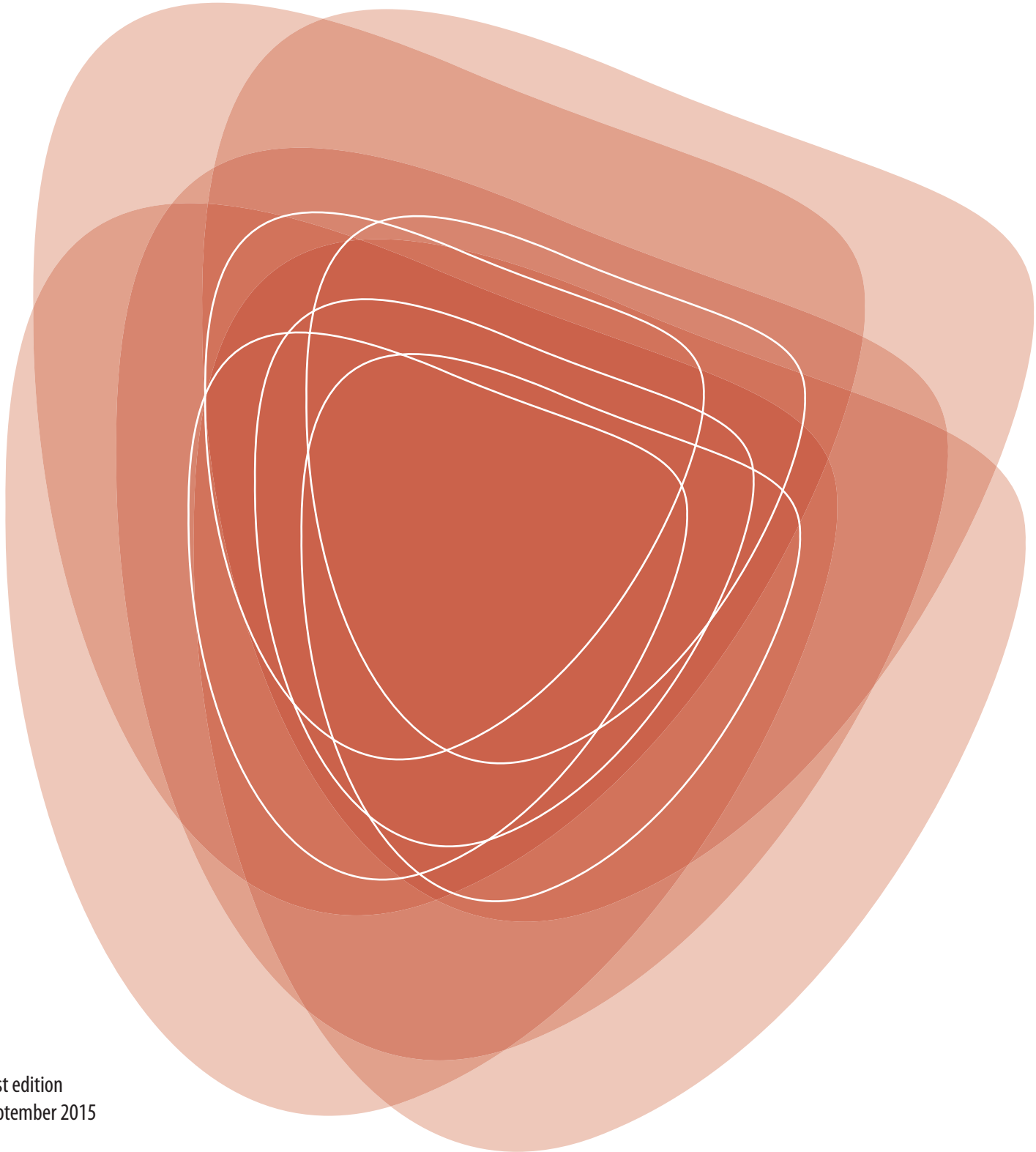
Clinical pathway for people with atrial fibrillation or at risk of atrial fibrillation

NHS

Cheshire and Merseyside Strategic Clinical Networks



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C&M SCN AF Expert Panel Group

Boehringer Ingelheim

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Introduction

This clinical pathway has been prepared to support providers, public health commissioners and NHS commissioners to develop services and improve clinical practice for people with, or at risk of, atrial fibrillation (AF). It is hoped that it will prove to be a practical guide that will help to encourage discussion and collaboration between different stakeholders and help to deliver clinically effective and coordinated holistic services for people with AF or at risk of AF across the full pathway of care.

This pathway focuses on the standard of care that one would expect to receive if suspected of AF or following a diagnosis of atrial fibrillation. It is also designed to support those stakeholders interested in, and working towards, a reduction in AF-related strokes. It does not, however, comprehensively cover every single clinical anomaly that may arise in clinical practice.

Why effective commissioning for atrial fibrillation is *essential*

The 2015 Sentinel Stroke National Audit Programme (SSNAP)[1] revealed that one fifth of patients were in atrial fibrillation on admission following a stroke and of these only 37% were on anticoagulant therapy; 34% of patients were on anti platelet therapy [which is considered ineffective for patients in AF] with 4% on both. In addition, over a quarter of patients in the audit had a previous stroke concluding that there are still major issues in primary and secondary care regarding effective stroke prevention.

The NHS and Public Health Outcome Frameworks together with the Clinical Commissioning Outcome Indicator Set place an ambition for a reduction in mortality in people under 75 years of age from cardiovascular disease. The main causes of mortality are heart disease and stroke. The inclusion of the under-75 mortality rate from cardiovascular disease means that all commissioners across the pathway will have a major role to play in ensuring that services focus on identifying people with suspected AF, treating those with a diagnosis of AF with appropriate anticoagulation and addressing the wider issues of stroke prevention.

Anticoagulation to reduce the risk of stroke is an essential part of AF management. The Cardiovascular Outcomes Strategy[2] suggests that 7,000 strokes could be avoided and 2,100 lives saved each year in England with appropriate AF management. By implementing this pathway together commissioners and providers can improve the identification, treatment and management of AF, improve quality of life for people with AF and, importantly, address the devastating consequences that an AF-related stroke has on patients and carers. Understanding the wider economic impact on the health and social care system is an essential part of effective commissioning in AF.

