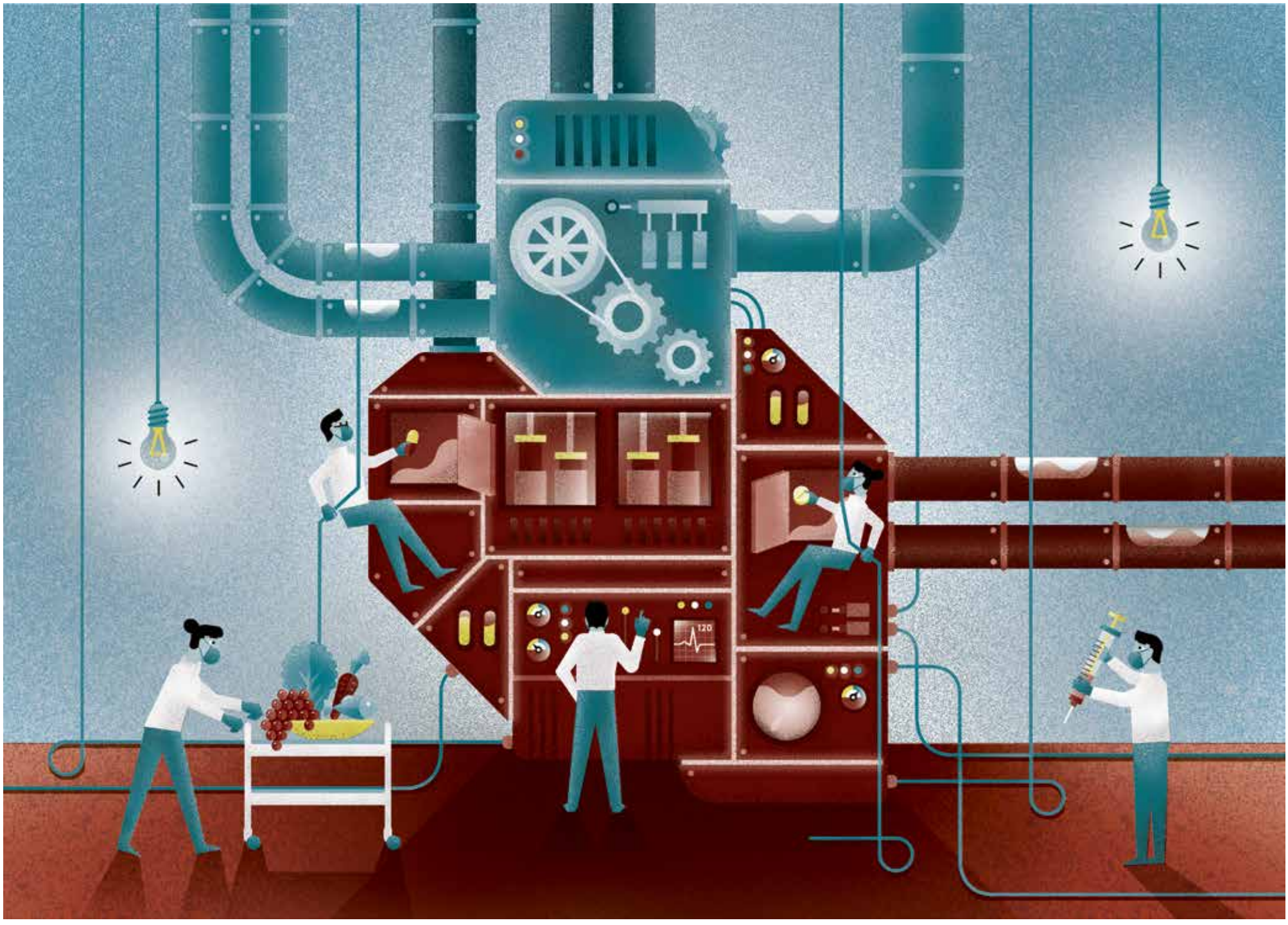
CARDIOVASCULAR HEALTH



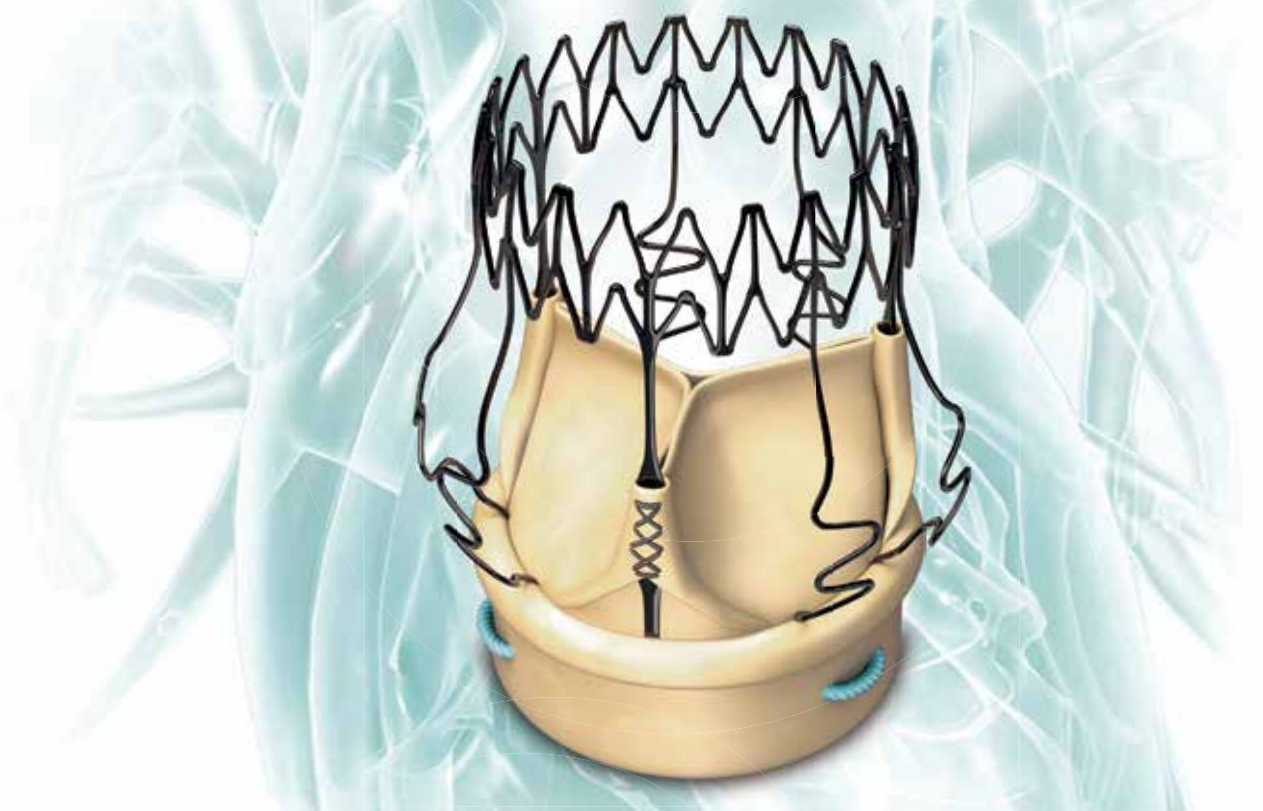
LivaNova

Health innovation that matters

Optimizing the surgical approach to aortic valve replacement

PERCEVAL™

Aortic Pericardial Heart Valve



- Over **9** years of clinical experience
- Over **150** peer reviewed papers
- Over **20,000** patients treated

www.livanova.com

CARDIOVASCULAR HEALTH

DISTRIBUTED IN
THE TIMES

RACONTEUR

PUBLISHING MANAGER
Lucy O'Boyle

PRODUCTION EDITOR
Benjamin Chiou

MANAGING EDITOR
Peter Archer

HEAD OF PRODUCTION
Natalia Rosek

DIGITAL CONTENT MANAGER
Lorna North

DESIGN
Samuele Motta
Grant Chapman
Kellie Jerrard

CONTRIBUTORS

LILIAN ANEKWE
Consumer health editor at the BMJ Group, she is an award-winning medical journalist who has also written for *New Scientist* and *New Statesman*.

MARTIN BARROW
Former health editor, news editor, foreign news editor and business news editor at *The Times*, he specialises in the NHS and social care.

DANNY BUCKLAND
Award-winning health journalist, he writes for national newspapers and magazines, and blogs on health innovation and technology.

ROGER DOBSON
Award-winning freelance journalist and author, he contributes to national newspapers on a range of health issues.

VICTORIA FLETCHER
Freelance health writer and former health editor at the *Daily Express*, she contributes to the *Mail on Sunday* and *The Sunday Telegraph*.

NIGEL HAWKES
Science and health journalist, formerly with *The Observer* and *The Times*, he is a regular contributor to *The BMJ*.

VICTORIA LAMBERT
Award-winning journalist specialising in health, she contributes to a wide range of national newspapers and magazines.

Ekkasit Rakrotchit / Shutterstock

Learning to love your heart

Today is World Heart Day, an international campaign to inform people about cardiovascular diseases – the biggest cause of death – and promote preventative measures to reduce risk

OVERVIEW
MARTIN BARROW

Today in the UK around 480 people will go to hospital with a heart attack. About seven in ten will return home. In the space of a generation, pioneering research has transformed the way in which we care for victims of heart attacks, paving the way for life-saving treatments. The odds of survival and recovery have improved beyond recognition.

But cardiovascular disease – heart conditions and stroke – still kills around one in four of us, and takes the lives of more than 100 people in the UK every day. Many of those who survive a heart attack or stroke suffer from a decline in their quality of life through disability and their life expectancy is reduced.

The World Health Organization (WHO) has set a target to reduce mortality from four major preventable diseases – diabetes, cancer, chronic lung disease and cardiovascular disease – by 25 per cent by 2025, against 2010 levels. The UK government has formally signed up to this target and has made a commitment to take strong action at all levels to ensure it is met.

The WHO programme on cardiovascular disease is run in partnership with the World Heart Foundation, which is tasked with monitoring progress and ensuring best practice is openly shared to inform global public health policy.

There are an estimated seven million people in the UK living with cardiovascular disease, divided almost equally between men and women. An ageing and growing population, and improved survival rates from cardiovascular events, will see this number rise further. If the UK succeeds in meeting the WHO target, it would save 10,500 more lives each year.

Three quarters of cardiovascular disease is preventable. There are big gains to be made through health education and raising awareness of the risks. This means empowering people to make healthy choices related to physical inactivity, smoking, high blood pressure, elevated cholesterol and obesity that reduce the risk of cardiovascular disease.

There is an urgent need to reduce the number of people who smoke or live with undiagnosed high blood pressure or high cholesterol, with a particular focus on people and communities at highest risk of heart disease.

7m
people are living with cardiovascular disease in the UK

Source: British Heart Foundation 2016

Preventing cardiovascular disease is also about helping to create a sustainable NHS. The health service is struggling to contain costs, which are increasing by about £5 billion a year, partly because of the increase in demand for care from patients with long-term conditions.

Cardiovascular disease wreaks havoc on individuals and families' lives, but is also a blight on the wellbeing of communities, and increases deprivation and inequality. People with cardiovascular disease live shorter lives and live a greater proportion of their lives with disability. In the most deprived communities more than a quarter of adults smoke and are at greater risk of cardiovascular disease and premature death.

Earlier this year, the Richmond Group of charities published a report, entitled *The PROMISE Study*, into how the UK can achieve the 25 x 25 goals set by the WHO. The Richmond Group is a coalition of 12 leading health and social care organisations in the voluntary sector. Its members include the British Heart Foundation, Stroke Association and the British Lung Foundation. Their view is that the targets are not ambitious enough for the UK, given the country's wealth and the quality of our healthcare system.

It is disappointing that the Richmond Group has warned that the UK risks missing its WHO targets unless urgent new action is taken.

The PROMISE Study found that, if current trends continue, we should see 25 per cent early deaths in women and 22 per cent in men in the UK. Achieving the WHO goals would delay or avert around 250,000 deaths (161,000 deaths in men, 89,000 in women). It would also prevent around 1.12 million years lived with disability (630,000 in men and 490,000 in women); in other words, 1.12 million people having one extra year of healthy, disability-free life.

A number of interventions are needed if the UK is to make the required progress towards the 25 x 25 goals and beyond. The Richmond Group welcomes the introduction of the sugar tax, but calls for bolder steps in food reformulation to reduce salt and sugar content as well as portion size. It also seeks a further increase in tobacco tax of around 5 per cent above the level of inflation and restrictions on alcohol marketing. The group further recommends that health professionals, including GPs, should openly advocate the need to increase physical activity, to help bring about the required change.

With increasing pressures on the NHS and social care, we need look after our own health better. Individuals, families and communities must be supported and enabled to take action. But providing information alone is not enough to create the scale of change needed to prevent unnecessary illness. We need action to tackle the underlying causes and motivations of harmful behaviour, and create an environment in which people can more easily make healthy choices around food and drink, be more active, and not smoke.

Public services, business, charities and government have a vital role to play in improving health, preventing long-term conditions and avoidable deaths. World Heart Day is an opportune moment to reflect on what is at stake and what remains to be done.

Share this article online via **Raconteur.net**


Monty Rakusen/Getty Images

STATINS

NIGEL HAWKES

War of words over statin side effects

For many, statins are a wonder drug that save many millions of lives worldwide, but despite this some patients have stopped taking them fearing side effects

Few drugs have been tested as comprehensively as statins. Trials involving hundreds of thousands of people have shown that even those with no history of heart disease can cut their risk of a heart attack or stroke by 20 per cent if they take statins. And since heart attacks and strokes account for a third of all deaths, the overall benefits are huge – in the UK, statins are reckoned to save 9,000 lives a year.

Yet every day, people who have been prescribed statins by their GPs give them up. This even applies to people who have had a stroke, says Peter Sever, professor of clinical pharmacology at Imperial College, London. "These are patients who have had a stroke, recovered the use of their limbs and been prescribed a statin because it reduces their risk of a second stroke by 25 per cent," he says. "Yet within a year, 80 per cent of them are no longer taking it – that is a terrible statistic."

Understanding why so many people give up a potentially life-saving drug is a conundrum that puzzles those like Professor Sever who have been involved in the trials. "It's easy to blame the patients for not listening to what we tell them, but sometimes we don't tell them the right things," he says.

"Some physicians and specialists are actually not very good at explaining these things. Stroke patients are treated by neurologists then sent home to the care of their GPs and some are just not focused enough on the need for these people to stay on statins for the rest of their lives."

From the perspective of the trialists, it's an open-and-shut case. Some have become very critical of any countervailing views, says Sir Rory Collins, professor of medicine and epidemiology at the Clinical Trial Service Unit within the University of Oxford, comparing those who cast doubt on statins as being as irresponsible as those who put children at risk by falsely claiming a link between MMR vaccine and autism.

Sir Rory and Professor Sever are among the authors of a new review of the evidence, published earlier this month in *The Lancet*. This argues that patients and some doctors have been overly influenced by studies linking statins to muscle pains, when the gold standard of evidence, from randomised controlled trials, shows no such link. Launching the review on September 7, Sir Rory said he had complete confidence from the trial evidence that muscle pain was a rare consequence of taking statins.

B. BOISSONNET /BSIP/Getty Images

Publication in *The BMJ* of two papers that made erroneous claims about the frequency of side effects of statins was a serious disservice to British and international medicine, far worse in the harm done than the MMR scare, he says.

