Daiichi Sankyo have assisted AF Association by providing funding for this White Paper but have had no input or influence over the content.
Introduction ........................................ 1
The New Normal ................................. 4
PREVENT ........................................... 6
DETECT ............................................. 9
PROTECT .......................................... 15
CORRECT ......................................... 19
PERFECT .......................................... 21
Conclusion ....................................... 23
References ....................................... 24
Atrial fibrillation (AF) is the most common sustained arrhythmia (an irregular heart rhythm), affecting 2–4% of the world’s population. In England alone, approximately 1.5 million people have been diagnosed with the condition (2.5% of the population) and, according to data from Public Health England, a further 300,000 are undiagnosed.

The condition is the result of abnormal electrical impulses firing in the atria (the heart’s upper chamber); these impulses can override the sinus node (the natural pacemaker of the heart) and can lead to the heart beating abnormally. Symptoms can range from heart palpitations to chest pain, but some people with AF (particularly those who are older) will not experience any symptoms. There are different types of AF, ranging from paroxysmal (episodic) to permanent (present all the time). However, regardless of type, all people with AF are at increased risk of AF-related stroke and, thus, anti-coagulation therapy should be considered.

See Box 1 — types of AF

Overall, AF is now recognised as causing significant mortality and morbidity — with the greatest concern being AF-related stroke. Without anti-coagulation, a person with AF may be up to five times more likely to have an ischaemic stroke than someone without AF. AF-related strokes are devastating, with 20% being fatal and 60% being disabling. In fact, AF-related strokes are associated with higher mortality and greater disability than are non AF-related strokes. Aside from the risk of AF-related stroke, AF can lead to heart failure, dementia, and a poor quality of life.

Therefore, AF is a serious condition that requires optimal management.

The AF Association believes that the best outcome can be achieved with its “PREVENT, DETECT, PROTECT, CORRECT, and PERFECT” strategy.

It also calls for consideration to be given to lessons learnt from the “New Normal” of the COVID-19 pandemic. Above all, the AF Association calls for an approach that is centred on the person with, or at risk of, AF. The Call to Action of this AF White Paper is to “Put People First” using a “PREVENT, DETECT, PROTECT, CORRECT, and PERFECT” strategy in the context of the New Normal.

The subsequent chapters will explore each section of this strategy in detail.
Unmet Needs

• Insufficient education for people in the 20s–50s age groups on the need to live a healthy lifestyle.
• People in the 20s–50s age groups, because of work/family commitments, may have little contact with healthcare professions to review the need for healthy habits.
• Obesity, hypertension, and type 2 diabetes are all potentially modifiable risk factors for AF.

• About 300,000 people in England have undiagnosed AF.
• AF is often only diagnosed after a person has had an AF-related stroke.
• In addition to AF-related stroke, AF is associated with heart failure, cognitive impairment and dementia, anxiety and depression, unexpected admissions to hospital and a reduced quality of life.

• Without anti-coagulation, people with AF are at high risk of an AF-related stroke.
• 20% of people who have an AF-related stroke die and 60% become disabled.
• AF-related strokes are associated with greater mortality and morbidity than strokes from other causes.
• Data suggest that more than 25% of people with AF who have had an AF-related stroke in England are not receiving any form of anti-coagulation and almost 10% are on antiplatelet monotherapy.

• PROTECT therapies do not treat the underlying causes or symptoms of AF.
• Despite guideline-based management, approx. 5% of people with AF experience heart failure, AF-related stroke, acute coronary syndrome (heart attack) or cardiovascular death each year.
• Of those who receive adequate anti-coagulation, 35% to 50% die or receive inpatient therapy within five years.

• A healthcare team may be unaware of all the problems that a person with AF has.
• If a person with AF does not receive adequate information or support about their condition, they may be less likely to adhere to therapies and treatments.
• If a person with AF is not included in decisions about therapies and treatments, they may feel powerless and not in control.
There are already multiple existing opportunities within the NHS — such as the NHS Health Check programme — for communicating with people the benefits of risk factor modification for preventing cardiovascular disease and, consequently, preventing AF.

- **Every contact should count**: opportunities should be taken during any healthcare professional contact — whether this is at the primary, secondary, or tertiary care level — to provide guidance, information and support on a healthy lifestyle and risk factor management to optimise lifelong cardiovascular health.

- DETECT AF with a simple Pulse Check, or digital technologies, to PROTECT against AF-related stroke using anti-coagulation therapy (not aspirin), heart failure, dementia, and poor quality of life.

- AF Association’s Know Your Pulse to Know Your Heart Rhythm campaign raises public awareness of the need to DETECT AF. It advocates that Knowing Your Pulse — with a simple manual 30-second pulse check — to Know Your Heart Rhythm Could Save Your Life.

- Any contact with a person aged ≥65 is an opportunity to DETECT AF. This can be in the form of a medical contact with a healthcare professional or in a non-healthcare community setting.

- Research is needed to determine the incidence and risk of AF-stroke in BAME communities in the UK and whether there are any disparities in care.

- PROTECT against AF-related stroke using anti-coagulation therapy (not aspirin); direct oral anti-coagulants should be the first-line therapy.

- People with AF must be involved in choice of anti-coagulant therapy.

- Reducing risk factors for cardiovascular disease, soon after a diagnosis of AF, is an important part of improving outcomes in people with AF.

- CORRECT underlying cardiovascular abnormalities in part by use of specialist arrhythmia nurses.

- CORRECT the irregular rhythm with access to appropriate treatment.

- PERFECT the patient care pathway by having the person with AF at the centre of integrated care.

- The focus should be on the person with AF rather than the AF itself.

- People with AF should be signposted to organisations such as AF Association, who can provide medically approved information, advice, and support.
By early December 2020, in the UK, 60,000 people had died of COVID-19. However, this figure does not account for the number of people who died as an indirect result of the virus. In the initial stages of the pandemic, during the March UK-wide 2020 lockdown, elective procedures were postponed, hospital appointments were cancelled, and members of the general public felt that hospitals and GP practices should be avoided. This situation may have led them to not seeking the medical attention that they needed and, as a result, their conditions becoming worse — perhaps even fatally so.

Wu et al report that following the first COVID-19 death in the UK, on 2 March 2020, there was “an excess acute cardiovascular mortality of 2,085 (a proportional increase of 8%) compared with the expected historical average in the same time period of the year”. Additionally, the authors state that “deaths at home saw the greatest increase in excess acute CV deaths (a proportional increase of 35%)”.