Aims of the pathway

The short and long-term aims of introducing and implementing a pathway for atrial fibrillation across different care settings are based on five fundamental principles:

1. **Prevention of atrial fibrillation**
2. **Early detection of atrial fibrillation**
3. **Treatment of atrial fibrillation in acute and long-term settings**
4. **Reduction of complications (e.g. stroke, thrombo-embolic disease and heart failure)**
5. **Support at the end of life**

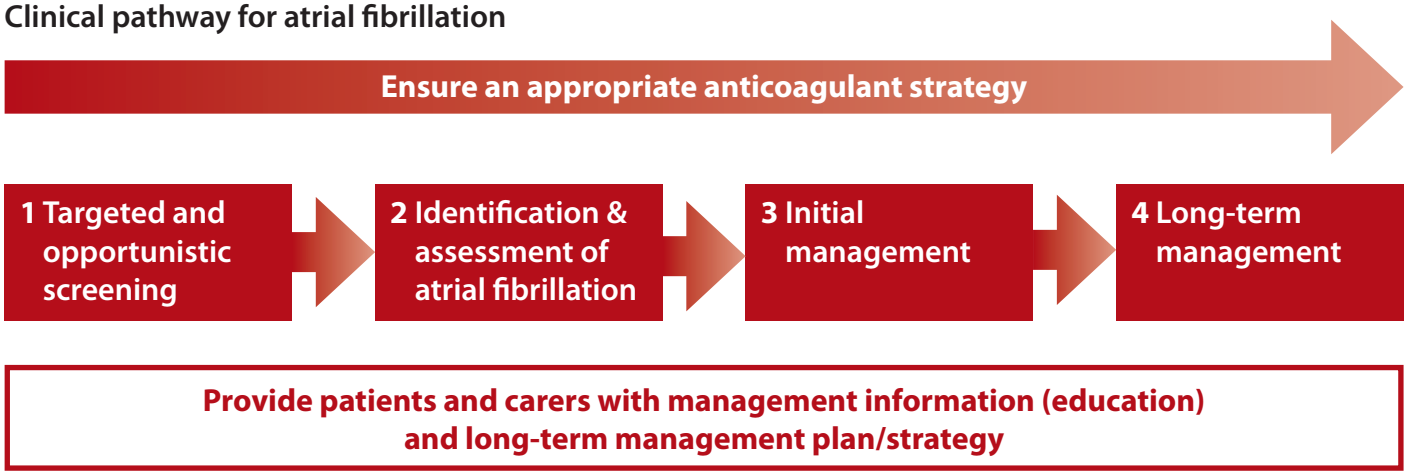
Who is this document for?

- Providers of AF-related services
- Primary Care
- Patients
- Consultants in public health
- Public health commissioners
- Clinical Commissioning Groups
- NHS England

The Pathway

The following diagram sets out the four essential stages of patient management across the pathway of AF-related care. The detail at each stage of the pathway incorporates five elements; a flow chart on how to manage someone with atrial fibrillation or suspected atrial fibrillation, a set of indicators (process and outcome measures), guidelines, standards and, if appropriate, recognised competencies. This format provides validity in the measurement, efficiency and clinical effectiveness across the pathway thus providing confidence in the commissioning and provision of care.

Clinical pathway for atrial fibrillation



Prevention

Although there is no single intervention that can prevent AF (in the same way that not smoking dramatically reduces the risk of getting lung cancer), it is widely recognised that maintaining a heart-healthy lifestyle would be the starting point for preventing AF along with treating underlying conditions that may contribute to the development of AF. Reducing the risks associated with AF from a secondary prevention perspective is also very important.

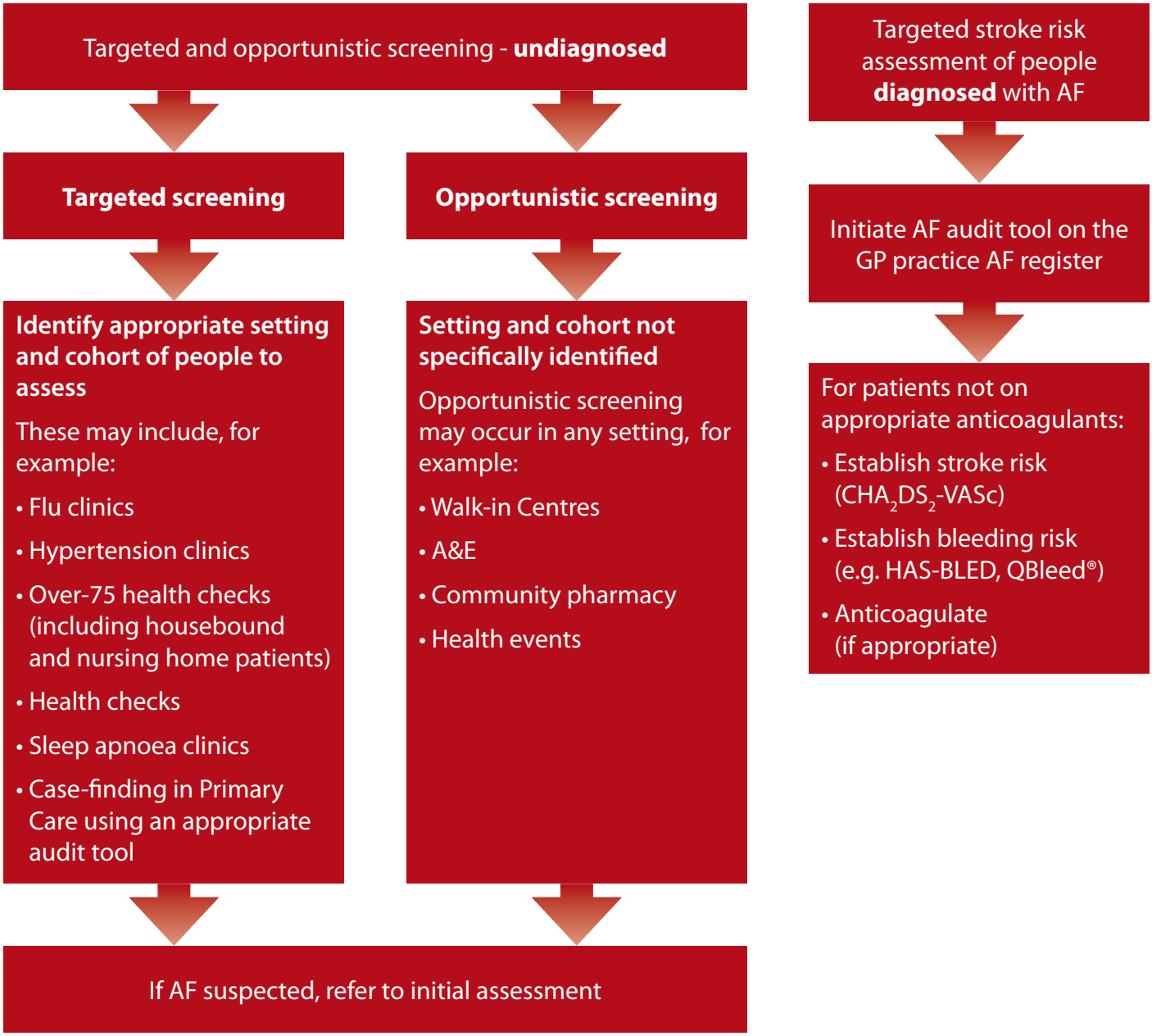
Primary prevention of AF

- Maintaining a heart-healthy lifestyle
- Treatment of other underlying conditions that can contribute to the onset of AF:
  - Sleep apnoea
  - Thyroid disease
  - Diabetes
  - Obesity
  - Chronic lung disease
  - Other heart conditions

Secondary prevention
(to reduce risks of complications associated with AF)

- Anticoagulation (in accordance with CHA_2DS_2-VASc)
- Regular physical activity
- Heart-healthy diet, low in saturated fats, trans fats, and cholesterol
- Management of high blood pressure
- Avoiding excessive amounts of alcohol and caffeine
- Smoking cessation
- Cholesterol control and maintaining a healthy weight

First stage - **Targeted and opportunistic screening**



Purpose of this stage

To identify individuals with atrial fibrillation early in order to initiate treatment and reduce risk of adverse events (stroke or transient ischaemic attack, thromboembolism or heart failure).