In this high-stakes statins war, proponents battle for the moral high ground. The evidence of benefit may be clear, but many doctors baulk at the proposition that millions of healthy people should be prescribed drugs to protect against diseases they do not yet have and may never get.

Guidance from the National Institute for Health and Care Excellence (NICE) that anybody with a greater than 10 per cent risk of developing cardiovascular disease within the next ten years should be offered statins has been ignored by many GPs. "There should be no automatic prescribing based on slavish devotion to a simplistic mathematical model of risk," according to Dr Andrew Green of the British Medical Association in October 2014.

Even more hotly-contested is the issue of side effects. The trials paint an attractive picture, with serious adverse effects being extremely rare, and that is borne out by experience. But patients with more modest side effects such as muscle pain turn up much more often in GPs' waiting rooms than the trials predict. A recent high-profile casualty was Sir David Nicholson, former chief executive of the NHS, who said in July that he had given up taking statins.

Sir David told *The Sunday Times*: "I was getting muscle and joint pain. It was getting worse and worse. It was mild to begin with and I kind of thought it was because I was getting old. I stopped taking them for a week and I got better."

His experience perfectly matches that of many people and suggests evidence of minor but debilitating side effects has been missed. Those who carried out the trials deny flatly that this is possible.

"The trials show there is a very small increase in the risks of muscle problems, but it's absolutely tiny when you look at it in an entirely objective way," says Professor Sever. The chance of anyone getting muscle problems was between one in a thousand and one in ten thousand – and that was true whether they were taking the drug or taking a placebo."

He was a chief investigator in the Anglo-Scandinavian Coronary Outcomes Trial (ASCOT) , a part of which was stopped early after three-and-a-half years because the emerging benefits of statins were so great it would have been unethical to continue offering half the participants placebo pills.

"But when we stopped we said to them we are going to offer you statins until the original planned end of the trial, another two-and-a-half years," says Professor Sever. "About two thirds said yes, and they were all followed up in the same way. Every time they came to the clinic they were asked how they were, had they had any side effects. In the blinded part of the trial – when people didn't know if they were getting a statin or a placebo – we couldn't detect any excess muscle problems. But as soon as they knew they were taking a statin, there was a 40 per cent increase in complaints of muscle-related symptoms."

All that had changed was that participants now knew they were taking a statin, when earlier they

9k

lives are thought to be saved each year in the UK by the use of statins

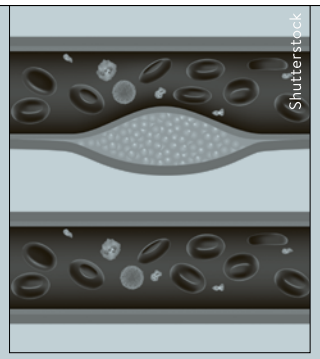
WHY DO I NEED STATINS?

YOU MAY BE GIVEN A STATIN IF YOU HAVE

- HAD A HEART ATTACK OR STROKE
- ANGIOPLASTY OR BYPASS SURGERY
- ANGINA OR PERIPHERAL ARTERIAL DISEASE
- THE INHERITED CONDITION OF FAMILIAL HYPER-CHOLESTEROLAEMIA
- DIABETES
- A HIGH RISK OF DEVELOPING ANGINA OR HAVING A HEART ATTACK/STROKE

Source: British Heart Foundation

HOW DO STATINS WORK?



Statins lower cholesterol, a naturally occurring waxy substance that circulates in the blood. It is made by the body, particularly the liver, but also occurs in food. People with higher levels of cholesterol are more prone to heart disease, so efforts over decades were devoted to finding drugs to lower cholesterol. Many were tested and did indeed lower cholesterol, but had little or no effect on death rates.

Statins were the breakthrough. But since earlier cholesterol-lowering drugs didn't work, some experts believe that statins have other effects that may be equally important – stabilising the "plaques" that form in the arteries from excess cholesterol and preventing them from breaking away to block the flow of blood. Statins may also reduce levels of inflammation. Be that as it may, doctors still work on the assumption that lowering cholesterol is the key.

Other drugs exist for those who have high cholesterol levels, but cannot tolerate statins. Ezetimibe (Ezetrol) may be used on its own or in conjunction with statins. Evidence shows that when used with a statin it does add some value, but at considerable cost. It is used mainly for patients with inherited high cholesterol levels.

A new group of drugs, the PCSK9 inhibitors, are causing a lot of excitement. They are biological agents (monoclonal antibodies) which target a protein in the liver called proprotein convertase subtilisin kexin 9 (PCSK9) and greatly reduce levels of the harmful form of cholesterol.

Trials show they are powerful cholesterol-lowering drugs and, more importantly, there is early evidence that they reduce heart attacks or the development of heart failure. Two PCSK9 inhibitors are licensed in the UK, alirocumab (Praluent) and evolocumab (Repatha). The disadvantage is that they are expensive, at £4,000 per patient a year, and have to be given by injection every two or four weeks. NICE recommends their use only for a small group at extremely high risk and even then only after the manufacturers agreed to a price cut.

hadn't. "It's not exactly rocket science to deduce that complaints increased because there has been such intense media publicity about statin-related issues," he says.

Many doctors blame newspapers and TV, but the media did not invent the issue. Plenty of studies have been published in the medical literature that show higher rates of side effects than in the trials, but they use less reliable methods. It was one of these observational studies that led to *The BMJ* reporting in two articles that 18 to 20 per cent of statin-takers suffered side effects, claims since withdrawn because the original study that made them did not prove cause and effect. The problems it found were not imaginary and occurred while people were on statins, but the drug and the side effects could not be unequivocally linked.

> The trials show there is a very small increase in the risks of muscle problems, but it's absolutely tiny when you look at it in an entirely objective way

Publication in *The BMJ* and the resultant publicity led to an 11 to 12 per cent rise in people giving up statins in the UK, a study later showed, which could result in 2,000 heart-attack or stroke deaths over the next ten years that otherwise might have been avoided. Sir Rory warns: "The impact worldwide, given the international readership of *The BMJ*, may well be far greater."

Patients buffeted about in this war of words may well wonder what they should do, especially if they look at the information leaflet in their pack of statins and read that common side effects such as muscle pain "may affect between one in ten and one in a hundred patients". If the manufacturers say risks are that common, why should patients believe the trialists who say they are 100 times less likely? Are these leaflets wrong? "Yes, there is a need to review the kind of information provided to patients," Sir Rory concludes.

Share this article online via **raconteur.net**

COMMERCIAL FEATURE

ONE-STOP CENTRE OF EXCELLENCE

Royal Brompton & Harefield Hospitals Specialist Care aims to provide a world-renowned diagnostic centre

RB&HH SPECIALIST CARE

Creating a centre of excellence in the Harley Street medical area of London is no easy feat. When Royal Brompton & Harefield Hospitals Specialist Care, the private wing of the famous heart and lung hospital, became the first NHS specialist trust to open a facility there, huge MRI (magnetic resonance imaging) and PET (positron emission tomography) scanners had to be lifted by crane over the front wall and lowered into the six-storey building at 77 Wimpole Street.

Together with X-ray and ultrasound machines, the scanners are the heart of a new outpatient and diagnostic facility, located to provide convenient access for patients and clinicians in the capital. The PET-CT imaging service, which caters for cardiac, oncology and neurology patients, is one of only two in the UK that can perform rubidium cardiac imaging, which provides faster and more detailed imaging, and delivers a lower radiation dose to patients than comparable scans.

The trust has more than 30 years' experience in providing private care and this offering continues to grow. Patient choice is the key driver behind this – being able to see the specialist they choose, when they want, in addition to having all diagnostics at the one site, are important factors for patients.

AT OUR HOSPITALS DURING 2015-16

2k+ coronary angioplasties performed

190k outpatients treated

40k patients cared for on our wards

200+ transcatheter aortic valve implantations (TAVI)

While the private service caters to the needs of those who have medical insurance or choose to fund their care, it also plays another important role. The revenue stream that private care generates is invested back into the trust's NHS services, to continue to support the delivery of specialist heart and lung care to all patients.

The trust has two main London sites – Royal Brompton Hospital in Chelsea and Harefield Hospital near Uxbridge – both of which provide private care from more than 150 consultants across a whole range of cardiothoracic specialties. The trust has a long history of leading medical advances, including pioneering the UK's first combined heart and lung transplant, and the first implanted coronary stent. It is the country's largest centre for the treatment of adult congenital heart disease and has pioneered intricate cardiac surgery for new-born infants.

An independent analysis, published earlier this year, showed that researchers at the trust had more highly cited papers about respiratory care than any other trust in the UK and the joint-highest number in the field of cardiovascular medicine.

Experts working at Royal Brompton and Harefield Hospitals continue to pioneer new treatments for heart and lung disease. This year, for the first time in the UK, a patient with a leaking mitral valve in her heart, had it repaired at Royal Brompton without the need for open heart surgery, through the use of a new technology known as the Harpoon device. The minimally invasive procedure takes half as long to perform as open heart surgery and allows for a quicker recovery.

The Harefield team implant more left ventricular assist devices (LVADs), mechanical pumps to support a failing heart, than any other UK hospital. The trust, meanwhile, has one of the country's biggest centres for the implantation or renewal of pacemakers and defibrillators, last year implanting or renewing 3,395 of these life-saving devices.

It is this expertise and quality of care that encourages patients to seek treatment with Royal Brompton & Harefield Hospitals Specialist Care. Now, with the new Wimpole Street facility, the trust has extended its private service to be open six days a week, providing access to more than 50 leading consultants at this location. The aim, says Dudley Pennell, professor of cardiology, is to provide a one-stop diagnostic centre with globally renowned consultants.

A dedicated website – www.rbhh-specialistcare.co.uk – provides more details, and the facility to find a consultant and make an appointment

COMMERCIAL FEATURE

SAVING LIVES AND MONEY

*A medical device developed by Norwegian firm **Medistim** reduces the risk of graft failure in coronary bypass operations and can save the NHS money*

Coronary heart disease is not something many of us expect to suffer with. So for the two million people in the UK who have the condition, diagnosis can come as a huge shock.

Figures from the Office for National Statistics show it is now the leading single cause of avoidable death in Britain.

The burden of this condition on both patients and their families is huge. Patients often need medication as well as surgery to unblock the blood vessel and many doctors will recommend patients have a stent inserted.

But experts believe the most complicated cases should be offered a cardiovascular operation known as a coronary bypass graft or CABG instead. In the UK, around 20,000 patients a year have this type of surgery.

David Taggart, professor of cardiovascular surgery at the University of Oxford, says CABG is a good option for patients.

"There is overwhelming evidence that for most patients, CABG gives a better long-term outcome in terms of survival as well as a reduced risk of further heart attacks and the need for any more stents," he says. "But even though there is already overwhelming evidence for CABG, we should still ask the question, 'Could the results be even better?'"

Although CABG can provide astonishing results in patients with severe coronary heart disease, estimates suggest that between 5 and 11 per cent of grafts will fail. Often this is because surgeons are not aware the new graft they have just created does not work properly.

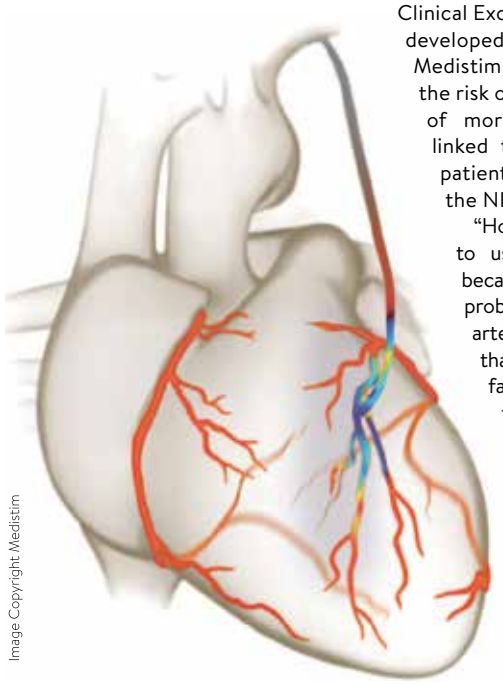


Image Copyright Medistim

Coronary artery bypass grafts use a section of a blood vessel taken from another part of the body such as the chest or leg. This is stitched to the coronary artery to create a bypass around a blockage, allowing blood to flow freely to the heart.

Key to the success of the operation is checking to see if blood is flowing properly through the graft before the patient leaves the operating room. The case for measuring blood flow during CABG is compelling.

A 2010 Canadian study by Kieser et al showed that measuring graft function using TTFM (transit time flow measurement) during the operation gave surgeons a score that indicated how well the surgery had gone. Grafts that scored above a five tended to leave patients at higher risk of a serious adverse event later. The study showed that major cardiac events occurred in 17 per cent of patients who scored highly compared with 5.4 per cent of patients with a lower score.

Following non-emergency surgery, 9 per cent of patients with the higher reading died compared with only 2 per cent who had the lower reading.

Using a scoring system during surgery was therefore pivotal to helping surgeons understand if they needed to make revisions to the grafts while the patient was still on the operating table.

According to guidance issued to NHS doctors in 2011 by the National Institute for Health and Clinical Excellence (NICE), a tool developed by Norwegian firm Medistim was shown to reduce the risk of graft failure and risk of morbidity and mortality linked to the operation for patients, while still saving the NHS money.

"Hospital teams may want to use the VeriQ system because it can reduce problems after coronary artery bypass graft surgery that are caused by graft failure and may reduce the length of time people need to stay in hospital," the NICE guidance states.

Despite this, most NHS hospitals have still not adopted use of the technology during CABG surgery. Currently, fewer than one in twenty operations in the UK assess the graft using the technology.

This compares starkly to Japan where more than 80 per cent of surgeons use TTFM and Germany where around 70 per cent of surgeons have adopted it.

Medistim has funded Professor Taggart to carry out research using their device on patients in Oxford.

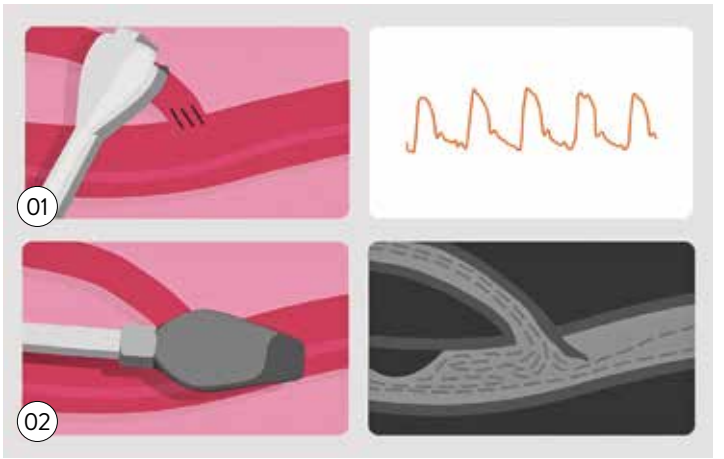
"The advantage of this device is that it allows the surgeon to prove they really have done a great job," he says. "In my research, we have found that about one in twenty bypass grafts have a problem that could be resolved while the patient is still in the operating room if the surgeon knew.

"But often the surgeon will not know that there is a problem until after the operation when complications can arise in either blood pressure or an abnormal ECG. In fact it may not become obvious until after the patient has left the hospital.

"It is well established that for one specific type of CABG graft, the mammary artery, it actually increases life expectancy. So it is intuitive to check that this graft really is patent before the patient leaves the operating room.

