

Opportunistic podiatry-led detection of heart arrhythmias (atrial fibrillation): a step towards standard care

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FOREWORD

Atrial fibrillation (AF) is one of the most common heart rhythm disorders and causes an irregular, and often abnormally, fast heart rate. A person with AF has a 5-fold increase in the risk of stroke (NICE, 2018). The total societal cost of AF-related stroke is estimated to be £56,847 in the first year following a stroke and £30,768 in subsequent years conditional on survival (Patel et al, 2018). This cost incorporates NHS costs, loss of employment, and personal social services and informal care.

AF is typically detected as an irregular pulse or rhythm and diagnosis is confirmed via a 12-lead electrocardiogram (ECG; NICE, 2021). Podiatrists and podiatry-led teams are well placed to detect an irregular pulse as they routinely palpate the foot and lower limb as part of their day-to-day practice. Work has already shown the positive impact community and podiatry-led opportunistic detection can have in identifying people with AF (Lowres et al, 2013; Hicks et al, 2017; Health Innovation Network, 2019; Fisk et al, 2020; Petridou et al, 2021). The Atrial Fibrillation Early Detection Pathway (page 10) guides the podiatry team to refer an individual to their GP for further investigation if the foot pulses are irregular on palpation or sound irregular on ultrasound investigation. The pathway was developed by NHS Northern Care Alliance and supported by the Royal College of Podiatry [RCOP], 2019).

An expert working group representing the four nations of the United Kingdom – England, Northern Ireland, Scotland and Wales – explored the role of podiatry teams in opportunistic detection of irregular rhythm pulses that may be indicative of AF. The publication has the following aims:

- To develop and embed AF detection as a standard of care in the treatment and management of people who receive a diabetes vascular screening or lower limb vascular assessment
- To raise awareness of AF among the podiatry community
- To empower all individuals carrying out vascular assessment to check for irregular rhythm pulses
- To direct rapid referral for appropriate AF diagnosis and treatment to primary care
- To revise the Atrial Fibrillation Early Detection Pathway and provide support for its implementation.

ATRIAL FIBRILLATION – WHAT ARE THE CHALLENGES?

Atrial fibrillation (AF) is characterised by a fast and erratic heartbeat. AF occurs when abnormal electrical impulses begin firing in the heart's upper chambers (the atria). These impulses override the heart's natural pacemaker, which can no longer control the rhythm of the heart, and this causes an irregular pulse rate.

AF is an independent risk factor for stroke and, without treatment, people with AF are five times more likely to experience a stroke (NICE, 2018). People with AF may have an increased risk of blood clots forming in the heart, which can lead to a clot travelling to the brain and causing an AF-related stroke. AF-related strokes are considered to be more severe and cause greater disability than non-AF-related strokes (Lamassa et al, 2001; Marini et al, 2005) by having a wide impact on a person's life and the lives of their families and carers (White et al, 2006). Following an AF-related stroke, half of all individuals will die within 12 months (Marini et al, 2005).

It is estimated that 1.2 million people in the United Kingdom have AF (The Stroke Association, 2017); however, AF remains largely underdiagnosed as estimates suggest one-third of people with AF do not experience symptoms, and many only become aware they have the condition after they have a stroke (Savelieva and Camm, 2000). A quarter of all people who experience an AF-related stroke will not have been previously diagnosed, so earlier diagnosis in this group of individuals represents an opportunity to save lives (Boriani et al, 2015).

It can be difficult to diagnose AF as the visible symptoms [see Box 1] can mirror other cardiovascular conditions, and the clinical presentations of AF are varied (Hindricks et al, 2020):

- **Paroxysmal AF** – AF episodes come and go, and usually stop spontaneously or with intervention within 7 days of onset
- **Persistent AF** – each episode of AF lasts for longer than 7 days, or less when it is treated

Box 1. Symptoms of AF (NICE, 2021)

- Breathlessness
- Palpitations
- Syncope (fainting) or dizziness
- Chest discomfort
- Stroke or transient ischaemic attack

Often the only symptom present is an irregular pulse.