Importance of this stage

Atrial fibrillation is the most common sustained cardiac arrhythmia and is a leading cause of mortality and morbidity. The prevalence of atrial fibrillation increases with age and is becoming more prevalent. In a review of the evidence NICE believe that it is probable that the true prevalence of AF for the population of England is of the order of 2%. Having AF increases the risk of stoke five-fold[3].

A substantial proportion of individuals with atrial fibrillation may be asymptomatic ('silent atrial fibrillation') and atrial fibrillation may not be detected until after a cerebrovascular event. A substantial public health imperative therefore exists to identify individuals with atrial fibrillation early to reduce risk of adverse events.

The shortfall in the prescribing of anticoagulants to patients with AF was clearly seen in the Sentinel Stroke National Audit Programme by the Royal College of Physicians[1]. Of 19,652 patients admitted with stroke to hospitals in England, Wales and Northern Ireland in the last 3 months of 2014, approximately one fifth (4,155 patients) were in AF on admission and of these 25% were on no antithrombotic treatment.

Consequences of not following this stage

Failure to comply with NICE CG180 and NICE quality standards for AF (Quality statement 1: Pulse palpation - adults with risk factors for atrial fibrillation have a manual pulse palpation).

Please note - awaiting publication date of NICE quality standards.

Missing the opportunity to identify patients with AF and consequently failing to prevent unnecessary strokes and TIAs.

Rationale behind the indicators

Both systematic (targeted) and opportunistic screening using pulse palpation detects significantly more cases of AF. The Fitzmaurice et al study in 2007[5] concluded that the only strategy that improved on routine practice was opportunistic screening. However, despite general population screening being beyond the scope of the NICE guideline (CG180), it is recommended that targeted/opportunistic screening of **symptomatic patients** or those **with risk factors** may allow identification of AF patients.

Core components of targeted and opportunistic screening	Measures and guidance
Indicators	Number of practices using screening/case finding tools Percentage of patients with confirmed AF who have had CHA_2DS_2-VASc performed Proportion of adults over-65 and/or with risk factors for AF who have a manual pulse palpation Proportion of abnormal rhythms identified Proportion of patients identified with undiagnosed AF Number of patients with AF not on appropriate treatment Proportion of patients commenced on appropriate treatment Number of staff trained
Standards	NICE Quality Standard - adults with risk factors for AF have a manual pulse palpation (20sec radial check)
Guidelines	NICE CG AF Clinical Guideline 180 (2014) NICE Quality Standards - AF (TBC) European Society of Cardiology Guidelines (2012)
Competencies	Manual pulse checks are easily delivered by primary care clinicians and commissioned through QoF and the National Health Checks programme or through local arrangements (quality improvement schemes, local GP specifications). All primary care clinicians should be competent in manual pulse-taking. All staff interpreting an ECG to be competent

Notes on this section

In data from a cluster randomised trial of opportunistic versus targeted screening in general practices, 172 patients would have to be screened systematically and 167 would have to be screened opportunistically to detect one additional case of atrial fibrillation[6].

Targeted screening for atrial fibrillation could be feasibly implemented at routine health checks, influenza vaccination clinics, COPD clinics, hypertension clinics and heart failure reviews.

Opportunistic screening can be implemented when people over 65 attend the practice or if people with a clinical condition which may be associated with AF (breathlessness/dyspnoea, palpitations, syncope/dizziness, chest discomfort and stroke/transient ischaemic attack) visit their GP/healthcare provider.

Electronic reminder systems in GP practices can flag eligible patients who have not previously had a pulse palpation check for atrial fibrillation. Manual health checks are offered as part of the National Health Checks programme for adults over 40 years old, however the uptake of this programme is generally low in England.

Manual pulse checks

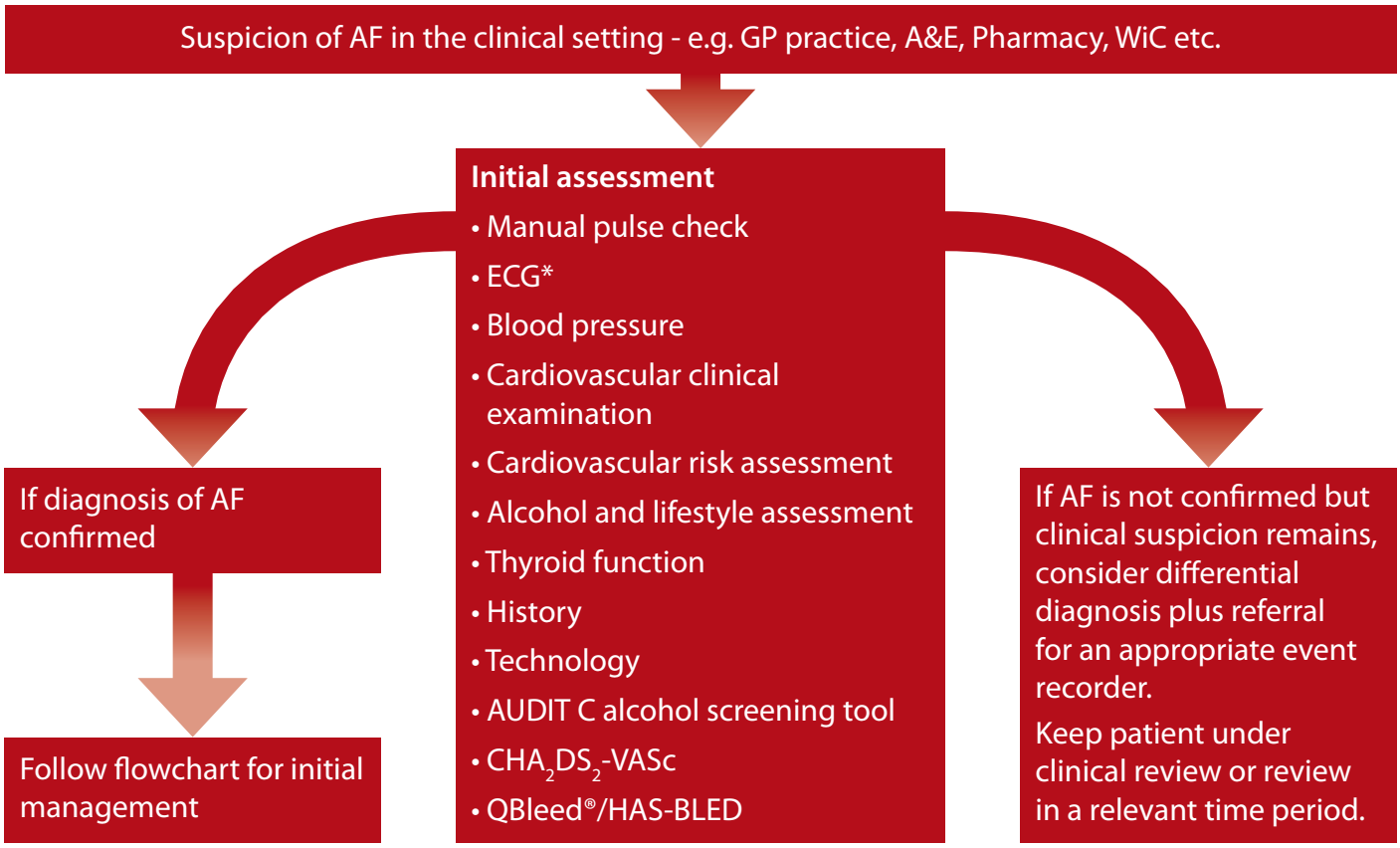
Checking for an irregular pulse can help to identify atrial fibrillation. Early identification of atrial fibrillation can reduce the likelihood of it being detected only after adults present with serious complications, such as a stroke or transient ischaemic attack, thromboembolism or heart failure. Manual pulse checks need to be strategically planned and there should be evidence of local arrangements and written clinical protocols to ensure that adults with risk factors for atrial fibrillation have a manual pulse palpation. This can be done in a variety of settings (e.g. Hypertension clinics, over 75-year-old assessments, sleep apnoea clinics, community pharmacies etc.).

