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Glossary

• **Atrial fibrillation (AF)** – An abnormality in the rhythm of the heart that involves the upper chambers of the heart beating irregularly. AF is the most common heart rhythm disorder. It can increase the risk of an AF-related stroke.

• **Anticoagulation** – Coagulation is the process by which the blood forms into a clot. Anticoagulation is the process of preventing blood from clotting. A blood clot contains two sticky materials: small structures called platelets and a protein called fibrin. An anticoagulant is a medicine used to prevent blood clots from forming by preventing the formation of fibrin.

• **Oral** – Refers to the way you take medicine, by mouth.

• **Fibrin** – A protein that is formed when blood clots. It is vital in holding the clot together.

• **Platelets** – Small structures which stick to fibrin to make blood clot.

• **Antiplatelets** – Help prevent platelets from sticking together. Aspirin is an antiplatelet, also known as acetylsalicylic acid.

• **Ischaemia** – When the blood supply is restricted or cut off from an organ within the body, usually caused by a blood vessel becoming blocked.

• **Ischaemic stroke** – Caused by a blocked vessel in the brain preventing blood flow to that part of the brain. Ischaemic strokes are the most common type of stroke.
• **Embolism** – Caused when a blood clot travels through the bloodstream and becomes stuck in a limb or an organ.

• **Vitamin K** – Is essential for the formation of several proteins involved in the regulation of blood clotting. Vitamin K is consumed in the body from food intake.

• **Vitamin K antagonists (VKAs)** – Anticoagulant therapies that affect how the liver uses Vitamin K to form proteins which regulate blood clotting. Warfarin is the most commonly used VKA.

• **Non-vitamin K antagonist oral anticoagulants (NOACs)** – Anticoagulant therapies that work in a different way to VKAs to prevent the blood from clotting.

• **Reversal agent (often referred to as an ‘antidote’)** – Works to reverse the effects of a medicine. Currently, there are several ways available to doctors to reverse the effect of VKAs. There is a specific reversal agent available for one of the NOACs for use in hospitals, if emergency surgery is needed or in the uncommon event of a severe bleed.

• **International normalised ratio (INR)** – The test used to measure the blood’s clotting capability during VKA therapy, carried out by taking blood from the vein. Regular monitoring with blood tests is needed with VKAs. By measuring the INR, anticoagulant clinics and healthcare teams can optimise the amount of VKA therapy given to a patient.
Introduction

If you would like to learn about the importance of anticoagulation therapy for people diagnosed with atrial fibrillation (AF) then this booklet is for you.

This booklet will help you to understand the different types of anticoagulant therapy available. It will also help you to have informed discussions with your doctor and healthcare team.

Anticoagulants will not reduce or take away any symptoms of AF as they do not treat AF. Anticoagulants are prescribed to prevent blood clots from forming inside your heart and to reduce your risk of having an AF-related stroke.

It is important you understand the effect of an anticoagulant in your body to ensure you receive the best therapy to suit you. It is also very important that you take your anticoagulant as prescribed by your doctor whether or not you are experiencing symptoms of AF.
Why have I been prescribed an anticoagulant?

All anticoagulants work to reduce the risk of blood clots forming in the body. These clots can block the circulation of blood to parts of the body.

Understanding a blood clot

As part of the body’s natural defence and healing process, blood clots form to help repair damage, prevent the body from losing blood and stop bacteria from entering the body. For example, when you cut yourself a type of blood clot called a scab forms over the wound to stop the bleeding and creates a natural protective barrier.

The blood clot contains two sticky materials: small structures called platelets and a protein called fibrin.

If the body forms an internal blood clot, this can be dangerous. The clot can block blood vessels cutting off the oxygen supply to parts of the body such as the brain. Depending on the disease, doctors generally have two options to reduce blood clotting:

• Anticoagulants: which prevent the formation of fibrin.
• Antiplatelets: which prevent platelets sticking together.
How can AF lead to an AF-related stroke?

Having AF means that your heart is not beating regularly and your blood is not pumping as efficiently as it should. The contractions of the upper chamber of the heart become irregular which can lead to blood ‘pooling’ in the heart and potentially forming a clot. The clot can travel with your blood as it circulates to other parts of your body. If it gets stuck in your limbs or organs it is called an embolism. If the blood clot gets stuck in a blood vessel in the brain the blood supply is cut off to part of the brain, starving it of essential oxygen and nutrients.