- **Long-standing persistent AF** – AF is continuous for a year or longer and a rhythm control strategy has been adopted
- **Permanent AF** – the person and clinician accept there will be no further attempts to restore or maintain sinus rhythm.

Preventing new strokes by detecting, diagnosing and treating AF will reduce the number of people living with its effects. The 2020 European Society of Cardiology guidelines on AF suggest that early intervention and modifiable risk factor control could reduce AF incidence (Hindricks et al, 2020).

As recommended by NICE (2021), a health professional who detects a person with an irregular pulse with or without any of the symptoms associated with AF (e.g. breathlessness, palpitations, fainting or dizziness, chest discomfort, stroke or transient ischaemic attack) should suspect AF and refer to primary care for a 12-lead electrocardiogram (ECG). If AF is diagnosed, rapid appropriate treatment should follow [Figure 1]. There is significant scope for reduction in stroke-related morbidity through timely diagnosis and management of AF. For any disease, prevention is more efficient than treatment, so, as part of a preventative strategy for AF-related strokes, it is important to understand the modifiable and non-modifiable risk factors for AF [Box 2].

For every 25 people diagnosed with AF and treated appropriately, one stroke is prevented, saving an average of £46,039 per stroke in health and social care costs over 5 years (Xu et al, 2018).

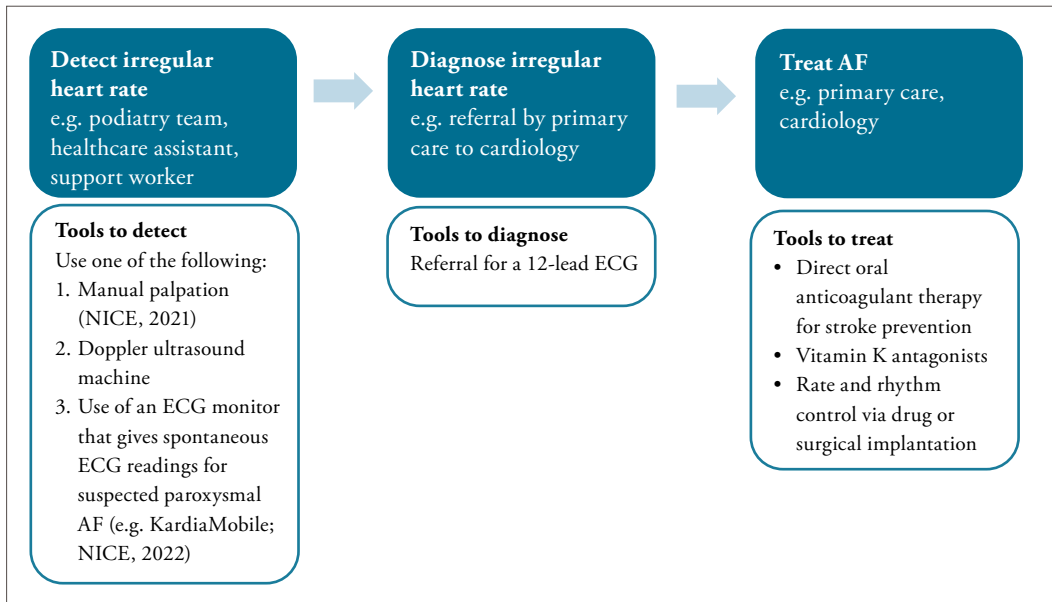


Figure 1. Detection, diagnosis and treatment of atrial fibrillation (NICE, 2021; 2022)
AF= atrial fibrillation; ECG= electrocardiogram.

Box 2. Risk factors for atrial fibrillation include (Hindricks et al, 2020)

- Increasing age
- Ethnicity
- Male sex
- Genetics
- Hypertension
- Diabetes
- Coronary artery disease
- Smoking
- Alcohol consumption
- Obesity.