Commissioners (NHS England) should ensure that they commission services that can demonstrate that adults who present with risk factors for atrial fibrillation have a manual pulse palpation to assess for an irregular pulse. (Also see Technology section on page 10 regarding hand-held 2-point ECG devices, which are able to detect AF and other arrhythmias.)

Audit tools

Audit tools are available to assist GPs considering implementing screening for atrial fibrillation into practice[6]. One such tool is the GRASP-AF audit tool[7]. GRASP-AF is used widely in primary care to identify patients who have an AF read code, are at risk of thromboembolic events but are not anticoagulated. Audit tools should be repeated annually as the co-existent risk factors (hypertension/ diabetes etc.) are likely to accrue over time.

Second stage -
Identification and assessment of Atrial Fibrillation



*** All surgeries should have access to ECG machines and a safe system for interpretation**

Purpose of this stage
Accurate detection and confirmation of atrial fibrillation and an assessment as to its cause.

Importance of this stage
Atrial fibrillation is a significant medical condition with potentially fatal or life changing consequences. An accurate diagnosis is very important to the well-being of an individual patient, which is complicated by the fact that it may be a paroxysmal cardiac rhythm, and therefore may be missed without rhythm monitoring.

On occasion a single episode of AF or paroxysmal AF may occur as a result of a potential treatable or reversible medical condition. These patients may therefore NOT require lifelong anticoagulation but regular follow up for recurrence is recommended.

Consequences of not following this stage
Patients may be mistreated and significant pathology as a cause of the AF may remain undiscovered. There may be further consequences to the patient as a result.

Paroxysmal AF may be missed by a single 12-lead ECG. Unnecessary anticoagulation may occur if a patient has an irregular pulse that is not caused by AF.

Rationale behind the indicators

There is a need in primary care to assess whether a reasonable number of cases are detected in relation to expected prevalence rates. The recording of manual pulse checks is important in order to demonstrate whether cases are being found in reasonable numbers and in an appropriate manner.

Core components of identification and assessment	Measures and guidance
Indicators	Number of patients identified with AF through pulse check Number of patients over 65 with a documented pulse rhythm Number of practices with a high exception reporting of AF on QoF Proportion of AF patients with a CHA_2DS_2-VASc score Proportion of patients with a QBleed®/HAS-BLED score Expected prevalence of AF vs. actual prevalence Percentage of stroke patients with known AF in primary care on treatment on admission treated with anticoagulant, antiplatelet or nothing Percentage of stroke patients with known AF on admission on an anticoagulant whose INR is within therapeutic range
Standards	NICE Quality Standard - adults with AF and a CHA_2DS_2-VASc stroke risk score of 2 or above are offered anticoagulation.
Guidelines	NICE CG AF Clinical Guideline 180 (2014) European Society of Cardiology Guidelines for the Management of AF (2012)
Competencies	n/a

Notes on this stage - identification of AF

Criteria for interpretation of AF on the ECG
An irregular pulse should always raise the suspicion of AF, but an ECG recording is necessary to diagnose AF.

The European Society of Cardiology[8] states:

1. The surface ECG shows 'absolutely' irregular RR intervals (AF is therefore sometimes known as arrhythmia absoluta), i.e. RR intervals that do not follow a repetitive pattern.
2. There are no distinct P waves on the surface ECG. Some apparently regular atrial electrical activity may be seen in some ECG leads, most often in lead V1.
3. The atrial cycle length (when visible), i.e. the interval between two atrial activations, is usually variable and <200ms (300 bpm).

Any arrhythmia that has the ECG characteristics of AF and lasts sufficiently long for a 12-lead ECG to be recorded, or at least 30 seconds on a rhythm strip, should be considered as AF.

Automatic ECG reports should NOT be relied upon
A system for the interpretation of ECGs should be in place to support general practice. If this cannot be done locally then arrangements for a service should be established with a cardiologist/ electrophysiologist at the local hospital. ECGs should be performed by a competent person and also seen and reported by a competent person.

ECG Event recorder
Consider using extended monitoring to aid diagnosis. The choice of monitoring will depend on the frequency of symptoms and local availability (e.g. 24-hour, 72-hour or implantable recorder). It is important to understand your local referral systems.