"The surgeon must be certain because the implications for the patient are so great. If it was me or my family having this operation, I would do my best to make sure the surgeon had checked the patency of the grafts before I left the operating room."

> The advantage of this device is that it allows the surgeon to prove they really have done a great job



01
Transit time flow measurement (TTFM) is used to verify graft function

02
Ultrasound imaging provides information from the inside of the vessel to check for possible obstructions of the blood flow

Medistim has more than 30 years' experience in making medical devices and their latest to come to market, the MiraQ system, is unique. The technology combines two types of probes to be used during cardiac surgery from the same system.

An ultrasonic imaging probe enables surgeons to decide where they should place the graft. The image allows them to detect and avoid areas of the aorta that are calcified or lined with soft plaques. This information is critical because dislodging the plaques can cause them to travel straight to the brain, triggering a stroke.

The second flow-measuring probe can then check that blood flow through the new graft is acting normally. The device sends ultrasound beams across the blood vessel and the return signal is analysed and displayed on a touch screen. Resulting data shows blood flow through the vessel in millilitres per minute and provides readings that indicate if the graft has been successful.

Professor Heinz Jakob, director of the Department of Cardiothoracic Surgery at the West German Heart Centre in Essen, has used TTFM for almost two decades.

"This device creates a safety net for surgeons and it saves the lives of patients. It is a really important tool for our staff, especially when training young cardiac surgeons in indicating low bypass flow in case of anastomotic mistakes, thus helping to prevent infarction," he says.

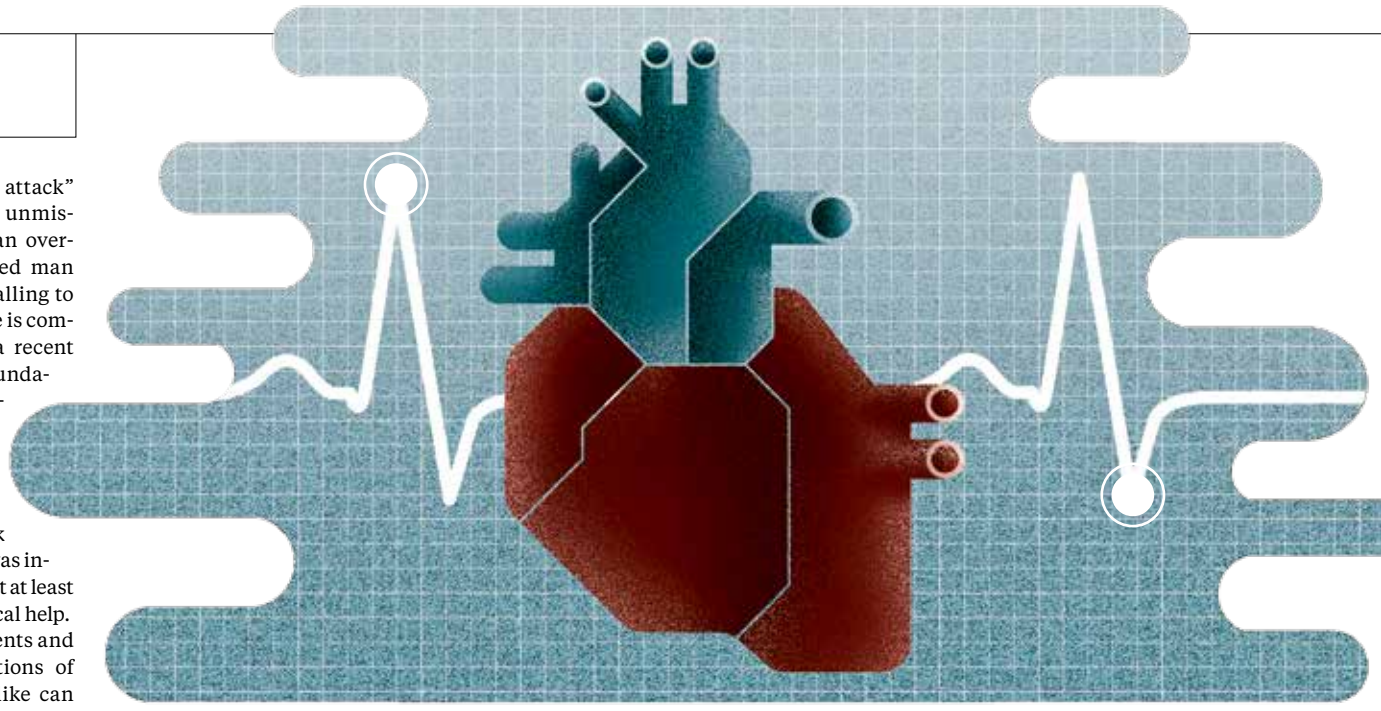
"The new imaging device enables us quickly to find hidden coronary arteries in re-do situations and adds visualisation of anastomoses to pure flow measurement, an additional step forward for safety. Surely it is in the interest of surgeons to get the best result possible for their patients?"

For more information please visit medistim.com

Learning to spot signs of a heart attack

Prompt diagnosis of a heart attack and other cardiac conditions can radically improve the patient's chances of survival and limit serious damage, but symptoms can be hard to spot

MISDIAGNOSIS
VICTORIA FLETCHER



The words "heart attack" conjure up the unmistakable image of an overweight, middle-aged man clutching at his chest and falling to the ground. While this scene is common in Hollywood films, a recent poll by the British Heart Foundation (BHF) showed the reality is very different.

Up to eight in ten patients said they didn't immediately realise their symptoms were of a heart attack and one in three believed it was indigestion. This led half to wait at least an hour before seeking medical help.

The problem for both patients and medics is that misconceptions of what a heart attack looks like can translate into misdiagnosis.

Recent research from the University of Leeds, charting the fortunes of 600,000 heart attack patients from when they first saw a medic to their discharge from hospital, found three in ten were initially misdiagnosed. The research also showed this was 50 per cent more likely to happen to women than men.

Chris Gale, associate professor of cardiovascular health sciences and honorary consultant cardiologist at Leeds who led the research, says misdiagnosis wastes valuable time and can ultimately cost lives.

"Of patients who had a heart attack and were initially misdiagnosed, we found a 70 per cent increased risk of death within 30 days," he says. "This meant the death rate for this group rose from 2.25 per cent to 4.2 per cent."

While well-known heart attack symptoms include pain or tightness in the chest, nausea, vomiting, light headedness, sweating and shortness of breath, heart attacks can manifest in a far wider variety of forms, especially in women. This can include severe anxiety, discomfort in the stomach, back, neck or jaw, palpitations and fatigue.

Dr Mike Knapton, associate medical director of the BHF, says understanding the array of symptoms is particularly important for women.

"There is still a perception women get breast cancer and men have a heart attack. But women simply get heart disease later in life," he says. "If they do have a heart attack, they may not recognise the symptoms because they don't have tight chest pain and it can be more subtle. Sociologically, women are often the main carers and are used to looking after others, and so they might not take their own symptoms as seriously."

Lisa Price, 44, from County Durham, suffered a heart attack aged just 38 while in hospital recovering from an ankle operation. She was misdiagnosed for four hours.

"I was waiting to be discharged when I started to get this burning pain in my chest. The nurses thought I was having a reaction to the anaesthetic from my operation and so gave me paracetamol, but it got worse and worse until it felt like a cannonball was being pushed through my ribcage. Eventually I was given an ECG that came out normal and then a blood test that was also inconclusive. Further tests showed a blood clot had triggered a heart attack, but by this time I'd suffered damage to the front left wall of my heart leaving me with heart failure."

Around 50,000 men and 32,000 women have a heart attack every year in the UK. Despite being relatively common, it can still be hard for emergency medical professionals to spot the signs of heart attack before a patient gets to hospital.

Although many will carry out an ECG heart rate monitor to diagnose heart attack patients before they get to A&E, a 2014 study in the journal *Heart* showed this only occurs in just over half of patients.

Even then, an ECG only provides an absolute diagnosis of the most serious type of heart attack, known as a STEMI (ST-segment elevation myocardial infarction), when the coronary artery is completely blocked. The more common type of heart attack, known as an NSTEMI (non-ST-segment elevation myocardial infarction), in which the artery is partially blocked, can yield a normal ECG.

Patients who are misdiagnosed at this critical stage often miss out on the vital medications and emergency surgery needed to limit the damage done to their heart muscle.

"Heart attack patients who have a change in diagnosis are less likely to get the guideline care they need quickly, including aspirin, heart scans and even surgery to unblock arteries. They may not receive rehabilitation or be under the care of a cardiologist," says Professor Gale.

Even a relatively new blood test that has transformed the rapid diagnosis of heart attack is not infallible. The troponin test detects protein biomarkers released during a heart attack, but analysis suggests the results are not always accurate for women. Scientists are now working to fine-tune the test for women.

The BHF points out that it is not only heart attack that can be hard to diagnose quickly. High blood pressure, an irregular heart beat, known as atrial fibrillation, and inherited cardiac conditions are often underdiagnosed.

> Heart attack patients who have a change in diagnosis are less likely to get the guideline care they need quickly

"We know that around a third of people with high blood pressure have been diagnosed, but that means two-thirds have not. These people are at increased risk of stroke, heart attack and kidney disease," says Dr Knapton.

Atrial fibrillation can also be missed because the irregular heartbeat does not always occur when the patient is being monitored. Other conditions, such as heart valve disease, can be caused by birth defects, disease or simply through ageing. Like heart attack, the vague nature of symptoms, such as shortness of breath and tiredness, can delay diagnosis.

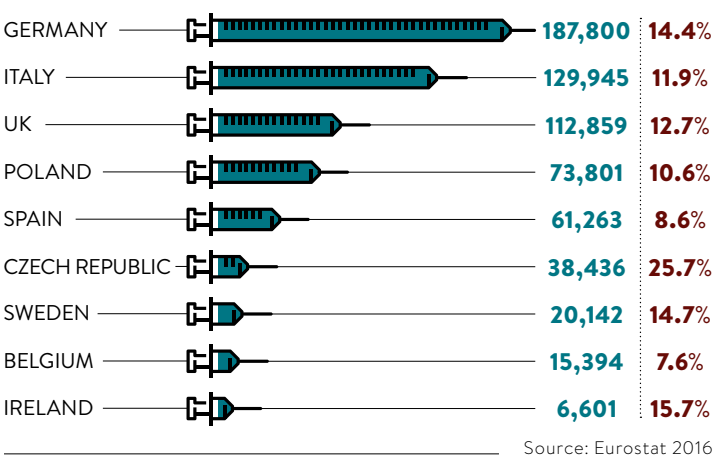
Despite the hurdles, NHS England says heart patients have seen huge improvements in care thanks to greater access to medications and an increase in the number of hospitals capable of providing coronary angioplasty, the emergency operation needed to open arteries and regain blood flow after heart attack.

In June, NHS England also unveiled new technologies for heart patients, including a device that can be strapped to a smartphone and can detect an irregular heart beat. They also have plans to increase awareness of the various symptoms of heart attack in a bid to boost survival rates.

According to an NHS England spokesman: "Survival rates for heart attacks are the best they have ever been, and swift diagnosis and treatment are key. We are working hard to improve tests for accurately diagnosing heart attacks in both men and women so correct treatment can begin without delay, ensuring the best possible recovery for patients. We are also working to increase awareness of signs and symptoms of heart attack, among both the public and healthcare professionals, as this will help speed up diagnosis."

8 in 10
patients didn't immediately realise their symptoms were a heart attack

HEART ATTACKS IN SELECTED EU COUNTRIES



Source: Eurostat 2016

COMMON SIGNS OF A HEART ATTACK

Source: British Heart Foundation

01 CHEST PAIN
02 PAIN IN ARMS/ NECK/JAW/ BACK/STOMACH
03 SWEATING
04 FEELING LIGHT-HEADED
05 BEING SHORT OF BREATH
06 FEELING NAUSEOUS OR VOMITING

COMMERCIAL FEATURE

BREAKTHROUGH IN HEART VALVE SURGERY...

A surgical innovation is helping a generation back on their feet and leading to reduced hospital stays for the growing population of heart valve disease patients

LivaNova
Health innovation that matters

With an ageing population – UK government statistics estimate the over-65 age group will grow from 11.4 million (18 per cent) currently to 17.5 million (almost 23 per cent) by 2039 – more patients are needing replacement heart valves.

The Perceval, a completely sutureless aortic valve replacement, is now a regular option and its breakthrough design enables surgeons to replace a diseased valve efficiently without the need for stitches, thus reducing operating time and aiding the recovery process.

The distinctive device, designed by LivaNova, has been deployed more than 20,000 times since it won approval, and the results are being welcomed by physicians and patients.

Aortic stenosis, the narrowing of the valve which forces the heart to exert greater force to circulate blood, is the most common heart valve disease and has a mortality rate of 30 to 50 per cent in severe cases within a year of diagnosis. The charity Heart Valve Voice believes more than one million people in the UK have heart valve disease.

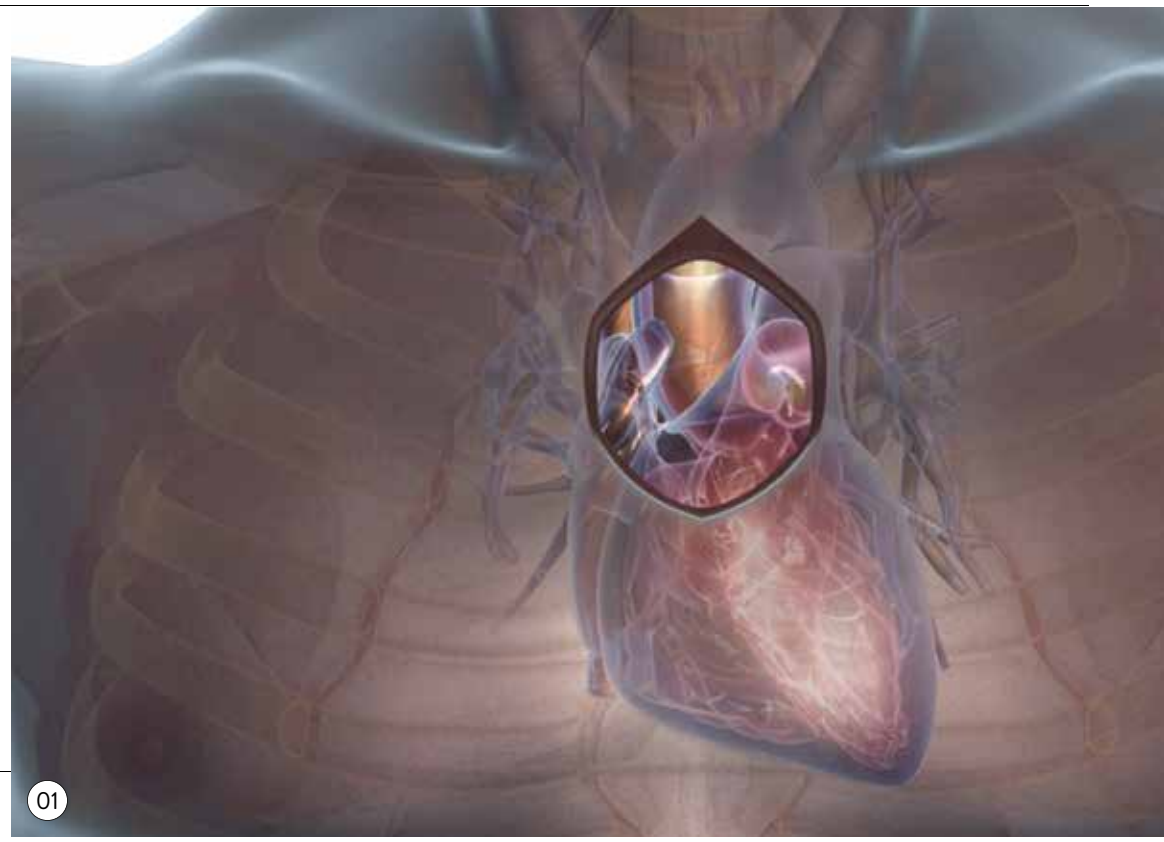
"A common operation is to replace the aortic valve in the heart," says Professor Stephen Clark, consultant cardiothoracic surgeon at the Freeman Hospital, Newcastle upon Tyne. "A significant proportion of valves can get narrowed down, thickened and calcified – age is one of a variety of causes along with high cholesterol and high blood pressure. With an ageing population, we are having more and more patients coming to see us in their late-70s, late-80s even, with a narrowed valve looking to have it replaced.