People with long-term conditions (e.g. hypertension, hyperlipidaemia, diabetes) are at higher risk of AF (Hindricks et al, 2020). Increasing age and diabetes are both risk factors for AF that are predicted to increase in prevalence in the UK. By 2030, it is estimated that 5.5 million people in the UK will have diabetes (Diabetes UK, 2022).

Approaches to reduce AF-related stroke risk

A coordinated action plan within healthcare systems is required to achieve earlier diagnosis and management to reduce the risk of stroke and other complications in people with AF. The NHS Long Term Plan (NHS England,

2019; Box 3) recognises that early detection and treatment of cardiovascular risk factors can help individuals live longer, healthier lives, while making financial savings and moderating the demand on NHS services.

There is an opportunity for all professional groups to contribute towards prevention of ill health.

Another approach recommended by some national and international bodies is the use of targeted AF screening programmes drawing on routine manual pulse checks and ECG readings (Hicks et al, 2020; Hindricks et al, 2021). However, the UK National Screening Committee (2019) currently do not recommend screening for AF to identify asymptomatic individuals. A UK project is currently underway to determine if AF screening is more beneficial than the current processes (UK National Screening Committee, 2019).

Box 3. The NHS Long Term Plan (NHS England, 2019)

Through public health initiatives over the next 10 years, the NHS Long Term Plan aims to:

- Prevent 150,000 heart attacks, strokes and dementia cases
- Provide education and exercise programmes to people with heart conditions
- Prevent up to 14,000 premature deaths.

RESEARCH SUPPORTING OPPORTUNISTIC AF DETECTION

To complement the NHS Long Term Plan to reduce cardiovascular events, in 2017, NHS England commissioned the 15 Academic Health Science Networks (AHSNs) to undertake a project to increase AF detection and reduce the incidence of AF-related stroke using mobile ECG devices. In total, 6,000 mobile ECG devices were distributed across the country, allowing a greater range of healthcare and non-healthcare settings to offer opportunistic pulse rhythm checks to asymptomatic groups at increased risk of AF. The South London Health Innovation Network distributed 400 mobile ECG devices and, between January 2018 and March 2019, 14,835 pulse rhythm checks were recorded, detecting 597 people with possible AF (Health Innovation Network, 2019; Lang et al, 2020). Community podiatry was identified as a high-impact setting to carry out opportunistic pulse checks as part of a routine vascular assessment as they detected a high rate of people with heart arrhythmias (Health Innovation Network, 2019).

The increased detection rate of irregular pulses in community podiatry compared to other settings may be due to the patients tending to be older, and with other risk factors, such as diabetes and/or cardiovascular diseases. Additionally, a routine appointment with a community podiatrist is typically between 15 and 20 minutes, which provides a greater opportunity to undertake a pulse rhythm check than other clinical settings that may have shorter appointment times (Health Innovation Network, 2019).

The community podiatry team at Guy's & St Thomas' NHS Foundation Trust built opportunistic detection for heart arrhythmias using the KardiaMobile ECG device (AliveCor UK) into their treatment templates to ensure that everyone receiving podiatry care in the community was offered a manual pulse check on their first appointment (Fisk et al, 2020). Cases of 'possible AF' were communicated to the GP over the phone and in writing. The

mobile ECG trace was sent to the GP practice, ensuring timely and appropriate onward referral for a 12-lead ECG and initiation of appropriate therapy (Health Innovation Network, 2019). Over an 8-month period, 590 pulse rhythm checks were performed, detecting 27 people with possible AF. This was equivalent to one case of possible AF in every 22 people tested in the community podiatry settings (Fisk et al, 2020).

In a study by Hicks et al (2019), a team of podiatrists and footcare technicians in Durham and Darlington were trained to proactively listen for pulse presence and rhythm using a Doppler ultrasound machine. When an irregular pulse was identified in an individual who did not already have a diagnosis of AF, they were referred to their GP for a 12-lead ECG. Out of 5,000 people who had a diabetes foot check over a 3-month period, 10 individuals were identified with previously unknown AF. This was equivalent to one case of possible AF in every 500 people checked (Hicks et al, 2019).

