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World Heart Day 2019

My Heart, Your Heart

This year on World Heart Day, as part of our mission to ensure heart health equity for all, we want to create a global community of Heart Heroes … people from all walks of life who are acting now to live longer, better, heart-healthy lives by making a promise:

- **A promise to our families** to cook and eat more healthily
- **A promise to our children** to exercise more and help them to be more active, to say no to smoking and help our loved ones to stop
- **A promise as a healthcare professional** to help patients give up smoking and lower their cholesterol
- **A promise as a policymaker** to support policies that promote healthy hearts
- **A promise as an employee** to invest in heart-healthy workplaces

A simple promise … for MY HEART, for YOUR HEART, for ALL OUR HEARTS.

Cardiovascular disease is the world's number one killer today. But it doesn't need to be this way. By making just a few small changes to our lives, we can reduce our risk of heart disease and stroke, as well as improving our quality of life and setting a good example for the next generation. It's about saying to yourself, the people you care about and individuals all around the world: "What can I do right now to look after my heart … and your heart?"

Because we believe every heartbeat matters.

What is World Heart Day?

The world's, and the World Heart Federation's, biggest awareness-raising platform for CVD

World Heart Day is celebrated every year on 29 September

In May 2012, world leaders committed to **reducing global mortality from non-communicable diseases (NCDs) by 25% by 2025**. Cardiovascular disease (CVD) is accountable for nearly half of all NCD deaths making it the world's number one killer. World Heart Day is, therefore, the perfect platform for the CVD community to unite in the fight against CVD and reduce the global disease burden.

Created by the World Heart Federation, **World Heart Day informs people around the globe that CVD, including heart disease and stroke, is the world's leading cause of death claiming 17.9 million lives each year**, and highlights the actions that individuals can take to prevent and control CVD. It aims to **drive action to educate people** that by controlling risk factors such as tobacco use, unhealthy diet and physical inactivity, at least 80% of premature deaths from heart disease and stroke could be avoided.

World Heart Day is a global campaign during which individuals, families, communities, and governments around the world participate in **activities to take charge of their heart health and that of others**. Through this campaign, the World Heart Federation **unites people from all countries and backgrounds** in the fight against the CVD burden and inspires and drives international action to encourage heart-healthy living across the world. We and our members believe in a world where heart health for everyone is a fundamental human right and a crucial element of global health justice.

What is Cardiovascular disease?

CVD is the world's number one killer, causing over 17.9 million deaths per year

The term 'cardiovascular disease' (CVD) refers to **any disease of the heart, vascular disease of the brain, or disease of the blood vessel**. More people die from CVDs worldwide than from any other cause: over 17.9 million every year, according to the World Health Organization. Of these deaths, 80% are due to coronary heart diseases (eg heart attack) and cerebrovascular diseases (eg strokes) and mostly affect low- and middle-income countries.

Did you know that your heart is the size of your fist and the strongest muscle in your body? It started beating about three weeks after you were conceived. If you live to be 70, it will have beaten two and a half billion times. However, although impressive and strong, your heart can also become vulnerable from habitual **risk factors like smoking, eating an unhealthy diet or putting it under stress**. Controlling these key risk factors and monitoring your blood pressure regularly may reduce an individual's risk of CVD.

The system can also be weakened from a pre-existing heart condition and other physiological factors, including hypertension or high blood cholesterol. When your heart's functions become compromised, this is known as cardiovascular disease, a broad term that covers any disorder to the system that has the heart at its centre.

RISK FACTORS

There are many risk factors associated with coronary heart disease and stroke. Some risk factors, such as family history, cannot be modified, while other risk factors, like high blood pressure, can be modified with treatment.

You will not necessarily develop cardiovascular disease if you have a risk factor. But the more risk factors you have, the greater the likelihood that you will, unless you take action to modify your risk factors and work to prevent them compromising your heart health.

