

# **UCLPartners**

## **World class outcomes for a unique population**

A proposal for clinical change  
in specialist cardiovascular  
services across north and east  
London

October 2013

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## Glossary of terms

### Hospitals and trusts

- Bart's Health, also known as Bart's and Bart's Health NHS Trust
  - The London Chest Hospital: part of Bart's Health NHS Trust
  - St Bartholomew's Hospital: part of Bart's Health NHS Trust
- Basildon, also known as Basildon and Thurrock University Hospitals NHS Foundation Trust
- GOSH: Great Ormond Street Hospital for Children NHS Foundation Trust
- Hammersmith Hospital: part of Imperial College Healthcare NHS Trust
- Liverpool Heart and Chest Hospitals: part of Liverpool Heart and Chest Hospitals NHS Foundation Trust
- Papworth: Also known as Papworth Hospital NHS Foundation Trust
- Royal Free Hospital: part of Royal Free London NHS Foundation Trust
- UCLH: University College London Hospitals NHS Foundation Trust
  - The Heart Hospital: part of University College London Hospitals NHS Foundation Trust
  - University College Hospital: part of University College London Hospitals NHS Foundation Trust

**Health terms**

- Adult congenital heart disease: ACHD
- Atrial fibrillation: AF
- Familial hypercholesterolaemia: FH
- Inherited cardiovascular conditions: ICC
- Heart failure: HF

**Administrative terms**

- 7/7: 7 Day working within the NHS. More information [here](#)
- HWB: Health and Well Being Boards
- NHS Healthcheck

## Executive summary

This document sets out the clinical case for change in the configuration of specialist cardiovascular services in north and east London. It shows that there is major unmet need for such services amongst the growing population of this geography; and that the current configuration of services is not sustainable, given commissioners' expectations, national policy priorities, and advances in treatment and technology.

The document also sets out a proposed solution: to bring together two existing specialist cardiac centres – at The Heart Hospital, UCLH and at the London Chest Hospital, Bart's Health – onto a single campus at a new building at St Bartholomew's Hospital, by December 2014. This proposal which has been developed by doctors, supported by UCLPartners, an Academic Health Science Network.

The purpose of this document is to explain the case for change and the proposed solution, so enabling commissioners (both NHS England and Clinical Commissioning Groups) to decide whether to proceed to public consultation on the proposed change.

### **National policy context: the imperative to reduce mortality from cardiovascular disease**

Cardiovascular disease (CVD) affects millions of people in the UK and remains one of the biggest causes of early death and disability. A new, national Cardiovascular Disease Outcomes Strategy (2013) shows that while improvements in CVD prevention and treatment over the last decade have led to a reduction in mortality, more needs to be done to bring the UK in line with outcomes achieved internationally, and to speed up the adoption of new technologies for the benefit of patients. The strategy proposes an integrated set of actions to improve outcomes, including improved prevention and risk management; better early diagnosis management and secondary prevention in the community; and improved acute care, including world class specialist 24/7 services for heart attack and unstable angina.

### **The local challenge: why we need to change to improve outcomes**

The rate of early deaths from heart disease and stroke in north and east London, at 84.8, is significantly higher than the rate for London (71.5) and England (67.3) (SEPHO). Eight out of the 12 London boroughs in this area have rates significantly higher than England as a whole. Cardiovascular risk profiles produced by Public Health England show that the observed prevalence of coronary heart disease (CHD) for north and east London is less than half the estimated prevalence. This indicates high, unidentified need among our population, which is undoubtedly contributing to higher rates of early deaths. High levels of deprivation and ethnicity increase CVD risk in the population. Moreover, the population in this part of London is expected to grow rapidly over the coming years, particularly in the middle and older age groups where CVD is more common – leading to increased demand for CVD services.

If we were to improve our Early Mortality from cardiovascular disease in North Central and North East London currently at 84.8 to 67.3 rate for England<sup>1</sup> we would save an estimated 1117 lives per year. If we were to improve to the European rate of 57.4%<sup>2</sup>, we would save an estimated 2201 lives per year, or 11,005 lives over 5 years.

### **An integrated approach: delivering ‘whole pathway’ cardiovascular care**

NHS England, CCGs and providers have committed to developing an ‘Integrated Cardiovascular System’ (ICVS) through UCLPartners, to provide whole life and whole pathway cardiovascular care. The system’s purpose is to improve cardiovascular health across the population through prevention and early detection; improve patient reported outcomes and experiences; and ensure that the ICVS is underpinned by the latest knowledge.

The ICVS provides a platform for delivering more consistent and joined up approaches to care for our population across primary and community services, district general hospitals and specialist centres. A comment by Dr Caroline Sayer, Chair of the Camden CCG, offers one illustration of the ICVS’s close collaboration with CCGs:

*“UCLPartners is working for Camden on a range of joint community initiatives aimed at preventing heart attacks and stroke. These include: identifying high risk patients, improving blood pressure monitoring through new technologies, improving management of patients with atrial fibrillation. These areas should complement the wider work on cardiovascular services and improve outcomes for Camden residents.”*

### **Why we need a new model of care for specialist CVD services in north and east London**

As one important element in building an ICVS, we must ensure that our CVD specialist services perform at world class levels. In recent years, London’s cardiovascular community has put major focus on the question of how to reduce the variation in acute care across the capital; reduce waits for surgery and hospital stays; and guarantee equal access to treatment wherever people live.

The London Cardiovascular Project Case for Change published a report in 2010 that reviewed the evidence and sought the views of patients and the public. It concluded that clinical outcomes would be improved, the uptake of new technologies would be accelerated, greater quality would be achieved, and efficiency optimised if specialist services were undertaken in fewer high-volume units. These units would link to other services, which should continue to be delivered locally. Its finding was unequivocal:

*“It is in the best interests of patients that hospitals should come together to provide high-volume units.”*

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1 CVD profiles 2011-12, South East Public Health Observatory, [www.sepho.org.uk](http://www.sepho.org.uk)

2 The Lancet “UK health performance: findings of the Global Burden of Disease Study 2010” March 2013 [Volume 381, Issue 9871](#), Pages 997 - 1020

These findings are particularly relevant in north and east London. Prompt access to emergency 24/7 services for heart attack, unstable angina, complex surgery and other urgent care is essential for our population and saves lives. These services are currently provided at The Heart Hospital, UCLH and the London Chest Hospital, Bart's Health – but they are under stress and are not configured in a way that allows them to meet evidence-based guidance and commissioner recommendations and specifications in all areas of their work.

Although each service currently delivers good outcomes, neither is large enough to meet current and future expectations for a high quality service, described in the London Model of Care for Cardiovascular Services 2010. For example:

Each surgical and anaesthetic team is too small to achieve the full sub-specialisation in mitral repair surgery that is the expectation of modern cardiac surgery.

In 2012 the London Specialised Commissioning Group agreed that there should be a separate 24/7 rota for acute aortic dissections in each quadrant of London. Neither service has the volumes of activity for surgeons to sub-specialise and deliver this across North East and North-Central London.

Ten years ago the majority of percutaneous coronary interventions (PCIs) were given on an elective or planned basis. The evidence has shifted to giving PCI for an increasingly wide range of acute cardiac conditions so that two-thirds of PCIs are now delivered on an emergency basis. Running 24/7 heart attack centres (HAC) requires rotas of highly trained staff in adequate numbers and presents the existing services with logistical problems. This type of urgent and emergency care is better being treated in larger specialist centres.

Meeting the challenge of seven day working will be difficult, particularly for support services, where there are workforce shortages in skills such as cardiac physiology and ITU staff. It will not be achievable by either The Heart Hospital if it stays where it is, or by services at the London Chest Hospital when they move to the new site at St Bartholomew's Hospital.

Standards endorsed in the CVD Model of Care for waiting times for patients needing urgent cardiac surgery cannot always be met because of limited capacity. Bed occupancy at The Heart Hospital currently approaches 95%. Activity has been increasing year on year and will continue to grow.

### Key reasons why we need to change

#### System-wide:

- We face a unique challenge to improve the cardiovascular health of our population, tackle unmet needs and reduce inequalities - *Section 2*
- We need to address cardiovascular risk in our growing population - *Section 2*
- We need to address the fragmentation of services; delivering 'whole pathway' cardiovascular care and better outcomes - *Section 3*



### Specialist services:

- We need to adopt a new model of care and deliver specialist adult cardiac services at a greater scale - *Section 4*
- We need to future-proof our specialist services so they are sustained for the next generation; addressing current capacity and workforce challenges, including delivering more services on a 24/7 basis and moving to 7/7 working - *Section 5*
- We need to deliver efficiency savings to reinvest in new technology and new treatments, making best use of tax-payers money - *Section 6*
- We have an opportunity to create a world-class joint academic and clinical centre, integrated on a single campus at the forefront of research, teaching and innovation; which would bring new treatments and technologies to patients and add value by harnessing our potential to create wealth - *Sections 7,8 and 9*

### **The proposed solution: bring together two existing specialist centres onto a single campus at St Bartholomew's Hospital**

We have a unique opportunity to improve our response to acute cardiac events and deliver world class surgery and cardiac intervention by bringing together two existing specialist cardiac centres, The Heart Hospital at UCLH and The London Chest at Bart's Health, onto a single campus at a new building at St Bartholomew's Hospital, by December 2014. It is possible to achieve this swift timescale because of long standing plans by Bart's Health to create a new facility for its specialist CVD services at St Bartholomew's Hospital, which is located midway between the existing two sites. Sufficient capacity can, however, be achieved for The Heart Hospital and the London Chest Hospital, together with CVD services in the Queen Elizabeth Wing at St Bartholomew's Hospital all to move into the new building at St Bartholomew's Hospital.

Currently there are three heart attack centres (HACs) in North East and North-Central London, which would reduce to two HACs under these proposals. The HAC at the Royal Free Hospital, together with associated services, would remain in its current location. The HACs at The Heart Hospital and The London Chest Hospital would relocate to form single HAC service at the St Bartholomew's Hospital site. This would not adversely impact on access times, given the services' future close location, less than two and a half miles apart.

By consolidating specialist services in north and east London we would reduce duplication and rationalise investment, particularly in a specialty that is increasingly technology- driven. A better use of resources would facilitate the achievement of the year- on -year productivity gains that need to be made in the NHS to enable investment in increased activity and new technologies.

Conversely, not creating a single service would create significant risks. Neither service would be sustainable, nor would they meet current expectations for specialist CVD services, for example, vascular surgery is identified as an important co-dependent service for major aortic surgery and is not currently available at The Heart Hospital site. The benefits of scale and the improved outcomes

would be lost at both sites and for the population. Innovation and research at both sites, on many fronts, would be impeded.

The Heart Hospital would face particular problems, given that it is currently running at full capacity – which is impacting on its ability to treat patients quickly – and activity is continuing to grow. In particular, Adult Congenital Heart Disease and Inherited Cardiac Disease services, centred at The Heart Hospital, are both rapidly growing services; The Heart Hospital on its own would not be able to respond effectively to the needs of these patient populations. The Heart Hospital is a land-locked site with no room for expansion. When the hospital opened in 2001 the expectation was that it would need to be reconfigured or moved to a new location; this is now overdue.

**Our vision for the future: delivering world class outcomes and experience for patients, underpinned by world-leading academic research and teaching**

Bringing these two high quality, but medium sized specialist CVD services together onto a single campus would enable them to operate at a scale to deliver world class results. We have the opportunity to bring the best in CVD medicine and research to the people that need it the most and to ensure we offer best value care for patients. Our vision is for a consolidated service that delivers improved outcomes and patient experience.

In particular, the new service would:

- Achieve full sub-specialisation in surgery, enabling the development of high volume centres for mitral valve and a regional aorto-vascular centre with a specialist 24/7 rota, so improving outcomes for patients.
- Meet and surpass evidence-based recommended volumes in complex and emergency procedures in cardiology, by consolidating into a single high volume service – a recognised marker for clinical safety and quality. Clinicians think that about 20 more lives each year could be saved in north and east London by treating a higher volume of cases in a single centre.
- Enable supporting services such as anaesthetics to sub-specialise, establishing expertise in sufficient numbers to a range of sub-specialities across the multi-disciplinary team, as well as the faster adoption of new techniques.
- Generate greater expertise amongst the whole workforce, driving up outcomes and giving patients a better experience of care; many services at the new centre would be the largest in the UK and so bring the benefits of critical mass to our population.
- Share the benefits of its expertise across our whole population, and beyond.
- Improve training opportunities for all groups of staff; the service would be able to recruit from a world class pool of expertise
- Strengthen research and wealth creation by creating access to data from such a large, diverse population and broad range of activity.

- By bringing surgery onto one site, streamline care pathways and create clearer referral routes for emergency units and the London Ambulance Service.
- Create greater capacity and flexibility to respond to demand, avoiding waits and cancellations.
- Creating a world-class academic centre that ranks in the top five most productive cardiovascular publishers in the world.
- Provide better value for money and maximise the gain from the investment already made at St Bartholomew's Hospital.

Achieving this vision would deliver considerable benefit for our patients and our population, including:

- The new St Bartholomew's Hospital would have the capacity across all departments to provide prompt access to treatment. Prolonged waits and cancellations of procedures would no longer be a problem.
- Patients would have their treatment given in a high- quality environment, with state of the art equipment in all departments.
- Patients would be treated by expert teams, with the accumulated knowledge and understanding that results from treating high volumes of similar conditions, even for rarer interventions such as mitral valve repair and aortic dissection, where greater specialisation would be possible for clinicians.
- Patients with rare diseases would know that they are being treated by teams who see some of the highest numbers of patients in the world with their condition, making clinical and research breakthroughs more possible.
- All patients would benefit from the increased opportunities to participate in clinical trials and the associated improvement in patient outcomes.

*"We are planning a system of integrated care which will see improvements delivered across whole pathways from the community setting to the most advanced heart treatments. To do this effectively we know that we need to concentrate specialist services at a state-of-the-art hospital. Such a facility is being built at St Bartholomew's. This will enable us to build upon the improvements in cardiovascular care which have been seen over the last few years in London while giving the people of NE and NC London access to the best specialist cardiovascular care in the world."* **Extract from a letter of support written by the Clinical, Academic and Nursing Leads of Cardiovascular Services at University College Hospitals and Barts Health (Appendix 3)**

## What happens next

While the clinicians working in our hospitals have recommended to commissioners that patient outcomes and the quality and sustainability of services would be improved by the consolidation of specialist services, no decisions will be made until wider engagement has taken place. Should commissioners decide to proceed to public consultation on the proposed change, this process would

involve understanding the views of local authorities, GPs, CCGs, patient groups and the general public.

Following such engagement, a decision will be made by NHS England and CCGs, as appropriate, based on how best to ensure that we can deliver a world class service for our population now and in the future.

## **1 Background – a new policy framework for addressing the burden of cardiovascular disease**

### **1.1 Improving outcomes from cardiovascular disease in north and east London**

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Cardiovascular disease (CVD) affects millions of people in the UK and remains one of the biggest causes of early death and disability. Across the population of 3.2 million in north and east of London, CVD causes approximately two-thirds of premature deaths every year. Compared with the rate for England, early mortality is significantly higher in the majority of the London boroughs in our partnership<sup>3</sup>. Many more people in our population are living with CVD and need support to live as full a life as possible.

Local clinicians - GPs, specialist doctors, public health doctors, nurses and health professionals - together with patient representatives have looked at how we could improve services for cardiovascular disease in north and east London.

Clinicians have identified the need to make further improvements system-wide across the care pathway - from prevention and earlier detection, to treatment and follow up care to address unmet needs and the early mortality from cardiovascular disease in our community.

Clinicians also believe that, to achieve world class standards of care, we need to change the way we deliver specialist adult cardiovascular services. They consider that to meet the expectations of greater clinical specialisation, truly 24/7 care and increased cost-effectiveness to allow investment in new technology, services need to be provided at a greater scale if patient outcomes and experience are to continue to improve.

Their proposal, which is the focus of this document about clinical service change, is to bring together the current two high quality, but medium sized units at The Heart Hospital, UCLH, situated in Westminster and the the London Chest Hospital, Bart's Health, situated in Bethnal Green.