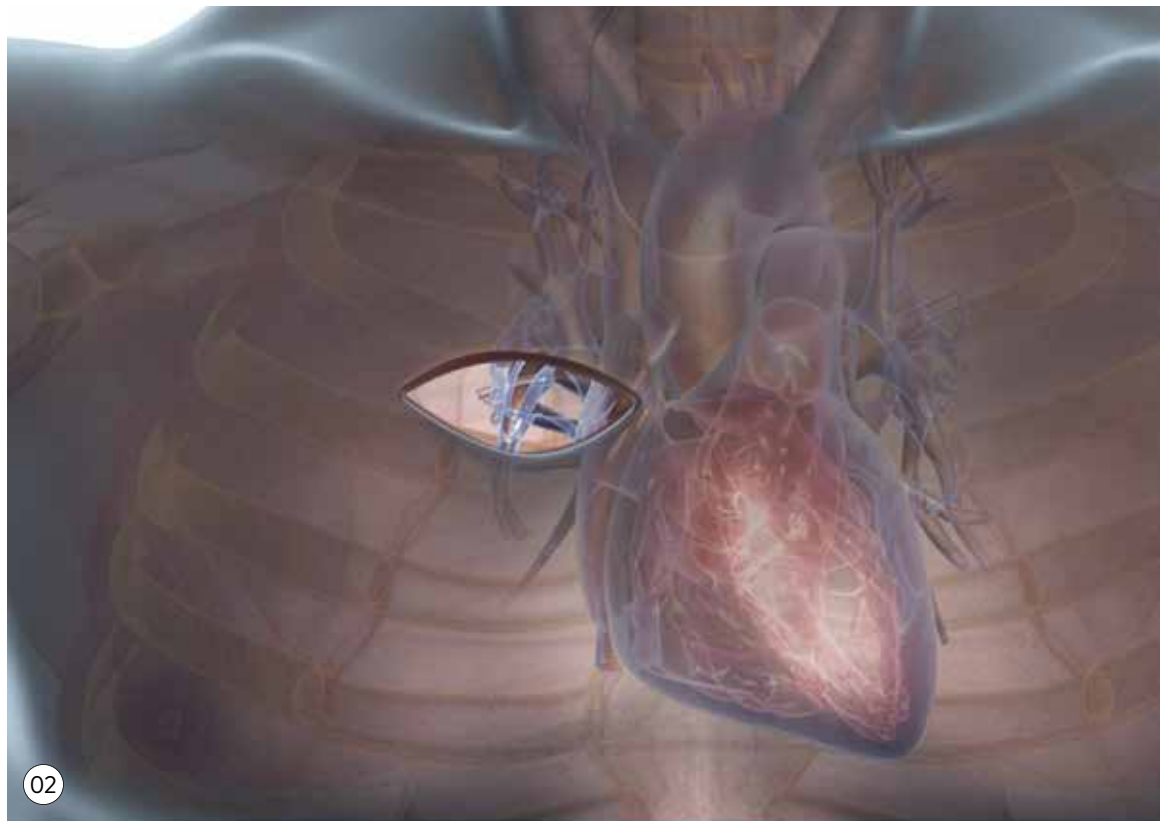
"Aortic stenosis will cause patients to be out of breath – people sometimes collapse without warning – and chest pain. It shortens your life and the only option is to replace the hardened, narrowed valve, normally with major open heart surgery."

Traditional valve surgery can involve the patient being put on a heart-lung machine and having their heart stopped for up to 60 minutes – known as cross-clamp time – while the diseased valve is removed, the replacement positioned and sewn into place.

"The advantage of the Perceval valve is that we don't put any stitches into it at all," says Professor Clark. "It comes collapsed so we just take the patient's valve out and lower this valve in and, literally with the press of a button, the valve expands itself into place and is stable in that position. There is no need for stitches.

"We then take a small balloon, pass that into the valve and inflate it for 30 seconds to finally expand the valve into place. What would have taken us an hour takes us 20 to 30 minutes. The saving is in the time the patient's heart is stopped and the time they are on the heart-lung machine is cut down by at least a half."


01


02

01 Ministernotomy approach for aortic valve procedures

02 Right anterior thoracotomy approach for aortic valve procedures

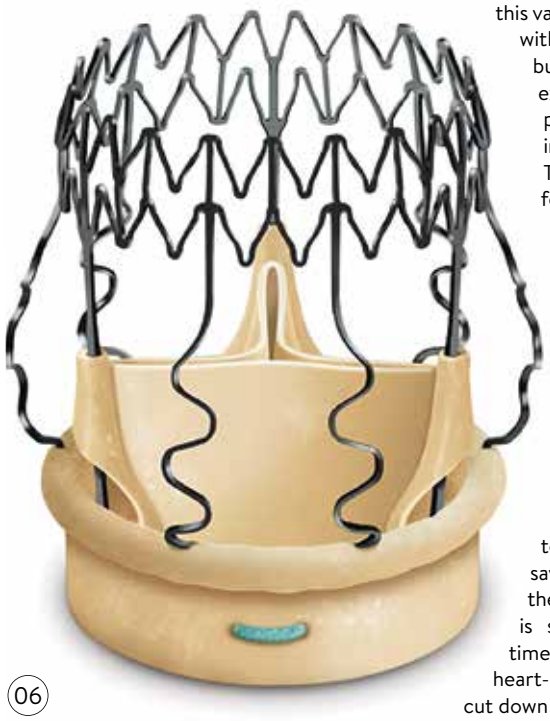
03 Enhanced visibility

04 Precise and reproducible deployment

05 No need for permanent suture

06 Perceval, the truly sutureless valve

07 Professor Stephen Clark Consultant cardiothoracic surgeon Freeman Hospital Newcastle upon Tyne


06

23% of the UK population will be in the over-65 age group by 2039

Source: HM Government

Other research reported that the Perceval had a significant reduction in the cross-clamp time of about 60 per cent. The reduced operating time has a direct influence on potential complications such as kidney failure, bleeding and breathing difficulties, according to Professor Clark.

He adds: "Because the valve can be implanted quickly and we don't need to be on the bypass machine for so long, all of those complications and problems are reduced so patients who are high risk because they are elderly or they have other diseases can now have this operation with a higher margin of safety. Because of its rapid deployment, the mortality goes down, the stroke risk is reduced, and the length of stay in intensive care and in hospital is shortened, so the patients are recovering better than would normally be expected."

The Perceval, constructed to adapt to the movements of the aorta during the cardiac cycle, is smaller than other replacement valves, which have an added sewing ring to fix them into place. This makes it suited to minimally invasive surgery where a faulty valve can be removed and the new one precisely positioned through very small incisions.

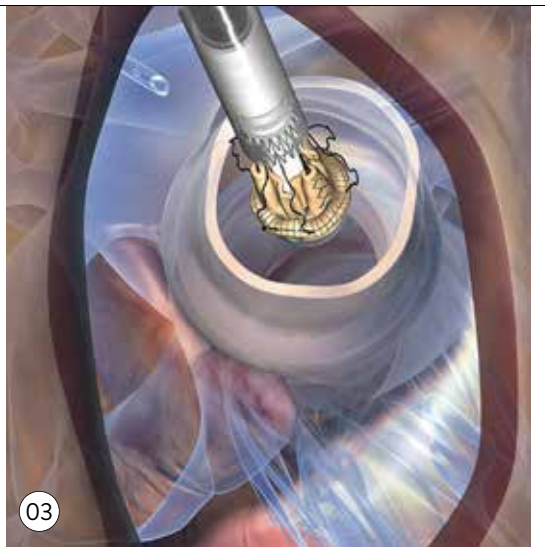
"Conventional valves have the leaflets of the valve within a strut and also a sewing ring so the area which the blood can go through is reduced," says Professor Clark. "An advantage of the Perceval-type device is that you don't need the sewing ring, so all the area is the valve and you have a greater orifice area through which the blood can go so the pressure gradients across the valve are very low making it more efficient than conventional valves."

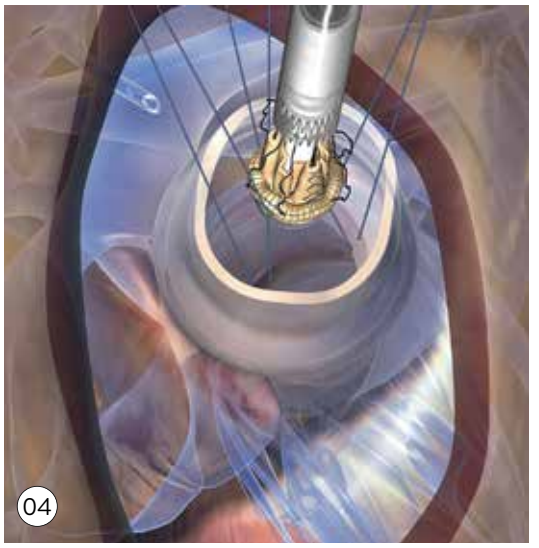
As well as boosting recovery rates, improved operating times free up hospital theatres for more procedures.

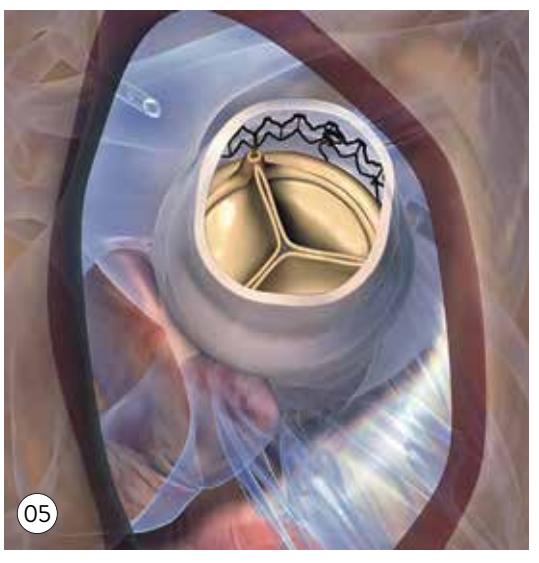
More than 150 clinical papers have reinforced Perceval's positive impact on operating time, haemodynamics, transfusions, post-operative hospital stays and healthcare costs. A recent paper, written by an expert consensus panel and published in a major European journal, confirmed the excellent results of this new valve technology and its potential for wider application in both routine and very complex cases.

> "The Perceval's breakthrough design enables surgeons to replace a diseased valve efficiently without the need for stitches, thus reducing operating time and aiding the recovery process

COMMERCIAL FEATURE







The prevalence of heart valve disease increases with age and, according to a 2011 study by Spaccarotella et al, 2 to 7 per cent of those aged over 65 have aortic stenosis. Heart Valve Voice is concerned there may also be undiagnosed heart valve disease.

"Having heart valve disease is a hugely worrying time for the patient and their families, and there is angst among patients, who are elderly and have a lot of other diseases, about the outcome and complications," says Professor Clark. "But this technology offers reassurance regarding what we can do to reduce those problems, and less time in hospital or intensive care means they can get back home to rehabilitate sooner and the recovery process is quicker.

"It is a significant technological advance which brings the benefits of reduced operating times and the reduction of intensive care and hospital stay, allowing us to be more efficient and be very cost effective – and that benefits the patients in terms of reducing their risks and speeding up their recovery."

For more information please visit www.livanova.com

ANN FINLAY: BACK WALKING HER DOGS

Active 81-year-old Ann Finlay loves to walk her dogs Tara and Barney across the moor near her Cumbrian home, but it is a delight that was in peril when she was diagnosed with a heart valve that was 90 per cent dysfunctional.

Ann, who had enjoyed good health throughout her life, had been suffering from moments of breathlessness and chest pain when she booked an appointment at her GP surgery.

"I was finding it was becoming more difficult to walk any distance without getting pains in the chest and getting short of breath," says Ann, who lives near Carlisle with her retired antique dealer husband Michael, also 81. "The doctor said it was 90 per cent dysfunctional and it was going to conk out if they didn't do something.

"I'd had a hip replacement ten years ago, but was in reasonably good health, so they said I should have the valve replaced. I wasn't too stressed about it because I have friends who have had the operation."

A further examination revealed that Ann needed a single bypass procedure at the same time and Professor Stephen Clark performed the operation in Newcastle upon Tyne, using a Perceval valve, earlier this year in March.

"I went in for assessment and tests about ten days before the operation date and was then admitted to hospital for the operation," says Ann, a former nurse who worked with terminally ill patients.

"It went very well and I felt all right after the operation. The most immediate thing was that there was no more pain in the heart and the breathlessness gradually got better over a period of about a month.

"I was in hospital for four days after the operation, but felt I recovered quickly once I came round form the anaesthetic and its effects wore off. The rehabilitation went well, and every day I felt better and stronger."

Her recovery suffered a temporary setback with a bout of shingles, but Ann, who has three daughters and five grandchildren, believes her revitalised heart helped her cope with the condition and continue with her positive recovery.

> The most immediate thing was that there was no more pain in the heart and the breathlessness gradually got better

Free from the breathlessness and concern that goes with it, she is now back enjoying walks with rescue dogs, eight-year-old Tara, a skittish greyhound with a Border Collie phobia, and four-year-old Barney, a Coton de Tulear.

"I feel the benefit of the surgery and I'm more positive. I now look forward to walking my dogs around the moor," she adds. "The hospital and the doctors were very good at providing information and telling me about the operation, but I didn't realise it was a new type of valve. All I know is that it works and I feel a lot better.

"It is well worth it if you feel you can trust your surgeon, which I did very much. It makes you feel a lot better, more energetic and more positive about life."

FRED ALLEN: WALKING AND CYCLING AGAIN

Striking out across a six-mile trail is not the most obvious recuperative choice for an 80 year old, who has just had a heart valve replaced. But Fred Allen was determined to return to active life as soon as possible after the procedure of removing a faulty valve in favour of a Perceval.

The operation, conducted by Professor Clark at the Freeman Hospital, Newcastle, was a success and former newspaper print hall worker Fred is now back to his active self.

"They say you should get out and walk as soon as you can, and I was only in hospital for four days after the operation," says Fred, who lives with his wife Margaret, also 80, near Carlisle. "We went on holiday shortly after the operation and did a stretch of Offa's Dyke. It was only six miles of it, but it was a bit of a walk so soon after and I was delighted to do it."

Fred, who took early retirement after 30 years working in Manchester, enjoyed a sporty lifestyle playing cricket and football regularly, and getting trials for Lancashire County Cricket Club as an all-rounder.