Modifiable risk factors include:

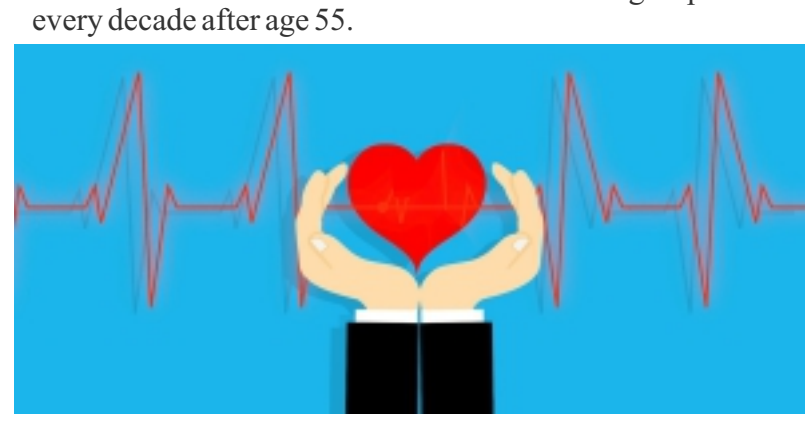
- Physical inactivity
- Unhealthy diet
- Raised blood pressure
- Tobacco use
- Cholesterol
- Obesity and being overweight

Non-modifiable risk factors include:

- Family history
- Diabetes

Other common non-modifiable risk factors include:

- Age: simply getting old is a risk factor for cardiovascular disease; risk of stroke doubles every decade after age 55.
- Gender: your gender is significant: as a man you are at greater risk of heart disease than a pre-menopausal woman. But once past the menopause, a woman's risk is similar to a man's. Risk of stroke is similar for men and women.
- Ethnicity: your ethnic origin plays a role. People with African or Asian ancestry are at higher risks of developing cardiovascular disease than other racial groups.



- Socioeconomic status: being poor, no matter where in the globe, increases your risk of heart disease and stroke. A chronically stressful life, social isolation, anxiety and depression also increase the risk.

Visit your healthcare professional and ask for a few simple checks:

Check your blood glucose levels

High blood glucose (blood sugar) can be indicative of diabetes. CVD accounts for 60% of all deaths in people with diabetes so if it's left undiagnosed and untreated it can put you at increased risk of heart disease and stroke.

Check your blood pressure

High blood pressure is the number one risk factor for CVD. It's called the 'silent killer' because it usually has no warning signs or symptoms, and many people don't realize they have it.

Check your numbers

Visit your healthcare professional and ask them to measure your cholesterol levels, weight and body mass index (BMI), as well as your blood pressure and blood glucose. They can then advise you on your CVD risk so you can plan to improve your heart health.

Understand the signs and symptoms of a heart attack

Over 70% of all cardiac and breathing emergencies occur in the home when a family member is present and could help a victim.

Talk to your healthcare professional about local cardiopulmonary resuscitation (CPR) courses so you can help a loved one in the event of a heart attack. If a family member is having a heart attack or stroke, seek medical help immediately.

HEALTHY HEART VIBES

Did you know ...?

High blood glucose (blood sugar) can be indicative of diabetes. CVD accounts for the majority of deaths in people with diabetes so if it's left undiagnosed and untreated it can put you at increased risk of heart disease and stroke.

High blood pressure is one of the main risk factors for CVD. It's called the 'silent killer' because it usually has no warning signs or symptoms, and many people don't realize they have it.

Cholesterol is associated with around 4 million deaths per year. Visit your healthcare professional and ask them to measure your levels, as well as your weight and body mass index (BMI). They will then be able to advise on your CVD risk so you can plan to improve your heart health.

Heart attack warning signs

Some heart attacks are sudden and intense, where no one doubts what's happening. But most heart attacks start slowly, with mild pain or discomfort. Often people affected aren't sure what's wrong and wait too long before getting help. Here are some signs that can mean a heart attack is happening:

- Chest discomfort. Most heart attacks involve discomfort in the center of the chest that lasts more than a few minutes, or that goes away and comes back. It can feel like uncomfortable pressure, squeezing, fullness or pain.
- Discomfort in other areas of the upper body. Symptoms can include pain or discomfort in one or both arms, the back, neck, jaw or stomach.
- Shortness of breath with or without chest discomfort.
- Other signs may include breaking out in a cold sweat, nausea or lightheadedness.

Heart attacks often manifest themselves differently in women than in men. As with men, women's most common heart attack symptom is chest pain or discomfort. But women are somewhat more likely than men to experience some of the other common symptoms, particularly shortness of breath, nausea/vomiting, and back or jaw pain.

Stroke warning signs

A stroke is a medical emergency. If any of these symptoms appear, don't delay – get medical help immediately!

- Sudden numbness or weakness of the face, arm or leg, especially on one side of the body
- Sudden confusion, trouble speaking or understanding
- Sudden trouble seeing in one or both eyes
- Sudden trouble walking, dizziness, loss of balance or coordination
- Sudden severe headache with no known cause

If experiencing any of these signs, which could come and go, call your emergency services/ambulance immediately.