How many of these excess acute cardiovascular deaths relate to AF is unknown but stroke was found to be the most common cause of death. Therefore, given that 10% of all ischaemic strokes are associated with previously undetected AF, that AF was a factor in some of these deaths is possible. Furthermore, Holt et al found that the diagnosis of new-onset AF declined by almost 50% in the early weeks of lockdown in Denmark. That a similar decline in AF detection occurred in England is probable, and opportunities to PROTECT against AF-related stroke and CORRECT the irregular rhythm may also have been missed. Additionally, a person with AF frequently has comorbid conditions. Thus, if AF has gone undetected, its associated conditions such as left ventricular systolic dysfunction may have also gone undetected. “The risk of undiagnosed AF patients developing complications could potentially translate into poorer outcomes in patients with AF during the COVID-19 pandemic,” observe Holt et al.

Although the COVID-19 pandemic has caused undeniably devastating changes to the world’s way of life, it has also prompted positive changes. The British Cardiovascular Society Working Group on The Future of Cardiology report that the cancellation of in-person medical appointments has led to an adaption and transformation of services that has never previously been possible. The group add that the pandemic has led to the development of virtual clinics; they state that these clinics should continue and be a mainstay of the redesign of cardiology outpatients. Of note, phone clinics could have a role for patients...
Although the COVID-19 pandemic has caused undeniably devastating changes to the UK way of life, it has also prompted positive changes.

who are uncomfortable using, or who do not have access to, digital technologies.

According to the British Cardiovascular Society Working Group, virtual multidisciplinary teams have also now “become the norm” and should continue to be so after the pandemic “both as a means of ensuring that patients can be discussed in a timely manner and to enable the participation of referring clinicians”. They conclude: “Cardiology, like other specialties, needs to assimilate and act on the lessons learnt during the pandemic. This will require a restructuring of the way that we all work and deliver clinical services.”

The pandemic could also lead to the greater adoption of digital technologies for detecting and managing AF. Holt et al report that the number of people receiving their new-onset AF diagnosis through virtual hospital contact was higher during the [Danish] lockdown than during the corresponding weeks in 2019: 12.5% versus 2.3% respectively. However, they comment that people diagnosed with AF during the lockdown “were younger, had a lower CHA2DS2-VASc score, and a higher prevalence of a history of cancer, heart failure, and vascular disease as compared with those diagnosed in 2019”. Therefore, they “speculate that patients with better physical resources had an increased chance of being diagnosed during a lockdown”.

This finding raises the issue that while the COVID-19 pandemic should lead to greater adoption of digital technologies in the healthcare setting, we should be mindful that there can be socio-economic barriers to using these technologies. Some people are not digitally literate and/or may simply be uncomfortable with sharing personal health information online (i.e. through virtual consultations or through apps). Also, for economic reasons, people do not always have access to the required technologies (e.g. a smartphone or Wi-Fi). Therefore, if digital technologies are adopted, the care of people who cannot or do not want to use these technologies must not suffer.

The COVID-19 pandemic has dramatically affected the management of AF, with some changes being positive, leading to a “New Normal”. This New Normal should be kept in mind with all aspects of the AF Association’s PREVENT, DETECT, PROTECT, CORRECT, and PERFECT strategy.
Although age is a major, non-modifiable, risk factor for AF, there are several modifiable risk factors for AF — such as obesity, hypertension, and type 2 diabetes. The 2020 European Society of Cardiology (ESC) Guidelines for the diagnosis and management of AF note: “The continuum of unhealthy lifestyle, risk factor(s), and cardiovascular disease can contribute to atrial remodelling/cardiomyopathy and development of AF that commonly results from a combined effect of multiple interacting factors (often without specific threshold values)”.

- Insufficient education for people in the 20s–50s age groups on the need to live a healthy lifestyle.
- People in the 20s–50s age groups, because of work/family commitments, may have little contact with healthcare professions to review the need for healthy habits.
- Obesity, hypertension, and type 2 diabetes are all potentially modifiable risk factors for AF.

- Existing public health campaigns and strategies to reduce risk factors for cardiovascular disease, such as obesity, can help to PREVENT AF.
- There are already multiple existing opportunities within the NHS — such as the NHS Health Check programme — for communicating with people the benefits of risk factor modification for preventing cardiovascular disease and, consequently, preventing AF.
- **Every contact should count**: opportunities should be taken during any healthcare professional contact — whether this is at the primary, secondary, or tertiary care level — to provide guidance, information and support on a healthy lifestyle and risk factor management to optimise lifelong cardiovascular health.
How to PREVENT

Additional specific PREVENT AF strategies are not necessary as existing public health campaigns to improve cardiovascular health could lead to a reduction in AF.

For example, the Change4Life public health programme (launched in 2009) seeks to address the causes of obesity by providing families with practical tips on healthy eating and staying active. If people, from a young age, adopt a healthy lifestyle, then they are less likely to become obese and, subsequently, are less likely to develop AF.

Every contact should count: opportunity should be taken during any healthcare professional contact — whether this is at the primary, secondary, or tertiary care level — to provide guidance, information and support on a healthy lifestyle and risk factor management to optimise lifelong cardiovascular health. This will pay dividends for cardiovascular health, and through reducing obesity and related hypertension (high blood pressure), diabetes, and sleep apnoea, will lower a person’s risk of developing AF.

Another existing opportunity to PREVENT AF is the NHS Health Check programme, designed to identify the early signs of high blood pressure, heart disease, type 2 diabetes, stroke, kidney disease, or dementia in adults aged between 40 and 74 via check-ups every five years. During these check-ups, healthcare professionals will discuss ways in which to reduce risk factors for cardiovascular disease — including losing weight — which will lower the risk of developing AF.

Furthermore, as part of its Long Term Plan, the NHS is aiming to introduce community-based “one-stop shops” for patients to undergo diagnostic tests, e.g. echocardiograms (ultrasound scans of the heart), at centres near to their home rather than travelling to hospital. These visits would also be ideal opportunities to discuss the benefits of healthy lifestyle and risk factor modification.