1. Having AF means that your heart is beating irregularly and your blood is not pumping as efficiently as it should.
2. The contractions of the upper chamber of the heart become irregular which can lead to blood ‘pooling’ in the heart and potentially forming a blood clot.
3. The clot can travel with your blood as it circulates to other parts of your body.
4. If the clot gets stuck in a blood vessel in your brain, it can cut off the blood supply causing an ischaemic stroke.
A stroke can affect the way the body works.

Depending on how long the blood supply is lost, brain damage can occur. This is known as an AF-related stroke. All strokes, including AF-related strokes, can cause life changing, disabling effects to your body and mind and greatly impact everyday life. Those affected by an AF-related stroke may not be able to look after themselves and interact as they did before an AF-related stroke, so family and friends are usually affected as well. Strokes, including AF-related strokes, can also be life threatening.

**AF-related ischaemic stroke**

- Ischaemic stroke occurs when a blood clot blocks the flow of blood and oxygen to the brain.
- AF-related ischaemic stroke is likely to result in persistent disability in three out of five people affected and even death for one in five.
It is important to do everything possible to avoid having an AF-related stroke and it is essential to keep taking the anticoagulant therapy prescribed by your doctor whether you are experiencing symptoms of AF or not.

It is important to understand the difference between possible symptoms of AF and an AF-related stroke.

**Symptoms of AF: Some people do not have any symptoms at all but other people experience some of the symptoms listed below**

- Palpitations
- Tiredness
- Shortness of breath
- Dizziness or lightheadedness
- Blackout (syncope)
- Chest pain or discomfort (angina)
- Sleep disturbance or insomnia

**Symptoms of an AF-related stroke**

- Numbness or weakness of face, arm or leg - especially on one side of the body
- Confusion, trouble speaking or understanding
- Trouble seeing in one or both eyes

Call 999 immediately if you experience a sudden onset of any of the above symptoms of an AF-related stroke. The more quickly help is sought, the faster potentially life-saving therapies can be administered.
Oral anticoagulants are the recommended therapy to prevent AF-related stroke

Oral anticoagulants are recommended by medical guidelines as the most effective therapy for the prevention of AF-related stroke because they can reduce the risk by two thirds or even more. Anticoagulants are recommended for most people with AF with the exception of a few who are assessed by their doctor as having a very low AF-related stroke risk.

A scoring system called ‘CHA2DS2-VASc’ can be used by doctors to calculate an individual’s risk of AF-related stroke. In this system, a score of 1 or more for men and 2 or more for women suggests that an anticoagulant should be considered for them to reduce their risk of an AF-related stroke.

Of those people who suffer from an AF related stroke, it can lead to persistent disability in three out of five people and even death for one in five.

European treatment guidelines and some national guidelines do not recommend antiplatelets such as aspirin for the prevention of AF-related stroke. Anyone who is taking aspirin for their AF should discuss their individual situation and therapy options with their doctor.
What is the risk of an AF-related stroke for people with AF?

- AF increases the risk of stroke by five times compared to people without AF.
- The risk of an AF-related stroke is just as high even if someone does not feel any symptoms of AF or if they only have occasional AF episodes (known as paroxysmal AF).
- Without oral anticoagulant therapy, roughly 1 in 20 AF patients will suffer an AF-related stroke within a year.
- The most efficient oral anticoagulant therapies can reduce the risk of stroke down to only 1 in 100 people per year, which is about the same level of risk as people without AF.

You are 5x more likely to have a stroke if you have AF.

Without oral anticoagulant therapy, 1 in 20 patients with AF will suffer an AF-related stroke within a year.
What are the available anticoagulant options?

Thanks to a number of medical advances, there are more anticoagulant options available today than there were a few years ago. They all help to prevent the risk of AF-related stroke by slowing down and reducing the formation of blood clots. Your doctor will work with you to find the right therapy, taking into account your individual risk of AF-related stroke, any other medicines that you might be taking and your medical history.

Anticoagulant therapy options currently available for reducing the risk of AF-related stroke can be divided into two groups; Vitamin K antagonists (VKAs) and Non-vitamin K antagonist oral anticoagulants (NOACs).