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<sup>3</sup> CVD profiles 2011-12, South East Public Health Observatory, [www.sepho.org.uk](http://www.sepho.org.uk)

The new state-of-the-art facility being built at St Bartholomew's Hospital, located midway between the existing hospitals, provides an opportunity to bring both onto a single campus; creating a joint academic and clinical centre, of a size that not only makes sure specialist adult cardiovascular services are sustainable for the future, but also brings them to the forefront of research, teaching and innovation.

Clinicians have been guided in the development of their ideas for improving care by the recommendations in the London Model of Care for Cardiovascular Disease (2010)<sup>4</sup> and the national Cardiovascular Disease Outcomes Strategy (2013)<sup>5</sup>, published by the Department of Health. They have also taken into account more general national policy priorities set out by NHS England in 'Everyone Counts: Planning for Patients 2013/14'<sup>6</sup>, in particular the need to improve access to services seven days a week and deliver this within the available workforce. These policies are described in the following paragraphs.

## 1.2 The CVD Outcomes Strategy (2013)

A new, national Cardiovascular Disease Outcomes Strategy (2013), published by the Department of Health, highlights that while improvements in CVD prevention and treatment over the last decade have led to a reduction in mortality, more needs to be done to bring us in line with the outcomes achieved internationally, and to speed up the adoption of new technologies for the benefit of patients. There is also a risk that recent gains would not be sustained as our population becomes older with a resulting increase in risk for CVD ; for example, due to higher levels of obesity and diabetes.

*"CVD is a common condition caused by atherosclerosis (furring or stiffening of the walls of arteries). Although CVD may manifest itself differently in individual patients, CVD in practice represents a single family of diseases and conditions linked by common risk factors and the direct effect they have on CVD mortality and morbidity. These include coronary heart disease, stroke, hypertension, hypercholesterolemia, diabetes, chronic kidney disease, peripheral arterial disease and vascular dementia. Many people who have one CVD condition commonly suffer from another...." (National Outcomes Strategy, 2013)*

The CVD Outcomes Strategy has highlighted actions to improve outcomes which will shape how services need to change locally.

These are to:

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<sup>4</sup> NHS Commissioning Support For London "Cardiovascular Project; Proposed model of care" August 2012

<sup>5</sup> Department of Health "Cardiovascular Disease Outcomes Strategy: Improving outcomes for people with or at risk of cardiovascular disease" March 2013

<sup>6</sup> <http://www.england.nhs.uk/wp-content/uploads/2012/12/everyonecounts-planning.pdf>

- **Manage CVD as a single family of diseases** – ensuring a more coordinated and integrated approach to assessment, treatment and care to improve outcomes, including patient experience of care and patient safety
- **Improve prevention and risk management** – local authorities have new responsibilities since April 2013 to support their populations to adopt healthy lifestyles and reduce health inequalities. They have taken on responsibility for the NHS Health Check Programme
- **Improve and enhance case finding in primary care** – in addition to the ‘NHS Health Check’ for adults between the ages of 40 and 74, GPs and other primary care staff need to identify at-risk patients, through their routine work and the use of specific tools
- **Improve identification of very high risk families and individuals**
- **Better early management and secondary prevention in the community** – ensuring, for example, that people who have atrial fibrillation are appropriately treated with anti-coagulants to reduce their risk of stroke; and that people with hypertension are adequately monitored
- **Improve acute care** – all CVD patients should have access to the right treatment, including specialist teams. Specialist services for heart attack and unstable angina are needed 24/7 where time is a critical factor, and reconfiguration may be required, building on the model for stroke care in London. However, for other conditions, such as for patients with chronic heart failure, access to expert assessment through networked care across specialist centres linked to District General Hospitals (DGHs), primary care and the community are required
- **Improve care for patients living with CVD** – ensuring that after diagnosis or an acute event patients have their needs assessed and are given a care plan, with their needs supported. Carers can also have a carer’s assessment
- **Improving end of life care for patients with CVD** – eliciting and respecting patients’ wishes about where they want to die; strengthening and improving the coordination of services in the community
- **Improve intelligence monitoring and research** – and publish comparative data on the quality of care provided to patients with CVD.

### 1.3 London Model of Care (2010)

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In 2009, the NHS in London brought together London’s cardiovascular community to propose changes to services in the capital. In March 2010, a Case for Change was published, which made a series of compelling arguments for the need to change cardiovascular services in London to:

- Reduce the variation in acute care across the capital
- Reduce waits for surgery and hospital stays

- Guarantee equal access to treatment wherever people live

The Case for Change<sup>7</sup> and subsequent London Model of Care reviewed the evidence and sought the views of patients and the public. They concluded that clinical outcomes would be accelerated; greater quality would be achieved; and efficiency optimised if specialist services were undertaken in fewer high volume units, linking to other services, which should be continued to be delivered locally. The finding was unequivocal:

*“It is in the best interests of the patients that hospitals should come together to provide high-volume units”<sup>8</sup>*

It also recommended that the international profile of research in London would be improved if a more systematic and collaborative approach was adopted across academic institutions.

The London Model of Care made recommendations on specialist elements of cardiovascular care that deal with some of the more complex or emergency procedures, or urgent treatment. These recommendations are explored in more detail in Section 4, ‘A new model of care for specialist services’.

The London Model of Care also made specific recommendations about vascular services which do not form part of this proposal for clinical service change.

## 1.4 NHS commissioning and policy

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Since April 2013, Clinical Commissioning Groups and NHS England have responsibility for the commissioning of NHS services, taking account of the DH Mandate, DH Outcomes Strategies and NICE guidance. NHS England has developed service specifications for the more specialist aspects of care, including cardiac surgery and complex invasive cardiology. NHS England has endorsed the recommendations of the London Model of Care and has set up Strategic Clinical Leadership Groups in London to take forward change in this and the DH CVD Outcomes Strategy.

The two documents are complementary. The CVD Outcomes Strategy outlines actions required across the care pathway, in all settings, by a range of organisations; while the London Model of Care mostly focuses on specialist hospital cardiovascular services.

In addition to policy specifically for CVD services, NHS England in “Everyone Counts: Planning for Patients 2013/14” announced its intention to ensure better access to routine services seven days a week, with the aim of improving clinical outcomes and reducing costs. Diagnostics, urgent and emergency care departments in particular, will need to respond to this challenge, ensuring there is parity of access for patients to optimum treatments, diagnostic tests and clinical decision-making throughout the week, not just during weekdays, but also at weekends. Work is on-going nationally to develop standards for the minimum quality of care patients should receive 7 days a week. All NHS

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<sup>7</sup> NHS London “Cardiovascular Project: The Case for Change” August 2010

<sup>8</sup> NHS London “Cardiovascular Project: The Case for Change” August 2010

organisations are considering the implications of having the workforce available to deliver services 7/7 and the inherent additional cost of doing this.

## **1.5 Responding to the new CVD policy framework across north and east London**

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If we are to succeed in meeting the needs of our population now and in the future, and to deliver the step change set out in the Government's new CVD outcomes strategy as well as the London Model of Care for specialist cardiovascular services, we will need to change what we do.

There is already widespread agreement across organisations in north and east London about the importance of delivering the improvements outlined in the CVD Outcomes Strategy. Local authorities working with Clinical Commissioning Groups (CCGs) and other stakeholders have identified the reduction of mortality due to CVD as a priority in their Health and Well Being Strategies.

NHS England, CCGs, local authorities and provider trusts have given their commitment to working with UCLPartners, an Academic Health Science Network<sup>9</sup> to develop an 'Integrated Cardiovascular System' (ICVS) to provide whole life and whole pathway cardiovascular care. The aims of the ICVS are:

1. To improve cardiovascular health across the population through prevention and early detection
2. To improve patient-reported outcomes and experience across integrated cardiovascular pathways
3. To ensure the ICVS is underpinned by the latest knowledge base and research, through the implementation of quality improvement and innovation initiatives and education across entire pathways.

As one important element in building an ICVS we must ensure that our adult specialist cardiovascular services perform at world class levels. This clinical proposal for a new model of care for adult specialist cardiovascular services, involving service change, is being made to commissioners by UCLPartners.

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<sup>9</sup> UCLPartners is an academic health science network spanning a 6 million population across north central and north east London, west Hertfordshire and Essex. 100,000 clinicians and academics work within the community, hospitals and universities located within the partnership. They enable collaboration across primary care, secondary care, community and social care, local government, patient groups, voluntary groups and industry helping people to work together to translate cutting edge research and innovation into measureable health and wealth gain for patients and populations – in London, across the UK and globally.



As described in 1.1, it is about taking the opportunity to provide services at a greater scale to drive improvements in outcomes in specialist care by bringing together provision at The Heart Hospital and the London Chest Hospital to a new facility at St Bartholomew's Hospital. Plans are already at an advanced stage for the transfer of services from the London Chest Hospital to St Bartholomew's Hospital, bringing those services much closer to The Heart Hospital. Given the proximity of these hospitals, just 2.4 miles apart, together with the fact that there is sufficient capacity at St Bartholomew's Hospital for both; it is now proposed that there are considerable clinical and patient benefits if services from The Heart Hospital also transfer to St Bartholomew's Hospital in December 2014. CVD services at the Royal Free Hospital Foundation Trust would not change under these proposals and teenagers who have received specialist cardiac care at Great Ormond Street Hospital would continue to be supported to transition to adult specialist services at the proposed new site. The CVD clinics and support services for other specialties at UCLH would continue.

This proposal for clinical service change is supported by clinicians at both University College London NHS Foundation Trust (UCLH) and Bart's Health NHS Trust (Bart's Health), as the principle providers of specialist cardiac services in north and east London, each hosting major biomedical cardiovascular resources of the National Institute for Health Research (NIHR). They have worked with clinicians from across our partnership to deliver a vision for future services. The proposal is also supported by Queen Mary University of London and University College London.

Commissioners (NHS England and CCGs) are now planning a process to get a broader range of views on this proposal for clinical change, prior to deciding whether to go to formal consultation later in the year.

## 1.6 Reasons why we need to change

While this proposal for clinical change is primarily about the future configuration of specialist services in response to the London Model of Care; it is essential that it is part of the broader, system wide improvement described in the CVD Outcomes Strategy. The specialist units will have a responsibility to support the development of services across the ICVS; offering their expertise to referring hospitals, primary care and community services through outreach clinics, shared care and 24/7 advice and treatment. Clinicians at both current hospitals believe the increase in critical mass of their workforce achieved by bringing services onto one site would make it easier to develop stronger outreach services at the same time as maintaining core 7/7 specialist services at the centre. The box below summarises the key reasons for change and the section(s) where they are explored further in the document.

### Key reasons why we need to change

#### System-wide:

- We face a unique challenge to improve the cardiovascular health of our population, tackle unmet needs and reduce inequalities - *Section 2*
- We need to address cardiovascular risk in our growing population - *Section 2*

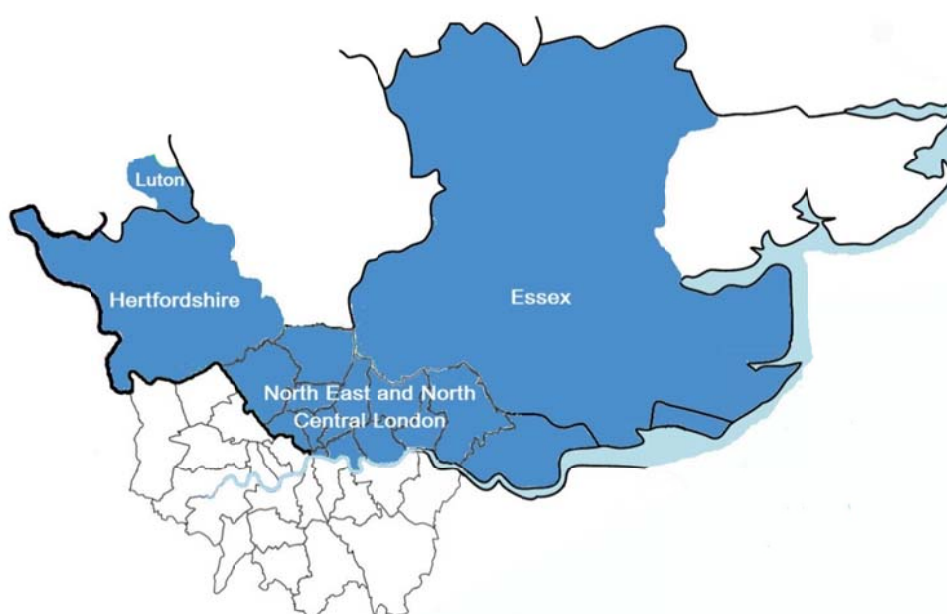
- We need to address the fragmentation of services; delivering ‘whole pathway’ cardiovascular care and better outcomes - *Section 3*

#### **Specialist services:**

- We need to adopt a new model of care and deliver specialist adult cardiac services at a greater scale - *Section 4*
- We need to future-proof our specialist services so they are sustained for the next generation; addressing current capacity and workforce challenges, including delivering more services on a 24/7 basis and moving to 7/7 working - *Section 5*
- We need to deliver efficiency savings to reinvest in new technology and new treatments, making best use of tax-payers money - *Section 6*
- We have an opportunity to create a world-class joint academic and clinical centre, integrated on a single campus at the forefront of research, teaching and innovation; which would bring new treatments and technologies to patients and add value by harnessing our potential to create wealth - *Sections 7,8 and 9*

## **1.7 The population covered by this proposal for clinical change**

**Figure 1: Map showing population covered by the full UCLPartners Academic Health Science Network (a total of 6 million people).**



The population covered by this proposal for clinical service change includes the 3.2 million living in the north east and north central London boroughs shown in figure 1 (above). The specialist CVD services provided by Bart’s Health and UCLH also provide treatment to patients from parts of Hertfordshire and beyond for rarer conditions. The majority of patients in Essex needing specialist

CVD care receive this at Basildon and Thurrock Universities Hospital NHS Trust. This would not change as a result of the clinical service change proposed by this document.

The vision for the academic/NHS partnership described in section eight of this document embraces the whole of UCLPartners academic health science network population (6 million people), highlighted in blue in figure 1.

## 2 Addressing the needs of our population

We face a unique challenge to improve the health of our population, address unmet needs and reduce inequalities. Overall our population in north and east London is diverse, ageing and growing rapidly and a high proportion face significant deprivation.

### 2.1 Years of life lost due to CVD in north and east London

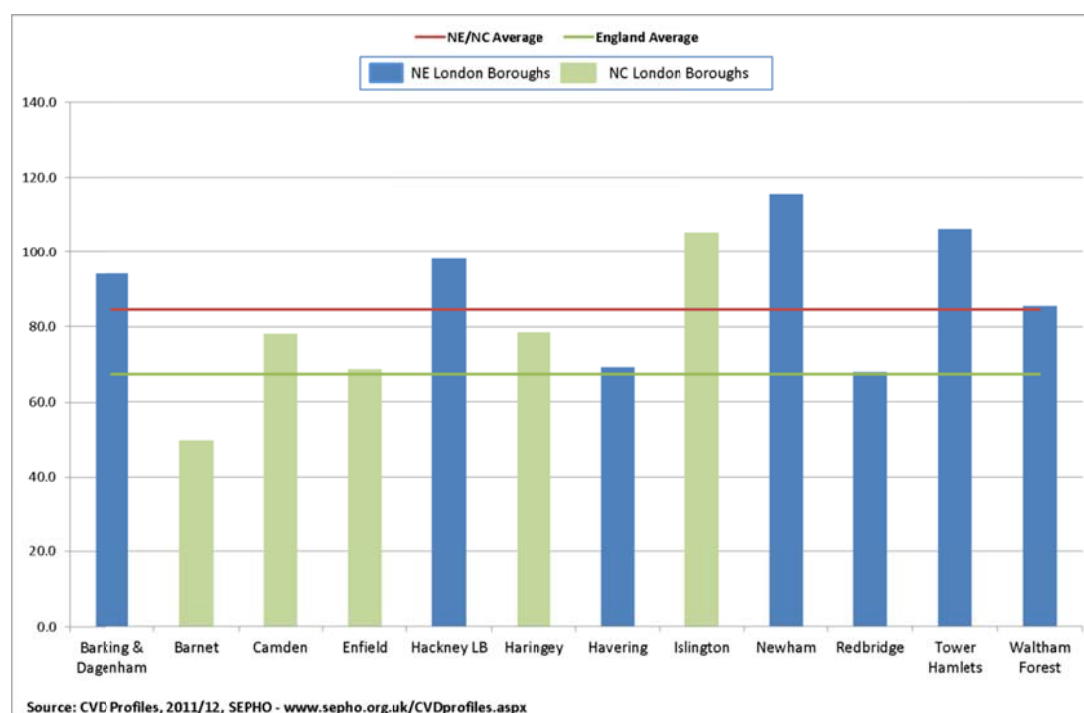
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North East London comprises seven London boroughs and the City of London. It is an area with profound health needs and includes some of the most deprived local authorities in the country. North Central London comprises five London boroughs and also has a wide variation in health outcomes and inequalities. Premature mortality from cardiovascular disease is amongst the highest in the country and data from 2008-10, shows that half of the NE/NC boroughs have mortality rates that are within the highest 20% nationally<sup>10</sup> (based on 150 local authorities) - see figure below.

