Diarrhoea, vomiting, gynaecomastia</td>
<td>Review treatment and seek advice from GP or cardiologist</td>
</tr>
<tr>
<td>Urea increases to ≥ 18 mmol/L or by 50% from baseline</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Medicine</th>
<th>Dose</th>
<th>Dosage Increments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spironolactone</td>
<td>25 mg OD</td>
<td>Can be increased under specialist guidance</td>
</tr>
<tr>
<td>Eplerenone</td>
<td>25 mg OD</td>
<td>Should be titrated to 50mg OD within 4 weeks if appropriate (BNF, 2010)</td>
</tr>
</tbody>
</table>
**Ivabradine (NICE 2012)**

NICE TA 267: Ivabradine is recommended as an option for treating chronic heart failure for people:
- with NYHA class II to IV stable chronic heart failure with systolic dysfunction and
- who are in sinus rhythm with a heart rate of 75 bpm or more and
- who are given ivabradine in combination with standard therapy including beta-blocker therapy, ACE inhibitors and aldosterone antagonists, or when beta-blocker therapy is contraindicated or not tolerated and
- with a left ventricular ejection fraction of 35% or less.

Ivabradine should only be initiated after a stabilisation period of 4 weeks optimised standard therapy with ACE inhibitors, beta-blockers and aldosterone antagonists.

**Initiation:**
In line with NICE recommendations, Ivabradine for heart failure should be initiated by a heart failure specialist with access to a multidisciplinary heart failure team. Dose titration and monitoring should be carried out by a heart failure specialist, or in primary care by a heart failure specialist nurse.

Do not initiate in acute heart failure or if heart rate < 75 beats per minute.

**Ventricular rate at rest should not be allowed to fall below 50 beats per minute**

**Titration:**
Usual starting dose is 5mg bd (2.5mg bd in patients >75yrs old). After two weeks of treatment, the dose can be increased to 7.5mg bd (5mg bd in patients >75yrs old) if resting heart rate is persistently above 60 beats per minute., or decreased to 2.5mg bd if resting heart rate is persistently below 50 beats per minute or if patient is experiencing side-effects related to bradycardia (e.g. dizziness, fatigue or hypotension). If heart rate is between 50 and 60 bpm, the dose of 5 mg twice daily should be maintained. Discontinue use if heart rate remains below 50 beats per minute or symptoms of bradycardia persist despite dose reduction.

**Medicine** | **Dosage Increments** | **Target Dose**
---|---|---
Ivabradine | 2.5mg bd, 5mg bd, 7.5mg bd | Dose that maintains resting HR between 50 and 60 beats per minute without intolerable side-effects

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**Sacubitril/Valsartan (Entresto®) (NICE 2016)**

Recommended for patients in NYHA II-IV with LVEF<35% who remain symptomatic despite treatment with a stable dose of ACE inhibitors or ARBs.

**Initiation:**
In line with NICE recommendations, Entresto® should be initiated by a heart failure specialist with access to a multidisciplinary heart failure team. Dose titration and monitoring should be carried out by a heart failure specialist, or in primary care by a heart failure specialist nurse. Do not initiate in patients with a history of angioedema or concomitant use with ACE inhibitors or ARBs. **DO NOT INITIATE THERAPY UNTIL AT LEAST 36 HOURS AFTER STOPPING ACE INHIBITOR THERAPY**. Avoid if systolic BP<100mmHg. **Monitor U&Es, creatinine and BP prior to each dose increase.**

**Titration:**
Usual starting dose is one tablet of 49/51mg as single tablet complex doubles at 2-4 weeks to target dose of one tablet 97mg/103mg twice daily. Consider lower starting dose of 24mg/26mg twice daily in pts not currently taking ACE inhibitors or ARBs, patients with SBP<120mmHg or renal impairment.