Vitamin K antagonists (VKAs)

VKAs affect how the liver uses Vitamin K to form proteins which regulate blood clotting. VKA therapy takes a few days to have an effect and it takes a few days for the effect to wear off when treatment is stopped.

Vitamin K is consumed in the body from food intake and is essential for the functioning of several proteins involved in the regulation of blood clotting. Vitamin K is found in many everyday foods, particularly green vegetables.

The most commonly used VKA is called warfarin. Other VKAs are called acenocoumarol, phenprocoumon and fluindione. VKAs have been used as anticoagulants for more than 60 years. Two out of three AF-related strokes are prevented with warfarin compared to those not taking anticoagulant therapy.
VKAs work by interfering with how your liver uses the vitamin K in your diet. The effectiveness of VKAs is affected by the amount of vitamin K in your diet. If your diet is reasonably consistent, then the amount of vitamin K in your diet will be matched by the warfarin dose. If the amount of vitamin K in your diet changes it can affect the ability of the VKA to prevent clot formation and the dose will need to be adjusted. Taking other medicines and consuming alcohol can also have an impact on how VKA works in the body.

Regular monitoring with blood tests is needed with VKAs by taking a blood sample from a vein. The specific test used to measure the blood’s clotting capability is called INR (International Normalised Ratio). By measuring the INR, anticoagulant clinics and healthcare teams can optimise the amount of VKA therapy given to a patient. Too little warfarin (INR less than 2) reduces the therapy’s ability to prevent an AF-related stroke whereas too much warfarin (INR more than 3) can put you at increased risk of bleeding. The dose of warfarin might need to be adjusted to ensure your INR remains within the target required for your condition. It might take a little while to get the dose right for you and initially your monitoring will be frequent. Once your INR is more stabilised your monitoring can become a little less frequent however it will still need to be done on a regular basis.

Regular monitoring can be done at your doctors’ surgery or there may be the possibility for you to self-monitor. Self-testing involves the use of a hand-held device to measure the INR in a drop of blood. This testing can be undertaken in the comfort of your own home, at work or while away on business or holiday.
The importance of taking your anticoagulation therapy

- Whether you take a VKA or a NOAC, you need to take your anticoagulant every day and exactly as prescribed.
- Make every effort not to miss a dose.
- Be sure you understand and follow your doctor’s instructions on how to take your anticoagulant therapy (e.g. if your doctor has told you to take it with or without food or at a certain time each day).
- Ensure that you always have enough pills available e.g. at home and work or if you are planning to travel.

If you are unsure about what type of anticoagulant you are taking, please ask your doctor.

Non-vitamin K antagonist oral anticoagulants (NOACs)

NOACs work in a different way to VKAs to prevent the blood from clotting. There are four NOACs currently available in Europe: apixaban (Eliquis), dabigatran (Pradaxa), edoxaban (Lixiana), and rivaroxaban (Xarelto).

NOACs are proven to be safer than VKAs while being as effective or even more so. NOACs do not require monitoring with regular blood tests. Unlike VKAs, there are no interactions with foods. NOACs have fewer interactions with other medicine compared with VKAs and they are given at a fixed dose. NOACs start to work more quickly than VKAs and the effect of NOACs wears off quickly too if therapy is stopped.

Further information on each type of anticoagulant is also available from the AF Association website: www.heartrhythmalliance.org.
How do anticoagulant options compare?

VKAs such as warfarin remain a frequently used and effective medicine for reducing the risk of AF-related stroke but VKAs have limitations that do not apply to the NOACs. VKAs require regular monitoring with blood tests, dose adjustments, a regular diet and they interact with many other medications.

The NOACs might appeal as a better option however it is important to ask how they compare to warfarin on effectiveness and safety.

- Tens of thousands of people with AF have participated in large clinical trials which have compared the effectiveness and safety of each of the NOACs with warfarin.
- All NOACs were at least as effective in reducing the risk of AF-related stroke or embolism compared to warfarin.
- All NOACs proved to be at least as safe as warfarin. The risk of major bleeding (for example bleeding inside the brain or when there is a need for a blood transfusion) was similar or even lower with NOACs. All NOACs were shown to considerably reduce the risk of bleeding within the skull (a rare complication of anticoagulant therapy).
- For one of the NOACs a specific reversal agent (“antidote”) is available in hospitals which works to immediately reverse its effects. It can improve therapy options for people taking this NOAC if emergency surgery is needed or in the uncommon event of a severe bleed.

