



Cardiovascular Disease

SBRI Healthcare NHS England and NHS Improvement competition for development contracts

June 2019

*The **AHSN** Network*

Summary

A new national Small Business Research Initiative (SBRI) Healthcare competition is being launched by NHS England and NHS Improvement in partnership with the Academic Health Science Networks (AHSNs) to find innovative new products and services. The projects will be selected primarily on their potential value to the health service and on the improved outcomes delivered for patients.

The competition is open to single companies or organisations from the private, public and third sectors, including charities. The competition runs in two phases (subject to availability of budget in 2020):

- Phase 1 is intended to show the technical feasibility of the proposed concept. The development contracts placed will be for a maximum of 6 months and up to £100,000 (**inc. VAT**) per project
- Phase 2 contracts are intended to develop and evaluate prototypes or demonstration units from the more promising technologies in Phase 1. Only those projects that have completed Phase 1 successfully will be eligible for Phase 2 (12 months and up to £1m per project).

Developments will be 100% funded and suppliers for each project will be selected by an open competition process and retain the intellectual property rights (IPR) generated from the project, with certain rights of use retained by the NHS.

The competition opens on **Monday 24th June 2019**. The deadline for applications is **12:00 (noon) on Wednesday 14th August 2019**.

Introduction & Background

Cardiovascular disease (CVD) is a general term for conditions affecting the heart or blood vessels and refers to any disease of the heart, vascular disease of the brain, or disease of the blood vessel.

CVD includes all heart and circulatory diseases, including coronary heart disease, angina, heart attack, congenital heart disease, hypertension, stroke and vascular dementia. It can also be associated with damage to arteries in organs such as the brain, heart, kidneys and eyes. CVD is one of the main causes of death and disability in the UK, but it can often largely be prevented by leading a healthy lifestyle¹.

The NHS Long Term Plan has identified that CVD is a key clinical priority over the next 10 years and being focused upon as the single biggest condition that could save lives. The Long Term Plan for the NHS has an ambition to help prevent over 150,000 heart attacks, strokes and dementia cases over the next 10 years². Whilst much of this ambition could be met through sharing best practice and reducing variation, there is also a significant unmet health need, to which this competition is looking for novel solutions.

Key facts:

- The British Heart Foundation have identified that there are around 7.4¹ million people living with heart and circulatory diseases in the UK - An ageing and growing population, and improved survival rates from heart and circulatory events, could see these numbers rise still further.
- More than twice as many people are living with heart and circulatory diseases than with cancer and Alzheimer's disease combined.

¹ British Heart Foundation, April 2019

² <https://www.longtermplan.nhs.uk/areas-of-work/cardiovascular-disease/>

- Heart and circulatory diseases cause more than a quarter (28 per cent) of all deaths in the UK; that's nearly 170,000 deaths each year - an average of 460 people each day or one death every three minutes.
- More than 43,000 people under the age of 75 in the UK die from heart and circulatory diseases each year³.
- Healthcare costs relating to heart and circulatory diseases are estimated at £9 billion each year.
- CVD's cost to the UK economy (including premature death, disability and informal costs) is estimated to be £19 billion each year⁴.
- In England, 1.8 million people have coronary heart disease, 1.1 million have atrial fibrillation (AF) and 500,000 people have been diagnosed with heart failure⁵.
- In 2018 Public Health England suggested that there is an opportunity to prevent more than 9,000 heart attacks and at least 14,000 strokes over the next 3 years with better diagnosis and management of high blood pressure, high cholesterol and atrial fibrillation⁶.

Digital Technology

Within the NHS Long Term Plan, the introduction of digital technology underpins some of the plan's ambitions. It is intended that the NHS app will act as a gateway for people to access services and information; by 2020/21, people will be able to use it to access their care plan and communications from health professionals. From 2024, patients will have a new 'right' to access digital primary care services (e.g., online consultations), either via their existing practice or one of the emerging digital-first providers. It is expected that after 10 years, patients will increasingly be cared for and supported at home using remote monitoring and digital tools. Digital technology will also support outpatient re-design including cardiology services in particular reorganising pathology and diagnostic imaging services⁷.

