



British Heart
Foundation

INVESTING TOGETHER CHANGING LIVES

Keeping the UK at the
heart of medical research



**FIGHT
FOR EVERY
HEARTBEAT**

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This report was written
by Chloe Watson at the
British Heart Foundation.

WORKING TOGETHER FOR UK RESEARCH

Over the past few decades, we have seen staggering improvements in the way that we prevent, diagnose and treat some of the most debilitating medical conditions. Medical research carried out by talented scientists in our universities and research institutes and supported by funders across the public and private sector has transformed millions of lives across the world. The range of treatments and technologies available today is unrecognisable from those on offer fifty years ago.



The British Heart Foundation is the largest independent funder of cardiovascular research, and the third largest charitable funder of medical research, in the UK. Each year, thanks to the vision and generosity of our supporters, we are able to fund

around £100 million of new research across the UK, supporting people, from PhDs to professors, as well as investing in large programme and project grants.

We have been at the centre of the last fifty years of progress in cardiovascular research and we are proud of the impact our work has delivered. However, these achievements are not ours alone and we could not have done it without the input of the Government, other charitable funders and industry.

As this report illustrates, rapid and transformational scientific progress is only achieved by a system of investors complementing each other's work. UK Government is a central part of this funding system and its continued investment in science is essential if we are to build on the progress that we have made so far.

Long-term Government investment will allow researchers to continue their world-leading research, maintaining the UK's global position in life sciences, stimulating the economy and providing continuing improvements in the health of the public, in Britain and globally. Cuts in the Government's funding of research, even if only applied in the short-term, would have profoundly damaging long term effects. They would discourage investment from other sources, such as industry; reduce the amount of research which charities can fund; and damage the UK's ability to retain and attract talent.

We have come a long way in the fight against heart disease but we still have much further to go. If the British Heart Foundation is to continue its life saving work, the Government must work with us and continue to invest in research.

Simon Gillespie
BHF Chief Executive

RESEARCH IN THE UK

Government, industry and charitable funders each have their own role within the funding landscape for science and research. If one steps away, the others will be unable to compensate.

Scientific research is one of the UK's biggest assets. It has led to some of the most important advances in health and technology, from the development of the first vaccine to the invention of the World Wide Web. In the past 50 years, cardiovascular research has completely transformed the lives of those living with heart disease. We now see more people survive heart attacks than ever before, better diagnosis and treatment of inherited conditions, and more babies born with heart defects growing up to live healthy, productive lives.

We have made remarkable progress but there is still much more to achieve. Cardiovascular disease (CVD) causes more than a quarter of all deaths in the UK; **the cost to the UK of premature death, lost productivity, hospital treatment and prescriptions relating to CVD is estimated at £15–19 billion each year; and healthcare costs alone total an estimated £8–10 billion¹.**

The UK has a strong track record for generating high-quality research. When compared internationally, it ranks second in the world for the quality of its scientific research institutions². While the UK represents less than 1% of the world's population, it produces 16% of top quality published research findings³. The strength of our science base enables us to attract and retain the very best researchers to the UK and leverage further investment for world-class research.

IT IS ESTIMATED THAT THE LAG BETWEEN INVESTMENT IN CARDIOVASCULAR RESEARCH AND ITS EVENTUAL IMPACT ON PATIENTS IS AROUND 17 YEARS⁴, MAKING LONG-TERM INVESTMENT ESSENTIAL.

This success has not been achieved overnight. It is the result of stable, long-term commitment from researchers and investors alike to push the boundaries of research, and transform exciting scientific discoveries into impact for patients. Long-term commitment from investors, including the UK Government, continues to be vital in order to support the sector, attract outside investment and innovation to the UK, and ensure that research today results in benefits in the future.

GOVERNMENT SUPPORT

The core of the UK Government budget for science and research is provided by the Department for Business, Innovation and Skills (BIS). BIS provides funding for research through a 'dual-support' system, whereby funds are allocated through annual block funding to higher education institutions (HEIs) from Funding Councils⁵ and research grants from the seven UK Research Councils. The 'dual-support' system allows HEIs to maintain a solid research base whilst allowing individual researchers the flexibility to pursue the most promising avenues of their research. Funding through both the Research Councils and the Funding Councils is awarded on the basis of excellence, ensuring that research is conducted by the best possible people, wherever they may be.