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<sup>10</sup> Boroughs within the 20% highest mortality nationally are: Barking & Dagenham, Hackney, Islington, Newham, Tower Hamlets, Waltham Forest

**Figure 2: Premature (aged under 75 years) mortality from heart disease and stroke**



All the NE and NC London boroughs have childhood obesity rates that are higher than the national average, both areas also have high rates of adult inactivity and there are also pockets of high smoking prevalence's – all of these are risk factors for cardiovascular disease (see figure 3, page 18).

Overall the rate of early deaths from heart disease and stroke in NE and NC London is 84.8 per 100,000 population, which is significantly higher than the rate for London (71.5) and England (67.3)<sup>11</sup>. Eight out of the 12 (67%) London boroughs in NE and NC London have rates that are significantly higher than England as a whole. Only three boroughs are not significantly different, and just one is significantly better.

Risk factors that increase the likelihood of cardiovascular disease such as hypertension, obesity, diabetes and smoking are now well known. To reduce early mortality from cardiovascular disease we need to do more to improve health and tackle the unmet needs of our population which are increasing cardiovascular risk.

If we were to improve our early mortality from cardiovascular disease in North Central and North East London currently at 84.8 to 67.3 rate for England<sup>12</sup> we would save an estimated 1117 lives per year. If we were to improve to the European rate of 50.4%<sup>13</sup>, we would save an estimated 2201 lives per year, or 11,005 lives over 5 years.

<sup>11</sup> CVD profiles 2011-12, South East Public Health Observatory, [www.sepho.org.uk](http://www.sepho.org.uk)

<sup>12</sup> CVD profiles 2011-12, South East Public Health Observatory, [www.sepho.org.uk](http://www.sepho.org.uk)

<sup>13</sup> The Lancet "UK health performance: findings of the Global Burden of Disease Study 2010" March 2013 [Volume 381, Issue 9871](#), Pages 997 - 1020

**Figure 3: Lifestyle factors that affect cardiovascular risk by borough**

Sub Region	Borough	% of reception year children who are obese <sup>14</sup>	% of Year 6 children who are obese	% of adults who are inactive <sup>15</sup>	% of current smokers <sup>16</sup>
NE	Barking and Dagenham	13.7%	26.9%	35.1%	23.0%
NE	City of London	-	-	24.2%	41.7%
NE	Hackney	13.4%	27.1%	30.2%	25.2%
NE	Havering	9.8%	20.9%	30.5%	20.0%
NE	Newham	13.0%	25.6%	35.1%	18.8%
NE	Redbridge	11.4%	23.2%	29.5%	16.1%
NE	Tower Hamlets	13.1%	25.1%	28.6%	21.5%
NE	Waltham Forest	9.6%	23.5%	28.4%	19.4%
NC	Barnet	9.7%	19.2%	26.1%	17.5%
NC	Camden	10.4%	22.3%	29.3%	17.3%
NC	Enfield	13.1%	23.8%	26.3%	18.5%
NC	Haringey	11.8%	23.8%	26.4%	18.8%
NC	Islington	10.0%	22.1%	20.1%	21.8%
London		11.00%	22.50%	27.2%	18.9%
England		9.50%	19.20%	28.5%	20.0%

Key		
Higher than the England average	Same as the England average	Better than the England average

<sup>14</sup> National Childhood Measurement Programme, 2011-12, [www.ic.nhs.uk](http://www.ic.nhs.uk)

<sup>15</sup> Active People Survey, data accessed from [www.phoutcomes.info](http://www.phoutcomes.info)

<sup>16</sup> Integrated Household Survey,

## 2.2 Identifying people with undiagnosed cardiovascular disease

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The CVD Outcomes Strategy places a high priority on improving and enhancing case finding or ascertainment (identifying patients with disease) in primary care. Cardiovascular risk profiles produced by Public Health England show that the observed prevalence of coronary heart disease (CHD) when aggregated for North East and North Central London is less than half the estimated prevalence (43.7%)<sup>17</sup>. This indicates high, unidentified need among our population, which is undoubtedly contributing to higher rates of early deaths. The gap between the estimated and observed prevalence in CHD is wider in North East and North Central London than it is for London as a whole (47.0%), and considerably wider than it is for England (58.2%)<sup>18</sup>.

**Hypertension** is a major risk factor for CVD. Similar to CHD, only 40.5% of the estimated prevalence of hypertension is currently observed in North East and North Central London. Again the gap between estimated prevalence and observed hypertension is wider than it is for London as a whole (41.5%), or for England (46.0%).<sup>19</sup>

*Untreated or poorly treated hypertension is the most important factor for acute CVD events, which place increased demands on emergency and specialised services<sup>20</sup>.*

**CHD emergency admissions** - The rate of emergency CHD admissions in north and east London (224.0) is significantly higher than the rate for England (198.3)<sup>21</sup>, indicating a failure of prevention, poor management of cardiovascular disease and high unmet need among our population. If we were to reduce emergency admissions to the England rate, we would prevent an estimated 848 emergency admissions each year, saving an estimated total of £3.9 million<sup>22</sup>.

**Heart failure** - Similarly, in 2011/12 there were over 3,000 emergency admissions for heart failure in north and east London. The rate of emergency admissions for heart failure (99.2) is significantly higher than the rate for England (60.7).<sup>23</sup> If we were to achieve the England rate we would prevent an estimated 1,117 emergency heart failure admissions each year saving an estimated total of £2.6m.<sup>24</sup> Reducing these emergency admissions would improve quality of life for these patients and their families as well as mortality. Often patients who have been admitted as an emergency for heart failure do not recover to their previous level of functioning. Earlier detection and better management could avoid many of these admissions.

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<sup>17</sup> CVD profiles 2011-12, South East Public Health Observatory, [www.sepho.org.uk](http://www.sepho.org.uk)

<sup>18</sup> CVD profiles 2011-12, South East Public Health Observatory, [www.sepho.org.uk](http://www.sepho.org.uk)

<sup>19</sup> CVD profiles 2011-12, South East Public Health Observatory, [www.sepho.org.uk](http://www.sepho.org.uk)

<sup>20</sup> NICE "Prevention of cardiovascular disease: Costing Report: Implementing NICE Guidance" June 2010 NICE Public Health Guidance 25

<sup>21</sup> CVD profiles 2011-12, South East Public Health Observatory, [www.sepho.org.uk](http://www.sepho.org.uk)

<sup>22</sup> NICE "Prevention of cardiovascular disease: Costing Report: Implementing NICE Guidance" June 2010 NICE Public Health Guidance 25 page 21

<sup>23</sup> CVD profiles 2011-12, South East Public Health Observatory, [www.sepho.org.uk](http://www.sepho.org.uk)

<sup>24</sup> NICE "Chronic Heart Failure: Costing Report: Implementing NICE Guidance" 2010 NICE Clinical Guideline 108 page 19

**Health checks** delivered by general practitioners are an important way of identifying all people at risk of CVD. In 2012-13, only 18.9% of the eligible population were offered a health check and of those offered less than half (47%) took it up<sup>25</sup>. Although this is low, it is similar to the picture for the rest of London and England. The uptake of health checks, however, is significantly lower in many parts of our partnerships than it is in London or England.<sup>26</sup> Again this suggests that there are many people at risk of CVD in our population who have not yet been identified and who are therefore not receiving appropriate care.

*Overall, the proportion of people identified for treatment for CVD or to manage CVD risk factors is likely to grow significantly as local authorities lead a drive to offer health checks to 100% of the eligible population over the next five years.*

## 2.3 Better identification of high risk families/inherited disease

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A smaller proportion of people are at risk of CVD that is passed on through families. One in 500 people in England are estimated to be at risk of familial hypercholesterolemia (FH), which is one type of inherited CVD. Only 15% of FH is detected in the population which suggests that there are an estimated 6,400 people residing in NE/NC London that have the condition and of these an estimated 5,400 are currently unidentified. . Because they have not been identified, these people continue to live without the opportunity to be screened and supported to manage their increased risk of CVD. Again this is a high priority for action in the CVD Outcomes Strategy.

The specialist Inherited Cardiac Disease and Genetics service at UCLH also has an important role to play in ensuring that relatives of diagnosed patients are traced, informed of risk and given the opportunity for assessment.

## 2.4 Addressing cardiovascular risk in our growing population

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As high levels of deprivation as well as ethnic diversity increase the cardiovascular risk of our population, the challenge to improve health, and address unmet need, will deepen as our population continues to grow rapidly over the coming years.

The latest population estimates<sup>27</sup> suggest that the current population of NE London is just over 1.8 million, and this is expected to rise to just under 2.1 million by 2021<sup>28</sup> - this is a 12.5% increase . The age groups that are estimated to see the highest growth increases are those aged 5-9 years (32%), 35-39 years (29%) and 55-59 years (28%). There is expected to be a fall in the population aged 15-24 years of approximately 4% in the same time period.

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<sup>25</sup> 2012-13 Healthchecks, Integrated performance monitoring – [www.england.nhs.uk](http://www.england.nhs.uk)

<sup>26</sup> CVD profiles 2011-12, South East Public Health Observatory, [www.sepho.org.uk](http://www.sepho.org.uk)

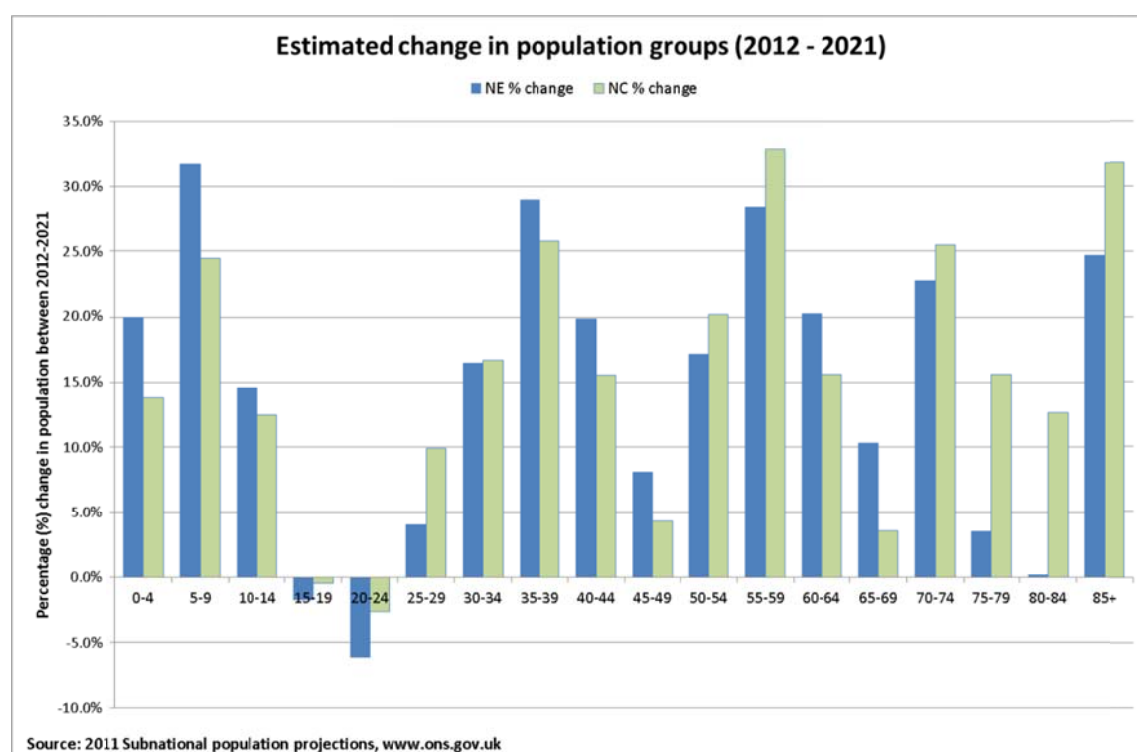
<sup>27</sup> 2012 Mid Year Population Estimates, [www.ons.gov.uk](http://www.ons.gov.uk)

<sup>28</sup> 2011 sub-national population projections, [www.ons.gov.uk](http://www.ons.gov.uk)

NC London has an estimated population of 1.37 million, with projections suggesting that this is likely to rise to 1.57 million by 2021 – this is a 12.4% increase. In NC London the growth pattern is slightly different to that of NE London, with the biggest increase in those aged 35-39 (26%), 55-59 (33%) and 85+ (32%). Those in the younger ages groups (15-24) are also expected to fall on average by 2%.

Cardiovascular risk among the population will grow as the age profile rise.

**Figure 4: Estimated population change by 5 year age group**



Black and minority ethnic (BME) groups have a proportionately higher CVD risk, and according to the Census (2011)<sup>29</sup> in North East London these groups constitute 48% of the population BME groups make up just over 36% of the population in North Central London. The Asian population has a much higher incidence of CVD than the white population, and it is the Asian population that is expected to grow fastest in North Central London. Ensuring equity of access to services and treatment for ethnic minority groups across both North Central and North East London is a high priority.

There are also specific groups of patients where numbers are growing; for example, adult congenital heart disease (ACHD). As a result of our success at treating this in children, more people are surviving into adulthood. These adults with ACHD will require high levels of specialist care throughout their lives.

<sup>29</sup> Census, 2011 – www.ons.gov.uk



### Key summary: Addressing the needs of our population

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- Our population in north and east London is diverse, ageing and growing rapidly. A high proportion of the population face significant deprivation.
  - Premature mortality from CVD is amongst the highest in the country. Half of north east and north central London boroughs have mortality rates that are in the highest 20% nationally.
  - If we were to improve our early mortality rate in north and east London to the rate for England we would save an estimated 1,117 lives per year.
  - If we were to improve our early mortality rate to the European rate we would save an estimated 2,201 lives per year or 11,005 lives over 5 years.
  - Observed prevalence of CHD in north and east London is less than half the estimated prevalence which is contributing to higher rates of early deaths in our population.
  - If we were to reduce admissions due to CHD to the England rate, we would prevent an estimated 848 emergency admissions each year saving around £3.9m.
  - There are around 3,000 admissions each year due to heart failure in north and east London. If we were to reduce to the same rate as for England we would prevent an estimated 1,117 emergency heart failure admissions each year, saving an estimated £2.6m.
  - Only 15% of familial hypercholesterolaemia is detected in the population of north and east London, leaving it undiagnosed in 5,400 people.
  - The population will rise by about 12.5% in north and east London by 2021. The population is also ageing and this will increase CVD risk.
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## 3 An integrated approach to delivering ‘whole pathway’ cardiovascular care and better outcomes

*“Our vision is to work across the partnership to ensure we are preventing CVD where possible through early identification of people at increased risk. Those at increased risk will receive world-class care, integrating primary, secondary and tertiary care pathways and care closer to home where appropriate. This will deliver a better patient experience, optimal management to reduce heart attack and stroke, and equitably improve the health of our population.”* **Dr John Robson, Tower Hamlets GP and primary care lead for the UCLPartners integrated cardiovascular system**

### 3.1 Developing the Integrated Cardiovascular System (ICVS)

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The ICVS is already working with a number of the new CCGs, including Camden CCG, to understand where we are failing to prevent cardiovascular events through a ‘root-cause analysis’ of every heart attack and stroke. This will enable the system to target resources more effectively and to deliver the service improvements needed to improve outcomes. Previous retrospective analysis has shown that up to 30% of all CVD patients on GP registers are not recorded as having a CVD event and are not on appropriate secondary prevention CVD medication. (CVD Mortality Audit, DH).