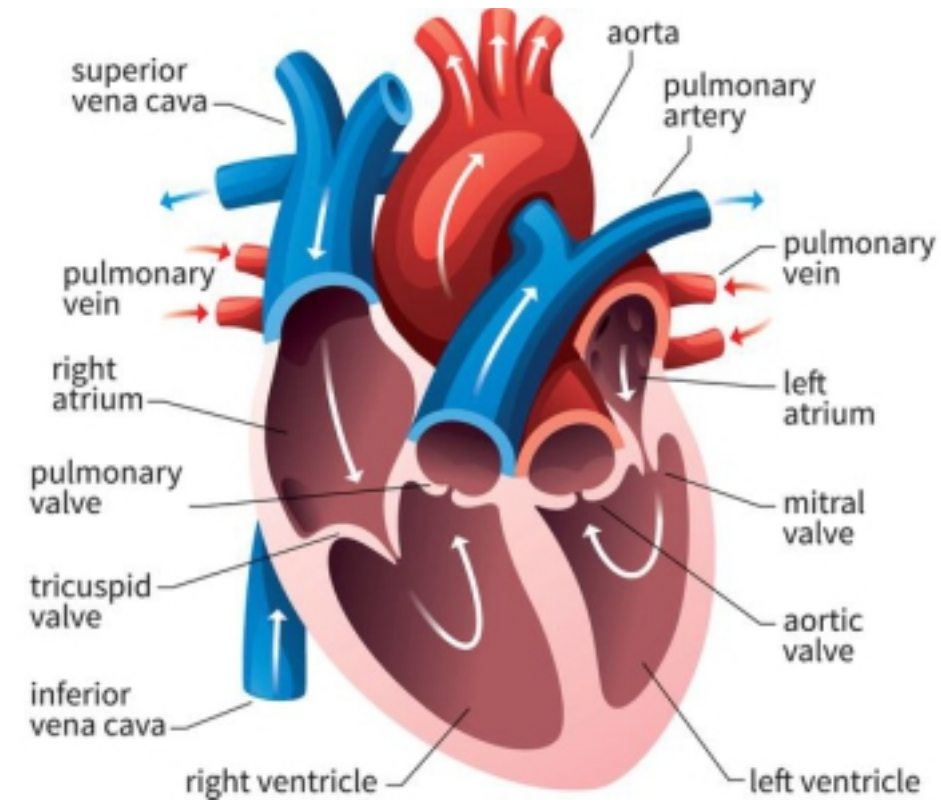
If there is no emergency response number, seek medical attention as soon as possible.

Learn how cardiopulmonary resuscitation (CPR) pumps oxygenated blood through the body and can help save the life of someone who is unconscious from a sudden cardiac arrest. Additionally, watch videos from our members on how to perform hands-only CPR.

KEY FACTS AND FIGURES

What is the burden of CVD?

An estimated 17.9 million people die of cardiovascular diseases every year. 80% of the deaths occur in low- and middle-income countries.



What causes CVD?

There are many risk factors that contribute to the development of cardiovascular disease. Some people are born with conditions that predispose them to heart disease and stroke, but most people who develop cardiovascular disease do so because of a combination of factors such as poor diet, lack of physical activity and smoking, to name just three. The more risk factors you expose yourself to, the higher the chance of developing cardiovascular disease. Many of the risk factors for cardiovascular disease cause problems because they lead to atherosclerosis. Atherosclerosis is the narrowing and thickening of arteries and develops for years without causing symptoms. It can happen in any part of the body. Around the heart, it is known as coronary artery disease, in the legs, it is known as peripheral arterial disease.

The narrowing and thickening of the arteries are due to the deposition of fatty material, cholesterol and other substances in the walls of blood vessels. The deposits are known as plaques. The rupture of a plaque can lead to a stroke or a heart attack.

What is cholesterol?

Cholesterol is a waxy, fat-like substance used by the body to build cell walls and make several essential hormones. Your liver produces cholesterol and you absorb it from the animal fats you eat. Cholesterol is carried through the blood by particles called lipoproteins. There are two types: low-density lipoproteins (LDL) and high-density lipoproteins (HDL). The former carries the cholesterol around the body in the blood and the latter transports cholesterol out of the blood into the liver.

When cholesterol is too high, or the levels of the two types are out of balance (dyslipidemia), the cholesterol can clog the arteries affecting the flow of the blood.

What are triglycerides?