Digital technologies, including apps and wearables (such as FitBit or other similar devices) are increasingly part of normal life for many. The NHS and Public Health England should help support people to use these technologies to maximum health benefit. It is never too early to start investing in your heart health!
Buerge and colleagues sought to reduce the risk of postoperative AF in people who had undergone cardiac surgery. They note that 30–50% of people develop AF after a cardiac operation and that AF after cardiac surgery (AFACS) is associated with “increased morbidity, mortality, and hospital and intensive care unit length of stay”. The authors, therefore, implemented an “AFACS prevention care bundle” with a focus on early (re)introduction of beta-blockers. Buerge et al report: “Baseline AFACS incidence and beta-blocker administration practices in our centre were audited for all patients undergoing valve surgery and/or coronary artery bypass graft (CABG) during a six-week period. The AFACS prevention care bundle graphical tool was subsequently introduced to the cardiac ICU by a multidisciplinary team and audited following a model of improvement approach”.

They found that their approach led to an increase in the number of patients receiving postoperative beta-blockers and a significant decrease in people developing AFACS. This, according to Buerge et al, ultimately led to 191 fewer people with AFACS per year in their hospital and a significant reduction in morbidity. “Our multidisciplinary team approach was paramount to the successful implementation of the scheme by placing joint responsibility for patient management on all members of the postoperative care team and helping to move away from purely consultant led decision making,” they note.

Buerge et al conclude: “The implementation of the tool has led to changes in clinical practice which will help minimise risk of AFACS for the benefit of our patients, and potentially reduce hospital expenditures.”

First published in AF Association Healthcare Pioneers Report: Showcasing Best Practice in AF 2021
The key reason to DETECT AF is to PROTECT against the risk of AF-related stroke. Not only is the risk of stroke high in people with AF, but AF-related strokes tend to be severe and are often worse than stroke related to other causes. AF is also associated with heart failure, cognitive impairment and dementia, anxiety and depression, unexpected admissions to hospital and a reduced quality of life.

The symptoms of AF include palpitations, tiredness and breathlessness but often people will be asymptomatic. If a person with AF does not experience symptoms, they may not realise something is wrong and, importantly, not know that they are at risk of AF-related stroke. In fact, figures suggest that there are about 300,000 people in England who do not know that they have AF. Unfortunately, AF is often only detected after a person has had a stroke. Between April 2019 and March 2020, of all people admitted to hospital in England with a stroke, approximately 5% were subsequently diagnosed with AF.

The NHS Long Term Plan recognises that DETECT AF is key to reducing the risk of cardiovascular mortality and morbidity. It notes: “Too many people are still living with undetected, high-risk conditions such as high blood pressure, raised cholesterol, and atrial fibrillation”. Additionally, the Plan acknowledges that England is lagging and could learn from other countries. “Other countries have made more progress on identification and diagnosis, working towards people routinely knowing their ‘ABC’ (AF, Blood pressure and Cholesterol). Replicating this approach will be increasingly possible with digital technology, and major progress could be achieved working with the voluntary sector, employers, the public sector and NHS staff themselves,” it states. In line with the NHS Long Term Plan, Public Health England (PHE) and NHS England has set a target of detecting AF in 85% of the people who are predicted to have the condition by 2029.

About 300,000 people in England have undiagnosed AF.

AF is often only diagnosed after a person has had an AF-related stroke.

In addition to AF-related stroke, AF is associated with heart failure, cognitive impairment and dementia, anxiety and depression, unexpected admissions to hospital and a reduced quality of life.

DETECT AF with a simple Pulse Check, or digital technologies, to PROTECT against AF-related stroke using anti-coagulation therapy (not aspirin), heart failure, dementia, and poor quality of life.

AF Association’s Know Your Pulse to Know Your Heart Rhythm campaign raises public awareness of the need to DETECT AF. It advocates that Knowing Your Pulse — with a simple manual 30-second pulse check — to Know Your Heart Rhythm Could Save Your Life.

Any contact with a person aged ≥65 is an opportunity to DETECT AF. This can be in the form of a medical contact with a healthcare professional or in a non-healthcare community setting.
In line with the NHS Long Term Plan, Public Health England (PHE) and NHS England has set a target of detecting AF in 85% of the people who are predicted to have the condition by 2029.

How to DETECT
The first step in detecting AF is to raise awareness of the condition among the general public. The AF Association, for example, runs the Know Your Pulse campaign, which tells people “Know Your Pulse to Know Your Heart Rhythm — it Could Save Your Life” and that “A simple pulse check only takes 30 seconds”.20 As well as providing advice on how to perform a manual pulse check, the campaign outlines, clinically validated, consumer available digital technologies for detecting AF. Furthermore, every November, the charity hosts Global AF Aware Week to bring attention to AF and the need to “PREVENT, DETECT, PROTECT, CORRECT and PERFECT”.21 Importantly, awareness campaigns should be accessible to people of all genders and all ethnicities.

A US study indicated that while white men had the greatest lifetime risk of developing AF, the risk in white women and in black men and women was not negligible: 36% for white men versus 30% for white women versus 22% for black women versus 21% for black men.22 Furthermore, among older age groups, the incidence of AF is actually higher in women than in men.1 Therefore, everyone needs to be made aware of AF and the need to Know Your Pulse. This is particularly important given women and BAME communities have been historically under-served both in research and in the management of cardiovascular disease.

The second step of detecting AF is for healthcare professionals to opportunistically screen, with a simple pulse check or using digital technologies, for AF in people aged ≥65 years at any medical contact. At present, the UK National Screening Committee does not recommend a national screening programme for AF because of a lack of evidence of benefit.24 However, the Health Inequalities National Support Teams, in their Developing a Systematic Approach to the Identification and Management of Atrial Fibrillation guideline, advise that “the addition of pulse checks is suggested as an option which individual areas might wish to endorse locally, particularly for those aged 65 and over”.23 The European Society of Cardiology (ESC), in their 2020 AF guidelines, also recommend opportunistic screening (via pulse checking or ECG rhythm strip) for AF in patients aged 65 or older.1 Additionally, the ESC advocate systematic ECG screening should be considered in patients aged >75 years, or those at high risk of stroke.1 Given people in older age groups (≥65) tend to have comorbidities, such as hypertension, they are more likely to be in regular contact with healthcare professionals than younger age groups — providing several opportunities for AF case finding with a simple pulse check or digital technologies. Of note, pulse checking is a mandated part of the NHS Health Check programme.15 The NHS Health Check Best...
Practice Guidance states “pulse rhythm should be taken prior to a blood pressure check”; this is because automated blood pressure devices may give an inaccurate reading if a person has an irregular rhythm. The guidance adds that individuals who are found to have an irregular pulse “require further assessment to determine if atrial fibrillation is present”.