In a Greek study, podiatrists and podologists performed pulse rhythm checks using palpation, which was confirmed with Doppler ultrasound wave assessment, as part of an individual's annual diabetes vascular screening. In the 12-month study, 300 people with diabetes received a pulse rhythm check and 51 (17%) presented with undiagnosed AF (Petridou et al, 2021). This was equivalent to one case of possible AF in every six people checked.

The AF detection rates identified by Petridou et al (2021), Fisk et al (2020) and Hicks et al (2019) are greater than those observed in the general population by Lowres et al (2013) in a systematic review. Lowres et al (2013) reviewed 30 studies, which included 122,000 individuals. Studies were included if they evaluated a general ambulant adult population and used a 12-lead ECG or pulse palpation to identify an irregular pulse suggestive of AF. The authors calculated that AF screening could identify 1.4% of the population ≥ 65 years with previously undiagnosed AF (approximately one in 100).

The rate of AF detection varied among the studies, which may be explained by the different populations reviewed and the methods used to check the pulse rhythm (Fisk et al, 2020). However, they all show that opportunistic

podiatry-led detection of heart arrhythmias is feasible to identify people with AF who could receive a full diagnosis and appropriate rapid treatment to reduce the risk of AF-related strokes (Hicks et al, 2019).

PODIATRY JOB DESCRIPTION

As part of undergraduate and graduate training, podiatrists have the understanding and knowledge to identify an irregular pulse. They are familiar with performing pulse rhythm checks to check for peripheral arterial disease (PAD) and they check the circulation to the foot or lower limb. Therefore, as a professional group, podiatrists are ideally placed to provide opportunistic AF detection at ‘the right place at the right time’ and to ‘make every contact count’, especially in a population group that is at higher risk of AF. There is no reason why opportunistic detection of heart arrhythmias could not be a part of standard of care.

Opportunistic heart arrhythmia detection is relevant for NHS and independent, private podiatrists alike. All podiatrists should feel confident to identify an irregular heart rate and work in partnership with the person’s GP to suggest a 12-lead ECG. Having such an impact on a person’s life can garner greater job satisfaction, confidence and a sense of achievement when they see the positive, holistic impact they have had on the individual beyond the lower limb — possibly even saving a life (Hicks et al, 2019).

The podiatrist has an active role in supporting the aims of the NHS Long Term Plan (2019) and by being a public health advocate. In the context of AF detection, podiatrists can be empowered ‘early detectors’ of cardiovascular disease, which helps prevent premature deaths and supports the NHS Long Term Plan (Hicks et al, 2019). Clinical podiatry appointments are often 15-20 minutes in length, which also gives podiatrists the opportunity to talk with the individual about their health beyond the lower limb – such as smoking cessation, nutrition and hydration.

Everyone over the age of 12 years who has

diabetes should have their feet screened annually (Box 4; NICE, 2015). It is estimated that across England, if all individuals with diabetes had their pulse rhythm checked as part of the annual foot review, approximately 7,600 people with AF could be detected and receive appropriate treatment (Hicks et al, 2019).

Detecting an irregular heart rate, which can prevent strokes among people with unknown AF, should be an integral part of annual diabetes foot screening.

There is currently no standardised national screening programme for either pulse rhythm checks or diabetes foot screening in England, Wales or Northern Ireland, like there is for retinopathy, bowel or cervical screening. In Scotland, there are standards for diabetes foot screening, which are recorded on the national SCI-Diabetes system. As a result, local policies regarding the delivery of annual diabetes foot screening are variable and aimed primarily at detecting whether pulses are present rather than determining pulse rhythm (Hicks et al, 2019).

Practicalities of identifying an irregular pulse

A pulse check of the posterior tibial artery and the dorsal pedal pulse during a vascular assessment assesses the absence or presence of a foot pulse [Figure 2]. It is conducted by either manual pulse palpation or using a handheld Doppler ultrasound machine for at least 30 seconds. Box 5 includes further training resources to support pulse palpation.

