



Stoke on Trent

Clinical Commissioning Group
Practice Development and Performance

Best practice in the clinical management of atrial fibrillation in general practice

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Purpose

NHS Stoke on Trent has commissioned this knowledge resource to support best practice in the clinical management of atrial fibrillation by health professionals in general practice. Practices may choose to adopt or adapt sections of the document as their own practice protocol if they do not already possess a current protocol for the clinical management of atrial fibrillation. It will help GPs and practice nurses who do not take a lead in their practice in relation to atrial fibrillation to 'catch up' on the essential aspects of clinical management.

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Reference sources

The document has been collated using the following guidance:

European Society of Cardiology. Guidelines for the management of atrial fibrillation. *E Heart J*. 2010; 31: 2369-429.

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Shropshire and Staffordshire Heart and Stroke Network. *Antiplatelet prescribing guideline*. Medicines Management.

www.medicinesmanagementstoke.nhs.uk/Antiplatelet_Prescribing_Guideline_SSHSN_v7_Feb_2011.pdf.pdf

Shropshire and Staffordshire Heart and Stroke Network. *Atrial Fibrillation Strategy. Draft 1. Version 4*. 2011.

Disclaimer

Information provided herein is for educational guidance only. Healthcare professionals should use their clinical judgment in individual cases and arrive upon a shared care management plan with their patients. This resource is based on current best evidence at the time of compilation and other national guidelines. The authors recognise that new evidence can come into existence rapidly, and clinicians should follow current best evidence at the particular time of applying their knowledge and skills in patient care for individual patients.

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1. Introduction

Atrial fibrillation (AF) is a cardiac arrhythmia in which the electrical activity in the atria becomes chaotic and, subsequently, the atria do not contract in a coordinated way. The result of this is that the sinus node does not conduct regular electrical impulses to the ventricles so ventricular contraction, and thus pulse rate, also become irregularly irregular. Most patients with AF have additional significant comorbidities and up to two thirds may have three or more comorbidities.¹

1.1. Prevalence

AF is common:^{1,2}

- Observed prevalence of AF across primary care in England is 1.4%²
- The local observed prevalence of AF among practices in Stoke on Trent was 1.35% (range 0.19%-2.32%) in 2010/11
- The true national prevalence is thought to be around 1.7%, increasing up to 8% in those over 65 years old and further as the population reaches over 80 years old^{3,4}

Disease burden of AF increases with age. The lifetime risk of developing AF at age 55 years is thought to be nearly one in four.⁵

1.2. Risks of AF

AF results from uncoordinated electrical activity within the heart's atria resulting in an irregular ventricular response. This can occur intermittently or for more prolonged spells. This is thought to result in stasis of blood within the atria and subsequent clot formation.²

The most significant associated risk of AF is thus thromboembolism, most commonly causing stroke – AF results in:

- 5-6x increased annual risk of stroke⁴
- 14% of all strokes = 12,500 strokes a year²
- strokes of generally greater severity, mortality and morbidity resulting in more lengthy hospital stays compared with strokes occurring in people without AF^{2,4}
- 6,000 strokes that could be prevented if patients were adequately risk stratified and anticoagulated in primary care²

Thromboembolic events may occur elsewhere in the body with sequelae such as:

- ischaemic limbs
- myocardial infarction (if coronary emboli occur)

Other risks of AF are heart failure and impaired cognitive function.⁵

Recent evidence has shown that women with AF have reduced survival rates, even after adjustment for BMI, hypertension, smoking, diabetes, hypercholesterolaemia and education status.⁶

Bearing the risks of AF in mind, see Box 1 for the six key objectives for AF management

Box 1: NHS Shropshire and Staffordshire Heart and Stroke Network: Six key objectives for AF Management

- 1) Opportunistic/targeted case detection including taking a manual pulse to detect AF
- 2) Accurate diagnosis of AF from an ECG
- 3) Further investigations and clinical assessment, including risk stratification for stroke and thromboembolism
- 4) Antithrombotic therapy as appropriate
- 5) Development of a management plan – rate-control, rhythm-control or referral
- 6) Follow-up and review

1.3. Who is at risk of getting AF?

The risk of AF increases with age.

The most common cause of AF is hypertension.

Other causes of, and associations with, AF include:^{1,7}

- Ischaemic heart disease
- Heart failure
- Valvular heart disease and rheumatic heart disease
 - Less common cardiac causes include – sick sinus syndrome, pre-excitation syndromes e.g. Wolff-Parkinson-White syndrome, cardiomyopathy, pericardial disease, atrial septal defect, congenital heart disease, atrial myxoma
- Pulmonary carcinoma, pneumonia, pulmonary embolism, thoracic surgery
- Hyperthyroidism
- Acute infection
- Electrolyte imbalance – for example, hypokalaemia, hypomagnesaemia, hypocalcaemia
- Diabetes
- Obesity (BMI $\geq 30\text{kg/m}^2$)
- Excessive caffeine and/or alcohol intake
- Smoking
- Drugs – bronchodilators, thyroxine, cocaine, possibly glucocorticoids⁸