Community pharmacists are particularly well-placed to DETECT AF. As part of the new Community Pharmacy Contractual Framework 2019–2024, an early detection service is being piloted in which community pharmacists seek to identify people who may have undiagnosed high-risk conditions such as hypertension. If this initial scheme is successful, these services could be rolled out to all community pharmacies in 2021–22. Ambulatory blood pressure monitors, which are being used in the pilot schemes, can identify an irregular rhythm as well as hypertension. Thus, identifying people with AF could become part of the scheme. Community-based healthcare settings such as chiropodists, opticians and dentists are also opportunities to DETECT AF.

Consideration should also be given to case finding in non-healthcare settings, within the community, where people at high risk of AF are likely to visit. For example, places of worship. Bhamra et al trained pharmacy students to DETECT AF — using mobile single-lead ECGs (AliveCor KardiaMobile) — in people attending Gurdwaras (Sikh temples). Six hundred and eight participants (average age 60 years; 96.1% British Indian) were screened (at two Gurdwaras) and 10 (1.6%) were given possible AF diagnoses. A cardiologist subsequently approved five of these possible diagnoses and three participants qualified for oral anti-coagulants. For more examples of detecting AF in non-healthcare settings, see the An example of good care box.

For some people with AF, episodes may be intermittent and, therefore, difficult to DETECT with a standard ECG recording (i.e. because at the time of the ECG, the person may be in sinus rhythm). The National Institute for Health and Care Excellence (NICE) recommend, in the 2021 AF guidance, using a 24-hour ambulatory ECG monitor “in those with suspected asymptomatic episodes or symptomatic episodes less than 24 hours apart” and “use an ambulatory ECG monitor, event
recorder or other ECG technology for a period appropriate to detect atrial fibrillation if symptomatic episodes are more than 24 hours apart”. Additionally, in a 2020 Medical Technology Guidance, NICE states that the Zio XT system is “an option for people with suspected cardiac arrhythmias who would benefit from ambulatory ECG monitoring for longer than 24 hours”. According to NICE, “evidence shows that Zio XT is convenient and easy to wear, with an improved diagnostic yield compared with standard 24-hour Holter monitoring”. The recommendation is, though, with the caveat that the NHS must collect more evidence on the system.

However, the COVID-19 pandemic meant that some, perhaps even all, opportunities to detect AF disappeared. In the initial few months of the pandemic, people were advised to stay at home, many in-person medical visits were cancelled, and a significant number of people felt that they should avoid hospitals and GP practices altogether. This may well have led to AF going undiagnosed — with one study showing detection rates down by nearly 50% — with potentially fatal consequences.

However, the increasing availability of consumer-led digital technologies means that AF can now be detected remotely and/or with social distancing measures in place. For instance, in the Apple Watch study, more than 400,000 people with an Apple Watch (or a compatible iPhone) downloaded the Apple Heart app, which can be used to record a high-quality ECG, to monitor their heart rhythm. Of these, 0.52% (rising to 3.1% in participants aged 65 or older) received a notification that their rhythm was irregular. Of those notified who returned an ECG patch (450 participants), 34% were identified as having AF. Authors Perez et al observe: “This finding is clinically relevant because these participants had a relatively high burden of AF, with a majority of episodes lasting more than one hour”. They add that among participants who were notified of an irregular pulse, the positive predictive value was 0.84 (95% CI, 0.76 to 0.92) for observing AF on the ECG simultaneously with a subsequent irregular pulse notification and 0.71 (97.5% CI, 0.69 to 0.74) for observing AF on the ECG simultaneously with a subsequent irregular tachogram. “We believe that these data support the ability of the algorithm to correctly identify AF in users whom it notifies of irregular pulses,” the authors conclude.

Another benefit of digital technologies is that they may be more effective at detecting AF than standard pulse checking. Halcox et al found that, for 12 months, regular twice weekly iECG recording and submission (with the AliveCor, KardiaMobile, system) was both “logistically feasible” and “highly acceptable” to people >65years of age with an increased risk of AF and AF-related stroke. They comment: “This approach results in an almost four-fold increase in the likelihood of a diagnosis of AF being made over the course of a year at a cost of $10,780 (£8,255) per additional AF diagnosis.”

Healthcare professionals could use digital technologies to detect AF in several different ways — for example, they could recommend people at risk of AF buy these technologies.
themselves, they could install these technologies at their centre (e.g. pharmacy or GP practice) for people at risk of AF to use, or they could lend them to people to use at home. If these technologies are installed at a healthcare centre, particularly in the current climate of COVID-19, depending on the type of technology, steps must be taken to ensure that the device is cleaned after each use and that sanitiser (or sanitising hand wipes) are available for patients to clean their hands after using a device.

All of these approaches do have a cost involved, whether that is to the NHS or the patient themselves, and (again) digital literacy is a concern. Some people do not have the skills, finances, or desire to use these technologies. Therefore, while these technologies can be useful tools for detecting AF, they are not going to be suitable for everyone. Good communication between healthcare professionals and those at risk of AF can help to determine when and how these tools should be used.

Also, as the ESC AF guidelines note, many commercially available healthcare tools are not clinically validated. Thus, only technologies (such as AliveCor or Apple Watch) that have been clinically validated should be recommended. Of note, digital technologies do not need to be specifically designed to DETECT irregular heart rhythms as technologies such as ambulatory blood pressure monitors can also be used to DETECT an irregular pulse which may be due to AF.

If advocating the use of these technologies, healthcare professionals should communicate with people about how to use them and advise on what information should be reported back. For example, only report ECG recordings that record an irregular rhythm or taken when the person had symptoms.