The vascular assessment may be conducted by any healthcare professional in the multidisciplinary team, which is led by the

Box 4. Elements of the annual diabetes foot screening (NICE, 2015)

Remove the individual’s shoes, socks, bandages and dressings, and examine both feet for evidence of the following risk factors:

- Neuropathy (use a 10g monofilament as part of a foot sensory examination)
- Limb ischaemia (see the NICE guideline on peripheral arterial disease)
- Ulceration
- Callus
- Infection and/or inflammation
- Deformity
- Gangrene
- Charcot arthropathy.

Box 5. Training resources to support pulse palpation

- Cambridge Diabetes Education Programme: Online diabetes competency-based training for healthcare staff. Diabetic Foot Care, Screening and Risk Assessment. <https://www.cdep.org.uk/>
- DiabetesFrame.org – training modules on diabetes overview and the purpose and steps of foot screening. Available at: <https://www.diabetesframe.org/nhs-scotland/>

The aim of vascular pulse assessment is to check for:

- Circulation
- Heart rate
- Rhythm.

podiatry team. Individuals with diabetes who are at high or moderate risk of foot-related problems, or who have an active diabetic foot disease — approximately 30% of the diabetes population (Short Life Working Group, 2019) — will be under the care of the diabetic foot teams. They may be reviewed as frequently as every 1-2 weeks and up to every 6 months depending on the level of risk and symptoms. The remaining 70% of the diabetes population are at low risk of diabetic foot

disease with no symptoms apart from callus and will receive diabetes foot screening in primary care on an annual basis (NICE, 2015).

Opportunistic detection of irregular pulses during the annual diabetes foot screening can be conducted by all appropriately trained clinical staff – not just the podiatrist.

The annual diabetes foot screening is a fantastic opportunity to detect whether an individual has an irregular pulse, especially as diabetes is a risk factor for AF (Hicks et al, 2019).

Assessment of the dorsal pedal pulse (A) and posterior tibial artery (B) during a vascular assessment assesses the absence or presence of a foot pulse (Zimmerman and Williams, 2020)

- Either manually palpate the pulse, or use a Doppler ultrasound machine for at least 30 seconds to identify an irregular pulse (Pickering, 2013; NICE, 2021)
- Consider using an ambulatory ECG monitor that gives spontaneous readings (NICE, 2021)
- Remember to remain confident of your skills to identify an irregular heart rate when speaking to primary care colleagues.