Triglycerides are fats found in the blood that are important for muscle energy. They travel through the blood in lipoproteins. As triglyceride levels rise, HDL cholesterol levels fall. High levels of triglyceride increase the risk of heart disease. In rare cases, very high levels can lead to pancreatitis. Conditions that may cause high triglycerides include obesity, poorly controlled diabetes, drinking too much alcohol, hypothyroidism, and kidney disease.

How is coronary heart disease diagnosed?

There are a number of ways to diagnose coronary heart disease. Your physician will probably use a number to make a definitive diagnosis. A coronary angiogram uses a dye inserted into your arteries and an x-ray to see how the blood flows through your heart. The picture taken, the angiogram, will show any atherosclerosis.

Another test is an electrocardiogram (EKG). This test records the electrical activity of your heart. An electrocardiogram measures the rate and regularity of heartbeats, the size and position of the heart chambers, the presence of any damage to the heart, and the effects of drugs or devices used to regulate the heart. It is a non-invasive procedure.

How are smoking and heart disease linked?

Smoking damages the lining of blood vessels, increases fatty deposits in the arteries, increases blood clotting, adversely affects blood lipid levels, and promotes coronary artery spasm. Nicotine accelerates the heart rate and raises blood pressure.

Does diet play a part in the development of heart disease?

Diet plays a significant role in protecting or predisposing people to heart disease. Diets high in animal fat, low in fresh vegetables and fruit, and high in alcohol have been shown to increase the risk of heart disease. Adopting a diet low in fat and salt has a protective effect over the long term. This means whole grains, fruits, and vegetables.

Aren't women protected from heart disease because of oestrogen?

Oestrogen does help raise good HDL cholesterol which helps protect women, but once through the menopause as many women as men are affected by heart disease. If a woman suffers from diabetes or has raised levels of triglycerides that cancels out the positive effect of estrogen.

How do the symptoms of a heart attack differ between men and women?

The symptoms of a heart attack in a man are intense chest pain, pain in the left arm or jaw and difficulty breathing. A woman may have some of the same symptoms, but her pain may be more diffuse, spreading to the shoulders, neck, arms, abdomen and even her back. A woman may experience pain more like indigestion. The pain may not be consistent. There may not be pain but unexplained anxiety, nausea, dizziness, palpitations and cold sweat. A woman's heart attack may have been preceded by unexplained fatigue. Women also tend to have more severe first heart attacks that more frequently lead to death, compared to men.

Is heart disease hereditary?

Heart disease can run in some families. But even if you inherit the risks factors that predispose you to heart disease, such as high blood cholesterol, high blood pressure, diabetes, or being overweight, there are measures you can take that will help you avoid developing cardiovascular disease. Learn how you can help protect your heart.

What counts as hypertension?

Optimal blood pressure is defined as a systolic blood pressure less than 120 mmHg. The level of raised blood pressure for which investigation and treatment have been shown to do more good than harm is called "hypertension". This is generally defined as a systolic blood pressure of 140 mmHg and/or a diastolic blood pressure at or above 90 mmHg. Systolic blood pressure is the maximum pressure in the arteries when the heart contracts. Diastolic blood pressure is the minimum pressure in the arteries between the heart's contractions.

What is the connection between raised blood pressure and heart disease?

Blood moving through your arteries pushes against the arterial walls; this force is measured as blood pressure. Raised blood pressure occurs when very small arteries (arterioles) tighten. Your heart has to work harder to pump blood through the smaller space and the pressure inside the vessels grows. The constant excess pressure on the artery walls weakens them making them more susceptible to atherosclerosis.

LOOK AFTER YOUR HEART

Make a promise to your heart. A promise to eat more healthily, get more active and say no to smoking

By making just a few small changes to our lives, we can all live longer, better, more heart-healthy lives

It's about saying to yourself, the people you care about and individuals all around the world, "what can I do right now to look after MY HEART… and YOUR HEART?"

So this World Heart Day, it's your opportunity to make a promise … a promise to cook and eat more healthily, to do more exercise and encourage your children to be more active, to say no to smoking and help your loved ones to stop.

A simple promise … for MY HEART, for YOUR HEART, for ALL OUR HEARTS.