*“UCLPartners is working for Camden on a range of joint community initiatives aimed at preventing heart attacks and stroke. These include: identifying high risk patients, improving blood pressure monitoring through new technologies, improving management of patients with atrial fibrillation. These areas should complement the wider work on cardiovascular services and improve outcomes for Camden residents.”* **Dr Caroline Sayer, Chair Camden CCG**

Through other projects we are focusing on detecting more people at high risk of CVD, such as those with AF, FH and HF to ensure they have access to the care they need to prevent a major cardiovascular event.

### 3.2 Atrial fibrillation

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The Cardiac Rhythm Management Group (adult centres with the full range of services are at UCLH, Bart’s Health, Basildon) has already developed a close integration and collaboration with DGHs and there are specialist arrhythmia clinics in all hospitals able to accommodate them.

At present there are only a limited number of specialist clinics in primary care. Satellite nurse-led primary care arrhythmia services have been very successful in identifying patients, delivering therapy and reducing referrals to secondary and tertiary care. This strategy not only gives patients access to specialist care locally, it reduces costs associated with hospital visits, investigations and potential stroke. In north central London we are implanting fewer devices than would be expected according to the levels of need in the population.

The ICVS offers the opportunity to fully integrate the patient pathway for arrhythmia disorders and ensure early diagnosis, prevention and treatment. This is just one of five priorities for the Cardiac Rhythm Group. Electrophysiology Networks were identified as a priority in the London Model of Care. Improved management of AF is an identified priority in the CVD Outcomes Strategy.

**Figure 5: Case Study: APEL (Anticoagulation Programme, East London)**

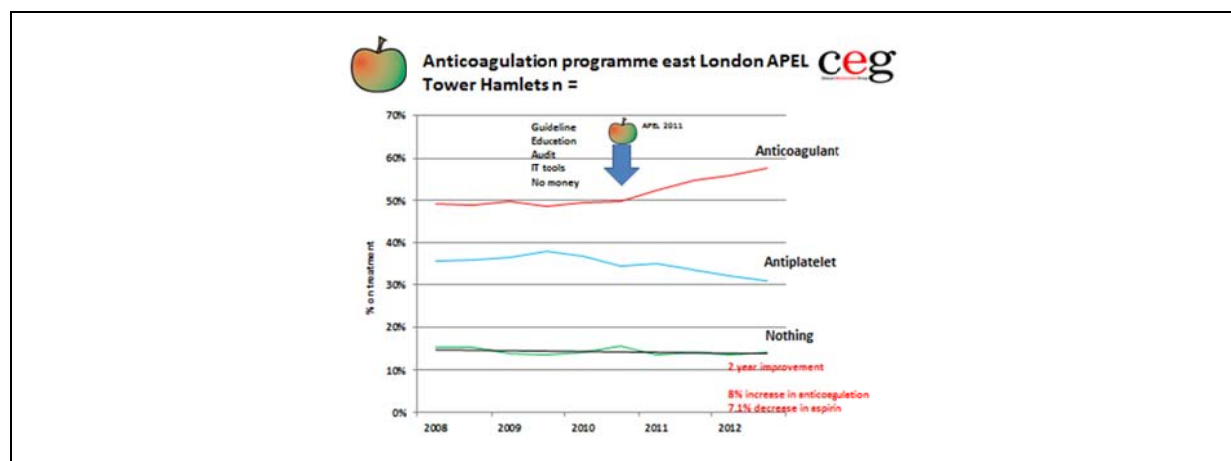
#### **APEL (Anticoagulation Programme, East London)**

AF is the most common cardiac arrhythmia affecting around a million people in the UK, with prevalence increasing to 18% over 85 years of age. AF is associated with one in eight strokes overall, and one in three over 80 years. More than half these strokes could be averted by oral anticoagulation (OAC), but the proportion of the population at risk who are on anticoagulant drugs has improved by only 1.5% per year over the last quarter century (only 50% in 2012) (Cowan et al. Heart 2013; doi: 10.1136/heartjnl-2012-303472). One third who are eligible for OAC do not receive them – a failure of translation due to professional therapeutic uncertainty; poor organisational processes; and patient case complexity. An estimated 13,227 people in NE/NC London are not appropriately anticoagulated<sup>30</sup> - if we were to anticoagulate these people as per the NICE guidance we would prevent strokes in 160 people at an estimated total saving of £1.7m<sup>31</sup>

Working with the North East Cardiac and Stroke Network, Dr. Robson and Clinical Effectiveness Group (CEG) colleagues, based at Queen Mary, University of London, and Bart's Health, have successfully piloted the APEL improvement programme in Tower Hamlets, Newham and City and Hackney. They have increased the proportion of people with AF on optimal antithrombotic therapy; with behavioural interventions additional to those in the existing national QOF initiatives. The CEG has an extensive track record of care pathway and therapeutic improvement and evaluation in East London. Tower Hamlets Primary Care Trust (PCT) ranked top in England in QOF 2012 results for blood pressure and cholesterol reduction in people with diabetes, and in the top centile for CHD and hypertension. Over the two-year period 2010 to 2012, anticoagulation in people with AF in Tower Hamlets increased from 50% to 58% (see box below).

<sup>30</sup> <http://www.afinfographic.co.uk/>

<sup>31</sup> NICE "Chronic Heart Failure: Costing Report: Implementing NICE Guidance" 2010 NICE Clinical Guideline 108 page 19



### 3.3 Heart failure

The CVD outcomes Strategy identifies chronic heart failure services as an example where improvement in services is needed. Chronic heart failure is common, affecting over half a million people in England. There is widespread under-diagnosis of heart failure and in Section 2 we have seen it is responsible for a significantly higher level of emergency admissions than for England. Even so, in England, HF accounts for 5% of all emergency admissions to hospital. Guidance in 2010 of the National Institute for Health and Care Excellence (NICE) indicates that all patients with a possible diagnosis should be referred for an initial management plan to a specialist in heart failure, or ideally to a consultant-led, multidisciplinary team, crossing primary and secondary care<sup>32</sup>. There are good examples of community-based follow up services by GPs working with specialist heart failure nurses according to a personalised management plan, including at Forest Road Surgery Heart Failure Clinic in Enfield and Camden Integrated Care Service. This work has already delivered better integration of heart failure services for the benefit of patients.

However, these arrangements are by no means universal or consistent across the ICVS. The role of the ICVS is to support the diffusion of good practice to all parts of the partnership.

Bringing the specialist services of The Heart Hospital and the London Chest Hospital together at St Bartholomew's Hospital would create a larger heart failure centre with greater capacity to allow the development of a specialist team of heart failure consultants and nurses that would enhance acute heart failure treatment both at the centre (for advanced and complex heart failure patients) and also throughout the network of hospitals aligned to the centre. The National Heart Failure Audit (NICOR) has shown that management by a cardiologist whilst an inpatient has a major effect on the mortality and morbidity of patients<sup>33</sup>, which is still evident three years after the admission, with the potential to save up to 364 patient lives each year across north and east London.

<sup>32</sup> <http://publications.nice.org.uk/chronic-heart-failure-cg108/key-priorities-for-implementation>

<sup>33</sup> <http://www.ucl.ac.uk/nicor/audits/heartfailure>

### 3.4 Patient experience across a care pathway

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Patient-reported experience in both our specialist centres is currently very good, however, we lack measures to assess whether our patients experience good care along the whole of their care pathway from primary care through to specialist services. Through the ICVS we shall develop patient reported outcome and experience measures (PROMS and PREMS) across whole pathways, starting with heart failure. One existing measure indicating patient and carer experience in heart failure is the number of patients who are able to die in their normal place of residence (e.g. at home) as opposed to hospital. Currently, a significantly lower percentage of heart failure patients in north and east London (42.5%) die at home, compared with the rest of England (58.5%)<sup>34</sup>. This is related to our high levels of emergency admissions - an improved pathway would see very ill patients cared for more appropriately at home or in a hospice.

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#### Key Summary: An integrated pathway

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- The ICVS is working with a number of the new CCGs to understand where we are failing to prevent CVD events through a 'root-cause analysis' of every heart attack and stroke.
  - Around 13,227 people in north and east London are not appropriately anticoagulated. If we were to anticoagulate in accordance with the NICE guidance, we would prevent strokes in 160 people, saving an estimated £1.7m.
  - Heart failure accounts for a high number of emergency admissions. If we improved the management of inpatients to ensure they were managed by a cardiologist we have the potential to save up to 364 patients' lives each year across north and east London.
  - Although we lack measures to assess whether our patients experience good care along the whole care pathway one existing measure in heart failure shows that a significantly lower percentage of heart failure patients in north and east London (42.5%) die at home, compared to the rest of England (58.5%) which is suggestive of poor patient experience in this area.
  - The ICVS is designed to work across the whole patient pathway. The specialist heart centre is only one part of the ICVS, and work is ongoing with CCGs in north and east London on a range of projects to increase early identification and treatment of patients with AF, HF and FH.
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<sup>34</sup> CVD profiles 2011-12, South East Public Health Observatory, [www.sepho.org.uk](http://www.sepho.org.uk)

## 4 A new model of care for specialist services

*“It is in the best interests of patients that hospitals should come together to provide high-volume units”* <sup>35</sup>

The London Model of Care focused on elements of CVD care that deal with some of the more complex or emergency procedures, or urgent treatment, because it is in these elements of specialist services that the biggest opportunities are found. Its key recommendations for a new model of specialist service provision for cardiac surgery and cardiology are set out below and the Strategic Clinical Leadership Group for Cardiac Services in London has been established to oversee their implementation.

### 4.1 Cardiac surgery

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To achieve truly world-class patient outcomes in cardiac surgery, the London Model of Care, 2010 recommended that expertise in some specialist procedures be concentrated amongst fewer surgeons. This recommendation was made despite the relatively low patient mortality that follows cardiac surgery. However, it was recognised that lives could be saved in the future as new technology was made available and as current and future cardiac surgeons become increasingly skilled and with closer alignment and access to clinical research and patient trials. Evidence from the United States also demonstrates a strong link between hospitals and surgeons undertaking high volumes of cardiac surgery and improved outcomes <sup>36</sup>, particularly for specialist procedures such as mitral valve surgery.

To enable this, specialist centralised units were favoured as the future model of care. Specific recommendations were made regarding greater surgical sub-specialisation in mitral valve repair surgery and aortic dissection. The London CVD Project developed a cardiac surgery specification setting out standards in June 2011, which has the support of NHS England.

**Services for major cardiothoracic aortic disease:** Aortic dissection is an emergency life threatening condition which occurs in the upper regions of the aorta in the chest cavity. It is, therefore, a surgical procedure undertaken in an emergency, where the on-call surgeon may or may not have specialist interest in the procedure. It has a 20% mortality rate.<sup>37</sup> The model of care proposes that patients with aortic dissection are only treated in units that have all the essential facilities and provide a comprehensive 24-hour service. Both type A and type B dissections should be treated in these units. On site input from vascular surgery, interventional radiology and nephrology is important for the

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<sup>35</sup> NHS London “Cardiovascular Project: The Case for Change” August 2010

<sup>36</sup> Birkmeyer, J.D., Findlayson, E.V.A. & Birkmeyer, C.M. (2001). Volume Standards for High-Risk Surgical Procedures; Potential Benefits of the Leapfrog Initiative. *Surgery* 130: 415-422.

<sup>37</sup> Keogh, B, Bridgewater, B (2008). *Surgical League Tables*. *Heart* 2008;94:936-942

delivery of an optimal service. In 2012 the London Specialised Commissioning Group agreed that four specialist centres for major aortic surgery should be developed, with one for each quadrant in London. Their recommendation is for one centre providing major aortic surgery across north and east London.

**Services for mitral valve surgery:** The mitral valve controls the flow of blood to the heart. Patients having mitral valve surgery have a greater risk of mortality than patients undergoing other forms of cardiac surgery. Patients who undergo mitral valve repair for mitral valve regurgitation due to degenerative mitral valve disease have better outcomes compared with mitral valve replacement surgery and a better quality of life. Patients who have a mitral valve replacement with a prosthetic valve, require long term anticoagulation, with its associated risks.<sup>38</sup> They may also face repeat operations due to the limited lifespan of replacement valves. Where surgeons are dedicated to mitral valve surgery it is more likely that they and their teams would adopt minimally invasive approaches to surgery, shortening hospital length of stay and reducing patient recovery times from three months to three weeks. Mitral valve surgery has more than doubled in the past ten years. The London Model of Care proposes greater surgical sub-specialisation in mitral valve surgery and that units should develop teams of surgeons who treat the disease, to achieve an increased uptake of mitral valve repair for degenerative valve disease to 85-90%.

**The role of the multidisciplinary team:** the Model of Care proposes that, as there is an increasing number of cardiac surgery patients with concurrent medical problems, appropriate cases should be discussed by a multidisciplinary team. The team should include both cardiac surgeons and cardiologists. Where patients are being considered for surgery, the team should include members of the proposed anaesthetic and intensive care teams. Cases that would benefit from multidisciplinary discussion are:

- All mitral valve cases – to discuss repair versus replacement
- All left, main-stem cases – in particular if percutaneous coronary intervention (PCI) is being considered
- Multi-vessel disease, especially in patients with diabetes
- Where there is a Euroscore greater than 10%.

NHS England Specialised Commissioning, the body that now commissions cardiac surgery, has indicated in its 2013/14 service specification for cardiac surgery (for adults) that its future intention is to subdivide the current specification into four divisions (revascularisation, aortic valve disease, complex valve disease and other cardiac surgical procedures).<sup>39</sup> This intention reflects the trend towards the greater sub-specialisation required in cardiac surgery.

**New technologies in surgery:** the London Model of Care proposes that the roll out of new technology would be concentrated in a few designated units that have the appropriate

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<sup>38</sup> <http://content.onlinejacc.org/article.aspx?articleid=1125483>

<sup>39</sup> <http://www.england.nhs.uk/wp-content/uploads/2013/06/a10-cardi-surgery-adult.pdf>

infrastructure and experience to set standards for future use. Such units would benefit from testing innovative technology and would need to assess outcomes and advise on the appropriate model of diffusion. Larger services are more likely to be selected to test new technologies as the greater volumes of patients they see would enable them to deliver assessments more quickly.

**Academia and research:** the London Model of Care identifies that changes to the way cardiac surgery units collaborate and the way research is carried out should help London become a world centre of excellence for cardiac surgery research and training. It states that investment in basic science, translational and clinically-based research could have a high economic return. It recommends consolidating and integrating research activity and improving university collaboration.

**Reducing the wait for urgent surgery and length of stay:** the London Model of Care recognised that the waiting times for urgent surgery, for example coronary artery bypass graft (CABG), are often too long. Patients can wait in DGHs or in the community for an urgent CABG. The maximum wait proposed is five days. The average length of stay for CABG should be no more than eleven days. The average total pathway for urgent CABG should not exceed 21 days. Effective discharge planning and expert perioperative management of surgery can significantly reduce length of stay. Treating patients outside these timescales puts them at inappropriate risk. Reducing length of stay can improve the overall patient experience and help the system operate more effectively. In line with the recommendations of the London Model of Care, a London-wide risk stratification tool is being established, as well as an electronic referral and inter hospital transfer system, to ensure that when there are waits, patients can be referred to any cardiac surgery centre in London where capacity is available.

## 4.2 Cardiology

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Evidence shows that for complex and emergency procedures such as primary angioplasty<sup>40</sup>, ablation<sup>41</sup> and implantable cardioverter defibrillator implantation<sup>42</sup> outcomes for patients treated by clinicians who are experienced and have high volumes of cases are better; and specialist procedures should be undertaken in specialist centres.

**Acute Coronary Syndrome (ACS):** There are eight designated HACs in London, three of which are in North East or North Central London. Treatment at an HAC allows patients with a type of heart attack called a myocardial infarction with ST-elevation (STEMI) to have immediate access to the services that they require to ensure the best clinical outcomes. Evidence has emerged that another group of

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<sup>40</sup> Van de Werf, F. et al (2008). Management of acute myocardial infarction in patients presenting with persistent ST-segment elevation. *European Heart Journal*.