The science budget within BIS also includes support for the National Academies, which promote excellence in UK science, engineering and the humanities and social science. The Department of Health provides support for research being conducted within the NHS, through the National Institute for Health Research.

A prosperous research environment depends on long-term investment, with a balance between investment in science capital and resource. Whilst new, state-of-the-art facilities and equipment, requiring capital spend, provide an exciting opportunity for UK research, they will be unable to deliver world-leading science without resource budget for the work that is already being carried out by talented researchers across the UK.

In 2010, despite significant financial pressures on government departments, the UK Government committed to protect the resource allocation for science and research in cash terms. More recently, the Government also made a real-terms commitment to investment in capital infrastructure to 2021. These commitments have provided much-needed stability to the research community, allowing the sector to focus on generating world-class research that adds to the knowledge base, delivers health benefits to patients and contributes to the UK economy.

However, holding the science budget constant in cash terms means that its value is gradually eroded as a result of inflation. According to analysis from the Campaign for Science and Engineering, the resource budget accumulated a real-terms shortfall of £1 billion over the course of the last Parliament⁶. It is too early to tell what impact this shortfall will have on the sector.

We believe that continued long-term commitment from Government, maintained in line with inflation, is essential if the UK is to build on its position as a world-leader in scientific research.

OTHER FUNDING SOURCES

Charities and the private sector are another vital component of the UK funding ecosystem.

Medical charities invest £1.3 billion annually in research, constituting a third of all publicly funded medical research⁷.

The private sector also plays a crucial role in developing promising new treatments and technologies that have emerged as a result of publicly funded research, as it has the financial power to support later stages of development, investing an estimated £4.1 billion in health research in 2013⁸.

The strength of the UK research base enables researchers to attract substantial funding from international sources. The UK has won 16 per cent of research funding from the European Framework Programme (FP7) with only 12.7 per cent of the EU-28 population⁹.



¹ BHF & CEBR analysis 2014

² World Economic Forum, Global Competitiveness Report, 2014–2015

³ Elsevier, International Comparative Performance of the UK Research Base, 2013

⁴ Health Economics Research Group, RAND Europe and Office of Health Economics, Medical Research: What's it Worth? Estimating the economic benefits from medical research in the UK, 2008

⁵ BIS provides block funding to HEIs in England only (through HEFCE). Similar block funding is awarded to the devolved nations through funding councils in Scotland, Wales and Northern Ireland

⁶ Campaign for Science and Engineering (CaSE), Budget Briefing, March 2015

⁷ Association of Medical Research Charities, www.amrc.org.uk/aboutus

⁸ "Working together for patients and economic growth" Infographic, Association of Medical Research Charities, 2015

⁹ Building a stronger future: Research Innovation and Growth, UK National Academies 2015