A risk scoring system to predict the 10-year risk of patients developing AF has been developed⁹

- To identify patients who may be at greater risk of AF
- To help to detect new cases
- To actively manage risk factors for AF in an attempt to prevent it from developing

Patients are scored according to Table 1. The scores are translated into a risk over the next 10 years, see Table 2.⁹

Table 1 Risk scoring tool to calculate 10 year risk of developing AF⁹

	Score	
Age (years)		
45-49	-3 Women	1 Men
50-54	-2 Women	2 Men
55-59	0 Women	3 Men
60-64	1 Women	4 Men
65-69	3 Women	5 Men
70-74	4 Women	6 Men
75-79	6 Women	7 Men
80-84	7 Women	7 Men
≥85	8 Women	8 Men
BMI		
<30 kg/m ²	0	
≥30 kg/m ²	1	
Systolic Blood Pressure		
<160 mmHg	0	
≥160 mmHg	1	
Treatment for hypertension		
No	0	
Yes	1	
PR interval on ECG (ms)		
<160	0	
160-199	1	
≥200	2	
Age at which significant cardiac murmur developed (years)		
45-54	5	
55-64	4	
65-74	2	
75-84	1	
≥85	0	
Age of heart failure (years)		
45-54	10	
55-64	6	
65-74	2	
≥75	0	

Table 2 Risk corresponding with score from Table 1⁹

Risk score	≤0	1	2	3	4	5	6	7	8	9	≥10
Predicted risk	≤1%	2%	2%	3%	4%	6%	8%	12%	16%	22%	>30%

1.4. Classification

The current classification for AF relates to the duration over which the irregular heart rhythm has been present.¹⁰

Initial event = first detected episode	<ul style="list-style-type: none">• Duration: May be unknown• May be self-limiting and non-recurrent or subsequently develop into paroxysmal, persistent or permanent AF
Paroxysmal AF	<ul style="list-style-type: none">• Duration: ≤ 7 days• Spontaneous reversion back to sinus rhythm• This carries the same stroke risk as persistent/permanent AF
Persistent AF	<ul style="list-style-type: none">• Duration: > 7 days• Will not spontaneously revert back to sinus rhythm
Permanent AF	<ul style="list-style-type: none">• Duration: usually > 1 year• Cardioversion:<ul style="list-style-type: none">• Attempted but failed• Successful but subsequent relapse• Not attempted and decision made not to attempt cardioversion• Reversion to sinus rhythm possible if underlying cause of AF treated

Patients may move through different categories of AF, for example, a patient who initially has paroxysmal AF may later develop persistent AF, this in turn could subsequently become permanent.

2. Diagnostic approach

2.1. Presentation

Patients in AF may present:¹¹

- ***Acutely unwell:*** patients presenting with AF of any duration associated with haemodynamic instability require emergency hospital admission for emergency cardioversion.¹
- ***Symptomatic:*** with symptoms of palpitations, shortness of breath, chest discomfort, syncope/dizziness or stroke/TIA.¹ 18% of patients presenting with stroke are found to be in AF.² Thus a routine pulse check is essential during assessment of any such patient to detect an irregular pulse.
- ***Opportunistically:*** symptoms can be non-specific or absent. Thus, opportunistic pulse checks are essential in detecting undiagnosed cases, particularly in at-risk groups.

Recommendations for primary care professionals to improve timely detection of AF

- Targeted (offering a pulse check and ECG) and opportunistic (taking the pulse of patients and doing an ECG in those in whom it is found to be irregular) screening are equally effective in detecting new cases of AF among those at risk, in particular, those aged 65 years and over.³ Thus GPs and practice staff should be encouraged to opportunistically check the pulse of all patients in the at risk groups at each attendance
- Pulse rate and regularity be included in disease management templates for hypertension, ischaemic heart disease, stroke and heart failure and during the NHS Health Check programme.² Opportunities for screening include during provision of flu vaccinations in the surgery or at patient's home

2.2. Investigations

2.2.1. 12-lead Electrocardiogram (ECG)

All patients in whom AF is suspected due to detection of an irregular pulse should undergo a 12-lead ECG. The characteristic features of AF on ECG are:

- An irregular baseline with no discernible P waves
- An irregular ventricular response indicated by irregularly irregular QRS complexes

A 12-lead ECG is the gold-standard method of diagnosing AF, however some practices employ a single channel ECG recorder (e.g. the Omron HeartScan) as a rapid first-line assessment of cardiac rhythm (see Appendix 1 for further information). If abnormalities are detected on single-channel devices, a 12-lead ECG should subsequently be performed for a more thorough assessment.