"I played for Middleton in the Central Lancashire League and I was always a good fielder because I could move around the field. I didn't get through the trials, but I love sport and carried on playing cricket in the summer and local league football in the winter," he says.

He also walked the 603 miles from John O'Groats to Land's End to raise money for one of his sons to go on a charity trip to Pakistan. "I was in my mid-50s then, and I've always kept active and enjoyed good health," he adds.

> I'm walking almost four miles every day and I'm still cycling at 80. I'm happy about the way I feel and hope I keep going

Fred and Margaret moved from the family home in Heywood, north Manchester, where they brought up five children, now aged 42 to 55, to Carlisle to be near two of their sons, and they renovated their new home.

"It needed a lot doing to it, but I was as fit as a fiddle and worked on it with my son who was a fireman," he says. "That was about ten years ago and everything was fine, but I started to slow down about four years ago and I suppose that is old age.

"I went to the doctor at Carlisle Hospital and he wasn't happy with my heart, and wanted other people to have a closer look at it, and eventually they decided that I should have the operation.

"They looked after me really well and said I could go home on the fifth day. I wouldn't say it makes you a completely new man, because I'm 80 years old, but I am happy.

"I'm walking almost four miles every day and I'm still cycling at 80. I'm happy about the way I feel and hope I keep going."

Gathering local information ir

With healthcare systems around the world facing a shared problem of increasing demand and stretched resources,

GEOSPACIAL TECHNOLOGY

MARTIN BARROW

Worldwide those responsible for increasingly complex health systems are searching for new ways to provide effective health and social care solutions in a challenging economic environment. From Dublin to Riga and from Lima to Kuala Lumpur, the same question is being asked: how to do more with less?

Public health officials have always understood that their effectiveness depends, to a large extent, on the quality of the information at their disposal. Their mission is being transformed through access to powerful datasets collected at an increasingly local level. These datasets can be mined for information that allows the targeted delivery of care and support in the most efficient way. Common technology platforms make it possible for this information to be shared globally, allowing different jurisdictions to fast-track the learning process.

> The application of GIS has resulted in groundbreaking studies that reveal significant variation in morbidity rates from cardiovascular disease

In recent years geospatial technology has emerged as one of the most effective tools in tracking and preventing diseases. Health professionals, epidemiologists and government officials have been tracking communicable diseases such as West Nile virus and Ebola on a global scale using a variety of tools. Now geospatial technology, such as GIS (geographic information system) and GPS (global positioning system), is being applied to non-communicable diseases including cancer, diabetes, obesity and cardiovascular disease to equal effect.

The growing epidemic of chronic diseases is driving an urgent need for analysis and measurement to support their identification and treatment. Geospatial surveillance facilitates the integration of knowledge and open-source data to the benefit of multiple agencies.

The United States is leading the way in the application of GIS to track and prevent cardiovascular disease through the Centers for Disease Control and Prevention. These have fostered a policy of innovation and collaboration across the US, where cardiovascular disease has been identified as a high priority in the battle to reduce the number of avoidable deaths. In the US, heart disease is the leading cause of death for both men and women. Heart disease accounts for one in every four deaths, with someone in the US suffering a heart attack every 42 seconds. It costs the US more than $200 billion every year, including the cost of health care services, medication and lost productivity.

The application of GIS has resulted in groundbreaking studies that reveal significant variation in morbidity rates from cardiovascular disease. Mapping the location of people hit by the disease can give new insights into possible risk factors, including lifestyle and the environment. It also informs the development of targeted health initiatives and preventative measures, and reduces healthcare costs.

At the local level, geospatial surveillance can be more effective than at county or state level. For example, GIS helps to understand the poor uptake of some services. Mapping these areas at a community level shows walking distances, the number of fast food outlets, public parks, recreation facilities, healthcare centres, fitness gyms and other environmental factors that have a major impact on the risk of cardiovascular disease.

In the US, Rhode Island implemented a geospatial programme that studied risk factors at the neighbourhood level. Researchers found that people living in poorer areas were more likely to be exposed to advertisements for smoking and have easier access to cigarettes. The research looked at a total of eight cities and towns in the state to identify the number of tobacco vendors, price incentives, illegal sales and tobacco proximity to young people. The findings showed that children in poorer neighbourhoods were exposed to a much higher rate of tobacco vendors, often operating in school zones.

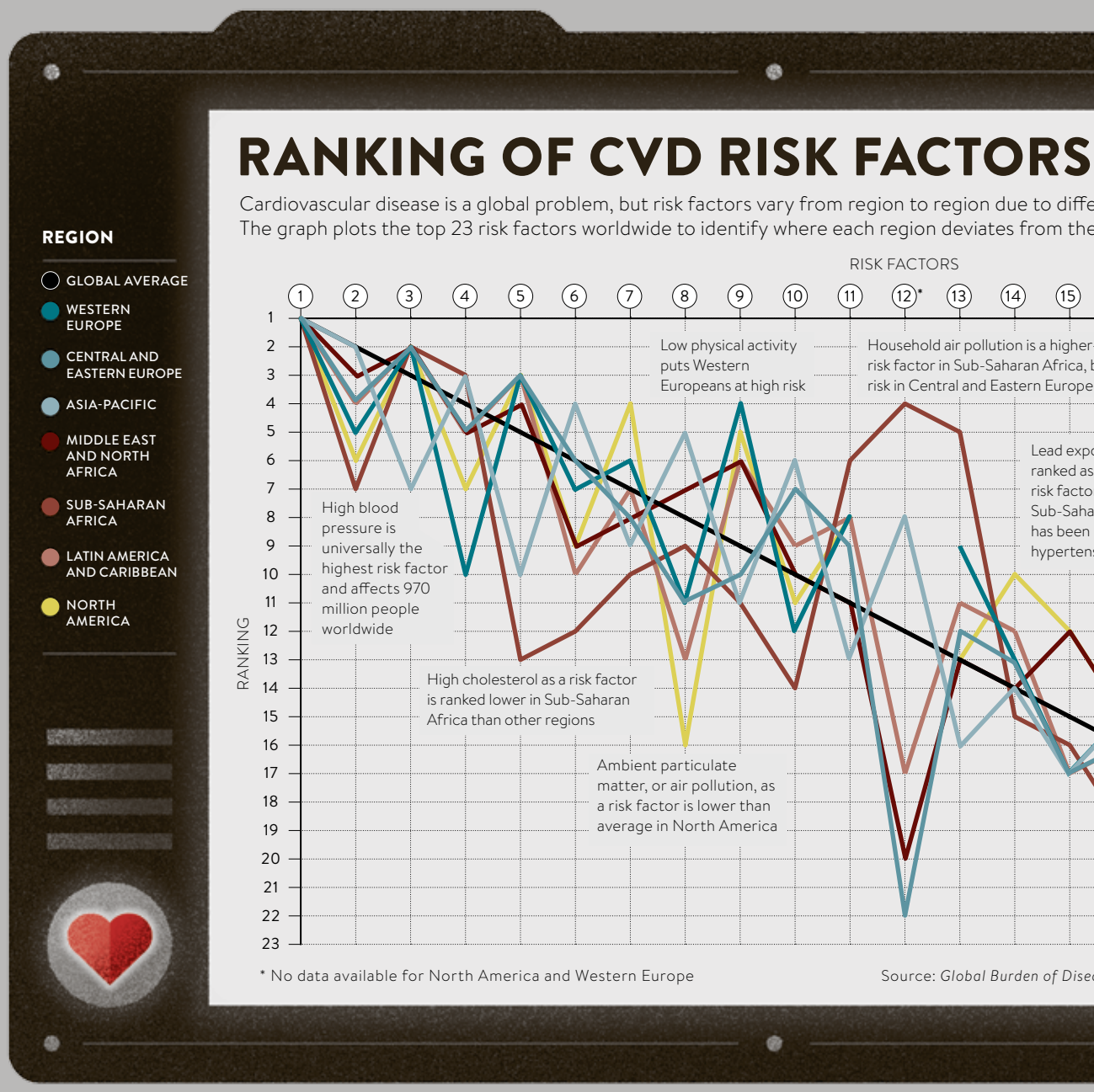
These findings prompted legislators to advocate for initiatives to reduce the number of smoking advertisements and products, and to implement plans to prevent cardiovascular disease in these areas.

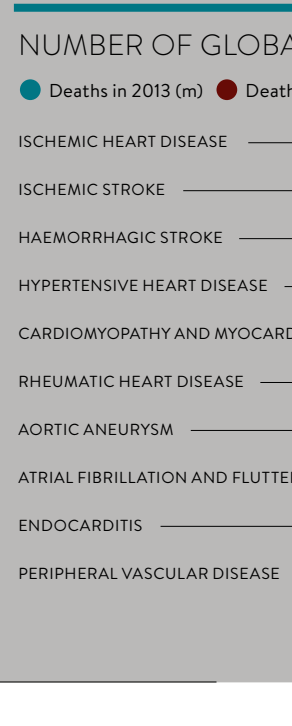
At a time of global concern about the rising financial burden of healthcare, the cost-cutting implications of GIS in the fight against cardiovascular disease are significant. Using spacial data gives an opportunity to apply evidence of what works to design care and support in neighbourhoods where they are most needed, mitigating the risk of wasting resources. However, consideration must be given to some of the significant costs associated with GIS including employee training. Resources are required to train healthcare staff to enter data at the user level. Employee turnover is also a concern because typically there are only ever a small number of healthcare employees with the relevant skills and knowledge.

As with most computer-based technology, security is a concern. Patient data, confidentiality and other privacy concerns are significant. Security breaches, improper access to records and third-party reviewers are the main concerns. Geocoding mitigates some of the risks, but it is still imperative to secure software and hardware. Larger healthcare facilities are likely to have IT departments to assist with compliance, but smaller facilities may be exposed to risk. This represents a problem for open-source GIS with many different users in remote locations. Many US healthcare facilities are unaccustomed with the level of security breaches that other business sectors typically face.

The use of GIS in public health in the UK is also becoming more prevalent and is helping the NHS to address some of the concerns about its ability to harvest data to the benefit of patients. Public Health England (PHE) is instrumental in promoting and supporting the use of spatial analysis through its Public Health GIS Unit, based at the University of Sheffield, and works with a number of partners within the academic and NHS sectors.

Much of the unit's work has a direct impact on the understanding of cardiovascular disease at a local level. Current research includes alcohol outlet density and alcohol-related harm, a project funded by the Medical Research Council, and hospital admissions for vascular surgery, with funding from the National Institute of Health Research. PHE also undertakes training focused on the application of GIS and spatial epidemiology to public health.





n bid to tailor prevention plan

, geospatial technology could hold the key to tackling and preventing cardiovascular disease

AL CVD-RELATED DEATHS 1990-2013

ns in 1990 (m)		Percentage change	Change due to population growth
8.14	5.74	+41.7%	23.6%
3.27	2.18	+50.2%	21.6%
3.17	2.4	+30.7%	26.8%
1.07	0.62	+74.1%	29.5%
0.44	0.29	+51.4%	27.4%
0.28	0.37	-26.5%	31.8%
0.15	0.1	+52.1%	34.5%
0.11	0.02	+288.1%	35.4%
0.06	0.04	+46.3%	42.2%
0.04	0.01	+155.3%	53.7%

Source: *Global Burden of Disease Study*, Institute for Health Metrics and Evaluation 2015

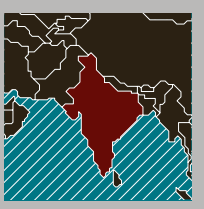
HEART DISEASE WORLDWIDE

BRAZIL

CVD accounts for about 26 per cent of total adult deaths. Around one-fifth (18 per cent) of adults are obese. Almost a fifth (17 per cent) of the population smoke tobacco. More than 40 per cent of men and over 50 per cent of women get insufficient exercise. Some 8.8 per cent of women and 7.4 per cent of men live with diabetes.

CHINA

CVD accounts for about 39 per cent of total adult deaths. One in five adults has a cardiovascular disease, one of the highest CVD death rates in the world. Some 28 per cent of adults and half of all men smoke tobacco, while 5.7 per cent of adults are obese. Cardiovascular events are projected to increase by 50 per cent among the population between 2010 and 2030.

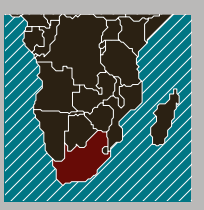


INDIA

CVD accounts for about 16 per cent of total adult deaths. Some 15 per cent of the population smoke tobacco. Some 21.1 per cent have hypertension which can increase risk of heart attack, heart failure, kidney disease or stroke. India was the first country to develop specific national targets and indicators aimed at reducing the number of premature deaths from non-communicable diseases by 25 per cent by 2025.

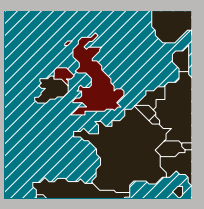
MEXICO

CVD accounts for about 18 per cent of total adult deaths. Some 32.1 per cent of adults are obese and 17 per cent of the population smoke tobacco. In 2014, Mexico introduced a new tax on sugar-sweetened drinks to combat obesity. In the first year, on average, people purchased 6 per cent fewer sugar-sweetened drinks than would have been expected. These changes were most pronounced in households with the lowest incomes.



SOUTH AFRICA

CVD accounts for about 8 per cent of total adult deaths. Some 31.3 per cent of adults are obese and 18 per cent of the population smoke tobacco. In February, South Africa became the first African country to announce plans to introduce a new tax on sugar-sweetened drinks, coming into effect in April 2017. In 2013, the government introduced legislation aimed at reducing salt intake to less than 5g a day per person by 2020.



UNITED KINGDOM

CVD accounts for about 28 per cent of total adult deaths. Some 26.9 per cent of adults are obese. An estimated 30 per cent of children are overweight or obese. More than a fifth (22 per cent) of adults smoke tobacco. The economic burden of CVD, including indirect costs from premature death and disability, is estimated to be more than £15 billion each year.

UNITED STATES

CVD accounts for about 28 per cent of total adult deaths. About 69 per cent of adults are overweight or obese. Some 19 per cent of men and 15 per cent of women are smokers. Some 30 per cent of adults do not participate in any leisure-time physical activity. The number of overweight children has doubled and the number of overweight adolescents trebled since 1980.

URUGUAY

CVD accounts for about 25 per cent of total adult deaths. A quarter (24.8 per cent) of adults are obese. A quarter (25 per cent) of the adult population smoke tobacco. Uruguay was the first country in Latin America to ban smoking in enclosed public spaces. More than a third (35.1 per cent) have hypertension.

Source: World Health Organization

From mechanics to hi-tech innovations

Ingenious medical devices and surgical instruments have helped improve survival rates among patients with life-threatening heart conditions

MEDICAL DEVICES
DANNY BUCKLAND

Heart surgery was once a breath-holding grand production that reduced hospitals to a near-reverential silence. Survival rates were poor and short-lived as surgical brilliance wrestled with the frontiers of medical possibilities.

Man and mechanics have had to work in harmony, and a significant element of the first successful open heart surgery in 1952 was the technology provided by General Motors (GM), which manufactured the machinery that allowed a mitral valve to be replaced.

While classic car models, such as the Ford Mustang and the Chevrolet Impala, rolled off the Detroit production lines by the millions, its medical technology department was developing the engineering crucial to saving lives. It did not last, but set a template for design and innovation that has kept pace with advanced physiological understanding and provided the tools that now make heart surgery an everyday event rather than a rarity.