<sup>41</sup> Aliot, E.M., W.G. Stevenson, J.M. Almendral-Garrote et al (2009). EHRA/HRS Expert consensus on catheter ablation of ventricular arrhythmias. *Eurpace* 11: 771-817.

<sup>42</sup> Al-Khatib, S.M., L. Lucas, J.G. Jollis, D.J. Malenka, and D.E Wennberg (2005). The relation between patients' outcomes and the volume of cardioverter-defibrillator implantation procedures performed by physicians treating medicare beneficiaries. *Journal of American Cardiology* 46: 1536-1540.



patients with a condition called acute coronary syndrome without ST-elevation (NSTEMI) would also benefit from the same prompt access to the procedures offered to STEMI patients<sup>43</sup>.

Developing 24/7 services for patients with NSTEMI is identified as a priority in the 2013 CVD Outcomes Strategy. Timely management of NSTEMI offers improvements in clinical outcomes, reduced hospital stays and more efficient use of hospital resources. The evidence-based shift towards the invasive management of STEMI and NSTEMI has resulted in the majority of PCI for acute coronary syndromes being undertaken outside 'normal' daytime working hours. The provision of emergency 24/7 working requires on-call rotas of highly skilled staff in adequate numbers in order to ensure their sustainability and this presents clinical and logistical problems to the current services, for example, ensuring anaesthetic presence wherever needed, even where there are conflicting surgical emergencies.

For PCI in general, there is evidence suggesting improved outcomes for patients who are treated in higher volume PCI centres, particularly those that reach 400 procedures per annum. This forms part of the recommendations of the working group on PCI of BCIS and the British Cardiovascular Society. This evidence base is cited in the 2013/14 NHS England Specialised Commissioning Service Specification for Complex Invasive Cardiology. The Clinical Reference Group (CRG) considered that primary PCI (PPCI) (when an angioplasty is used to restore blood flow to the heart during a heart attack) is a much higher risk procedure than PCI for stable patients. The consensus of the CRG was that PPCI patients should only be treated in 24/7 centres in keeping with the European Society of Cardiology Guidelines (ESC). The NHS England specification sets a recommended activity of 300 PPCIs each year, per provider, with a minimum threshold of 100 procedures.<sup>44</sup>

**Electrophysiology services:** The London Model of Care recommended the establishment of EP networks (discussed in 3.2) to address the wide variation in implantation rates and inequity of care. It called for greater coordination of EP services between specialist and non-specialist hospitals, with care taking place locally where possible, but with specialist procedures such as ablation, ICD procedures and CRT implantations taking place at centres. It recommends that centres provide a 24/7 service to manage urgent and emergency arrhythmia cases.

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### Key Summary: The Model of Care

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- The Strategic Clinical Leadership Groups for CVD will oversee implementation of the London Model of Care (2010) recommendations which focused on some of the more complex, urgent and emergency treatments.
- Some specialist procedures (mitral valve and aortic dissection) should be concentrated amongst fewer surgeons. Evidence shows a strong link between hospitals and surgeons undertaking high volumes of cardiac surgery and improved outcomes. Dedicated 24/7 rotas should be established

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<sup>43</sup> Cantor, W.J., S.G. Goodman, C.P. Cannon, S.A. Murphy, A. Charlesworth, E. Braunwald and A. Langer (2005). Early cardiac catheterization is associated with lower mortality only among high-risk patients with ST- and non-ST-elevation acute coronary syndromes: Observations from the OPUS-TIMI 16 trial. *American Heart Journal* 149: 275-283.

<sup>44</sup> <http://www.england.nhs.uk/wp-content/uploads/2013/06/a09-cardi-prim-percutaneous.pdf>

for aortic dissection surgery and the ratio of mitral valve repair to replacement should be at 85%.

- Multi-disciplinary teams should discuss cardiac surgery patients with concurrent medical problems.
- New technology roll out should be concentrated in a few designated units with the appropriate infrastructure and experience to set standards for future care.
- Evidence shows that in cardiology, for complex and emergency procedures such as primary PCI, ablation, and implantable cardioverter defibrillator implantation, outcomes for patients treated by clinicians who are experienced and have high volumes of cases are better.
- The evidence-based shift to invasive management of STEMI and NSTEMI has resulted in more work being undertaken outside normal daytime hours, requiring 24/7 teams of highly skilled staff to ensure their sustainability. The NHS England service specification for primary PCI recommends an activity level of 300 or more procedures each year in a HAC.

## 5 Our current services

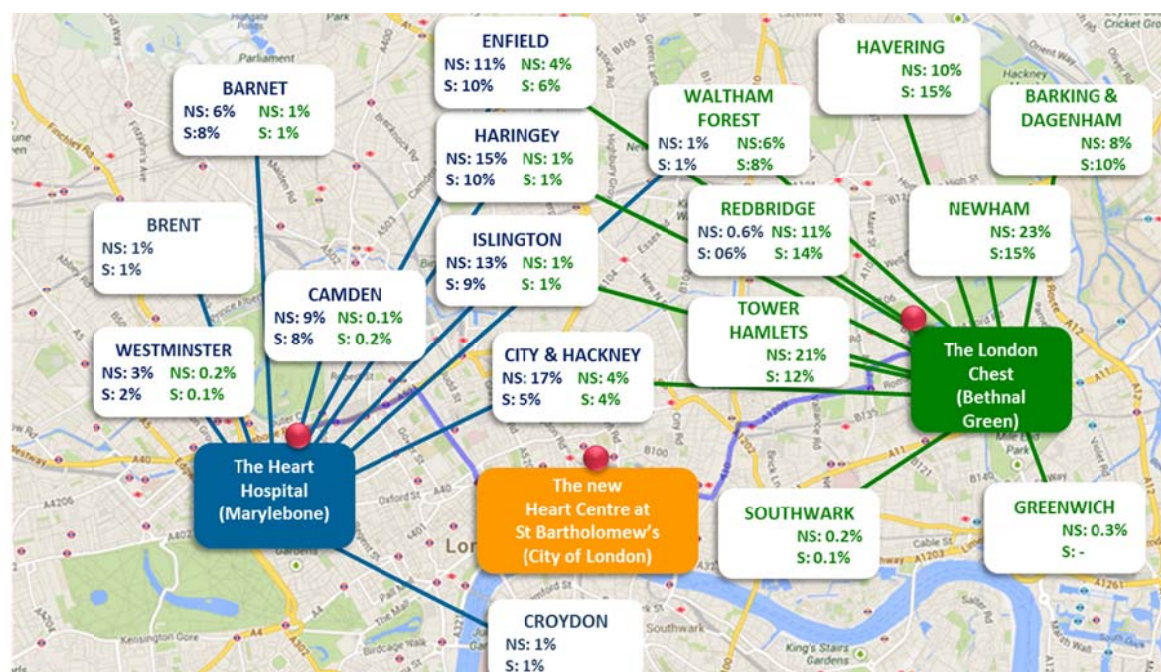
We need to future-proof our specialist services in north and east London so they are sustained for the next generation

### 5.1 Providers of tertiary cardiac care

The main providers of complex tertiary cardiac care in north and east London are Bart's Health NHS Trust (Bart's Health) and University College London Hospitals NHS Foundation Trust (UCLH). The Royal Free London NHS Foundation Trust (Royal Free) also provides complex invasive cardiology and vascular surgery, with specialist cardiology care provided for children at Great Ormond Street Hospital NHS Foundation Trust (GOSH).

Appendix 1 gives details of the cardiac services provided by Bart's Health and UCLH, together with their inpatient and outpatient activity. The figure below shows the existing locations of The Heart Hospital (UCLH) and the London Chest Hospital (Bart's Health), as well as the new site at St Bartholomew's Hospital where it is proposed that services from The Heart Hospital are consolidated with those already moving from The London Chest Hospital in 2014. It also shows the patient flows for specialised and non-specialised commissioning activity from the surrounding boroughs of London.

**Figure 6:** Map showing existing location of The Heart Hospital and the London Chest Hospital, the proposed location of a new centre at St Bartholomew's Hospital and the existing patient flow for specialised and non-specialised commissioning activity from the surrounding boroughs.



Distance from the London Chest to St Bartholomew's is 3.3 miles  
Distance from The Heart Hospital to St Bartholomew's is 2.5 miles

**KEY**  
NS = % non-specialised referrals from London (2010-13)  
S = % specialised referrals from London (2010-13)  
Green text = % referrals to The London Chest Hospital  
Blue text = % referrals to The Heart Hospital

Bart's Health is the largest NHS Trust in the county and a major provider of acute hospital services in North East London. It serves a population of 2.5 million and employs 15,000 staff across six main hospitals and community services in Tower Hamlets. Bart's Health is due to relocate the cardiac services currently provided at the London Chest Hospital and those already provided in St Bartholomew's Hospital to a new state-of-the-art facility within the St Bartholomew's Hospital complex once the building is complete from the end of 2014.

UCLH in North Central London acquired The Heart Hospital in 2001. The hospital, which is located in Marylebone, has since become the centre for the Trust's cardiac services which were previously provided at the former Middlesex Hospital.

Some general cardiology services are provided at University College Hospital (as opposed to The Heart Hospital), including Rapid Access Chest Pain Clinic, imaging (PET/CT coronary angiography) and a consultant service for inpatient support.

## 5.2 Capacity challenges in current provision at The Heart Hospital

Services at The Heart Hospital currently face the following capacity challenges:

- Activity is increasing due to the growing and ageing population
- Some more specialist activity is growing especially ACHD, and there is an increase in referrals for Inherited Cardiac Conditions
- The hospital has no further capacity to expand, it is on a landlocked site
- Vascular surgery, identified as an important co-dependent service for major aortic surgery is not available on-site
- Limited resilience is offered in case of outbreaks of infection, as side-room capacity is insufficient in critical care
- Bed occupancy currently approaches 95%. Physical constraints at the hospital have already contributed to higher-than-average waiting times for surgery and higher readmission rates.<sup>45</sup> Prolonged waits and cancellations are a threat to the current excellent patient experience
- Critical care capacity limits surgical and catheter lab interventions at times of peak demand, increasing the risk of cancelled procedures
- During 2012/13 250 patients had their operations cancelled due to lack of capacity. The Patient Experience Survey results around patient's access to services flagged this as an area of concern.

### 5.3 Patient experience

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The Patient Experience survey (2012) confirms that patients are concerned about waits and cancellations of procedures at The Heart Hospital. It is important that these concerns are viewed in the context of very high overall patient satisfaction with services at the Heart Hospital. For example, only five percent of patients rated their overall experience as less than seven out of 10 compared with 14% of patients at UCLH as a whole and 17.5% at all Picker surveyed Trusts<sup>46</sup>. Similarly 87.7% of inpatients at The Heart Hospital had confidence in the doctors treating them, compared with 83.4% at all UCLH sites and 80% of all Picker surveyed sites.

However, there are negative patient responses. For example, the Picker Survey reveals significantly less choice of admission date given to patients at The Heart Hospital than the rest of UCLH (63% at The Heart Hospital, versus 77% at UCLH). 32% of elective patients at The Heart Hospital thought they

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<sup>45</sup> [www.drfoosterhealth.co.uk](http://www.drfoosterhealth.co.uk)

<sup>46</sup> Picker Inpatient Survey 2012 "University College London Hospitals NHS Foundation Trust Site Report: The Heart Hospital" Final Report February 2013

could have been admitted sooner and 21.1% of patients reported having their appointments changed multiple times.

In addition, more patients at The Heart Hospital shared a sleeping area with patients of the opposite sex than at other sites (17.5% at The Heart Hospital, as opposed to 11.8% at other sites) and more patients experienced one or more moves to different wards during their stay.

These responses suggest that the physical limitations of The Heart Hospital are impacting negatively on what is otherwise a very high standard of patient experience.

Equivalent patient survey data for the London Chest Hospital within Bart's Health is, unfortunately, not available. NHS Choices Friends and Families Test Information and CQC confirm a high level of patient experience at The Heart Hospital, the London Chest Hospital and St Bartholomew's Hospital.

## 5.4 Future activity risks for services at the Heart Hospital.

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The Heart Hospital is of an average size in terms of activity but is one of the smaller tertiary cardiovascular units in London. For example, volumes of PPCI, at The Heart Hospital meet the 100-case minimum level required but, at approximately 150 PPCIs carried out last year, they do not reach the recommended level of 300 cases per year in the 2013/14 NHS England Specialist Commissioning Service Specification for Complex Invasive Cardiology.<sup>47</sup>

Detailed mapping by London Ambulance Services of the impact on emergency journeys of the move from the London Chest to St Bartholomew's Hospital is being undertaken by local commissioners. However, it is likely that some journeys currently flowing to The Heart Hospital would transfer to St Bartholomew's Hospital in the future because of shorter route times. Activity at the relatively small PPCI services at The Heart Hospital (approx. 150 PPCIs per year) may therefore decrease in future.

Activity from The Heart Hospital may also be at risk from factors in addition to emergency journey times. In paragraph 4.1 it was noted that a London-wide system is being established to ensure that patients waiting for urgent surgery can be treated in any cardiac surgery centre where capacity is available. Given the problems the limited capacity place on The Heart Hospital, a proportion of urgent cases may be redirected to other London centres. Patients waiting for routine surgery may also choose to travel to hospitals with shorter waits.

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<sup>47</sup> <http://www.england.nhs.uk/wp-content/uploads/2013/06/a09-cardi-prim-percutaneous.pdf>

## 5.5 Future workforce and service risks for CVD specialist services in north and east London

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While neither UCLH or Barts Health operating alone would be able to maximise the opportunities provided by the combined critical mass to deliver sub-specialisation, the new specialist centre at St Bartholomew's Hospital would have the benefit of a state-of-the-art building and strong academic links to strengthen training and research. It would be a very attractive place for staff to work and in this context, and The Heart Hospital is likely to find it increasingly hard to attract and retain the best staff. Commissioners would not be able to sustain investment in new technologies across two sites, and it is likely that The Heart Hospital services would decline over time – a poor outcome for patients and staff.

Without changing the status quo, many clinical benefits would not be achieved; for example, neither service would be able to achieve the further sub-specialisation of surgery to benefit patient care and clinical outcomes. Both services would remain at risk. Innovation at both sites and on many fronts would be impeded.

Each service (at Bart's Health and at UCLH), although delivering good outcomes, is too small to stand the test of time. Neither is large enough to meet the current and future expectations for a high quality service, described in the London Model of Care for Cardiovascular Services 2010, primarily due to workforce constraints. For example:

- Each surgical and anaesthetic team is too small to achieve the full sub-specialisation in mitral repair surgery which is the expectation of modern cardiac surgery and neither are meeting the 85-90% levels of mitral valve repair recommended in the Model of Care. UCLH currently achieves 53% and Bart's Health achieves 56%. Larger volumes of activity through consolidation would enable us to provide one or more dedicated surgeons for mitral valve surgery, in line with other larger specialist centres. Some minimally invasive mitral repair surgery is undertaken, but this could be expanded and would be facilitated by a dedicated mitral team.
- In 2012, the London Specialised Commissioning Group agreed that there should be a separate 24/7 rota for acute aortic dissections in each quadrant of London. Our sites are currently delivering a combined volume of acute aortic dissections of approximately 25 each year. Neither service has the volumes of activity for surgeons to run a separate sub-specialist rota across north and east London.
- Ten years ago the majority of PCIs were given on an elective or planned basis. The evidence has shifted to giving PCI for an increasingly wide range of acute cardiac conditions so that two-thirds of PCIs are now delivered on an emergency basis<sup>48</sup>. Running a 24/7 HAC requires

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<sup>48</sup> [http://www.uclpartners.com/lotus/wp-content/uploads/2013/02/ICVS\\_Percutaneous.Coronary.Intervention- FEB2013.pdf](http://www.uclpartners.com/lotus/wp-content/uploads/2013/02/ICVS_Percutaneous.Coronary.Intervention- FEB2013.pdf) page 10



rotas of highly trained staff in adequate numbers and presents services with logistical problems

- Meeting the new challenge of seven-day working will be difficult, ensuring diagnostic support to clinical decision-making at weekends as well Monday to Friday, particularly in critical areas such as cardiac physiology where there are national workforce shortages. It would not be achievable at The Heart Hospital if it stays where it is, nor by services at the London Chest Hospital when they move to the new site at St Bartholomew's Hospital, without expansion in numbers.