The European Society of Cardiology (ESC) is an independent European medical society bringing together leading heart experts from across Europe, many of whom specialise in AF. The ESC has carefully considered the clinical and scientific evidence for reducing AF-related stroke, including the key points summarised above, and has provided clear guidance for healthcare professionals.
The ESC guidelines recommend that when anticoagulant therapy is considered necessary following the assessment of an individual’s AF-related stroke risk, due to their favourable profile one of the NOACs should be considered in preference over a VKA for most people with AF. NOACs are not suitable for all people with AF though, particularly those with severe kidney or liver problems or with artificial heart valves.

Remember, your individual circumstances need to be taken into account when determining the best anticoagulant for you. If you are not sure why you are taking your current anticoagulant, please discuss this with your doctor.
What are the possible side effects associated with anticoagulants?

Oral anticoagulants can prevent two out of three AF related strokes. When assessing which anticoagulant is the right one for you, your doctor will balance the benefits of your therapy versus the possible side effects and impact on your quality of life.

**Side effects**

Like all medicines, each anticoagulant may lead to individual side effects specific to that particular medicine. You should ask your doctor to ensure you are aware of the possible side effects associated with your therapy and if you think you are experiencing any of them then you should raise this with your doctor.

**Anticoagulants and bleeding**

Anticoagulants do not cause bleeding. Bleeding can occur from an injury or can develop internally, for example in the stomach or gut. The role of anticoagulants is to help prevent potentially dangerous clots from forming in the body. So if you are bleeding it may take longer for your blood to clot when you are taking an anticoagulant. Bleeding can be minor from an injury (e.g. a scratch) or major from a more serious accident (e.g. bleeding inside the head). The risk of major bleeding in people taking anticoagulants is low and can affect about 3 in 100 people a year. If you experience a major bleed (with severe blood loss and/or symptoms requiring treatment in hospital) and you are on an anticoagulant, it can be treated successfully in approximately 90% of cases.

Your doctor prescribed the anticoagulant to help prevent an AF-related stroke and the prospect of your blood taking longer to clot if you are bleeding should not stop you from taking the therapy.
Minimising bleeding risks

There are things to keep in mind to help you minimise the risk of bleeding if you are on an anticoagulant:

- Ensure you attend regular visits to your doctor or clinic as advised

- **High blood pressure** is a risk factor for bleeding. If you suffer from high blood pressure, take any medicines you may have been prescribed to control it, measure regularly and talk to your doctor if it does not normalise (<140/90 mmHg)

- **Have your kidney and liver function checked** by your doctor who will tell you how often this is needed

- Ensure your doctor is aware of all other medicine you are taking whether it is prescribed or purchased over the counter including common remedies and health supplements. Do not take aspirin-containing medicines or non-steroidal anti-inflammatory drugs (also called NSAIDs) such as ibuprofen, diclofenac and naproxen, or antidepressants without having talked to your doctor

- **If you are on a VKA, talk to your doctor if the INR is not stable** (it should be in the range of 2-3 at least 7 out of 10 times). Please ask at your regular monitoring session if you are not sure whether your INR is stable or not

- If **alcohol** is consumed, it should be within the recommended limits. Alcohol consumption above recommended levels increases the risk for major bleeding from an injury

- If you need **surgery** or any form of invasive procedure, tell the healthcare professional treating you that you are taking an anticoagulant
• Avoid activities and sports that can easily hurt you to avoid the risk of injury where possible. Note that you can still exercise and many exercises have low risk of injury, for example walking and swimming. If in doubt, please speak to your doctor.

• Minor bleeds can also be avoided by using a soft toothbrush and waxed dental floss rather than toothpick; using an electric razor; being careful when you trim your fingernails and toenails; not trimming corns and calluses yourself; wearing protective gloves when gardening.

• Remember to tell your dentist that you are taking an anticoagulant when you visit, regardless of whether you are expecting to have treatment or just a general check-up or clean and polish.

**Warning signs and what you should do:**

• If you experience bleeding that does not stop, seek medical attention immediately.

• If you have a serious fall or injure yourself, especially if you hit your head, seek medical attention as soon as possible so that you can be checked properly by a professional for any signs of internal bleeding. It is not always possible to know immediately that you are bleeding if the damage is internal.