Relevant questions to be put to a patient with suspected or known AF

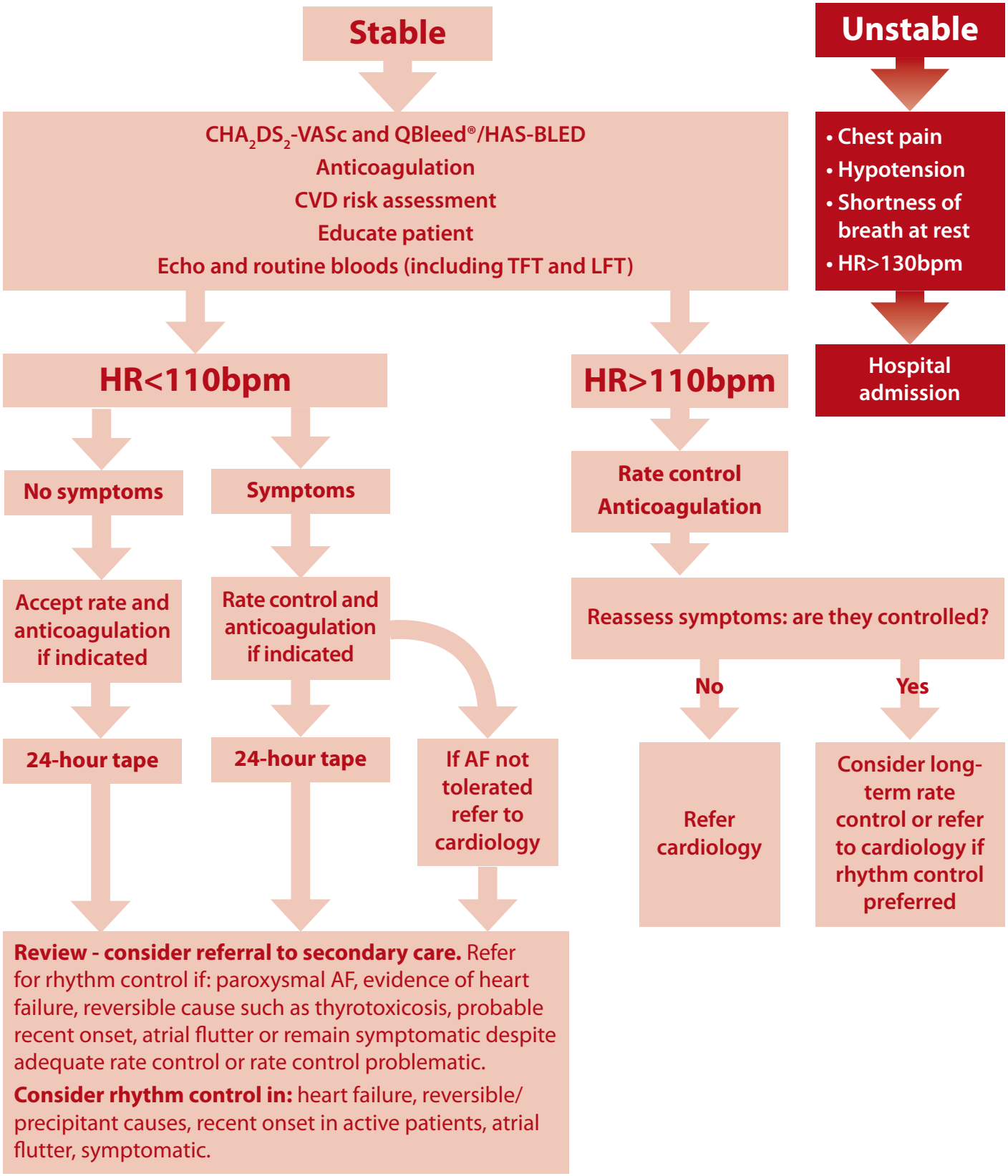
- Does the heart rhythm during the episode feel regular or irregular?
- Is there any precipitating factor such as exercise, emotion, or alcohol intake?
- Are symptoms during the episodes moderate or severe?
- Are the episodes frequent or infrequent, and are they long or short lasting?
- Is there a history of concomitant disease such as hypertension, coronary heart disease, heart failure, peripheral vascular disease, cerebrovascular disease, stroke, diabetes, or chronic pulmonary disease?
- Is there an alcohol abuse habit?
- Is there a family history of AF?

Technology
Pulses can also be accurately checked by technological devices such as the AliveCor® device or MyDiagnostick®, which use algorithms to detect AF and other arrhythmias. Williams et al (2015)[9] concluded that AliveCor® is a simple and non-invasive way of identifying atrial fibrillation, it has a high sensitivity and will identify potential cases. It has a high negative-predictive value in a general practice population and so is a good 'rule-out' test. However, suspected cases should have a 12-lead electrocardiogram (ECG) and/or an ECG event recorder as a diagnostic test.

Cardiovascular risk assessment
A cardiovascular risk assessment is an important element in the review of someone with actual or suspected AF. Addressing issues such as smoking, weight, alcohol etc. are essential to improve cardiovascular health. The QOF recommended assessment tool is known as the QRISK2[10]. In addition to QRISK2, The Joint British Societies for the prevention of Cardiovascular Disease have produced a useful cardiovascular risk assessment tool[11] known as the JBS3. The JBS3 risk calculator is a tool to help communicate the risk of CVD and the benefits of interventions, whether they are lifestyle or pharmacological.

Patient education
Patient education and understanding of the risks and benefits of anticoagulation and thromboembolic events are paramount to ensuring concordance with treatment. There are many websites with excellent patient educational materials such as:
Atrial Fibrillation Association:
http://www.atrialfibrillation.org.uk/
The British Heart Foundation:
https://www.bhf.org.uk/
The Arrhythmia Alliance:
http://www.arrhythmiaalliance.org.uk/
Anticoagulation Europe:
http://www.anticoagulationeurope.org/

Third stage - **Initial management**



Purpose of this stage

To provide confidence for primary care to manage stable atrial fibrillation (AF) and clarify the place of specialist services.

The priority is stroke prevention and bleeding risk stratification.

Stroke prevention requires patient and/or carer education, assessment of co-morbidities and CVD risk.

Rate control is the treatment of choice and use of rhythm control is detailed on page 14.

Importance of this stage

Most AF can be managed solely in primary care without hospital admission. This step avoids unnecessary hospital admissions that cost the patient and the NHS.

In the presence of AF the average risk of stroke increases to 20% in patients aged over 80 years; this is reduced significantly by oral anticoagulation or atrial appendage closure devices.

Most patients are asymptomatic of the arrhythmia and rate control therapy in primary care is recommended. Rhythm control may be difficult and is potentially avoidable.

This stage highlights those who may benefit from rhythm control requiring specialist cardiology referral.

Consequences of not following this stage

Not complying with NICE CG180 and the current evidence on AF management and stroke reduction.

This exposes patients to the risk of unnecessary hospital admissions and stroke resulting in disability and mortality; plus increased morbidity from inadequate management of the arrhythmia.

Rationale behind the indicators

Confidence for primary care to assess a patient with AF will ensure appropriate utilisation of specialist services. This will reduce hospital admissions for management of AF.

Confidence for primary care to make anticoagulation decisions will reduce the incidence of stroke in AF.

Increased awareness and usage of atrial appendage closure devices for those not suitable or unable to take anticoagulation.

Core components of initial management	Measures and guidance
Indicators	Proportion of patients assessed who are stable Proportion of patients referred to secondary care Proportion of patients anticoagulated or offered atrial appendage closure device Number of patients admitted with AF who have zero length of stay
Standards	All patients should have a CHA_2DS_2-VASc recorded NICE Quality Standard - Adults with atrial fibrillation prescribed anticoagulation are given a choice of anticoagulants. NICE Quality Standard - Adults with AF whose treatment fails to control their symptoms are referred for specialised management within 4 weeks Anticoagulation or atrial appendage device should be offered
Guidelines	NICE CG AF Clinical Guideline 180 (2014) European Society of Cardiology Guidelines for the Management of AF (2012)
Competencies	Majority of patients can be managed by a primary care clinician. Secondary care involvement for all rhythm control treatment. All staff interpreting an ECG to be competent.