## 5.6 Lack of sub-specialisation

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The London Model of Care is clear about the need to support further sub-specialisation within the clinical teams. Currently, neither of the volumes of specialist patients at either site, or the workforce delivering the procedures are of a sufficient scale to support full sub-specialisation. The London Model of Care clearly identifies the opportunity to improve outcomes offered by greater sub-specialisation in cardiac surgery.

## Access to technology and innovation

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Within the current economic climate it is unlikely that two medium-sized, specialist cardiac services, situated less than two-and-a-half miles apart, are sustainable. This is especially relevant for a service that requires highly trained staff with specialist skills; and that is increasingly dependent on expensive technologies and innovations to deliver improved outcomes for patients. For example, the hybrid theatre planned for the new development at St Bartholomew's Hospital for aorto-vascular surgery would place state of the art 3D imaging within a theatre, enabling surgeons and interventional vascular radiologists to work together. The hybrid theatre would be unique amongst the cardiac units in London and most of England, and would enhance and facilitate the growth of this specialty.

Clinicians recognise the inherent risks of this situation, have an ambition to deliver excellent care to their patients and populations, and want to manage the challenges proactively by moving together to a single campus.

The proposed solution: bring together two existing specialist centres onto a single site at St Bartholomew's Hospital.

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### Key summary: Current services

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- The London Chest is due to relocate to a new, state of the art facility at St Bartholomew's at the end of 2014.

- We need to future-proof our adult specialist cardiac services in north and east London, currently provided at The Heart Hospital (UCLH), and the London Chest (Bart's Health) so they are sustained for the next generation.
  - The Heart Hospital is facing capacity challenges: activity is increasing due to the growing and aging population; it is running at full capacity (95% occupancy), with no room to expand as the site is land-locked; shortage of critical care space limits surgical and interventional activity.
  - 95% of patients rated their overall experience as high at both sites, but the physical limitations at the Heart Hospital are impacting negatively on patient experience. Patients report experiencing long waits (30 days longer for non-urgent surgery than the average for England); and multiple cancellations.
  - Vascular surgery, an important codependent service for aortic surgery is not available at The Heart Hospital.
  - Workforce constraints are impacting on both providers. Neither of the two average sized services operating alone has the critical mass to deliver full sub-specialisation in aortic dissection and establish a separate 24/7 rota; or full sub-specialisation in mitral valve surgery. The number of primary PCIs at the Heart Hospital at around 150 PPCIs each year does not meet the commissioner recommended extended specification of 300 PPCIs.
  - More activity is being undertaken on an urgent basis outside of normal working hours. Meeting the new challenge of 7/7 services would be very difficult as there are critical workforce shortages, for example, in cardiac physiology.
  - Cardiovascular services are increasingly driven by new, expensive technologies and innovations which drive improved outcomes for patients; it would not be possible to invest in these at all sites. The hybrid theatre planned at the new St Bartholomew's hospital is an example.
  - Clinicians recognise the inherent risks of this situation, have an ambition to deliver excellent care to their patients and populations and want to manage the situation proactively by moving together to a single campus at St Bartholomew's.
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## 6 The proposed solution

We have a unique opportunity to improve our response to acute cardiac events, and to deliver first-class surgery and cardiac intervention by bringing together two average-sized specialist cardiac centres – The Heart Hospital, UCLH and the London Chest Hospital, Bart’s Health – onto a single campus at a new building at St Bartholomew’s Hospital by December 2014 (alongside additional cardiac services already situated within the St Bartholomew’s Hospital campus).

It is possible to achieve this swift timescale because of long-standing plans by Bart’s Health to create a new facility for its specialist cardiac services at St Bartholomew’s Hospital which would bring services currently provided at the London Chest Hospital together with services provided in the Queen Elizabeth Wing of St Bartholomew’s Hospital into a new state of the art building within the St Bartholomew’s Hospital campus. It is possible to achieve sufficient capacity to accommodate the two existing Bart’s Health services and The Heart Hospital within the new building.

*“Clinical staff are ambitious to bring together their expertise so that cardiovascular care continues to improve, is delivered to more patients, and is focused on care in the best environment and prevention”* **Dr. Edward Rowland, Divisional Clinical Director, The Heart Hospital**

### 6.1 Heart attack centres: 24/7 services

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Currently there are three Heart attack centres (HACs) in north and east London, which would reduce to two HACs under these proposals. The HAC at the Royal Free Hospital, together with associated services, would remain in its current location. The HACs at The Heart Hospital and The London Chest Hospital would relocate to form a single HAC service at the St Bartholomew’s site. This would not adversely impact on access times, given their current close location.

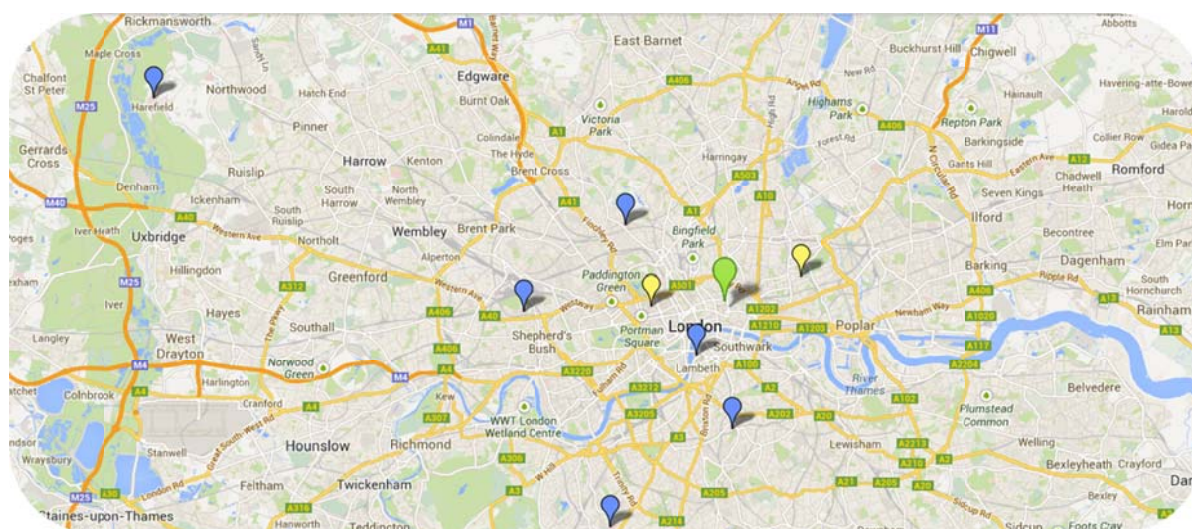
There are currently eight HACs in London:

- St Bartholomew’s Hospital – The London Chest Hospital
- Hammersmith Hospital
- Royal Free Hospital
- St Thomas' Hospital
- Harefield Hospital
- King's College Hospital
- St George's Hospital
- University College London Hospital – The Heart Hospital

In figure 6 (below) the London-wide HACs are indicated by blue tabs, with the exception of the existing HACs at The Heart Hospital and The London Chest Hospital which are indicated by yellow tabs. The proposed location of a new centre at St Bartholomew's Hospital, to replace those at The Heart Hospital and The London Chest Hospital, is indicated by a green tab, midway between the two existing facilities.

An analysis of London Ambulance Service journey times shows that journeys currently to The Heart Hospital would almost all transfer to St Bartholomew's Hospital, with the exception of some activity from the Borough of Westminster which would transfer to the Royal Free Hospital.

**Figure 7: Map showing the location of HACs in London**



## 6.2 Arrhythmia centres and 24/7 services

The London Model of Care recommends that specialist procedures such as ablation, ICD procedures and CRT implantations should be provided in designated centres, which should also provide a 24/7 service for urgent and arrhythmia cases. The full range of adult arrhythmia services for the population of north and east London is currently provided only at The Heart Hospital and St Bartholomew's Hospital, both of which provide a 24/7 service. Under this proposal all activity provided by these two services would transfer to the new facility at St Bartholomew's Hospital.

## 6.3 Making the best use of taxpayers' money and harnessing our potential to contribute to the UK economy

By consolidating specialist services in north and east London we would reduce duplication and rationalise investment, particularly in a specialty that is increasingly technology-driven. A better use of resources would facilitate the achievement of the year-on-year productivity gains that need to be made in the NHS to enable investment in increased activity and new technologies.

Consolidation would also ensure we are making the best use of NHS estates, particularly with a new hospital facility already being built at St Bartholomew's Hospital.

St Bartholomew's Hospital is already a globally-recognised brand. A new world-class centre offering the latest technologies and treatments would attract a greater number of national and international referrals and create an income stream that is not solely reliant on local NHS resources. Perhaps the greatest opportunity, however, is the opportunity to maximise investment through increased research activity and industry collaborations, supported by the academic health science partnership. Here, a new higher-volume centre could significantly increase our contribution to life sciences, with compelling opportunities for wealth creation for the local health system and the UK.

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### Key Summary: The Solution

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- This clinical proposal for change recommends that services at The Heart Hospital transfer at the same time as the planned move of the London Chest Hospital to the new facility at St Bartholomew's, bringing specialist heart services in north and east London onto a single campus.
  - There are eight HACs in London. The HAC at the London Chest, in Bethnal Green is planned to move to the St Bartholomew's site, which is midway between the London Chest and The Heart Hospital. Under these proposals, the relatively small sized HAC at The Heart Hospital would also transfer to the St Bartholomew's site, less than two and a half miles away. The HAC at the RFH would remain.
  - The full range of specialist arrhythmia services, currently provided only at St Bartholomew's and The Heart Hospital for north and east London, would come together at St Bartholomew's
  - Bringing the service together would facilitate the achievement of the year on year productivity gains that need to be made in the NHS to enable investment in increased activity and new technologies. It would avoid unnecessary and expensive duplication of equipment.
  - Consolidation on one site makes best use of the NHS estate, particularly with a new hospital facility already being built at St Bartholomew's.
  - A new world-centre offering the latest technologies and equipment would attract national and international referrals and additional income to support further investment.
  - This reconfiguration also offers a huge opportunity to increase research activity and industry collaborations. The new higher volume centre would maximise our contribution to life sciences, providing opportunities for wealth creation for the local health system and the UK.
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## 7 Our vision for the future

### Delivering world-class outcomes and experience for patients, underpinned by world-leading academic research and teaching

*“We serve a distinct population and have a unique opportunity for the organisations within the UCLPartners academic health science partnership to provide whole life and whole pathway cardiovascular care. The population served by UCLPartners is varied in terms of ethnicity and deprivation, with high levels of unmet cardiovascular need.*

*We have the opportunity to bring the best in cardiovascular medicine and research to the people that need it the most and ensure that we offer best value care for patients across the entire course of their conditions.” Dr Charles Knight and Dr Clare Dollery, letter of support, January 2013 (appendix 2)*

#### 7.1 Service vision for the Bart’s Heart Centre

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Given the risks we have identified if services stay as they are, it is important to take this opportunity to deliver the right pathways of care and the right configuration of hospital services for specialist CVD care.

Bringing these two high quality, but average sized specialist CVD services together onto a single campus would enable them to operate at a scale to deliver world class results. We have the opportunity to bring the best in CVD medicine and research to the people that need it the most and to ensure we offer best value care for patients. Our vision is for a consolidated service that delivers improved outcomes and patient experience.

In particular, the new service would:

- **Achieve full sub-specialisation in surgery**, enabling the development of a high volume centre for mitral valve and a regional aorto-vascular centre with a specialist 24/7 rota, so improving outcomes for patients. For example, if we were to deliver the recommended levels of mitral repair surgery verses replacement 104 patients each year would benefit from lower mortality risks at the time of treatment.
- **Meet and surpass evidence-based recommended volumes in complex and emergency procedures in cardiology**, by consolidating into a single high volume service – treating around 650 patients each year - a recognised marker for clinical safety and quality. Improving mortality across the whole service to that currently achieved by the London Chest Hospital would save around 6 lives each year. Improving mortality in line with the best centre in the UK, which treats 600-700 cases annually, could save around 20 lives per year.

- **Enable supporting services such as anaesthetics to sub-specialise**, establishing expertise in sufficient numbers to a range of sub-specialities across the multi-disciplinary team, as well as the faster adoption of new techniques.
- **Generate greater expertise amongst the whole workforce**, driving up outcomes and giving patients a better experience of care; many services at the new centre would be the largest in the UK and so bring the benefits of critical mass to our population.
- **Share the benefits of its expertise across our whole population, and beyond.**
- **Improve training opportunities for all groups of staff**; the service would be able to recruit from a world class pool of expertise
- **Strengthen research and wealth creation** by creating access to data from such a large, diverse population and broad range of activity.
- **Streamline care pathways** by bringing surgery onto one site and create clearer referral routes for emergency units and the London Ambulance Service,
- **Create greater capacity and flexibility** to respond to demand, avoiding waits and cancellations. There are ongoing discussions to ensure sufficient capacity is developed in the new Heart Centre at St Bartholomew's Hospital.
- **Rank in the top five most productive cardiovascular publishers in the world.**
- **Provide better value for money** and maximise the gain from the investment already made at St Bartholomew's Hospital.

Clinicians have come together across UCLPartners and worked with a wide range of stakeholders to create a vision for a new specialist centre to rival the best in the world. They have produced proposals for the range of different aspects of care (<http://www.uclpartners.com/lotus/our-programmes/integrated-programmes/#intcardiovascular>) which are reflected in this document. Elements of this vision relate to networked delivery of care in DGHs, primary care and the community. Other elements focus on more specialist interventions and treatments, and the opportunities for bringing services together on a single campus. Both these approaches are necessary if we are to identify unmet needs and ensure early diagnosis as well as provide access to the highest quality services for acute events such as 'heart attacks', surgery and other complex procedures.

The key service benefits of consolidating on one site are now described in detail for each of the main services.

## 7.2 Cardiovascular surgery

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Services currently provided at:

- The Heart Hospital, University College London Hospitals NHS Foundation Trust
- The London Chest Hospital, Bart's Health NHS Trust
- St Bartholomew's Hospital, Bart's Health NHS Trust

Cardiac surgery mortality is currently around the national average at The Heart Hospital and the London Chest Hospital. Other centres with volumes that are similar to the combined surgery activity at Bart's and UCLH have shown that better outcomes are achievable. Consolidating services in NE/NC London would create the largest cardiac surgery centre in terms of activity. Activity would be slightly higher than the current largest centre, which is Papworth Hospital NHS Foundation Trust – if we were to achieve the same mortality as Papworth Hospital, we would save at least 10 lives per year. If we were to achieve a mortality rate to the lowest in England we would save at least 20 lives per year.<sup>49</sup>

It is important that surgery is delivered as part of an integrated system of care. Bringing surgery from three sites to one would streamline care pathways across the regional population we serve. The greater capacity at the new site would enable the service to meet recommended timeframes for urgent referrals.

Cardiac surgery continues to be technologically driven and dependent upon multidisciplinary care. These trends are accelerating and the costs of equipment, facilities, appropriately-trained consultants and support staff in adequately trained numbers with essential co-locations demand sufficient critical mass if they are to be achieved. A thriving training programme would derive from this. Good examples of the opportunities available in the UK are seen at Papworth Hospital and the Liverpool Heart and Chest Hospitals, which are among the country's largest, and offer the most diversified cardiac surgery.