Promise to eat well and drink wisely

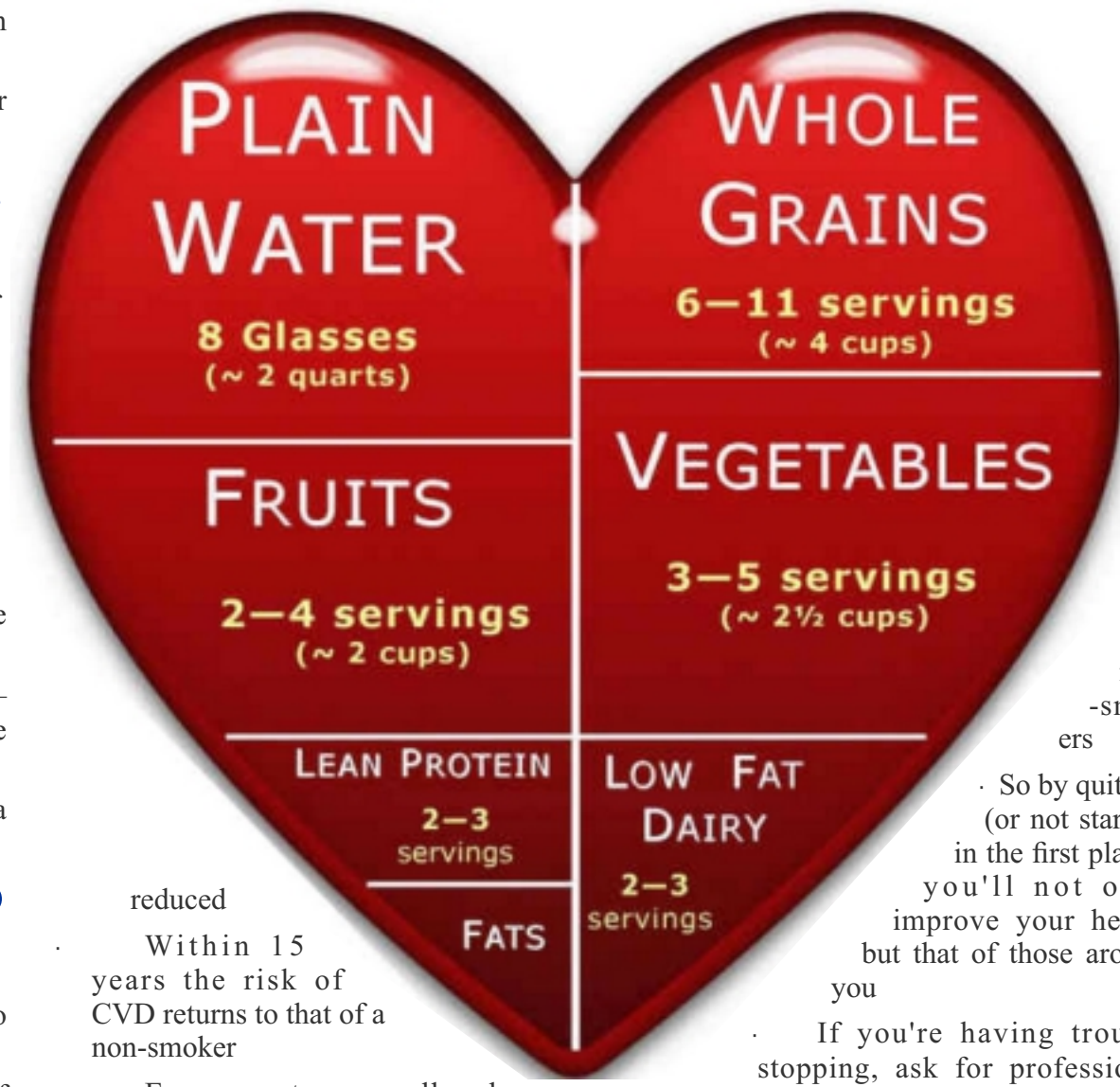
- Cut down on sugary beverages and fruit juices – choose water or unsweetened juices instead
- Swap sweet, sugary treats for fresh fruit as a healthy alternative
- Try to eat 5 portions (about a handful each) of fruit and veg a day – they can be fresh, frozen, tinned or dried
- Keep the amount of alcohol you drink within recommended guidelines
- Try to limit processed and prepackaged foods that are often high in salt, sugar and fat
- Make your own healthy school or work lunches at home

Promise to get more active

- Aim for at least 30 minutes of moderate-intensity physical activity 5 times a week
- Or at least 75 minutes spread throughout the week of vigorous-intensity activity
- Playing, walking, housework, dancing – they all count!
- Be more active every day – take the stairs, walk or cycle instead of driving
- Exercise with friends and family – you'll be more motivated and it's more fun!
- Download an exercise app or use a pedometer to keep track of your progress