Regardless of the method used to DETECT AF, the ESC guidelines state that “a single-lead ECG tracing of ≥30 seconds or a 12-lead ECG showing AF analysed by a physician with expertise in ECG rhythm interpretation is necessary to establish a definitive diagnosis of AF”. So, even if a digital technology is clinically validated, and capable of producing a high-quality ECG, a physician with the relevant expertise must be the healthcare professional to confirm the diagnosis. If a 12-lead ECG is required to confirm the diagnosis, given not all GP clinics have access to these facilities, this could be installed at the community one-stop shop diagnostic hubs proposed in the NHS Long Term Plan. As the use of clinically-validated digital technologies for detecting AF increases, and people send their home-taken ECG to their doctors, GPs will need training on how to interpret them.
NHS England allocated the Academic Health Science Network (AHSN) in North East and North Cumbria 370 pulse-checking AliveCor devices (with a further 100 purchased by the AHSN) to DETECT AF in high-risk, asymptomatic people in various settings (nearly 18,000 people are thought to have undiagnosed AF in the region). These settings included the Fire and Rescue Service in Cumbria, who used the pulse-checking devices during their “Safe and Well” visits. These visits included pulse checking, advice on alcohol reduction, smoking cessation, and social wellbeing with the focus on older, frail, or vulnerable people.

Holdsworth and colleagues report “Between January 2018 and March 2019, a project lead trained Cumbria FRS Safe and Well Team on a face-to-face basis in small groups (<10 people). They were given a protocol for use and offered support through an online video. To maintain engagement, they received a series of seven automated emails for three months after training which consisted of case studies and infographics. Device usage was monitored, and feedback was sent to the staff and organisation.” They add the fire service actively promoted the use of the technologies in North Cumbria.

According to Holdsworth et al, AliveCor devices were used 169 times and detected 11 abnormal rhythms. “For one woman, who was diagnosed with AF, had it not been for the visit of the crew, she reported that the outcome could have been life-changing for herself and her family and could not stress enough the importance of taking the test when offered, as it has potentially saved her life” they observe. The authors conclude: “Locating AliveCors in non-healthcare settings with those who can reach isolated communities and individuals, who may not engage with healthcare services, proved to be beneficial in detecting people with undiagnosed AF.”

First published in AF Association Healthcare Pioneers Report: Showcasing Best Practice in AF 2021
Protecting against AF-related stroke is essential because, without anti-coagulation, a person with AF may be five times more likely to have an ischaemic stroke than someone without AF. Furthermore, the consequences of a stroke for a person with AF are often devastating — 20% die and 60% become disabled. AF-related stroke is also associated with greater mortality and morbidity than stroke from other causes.

Another reason to PROTECT against AF-related stroke is its economic impact. Figures from the Department of Health indicate that the overall cost of in-hospital care of an AF-related stroke is £103 million and that the cost of post-discharge care is £45 million; meaning that, during the first year, the total cost of AF-related stroke is £148 million. Therefore, fewer AF-related strokes could mean less financial strain on the NHS.

How to PROTECT

Following a diagnosis of AF, the risk of AF-related stroke should be assessed using the CHA\textsubscript{2}DS\textsubscript{2}-VASc score. The new ESC AF guidelines say that only those with a truly low risk of stroke — CHA\textsubscript{2}DS\textsubscript{2}-VASc score 0 in men/1 in women — do not require anti-thrombotic therapy. However, the guidelines observe that the risk of stroke can change over time and possibly increase in people initially categorised as being at low risk. Thus, those at low-risk of stroke may require anti-thrombotic strategies further down the line. Within the NHS England, the goal is for 90% of people with AF who are known to be at high risk of stroke to be on anti-coagulation by 2029.

Additionally, the risk of AF-related stroke may be higher in black people than in white people. Patel et al report, in Heart Rhythm, black people with a new diagnosis of AF “were 62% more likely to have had an ischemic stroke prior to AF diagnosis than whites who developed AF.”

Without anti-coagulation, people with AF are at high risk of an AF-related stroke.

20% of people who have an AF-related stroke die and 60% become disabled.

AF-related strokes are associated with greater mortality and morbidity than strokes from other causes.

Data suggest that more than 25% of people with AF who have AF-related stroke in England are not receiving any form of anti-coagulation and almost 10% are on antiplatelet monotherapy.

Research is needed to determine the incidence and risk of AF-stroke in BAME communities in the UK and whether there are any disparities in care.

PROTECT against AF-related stroke using anti-coagulation therapy (not aspirin); direct oral anti-coagulants should be the first-line therapy.

People with AF must be involved in choice of anti-coagulant therapy.
Within the NHS, the goal is for 90% of people with AF who are known to be at high risk of stroke to be on anti-coagulation by 2029

and this higher risk persisted after “multivariable adjustment for age, sex, smoking, hypertension, diabetes, obesity, heart failure, coronary heart disease, chronic kidney disease, and vascular disease”. The authors add: “In strokes that occurred after the diagnosis of AF, blacks had a 67% higher and independent risk of developing an ischemic stroke compared to whites.” “Future public health interventions should continue to highlight the importance of AF screening and anti-coagulation therapies and evaluate whether such interventions can reduce the excess burden of ischaemic strokes and subsequent racial differences,” they conclude. More research is needed to determine the incidence and risk of AF-related stroke in BAME communities within the UK and, if found, disparities in care should be addressed.

If a person has a moderate or greater risk of stroke, anti-thrombotic therapy should be considered. Specifically, direct oral anticoagulants (DOACs) are now firmly established as the first-line therapy to protect against AF-related stroke in people with non-valvular AF. Ruff et al found that DOACs “had a favourable risk–benefit profile, with significant reductions in stroke, intracranial haemorrhage, and mortality, and with similar major bleeding as for warfarin”. Unlike warfarin therapy, DOAC therapy does not require people to monitor their international normalised ratio (INR) to ensure that they are sufficiently anticoagulated. Thus, if receiving DOAC therapy, a person with AF does not need to regularly attend an in-person “warfarin” clinic. DOACs, being non-vitamin K antagonists, also do not require people to avoid Vitamin K rich foods such as spinach.

When anti-coagulant therapies are being considered, the risk of bleeding needs to be assessed. However, while risk factors for bleeding should be modified, a high risk of bleeding alone should not preclude the use of anti-coagulation. If a person does have a long-standing contraindication to anti-coagulation, left atrial appendage occlusion is a potential option. Antiplatelet monotherapy (i.e. aspirin) is not a suitable alternative to anti-coagulation and should not be used to protect against AF-related stroke. Despite the clear evidence for using anti-coagulation to protect against AF-related stroke, there are suggestions that this is not always being done in England. Of those admitted to hospital for stroke with a prior diagnosis of AF between March 2019 and April 2020, more than a quarter were not receiving any form of anti-coagulation. Additionally, nearly 10% were receiving antiplatelet monotherapy. Findings also show that of all people admitted to hospital with stroke who were on some form of anti-coagulation therapy between March 2019 and April 2020, nearly 30% were on vitamin K antagonists. For some of these people, of course, use of warfarin may be legitimate — for example, according to the ESC, warfarin is the first-line therapy for people with prosthetic heart valves or moderate to severe mitral valve stenosis. However, potentially, some may have been AF patients who should have been receiving DOACs.