A 12-lead ECG may also provide evidence pertaining to any underlying cardiac cause of the AF, for example, structural, electrophysiological or ischaemic causes.¹¹

2.2.2. Ambulatory ECG recording

Patients in whom paroxysmal AF is suspected but who are in sinus rhythm at the time of the 12-lead ECG should be considered for ambulatory ECG recordings over at least 24 hours; event recorder ECG devices can be used for episodes occurring more than 24 hours apart.¹

2.2.3. Transthoracic echocardiography

All patients should be considered for echocardiography; however, echocardiography is strongly indicated in the following patients:

- Younger patients (e.g. <65 years) where a rhythm control strategy is likely to be favoured and the consequences of associated cardiac abnormalities are likely to be most significant
- Those being considered for cardioversion (electrical or pharmacological)
- Those thought to have (a high risk of) structural, functional or valvular abnormalities and in whom determining this definitively may direct clinical management
- Those for whom risk scoring for antithrombotic therapy requires refinement – e.g. objective evidence of heart failure required for CHADSVASc

3. Identifying the underlying cause of atrial fibrillation

3.1. Blood pressure

Blood pressure measurement is essential to:

- Identify the underlying cause of AF
- Assess the haemodynamic status of the patient
- Promote adequate BP control to reduce risks of antithrombotic medication and minimise risk of further cardiovascular events

3.2. Physical examination

The following examination should be undertaken:

- Cardiovascular examination – assess for:

- cardiovascular compromise
- valvular heart disease
- heart failure
- Respiratory examination – assess for
 - lung disease (may have precipitated AF)
 - signs of pulmonary oedema
- Thyroid examination – assess for:
 - hyperthyroidism as a possible underlying cause

3.3. Blood tests

The following tests should be considered:¹¹

- Urea and electrolytes (U&E)
- Full blood count (FBC)
- Liver function tests (LFT)
- Blood glucose
- Thyroid function tests (TFT) – if hyperthyroidism is suspected
- B-natriuretic peptide (BNP) – if heart failure is suspected

3.4. Chest x-ray

Chest x-ray should be considered to rule out the possibility of pulmonary malignancy as an underlying cause.

4. Clinical management

4.1. Lifestyle modification for people with atrial fibrillation

- Smoking cessation
- Reduce excessive alcohol and/or caffeine consumption
- Teach patients to be 'pulse aware' – particularly if patients have paroxysmal AF
 - Teach patients how to check their pulse rate and rhythm
 - Correlate pulse rate and rhythm with their symptoms

4.2. Drug therapy

4.2.1. Antithrombotics

The primary consideration of **all** stable patients with confirmed AF should be to commence antithrombotics unless specifically contraindicated and once comorbidities (e.g. elevated blood pressure) have been appropriately managed

The two most commonly used agents to date are warfarin and aspirin (both 75mg to 300mg aspirin daily have been investigated in large trials but there is no evidence that 300mg is superior to 75mg so most UK cardiologists favour the smaller dose).

Warfarin is underused among patients at the high risk of stroke,^{2,4} often due to clinician anxiety about the risk of haemorrhage and falls.⁴

- Recent evidence suggests that risk of bleeding is not increased among patients on warfarin when compared to those on aspirin and the beneficial effect on stroke reduction outweighs the risk of bleeding if the INR is well controlled.⁴
- Warfarin is more effective in reducing stroke compared with aspirin: 64% versus 22%.^{2,12}
- Where appropriate and necessary, clinicians should anticoagulate all patients at high risk of stroke rather than start aspirin
- Unless specifically indicated (e.g. in patients with certain coronary stents), long-term concomitant antiplatelet and warfarin use is not advised
 - It is appropriate to continue aspirin while initiating warfarin, until the INR is in the therapeutic target
 - If concomitant antiplatelet and anticoagulation therapy is indicated, tight control and regular monitoring of the INR is essential. Consideration should be given to the addition of a proton pump inhibitor as gastroprotection especially in the elderly.

If **warfarin** is to be used:

- Dedicated INR monitoring is mandatory and clinicians involved must be adequately and appropriately trained⁴
- Tight control of blood pressure is essential⁴
- Baseline FBC, U&E, LFT and INR must be performed
- Unless a rapid initiation is specifically indicated, a slow, outpatient induction regime e.g. Tait and Sefcick regime,¹³ can be used with antiplatelet cover until the target INR is achieved. Warfarin induction regimens must be appropriately adjusted according to drug handling ability.

Direct thrombin inhibitors (dabigatran, apixaban and rivaroxaban): are a new class of oral anticoagulants of which dabigatran is the most advanced and currently the only one with a licence for thromboprophylaxis in atrial fibrillation. These drugs should only be considered for non valvular AF and not for valvular AF when warfarin remains the drug of choice. At the time of writing, appropriate prescribing practice for the newly licensed antithrombotic, dabigatran (and other future antithrombotic agents) is not yet locally finalised and current recommendations are that they should not be initiated in primary care.

Who

Patients at high risk of stroke should be given antithrombotic medication unless specifically contraindicated.