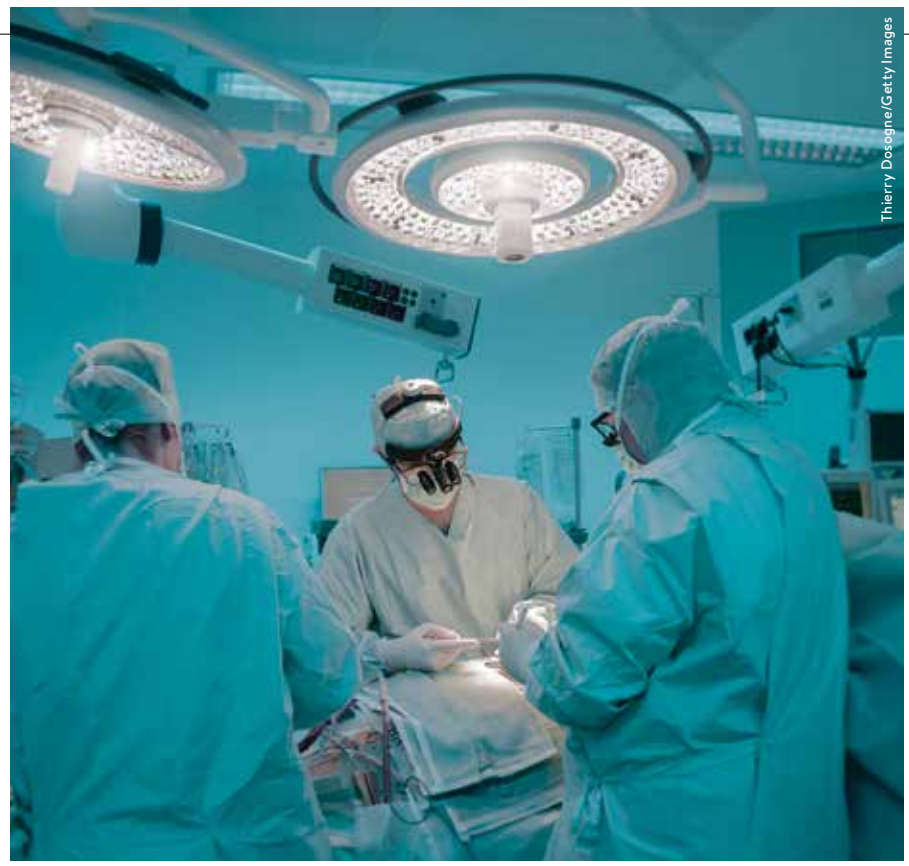
GM's mechanical heart pump, configured like a car engine with distinctive cylinders, now has a hallowed place in the Smithsonian Institution, underscoring the importance of devices to medical achievement.

Latest figures show that 36,000 heart operations took place in England and Wales in 2014 and the number is likely to rise as the UK's ageing population checks in for regular heart procedures. The highest annual demand was in the 65 to 69 age group with 49,470 episodes of care, almost double the 50 to 54 age group, according to NHS Digital.

The over-65 age group is predicted to hit almost 23 per cent, or 17.5 million, of the population by 2039, up from current levels of 18 per cent and 11.4 million respectively.

Dr Mike Knapton, associate medical director of the British Heart Foundation (BHF), crystalises the issue. "The ageing population and the gratifying improvement in heart attack survival rates, has seen a record number of heart failure hospital visits in a decade – a 36 per cent increase," he says. "This puts an excess strain on the NHS and we urgently need to fund more research to prevent heart attacks, improve treatments for heart failure, and find ways to reduce and repair the damage caused by a heart attack, to improve outcomes for patients."

BHF figures show that UK healthcare costs for cardiovascular disease (CVD) reach £11 billion every year, so faster diagnosis, more effective treatments, and reduced operating times and hospital stays, particularly in £1,500-a-day-plus intensive care, are imperative.



Thierry Dosogne/Getty Images

University of Cambridge

Medtronic

RIGHT
Medtronic's Micra Transcatheter Pacing System is the world's smallest pacemaker, implanted directly into the heart without the use of leads

TOP RIGHT
Prototype of a flexible polymer valve being developed by the University of Cambridge

> Medical devices for heart surgery continue to benefit from leading-edge technology such as virtual reality, 3D printing and heart pacemakers measuring just an inch long

36%
increase in the number of heart failure hospital visits in a decade

The latest breed of implantable device, such as Medtronic's Micra Transcatheter Pacing System, come with a hefty price tag of around £7,500, but many believe that leadless pacemakers will be standard in the future, particularly as big companies St Jude Medical and Boston Scientific have also developed versions.

Minimally invasive surgery, using laparoscopic or advanced surgical tooling, has also been instrumental in improving mortality and, critically, reducing hospital stays for open heart surgery from 2.7 days to 1.3 days, according to American Association of Thoracic Surgery figures.

Advances range across the heart disease spectrum from the BHF's Heart Age Tool, to help people reduce their risks, to cyborg heart patches that can react to and treat abnormalities or heart attacks.

Earlier this year, researchers at Israel's Tel Aviv University unveiled a remote-controlled "bionic" heart, or the Cyborg Cardiac Patch, which is engineered with nano electrodes and polymers so that it can administer electrical stimulation or release drugs if it senses problems with heart rhythm or volume.

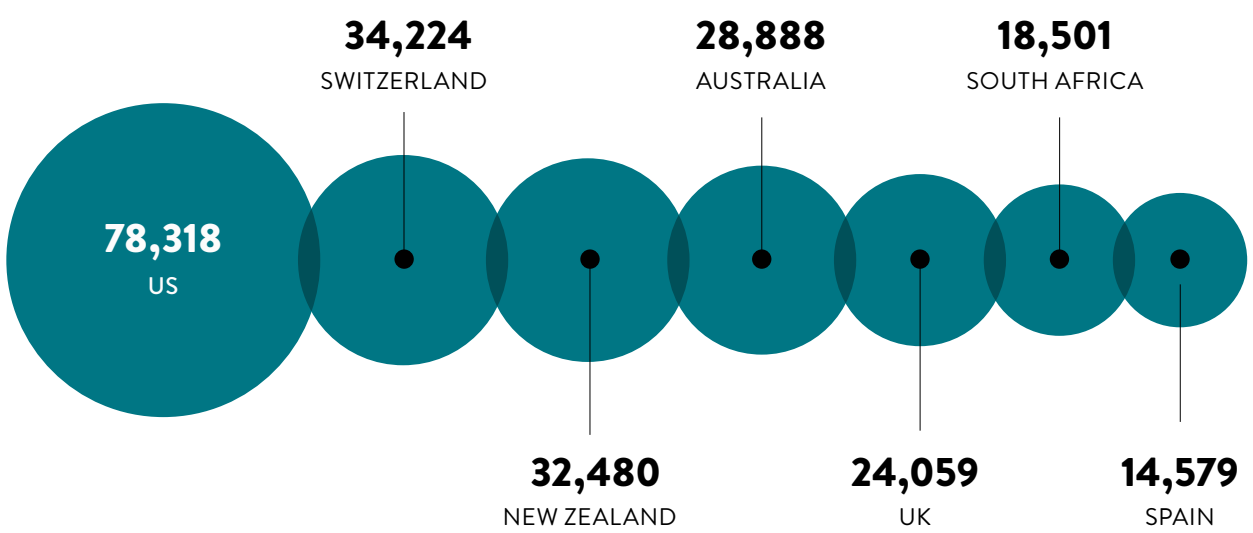
Professor Tal Dvir, who pioneered the device, says the first generation versions will be monitored by physicians, who would make tweaks from data transmitted by the patch, but future models would use artificial intelligence to deliver therapies without the need for human intervention.

Cardiac surgery hardware is ever-evolving and Dr Geoff Moggridge at Cambridge University is developing a flexible polymer bonding, which could lead to replacement valves that mimic human performance. The valve, which is being laboratory tested in a BHF-funded project, could provide better function and last longer than current mechanical and animal versions.

Implantable defibrillators, one of many devices controlling heart rhythms, have reduced from the size of a house brick 20 years ago to a compact and powerful unit that can be fine-tuned to individual patients.

Dr Paul Roberts, an electrophysiologist at Southampton General Hospital (SHG), who uses a range of devices to control heart rhythms, believes incremental advance will continue to improve mortality and

AVERAGE COST OF BYPASS SURGERY IN SELECTED COUNTRIES ($)
INCLUDES BOTH HOSPITAL AND PHYSICIAN COSTS

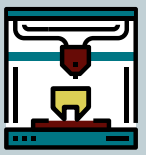


Source: International Federation of Health Plans 2015

THREE TOP INNOVATIONS

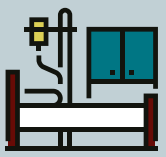
01 PROOFX

The Chicago-based biomedical printing company is using 3D modelling techniques to create precise replicas of a patient's heart system to help surgeons plan complex surgery. The exact model of the heart is constructed from more than 500 CT images to give a more complete view either as a physical model or a 3D computer image. Surgeons visualise procedures with a "fly-through" view from the external to internal contours to show the tears that cause aortic aneurysms and, with the aid of predictive intelligence, examine weakened areas that may also need attention.



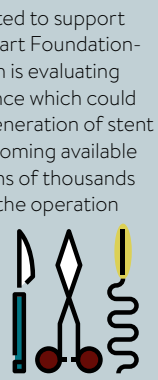
02 HARPOON

A new medical device that allows surgery to be performed on a still-beating heart. The Royal Brompton Hospital and Harefield NHS Foundation Trust Hospital in London was the first to use this device to repair leaking mitral valves, which used to require open heart surgery. The harpoon can be deployed through a small incision in the chest and directed to the damaged flap in the valve which can be repaired and repositioned using cords. About one in 50 people in the UK have the condition, but leave treatment until too late because they are put off by the prospect of a major operation.



03 BIOABSORBABLE STENTS

Stents are used routinely to reopen blocked arteries that can cause a heart attack. But, although hugely successful, the metallic cage structure can damage the artery wall causing scar tissue and their enduring presence in the body can raise the risk of thrombosis and inflammation. Bioabsorbable stents are designed to do the same job, but dissolve once the vessel has adapted to support itself. British Heart Foundation-funded research is evaluating their performance which could lead to a new generation of stent technology becoming available to surgeons. Tens of thousands of people have the operation annually and stenting is used in 92 per cent of angioplasty procedures in the UK.



morbidity, but that the NHS has to provide guidelines which take into account the improved potential.

"We have an ageing population with a larger population who can benefit from these treatments, but we are not necessarily seeing any restrictions in terms of age for someone to receive a device," says Dr Roberts, a specialist at a busy SHG centre which has one of the lowest risk-adjusted mortality rates in the country. "The research and development costs of these devices run into millions, so they don't come cheap. It is a challenge to us now and will be in the future in terms of understanding where you draw the lines."

> The research and development costs of these devices run into millions, so they don't come cheap

Further funding shockwaves rattle across the CVD landscape with the NHS chasing £20-billion savings, and combined funding from charities and government for coronary heart disease, at £166 million a year, lagging behind cancer which gets £544 million of the £856 annual total, according to an analysis published in *BMJ Open*.

Technology has also yet to prove it can address the lifestyle issues which are catapulting a generation into obesity-related illnesses from an early age.

Dr Knapton comments: "One in five children in England are overweight or obese before they start primary school and, by the time they leave, this increases to almost one in three. Being overweight or obese, smoking and inactivity all contribute towards your likelihood of having heart disease. Young people should be given the facts, so they can take action to minimise their risk. It is essential government takes action to improve our environment, so young people are made aware of the risk factors that could increase their likelihood of developing CVD and be enabled to take action."

Share this article online via **raconteur.net**

Healing the mind, not just the da

Heart disease and hospital treatment can leave patients feeling depressed and vulnerable to further health problems

PSYCHOLOGY

VICTORIA LAMBERT

You might imagine that recovering from cardiac surgery or a heart attack would bring feelings of relief, perhaps even elation. Yet almost one in five patients will experience a major depressive episode within a few weeks. And a further 25 per cent of patients will experience minor depression or elevated levels of depressive symptoms, according to the charity Depression Alliance.

You may even be more likely to have a second heart attack if you are suffering from depression, says Andrew Steptoe, British Heart Foundation professor of psychology at University College London. "There is thought to be around a twofold risk [in those people] of having another heart attack or dying of heart disease, and there's a lot of concern at the moment as to how that link takes place and what we can do about it."

Dr Mike Knapton, associate medical director at the British Heart Foundation (BHF), says: "It's a significant problem. There is evidence to suggest if you suffer from mental health problems, you are more likely to suffer cardiovascular disease (CVD), but there is also an increased risk of depression and anxiety following a cardiac event and surgery."

In simple terms, that depression may be linked to being told you have a life-threatening condition. "But it may also limit your quality of life as can some drugs, such as beta blockers, which have side effects such as tiredness," he says.

"Cardiac rehabilitation, including psychological rehab, is one of the most important aspects of the treatment pathway. But there is no point in saving lives if you can't give a quality of life worth living."

Yet, according to Depression Alliance, figures show that while 42 per cent of cardiac patients are currently provided with rehabilitation, only 16 per cent of these programmes have a psychological component, despite 31 per cent of patients experiencing significant anxiety problems and 19 per cent having depression. The charity warned in its 2012 report *Twice as Likely* that cardiac patients who are struggling with depression are linked with greater use of health services, poor quality of life and less successful rehabilitation.

Part of the problem may lie in the often acute onset of the condition. Patients whose CVD is diagnosed by a GP and who have already manifested symptoms of depression can be monitored. But, notes Tim Graham, consultant cardiothoracic surgeon at Queen Elizabeth Hospital Birmingham and a council member of the Royal College of Surgeons of Edinburgh: "If a patient enters the pathway through an emergency route, much less is known and often in critical cases speaking to family members can be helpful."

Either way, Mr Graham says: "If depression is suspected, the patient and their family are consulted at length and advised of the potential for the surgery to possibly make the condition worse. Patients also may be on a range of antidepressant medication all of which need careful monitoring during and after surgery as the surgery can affect the levels of these drugs adversely.

"We know that any patient who has surgery under anaesthetic has an increased potential to develop post-operative depression. Cardiac surgery is major surgery which therefore impacts on the potential for this, as well as the usually extended stay in intensive care. We also know that post-operative pain can lead to anxiety or depression, so pain management is a key aspect post-operatively."

> There is no point in saving lives if you can't give a quality of life worth living

How can this be improved? An independent *Cochrane Systematic Review* points out observational data suggests psychological interventions, either alone or in combination with exercise and education, reduces depression in adults with heart failure. It also suggests that as previous studies have shown exercise improves mood and reduces weight, plus a reduction in depression improves compliance with medication and reduces behavioural risk factors for CVD.

Research comparing the benefits of psychological intervention alone, with comprehensive cardiac rehabilitation, including psychological intervention and/or usual care to identify which component is most important, is overdue.

That information might come from BHF-funded research. Professor Steptoe is involved in detailed lab work looking at the biological processes through which psychological factors might influence heart disease risk. His team is also carrying out clinical studies of people who have experienced a heart attack or had cardiac surgery and the emotional aspects of those experiences.