If optimal PROTECT AF strategies are not being deployed, then an AF Virtual Clinic could help to optimise anti-coagulation. Recognising that their rates
of people with AF on anti-coagulation was suboptimal, Lambeth and Southwark clinical commissioning groups (CCGs) developed an AF Virtual Clinic programme. Led by a specialist anti-coagulation pharmacist or nurse, these clinics reviewed in-practice GP records to case-find AF patients who were not receiving optimal anti-coagulation. The anti-coagulant specialist then discussed these patients with their GP and developed a therapy plan. The GP subsequently discussed the plan with the AF patient and, together, they jointly decided on the best course of therapy. At the end of the programme, across the Lambeth and Southwark clinical commissioning groups (CCGs), an additional 1,200 people with AF were anti-coagulated. Furthermore, in the three years since the AF Virtual Clinic programme was initiated, the rate of AF-related stroke in Lambeth and Southwark fell by 25% (compared with a 3% fall nationally). The Health Innovation Network is now in the process of rolling out AF Virtual Clinics across South London.

That, as part of the AF Virtual Clinic programme, people with AF were involved in discussions about anti-coagulation was fundamental. People with AF are individuals and, as such, have different needs and wants. Therefore, healthcare professionals and patients must review, together, the available therapies and decide which agent is most suitable. Good communication between healthcare professionals and patients is also vital for helping patients to understand how to take anti-coagulants and the importance of adherence. With the advent of the “New Normal”, because of COVID-19, these discussions could be virtual or over the phone.

In partnership with Inspira Health, Luton Clinical Commissioning Group (LCCG) adopted the “Primary Care Atrial Fibrillation (PCAF) Service” model, which is led by Consultant Cardiologists and has five phases (ranging from running the AF-PRIMIS audits on the clinical system to review of recommendations and subsequent actions at two months post clinic to determine outcomes). According to Antony Grayson (Inspira Health and LCCG, UK) and colleagues, through this approach, 399 patients were invited for review by a consultant cardiologist at their local GP practice with 72% attending. “From all face-to-face and telephone consultations, 354 patients had anti-coagulants prescribed, changed, management of INRs improved, DOAC dose increased or were in the process of being anticoagulated at the time of follow-up,” Grayson et al note. They add: “From this we would expect, 14 AF-related strokes prevented, eight lives saved, and a cost saving to the NHS of £336,000 per year.” They conclude: “A Consultant Cardiologist led programme across GP practices in LCCG has enabled improved anti-coagulation to PREVENT AF-related stroke.”

First published in AF Association Healthcare Pioneers Report: Showcasing Best Practice in AF 2021
I was first diagnosed with AF in 2010 but I think I first started having episodes of AF long before then. I went for a procedure in 2000, for example, and the anaesthetist said, “you have a little bit of an irregular heartbeat but do not worry about it”.

I found that AF has greatly affected my life. The problem is that I am no longer a wife, mother or a teacher but a person with AF. I seesaw between feeling hopeful and feeling helpless. Also, the relationship with my friends and family has changed. My sons are fearful for me, which is hard to deal with because you always want to be protective of your children. These days, the first thing that my friends ask me about is my health. However, prior to the pandemic, I did not let AF affect my desire to travel. Since the diagnosis, we have been to Hong Kong, China, and other places. I have not let AF stop me.

When I was first diagnosed with AF, I totally relied on what my doctors told me, and I did exactly as I was told. It was not until I began to see my electrophysiologist that I realised that I should have as much input into my therapies and treatments as the medics! He explained he would try an ablation but that it was unlikely to be a one off and what the plan going forward was.

That is when I started to take back control. You have to speak up. If you are being treated for something other than AF, the medic may not know about your heart. On occasion, I have had to explain to a nurse — because I am on a DOAC rather than warfarin — that they do not need to measure my international normalised ratio (INR). Also, my advice to other people with AF is to get a second opinion if you do not feel comfortable with what you have been told or with the medic you have seen. You do not have to assume that they are right.

For some people, making lifestyle changes after a diagnosis of AF is the right thing to do. However, for me, I have not changed anything. I have always struggled with my weight, but I have done what I can to address that by eating healthily and exercising. What is good for one person might not be good for another person. What I would say is that if someone is going to make lifestyle changes, then do it slowly. I would be concerned about someone making such drastic changes that their quality of life became worse than it was with AF. Everything in moderation; it is about finding a balance.

I would also recommend that people with AF keep a record of everything — all procedures and all tests — you would be amazed at how often it will come in handy. Also, always keep information about your AF somewhere on you. If you see a medic about something else, they still need to know about your AF.