To identify those patients at high risk of stroke, two scoring systems are currently in use, (see Table 3)

1. **CHADS₂** – can be used to screen those at high risk who need anticoagulation and those who need further assessment (see Table 4)
2. **CHADSVASc** – provides a more accurate estimation of risk

Table 3 Items scored on CHADS2 and CHADSVASc¹⁴

	CHADS2 score	CHADSVASc score
Congestive heart failure/LV dysfunction	1	1
Hypertension	1	1
Age ≥75 years	1	2
Diabetes mellitus	1	1
Stroke/TIA/thromboembolism	2	2
Vascular disease (MI, PAD, aortic plaque)	--	1
Age 65-74 years	--	1
Female sex	--	1
Maximum possible	6	9

CHADS2 score = 0 or 1	<ul style="list-style-type: none"> •Use CHADSVASc to detect patients who are at high risk of stroke and have been missed by CHADS2¹⁴
CHADSVASc score = 0	<ul style="list-style-type: none"> •Patient's stroke risk = background risk •Antithrombotic medication may not be required¹⁴
CHADSVASc score = 1	<ul style="list-style-type: none"> •Consider oral anticoagulation •Discuss warfarin vs aspirin with appropriate patients¹⁴
CHADS2 or CHADSVASc score = ≥2	<ul style="list-style-type: none"> •Oral anticoagulation is advised if not contraindicated¹⁴

Please note that these scoring systems may need to be changed/adapted upon introduction of any newer antithrombotic agents¹¹

Table 4 Stroke risk associated with CHADS2/CHADSVASc scores¹⁴

CHADS2/CHADSVASc Score	CHADS2 Associated stroke risk (%/yr)	CHADSVASc Associated stroke risk (%/yr)
0	1.9	0
1	2.8	1.3
2	4.0	2.
3	5.9	3.2
4	8.5	4.0
5	12.5	6.7
6	18.2	9.8
7		9.6
8		6.7
9		15.2

Prior to starting antithrombotic medication consideration of the following is required:

- Bleeding:

- The HAS-BLED risk assessment tool facilitates assessment of the risk of bleeding and identification of modifiable risk factors to improve the safety of antithrombotic medication (see Table 5)
- The HAS-BLED tool has no cut-off limits that indicate safe or contraindicated use of antithrombotics – it is intended as a decision-making aid for clinicians
- Scores ≥ 3 indicate that caution is required if starting *any* antithrombotics
 - Aspirin is not a ‘safe option’¹⁴
 - Risk factors should be minimised and, if anticoagulation is to occur, more intensive monitoring of INR is essential¹¹
- Patient choice
- Co-morbidities
- Concurrent medication
- Potential need for intermittent short burst medications that may interact with anticoagulants (e.g. antibiotics)

Table 5 The HAS-BLED risk assessment tool¹⁴

	Criteria	Score
H	Hypertension SBP ≥ 160 mmHg (note: score = zero if hypertension is controlled with medication)	1
A	Abnormal renal (creatinine ≥ 200) and liver function (e.g. bilirubin $>2x$ upper limit of normal, ALT/AST/Alk Phos $>3x$ upper limit of normal)	1 or 2 (1 point each for liver and renal)
S	Stroke	1
B	Bleeding (e.g. bleeding history and/or predisposition to bleeding)	1
L	Labile INR (e.g. $<60\%$ time in therapeutic range)	1
E	Elderly (e.g. age >65 years)	1
D	Drugs (e.g. NSAIDs, antiplatelets) or alcohol (alcohol abuse) (note: score = zero if patient’s NSAIDs stopped; or patient reduces alcohol consumption)	1 or 2 (1 point each for drugs and alcohol)
Maximum		9

Useful advice

If antithrombotic treatment is appropriate, warfarin should be the first-line medication:¹⁵

- Contraindications: pregnancy, hypersensitivity to warfarin, within two days of surgery, bacterial endocarditis, severe renal or hepatic disease, peptic ulcer, severe hypertension
- Side effects: bleeding, bruising, hypersensitivity, alopecia, rash, diarrhoea, purple toes
- Daily dose – administered at the same time each day – ideally 6pm
- Advise patients to inform their:
 - dentist
 - pharmacist (when buying over-the-counter medications)
- Give all patients a yellow oral anticoagulation therapy booklet and verbal and written information on commencement of warfarin¹⁶
- Do not issue a repeat prescription for anticoagulation medication before checking that the patients’ INR is being regularly monitored¹⁶

- Ensure that additional INR checks are arranged if the patient is prescribed drugs that may interact with the warfarin
- Advise the patient to inform the anticoagulation clinic they attend of any changes to their medication¹⁶

See **Error! Reference source not found.** for information about GRASP-AF, a tool that can help your practice ensure all patients that may be appropriate for anticoagulation are prescribed this

Box 2: Use of GRASP-AF to ensure adequate and appropriate anticoagulation

- All practices should access the GRASP-AF tool (available from www.improvement.nhs.uk/graspaf) to detect patients with previously diagnosed AF who are not on warfarin and who have a CHADS2 score ≥ 2
- GRASP-AF is reliant upon accurate coding of AF within patient notes, thus practices should ensure coding is reviewed using predicted and observed prevalence rates as a guide as to the likely completeness of the practice dataset
- GRASP-AF currently uses CHADS-2 to identify patients who may be suitable for anticoagulation by highlighting patients scoring ≥ 1
- GRASP-AF does not detect contraindications to anticoagulation – all cases identified by the GRASP-AF tool need reviewing by a clinician to determine if commencement of anticoagulation is appropriate
- From November 2011, GRASP-AF will also be incorporating CHADSVASc (rather than CHADS2 alone) to detect patients on inadequate anticoagulation

Target

If **warfarin** is prescribed, the target INR should be 2.5 (range between 2 and 3) – unless the patient has a mechanical heart valve or another specific indication for increased target INR.