The Categories

The theme of the current competition is **'Cardiovascular Disease'** and within this topic three categories have been identified via review of key policy documents and in conjunction with key professionals, CVD clinicians and stakeholders. These are outlined in detail below.

Applicants are expected to respond to one of the three categories, whilst being mindful of the broader system.

Companies applying are also asked to consider:

- How will the proposed solution impact on the clinical care pathway, and how will the care pathway need to be changed in order to deliver system-wide benefits?
- How will you ensure that the technology will be acceptable to patients (and their families) and to healthcare workers? How could these groups be involved in the development of the innovation?
- How will you ensure that the technology is affordable to the NHS both immediately and throughout the life of the product? What health economics evidence will the NHS require before the technology can be adopted?

³ British Heart Foundation, April 2019

⁴ UK Factsheet, British Heart Foundation, April 2019

⁵ <https://www.england.nhs.uk/wp-content/uploads/2019/04/cardiology-elective-care-handbook.pdf>

⁶ <https://www.healthcheck.nhs.uk/commissioners-and-providers/data/size-of-the-prize-and-nhs-health-check-factsheet/>

⁷ <https://www.kingsfund.org.uk/publications/nhs-long-term-plan-explained#acute>

Category 1: Detection and Prevention

What if we could detect cardiovascular disease in a more efficient and less invasive way?

Background

The NHS Long Term Plan identifies that CVD is largely preventable, through lifestyle changes and a combination of public health and NHS action on smoking and tobacco addiction, obesity, tackling alcohol misuse and food reformulation. In addition, the Long Term Plan identified that early detection and treatment of CVD can help patients live longer, healthier lives. Too many people are still living with undetected, high-risk conditions such as high blood pressure, raised cholesterol, and atrial fibrillation (AF). The CVD prevention pathways highlighted that there are an estimate 5 million people with undiagnosed high blood pressure. Of those with a diagnosis, 40% have poorly controlled blood pressure⁸.

For clinicians to confirm a suspected diagnosis, a number of different tests are used to diagnose heart-related problems including electrocardiogram (ECG), X-rays, echocardiogram, blood tests, coronary angiography, MRI scans (magnetic resonance imaging) and radionuclide tests. The speed and efficiency of these tests was raised as challenges by the clinicians working in CVD and further improvements in accuracy were highlighted as required.

Challenges

There are many innovations that support people to improve their health behaviour (e.g. stop smoking, healthy eating and exercise) however to prevent CVD we need radical solutions to build upon the ambitions of the Long Term Plan.

Public Health England, NHS England and NHS Improvement are leading a coalition of over 40 organisations to improve the detection and treatment of atrial fibrillation, high blood pressure and high cholesterol (A-B-C). The ambitions include by 2029: to increase the detection and treatment of people with undiagnosed high blood pressure from current levels of 57% to 80% (4 in 5 people); to ensure 75% of 40- to 74-year-olds have received a formal CVD risk check and have had their cholesterol levels recorded (currently 45%); to increase from 35% to 45% the proportion of 40 to 74 year olds at high risk of developing CVD who are treated with statins.

The Long Term Plan has identified that this approach could be possible in England with digital technology, and major progress could be achieved working with the voluntary sector, employers, the public sector and NHS staff themselves.