Finally, no treatment is an instant fix. Treatments are about improving your quality of life. AF is a journey, and it does not have to be lonely. I have found the AF Association Forum, for example, very helpful.
The 2021 National Institute for Health and Care Excellence (NICE) AF guidance recommends rate control should be the first-line treatment for people with AF except in people: with AF with a reversible cause; with heart failure thought to be caused by AF; with new-onset AF; with atrial flutter whose condition is considered suitable for an ablation strategy to restore sinus rhythm; and those for whom a rhythm control strategy would be more suitable based on clinical judgement. Rhythm control, overall, is recommended when symptoms persist despite rate treatments controlling a person’s heart rate or when rate control has not been successful. However, growing evidence suggests that consideration should be given to early rhythm control. Kirchhof et al, with the EAST-AFNET 4 study, found that early rhythm control was associated with a lower risk of adverse cardiovascular outcomes than usual care among patients with early AF and cardiovascular conditions. In the study, patients with early AF (diagnosed ≤12 months prior to enrolment) were randomised to undergo early rhythm control (use of antiarrhythmic drugs and/or AF ablation after enrolment) or to standard care. The primary outcome was a composite of death from cardiovascular causes, stroke, or hospitalisation with worsening of heart failure or acute coronary syndrome. The authors report: “A first primary-outcome event occurred in 249 of the patients assigned to early rhythm control and in 316 patients assigned to usual care (P=0.005).” However, as to be expected, the incidence of adverse events was higher with early rhythm control, but the authors note that overall safety outcome events were similar in the two groups. In terms of which rhythm control strategy to use, compared with antiarrhythmic drug therapy catheter ablation is known to reduce the number of acute episodes and prolong the duration of sinus rhythm. There is also increasing evidence that ablation, rather than antiarrhythmic drugs, could be the first-line approach. Andrade et al found, in the EARLY-AF study, “arrhythmia recurred significantly less often with an initial strategy of catheter cryoballoon ablation than with an initial strategy of antiarrhythmic drug therapy, with a number needed to treat of 4” in people with paroxysmal AF. Wazni et al, in the STOP AF trial, also found that cryoballoon ablation as the initial treatment was superior to drug therapy for the prevention of atrial arrhythmia recurrence in people with paroxysmal atrial fibrillation. Even with appropriate rate and rhythm treatments, more does need to be done to reduce mortality and morbidity associated with AF. Kirchhof et al observe that despite guideline-based management, about 5% of AF patients experience heart failure, a stroke, acute coronary syndrome or cardiovascular death per year. They add that 35% to 50% of patients with AF who receive adequate anti-coagulation either die or receive inpatient therapy within five years.
Example of good care — Cardiac nurse-led for chemical conversion of recent-onset AF

The Emergency Cardiology Service (ECS) is a frontline Advanced Nurse Practitioner (ANP) led clinical service, focused on improving patient experience in the emergency department by identifying patients with cardiac complaints early in their emergency department journey; providing expedited expert consult, diagnosis, treatment and facilitating early discharge to outpatient ambulatory diagnostics. Paul Stoneman (Beaumont Hospital, Ireland) reports: “An innovative pathway was implemented to manage patients presenting to the emergency department with recent onset AF of less than 24h (ESC guidelines <48h) and that who be eligible for a rhythm control strategy.” He explains that the clinical pathway involves the administration of “vernakalant hydrochloride, a rapid-acting antiarrhythmic drug licensed in the EU since 2010 for the conversion of recent-onset AF with proven efficacy and safety when compared with placebo and amiodarone in randomised clinical trials”.

According to Stoneman, sinus rhythm was restored in 51 out of 61 patients (83%) in an average of 8.8 minutes (median eight minutes). He concludes: “Our recent onset AF pathway is safe, rapid, facilitates same day discharge and outpatient follow-up, negating the need for an acute hospital bed; improving patient experience.”


inpatient therapy within five years of diagnosis. Furthermore, according to Kirchhof et al, the risk of cardiovascular events is increased during the first year of diagnosis. Thus, work should focus on reducing the risks associated with AF soon after diagnosis.

One way to further reduce risks associated with AF is to recognise that a person with AF frequently has other comorbidities and the management of all these comorbidities can improve prognosis overall. Therefore, following diagnosis, as per the recent European Society of Cardiology (ESC) AF guidelines, a review of an AF patient’s other risk factors must be performed, and the patient must be helped to modify these risk factors. For example, ensure hypertension and cholesterol are under control.

Weight management may be particularly important for reducing the risks of AF; Middeldorp et al found that, in overweight and obese individuals with symptomatic AF, sustained obesity was associated with “progression of the AF disease while progressive weight loss has an association with the ‘reversal’ of the natural progression of AF”. Furthermore, Pahtak et al found that aggressive risk factor management, including weight loss, improved the long-term success of AF ablation. “This study underscores the importance of therapy directed at the primary promoters of the AF substrate to facilitate rhythm control strategies,” the authors conclude.

Multidisciplinary, integrated, care is pivotal to ensuring optimal CORRECT treatments are in place, and this should include specialist arrhythmia nurses. Hendriks et al found that nurse-led care of people with AF reduces mortality and morbidity. “Nurse-led care for stable AF is superior to usual care in terms of major clinical events. These findings should trigger disease management for AF similar to other chronic cardiovascular conditions like heart failure and diabetes,” they report.

Above all, integrated care should have the person with AF at the centre. The ESC 2020 guidelines for the diagnosis and management of AF state: “Involvement of patient and family/carers is integral to the success of AF management.”

As reported by the British Cardiovascular Society Working Group paper, the New Normal of COVID-19 has led to changes, such as virtual rather than physical multidisciplinary team meetings, in the way that healthcare is delivered — changes that could remain in place after the pandemic. Therefore, any need for social distancing should not be a barrier to providing integrated care.
A healthcare team may be unaware of all the problems that a person with AF has.

If a person with AF does not receive adequate information or support about their condition, they may be less likely to adhere to therapies and treatments.

If a person with AF is not included in decisions about therapies and treatments, they may feel powerless and not in control.

**PERFECT** the patient care pathway by having the person with AF at the centre of integrated care.

The focus should be on the person with AF rather than the AF itself.

People with AF should be signposted to organisations such as AF Association, who can provide medically approved information, advice, and support.

Specifically, in the context of AF, integrated care improves outcomes. Gallagher et al, in a systematic review and meta-analysis, found that “an integrated care approach resulted in a significant 49% reduction in all-cause mortality”.

They add that integrated care was also associated with a “significant 42% reduction in cardiovascular hospitalisations”.

An AF Association survey of people with AF, conducted in 2018, indicated that integrated care is not always being provided — or at least is not always being provided optimally. Nearly a third (30%) of survey respondents agreed with the statement “my healthcare team is not aware of all my problems”.

Helping people with AF adhere to their **PROTECT** therapies and **CORRECT** treatments is an integral part of perfecting the patient care pathway, which can be achieved through good communication between healthcare professionals and patients. By talking to people with AF about their needs and their concerns, healthcare professionals can help those with AF to understand the need for **PROTECT** therapies, when **CORRECT** treatments will be beneficial (and when they will not), and address challenges to medication adherence (such as side effects, polypharmacy, etc.). Furthermore, a patient’s view of a successful outcome may be different from that of a healthcare professional. Thus, by working together, patients and healthcare professionals can agree on goals of management and how these can be achieved. If, for whatever reason, in-person visits cannot take place, thought needs to be given to how dialogue can continue remotely.