- Time in therapeutic range (TTR) should be $\geq 70-80\%$ - this can be obtained through
 - Manual calculation
 - The UHNS *Anticoagulation Management Service* upon request if the patient attends this clinic
- If TTR $< 50\%$ the benefit against stroke is lost but bleeding risk remains
- An INR that is regularly ≥ 4 increases the risk of major haemorrhage, including intracranial haemorrhage⁴
- Clinicians should use decision support software to improve INR control and safety

Aspirin has no target that should be routinely measured.

4.2.2. Rate control

In many cases a rate control strategy alone may be adequate for patients with persistent AF. There is no additional survival benefit in rhythm control compared with rate control among elderly patients.

When

Rate control should be considered in any patient with persistent or permanent AF associated with:¹

- Elevated ventricular response
- Age over 65 years
- Coronary artery disease

- Contraindication(s) to antiarrhythmic drugs
- Being unsuitable for cardioversion
- Absence of congestive heart failure

Why

Rate control is important to reduce symptoms of AF with a fast ventricular response and to protect the myocardium

Options

First line treatments in stable patients include the following (the most appropriate drug for individual patients will be determined by considering comorbidities and functional status):¹

- Beta blockers – consider for patients with heart failure
- Rate limiting calcium channel antagonists (diltiazem, verapamil) – consider for those in whom beta blockers are best avoided (e.g. asthma)
- Digoxin therapy – is now considered second line therapy. It may be considered for sedentary patients¹ and those with heart failure¹¹ due to its positive inotropic effects
 - It has a limited effect on heart rate on exertion
 - Digoxin has a long half-life, a narrow therapeutic index and an outcome of treatment that is difficult to measure
 - Digoxin toxicity can result in hospital admission

Due to the wide variation in serum concentrations in patients given the same dose of digoxin, the use of a nomogram can estimate the most appropriate dose for both loading and maintenance treatment. A correct loading dose allows for rapid achievement of serum levels within the therapeutic range. See

- Appendix 2 for a digoxin prescribing nomogram.

If single drug therapy with a beta blocker or a calcium channel blocker is ineffective for controlling rate, digoxin may be added.

If drug methods fail then referral for ablation and/or pacing may be considered.

Ablation may be the only appropriate option in patients with Wolff-Parkinson-White syndrome.

If the patient is haemodynamically compromised by an abnormally low or high rate they should be referred urgently to acute secondary care services for stabilization.

Target

A resting heartbeat < **110bpm** should be the initial target with stricter targets for those who remain symptomatic or if tachycardic cardiomyopathy is suspected or present.¹⁷

- Traditionally the target for rate control was to eliminate symptoms and to have a heart rate at rest of around 80bpm and that on exertion to be around 115bpm.
- A resting heartbeat < 110bpm may be easier to achieve and, as it appears to be as effective as stricter rate control in preventing cardiovascular morbidity and mortality¹⁸ – may be more appropriate if patients are asymptomatic or unable to tolerate greater doses of rate limiting medication

Ambulatory ECG monitoring may be appropriate if adequacy of rate control cannot confidently be determined.¹¹

4.2.3. Rhythm control

When

Rhythm control should be considered in the following patients:

- AF of recent onset
- With persistent AF who remain symptomatic despite maximal/appropriate rate control measures
- Instead of rate control measures - particularly if they are younger than 65 years, have 'lone AF', have comorbidities that favour a rhythm control method or if this is the patient's choice after discussion of each strategy¹
- Those with AF secondary to a treated/corrected cause¹
- Those with paroxysmal AF
- Those with congestive heart failure

Why

To attempt to restore sinus rhythm which may subsequently improve symptoms and functional status and protect the myocardium (e.g. from cardiomyopathy).¹¹

Options

Options for rhythm control include:

- Pharmacological methods
- DC cardioversion
- Ablation.

For initiation of any of these methods referral to secondary care is required.

Urgent DC cardioversion is indicated if there is:

- Acute persistent AF (<24 hours)
- Haemodynamic disturbance
- Moderate to severe aortic stenosis
- Wolff-Parkinson-White syndrome

Elective DC Cardioversion is indicated if AF is:

- < 6 months duration
- Associated with structurally normal heart (long term success rate is lower if structural abnormality is present)
- Patient symptomatic despite optimum rate control

When referring patients for elective rhythm control, ensure that anticoagulation is commenced, unless referral is as an emergency or there is a significant contraindication.

Patients should be maintained on therapeutic warfarin (INR 2.3, range 2.0-3.0) for at least **3 weeks** before elective cardioversion attempts.¹

Target

The target is to restore sinus rhythm, however, even if this is successful, reversion back to AF is common (>60% at 3 months) and carries associated risks of thromboembolic disease.