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**Thiazide Diuretics-Metolazone and Bendroflumethiazide**

Bendroflumethiazide or Metolazone (2.5mg-5mg given once, twice or three times a week depending on patients condition) may be useful in patients with resistance to large doses of loop diuretic. This should be undertaken in liaison with a Cardiologist. Close supervision and monitoring of symptoms, fluid balance and electrolytes will be required for these patients. Patients newly initiated on thiazides with loop diuretics should have their renal function checked as follows:

**Once weekly thiazide - U+E every two weeks**
**Twice weekly thiazide - U+E once a week**
**Three times a week thiazide - U+E should be checked twice a week**

NB. If patient on Metolazone for longer than three months & renal function stable, use clinical judgement in relation to frequency of monitoring as agreed with cardiologists.

Metolazone is no longer manufactured in the UK — it can be imported into the UK, but some importable brands contain dyes not approved for use in the EU. Bendroflumethiazide will be considered the first line thiazide in patients requiring sequential nephron blockade, but where metolazone is considered to be required, this can be accessed and supplied by secondary care.

Patients in whom metolazone is no longer appropriate or available should be switched to the equivalent dose of bendroflumethiazide under careful medical supervision as equivalent efficacy can not be assumed.
The following will be provided at the appropriate time according to individual patient and carer needs:

- Specialist care (condition-specific and/or palliative)
- Specialist psychological support
- Respite care
- Spiritual support
- Self-help and support services
- Equipment
- Verification of death
- Care after death
- Bereavement support needs assessed and agreed. Referral made for further support if appropriate.
- Review case in MDT
- Consider after death audit
- EPaCCs/Special Patient Note updated

GSF initiated
Carer needs assessment fast-tracked
Holistic needs assessed
Understanding and information needs assessed
Consider NHS Continuing Health Care
Appoint lead GP / nurse
DS1500 completed (if < 6 months)

EPaCCS consent, complete, Special Patient Note (SPN) where required
Advance care planning (ACP) inc. ADRT, PPC initiated
DNACPR status reviewed and communicated
Respite care arranged if appropriate
Blue Badge application fast-tracked if applicable
Medication reviewed

ACP inc. ADRT, PPC reviewed
DNACPR status reviewed and communicated
Continuing Care fast track completed if additional service funding required
Anticipatory medications supplied
Carer needs reviewed
Support arranged for provision of terminal care in setting of patient’s choice e.g. Hospice at Home
EPaCCS/Special Patient Note updated

Priorities of Care of the Dying Person – Create an individual plan of care
Bereavement support needs assessed
EPaCCS / Special Patient Note updated

24 hour access to advice and co-ordination of care underpin the guide
NUH ICD Deactivation algorithm

Patient with ICD approaches end of life
Decision made to institute End of Life Care

Discussion of ICD deactivation as early as possible with patient by
any of the following healthcare professionals:
- Patient’s cardiologist
- Patient’s GP
- Oncologist/Palliative Care specialist
- Heart failure nurse
- Community Matron
- Palliative Care nurse
- Cardiac physiologist
- Any other physician with main responsibility for care of patient at
time of decision for instituting End of Life Care

Agree decision to deactivate ICD and logistics of ICD deactivation with Cardiology by
contacting, in order of preference:
- Patient’s Cardiologist
- Device or Heart Failure consultant via Pacing Clinic
- On call Consultant Cardiologist

Planned deactivation (Day time hours only)

- Complete ‘Request for Deactivation of ICD’ form
- Contact Pacing clinic to arrange ICD deactivation,
  and fax ‘Request for Deactivation of ICD’ form to:
  Telephone number: 01159691169 Ext 56177
  Fax number: 0115 9628097
- ICD deactivation
  Either patient attends Pacing Clinic
  Or
  Cardiac Physiologist attends current patient location
- Send copy of ‘Request for Deactivation of ICD’ form
to GP, Heart Failure nurse, Community
matron/Palliative Care nurse/patient/any other
relevant healthcare professional involved in care of patient

Emergency temporary deactivation

- Out of hours while awaiting planned deactivation, or
- When planned deactivation was not carried out, and the Cardiac Physiologist is unable
to get to the patient immediately, or
- When patient is imminently dying

- Place a magnet over the ICD site on the patient’s skin, and ensure it is taped down.
  The magnet will deactivate shock function and anti tachycardia pacing, but not
  bradycardia pacing.
- The magnet needs to be kept in position to deactivate the ICD, including after death