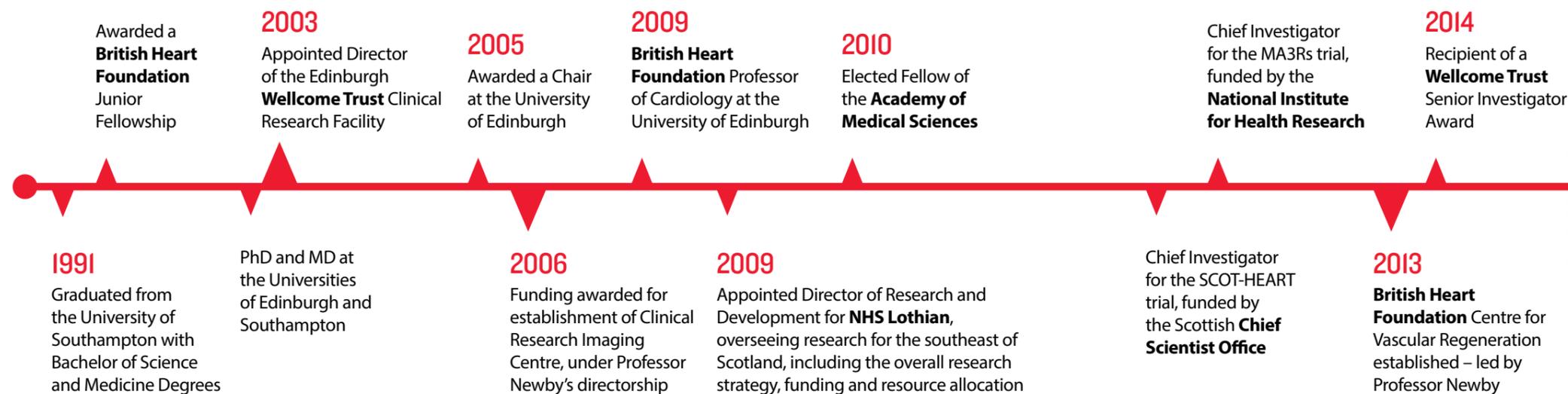
DAVID NEWBY

Professor David Newby, University of Edinburgh, has been a BHF Professor since 2009. His research focuses on how blood vessels and the heart react in health and disease, particularly in heart attacks and heart failure. In addition to several high-profile roles within research, Professor Newby is a Consultant Interventional Cardiologist at the Royal Infirmary of Edinburgh.

“Joint funding from the UK Government and the charity sector was instrumental in establishing the Clinical Research Imaging Centre and the Edinburgh Clinical Research Facility.”

The Edinburgh Wellcome Trust Clinical Research Facility (CRF) was established through a 1997 initiative from the **Wellcome Trust** and the **English and Scottish Executive Health Departments**, to strengthen clinical research in the UK. Since the official opening of the Wellcome Trust CRF in 2001, the facility has expanded to include clinical research facilities across three sites: Wellcome Trust CRF at Western General Hospital, Royal Infirmary of Edinburgh and Children’s Clinical Research Facility at Royal Hospital for Sick Children.

Studies at the CRF are funded through a variety of funding sources, from UK charities and NHS research and development, to research councils and commercial organisations.



The Clinical Research Imaging Centre opened in 2009. It was built over a period of nearly 2 years, and comprises state of the art facilities, which aim to improve patient care and research capabilities through a partnership between the University of Edinburgh and NHS Lothian Health Board. The facility received vital funding, totalling £20 million, from sources including the **Wellcome Trust, Medical Research Council, British Heart Foundation, European Union, Scottish Funding Council** and **Chief Scientist Office**.

BHF Centre for Vascular Regeneration was established in 2013 as a partnership between the Universities of Edinburgh, Glasgow and Bristol, and King’s College London. It aims to identify approaches for blood vessel regeneration that can be translated into the clinic. The centre is one of three **BHF** Centres for Regenerative Medicine, established through the BHF’s Mending Broken Hearts Appeal. Each centre has strong links with the **MRC**-led UK Regenerative Medicine Platform, which was established at the same time to address the translational challenges of regenerative medicine.



“RESEARCH FUNDING IS THE LIFEBLOOD OF EVERYTHING WE DO.”

Without this generous research funding environment in the UK, my career would have been completely different. I would probably just be teaching students – and not particularly well, as without research you can't teach students the cutting edge. ”

Professor Andrew Newby, University of Bristol

THE FUNDING ECOSYSTEM

Continued scientific progress relies on stable investment from Government, industry and the third sector, with funders complementing and leveraging investment from each other to support research.

Recent analysis commissioned by the Department for Business, Innovation and Skills suggests that an extra £1 of public funding will give rise to an increase in private funding of between £1.13 and £1.60¹⁰. A reduction in Government funding would disincentivise investment from other funding sources, damaging the UK's ability to conduct life saving research.

DIRECT vs INDIRECT FUNDING

Medical research charities pay for the direct costs of research, but they are dependent on Government investment to cover indirect costs such as heating and lighting. This investment is crucial to ensure that donors see the direct impact their money has on life saving research and its benefit for patients.

Through combined investment from charity and Government, we can do more to support research than either funder could achieve alone.

PARTNERSHIPS

Government, charity and industry often fund in partnership in order to support larger research projects. Joint funding between the BHF and the UK Government has made real progress in our understanding of why heart disease occurs and how to prevent and treat it. We fund in partnership with the Medical Research Council (MRC), as well as benefitting from investment by the National Institute for Health Research (NIHR) when funding clinical studies in the NHS. Between 2008 and 2014, 51% of publications arising from BHF-funded research cited a contribution from a UK government-funded agency such as the MRC and the NIHR¹¹.

Two of our recent projects, made possible through joint Government funding, are helping to establish the best course of treatment for heart attack patients (case study 1) and for individuals with high blood pressure (case study 2).

I. Establishing the best course of treatment after a heart attack

Collaboration between the British Heart Foundation and the National Institute for Health Research.