If sinus rhythm is successfully restored, cessation of anticoagulation should not occur before 4 weeks post-cardioversion and, after this time, should only occur if there is good reason.¹

Oral anti-arrhythmic drugs may be prescribed in attempt to maintain sinus rhythm.

4.3. Referral to secondary care

Indications for referral to secondary care include:

- Suspected paroxysmal AF – for diagnosis and advice on antiarrhythmic medication
- Patient has AF associated with structural (unless isolated mildly dilated (4.5cm) left atrium)¹¹, electrophysiological (e.g. Wolff-Parkinson-White) or valvular heart disease¹
- Rhythm control indicated
- Patient remains symptomatic despite drug treatment or they cannot tolerate simple drug treatment (e.g. rate control measures)
- Patient presenting with episodes of syncope
- AF associated with a slow ventricular response
- Patient who has had a percutaneous coronary intervention (PCI) and insertion of a stent who is on dual anti-platelet treatment who has AF or is at risk of a stroke – for further advice on anti-coagulation

Urgent or emergency referral to acute secondary care services may required if:

- Patient presents acutely with haemodynamic compromise and/or syncope
- There is concern re underlying cause of AF – e.g. myocardial infarction
- Onset of symptoms <24 hours – early cardioversion may be possible
- Patients are presenting acutely with signs of stroke/TIA – in this case refer using the stroke pathway

4.4. Follow-up

Frequency of follow up should be dictated by the clinical status of the patient.

If the patient is newly diagnosed and new medication has been initiated, follow-up may need to be weekly.

Patients who have been admitted for stroke who have AF should have a clear plan of anticoagulation on discharge; it's worth checking on this.

Once the patient is asymptomatic and their AF is controlled, follow up may be appropriate at intervals up to 6-monthly.

Checklist for each follow-up

Assess:

- Pulse to assess rate and rhythm – is a dose adjustment of medication or further intervention or referral required?
 - If symptomatic, undertake a repeat 12-lead ECG (document rhythm and rate)
- Blood pressure – if evidence of haemodynamic compromise is hospital admission indicated?
- Risk factors for precipitation and perpetuation of AF – presence of new risk factors and management of new and existing risk factors
- Tolerability of medications and concordance with the management plan
- Regularity of INR testing and TTR, if the patient is taking warfarin
- If patient is not on anticoagulation, re-assess stroke and bleeding risk
- Test blood to monitor medications, thyroid function and electrolytes as appropriate
- Ensure co-morbidities are appropriately managed and adequately controlled

5. Information for patients

Below is a list of some resources that could be useful for patients and their families to understand atrial fibrillation and its management:

- Arrhythmia Alliance www.heartrhythm.org.uk
- Atrial Fibrillation Association www.atrialfibrillation.org.uk
- British Cardiac Patient Association www.bcpa.co.uk
- British Heart Foundation www.bhf.org.uk
- National Prescribing Centre information on warfarin vs aspirin for AF www.npci.org.uk/therapeutics/cardio/atrial/resources/pda_af.pdf
- North Staffordshire Heart Committee www.northstaffsheart.org.uk/index.htm
- Patient UK www.patient.co.uk
- Stroke Association www.stroke.org.uk

6. Clinical audit of atrial fibrillation

6.1 Example 1 – detecting patients with AF

Aim

To prevent the morbidity and mortality associated with AF by ensuring adequate detection levels within the general practice.

Standard

Those at risk of AF should have opportunistic pulse checks to detect asymptomatic cases of AF.

Criteria

At least 70% of patients > 40 years have pulse rate and rhythm recorded in the last 15 months (QIF criterion – and matches local service specification for NHS Health Check).

Method

Identify an at risk population or a sample of these people (e.g. age 65 years and older). How many people have had a pulse check in the last year? If low levels of pulse checks among at-risk groups, develop a practice team strategy to detect potentially missed cases.