Promise to say no to smoking

- It's the single best thing you do to improve your heart health
- Within 2 years of quitting, the risk of coronary heart disease is substantially reduced
- Within 15 years the risk of CVD returns to that of a non-smoker
- Exposure to secondhand smoke is also a cause of heart disease in non-smokers
- So by quitting (or not starting in the first place), you'll not only improve your health but that of those around you
- If you're having trouble stopping, ask for professional advice and ask your employer if they provide smoking-cessation services



CVD & Diabetes

People living with diabetes are twice as likely to develop and die from cardiovascular disease

Understanding what steps you can take may reduce your risk of CVD

Diabetes is a major global health threat. It affects 1 in 11 adults … 425 million people with the overall figure predicted to rise to 629 million by 2045. Type 2 diabetes accounts for approximately 90% of all people with diabetes. All of those living with diabetes are at heightened risk of CVD making the prevention of CVD onset a major priority.

Why are people with diabetes twice as likely to have a heart attack or stroke than adults without diabetes?

- Diabetes can damage your blood vessels and nerves
- People with type 2 diabetes might also have high blood pressure, high cholesterol or are overweight. These increase the chances of getting heart disease
- The longer you live with diabetes, the higher your risk of heart disease and stroke

For adults at age 60, having type 2 diabetes and cardiovascular disease shortens life expectancy by an average of **12 years**.

About CVD and type 2 diabetes

Diabetes is a metabolic disorder characterized by high blood sugar, insulin resistance and relative lack of insulin. Long-term complications from high blood sugar include heart disease, strokes and diabetic retinopathy, which can result in blindness, kidney failure, and poor blood flow in the limbs that may lead to amputations.

Those living with type 2 diabetes are twice as likely to die from heart disease and stroke compared to patients without diabetes. It is estimated that globally, as many as 212.4 million people or half of all people aged 20-79 years with diabetes are unaware of their disease, and these people are all at increased risk of CVD.

All of this results in an urgent need to prevent CVD in those with diabetes, requiring careful attention to CVD risk factors such as tobacco use, hypertension, and blood lipids.

Top 3 questions to ask your doctor about diabetes and your heart

All it takes is one conversation to start reducing your risk of CVD, including heart disease and stroke. Millions of people with diabetes are living heart-healthy lives and you can too. So ask your doctor:

1. What changes can I make as part of my daily life to take care of my heart
2. How will I know if any of the changes I've made are making a difference?
3. Are there any resources that will help me to learn more?

ABOUT HEART FAILURE

The Global Burden Of Heart Failure Is Rising

At any one time, the number of cases of heart failure worldwide has been estimated at 26 million[2]. Add in the estimated number of ***undiagnosed cases and*** the figure rises to 37.7 million[3], with increasing numbers reported every year. Despite the fact that many cardiovascular diseases end in heart failure, the condition too often fails to attract the awareness and emphasis it deserves.

1 in every 5 people will develop heart failure in their lifetimes

Heart failure is a severe condition that occurs when your heart doesn't pump enough blood around your body. It can be either acute and come on suddenly, or a progressive, long-term condition. The symptoms include:

- Shortness of breath
- Coughing or wheezing
- Tiredness and fatigue
- Fluid retention with swelling of the legs and/or abdomen
- Being less able to do physically demanding tasks or exercise