There are around 188,000 heart attacks in the UK each year. When a heart attack occurs, the individual is often treated by inflating a balloon inside the blocked artery to force it open. If they have a dangerous narrowing in another artery as well, it can be difficult to decide whether this artery should be treated at the same time as the 'culprit' artery responsible for the heart attack. Currently, there is no information to tell doctors what is the best approach.

However, funding from the British Heart Foundation and the National Institute for Health Research¹² has allowed researchers at the University of Leicester to assess the two courses of action in 296 heart attack patients across seven UK centres, using 'gold standard' imaging techniques to study the heart's pumping function and measure damage sustained as a result of the heart attack.

The results of the study suggest that there is a significant benefit to opening all blocked arteries after a heart attack, which conflicts with current guidelines. If the results are confirmed by larger trials this will change clinical practice, with potential to benefit patients.

¹⁰ Economic Insight, What is the relationship between public and private investment in R&D?, 2015

¹¹ Figure calculated using data extracted from Europe PubMed Central

¹² The main study was funded by the British Heart Foundation, with a cardiac imaging sub-study supported by the National Institute for Health Research

2. Predicting response to antihypertensive drugs

Collaboration between the British Heart Foundation and the Medical Research Council through the MRC's Stratified Medicine Initiative.

High blood pressure (hypertension) is very common within the UK population and, if left untreated, increases the risk of heart disease, kidney disease and stroke. Although there are a number of drugs available to control blood pressure, some people respond better to certain drugs or drug combinations than others. As a result, there is often a process of 'trial and error' to find the most suitable treatment for each individual, delaying blood pressure control in a large proportion of people.

Research at King's College London, supported by the British Heart Foundation and the Medical Research Council, is looking at ways to better predict the best type of drug or combination of drugs for an individual with high blood pressure. Whilst relatively little is known about why some people respond better to certain treatments than others, we know that response to treatment differs in different ethnic groups. The research is therefore investigating whether we can use genetic markers of ancestry (which predict the proportion of a person's ancestors from Europe, Asia and Africa) and a measure of some naturally-occurring chemicals in the blood, to predict the most appropriate treatment. It is hoped that this will lead to a more effective approach to the treatment of high blood pressure and better outcomes for patients.



EVERY £1 OF PUBLIC FUNDING GIVES RISE TO AN INCREASE IN PRIVATE FUNDING OF BETWEEN £1.13 AND £1.60

MULTI-FUNDER COLLABORATIONS

Some of the most exciting and ambitious projects emerge when large coalitions of funders come together to address an issue or develop the UK's strengths in a particular area. The creation of UK Biobank, the Francis Crick Institute and the Farr Institute of Health Informatics Research are just some of the innovative projects made possible through large collaborations in recent years. These projects have the power and breadth of expertise to have real impact on progress with UK research.

3. The Farr Institute of Health Informatics Research

Collaboration between a consortium of funders across UK Government and the charity sector.

The Farr Institute of Health Informatics Research was established in 2013 in order to optimise the use of health data in research and strengthen the UK's capacity in health informatics research. The Institute is led from four core centres across the UK (London, Manchester, Swansea and Dundee), bringing together a wider network of 24 academic institutions and two MRC units.

Through increased collaboration across the four centres and the wider network, the Institute aims to ensure a coordinated approach to the use of patient and research data and encourage partnerships between academia, industry and the NHS that lead to significant improvements in health and healthcare delivery.

The Institute was made possible through a £17.5 million research award from a consortium of ten funders, across charity and UK Government, and £20 million capital funding from the MRC.

TRANSLATIONAL RESEARCH

Complementary investment from Government, charities and industry is vital if we are to turn world-class research into tangible technologies and treatments.

Supporting the development of a new treatment from the lab-bench to the clinic is no small task. It can take between 10 and 12 years to complete all of the research and development needed for a new drug to become a licensed product¹³, at an estimated cost of £1.15 billion¹⁴. Industry often plays an important role in the later stages of development, supporting the large clinical trials needed to properly assess a promising product and take it to market. However, Government and charities also play a vital role in this process. By investing in promising research at a much earlier stage of development, Government and charities can alleviate the risk of projects so that they are more attractive for follow-on investment from larger funders. This support is crucial, as it prevents new drugs, diagnostics and other technologies with real potential from falling by the wayside and never making it to the patients that could benefit most.

In October 2014, the BHF launched an award that aims to support exactly this type of project. The BHF Translational Award supports pre-clinical development of innovative medicines and technologies so that they are more attractive for onward investment by larger charitable funders or industry. Our first award (outlined right, case study 4), looks at a test that could improve the diagnosis of heart attacks.