Consolidation of surgery on one site would enable:

- A regional aorto-vascular centre – a single regional approach for north and east London would provide the critical mass to develop the necessary experience and expertise to provide world-class results. This would provide the critical mass expected by specialised commissioning (see Section 2.4) as well as the necessary on-site co-dependent services of vascular surgery, vascular radiology and nephrology
- Clearer referral pathways for emergency units and the London Ambulance Service

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<sup>49</sup> Based on data available through NICOR <http://www.ucl.ac.uk/nicor/audits/Adultcardiacsurgery/datasets>



- A Mitral Valve Centre – there is a general recognition that the results of mitral valve repair are more successful in high-volume centres. Greater sub-specialisation in mitral valve repair would be possible
- A regional Transcatheter Aortic Valve Implantation (TAVI) service – through the merger of two medium-sized TAVI services. This procedure is particularly suited for high-risk patients and for those where conventional surgery cannot be offered. There is a high cost to these procedures and the likelihood is that in future they would only be funded in high-volume centres
- Innovation – a high volume centre is more likely to be selected to test innovative technology, advise on outcomes and create appropriate models of diffusion
- ACHD surgery - this service is currently part of a nation-wide review. The service is closely linked to the congenital heart service at GOSH, and provided by surgeons from GOSH, ensuring a sound transition for children as they grow up to adult services.
- Improved training and recruitment – the creation of one of the largest surgical units in the UK would enhance education and training and enable the recruitment of leaders in the field
- Research, basic science and clinical trials – UCL is one of the few remaining thriving Cardiac Surgical Research programmes in the UK, clinical, translational and basic. The significant critical mass resulting from the merger would provide a unique base for funding clinical trials and outcome and epidemiological studies. A current Yale/UCL collaboration ensures there is the potential to be a national/international leader in research.

From a hospital care perspective, the benefits offered by the opportunity to consolidate the expertise from two already strong units into a bespoke unit that is strongly integrated and has world-class academics should not be underestimated. When placed into the context of the integrated cardiovascular system, the opportunity to improve the whole patient pathway for cardiovascular care becomes truly unique.

*"The new state-of-the art-building at St Bartholomew's provides a unique opportunity to bring specialist cardiovascular clinicians and researchers together to create an innovative and integrated cardiovascular centre. We will be able to provide the best cardiovascular care for the communities that need it the most."* **Dr. Charles Knight, Clinical Director of Cardiovascular Services, Bart's Health NHS Trust**

### 7.3 Cardiac anaesthetics and critical care

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Services currently provided at:

- The Heart Hospital, University College London Hospitals NHS Foundation Trust
- The London Chest Hospital, Bart's Health NHS Trust
- St Bartholomew's Hospital, Bart's Health NHS Trust

These services are key to improving patient outcomes from cardiac surgery and other interventions.

**Anaesthetics:** the critical mass gained by bringing the services together would help overcome the lack of timely anaesthetic availability, particularly for catheter lab procedures. Sub-specialisation by anaesthetic teams would be achieved (such as surgical myectomy, complex valve repairs and thoracic aortic work), with participation in multidisciplinary discussion where appropriate. A single site would make this possible.

A new, larger-volume centre would facilitate important developments in anaesthesia, speeding up recovery and reducing lengths of stay. As examples, fast track surgery reduces the period of stay at an intensive care unit ICU; same-day admission can be achieved in more patients; and a greater critical mass of staff would enable the development of perioperative medicine specialists, managing the complex requirements of those particularly at risk from surgery.

**Critical Care:** there are three critical care units with accumulated expertise at the three sites in the two organisations. There would be gains for the whole service from bringing this expertise and a broader range of conditions (for example, ACHD patients) together on one site.

The new centre would have state-of-the-art facilities and overcome the current capacity constraints. The greater volume of cases, as well as their diversity, would provide substantially better training opportunities and attract high quality staff.

## 7.4 Cardiac imaging

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Services currently provided at:

- The Heart Hospital, University College London Hospitals NHS Foundation Trust
- The London Chest Hospital, Bart's Health NHS Trust
- St Bartholomew's Hospital, Bart's Health NHS Trust
- The Royal London Hospital, Bart's Health NHS Trust

Advanced cardiac imaging now forms a key part of service delivery, underpinning care in a variety of conditions. For cardiac MRI, the current services at Bart's and The Heart Hospital are the second and third largest in the UK and both are in the top-10 internationally. In 2012, 6,700 patients were scanned across the two trusts, but with national growth at 20% in this field (provided by proportional, appropriate dis-investment in other technologies), growth has been seen in all cardiovascular imaging modalities, including CT, cardiovascular magnetic resonance imaging (CMR), echo and nuclear.

The units provide major perfusion services (for angina) and innovative technologies (T1 mapping for amyloid, MRI pacemaker scanning) as well as world-class research. The units have produced key initiatives including the national "peer review" scheme, national tariffs and the template "delivering



a UK CMR service” document which forms the basis of national CMR commissioning. Through local and online education, the centres are leading training for CMR globally.

Within both organisations there are currently disparities in the ready access to technology such as scanners and the types of imaging modality available on each of the sites; this would be addressed at a centre with a larger volume of cases.

Bringing together services onto one site would make the centre the largest in the world in terms of cardiac MRI and cardiac CT volume, providing an important source for research, with unique populations to investigate (ethnic diversity, heart muscle disease, congenital heart disease and pulmonary hypertension).

## 7.5 General interventional cardiology

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Services currently provided at:

- The London Chest Hospital, Bart’s Health NHS Trust
- The Heart Hospital, University College London Hospitals NHS Foundation Trust

We have already discussed the fact that logistical challenges of the evidence-based shift towards invasive management of STEMI and NSTEMI has resulted in a change in work so that only one third of PCI is undertaken in stable patients, with the greater proportion occurring outside ‘normal hours’. Consolidation onto a single site would make it easier to provide 24/7 rotas of highly skilled staff in adequate numbers to ensure the sustainability of services so that NICE Guidance 2010 is met.

The service would be able to meet the activity levels of 300 primary PCIs each year as recommended in the 2013/14 NHS England Service Specification. Currently The Heart Hospital does not have the volume of patients to meet the recommended higher-level volumes. These upper volumes would be met and surpassed by the new service.

Hospital volume and individual clinician volume is a recognised key marker for clinical safety and quality in complex interventional processes.

## 7.6 Adult congenital heart disease (ACHD)

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Services currently provided at:

- The Heart Hospital with support from Great Ormond Street Hospital

The reported prevalence of congenital heart disease is lower than would be expected for the East London population, suggesting an under-diagnosis/under-reporting, which we would aim to address through the new larger service located in north east London. We have already identified that ACHD affects a growing population of patients, and the severity of disorders in the adult population is also

increasing. Despite treatment in childhood, most adults require specialist long-term follow-up and many would need further interventions including cardiac catheterisation and/or surgery throughout their lives. The integrated cardiovascular system provides the opportunity to provide lifetime care to this growing cohort of patients, with excellent specialist care within the new heart centre and integration with other hospitals to ensure excellent shared care locally.

Care for patients with congenital heart disease is currently provided at The Heart Hospital. The service delivers care to 6,500 patients, with 300-400 new patients being treated by the service per year (85% of these are young patients transferring from GOSH and 15% are from other sources). The surgical service for ACHD at The Heart Hospital is provided in cooperation with GOSH. This provides complex treatments, of which 60% are successive operations on individuals who would need multiple operations during their lifetime in order to maintain their health. The outcomes are excellent (mortality <1%) despite the complexity of the surgery. The Heart Hospital's maternal cardiology service has seen over 760 babies born to women with complex heart disease, with a mortality rate of <0.2% and morbidity of <5%. Care is provided by an expert multidisciplinary team, which includes colleagues from GOSH.

The new centre would have the capacity for this service to continue to grow. It would be the largest in the world for these patients and would benefit from researching into outcomes, advanced imaging, pulmonary hypertension, novel devices and quality of life assessment.

*“Models for clinical care of patients with congenital heart disease are moving toward a joined up, seamless care pathway between childhood and adulthood within specialist centres, and which can provide research opportunities which are key to improving clinical outcomes. We now have the opportunity to support the development of the largest centre in Europe, which can deliver this vision for best care and it should be seized without hesitation in the best interest of patients”* **Dr. Fiona Walker, Clinical Lead, Adult Congenital Heart Disease, UCLH**

## 7.7 Inherited cardiovascular conditions (ICC)

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Services currently provided at:

- The Heart Hospital with support from Great Ormond Street Hospital for Children
- The London Chest Hospital, Bart's Health NHS Trust

The prevalence of cases for the commonest inherited cardiovascular conditions in the UCLPartners population is estimated at between 30,000-35,000. The current combined UCLH and Bart's Health services, however, see between 8,000-9,000 outpatients per year, with less than 50% from London. This suggests a substantial shortfall in local provision due to unidentified population.

The cardiomyopathy unit at The Heart Hospital is the largest inherited heart condition service in the UK and also provides joint cardiomyopathy services with Great Ormond St Hospital. A dedicated

heart muscle disease service at the London Chest Hospital was established in 2006 with currently three heart muscle disease clinics a week and the UK's largest septal ablation service, addressing an evident but previously unmet clinical need for local outpatients. Both services are showing significant growth as more children survive into adulthood.

Moving on to one site for adult services would make it easier to share personnel, clinical and research governance and information systems.

The aim of the National ICC services is to act as a hub for a number of satellite services. A number of highly specialist services are based within UCLPartners for whom cardiac disease is an important manifestation of their disease.

This provides opportunities for enhanced research collaborations. Clinical and translational research is a major centralising force. A key component of our research strategy is the ambition to include all patients in research projects including bio-banking and large-scale outcomes research.

Inherited cardiac diseases represent a substantial unmet need for therapeutic innovations. The scale of clinical activity provides a globally unique platform for the identification of novel therapeutic targets, randomised clinical trials and population-scale outcomes research.

Increasing demand for inherited cardiac disease services over the next 5-10 years will generate an increased need for training. The new service would have the critical mass to support a comprehensive training programme.

## 7.8 Cardiac rhythm management

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Services currently provided at:

- The Heart Hospital, University College London Hospitals NHS Foundation Trust
- St Bartholomew's Hospital, Bart's Health NHS Trust

The past 20 years have seen huge developments in the field of cardiac rhythm management with new therapies, including anticoagulants, devices and ablation, producing demonstrable reductions in morbidity and death underpinned by robust data from randomised controlled trials. The critical mass of each service would provide sufficient volume to dedicate a catheter lab to care for patients with ventricular tachycardia (a life threatening arrhythmia) and cause less disruption for elective and non-emergency patients. The aim is to increase implant rates across north and east London to equal nationally recommended levels.

Both Bart's Health and UCLH are recognised as cardiac rhythm management centres of excellence which are research active, continually innovating and of national prominence. There is also a strong history of collaborative working across the two services. Both are currently participating in a six-month pilot of paramedic triaged, direct ambulance access for patients with ventricular tachycardia, complete heart block and multiple shocks from their implanted devices. The associated increasing workload and the sustainability of providing these services 24/7 is likely to be a challenge under

existing configurations but will be reviewed in the next two months when the pilot concludes. The new service would facilitate the adoption of innovative ways of working and the provision of 24/7 services.

The box on atrial fibrillation in section 2.3 describes the networked service of clinics at DGHs run by the Cardiac Rhythm Group and the strategy for satellite nurse-led primary care arrhythmia services.

## 7.9 Heart failure

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Services currently provided at:

- The Heart Hospital, University College London Hospitals NHS Foundation Trust
- St Bartholomew's Hospital, Bart's Health NHS Trust
- Community-based rehabilitation services

Heart failure affects 1.2% of the population, causing a debilitating and eventually terminal illness with episodic deterioration and potential for unplanned admissions during the late stages. Modern treatment comprises of pharmacological treatments and non-pharmacological interventions such as pacemakers, ultrafiltration, arrhythmia ablations, defibrillators and lifestyle changes, all of which can deliver increased life expectancy and quality of life.

Mortality and morbidity and levels of service provision vary considerably across North East and North-Central London. National Heart Failure Audit data<sup>50</sup> indicates that mortality outcomes are significantly improved if patients in hospital with heart failure are managed by specialists on cardiology wards, as there is better access to life saving treatment.

"For every 100 patients discharged, 12 more will be alive one year later if managed by a cardiology team."<sup>51</sup>

The service at the specialist centre would play a leadership role working with commissioners and trusts to deliver the NICE Guidance for heart failure, both in the community and through ensuring every DGH/Trust within UCLPartners has access to a specialist in the management of HF.

At present, in both UCLH and Bart's Health trusts a large proportion of heart failure patients are cared for by non-specialist physicians. At the new site there would be the ability to build a large pool of specialists with an increased bed capacity to ensure that any necessary admission was effective and unlikely to be repeated, root cause analysis of all admissions and re-admissions would be performed to identify system errors and prevent recurrence.

We would also work with specialist commissioners to develop the role of the Heart Failure Service for the small group of patients with advanced heart failure across the population of six million.

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<sup>50</sup> <http://www.ucl.ac.uk/nicor/nicor/hfreport11-12>

<sup>51</sup> National Heart Failure Audit, NICOR 2011-2012.

## 7.10 Training and education

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One of the undoubted benefits of centres with greater mass and more opportunity to treat specialist cases is the associated training opportunities available to junior staff. Staff dealing with complex patient cases gain more experience, which translates to more knowledgeable teams across the patient pathway who in turn are themselves better placed to deliver high quality training to others. In units where specialist cases are rarer, or where rotas are not sustainable, the opportunity to train and develop staff to deliver specialist care is limited.

*“The doctors of the next 40 years need to understand how to direct every step in preventing and managing what will remain one of the commonest causes of disability and death in this century. Our new undergraduate curricula are designed to take full advantage of integrated systems of cardiovascular care, reflecting what our community needs now and in the future.*

*Major advances in effectively treating common and less common, yet critical, cardiovascular diseases requires focusing skills and expertise not only to ensure excellent care but also to concentrate experience for those who must learn in only a few years, everything about the wide range of cardiovascular diseases that continue to challenge us. A centre of global excellence in the management of cardiovascular diseases will attract the very best national and international trainees in recognition of the advantages our training programmes will bring to them and their future patients.”* **Professor Jean McEwan, Consultant Cardiologist and Higher Education Institute representative for North-Central and East London Local Education and Training Board (LETB)**

*“The development of a larger centre offers an opportunity to bring together the clinical nurse specialist workforce and develop existing skills to create roles that will bridge the gap between primary and tertiary care. There will be an opportunity for the CNS to move beyond reactive care and towards preventative medicine. The professional development for nurses and allied health professionals will be greatly increased by the opportunity to have multiple cardiovascular services in a single location, this will allow nurses the support to develop nurse led services and take on clinical roles that in the past were managed by medical teams. While the exposure to higher volumes of rare clinical cases will support the establishment of roles such as Nurse Practitioners who improve the efficiency of patient pathways and improve patient experience as a result.”* **Jonathan Hanbury, Divisional Senior Nurse, The Heart Hospital, UCLH**

## 7.11 Technological innovation

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*“The future of healthcare is high tech, delivered at scale, with a greater range of treatment options. Concentration of tertiary care will create an opportunity to deliver modern services with technical solutions.”* **Professor Mark Caulfield, Director of the William Harvey Research Institute and Director of Bart’s and The London NIHR Cardiovascular Biomedical Research Unit**

One of the aims of UCLPartners is to support the introduction of innovative new technology and treatment to improve patient outcomes. But new technological innovation can come at cost, making independent investment in different units challenging in the current economic climate.

The new building at St Bartholomew's Hospital, along with the geographical alignment to the William Harvey Research Institute, means that patients in north and east London would have better access to modern equipment and technology that supports innovation in treatment. It is part of the wider strategy for Bart's Health, in partnership with Queen Mary, University of London, and University College London to build a Centre for Therapeutic Innovation on the St Bartholomew's Hospital site. This builds towards creating a campus of cardiovascular excellence in Northeast London.

## 7.12 Academic integration

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All the clinical and academic service lines see significant benefits from the integration of services. Combining their output, UCLPartners universities would move up the rankings and into the top-five, most productive cardiovascular publishers, rather than in the current top fifteen. Combined, these services would create the largest adult congenital heart disease unit in the world, the largest in Europe for elements of cardiovascular imaging, and the largest in the UK for inherited cardiac disease, cardiac intervention and electrophysiology. All this offers the opportunity to bring the benefits of critical mass to our patients, improving patient outcomes and experience.

*“Creating partnerships with the life sciences industry is at the heart of the UK health and wealth agenda. Industry wants to align with the biggest and the best. This development will create the biggest cardiovascular clinical and research centre in Europe, on a par with the best in the world – an unbeatable proposition for London.”* **Professor Bryan Williams, Professor of Medicine and Director of the Biomedical Research Centre at UCLH**

## 7.13 Optimisation of estates

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In north and east London we have an opportunity to overcome some of the physical constraints around delivering care for cardiovascular services. With the current development of a larger specialist cardiovascular unit on the St. Bartholomew's Hospital site we have a unique opportunity to address some of the key challenges in delivering better cardiovascular care. The development of new, bespoke facilities is sufficiently rare that another opportunity to properly invest and develop a fit-for-purpose centre, to enable truly world-class outcomes, is unlikely to present itself again in the near future. We need to seize the opportunity.