As well as arrhythmia nurses, clinical pharmacists are a vital part of the multidisciplinary team within the new primary care pathway.
care networks, and they can prescribe PROTECT therapies.\textsuperscript{39,42} Specifically, they can identify and address, with the patient, any potential issues with adherence. Furthermore, as part of the NHS New Medicines Scheme, people on new blood thinning medication are entitled to have three private consultations with a (clinical or community) pharmacist to review the medication and potential challenges they may have in taking it.\textsuperscript{43} Therefore, there are multiple ways in which pharmacists can help to provide integrated care for people with AF.

According to Mills \textit{et al}, exercise-based cardiac rehabilitation may also have a role for improving the patient care pathway in AF.\textsuperscript{44} To explore the benefits of cardiac rehab for people with AF, the authors enrolled AF patients into an existing six-week programme composed of “physical activity and education sessions”. Of 50 people who signed up to the programme, 33 completed it and 17 dropped out. Compared with people who dropped out, those who completed it saw improvements in the six-minute walk test. They also had reduced anxiety and depression. Mills \textit{et al} found that “severe obesity, high anxiety and depression levels, and lower initial exercise capacity may be barriers to enrolling patients with AF into exercise-based cardiac rehabilitation” but they add “we plan to target these factors in future improvement cycles”.\textsuperscript{44}

As with many aspects of AF, COVID-19 is a potential barrier to optimal management. However, digital technologies can again be used to ensure care continues. Pluymaekers \textit{et al} developed an “on-demand app-based heart rate and rhythm monitoring infrastructure to allow appropriate management of AF” for people with AF who, because of COVID-19 restrictions, could not visit an AF outpatient clinic.\textsuperscript{44}

“The TeleCheck-AF approach guarantees the continuity of comprehensive AF management and supports integrated care through teleconsultation during COVID-19. It incorporates three important components: a structured teleconsultation (‘Tele’); a CE-marked app-based on-demand heart rate and rhythm monitoring infrastructure (‘Check’); and (iii) comprehensive AF management (‘AF’),” they report. According to the authors, the system can be easily implemented in European centres during COVID-19. Going forward, past the pandemic, remote monitoring systems such as TeleCheck-AF (which used the CE-marked FibriCheck system) could be adopted on a longer-term basis if people with AF prefer them to standard outpatient clinics. However, any move to using digital technologies would again need to be mindful of the individual needs and wants of the person with AF.

People with AF must be empowered to take charge of their condition and be encouraged to use “self-care” to improve their quality of life. This could include directing people to AF Association, which has a range of resources to help people with AF understand and manage their condition.\textsuperscript{46} Additionally, through their associated patient support groups and social media platforms, AF Association can connect people with AF with other people with the condition for peer support.
I probably started having episodes of AF in the mid-1980s when I found that if I had anything with alcohol in, I would get breathless and my heart would race. My GP at the time just said, “Think of the money you will save by not drinking” and left it at that. About 10 years later, in the mid-90s, I went back to the doctors about this “bubbly feeling” that I was having, but again, the GP did not consider AF to be the cause. Instead, I was misdiagnosed as having something wrong with my stomach — so that was another waste of time!

After moving to Devon and a change of doctor in 2005, AF was finally diagnosed and then only because my new GP’s mother had AF and she understood the issue. I was referred to the main cardiac hospital in Devon (UK), The Royal Devon and Exeter Hospital, and ablation was recommended. I did not like the sound of that very much so declined but, as my consultant predicted, my AF became worse and, within six months, I was back banging on doors and begging for ablation. I was referred to the Royal Brompton Hospital in London and had the first of three ablations for AF, which seemed to make things worse. The second lasted about six months and the third, in 2008, stopped my AF completely.

Recently, however, I have developed atrial tachycardia and had several cardioversion procedures to put me back into normal rhythm. Unfortunately, in 2017, I had an extremely rare but serious complication (pulseless electrical activity), from which I was fortunate to survive, so have no wish to undergo any future cardioversions. I had a fourth ablation in 2019 for the atrial tachycardia, which sadly seems to have introduced a different arrhythmia and I am currently awaiting further tests to find out what the next treatment options will be.

I do believe that people need to think about ablation as just another form of treatment. People tend to hope ablation is a cure, but I think about it being for quality of life.

AF may be in your life but do not let it be all your life.

The AF Association believes that its “PREVENT, DETECT, PROTECT, CORRECT, and PERFECT” strategy is the optimum approach for reducing the mortality and morbidity associated with AF, specifically reducing the incidence of AF-related stroke. As the ESC advocates in its 2020 AF guidelines, people with AF should be at the centre of decisions about the management of their condition. Therefore, at every step of the AF Association strategy, people with AF should be “put first”. Understanding their individual risks, circumstances, and desires is essential to optimising the management of AF. The more in control a person with AF feels, the better their outcomes will be.
References


2. Gov UK. Atrial Fibrillation prevalence estimates for local populations. shorturl.at/dqNgS3 [Date accessed 23 October 2020]


8. AF Association. Why you need protection against AF-related stroke if you have atrial fibrillation. www.hearthrhythmalliance.org/afa/uk/patient-resources [Date accessed 21 October 2020]


46. AF Association. AF Information & Advice For Patients. https://www.hearthrhythmalliance.org/afa/uk/for-patients [Date accessed 02 November 2020]
Patient resources available from the AF Association include:

**Booklets**
- AF Fact File
- Ablation for AF
- Accessing appropriate treatment options
- AF and you
- Atrial flutter
- Mindfulness and healthy living with AF
- Oral anti-coagulant therapy
- Preventing AF-related stroke
- The heart, the pulse and the ECG

**Factsheets**
- AF and heart failure
- AF-related stroke
- Anti-coagulation and AF
- Cardioversion
- Cognitive behavioural therapy (CBT)
- Pacemaker and AV-node ablation
- Pill-in-the-pocket cardioversion
- Rate versus rhythm management
- Transcatheter closure of the left atrial appendage
- Warfarin therapy

To view these patient resources & other educational videos visit [www.afa.org.uk](http://www.afa.org.uk)
The wording “DETECT AF with a simple Pulse Check, PROTECT against AF-related stroke using anti-coagulation therapy (not aspirin), CORRECT the irregular rhythm with access to appropriate treatment, PERFECT the patient care pathway” are trademarked to the AF Association (UK).