RESEARCH CAREERS

Research is at its most effective when scientists are free to focus on research rather than funding, generate new ideas, and build networks across institutions that allow those ideas to be exchanged, discussed and challenged. As the biographies throughout this report demonstrate, very few researchers receive funding from only one source during the course of their career, making long-term support from a system of funders essential for scientific progress. Likewise, networks of researchers are reliant on a network of funders. If the support from one funder falls away, these networks will quickly unravel.

4. Improving heart attack diagnosis

Bridging the gap between basic research and patient benefit

Our first Translational Award is looking at improved heart attack diagnosis. Following a heart attack, the protein troponin is released into the bloodstream. Previous tests for troponin took around 10–12 hours to detect changes in troponin levels to diagnose a patient suffering with chest pains with a heart attack. New, more sensitive tests have been developed, which have recently been approved in NICE guidelines (October 2014) for use and further clinical study. BHF-funded researchers at the University of Edinburgh have led crucial research in verifying the efficacy of these tests, such as demonstrating that one such test can double the diagnosis of heart attacks in women.

Our new Award in King's College London is now looking at whether testing for an alternative protein, myosin binding protein-C, could provide even higher sensitivity and thus better diagnosis of heart attack.

SENSITIVE TESTING CAN NOW DOUBLE THE DIAGNOSIS OF HEART ATTACKS IN WOMEN

x2

¹³ Association of the British Pharmaceutical Industry: <http://www.abpi.org.uk/industry-info/knowledge-hub/rannd/Pages/new-medicines.aspx>

¹⁴ Association of the British Pharmaceutical Industry: <http://www.abpi.org.uk/industry-info/new-medicines/Pages/default.aspx>

COSTANZA EMANUELI

Professor Costanza Emanuelli, University of Bristol, was awarded a BHF Professorship in 2015. Her research aims to provide new therapeutic options for patients suffering from cardiac and peripheral ischaemia (a restriction in blood supply to the tissues). She is also developing new biomarkers and therapeutics to be used in the context of heart surgery. Professor Emanuelli is also a visiting professor at the National Heart & Lung Institute at Imperial College London.

The National Heart & Lung Institute carries out world-leading research into the mechanisms underlying cardiovascular and respiratory diseases. Research in the cardiovascular arm of the institute is supported by funding from **UK Research Councils**, charities (including the **British Heart Foundation**, **Heart Research UK**, **Arthritis Research UK**, and the **Wellcome Trust**) and commercial sources.

“Through my research, I work in collaboration with researchers across the UK and internationally. Collectively, we are supported by a wide range of funders, including the BHF, NIHR and the MRC.

Without continued support from all of these sources, these networks would no longer exist.”



1997-2000

PhD in Pharmacology and Medicine at the Università degli studi di Firenze

Worked in research institutions in Italy and America

2007

Elected Fellow of the **American Heart Association**

2013

Appointed Honorary Professor at the National Heart & Lung Institute (Imperial College London), working in collaboration with scientists at the **Medical Research Council** Clinical Sciences Centre

2013

British Heart Foundation Centre for Vascular Regeneration established – Professor Emanuelli is the Bristol coordinator

2015

Awarded **BHF** Professorship in Cardiovascular Science

1988-1992

Degree in Biological Sciences, Biology, Biomedical Sciences and Molecular Biology at the Università degli studi di Firenze

2005

Moved to the UK and awarded a **BHF** Basic Science Lectureship at the University of Bristol

2010

Awarded **BHF** Senior Fellowship at the University of Bristol

Part of the Bristol **NIHR** Biomedical Research Unit (BRU) for Cardiovascular Disease

2013

Leducq Network for Vascular MicroRNAs established – Professor Emanuelli is the Bristol coordinator

The Bristol BRU is one of five UK centres funded by the **National Institute for Health Research** to translate cardiovascular research into improved patient care. The Institute brings together scientists and clinicians, making use of clinical facilities within the Bristol Heart Institute and the Bristol Royal Hospital for Children. Its Director, Professor Gianni Angelini, is a **BHF** Professor and **NIHR** Senior Investigator.

The Leducq Network for Vascular MicroRNAs brings together researchers across the UK, Germany and the USA to study the role of microRNAs (small sequences of genetic material) in vascular diseases. The network is funded by the **Leducq Foundation** between 2013 and 2018.