Progress has been made in AF detection, since 2016 the AHSN Network collaborating with NHS and social care partners have increased detection using manual pulse checks or mobile ECG devices. This has delivered an increased in AF diagnosis of over 130,000 and provided lifesaving anticoagulation therapy to 150,000 more people at high risk of AF stroke⁹. We need to build upon this type of progress in the prevention and earlier detection of risk factors through novel and innovative solutions of detecting people at greatest risk of CVD that are cost effective, accessible and reduce the rate of false positive rates. We need easier and

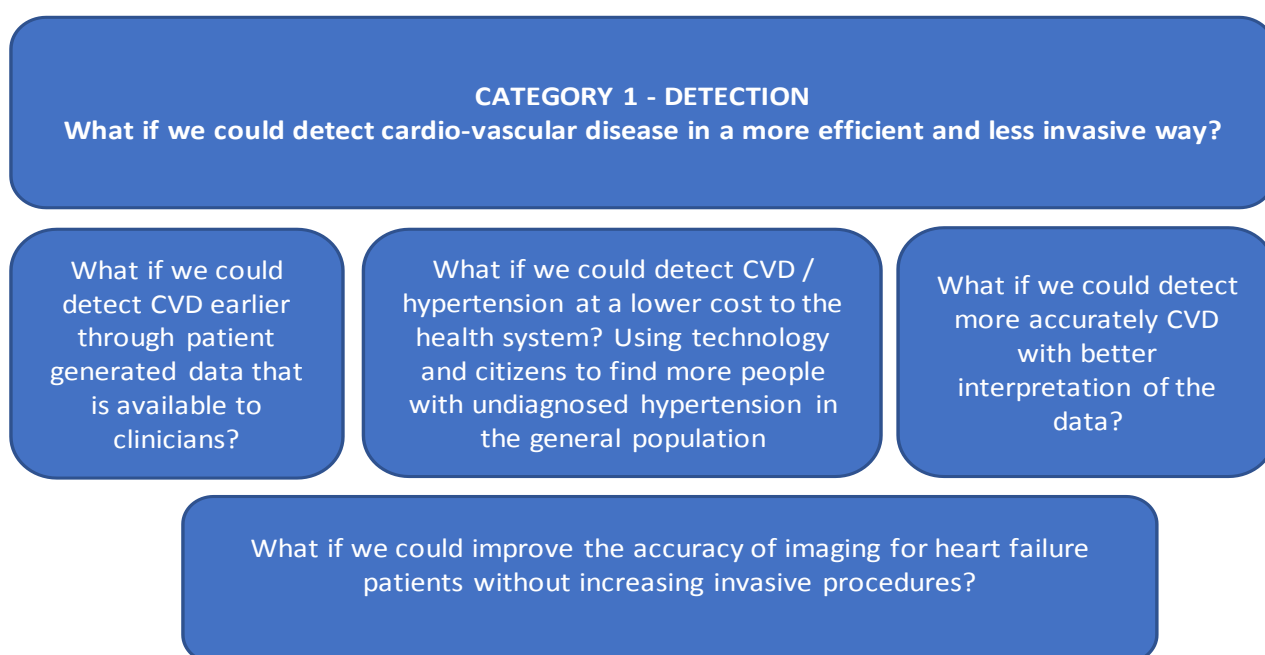
⁸ <https://www.england.nhs.uk/rightcare/products/pathways/cvd-pathway/>

⁹ AHSN Network, 2019

quicker ways to prevent CVD; identifying those at risk accurately and affordably in ways which do not increase the burden on existing services. The rapid adoption of mobile digital devices and smartphone technology provides opportunities for earlier detection and treatment of CVD.

The British Heart Foundation, in their five recommendations for the Long Term Plan's ambitions for CVD, identified that new technology and data science offer opportunities to address the challenges of CVD¹⁰. They highlighted that wearables have a place in the detection and management of risk factors including the avoidance of hospital visits through at-home monitoring. Clinicians can maximise the opportunities that big data from a patient's wearable can provide in the management of their patient's care.

The following "what if's" are some examples of scenarios that have the potential to help meet unmet needs for our "Detection and Prevention" challenges. The statements are intended as examples only.



¹⁰ <https://www.bhf.org.uk/for-professionals/healthcare-professionals/articles/update/five-ways-the-nhs-long-term-plan-can-turn-back-the-tide-on-cardiovascular-disease>

Category 2: Intervention and invasive investigations

What if cardiovascular interventions were more accurate, predictable, non-invasive and provide better patient outcomes?