Dr Peter Brown, 56, a GP and father of four from Plymouth, suffered depression and anxiety for 12 months following emergency seven-hour bypass surgery three years ago. He says: "My

PSYCHOLOGICAL IMPACT OF CVD

10.1k
patients will experience a major depressive episode within a few weeks of a heart attack or cardiac surgery

2-3x
Depression is two to three times more common in cardiac patients

31%
of patients undergoing cardiac surgery experience significant anxiety problems

16%
of rehabilitation programmes provided to cardiac patients have a psychological component

Source: Depression Alliance

maged heart

unless doctors treat psychological symptoms

TREATING THE WHOLE PATIENT


Budimir Jevtic / Shutterstock

Part of all surgeons' training focuses on cardiothoracic surgery, says Tim Graham, consultant cardiothoracic surgeon at Queen Elizabeth Hospital Birmingham and a council member of the Royal College of Surgeons of Edinburgh (RCSEd).

"As well as having training in the 'nuts and bolts' of the surgery, there is also now an additional part of the syllabus which trains the surgeons in 'human factors' including how people behave and react to surgery. This is becoming increasingly important, and many courses and toolkits are being put in place by the RCSEd to improve this aspect of training, including the recognition and management of mental health."

After surgery, the British Association for Cardiovascular Prevention and Rehabilitation (BACPR) has established standards of care which include psychosocial health. For this it recommends comprehensive, holistic assessment of patients as crucial, suggesting individuals with clinical levels of anxiety or depression should have access to appropriately trained psychological practitioners.

Moreover, the standards, which were set in 2012, suggest NHS services help patients develop awareness of ways in which psychological factors affect physical health, including perceptions of illness, stress awareness and development of stress management skills.

The BACPR standards confirm the importance of social support as social isolation or lack of social support is associated with increased mortality, whereas overprotection may adversely affect quality of life, and it notes the value of an agreed referral pathway to provide support and advice.

Dr Peter Brown, a Plymouth GP who suffered prolonged depression and anxiety after heart surgery, would like to see that pathway made more like those set out for cancer cases.

"Training is not good enough among cardiologists and surgeons," he says. "The specialist nurses are excellent, but funding only allows three or four visits, which is inadequate. I think everyone should see a psychologist, even those patients who may be resistant. The psychological aspect holds back the physical recovery. If you are wound up, you can't do your physical rehab properly. You need to get both right to make a good recovery."

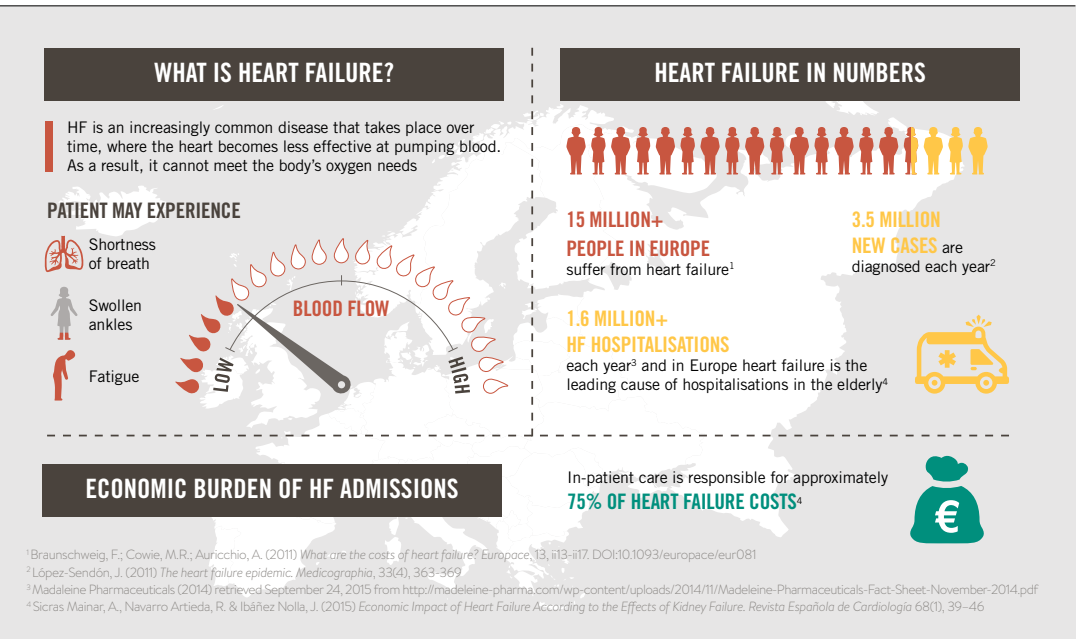
father had undergone bypass surgery at 53 and died 11 years later from a massive heart attack the night before he was due to have further cardiac operations. So I was worried before and after surgery.

"It began to feel like a Sword of Damocles was dangling over my head, which wasn't helped when one of the bypass grafts failed six months later and I was rushed to hospital to get a stent fitted.

"The cardiologist told me it was bad luck, but I became depressed and anxious. I'd think, 'am I going to die tonight? Will I see my children grow up?' You try and concentrate on the positives, but it is scary."

But with support at home from his family, from nurses who taught him an exercise regime and then showed him via heart rate monitors that it was working, and sessions with a specialist cardiac psychologist, Dr Brown began to feel he had recovered after about 12 months.

"You have to build up your confidence slowly," he says. "I used to get nightmares of boats sinking, cars crashing. But anxieties must be treated as much as physical symptoms – you have to address these fears."



RAISING AWARENESS OF HEART FAILURE

Greater awareness and understanding is needed to help the UK combat the impact of heart failure, new research has revealed

ST. JUDE MEDICAL

Serious misconceptions and knowledge gaps exist around heart failure, according to a survey conducted by the patient-led charity Pumping Marvellous with support from St. Jude Medical.[1]

It found that, although one in five people in the UK currently live with heart failure, only 49 per cent of those surveyed could identify swelling as one of the main symptoms of heart failure, while the vast majority confused it with a symptom of heart attack.

The study also found that one in five believed heart failure was a silent condition with no symptoms and many mistakenly thought it only effects older generations.

Heart failure is a serious chronic condition where the heart cannot pump enough blood to meet the body's oxygen needs. It can affect all ages and the most common symptoms, which can vary from person to person, include a combination of fatigue, breathlessness and swelling.

It is caused by the heart failing to pump enough blood at the right pressure and usually occurs because the heart muscle has become too weak or stiff to work properly. The causes of heart failure are varied, but the most common are coronary artery disease, high blood pressure and diseases of the heart muscle (cardiomyopathy), which can sometimes be genetic.

Although there is no cure for heart failure, symptoms can be managed through medication or medical devices, so many individuals are able to continue to live full and active lives.

"It's important for people to understand the symptoms and causes of heart failure, as undiagnosed heart failure can lead to serious health consequences," says Nick Hartshorne-Evans, founder and chief executive of Pumping Marvellous. "Increasing awareness of heart failure and treatment options will ensure those at risk seek professional help as early as possible to help manage their condition."

> "Increasing awareness of heart failure and treatment options will ensure those at risk seek professional help as early as possible to help manage their condition

Heart failure is an increasingly common disease with the UK, Germany and France spending £7.2 billion on treating heart failure in 2010.[2]

Reassuringly, the survey found that 80 per cent understood that lifestyle factors, such as obesity, smoking, stress and lack of exercise, could increase the chances of developing heart failure, but 37 per cent still believed heart failure was a result of bad luck and nothing can be done to prevent it.

Professor Martin Cowie, consultant cardiologist and professor of cardiology at Imperial College London, comments: "It's encouraging to see there is some understanding that lifestyle choices are a factor in the occurrence of heart failure. Healthy lifestyle changes and developments in treatment options give hope that many people with heart failure can still lead full lives. It's therefore important they and their carers fully understand the condition, so they can work with their doctor to manage it properly."

St. Jude Medical, a leading global medical device manufacturer dedicated to transforming the treatment of some of the world's most expensive epidemic diseases, specialises in developing cost-effective medical technologies that save and improve lives of patients around the world.

"Understanding heart failure is the first step in opening a dialogue between a patient and their doctor to get the right treatment," says Dr Mark Carlson, vice president of global clinical affairs and chief medical officer at St. Jude Medical.

"While it is concerning that half of the UK population are not aware of the symptoms associated with heart failure, we are committed to supporting charities such as Pumping Marvellous to raise awareness of the condition and helping physicians educate their patients on treatment options, in an effort to help them live life to the fullest."

Learn more about heart failure symptoms and solutions at heartfailureanswers.co.uk

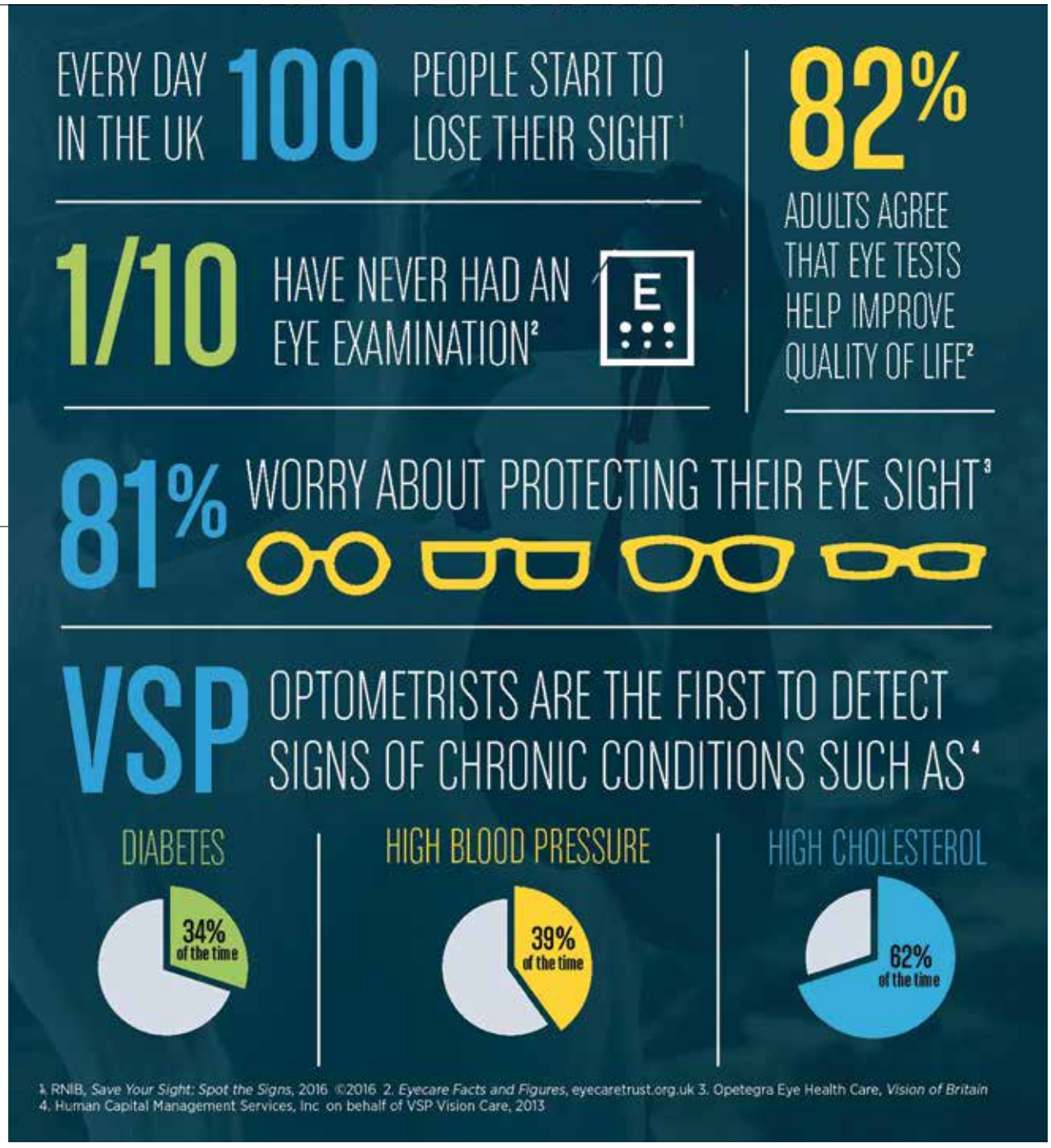
[1] *Pumping Marvellous Heart Failure Awareness Survey*, June 2016: undertaken by Innovationbubble.eu on behalf of Pumping Marvellous, supported by an unrestricted educational grant from St. Jude Medical

[2] Hobbs, R. (2010) *Clinical burden and health service challenges of chronic heart failure: British Journal of General Practice*, 60(577), 611–615

COMMERCIAL FEATURE

KEEPING A CLOSE EYE ON YOUR HEALTH

The eyes aren't just a window to the soul, as Shakespeare once said – increasingly they are a porthole into the state of our overall health



Conditions such as type 2 diabetes and cardiovascular disease can now be detected through painless examination of the back of the eye during routine appointments. Serious sight diseases such as glaucoma can be picked up before serious damage takes place. And all of us can benefit from having slight changes to our long or short sight calculated on a regular basis.

Moreover, 90 per cent of people in the UK say that sight is the sense they fear losing most, according to a 2006 Royal National Institute for the Blind report.

Yet, even though every day 100 people in the UK start losing their sight, regular eye tests seem to get pushed down the priority list for families.

Indeed, a 2014 UK eyesight study found that one in ten of us have never had their eyes tested, rising to one in five in London. The College of Optometrists report *Britain's Eye Health in Focus* in 2013 warned that 5 per cent of people aged over 40 had not been for a sight test for at least ten years or could not recall when they last went. This rises to 11 per cent of ethnic minorities questioned, a particular concern as this group is at increased risk of particular eye conditions. And a quarter of parents said their child had never had an eye test while almost one in ten parents either couldn't recall when their child last had a sight test or said it was more than ten years ago.

Kate Renwick-Espinosa, president of international optical care providers VSP Vision Care, believes we need to refocus on just why an eye test is important.

"We rely a lot on our eyesight in our daily lives," she says. "Without it, activities such as reading, writing, driving a car or cooking a meal become very challenging, if not impossible."

> Our eyes are unique in that they are the only place in our bodies that give a clear view of arteries, cranial nerves and blood vessels

While the importance of clear vision is evident, she adds: "Eye problems often have no obvious symptoms and many people wait to see an optometrist until they notice a change in their vision. Others may have received a vision screening and think there's no need for a full examination.

"Vision screenings can be very helpful, but they don't show the full picture and often aren't conducted by an optometrist. Visiting an optometrist regularly for a comprehensive eye exam can help detect vision problems early and allow for proactive steps to prevent future problems."

At a comprehensive eye test, your optometrist will look for vision disorders, eye muscle imbalances and eye diseases that could cause more problems later on if left uncorrected. These might include glaucoma, an eye disorder that is caused by too much pressure which can damage the retina, optic nerve or both, and cause vision loss. "Glaucoma is one disease that's especially important to monitor," explains Dr H. Chapman Leffingwell, OD, a VSP doctor. "The harmful effects can increase in later years if it's not managed right away."

Optometrists will also check for cataracts, a blurring of the lens when protein molecules clump together, blocking out light and dimming vision, and age-related macular degeneration, when the macular or centre of the retina breaks down destroying central vision.

Increasingly though, new tests are allowing optometrists to see early signs of conditions which affect the whole body. Digital retinal imaging is particularly useful for helping to detect diseases early, and retinal images provide a permanent and historical record of changes in your eye. Images can be compared side by side, year after year, to discover even subtle changes and help monitor your health.

Ms Renwick-Espinosa explains: "Our eyes are unique in that they are the only place in our bodies that give a clear view of arteries, cranial nerves and blood vessels. That perspective allows optometrists to detect early signs of chronic health conditions such as diabetes, high cholesterol and even brain tumours – and often before other symptoms are apparent."