THE HEALTH BENEFITS OF INVESTMENT IN RESEARCH

Medical research underpins the vast improvements we have seen in human health and wellbeing in recent years. Increasingly we understand better why disease occurs, how we can prevent it and how we can treat it. Across different conditions and diseases, people are now living longer, healthier lives thanks to investment in science.

5. A life saving revolution

The impact of research on heart attack patients

Before the 1970s heart attacks were poorly understood, there were no medicines to treat them, and most victims lost their lives.

All that began to change when meticulous research by BHF Professor Michael Davies proved that heart attacks are caused by a blood clot in a coronary artery. His work paved the way for clot-busting drugs, and helped to show the world their life saving potential by supporting the pioneering Clinical Trial Service Unit (CTSU) in Oxford.

In a study of more than 17,000 heart attack patients – published in 1988 – the CTSU team discovered that rapid use of the clot-buster streptokinase, with aspirin, cut deaths by nearly 40 per cent compared to no treatment.

Thanks to modern treatments built on BHF-funded discovery, around seven out of ten people now survive a heart attack¹⁵.

70% NOW SURVIVE A HEART ATTACK

In cardiovascular disease in particular, over the last fifty years the outlook for patients has completely transformed, and death rates have more than halved. There are people living healthy, productive lives today who would have died in childhood in the past. Others have been prevented from ever having heart attacks which would previously have been unavoidable. New drugs and better understanding of the root causes mean that when heart attacks do happen, 70% of people now survive, when in the 1970s the majority would have died¹⁶. The phrase 'life saving research' is no empty cliché, our patients and supporters are with us today as living proof of its truth.

But there is further to go. People continue to die prematurely from heart disease and we need ongoing research to put an end to this. Our success also brings with it new challenges. As children survive into adulthood with complex, previously fatal conditions, we must discover how to keep them healthy throughout their lives. As people survive heart attacks, we need to learn how to help them recover from lasting, often debilitating side effects, such as heart failure, so that we are not only extending, but also improving life.

6. Fixing little hearts

The impact of research on babies born with congenital heart defects

In the UK, around 12 babies are born each day with a heart defect. BHF-funded advances are giving them the best chance of beating it.

In the 1970s BHF Professor Sir Magdi Yacoub developed a surgical technique to correct a defect in which a baby's major blood vessels are attached to the wrong chambers of their heart. Surgeons still use the method today.

BHF Professor Robert Anderson helped to improve treatment by carefully mapping the anatomy of heart defects. For example, this helped surgeons avoid putting a stitch where it could disrupt an electrical circuit controlling the heartbeat.

Until a decade ago, replacement of faulty heart valves in children required traumatic and risky open heart surgery. We funded research at Great Ormond Street Hospital to develop a quicker and less-stressful technique to replace heart valves via a tube inserted into a blood vessel in the groin.

Such **BHF-funded advances have helped to reduce the number of children dying from congenital heart disease by more than 80 per cent over the last three decades**, and made life better for survivors¹⁷.



Gretel,
Survivor.

¹⁵ BHF Coronary Heart Disease Statistics Compendium 2012 (original paper: Smolina et al, BMJ, 2014)

¹⁶ Trends in Coronary Heart Disease, 1961-2011 (original paper: Goldacre et al, BMJ, 2003)