Background & Challenges

There is a national focus to remove unwarranted variation and ensuring timely access to specialist cardiac screening, including echocardiography, computerised tomography (CT) scans and magnetic resonance imaging (MRI) so that all patients receive assessment, treatment and care in the most appropriate setting, first time.

Addressing lack of capacity in secondary care and improving processes in outpatient clinics. There are opportunities for optimising the skills and expertise of all staff within multidisciplinary working. Transforming patient pathways to ensure that patients receive assessment, treatment and care from the right person, at the right place, in the first time could be achieved through technological solutions and treatment closer to home. Currently patients often attend appointments several times before the point of the 'decision to treat'.

Improvements in diagnostics could result in patients accessing appropriate assessment and diagnostics more quickly and easily. By improving the information / data available to clinicians they can assess, diagnose and (where appropriate) prepare patients for surgery sooner. This avoids unnecessary delays, which can mean diagnostic test need to be repeated.

If patients have the appropriate cardiology diagnostic tests before being seen in secondary care, then they can be seen more quickly by the most appropriate practitioner. This should result in increasing the conversion rates for those who are referred.¹¹

Interventions – Below are details of some of the interventions and procedures frequently used to treat CVD¹²

Angioplasty: For coronary patients with obstructions in their arteries, they may require interventions and techniques to improve blood flow (called coronary revascularisation). This could involve the insertion of stents, known as percutaneous coronary intervention (PCI) or 'angioplasty'.

Angiogram: An X-ray investigation performed under a local anaesthetic that produces images of the flow of blood within an artery (in this case the coronary artery). Narrowing and complete blockages within the arteries can be identified, allowing decisions to be made regarding treatment, such as primary percutaneous coronary intervention or coronary artery bypass grafting.

Implantable cardioverter defibrillator: A small device placed in the chest or abdomen to help treat irregular heartbeats called arrhythmias.

Cardiac resynchronisation therapy (also known as biventricular pacing): Aims to improve the heart's pumping efficiency by making the chambers of the heart pump together. 25–50% of all heart failure patients have

¹¹ Transforming elective care services cardiology, Learning from the Elective Care Development Collaborative, NHS England and NHS Improvement April 2019

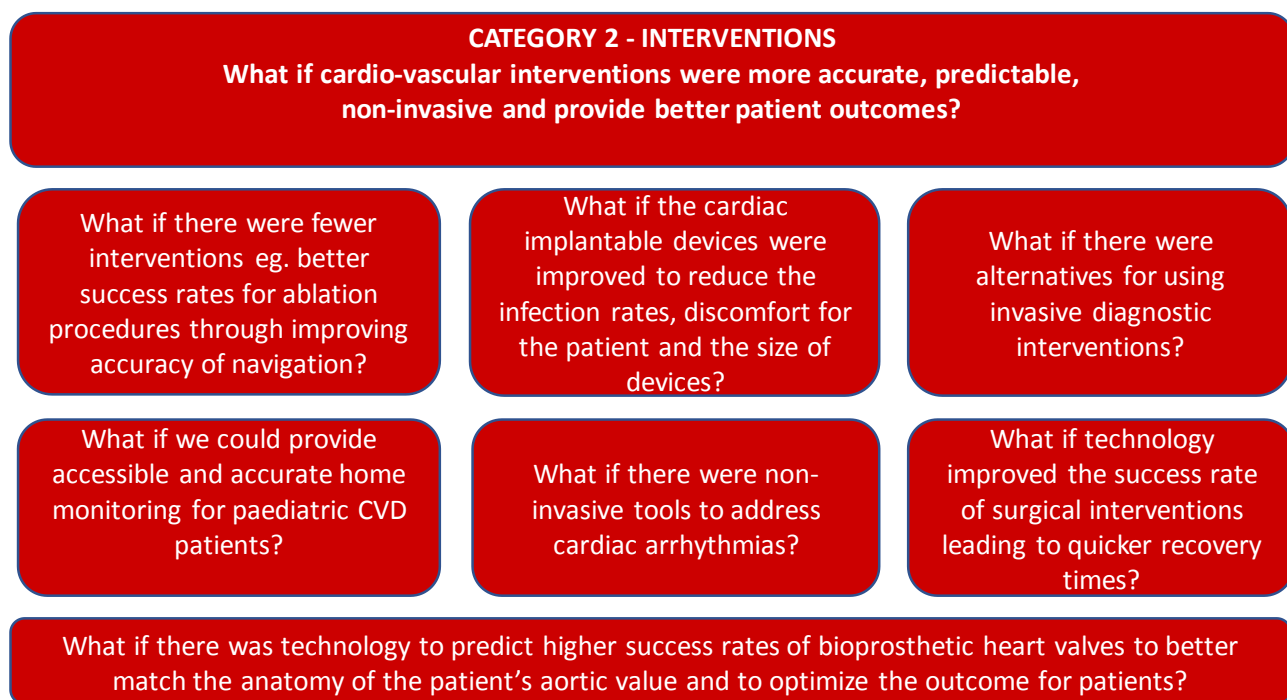
¹² <https://www.nicor.org.uk/wp-content/uploads/2018/11/NCAP-Annual-Report-2018.pdf>