There are an estimated 11.7 million cases of undiagnosed heart failure globally

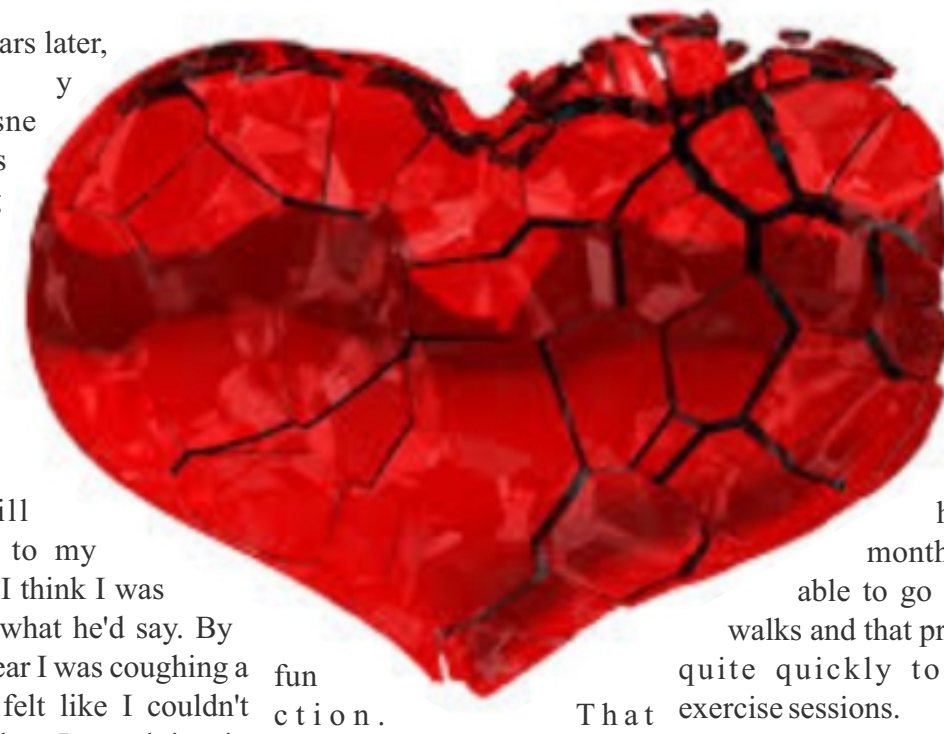
Causes of heart failure

There are many possible causes, including:

- Heart attack
- Neglected and rare diseases, such as Chagas, rheumatic heart disease, Kawasaki disease and cardiac amyloidosis;
- Cardiac conditions, such as heart muscle disease, coronary heart disease, valve disease, congenital heart disease, pericardial disease and rhythm disorders
- Chronic lung disease
- Poor lifestyle choices, such as a high salt diet, smoking tobacco, alcohol or drug misuse
- Failure to take preventative medications

How one patient overcame heart failure

"In my 20s and 30s I never thought about my heart health. I stopped exercising when I left school, my diet was pretty bad and I was a smoker. By my late 30s I had gained quite a bit of weight, I couldn't climb the stairs without getting out of breath and my legs were swollen. I didn't realize this meant I was retaining fluid which is a classic symptom of heart failure.



"A few years later, my breathlessness was getting worse and my legs were an unusually pale colour. But I still didn't go to my doctor … I think I was scared of what he'd say. By the next year I was coughing a lot and I felt like I couldn't breathe when I was lying in bed. I finally went to see the doctor who diagnosed me with high blood pressure, type 2 diabetes and kidney disease. Shortly after this I was diagnosed with progressive heart failure and my heart was working at only 30% of it started eating healthily. function. That dropped to 20% within a couple of months.

"In hospital, a cardiologist told me that I was in serious trouble, so as well as taking my medications I stopped smoking and drinking, and within a few months I was able to go for short walks and that progressed quite quickly to longer exercise sessions.

"My family had a history of heart disease but I was determined not to let this condition get the better of me. Now I no longer need the prescription medicines and heart health has become a way of life for me."

Rare Cardiovascular Diseases

By increasing awareness of uncommon conditions, we can help to ensure better diagnosis rates and heart health equity … because every heartbeat matters

While each individual disease is rare, collectively rare diseases are common, affecting approximately 5% of the world's population. There are more than 7,000 known rare diseases, some of which affect the heart and circulatory system.

Eighty percent of rare diseases are genetic in origin and often present at an early age. Patients with rare diseases also suffer from delays in diagnosis due to a lack of medical knowledge and poor awareness of these conditions, which contributes to a considerable social and financial burden for affected individuals as well as their families and caregivers.

Cardiovascular disorders are anything but rare, accounting for almost 50% of all noncommunicable diseases worldwide and caused by common conditions such as hypertension. With constrained resources and limited access to specialist cardiac investigations, the diagnosis of rare cardiovascular disease can be challenging. In many cases, suspicion is triggered by an unusual or extraordinary event—for example, a sudden death in a young relative. On other occasions, the diagnosis is retrospective following delayed recognition of atypical features.

While acknowledging the diagnosis of rare diseases requires some specialized knowledge and access to investigations such as genetic testing, appropriate clinical assessment combined with routinely available tests can be used as a first pass filter to detect some of the most important rare cardiovascular conditions.

One of these is called transthyretin amyloid cardiomyopathy or ATTR-CM, which is a form of cardiac amyloidosis. ATTR-CM is a rare, underdiagnosed and fatal condition, resulting in progressive heart failure.

Another is Kawasaki Disease, which is actually becoming increasingly common and is the leading cause of acquired heart disease on children.