¹⁷ Children & Young People Statistics 2013, British Heart Foundation

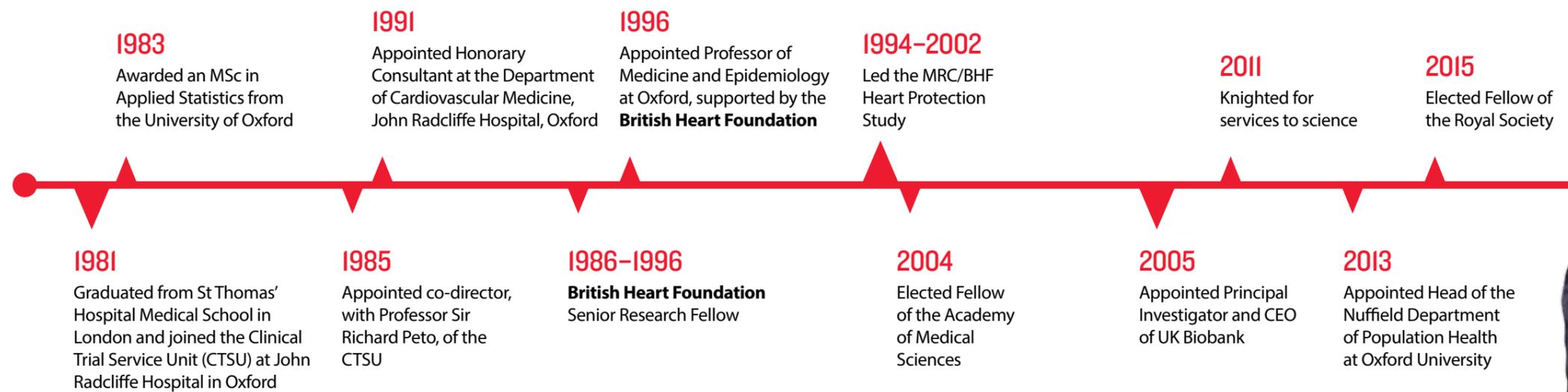
RORY COLLINS

Professor Sir Rory Collins, University of Oxford, has been a BHF Professor since 1996. His epidemiological studies unit aims to reliably assess the causes and treatment of heart and circulatory disease and has been responsible for some of the most influential clinical trials in cardiovascular medicine. Professor Collins is also Principal Investigator and CEO of UK Biobank.

“The quality of the UK research environment allows us to attract significant investment from the pharmaceutical industry, and conduct independent research that wouldn't otherwise have been possible.”



The MRC/BHF Heart Protection Study (outlined in case study 8) investigated the use of statins and antioxidant vitamins in patients at increased risk of heart disease. The study, which cost around £22 million, was funded by the **Medical Research Council, British Heart Foundation**, and the pharmaceutical companies **Merck & Co.** and **Roche**. The British Heart Foundation was the first organisation to invest, giving the study the credibility needed to leverage considerable investment (approximately two-thirds of the total cost) from industry. Without support from government, charity and industry, this influential study would not have been possible.



The Clinical Trial Service Unit is part of the Nuffield Department of Population Health at the University of Oxford. It is a world leader in the conduct of large scale studies, carrying out research into the causes and treatments of a number of chronic diseases. The CTSU receives core funding from the **British Heart Foundation, Medical Research Council** and **Cancer Research UK**. It also attracts substantial amounts of funding from industry to support clinical trials and increasingly, through relationships built between industry and the CTSU, to invest in non-drug-related research.

Over the past 20 years, the CTSU has attracted over £240 million in industry funding to further our understanding of disease and improve outcomes for patients.

UK Biobank was set up in 2006 to help researchers shed light on life-threatening conditions such as cancer, heart disease and dementia. It is a rich resource of biological samples and medical and lifestyle data, and is open for use by approved scientists.

UK Biobank is encouraging collaboration by bringing together researchers across different disciplines to unlock the full potential of the data that has been collected. It is also helping to drive innovation within research, as scientists develop creative solutions to analyse and interpret the wealth of data available.

The success of UK Biobank has relied on support from a wide range of funders across Government and the UK charity sector. It was established by the **Wellcome Trust, Medical Research Council, Department of Health, Scottish Government** and the **Northwest Regional Development Agency**. It has also had funding from the **Welsh Assembly Government, British Heart Foundation** and **Diabetes UK**.

THE ECONOMIC BENEFITS OF INVESTMENT IN RESEARCH

Through the creation of employment opportunities, development and commercialisation of innovative technologies, and collaboration between business and academia, science and research strengthen the UK's competitiveness and drive economic growth and productivity.

Investment in science and research generates substantial economic returns. The UK life sciences industry generates an estimated annual turnover of £56 billion. **For every £1 spent by the government on R&D, private sector productivity rises by 20p every year**¹⁸.

The UK life sciences sector directly employs around 183,000 people¹⁹. These people are our most valuable asset – without them, progress towards exciting new treatments and technologies would grind to a halt. In the last financial year, the BHF spent £40 million on salaries through our research grants²⁰, to support cardiovascular researchers across the country. Our researchers are based at more than 50 different institutions across the UK, conducting life saving research across the four nations. This investment contributes to productivity and prosperity across the UK. If we do not continue to invest in research, we will lose talented people to overseas and from the science community entirely.

If we are to continue to retain and attract talented people and maintain the UK's global competitiveness, it is vital that funding is available for researchers at all stages of their career. Investment is needed to nurture future talent, support those at the forefront of their field, and ensure there is flexibility for the most talented researchers to return to academia after time away. One way in which the BHF does this is through the Career Re-entry Research Fellowship (see right, case study 7).