Analysis plan

Summary of individual patient records in

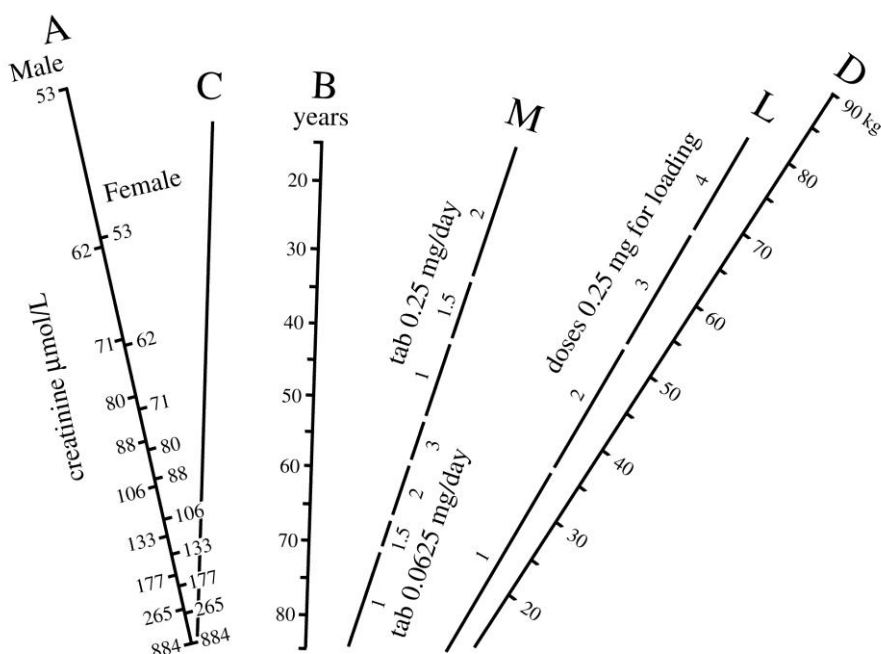
Appendix 2 Digoxin prescribing nomogram

Instructions for using nomogram

A nomogram for digoxin dosage, which provides a loading dose (L) and a maintenance dose (M) for an adult patient whose plasma creatinine (A), age (B) and body weight (D) are known. To use, join A to B with a line that crosses C; then join this intercept on C to D with a line that crosses M and L.

Specific circumstances

- In elderly patients with reduced muscle mass, serum creatinine may be artificially low and will not reflect renal function. Assume a value of 100 $\mu\text{mol/l}$ for A in such patients
- In obese patients, body weight will not reflect the distribution volume of digoxin. Use ideal body weight (this can be calculated from height) for D in such patients



MONITORING

Indications for measurement

- to question the need for continued treatment in patients with sinus rhythm
- to monitor the effect of concurrent disease or drug treatment
- to confirm a diagnosis of suspected toxicity, and to aid dose reduction
- to investigate suspected treatment failure or non-compliance

Sampling

- Steady state is not achieved until 1-3 weeks after starting therapy or changing the dose, depending on the patient's renal function.

January 2012
• Samples should be taken at least 6 hours after the dose. It is often easier to sample immediately before a dose is due.

Target range

1. How many registered patients are coded as having AF?	
2. Select an 'at risk' group of patients (or a sample of these)	
3. What proportion of your selected at-risk population already have had a diagnosis of AF?	
4. What proportion of your selected at-risk population, who have no previous diagnosis of AF, have had a pulse check in the last year?	
4. Implement strategy for undertaking pulse-checks in selected at-risk group	
5. Determine the number of patients checked as a result of your strategy that were newly diagnosed with AF	

Review and Action Planning

Present the results at a practice meeting and devise an action plan after discussion (see **Appendix 5**). One of the actions should be to set timescale for re-audit to complete the audit cycle.

Your next step might be to extend your clinical audit to focus on stroke prevention among patients with diagnosed AF. You might progress to Example 2.

6.2 Example 2 – specific focus on preventing strokes among AF patients

Aim

To detect patients with AF at high risk of stroke and to ensure that all are on appropriate antithrombotic medication.

Standard

QOF 2011/12 requires practices to treat patients with AF with aspirin or anticoagulation.¹⁹

Or as new evidence suggests that if a patient has a CHADS2 or CHADSVASc score of ≥ 1 anticoagulation is required rather than antiplatelet therapy unless there are contraindications. Aim for $\geq 90\%$ of patients with CHADS2/CHADSVASc score of ≥ 1 to be on warfarin.

Criteria

QOF 2011/12 rewards practices with 40-90% of patients with AF on aspirin or anticoagulation

Or

$\geq 90\%$ of patients with CHADS2/CHADSVASc score ≥ 1 are on warfarin

Method

Use CHADS2 or CHADSVASc to detect patients with a score of ≥ 1 . The GRASP-AF tool available at www.improvement.nhs.uk/graspaf can be used to identify patients with a CHADS2 score of ≥ 1 who are not on warfarin. Identify patients who may be suitable for warfarin and invite them to the surgery for discussion of anticoagulation. Ensure that those who are not have had adequate discussions and the reasons for not anticoagulating them are clearly documented.

NB From November 2011 GRASP-AF will have the option to use CHADS2 or CHADSVASc scoring systems to detect high risk patients.

Analysis Plan

Summary of individual patient records in Appendix 4	
1. How many patients in the practice have AF?	
2. How many patients had a CHADS2/CHADSVASc score ≥ 1 ?	
3. How many of these patients are not anticoagulated?	
4. How many patients not on anticoagulation may be suitable for anticoagulation?	
5. After discussion, how many additional patients have been anticoagulated?	

Review and Action Planning

Present the results at a practice meeting and devise an action plan after discussion (see Appendix 5). One of the actions should be to set the timescale for re-audit to complete the audit cycle.

Appendix 1 Use of a single channel ECG recorder

Small, patient operated, single-channel ECG recorders (e.g. Omron HeartScan) are now being used by practices to assist detection of AF among patients who may otherwise be missed. Opportunistic screening of patients at risk of having AF is advocated, however, many such patients may be those who cannot easily come to the surgery to undergo a 12-lead ECG. Thus some practices use these ECG recorders in both the GP surgery as well as by practice nurses who undertake, for example, 'flu vaccinations at home. Such devices may be loaned to patients after minimal training, to help to detect irregular pulse rhythms occurring intermittently, for example in the case of intermittent palpitations of unknown cause.