According to a survey carried out by VSP Vision Care in 2013, its own optometrists had been first to detect high cholesterol in 62 per cent of cases, 39 per cent in cases of high blood pressure and 34 per cent in cases of type 2 diabetes.

Even cancer can be detected early. A dark spot at the back of the eye may signal a melanoma, which if spotted can be treated before it travels to other areas of the body through the bloodstream and causes serious damage.

This early detection could save the NHS vital funds. Ms Renwick-Espinosa says: "By identifying conditions early, eye exams contribute to fewer hospital admissions and visits to accident and emergency departments, lower medical costs, and less time off work." VSP's survey in 2013 found that employers who invested in vision health plans for their staff saw a staggering 145 per cent return on investment.

Best of all, it could prove life-saving for you. According to Public Health England's report, *Tackling High Blood Pressure: From Evidence into Action*, high blood pressure affects more than one in four adults in England and is the second biggest risk factor for premature death or disability. Yet only four out of every ten adults in England with high blood pressure are both aware of their condition and managing it to the levels recommended.

RIGHT
Kate Renwick-Espinosa
President
VSP Vision Care

So far from being a chance to try on new lenses and learn about the latest contact lenses, useful and enjoyable though that is, a regular trip to the optometrists could be the ultimate in personal future-proofing.

After all, it's one thing to be a little myopic when you're reading a menu; quite another to be short sighted about staying fit and well for life.

For more information please visit www.vsp-uk.co.uk

CONGENITAL HEART DISEASE

ROGER DOBSON


Amelie-Benoist / Getty Images

Pioneering success is saving patients' lives

Advances in treating congenital heart disease are saving babies, and increasingly adults, from early death and debilitating symptoms

Deaths in the UK of children from congenital heart disease (CHD) have dropped more than fivefold in little more than 30 years. Advances in diagnosis, technology and surgery have cut mortality rates from more than 1,000 a year to around 200 – and the numbers are still falling.

Once considered a paediatric condition, because patients with complex problems seldom survived childhood, adults are now outnumbering children with both severe and other types of the disease.

"We are seeing major improvements," says Dr Alessandro Giardini, paediatric cardiologist at Great Ormond Street Hospital. "Between 1979 and 1983, more than 5,200 children lost their lives to congenital heart disease in the UK, but between 2004 and 2008 that had plummeted to 893 and numbers are still falling. The number of cases being treated is also increasing, and 5,532 children and adults had cardiac surgery for congenital heart disease last year with an overall survival rate of 98 per cent."

CHD, which affects up to nine in every thousand babies born in the UK, is a wide range of defects that affect the heart. Severity ranges from insignificant and self-resolving problems, such as ventricular septal defects or holes in the heart that can often spontaneously close, to highly complex defects with a high risk of mortality.

Common problems include septal defects, where there is a hole between two of the heart's chambers; coarctation of the aorta, where the large artery of the body is narrower than normal; and transposition of the great arteries, where the pulmonary and aortic valves and the arteries they are connected to have swapped positions.

Most cases of CHD are the result of something going wrong in early fetal development, but the specific causes remain largely unknown. Historically the defects have been put down to genetic and environmental factors or in some cases infection, but specific genes are unknown in most cases, and it is likely that a large number of causative genes are involved in each case.

"For some conditions, we can screen individuals in families where the disease has been observed and rule out that they have inherited the gene responsible for the condition," says Dr Giardini. "The number of these conditions where we know the gene involved is growing. One example is hypertrophic cardiomyopathy where there is excess growth of the heart muscle."

Some defects can be picked up during routine pregnancy scans in the 20th week. Specialist fetal scans may be carried out if a problem is suspected or where there is a family history of CHD. Other cases are not identified until after birth, and symptoms include extreme tiredness, rapid heartbeat, breathing problems, chest pain and a blue tinge to the skin. In others, including some atrial septal defects, the condition may go undiagnosed until the teens.

New research shows that some types of defect can be prevented with folic acid supplementation by mothers-to-be. Based on more than six million births, the 1998 study found that mandatory fortifying of food in Canada led to an 11 per cent drop in the overall number of congenital heart problems.

"Although the reduction in congenital heart defects following food fortification with folic acid was unexpected, it adds to the body of evidence supporting the practice of fortifying food with folic acid," says Professor K.S. Joseph, of the University of British Columbia, who led the study reported in the journal, *Circulation*. "The experience since 1998 has confirmed the benefits of food fortification with regard to preventing neural tube defects and also shown that the fears related to this population intervention were unjustified."

While the research does support a role for folic acid in prevention, advances in CHD treatments have led to major improvements in survival and prenatal detection rates are improving rapidly. A study at the Children's Hospital of Wisconsin, reported in *Prenatal Diagnosis* and based on 535 cases, shows that the pre-birth diagnosis rates improved from 44 per cent in 2007 to 69 per cent in 2013.

And British Heart Foundation data shows that in the 1950s around eight out of ten babies with a complex congenital heart condition died before their first birthday. Now more than eight out of ten survive into adulthood.

> New research shows that some types of defect can be prevented with folic acid supplementation by mothers-to-be

"In most cases, a baby born with congenital heart disease can live a full life after treatment," says Dr Giardini. "Individual cases vary and some patients will require further treatment throughout life. Some cases will be very challenging, but some will not require any treatment. Others may need medicines or interventional procedures involving cardiac catheterisation or child heart surgery."

One of the challenges for clinicians is that the heart of a newborn, with all its complexities, is only the size of a table tennis ball.

To help doctors plan operations, clinicians and scientists at Great Ormond Street have used 3D printing to create three dimensional patient-specific plastic heart models. Based on magnetic resonance images of the real thing, they are designed to help doctors plan the procedure in advance. Doctors have also used the models to explain treatment to parents. It's been so successful, 73 per cent wanted to take the model home.

For some patients, the way forward is heart transplantation. "But paediatric donor hearts are not commonly available and the numbers are not increasing although demand is," says Dr Giardini. "This creates issues because we need to keep the patient sedated while they wait for a donor, and that can mean loss of muscle tone and so on, which will lead to longer recovery times. In some cases, patients may die waiting for a heart."

For this group of patients, new mechanical pumps can mean the difference between life and death. The pumps can be wholly implanted or mounted externally and used to keep patients alive until a heart becomes available.

Work at Great Ormond Street shows how effective they can be. Dr Giardini and colleagues have successfully used a pump for 251 days to keep a three-year-old alive while awaiting a heart.

His condition, Barth syndrome, carries a high risk of severe heart failure in infancy or early childhood. The first report of the syndrome, in the 1980s, described how 17 boys in one family from the Netherlands died at between three days and 31 months as a result. The Great Ormond Street success gives new hope to children with this and other conditions who might otherwise not survive the wait for a new heart.

CONGENITAL HEART DEFECTS

10.1k
procedures related to congenital heart defects were carried out in 2014-15, 7.3K on children and 2.8K on adults

40%
rise in the number of procedures undertaken and activity levels since 2000

50%
of infants who require a procedure to treat congenital heart malformation in their first year were diagnosed through antenatal screening

Source: National Institute for Cardiovascular Outcomes Research

5-fold
drop in the number of deaths of UK children from congenital heart disease in three decades

Know the risks to stay heart healthy

Cardiovascular disease affects people of all ages, from different walks of life and ethnic backgrounds, but some may be more at risk than others

RISK FACTORS
LILIAN ANEKWE

There are several risk factors for cardiovascular disease (CVD), but the good news is that in many cases it can be prevented.

Whatever your situation, you can reduce the impact of your risk factors and improve your chances of preventing CVD by adopting healthy lifestyle habits and getting advice from healthcare professionals.

This is even more important for people who don't see themselves as at risk. The reality is that this condition affects people young and old, and with very different lives. Here are three examples of how people from varied backgrounds could be at risk.

Share this article online via **raconteur.net**

"What about a baby's health?"

RACHEL, 28

80%
of children with congenital heart disease will survive into adulthood

Source: NHS

Doctors don't know what causes most congenital heart defects, which develop in the womb, although some are linked with genetic syndromes. For example, many children with Down's syndrome have heart defects.

But congenital heart defects do appear to run in families. If Rachel already had a child with a congenital heart defect, there are tests that estimate the likelihood of her next child being born with one. Some problems can also be picked up in pregnancy, most often by an ultrasound scan at 20 weeks.

However, environmental factors can play a role in congenital heart defects and in some cases women like Rachel can take steps to reduce this risk.

Once Rachel is pregnant, certain medical conditions, such as the viral disease rubella, can cause problems in the baby's heart development. In early pregnancy a midwife will test Rachel to see if she's had rubella and arrange a vaccination if not. For women who are diagnosed with diabetes before pregnancy, carefully controlling their condition, before and during pregnancy, will reduce the risk of heart defects.

Taking certain medicines during pregnancy increases the risk of congenital heart defects. These include the acne medication isotretinoin, lithium, which is used to treat bipolar depression, and anti-seizure medications containing valproate. So Rachel should give her GP a complete list of prescribed medicines before trying for a baby.

It's also important to avoid alcohol and smoking during pregnancy, which further increase the risk of congenital heart defects.

"Heart disease affects men not women"

HELEN, 49

Women like Helen often know everything about their family's health, but sometimes overlook their own.

This is despite the fact that 900,000 women in the UK are living with heart disease, the main cause of heart attacks. As a result some 68,000 UK women are treated in hospital for a heart attack each year, an average of 186 women a day or eight every hour.

Helen doesn't know the symptoms of a heart attack, so may delay getting medical help, putting her life and future recovery at risk.

The most common signs of a heart attack are chest pain, pain or discomfort in the arms, neck, jaw, back or stomach, sweating, feeling light-headed, shortness of breath, nausea or vomiting.

900k
women in the UK are living with heart disease, the main cause of heart attacks

60%
of women in the UK are measured as overweight, with a body mass index more than 25

Source: British Heart Foundation

Like 60 per cent of women in England, Helen is overweight, which increases her risk of heart disease. Losing weight will reduce the risk and Helen's shape matters as well as her weight. Being apple-shaped, carrying excess weight around your waist, puts her at higher risk of heart disease than being pear shaped, having excess weight around the hips, so she should aim for a waistline of less than 80cms (31.5 inches).

Doctors used to think that using hormone replacement therapy or HRT, which Helen is taking for menopausal symptoms, also protected women against heart disease. But research now suggests this is not the case.

"I'm too young to suffer heart disease"

RAJ, 31

Research shows that CVD, which can lead to a heart attack, is more common in South Asian people from India, Pakistan and Bangladesh. But Raj is unaware of this fact and that South Asian men in the UK have a 40 per cent higher risk of dying from heart disease than other men of the same age.

Raj has no idea what his cholesterol level is. But a low HDL (good cholesterol) level is more common in South Asian people. This is possibly linked to genetics, although this is not yet fully understood. Certain cultural factors, such as the cooking oils and ingredients in the home-cooked food Raj still enjoys, may be linked, although again this has not been confirmed.

40%
higher risk of South Asian men in the UK dying from heart disease compared with other men of the same age

Source: British Heart Foundation

For South Asian men like Raj, research shows that fat around the waist is more risky than the same amount of fat in a white person. Raj goes to the gym regularly, which is good news, as maintaining a healthy weight is even more important for him. The National Institute of Health and Care Excellence recommends keeping waist circumference to less than 90cms (35 inches) to reduce the risk of complications linked to weight.

OPINION COLUMN

Power your life on World Heart Day

The message on World Heart Day, the World Heart Federation's biggest platform for raising awareness about cardiovascular disease, is it's easy to give your heart the care it deserves

JOHANNA RALSTON

Chief executive
World Heart Federation

66 In 2013, the World Health Organization adopted a global target to reduce premature non-communicable disease (NCD) mortality by 25 per cent by 2025. The World Heart Federation recognised that achieving this would require a primary focus on cardiovascular disease (CVD), which is responsible for half of all NCD deaths. So we adopted our own '25 by 25' goal to work towards the reduction of premature death from CVD, including heart disease and stroke.

CVD is the leading cause of death and disability in the world, killing 17.5 million people a year. That's a third of all deaths on the planet and around 80 per cent of these deaths are in low and middle-income countries, where human and financial resources are least able to address the CVD burden.

World Heart Day plays a crucial role in changing all this. It is a vital global platform that we, as well as our members, supporters and other civil society organisations can use to raise awareness and encourage individuals, families, communities and governments to take action now.

> Just a few simple steps, such as eating more healthily, cutting down on alcohol and stopping smoking, can improve heart health and overall wellbeing

This World Heart Day, we want everyone to understand what they can do to fuel their hearts and power their lives. We're sending out the message that your heart is at the heart of your health and it's easy to give it the care it deserves. Just a few simple steps, such as eating more healthily, cutting down on alcohol and stopping smoking, can improve heart health and overall wellbeing.

On and around September 29, thousands of activities and events will be organised around the world to spread the word about how we can combat premature mortality caused by CVD, the world's number-one killer. Because the fact is that 80 per cent of premature deaths from CVD could be avoided if the four main risk factors – tobacco use, unhealthy diet, physical inactivity and harmful use of alcohol – are controlled.

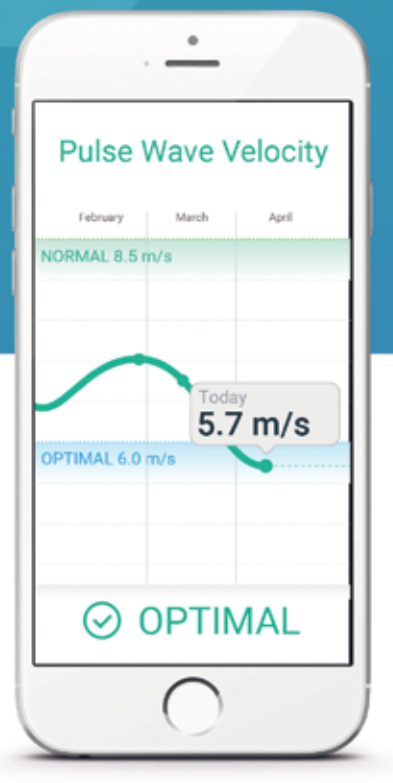
From World Heart Day 2016, we are also asking governments and policy-makers across the globe to answer our call to implement reliable, simple and fit-for-purpose surveillance systems for monitoring the burden and treatment of CVD.

The need for reliable data around CVD has never been greater. CVD remains the number-one cause of global deaths and places a high economic burden on countries. By implementing the policy call and committing to reliable data collection, we have a real opportunity to provide the evidence that will lead to the formulation of accurate policy and legislation to tackle CVD.

Indeed, we feel that one of the barriers to recognition of CVD as the leading cause of death in the world, and the new scourge of low and middle-income countries, has been the lack of reliable and consistent data to demonstrate how the burden has shifted and increased.

By working together, we have the power to reduce the burden of CVD and the premature deaths it causes, helping people everywhere to live longer, better, heart-healthy lives. 99

Weigh Better



Body Cardio

The first scale that tracks cardiovascular health.

Body Cardio is the revolutionary new Wi-Fi scale that gives anyone the opportunity to follow heart health at home via the introduction of a new measurement: pulse wave velocity. Recognized by the medical community as the best stand-alone indicator to provide a reliable assessment of overall cardiovascular health, pulse wave velocity assessments, along with personalized in-app advice, can help people clearly see how adopting small lifestyle changes — like a healthier diet and more activity — can have a big impact on improving the health of their arteries.

Withings®
Inspire health