Scientific research also contributes to the productivity of the UK workforce by developing treatments and technologies that enable people to live longer, healthier lives. Thousands of lives are now saved every year, thanks to developments in the prevention and treatment of heart attack. As a result of studies funded by the BHF and the MRC, statins are estimated to save around 7,000 lives a year in England alone by reducing risk of heart attack, heart disease and stroke.

7. BHF Career Re-entry Research Fellowship

Supporting and retaining talent within the science sector

Dr Danielle Paul began her career as a BHF-funded PhD student, studying heart tissue under the microscope. After several years as a researcher, she took a two-and-a-half year career break to spend time with her young children. In the time that she was away, there was a revolution in electron microscopy, which saw the introduction of new detectors for the microscopes and advances in processing software.

Dr Paul has recently returned to academia through a BHF Career Re-entry Research Fellowship, which allows successful academics to re-establish a career in research after a career break. The BHF's support means that Dr Paul can return to a sector that is constantly pushing the boundaries and making exciting advances, and benefit from these advances as she continues her own research.

A full interview with Dr Paul is featured in the BHF's Heart Matters magazine, September 2015

THE NUMBER OF PEOPLE OF WORKING AGE DYING OF A HEART ATTACK IN THE UK HAS DROPPED FROM AROUND 275 PEOPLE A WEEK TO LESS THAN 200 PEOPLE A WEEK OVER THE LAST TEN YEARS.

8. Statins

Maintaining a healthy UK workforce

Cholesterol-lowering statins became available in the late 1980s. Shortly after, BHF Professor Stuart Cobbe and colleagues in Glasgow launched a clinical trial looking at their effect in men at high risk of a heart attack and with high cholesterol levels. They showed that over five years, statins significantly cut these people's risk of heart attack and death from heart disease.

The BHF/MRC Heart Protection Study led by BHF Professor Sir Rory Collins, then tested if statins helped people at high risk of heart attack, but with 'normal' cholesterol levels. It revealed that those taking statins were about 25 per cent less likely to have a heart attack or stroke, or to die from heart disease.

Thanks to these world-leading studies, statins are now estimated to save around 7,000 lives a year in England alone.²¹

Partly due to advances in medical research, **the number of people of working age²² dying of a heart attack each week in the UK has dropped from around 275 people a week to less than 200 people a week over the last ten years²³**. Despite this improvement, the number of people of working age that are dying of heart attacks remains substantial. Continued investment in medical research will be essential if this number is to continue to fall.

INVESTING ACROSS THE UK

The British Heart Foundation is currently funding over 1,000 research projects across the UK. This map pinpoints just a few of the exciting projects that were funded across the country by the BHF in 2014, as well as our six Centres of Research Excellence.

These Centres aim to bring together scientists across different disciplines and encourage innovative approaches to cardiovascular research.



Scientific research has driven huge improvements in the way that we live and work as individuals, and to the UK economy as a whole. **The successes that we have seen in preventing and treating debilitating conditions, such as heart disease, have been made possible through long-term commitment from a network of funders, complementing and leveraging each other's investment. The UK Government is a vital part of this funding network.**

Through continued long-term commitment, maintained in line with inflation, the Government, together with charitable funders and industry, can and will continue to build on these successes and the strength of the UK economy.

¹⁸ Haskel, Hughes and Bascavusoglu-Moreau, The Economic Significance of the UK Science Base, 2014

¹⁹ Strength and Opportunity 2014, HM Government

²⁰ This figure is for researchers and their support staff only

²¹ NHS estimate

²² Individuals under the age of 65

²³ BHF analysis of UK Mortality Statistics, 2014 vs 2004



**British Heart
Foundation**

For over 50 years we've pioneered research that has transformed the lives of millions of people living with heart disease. Our work has been central to the discoveries of vital treatments that are changing the fight against heart disease.

But heart and circulatory disease still kills around one in four people in the UK, stealing them away from their families and loved ones.

That's why so many more people still need our help.

From babies born with life threatening heart problems, to the many mums, dads and grandparents who survive a heart attack and endure the daily battles of heart failure.

Join our fight for every heartbeat in the UK. Every pound raised, minute of your time and donation to our shops will help make a difference to people's lives.

policy@bhf.org.uk

**FIGHT
FOR EVERY
HEARTBEAT**

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