The Omron HeartScan records the heart rhythm for 30 seconds. It is operated by the patient, who holds the device in their right hand and presses the end against their bare chest wall, just below the left breast (approximately in the position of chest lead 4 in a 12-lead ECG).²⁰ The recording can be viewed immediately from the device or can be uploaded onto a computer for closer inspection and storage.

There are limitations of these devices. For example, they cannot be used to rule out ischaemic events and, with just one trace, they only provide a good indication of rhythm.

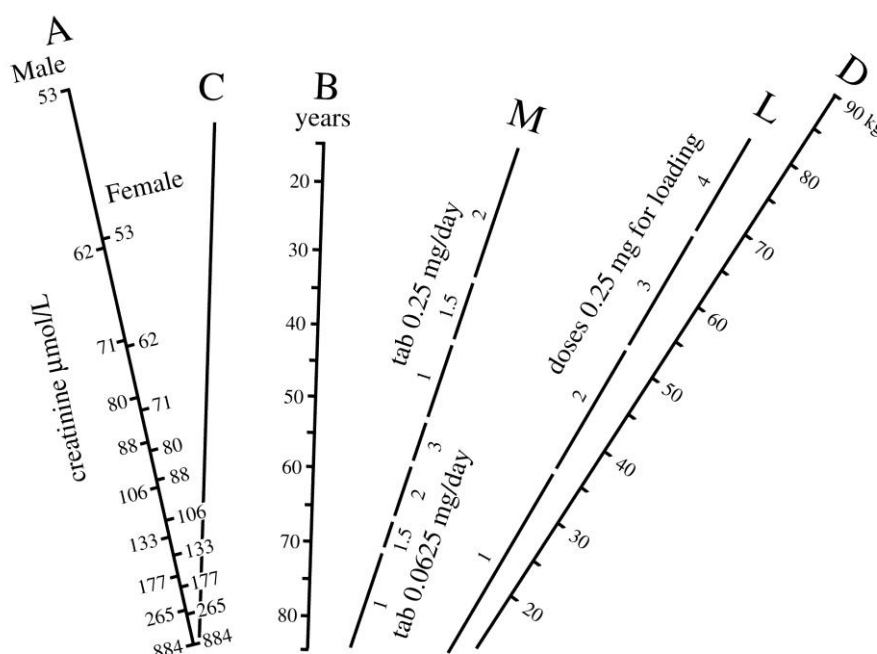
Appendix 2 Digoxin prescribing nomogram

Instructions for using nomogram

A nomogram for digoxin dosage, which provides a loading dose (L) and a maintenance dose (M) for an adult patient whose plasma creatinine (A), age (B) and body weight (D) are known. To use, join A to B with a line that crosses C; then join this intercept on C to D with a line that crosses M and L.

Specific circumstances

- In elderly patients with reduced muscle mass, serum creatinine may be artificially low and will not reflect renal function. Assume a value of 100 $\mu\text{mol/l}$ for A in such patients
- In obese patients, body weight will not reflect the distribution volume of digoxin. Use ideal body weight (this can be calculated from height) for D in such patients



MONITORING

Indications for measurement

- to question the need for continued treatment in patients with sinus rhythm
- to monitor the effect of concurrent disease or drug treatment
- to confirm a diagnosis of suspected toxicity, and to aid dose reduction
- to investigate suspected treatment failure or non-compliance

Sampling

- Steady state is not achieved until 1-3 weeks after starting therapy or changing the dose, depending on the patient's renal function.

- Samples should be taken at least 6 hours after the dose. It is often easier to sample immediately before a dose is due.

Target range

- 0.8-2.0 mcg/l – concentrations lower than 0.8 mcg/l have no useful inotropic effect
- This is a general guide and should be interpreted taking other factors, such as serum potassium and thyroid function, into account
- In atrial fibrillation, once treatment is established, ventricular rate is the best guide to the appropriateness of dosage in patients taking digoxin alone for rate control

Appendix 3 Detecting patients with AF – data collection form

Patient Number	Already has a diagnosis of AF	If no diagnosis of AF, has the patient had a pulse check in the last year?	If no, has a pulse check occurred due to your pulse-check implementation strategy?	If yes, was the patient diagnosed with AF followin the most recent pulse check?
	➡	➡	➡	
1	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
6	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
7	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
8	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
9	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
10	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
11	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
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13	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
14	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
15	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
16	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
17	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
18	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
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20	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
21	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
22	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

23	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
24	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
25	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
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29	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
30	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

Appendix 4 Prevention of stroke – data collection form

Patient Number	Does the patient have an appropriate diagnosis of AF?	If yes, are they on anticoagulation?	If no, do they have contraindications to anticoagulation?	If no, were they started on anticoagulation following discussion?
1	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
6	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
7	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
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22	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
23	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

24	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
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27	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
28	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
29	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
30	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

Appendix 5 Action Plan

Action	Co-ordinator	Action to be completed by
A re-audit of atrial fibrillation will be undertaken, in order to ensure the above actions have been implemented and a sustained improvement has been made, resulting in improvements inpatient care.		

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