Notes for this stage

Should patients with AF have an echocardiogram?
Baseline echocardiogram is important for long-term management especially:

- Where rhythm control is being considered
- High risk or suspicion of underlying structural/ functional heart disease that influences treatment
- Where refinement in clinical risk stratification for antithrombotic therapy is needed

Although Echocardiography is not a mandatory investigation in the NICE guidance it should be considered best practice as it establishes baseline LV function, provides measurement of atrial dimensions and determines the presence or absence of significant valvular disease. Assessment of anticoagulant risk and subsequent commencement of appropriate anticoagulant therapy should not be delayed by waiting for the Echo result.

Starting anticoagulation
Once the patient has been positively assessed for benefit from anticoagulation therapy this should be initiated as soon as possible and ideally within a two-week period. This period may be used to get updated blood investigations where relevant and also for patients and carers to reflect and consider further the implications of therapy using provided information on anticoagulation with warfarin or novel oral anticoagulants (NOAC) treatment. Warfarin initiation and NOAC choice and dosage initiation should then be made in line with local medicine management guidelines and protocols.

Educate patient
Information/care packages are available for patients at the point of diagnosis (e.g. AF booklet, stroke risk etc.).

Patient decision making tools should be deployed before a treatment approach. NICE CG 180 Recommend the following: Offer people with atrial fibrillation a personalised package of care and ensure that the package of care is documented and delivered, and that it covers:

- Stroke awareness and measures to prevent stroke
- Rate control
- Assessment of symptoms for rhythm control
- Who to contact for advice if needed
- Psychological support if needed
- Up-to-date and comprehensive education and information on: cause, effects and possible complications of atrial fibrillation, management of rate and rhythm control, anticoagulation, practical advice on anticoagulation, support networks (e.g. cardiovascular charities) etc.

See the weblinks on page 10 for excellent patient educational materials.

Cardioversion and anticoagulation
Patient's undergoing elective direct current cardioversion should have a minimum of 21 days of therapeutic anticoagulation prior to cardioversion. Which either includes being on warfarin with an INR >2 or on a NOAC at the correct dosage to them and have taken it without omission for a minimum period of 21 days.

Anticoagulation should be continued for a minimum of 4 weeks post cardioversion for all patients, although long term anticoagulation should be continued in those with CHA_2DS_2-VASc of 2 or more and considered for males with a score of 1.

Cheshire and Merseyside Strategic Clinical Network has a protocol for the use of NOACs in cardioversion. To access the NOAC DCCV pathway, please use: **www.cmscnsenate.nhs.uk**

CHA_2DS_2-VASc
The CHA_2DS_2-VASc assessment is a NICE recommended tool for assessing stroke risk in adults with AF. A score of 0 is 'low' risk of stroke, 1 is 'moderate', and any score above 1 is a 'high' risk. In general, a CHA_2DS_2-VASc score of 1 should warrant strong consideration for full oral anticoagulation. The one exception, however, is in patients who have a score of 1 due to gender alone - in these patients (female <65 years old without other risk factors), antithrombotic therapy should not be given. Therefore a CHA_2DS_2-VASc score of 1 or more in men and 2 or more in women should be considered for anticoagulation and commissioners [such as clinical commission groups and NHS England] should ensure that they commission services that offer anticoagulation to adults with atrial fibrillation to these values.

Rate and rhythm control

The 2014 NICE clinical guideline (CG180) on the management of atrial fibrillation provides guidance on both rate and rhythm management in patients with AF. Information is provided below:

When to offer rate or rhythm control?

Offer rate control as the first line strategy to people with atrial fibrillation, except in people:

- Whose atrial fibrillation has a reversible cause
- Who have heart failure thought to be primarily caused by atrial fibrillation
- With new onset atrial fibrillation
- With atrial flutter whose condition is considered suitable for an ablation strategy to restore sinus rhythm
- For whom a rhythm control strategy would be more suitable based on clinical judgement.

Rate control

Offer either a standard beta blocker (that is a beta blocker other than sotalol) or a rate limiting calcium channel blocker as initial monotherapy to people with atrial fibrillation who need drug treatment as part of a rate control strategy. Base the choice of drug on the person's symptoms, heart rate, co-morbidities and preferences when considering drug treatment.

Consider digoxin monotherapy for people with non-paroxysmal atrial fibrillation only if they are sedentary (do no or very little physical exercise).

If monotherapy does not control symptoms, and if continuing symptoms are thought to be due to poor ventricular rate control, consider combination therapy with any two of the following:

- A beta blocker
- Diltiazem
- Digoxin

Do not offer amiodarone for long-term rate control.

Rhythm control

Consider pharmacological and/or electrical rhythm control for people with atrial fibrillation whose symptoms continue after heart rate has been controlled or for whom a rate control strategy has not been successful.

Assess the need for drug treatment for long term rhythm control taking into account the person's preferences, associated co-morbidities, risks of treatment and likelihood of recurrence of atrial fibrillation.

If drug treatment for long-term rhythm control is needed, consider a standard beta blocker (that is, a beta blocker other than sotalol) as first line treatment unless there are contraindications.

If beta blockers are contraindicated or unsuccessful, assess the suitability of alternative drugs for rhythm control, taking co-morbidities into account.

Dronedarone is recommended [NICE CG180 1.6.13] as an option for the maintenance of sinus rhythm after successful cardioversion in people with paroxysmal or persistent atrial fibrillation:

- Whose atrial fibrillation is not controlled by first line therapy (usually including beta blockers), that is, as a second line treatment option and after alternative options have been considered and
- Who have at least 1 of the following cardiovascular risk factors:
  - Hypertension requiring drugs of at least 2 different classes
  - Diabetes mellitus
  - Previous transient ischaemic attack, stroke or systemic embolism
  - Left atrial diameter of 50mm or greater or
  - Age 70 years or older and who do not have left ventricular systolic dysfunction and who do not have a history of, or current, heart failure.

People who do not meet the criteria in recommendation [section 1.6.13] who are currently receiving dronedarone should have the option to continue treatment until they and their clinicians consider it appropriate to stop. [This recommendation is from Dronedarone for the treatment of non-permanent atrial fibrillation (NICE technology appraisal guidance 197).] [2010, amended 2012][12]

Consider amiodarone for people with left ventricular impairment or heart failure.

Do not offer class 1c antiarrhythmic drugs such as flecainide or propafenone to people with known ischaemic or structural heart disease. Both amiodarone and dronedarone require baseline and regular monitoring of liver, renal function and thyroid function [amiodarone therapy only] in line with local guidelines or as per the current recommendations of BNF.

Anticoagulation for AF patients

The decision to anticoagulate a patient should be based on their CHA_2DS_2-VASc and HAS-BLED scores as described as above. NICE recommends anticoagulation with either a novel oral anticoagulant agent such as direct factor Xa inhibitors (apixaban, rivaroxaban, edoxaban), direct thrombin inhibitors (Dabigatran) or Vitamin K antagonist such as warfarin.