• If you see anything that is unusual such as blood in urine or stools (this might make your stools look dark in colour like tar) please seek medical advice.

• Never stop taking your anticoagulant without talking to your doctor.

• If you are worried and your doctor’s surgery is closed, you should go to the emergency department of your local hospital.
Managing emergencies and reversal of an anticoagulant’s effect

Although uncommon, a person taking an anticoagulant may face an emergency, for example if they are involved in an accident or if they require immediate surgery. There are a number of measures that may need to be taken and they will vary according to individual circumstances and treatments. Treatment decisions will be based on the urgency of the situation and the ongoing need for anticoagulation to prevent AF-related stroke. Physicians working in emergency departments are trained and equipped to handle such scenarios.

For the NOAC dabigatran, a specific reversal agent ("antidote") is available in hospitals which works to reverse the anticoagulant effects within minutes. This is for use in emergency surgery / urgent procedures and life-threatening or severe bleeding caused by a serious accident for example. Reversal agents are in development that can be used for other NOACs.

Vitamin K is often misleadingly called an “antidote” for VKAs, however, reversing the effect of a VKA using vitamin K alone takes many hours. In cases of an emergency, faster alternative measures to restore clotting of the blood may need to be applied in hospital.

Major bleeds are uncommon and the majority can be treated successfully if they occur, even when the person is on anticoagulant therapy.
Additional questions you may have

How long do I need to take my anticoagulant medicine?

The medicines prescribed are intended to provide you with ongoing protection against the risk of AF-related stroke but they cannot stop your risk of AF-related stroke.

Therefore you should expect to continue anticoagulation therapy indefinitely unless your doctor changes or recommends another form of therapy.

Is AF dangerous?

AF is an abnormality in the rhythm of the heart. It involves the upper chambers of the heart beating irregularly. The main concern with AF is the risk of stroke. If you have AF, an oral anticoagulant is usually prescribed by your doctor to prevent clots forming inside your heart, to reduce the risk of having an AF-related stroke.

My AF symptoms have improved. Can I stop taking my anticoagulant or interrupt treatment?

Never stop your anticoagulant therapy without having consulted your doctor as this could put you at risk of having an AF-related stroke. If you wish to stop taking your medicine, please speak to a doctor first to discuss your reasons and to agree the best course of action for you.

Remember that some people do not have any symptoms of AF yet the risk of AF-related stroke is still there. Anticoagulant therapy should be taken continuously independent of any obvious AF symptoms.
Are there any drugs I shouldn’t take with my anticoagulant?

Do not start any new medicine (prescribed and/or over the counter), supplements such as vitamins or herbal remedies without first checking with your healthcare provider or pharmacist. Each anticoagulant is different so it is important to ask your doctor or pharmacist in relation to the anticoagulant you are taking. VKAs such as warfarin interact more with other medicines than the NOACs.

Why is monitoring required with VKAs but not with NOACs?

Monitoring is required for VKAs because a specific dose is calculated for each patient but the effect of this dose can change, for example with fluctuations in the amount of vitamin K taken in the diet, the level of alcohol consumed and changes to other medicines and supplements taken. If the anticoagulation effect is weakened then protection against risk of AF-related stroke is reduced. Decreasing the blood’s clotting capability by too much will increase the likelihood of experiencing a heavy bleed during an injury. Monitoring involves taking and testing a blood sample on a regular basis which can be done either at your doctors’ surgery or you can self-monitor.

NOACs are given in a fixed dose and provide a stable level of anticoagulant activity. NOACs are not affected by vitamin K in the diet and they have fewer interactions with other medicines than VKAs. Therefore NOACs do not need regular monitoring.
Which NOAC dose should I take?

Your doctor will decide which fixed dose is the best suited for you and this varies for each NOAC. Your doctor will assess your individual situation, for example looking at certain other aspects of your health and medical history and/or physical characteristics such as age, weight and kidney function to determine which dose you should be prescribed. If you are unsure about your NOAC dose, please ask your doctor.

What should I do if I experience a side effect?

For further information on side effects, please see the section within this booklet titled ‘What are the possible side effects associated with anticoagulants?’. If you think you are experiencing a side effect please seek medical attention.
When should I seek immediate medical attention?