hearts whose walls do not contract simultaneously. CRT involves implanting a CRT pacemaker or ICD with leads positioned to stimulate both ventricles. Most devices also include a third lead positioned in the right atrium to ensure that the atria and ventricles contract at the right times.

Transcatheter aortic valve implantation (TAVI): A non-surgical alternative to open heart surgery to replace the aortic valve.

Cardiac ablation is a procedure that can correct heart rhythm problems (arrhythmias). It works by scarring or destroying heart tissue that triggers or sustains an abnormal heart rhythm. In some cases, cardiac ablation prevents abnormal electrical signals from entering the heart and, thus, stops the arrhythmia. It is undertaken by using a catheter inserted through a vein or artery in the groin and threaded to the heart to deliver energy in the form of heat or extreme cold to modify the tissues in the heart that cause an arrhythmia.

The National Cardiac Audit Programme found that observational research using their Heart Attack audit data suggests that the increasing use of angiography has been clinically important. Between 2003 and 2013, the use of angiography after lower-risk heart attacks increased from 42.7% to 78.6% and, consistently, half of those undergoing angiography went on to angioplasty or CABG. At the same time, the unadjusted death rate six months after the acute admission fell from 10.8% to 7.6% (a relative reduction of 30%). An increase in angiography provision was significantly associated with the reduction in mortality.¹³ Whilst this improvement is very welcome, innovations that could replace the need for the invasive investigations would be very welcome.



The above “what ifs” are some examples of scenarios, intervention and invasive investigations, they are in no way prescriptive or limiting. Applicants should think as broadly as possible; the above scenarios are intended as examples only.

¹³ <https://www.nicor.org.uk/wp-content/uploads/2018/11/NCAP-Annual-Report-2018.pdf>

Category 3: Efficiency of CVD pathway

What if cardiovascular detection, diagnostics and interventions were more efficient

Background & Challenges

The NHS is experiencing significant pressure and unprecedented levels of demand for elective care. Although there are no statistics for CVD elective care; it is worth noting that around 1.7 million patients are referred for elective consultant-led treatment each month. Between 2011/12 and 2016/17, referrals rose annually by an average of 3.7% per year. Over the twelve months to December 2018, growth in GP referrals decreased by 0.4%. Total referral growth in 2018/19 was 1.6% at December 2018, against planned growth of 2.4%. This represents a significant achievement through the redesign of pathways across primary and secondary care and implementing interventions across the elective pathway, to reduce avoidable demand and ensure that patients are referred to the most appropriate healthcare setting, first time. The redesign of elective care has been positive, however managing the continued increase in demand for CVD services is a priority (for example, the 157,000 hospital visits due to heart attacks¹⁴). Further solutions are required to ensure pathways are efficient as possible through improved flow through services and cost effectiveness, for example turn-around times, speed of procedure or patient experience.