The NOACs have all been shown to have similar or superior efficacy to warfarin in terms of reduction in thromboembolic events (dabigatran 110mg, rivaroxaban, edoxaban 60mg/30mg, apixaban non-inferior; dabigatran 150mg superior). The overall rates of major bleeding with dabigatran 150mg and rivaroxaban were similar to warfarin and with apixaban, dabigatran 110mgs and edoxaban were lower than warfarin. However with all four agents there was a significantly lower rate of intracranial haemorrhage compared to warfarin.

The NICE AF clinical guideline key recommendations section states that anticoagulation may be with apixaban, dabigatran etexilate, rivaroxaban or a vitamin K antagonist. In addition, NICE support the use of edoxaban in non-valvular AF[13]. However, NICE guidance states that the choice of anticoagulant agent should be made after a full discussion with the patient and based on their clinical features and preferences (NICE 2014).

Rivaroxaban has been prospectively studied in patients prior to cardioversion[14] and is licensed to be initiated for this procedure. However, there are no data to suggest that other NOACs would be unsafe in this setting. Inform patient of unlicensed use if other NOAC used and document in the notes. The NOACs are not specifically licensed for initiation prior to AF ablation however the limited published data does not suggest any major safety concerns.

Therefore, there are a number of factors to consider when determining whether warfarin or a NOAC should be offered to a patient for thromboembolic prophylaxis.

Factors favouring warfarin include:

- Warfarin has been used extensively for over 50 years with a well-documented safety profile (whilst INR remains within the therapeutic range).
- Can be used in patients with AF with valvular heart disease including mitral stenosis and mechanical valves (NOACs contra-indicated or not studied)
- The measurement of INR gives a guide to patient compliance with medication whereas it is more difficult to determine compliance with NOACs
- Can be used in severe renal disease (all NOACs contraindicated if eGFR <15ml/min)
- Readily available reversal agents
  Note: NOAC reversal agent(s) are at varying stages of development
- Cheaper acquisition costs (but require costs of anticoagulation services)
- Patients with poor compliance - due to the longer half-life and prolonged effect, patients are more likely to remain anticoagulated than with the NOACs

Conversely, factors favouring use of a NOAC compared to warfarin include:

- NOACS do not require INR monitoring or support of anticoagulation services
- Provide immediate anticoagulant effect (warfarin requires 3–5 days)
- Better safety profile with lower risk of intracranial haemorrhage
- No significant food interactions
- Short half-life so only required to be stopped between 24–96 hours depending on NOAC type, renal function and surgical indication

If decision to offer a NOAC, which NOAC should be chosen?

As outlined on the previous page, the NOACs have similar efficacy and safety profiles in the major studies. However there are some practical considerations to consider when deciding on the choice of NOAC for a particular patient:

1. Renal Function
Dabigatran is predominantly renally excreted and hence can accumulate in renal impairment. It is contraindicated if the eGFR is <30mL/min. It should be used with caution if the eGFR is 30–50mL/min. Apixaban, rivaroxaban and edoxaban can be used provided the eGFR is >15mL/min but require dose modification (apixaban 2.5mg bd if eGFR 15–29mL/min; Rivaroxaban 15mg if eGFR 15–49mL/min; edoxaban 30mg if eGFR 15-50mL/min). It is therefore essential that renal function is checked prior to initiation and re-checked at least yearly (or more frequent if high-risk of deterioration). NICE Chronic Kidney Disease guidelines recommend apixaban ahead of other NOACs and warfarin if the eGFR is below 50mL/minute.

The information on dosage adjustment in the BNF is expressed in terms of eGFR for most drugs rather than a measure of creatinine clearance, which was used in the drug studies on NOACs. Although the two measures of renal function are not interchangeable, in practice, eGFR (MDRD 'formula') can be used to determine dosage adjustments. In patients at both extremes of weight (BMI of less than 18.5 kg/m2 or greater than 30 kg/m2) the absolute glomerular filtration rate or creatinine clearance (calculated from the Cockcroft and Gault formula) should be used to adjust drug dosages.

2. Dose modification
In addition to the dose reduction in renal impairment, apixaban, edoxaban and dabigatran require dose reduction dependent on the patient characteristics. Reduce dabigatran dose to 110mg bd in patients over 80 years. For patients aged 75–80 years, consider reducing the dose to 110mg bd if the thromboembolic risk is low and bleeding risk is high. Commence apixaban 2.5mg bd if 2 or more of the following (age>80, body weight<60kg, serum creatinine >133 micromol/L).

Reduce edoxaban to 30mg if body weight less than or equal to 60kg and/or concomitant use of any of the following potent P-glycoproteins inhibitors: ciclosporin, dronedarone, erythromycin, ketoconazole. Rivaroxaban does not require dose modification apart from in renal impairment (eGFR 15–49mls/min) as above.

3. Dosette boxes
Dabigatran can be obtained in its own separate 'dosette-style' packaging. Edoxaban, apixaban and rivaroxaban are safe to use in ordinary dosette boxes.

4. Once daily versus twice daily administration
Rivaroxaban and edoxaban are once daily whereas dabigatran and apixaban are twice daily. Rivaroxaban and edoxaban should be considered in patients in whom compliance with twice daily medication regimes is difficult.

5. Administration
Dabigatran must be swallowed whole. Rivaroxaban should be taken with food to increase absorption but can be crushed and given down an NG tube if required. Apixaban can also be crushed and administered via a NG tube. Edoxaban can be taken with or without food.

6. Pregnancy and Breast feeding
All NOACS are either not recommended or contraindicated in breast-feeding or pregnancy as is also the case for warfarin.

7. Gastro-intestinal bleeding risk
Dabigitran 150mg bd, edoxaban and rivaroxoban can lead to an increase risk of GI bleeding when compared to warfarin therefore, they should be used with caution in patients with a history of gastrointestinal bleeding or active gastrointestinal pathology.

Fourth stage - **Long-term management**

Focus management in primary care

Stroke prevention

- Audit tools in primary care
- Education including information on FAST
- Annual renal function
- Annual CHA_2DS_2-VASc score
- Annual QBleed®/HAS-BLED score
- Review of TTR if on warfarin
- Full blood count
- Review of anticoagulation options
- Consider - Left Atrial Appendage Occlusion (LAAO) service

Quality of life assessment

Assess symptoms, rate and rhythm control

Education

Consider rhythm control if: paroxysmal AF, evidence of heart failure, reversible cause such as thyrotoxicosis, probable recent onset, atrial flutter or remain symptomatic despite adequate rate control or rate control problematic.

Consider specialist referral to local provider:
For cardioversion
If co-existent valve disease
If symptoms of heart failure
For electrophysiology assessment - include pacemaker and ablation strategy
For consideration of LAAO

Purpose of this stage

Primarily to provide a robust and continuous monitoring system to ensure adequate treatment is given for prevention of strokes in patients who are previously or currently diagnosed with atrial fibrillation.
Secondly, to continually assess patient symptoms and how they affect their quality of life and allow access to specialist services if required.

Importance of this stage

Patient's conditions change overtime and can alter their risk stratification scores from being low risk to high risk. Reassessing the patient will highlight the need for the anticoagulation of patients whom have now become high risk.

For individuals who are symptomatic from atrial fibrillation they will be given access to treatments that will improve their quality of life and in many cases cure there arrhythmia.