You should seek immediate medical attention if you have a serious injury where there is a lot of bleeding, if it shows no signs of stopping and / or if you hit your head. Also if you see blood in your urine or stools (this might make your stools look dark in colour like tar) or if you cough / vomit up blood.

What should I do if I have a surgery / invasive / diagnostic procedure scheduled?

You need to tell the physicians involved in the procedure about the anticoagulant that you are taking, show them your patient alert card (your doctor or pharmacist can provide you with a patient alert card if you do not have one) and tell them when you took the last dose of your anticoagulant. They can then assess if any necessary measures need to be taken in relation to your anticoagulant therapy and your forthcoming procedure and advise you on any necessary action. It is likely that your doctor will advise you to stop taking the anticoagulant temporarily. It is important that you do not stop taking your anticoagulant without being specifically told to do so by your doctor.
What should I do if I miss a dose of my anticoagulant?¹

This depends on the type of medication you are taking and advice on what to do if you miss a dose of your anticoagulant differs for each type of anticoagulant.

**Apixaban:** Take the tablet as soon as you remember and take the next tablet of apixaban at the usual time then continue as normal.

**Dabigatran:** A forgotten dose can still be taken up to 6 hours prior to the next due dose. A missed dose should be omitted if the remaining time is below 6 hours prior to the next due dose. Do not take a double dose to make up for missed doses.

**Edoxaban:** You should take the tablet immediately and then continue the following day with the once daily tablet as usual. Do not take a double dose on the same day to make up for a forgotten dose.

**Rivaroxaban:** Do not take a double dose to make up for a missed dose. If you miss a dose, take your next dose at the usual time.

**Warfarin:** If you usually take your warfarin in the morning and have forgotten to take it, take the dose as soon as you remember and then continue as normal. If it is time to take your next dose, do not take a double dose to catch up (unless your doctor has specifically advised this). If you usually take your warfarin in the evening and forget to take your dose of warfarin in the evening but remember before midnight on the same day, take the missed dose. If midnight has passed, leave that dose and take your normal dose the next day at the usual time.

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¹. Taken from Package Leaflet for each anticoagulant
List of topics you might wish to discuss with your doctor or patient advocacy organisation

The list of topics below will help you to make the most of your time with your doctor. It may be helpful to take someone else with you for support and to have someone else present to hear what the doctor says. You could also write down your questions in the space provided below and take this booklet with you to the consultation.

• Why you need to take anticoagulation medicine
• Which anticoagulant you should take and why and any potential alternative anticoagulants
• Other medicines and how they might interact with the anticoagulant you are taking (include information on any non-prescription medicine, herbal remedies and vitamin supplements you take or plan to take)
• How to take your anticoagulant properly
• Further advice on how to reduce your risk of AF-related stroke
• What you need to be careful of in order to minimise your bleeding risk from injuries and accidents
• Advice on living with oral anticoagulation: impact on food and drink, physical activity, sports, hobbies, travel
• The circumstances that would require you to go back to your doctor
• The circumstances that would require you to seek urgent medical help
• What you need to do if you have planned surgery or invasive / diagnostic procedures
• Other:
Additional resources

Should you require more information please talk to your doctor, nurse or pharmacist or contact a patient advocacy group such as the Atrial Fibrillation Association. Remember to read the literature that comes with your anticoagulant medication.

Additional information can also be found here:

- Atrial Fibrillation Association (AF Association)
  www.heartrhythmalliance.org
- Arrhythmia Alliance
  www.heartrhythmalliance.org
- HealthUnlocked forum
  www.healthunlocked.com/afassociation
- Stop Stroke
  www.stopstroke.com
- AFIB Matters
  www.afibmatters.org

Disclaimers

This booklet/resource was compiled using a review of current clinical research and patient literature. The content was independently reviewed by AF Association/A-A’s medical committee and patient panel and the development of this booklet/resource was made possible thanks to an educational grant from Boehringer Ingelheim. Arrhythmia Alliance and SAFE would like to acknowledge that this booklet was developed by the AF Association and endorsed by Arrhythmia Alliance and the SAFE Board. The copy remains the intellectual property of the AF Association.

Please remember that this publication provides general information only and is not intended to replace the advice of a doctor. Individuals should always discuss their condition with their own doctor.