The Amazing Human Heart

"Do-it-yourself cardiac bypass surgery: All you need is walking shoes." —Harvard Medical School

Doctors have believed forever that the human heart is so fragile and helpless that it can't heal itself. The heart can only be improved after a heart attack, they believe, by putting the hapless patient through a car crash — excuse me, coronary artery bypass surgery. They are wrong.

Medical science is wrong for a whole bunch of reasons, one of which is angiogenesis. Angiogenesis is the formation of new blood vessels, provoked by protracted and at least periodically vigorous exercise. Another reason the docs are wrong is arteriogenesis, the improvement of existing blood vessels.

When coronary arteries begin to occlude — that is, close up — other arteries can expand to help increase blood supply to the heart. A heart attack (assuming the patient survives) has a similar effect. This process of expansion is called arteriogenesis.

Arteriogenesis begins with mechanical stress on the walls of the blood vessel. In other words, as one artery occludes, more blood attempts to pass through other arteries. This stresses the blood vessels, which in turn stimulates the production of a protein called monocyte chemoattractant protein 1, or MCP-1.

There follows a cascade of events that culminate in the increased diameter of the vessels until the pressure on the vessel walls is normalized. And as we will all recall, Poiseuille's Law of Flow posits that as the diameter of a tube (a blood vessel, for example) increases, the total flow capacity of the tube increases by a power of four. Thus, even small increases in vessel diameter result in very large increases in blood supply.

Interestingly, arteriogenesis happens only when the vessel is stressed in a repetitive manner. This typically happens during transient coronary artery occlusion, when an artery becomes nearly blocked, then unblocks itself, then becomes partially blocked again and so on over and over. Constant stress on the vessel wall, on the other hand, doesn't stimulate arteriogenesis. (Think high blood pressure.)

But we don't have to wait for blocked arteries or a heart attack to launch the process of arteriogenesis and improve the capacity of our blood vessels. We can stress the vessels just as well, or even better, by undertaking an exercise program that repetitively and intermittently pressures the vessels.

The most effective form of exercise (for producing arteriogenesis) appears to be interval training. Competitive athletes typically have advanced arteriogenesis, but ordinary people can accomplish much the same thing through an exercise regime that mimics sprint training.

For example, we could design a moderate exercise regime in which we walk (on a track, sidewalk, or treadmill) on level terrain for a few minutes, then climb steeply for a few minutes, then walk downhill for a few minutes, flat for a few minutes, and so on.

The important aspects of this regime are that a) the heart needs to be stressed intermittently, b) the degree of difficulty of the exercise needs to reach aerobic levels, and c) the exercise should be continued for about thirty minutes and be repeated several times per week.

Competitive sprinters will, of course, work much harder than this, but that's because they are trying to win races. To stimulate the production of MCP-1 and launch the process of arteriogenesis, we only need to stress the blood vessels intermittently and regularly at a minimum aerobic level. Anything beyond that will be useful for winning races, but not for initiating arteriogenesis.

Angiogenesis and arteriogenesis are remarkable phenomena, and they give the lie to the long-held medical opinion that the heart cannot heal itself. But there's more. A closely allied phenomenon is blood vessel collateralization.

All mammals have very small collateral vessels in their hearts, running between and connecting the coronary arteries. Under normal conditions these collaterals are "closed," that is, no blood is running through them, and they are almost invisible. But under certain conditions the collaterals "open" and blood begins to flow through them to the main arteries.

What are these conditions? They are the same conditions that launch angiogenesis and arteriogenesis — stress on the heart resulting from coronary occlusion, heart attack, or exercise. When a coronary artery becomes occluded, collateral vessels spring into action, bypassing the blocked portion of the artery.

As noted in the quote that heads this post, collateralization is essentially identical to what a heart surgeon does in a CABG procedure — bypassing clogged points in the arteries so that blood flow can resume. Except that your chest isn't being sawed open, your heart ripped out of your chest cavity, etc., etc.

So effective is vessel collateralization that researchers at UCL, Yale and other institutions found that heart patients with significant vessel collateralization had a 36 percent reduced chance of dying from a heart attack. To put that in perspective, it is nine times as effective as the best statin.

Combining the therapeutic effects of angiogenesis, arteriogenesis, and collateralization, we find that the human heart is actually extraordinarily robust. As far as I know, no one has studied the combined effect of these three phenomena on heart patients. But I wouldn't be surprised to find that individuals who have managed to engage all three of these natural therapies would have at least twice the chance of surviving a heart attack.