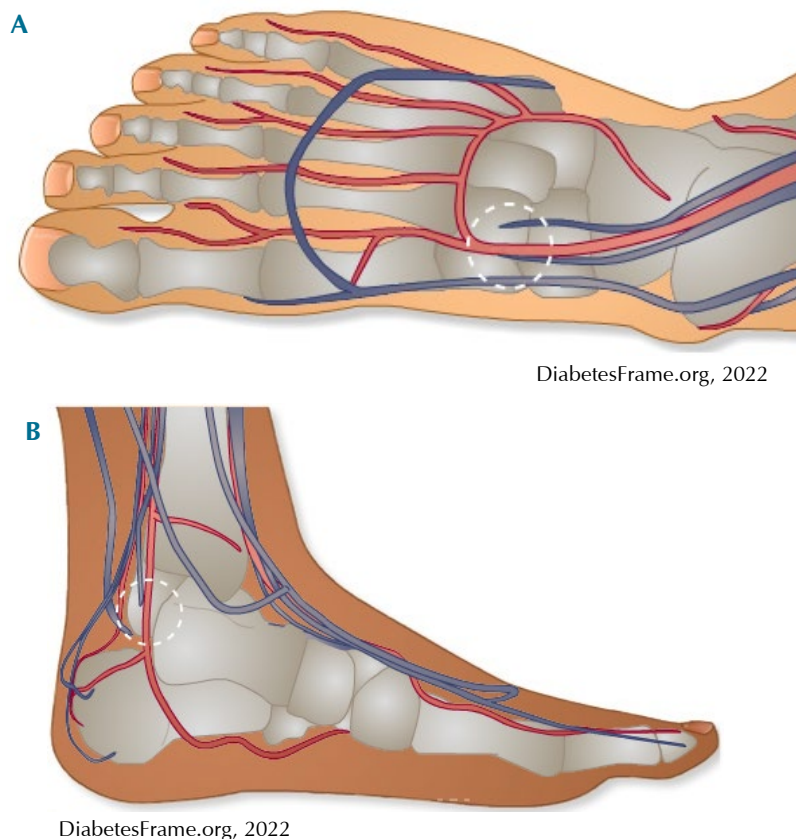


Figure 2. Location of the dorsal pedal pulse (circled on A) and posterior tibial pulse (circled on B). Images used with permission from Foot Risk Awareness and Management Education (FRAME). Available at diabetesframe.org

HOW COULD PODIATRY-LED OPPORTUNISTIC DETECTION BE INTEGRATED INTO CURRENT SYSTEMS TO FACILITATE AND SUPPORT USE?

Behaviour change does not occur overnight, so a solution-based approach that focuses on the positive impact opportunistic detection has on everyone is at the forefront of integration into practice. A top-down and bottom-up approach to raise awareness among the public and clinicians of different disciplines may include the undergraduate curriculum and endorsement from networks and national bodies (e.g. colleges, associations and charities).

Other tools that can be helpful include an endorsed pathway that can be integrated into local protocols. A referral pathway from podiatry to GP was initiated by the Manchester Health & Care

Commission in 2018 and integrated into the NHS Northern Care Alliance NHS Group. The referral pathway has been revised by the expert working group to reference the latest NICE (2021; 2022) guidance [Figure 3]. Box 6 includes a template letter that the podiatry team can send to the GP when an irregular pulse is detected and the person is unaware that they have AF, or unaware of their treatment plan, or are non-concordant with treatment. The tools in Figure 3 and Box 6 can empower podiatrists with the 'permission' to direct individuals with suspected AF to their GP for further investigation and rapid treatment if diagnosis is confirmed.

Box 6. Example template of a letter for action of the GP.

Trust / Practice Logo
Podiatry / Leg Circulation Service Address
Contact details
Date
GP
Practice name & address

For Action of GP

Dear Doctor,

Re: [Patient's name] DOB: DD/MM/YYYY NHS no:

Address, Town, Postcode

Your patient has been seen today by the [Podiatry / Leg Circulation Service / Foot protection] service and, during routine assessment of the feet and lower limb, it was identified that the foot pulse was irregular. There appears to be no record of this in the medical history or summary that we hold. Their irregular pulse could be a sign of atrial fibrillation – I would appreciate your review and consideration of further investigations, such as a 12-lead ECG, as per the recent NICE guidance for Atrial Fibrillation (NG196; 2021).

I have supplied the patient with a copy of this letter and asked them to make an appointment with your surgery to consider the need for any further investigations.