Consequences of not following this stage

If stroke risk is not reassessed then patients that become high risk will be missed and may suffer a cerebrovascular accident as a result.

The amount of acute hospital admissions with symptomatic episodes of atrial fibrillation will increase if appropriate referrals for access to treatments are not made.

Rationale behind the indicators

Increase in frequency and confidence to reassess patients in primary care and prevent the need for continuous monitoring to take place in secondary/tertiary care.

To reduce hospital admissions with cerebrovascular accidents or atrial fibrillation.

Increase awareness of atrial fibrillation, anticoagulation and the benefits of a system that reduces the risks for patients.

Core components of long-term management	Measures and guidance
Indicators	Proportion of patients with TTR above 65% over a specified timeframe Number of patients within each EHRA classification* Proportion of patients referred to secondary care Proportion of patients referred to tertiary care Quality of life measure
Standards	NICE Quality Standard - Adults with atrial fibrillation taking a vitamin K antagonist with a time in therapeutic range below 65% have their anticoagulation reassessed
Guidelines	NICE CG 180. Atrial Fibrillation: the management of atrial fibrillation. European Society of Cardiology. Guideline for the Management of AF (2012)
Competencies	n/a

* European Heart Rhythm Association (EHRA) score of AF-related symptoms

Reference: (1) European Heart Rhythm Association et al. Guidelines for the management of atrial fibrillation: the Task Force for the Management of Atrial Fibrillation of the European Society of Cardiology (ESC). Eur Heart J. 2010 (19): 2369-429

Notes on this stage

Review of anticoagulation options to include:

- NOAC
- Left atrial appendage occlusion device
- Warfarin (with local anticoagulation clinic support or use of CoaguChek device)

Review of patients on NOACs

Although there are no specific guidelines on when to review patients on NOACs, the expert panel group recommended that a six-monthly review as a minimum was appropriate to ensure drug compliance.

Review of TTR (Time in Therapeutic Range)

The Warfarin Patient Safety audit tool has been designed to help practices to audit their clinical data to look at the appropriateness of warfarin prescribing. The tool will assist practices in examining whether patients are achieving the optimum benefit from taking warfarin by calculating the amount of time their International Normalised Ratio (INR) is within therapeutic range.

See University of Nottingham for further details: **http://www.nottingham.ac.uk/primis/tools/audits/warfarin-patient-safety.aspx**

Ablation

The success rate of maintaining sinus rhythm after ablation for paroxysmal AF (PAF) is currently about 70% at first procedure and 90% with two procedures. The success rate of maintaining sinus rhythm after persistent AF (PeAF) is approximately 50%, or even lower if the duration of PeAF is longer than 12 months, and/or the left atrium is considerably dilated. There is a 1–2% risk of procedural complications.

Patients that should be referred for consideration for ablation are those that are:

- PAF: if patients are still experiencing symptoms in spite of drug therapy, if they are experiencing significant side effects from drug therapy or if they would prefer not to take lifelong anti-arrhythmic drug therapy.
- PeAF: if patients are still experiencing symptoms in spite of adequate rate control.

Patients should NOT be referred for ablation if their sole/ main motivation for this is to be able to discontinue oral anticoagulation. There are no long term prospective data that have proven the safety of stopping oral anticoagulant therapy following ablation treatment.

Referral for patients with atrial flutter should be considered for ablation as the success rates are higher. Consider referral also where there is ECG evidence of an accessory pathway.

Left atrial appendage occlusion

Some 90% of AF related strokes are because of clots that form in the left atrial appendage. LAAO implantation has been shown to be as effective as warfarin in randomised control trials. Therapy with warfarin as well as with NOACs is associated with a 2–3% annual risk of major bleeding, which includes intracranial and gastrointestinal haemorrhage. For AF patients who have experienced major bleeding on oral anticoagulation or have valid clinical contraindications to oral anticoagulation, LAAO offers a viable alternative option for stroke prevention.

It should be considered in patients unable to take anticoagulation or those with a very high bleeding risk following review by an established multi-disciplinary team. NHS England has selected Liverpool Heart and Chest Hospital as one of 10 centres chosen nationally for LAAO implantation. All patients who are at moderate or high risk of stroke (CHA_2DS_2-VASc score >1) and considered to be at high risk of bleeding with oral anticoagulation should be referred to LHCH for consideration of LAAO implantation.

Patient self-management and self-monitoring for patients on warfarin

The NICE diagnostics guidance [DG14] on self-monitoring coagulometers supports the use of the Coaguchek XS system (Roche Diagnostics) and the InRatio2 PT/INR Monitor (Alere) as options for some adults with atrial fibrillation or heart valve disease who are on long-term anticoagulation therapy such as warfarin, and who are at higher risk of developing blood clots, to self-monitor their INR. Information on the option of self-monitoring should be provided by the GP or anti-coagulation clinic when patients make the decision about the best treatment suitable for them. The diagnostics guidance for self-monitoring coagulometers is available on the NICE website: **http://www.nice.org.uk/Guidance/DG14**

Management of Anticoagulation in patients with advanced cancer or at end of life (ref Cheshire and Mersey Palliative Care Network Audit Group 2009)

Atrial Fibrillation is known to occur more commonly in patients with cancer and in particular those undergoing cancer surgery[10].

In addition many cancer patients are at a much higher risk of venous thromboembolism[16] due to the inflammatory response to advanced cancer and relative immobility.

However the management of anticoagulation in advanced cancer patients is challenging. Patients with cancer may be at an increased risk of both thrombosis and haemorrhage and their response to anticoagulation may be unpredictable. In particular, the use of warfarin may be challenging, especially in patients with significant liver metastases or those with persistent nausea and vomiting. In addition patients with advanced cancer may often require frequent courses of antibiotics, corticosteroids or anticonvulsants which may result in erratic INRs. Finally general frailty may make repeated blood tests inappropriate and venous access may be limited[15, 18].

There is no evidence to guide the use of anticoagulation in patients with advanced cancer and it is important for the clinician to decide whether it is appropriate to continue anticoagulation in patients with advanced cancer on an individual patient basis[17]. An MDT approach between the general practitioner specialist and palliative care team may be appropriate. When considering anticoagulation for patients with AF it is useful to consider the patients CHA_2DS_2-VASc score and it may be appropriate to stop anticoagulation in cancer patients if their annual risk of stroke is relatively low, if there are significant difficulties or risks in continuing anticoagulation. It is however important to note that the CHA_2DS_2-VASc does not take into account the presence of cancer which has been shown to confer an increased risk of thromboembolism in AF even after adjustment for known risk factors[17].

If the management of anticoagulation with warfarin is difficult, consideration could be given to long-term treatment with low molecular weight heparin (LWMH). At present there is no safety data on the use of novel oral anticoagulant agents in advanced cancer and if there are concerns about an increased bleeding risk these agents should be avoided.

Once a patient is deemed to be approaching end of life, all medication should be reviewed and non-essential medications discontinued. This would typically include any anticoagulation being given for thromboembolic prophylaxis.

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