The Long Term plan includes an ambitious pledge to use technology to fundamentally redesign outpatient services over five years. The aim is to avert up to a third of face-to-face consultations in order to provide a more convenient service for patients, free up staff time and save £1.1 billion a year if appointments were to continue growing at the current rate¹⁵.

New ways of delivering care to drive productivity, efficiency and better patient experience could address the increasing demand. In particular when the NHS staff numbers are failing to keep pace with demand and there is ongoing issues with retention and recruitment¹⁶.

There are already a number of applications and devices that are available to home monitoring of patients, but we are interested in novel technologies that could facilitate a step-change either in terms of the types of patients that could be monitored, the types of conditions or the ease of monitoring.

The following “what ifs” are some examples of scenarios that have the potential to help meet unmet needs for our “Efficiency of CVD pathway” challenges. Applicants should think as broadly as possible; the following scenarios are intended as examples only:

¹⁴ British Heart Foundation, 2019 <https://www.bhf.org.uk/what-we-do/our-research/heart-statistics>

¹⁵ <https://www.kingsfund.org.uk/publications/nhs-long-term-plan-explained>

¹⁶ <https://www.health.org.uk/news-and-comment/news/nhs-staff-shortages-put-long-term-vision-for-primary-and-community-care-at-risk>

CATEGORY 3 - OPERATIONAL / CLINICAL EFFICIENCY
What if cardio-vascular detection, diagnostics and interventions were more efficient?

What if cath (catheter) labs were more efficient and increase turnaround times?

What if remote monitoring of CVD patients (paediatric and adult) reduced number of outpatient appointments?

What if all endovascular aortic devices could be reliably monitored remotely or alert the patient that there may be a problem with the device reducing the need for regular CT or ultrasound scans?

Using data from wearables to measure patient outcomes after surgery (eg. bypass/aneurysm surgery/CABG etc) to show that patients were fitter and 'more functional' post invention?

Application process

This competition is part of the Small Business Research Initiative (SBRI) programme which aims to bring novel solutions to Government departments' issues by engaging with innovative companies that would not be reached in other ways:

- It enables Government departments and public sector agencies to procure new technologies faster and with managed risk.
- It provides vital funding for a critical stage of technology development through demonstration and trial – especially for early-stage companies.

The SBRI scheme is particularly suited to small and medium-sized businesses, as the contracts are of relatively small value and operate on short timescales for Government departments. It is an opportunity for new companies to engage a public sector customer pre-procurement. The intellectual property rights are retained by the company, with certain rights of use retained by the NHS and Department of Health and Social Care.

The competition is designed to show the technical feasibility of the proposed concept, and the development contracts placed will be for a maximum of 6 months and up to £100,000 (incl. VAT) per project.

The application process is managed on behalf of NHS England and NHS Improvement by LGC Group. All applications should be made using the application portal which can be accessed through the [SBRI Healthcare website](#).

Briefing events for businesses interested in finding out more about these competitions will be held on 1st July in London and on 10th July in Manchester. Please check the [SBRI Healthcare website](#) for confirmation of dates and venues, information on how to register and details of the challenges that will be presented at each event.

Please complete your application using the [online portal](#) and submit all relevant forms by **12:00 (noon) on Wednesday 14th August 2019**.

Key dates

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|---------------------------|---------------------------------------|
| Competition launch | 24 June 2019 |
| Briefing events | 1 July, London 10 July, Manchester |
| Deadline for applications | 14 August 2019 (12:00) |
| Assessment | August / September 2019 |
| Interview Panel | 10 October 2019 |
| Contracts awarded | November 2019 |

More information

For more information on this competition, visit: www.sbrihealthcare.co.uk

For any enquiries e-mail: sbri@LGCGroup.com

For more information about the SBRI programme, visit: <https://www.gov.uk/government/collections/sbri-the-small-business-research-initiative>

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