Yours sincerely

[Your name]
Podiatrist

Revised by the expert working group

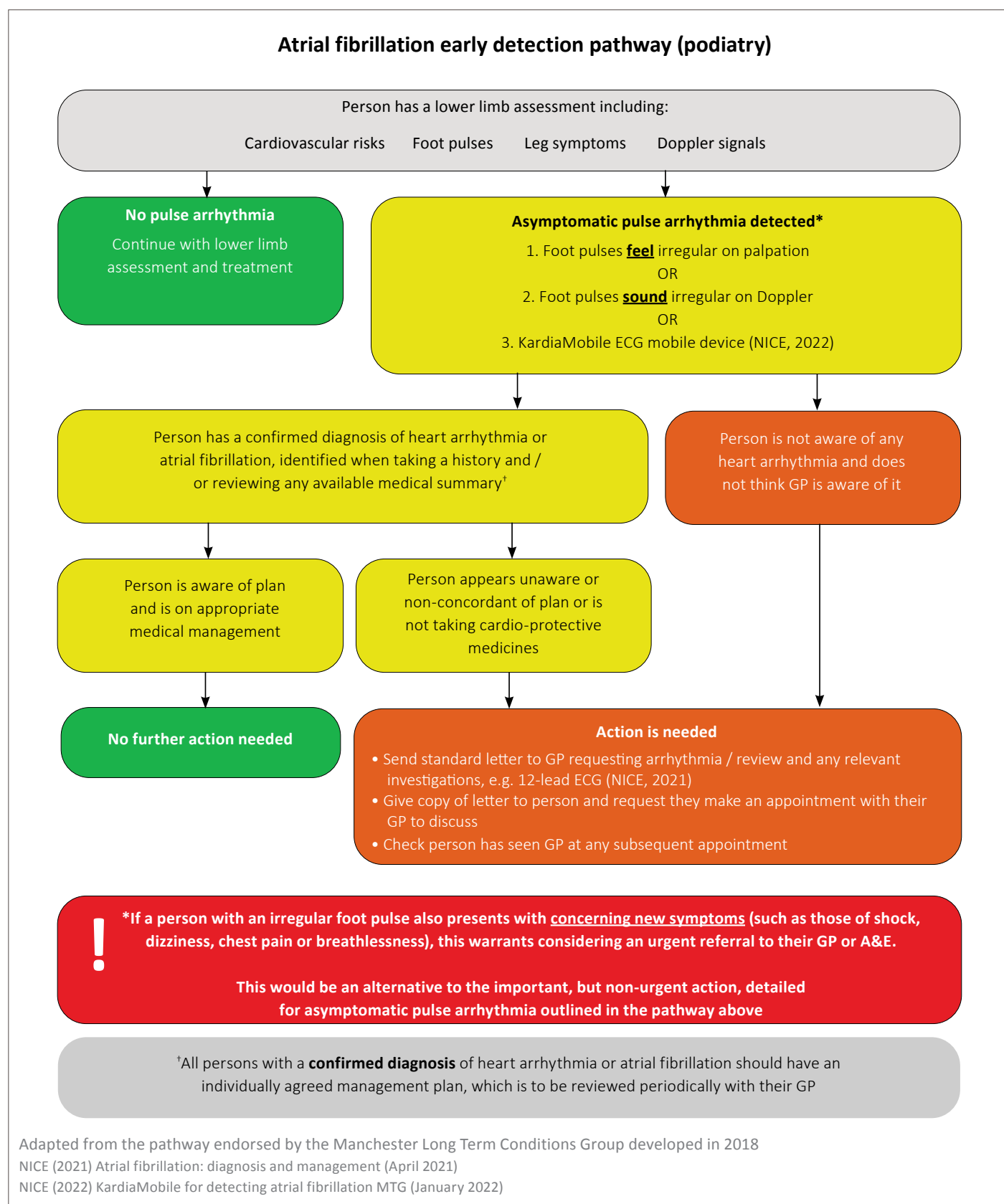


Figure 3. Atrial fibrillation early detection pathway (updated from Royal College of Podiatry, 2019)

CONCLUSION

If AF is detected early, diagnosed and managed correctly, fewer AF-related strokes would occur, reducing the risk of morbidity, mortality and the cost burden to health and social care. Podiatrists and podiatry-led teams can save lives and make a difference to patients' lives as they are well placed to conduct rhythm pulse checks and identify an irregular pulse (Hicks et al, 2019).

To date, work to empower podiatrists has been done sporadically, so there is opportunity to standardise opportunistic AF detection across the United Kingdom and add it to standard of care. The four nations expert working group

recommend a simple, key message "if you identify an irregular pulse and the person at the centre of care is unaware – refer to primary care for a 12-lead ECG".

This document solidifies the role that podiatrists can have in detecting an irregular pulse that may indicate of AF and require rapid treatment to reduce the risk of AF-related stroke. Detecting an irregular pulse is not a new task to add to the workload of podiatrists; it is just another way in which podiatrists can reduce the risk of strokes and support the NHS Long Term Plan (NHS England, 2019).

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