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## Key Summary: Our Vision

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- To create a cardiovascular hub for north and east London that provides specialist cardiovascular care which is world class.
  - To deliver specialist care in the context of an integrated cardiovascular system, delivering whole pathways of care designed around the patient.
  - Achieve full sub-specialisation in surgery, in line with specialist commissioning requirements
  - Meet and surpass evidence-based recommended volumes in complex and emergency procedures in cardiology
  - Enable supporting services such as anaesthetics to sub-specialise, establishing expertise across the multi-disciplinary team
  - Support the faster adoption of new techniques.
  - Generate greater expertise amongst the whole workforce, driving up outcomes and giving patients a better experience of care and share the benefits of its expertise across our whole population, and beyond.
  - Improve training opportunities for all groups of staff
  - Strengthen research and wealth creation
  - Create greater capacity and flexibility to respond to demand
  - Rank in the top five most productive cardiovascular publishers in the world.
  - Provide better value for money
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## 8 Academic vision for the Bart's Health heart centre

### 8.1 The overall vision

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Part of the strategy for a new centre at the St Bartholomew's Hospital site is to create a strong research unit aligned to the clinical services delivered there. The University and NHS partnership would create the premier global centre for cardiovascular healthcare, research and training by creating a unique Centre for Therapeutic Innovation focused on creating and testing the next generation of cardiovascular medicines and innovative devices achieved through:

- The ICVS that serves 6 million people and where cutting-edge diagnostic and therapeutic innovations with direct relevance to the diverse patient population and cardiovascular disease burden would be developed.

- The unique research window on communities worldwide made possible through the diversity of the UCLPartners population to develop innovative therapeutic solutions to address the growing global burden of cardiovascular disease.
- Establishment of a governance structure and organisational culture that ensures every NHS and Academic staff member is committed to an environment in which clinical and academic excellence are seen as partners in future success and that every patient has the opportunity to participate in research.
- Training the next generation of cardiovascular clinicians, scientists and healthcare professionals to become therapeutic innovators of the future.

## **8.2 A single tertiary academic partnership for UCLPartners at Bart's Health**

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The consolidation of tertiary cardiovascular clinical and academic endeavour at the new Bart's Heart Centre would be tightly connected to the wide-ranging academic strengths of Queen Mary, University London and UCL. By bringing this together in a unique CV partnership between two universities and the NHS we would have the critical mass and major synergies that would allow us to create a single location for therapeutic innovation for industrial partnership. This new Centre for Therapeutic Innovation would reach out to complete two-way translation and implementation of innovative healthcare extending across the Academic Health Sciences Network. The strategy:

- Allies two cardiovascular research institutes and multiple teaching hospitals with currently more than 30 principal investigators, of which two thirds are top-rated internationally, and a combined research staff of more than 200.
- Brings significant annual National Institute for Health Research infrastructure funds with aggregated 5-year grant support in excess of £176M from the Department of Health, National Institute for Health Research, British Heart Foundation, Wellcome Trust, Medical Research Council, the Bill and Melinda Gates Foundation, the Leducq Foundation and industrial sources.
- Creates a unique combined clinical and research portfolio that spans the life course, bridging discovery and translation; linking evaluative research with policy and national audit.

## **8.3 The vision for academic/NHS partnership; a UCLPartners centre for therapeutic innovation**

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The ambition is to be the world-leader for cardiovascular therapeutic innovation within 5 years. The proposal to form the UCLPartners Centre for Therapeutic Innovation is timely as there is broad recognition that though evidence-based interventions have transformed cardiovascular disease epidemiology, there is still great unmet need for multiple new therapies and interventions for growing numbers of patients with cardiovascular disease. This need is especially pressing in arrhythmias, heart failure, cardio-metabolic diseases (hypertension, coronary disease, vascular inflammation), and rare congenital cardiopulmonary disorders that are all within key work streams



of the UCLPartners Integrated Cardiovascular System. Unfortunately this and the existing pipeline for new cardiovascular therapeutic agents is limited and device development fragmented into silos rather than multidisciplinary innovation centres. The links with Yale University, the Crick Institute, and the 6 million population served by UCLPartners would maximise prospects for translation and research suggests that this Centre should have two unique strategic priorities:

- Therapeutic innovation around new medications and preventive strategies.
- Therapeutic innovation around device based therapies.

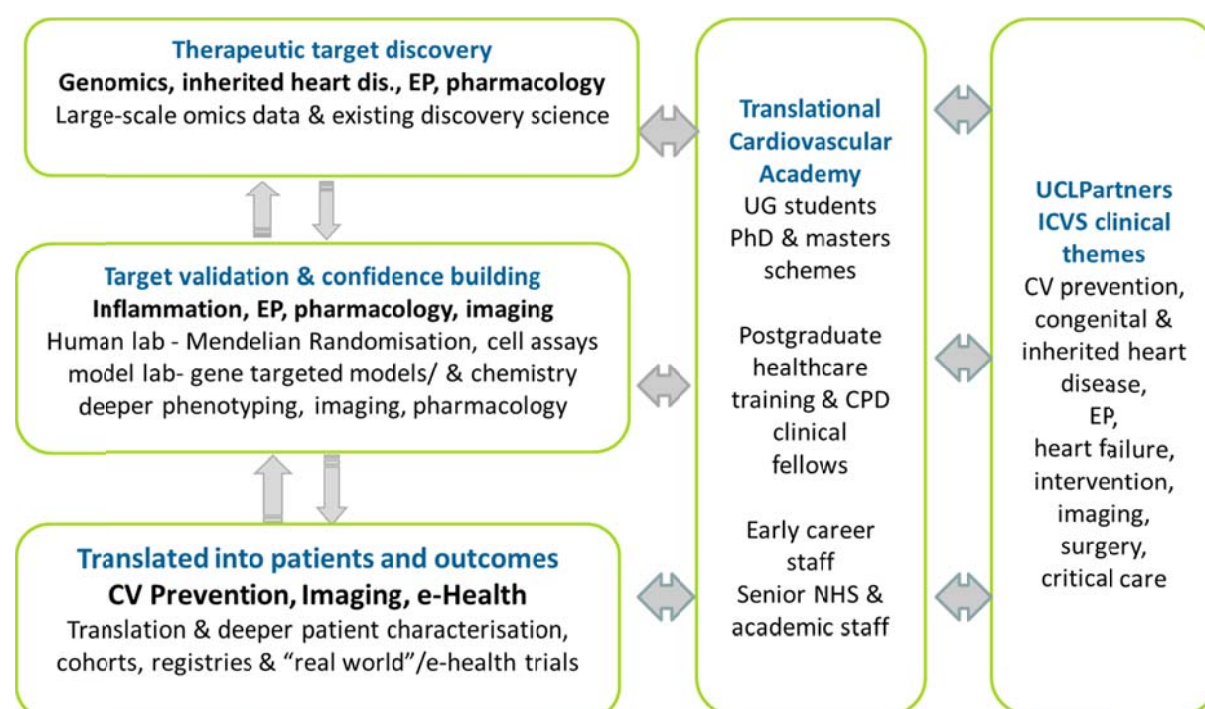
These united concepts harness the distinctive competitive advantage providing opportunity for the existing international leaders and for those aspiring to this position. This clarity of vision would also allow the recruitment of leading established researchers and developing researchers complementary to the existing innovative strengths within the Partnership.

## **8.4 Therapeutic innovation for CV medications and preventive strategies**

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In the area of novel therapeutic targets it is now widely acknowledged that a more sophisticated understanding of many diseases coincides with a decline in licensing of new cardiovascular medicines, and increased development costs due to high rates of late stage failure. The academic partnership offers a distinctive set of internationally-leading research strands (genomics, vascular inflammation and angiogenesis, electrophysiology, pharmacology, imaging, surgery, cardiovascular prevention and epidemiology, electronic health) that when linked together with the proposed UCLPartners Integrated Cardiovascular System NHS clinical work streams would provide a tremendous platform for therapeutic innovation. This Centre for Therapeutic Innovation would integrate large-scale data from existing programmes in genetic epidemiology and discovery science to identify new pathways previously not targeted, or overlooked for therapeutic innovation. By combining this with high fidelity drug target validation and confidence building it is possible to anticipate accelerated transition of novel therapies and repurposing opportunities for existing targets into the definitive experiment (the randomized controlled trial). To maximize the efficiency and cost-effectiveness of clinical studies the team would capitalize upon their recently awarded MRC electronic-Health Centre which would integrate primary, secondary and tertiary data in a scaleable manner enabling “real world clinical trials” in rare and common disease and extracting maximal value from multiple cardiovascular registries hosted at the National Institute of Cardiovascular Outcomes Research.

**Figure 8:** The academic/NHS Strategy for the UCLPartners Integrated Cardiovascular System and the UCLPartners-CCTI at Bart's, UCL and QMUL.



This unified approach means any clinical theme may interface with all the aspects of therapeutic innovation, education and training thereby integrating NHS and academic strengths to produce novel medicines and train a new cadre of therapeutic innovators.

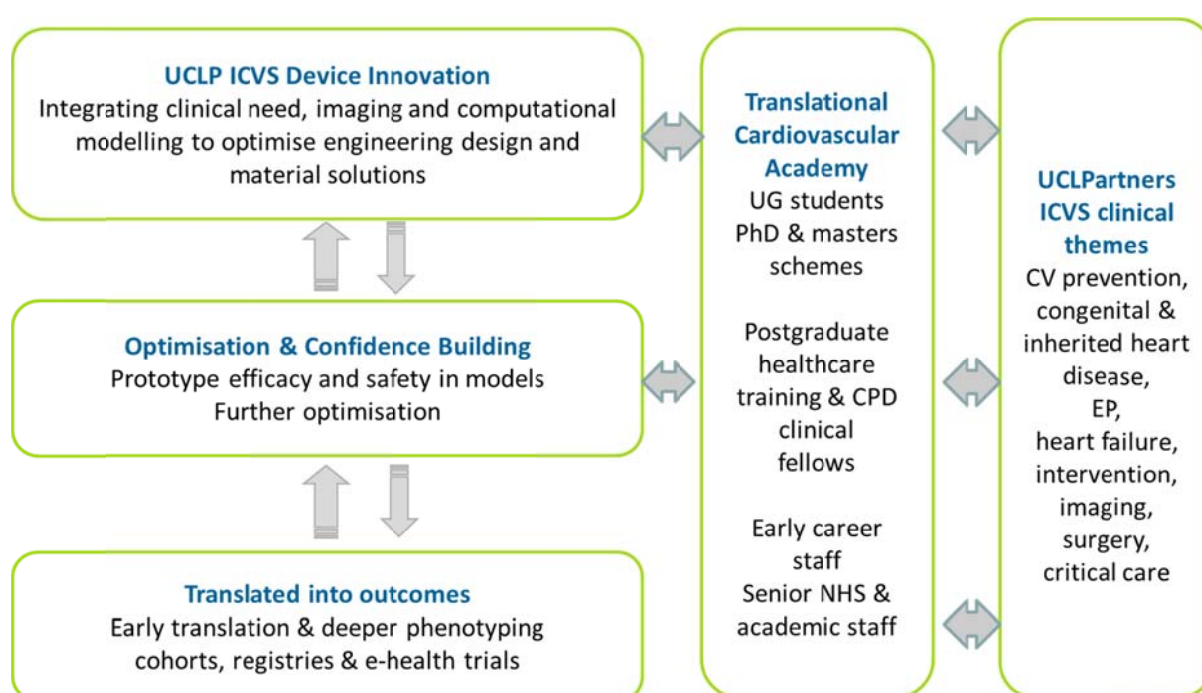
## 8.5 UCLPartners device-based therapeutic innovation

A second burgeoning area in CV innovation is device-based therapy with a global market that is expected to reach \$43.4 billion with a current annual growth rate of 4% (2010-2017). In this arena clinical prioritisation, reducing risks of first-in-man implantation, and surveillance of efficacy and safety are vital aspects of device development. Across UCLPartners implant or utilise device-based therapy is regularly used within the NHS yet at present no UK academic centre integrates its clinicians from key therapeutic areas with engineers and trialists to offer co-ordinated translation of concepts into patients.

This partnership has extremely strong credentials for forming a world-leading devices centre with the most highly cited engineering department in the UK (NIHR data) and a track record in percutaneous device development (e.g. the Melody™ and first native transcatheter pulmonary valves). In addition the team have a growing portfolio of new technologies (e.g. a transcatheter aortic valve, nanocomposite-based scaffolds for vessel grafts, and an EU-funded trial of a biodegradable coronary stent) from which to develop an international device and implant centre. This is enabled by the new UCL Institute of Biomedical Engineering and the QMUL Science and Engineering faculty through which it would be possible to uniquely integrate and invest in teams of biomedical engineers, materials and imaging scientists, clinicians and trial design experts committed

to high fidelity device development. The proposal creates a unique one-stop centre for device innovation and is greatly strengthened by the Yale/UCL device initiative that links preclinical animal and bench testing at Yale with clinical development and trials, and through the Devices Centre to other centres in Europe.

**Figure 9:** The academic/NHS Strategy for the UCLPartners Integrated Cardiovascular System and the UCLPartners-CCTI for Devices at Bart's, UCL and QMUL.



This unified approach means any clinical theme can integrate with computer modelling, engineers/bioengineers and material scientists to develop and optimise prototype devices. This would offer a unique education and training environment. It is envisaged that the Yale/UCLPartners partnership would interact at all levels and the team would create alongside this a Device Bioincubator to integrate industry and small to medium enterprises creating a unique multi-disciplinary environment with the crucial European research and development arena.

There are multiple opportunities for cutting edge innovation an example would be by capitalising on the current, talented advanced imaging teams and infrastructure to develop a unique a library of anatomical variation, and computer modelling to further develop 'virtual' device implantation to de-risk first-in man procedures. The International Devices Centre could lead rapid prototyping of individually tailored devices for congenital and other heart disease patients reaching across their life course where off-the-shelf technologies are unsuitable. We are now entering a new era with revolutionary developments in areas, such as, smart materials, high performance computing and nanotechnology. These advances could form the basis for the next generation of cardiovascular medical technologies and this Centre for Therapeutic Innovation could bring those benefits and opportunities to UK NHS patients. From existing contacts and partnerships with industry it is recognised that this interdisciplinary devices centre has potential for world leadership.

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**Key Summary: The Academic Vision**

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- The unique partnership between QMUL, UCL and the NHS at St Bartholomew's would provide the critical mass and major synergies to create a single location for therapeutic innovation for industrial partnership, 'The Centre for Therapeutic Innovation'.
  - The proposal allies two cardiovascular research institutes and many teaching hospitals with currently more than 30 principal investigators, two thirds of which are top rated internationally, supported by a combined research staff of over 200. They already bring in significant research funding.
  - There is unmet need for multiple new therapies and interventions for growing numbers of patients with CVD that are of direct relevance to the diverse population of north and east London, as well as patients with rarer disease from further afield, who visit the services for their expertise.
  - The diversity of our population provides a unique research window on worldwide communities and therapeutic responses to the growing global burden of CVD.
  - We can maximise prospects in therapeutic innovations and preventive strategies by linking leading research strands in the universities, with the clinical work streams; and supporting this with access to large scale data from genetic epidemiology and discovery science to find new pathways for therapeutic innovation. This would accelerate the transition of novel and other therapies into RCTs which can be supported with integrated primary, secondary and tertiary data enabling cost effective 'real world clinical trials' in rare and common disease on a large scale. The national cardiovascular registries, covering many aspects of CVD, hosted at NICOR provide rich contextual data.
  - A strategic priority is to create a unique one stop centre for device innovation, optimization and translation into patients, allowing any clinician to integrate with computer modeling, engineers/bioengineers and material scientists; whilst working with industry and small to medium sized enterprises.. There is a rapidly growing market for devices and revolutionary developments in smart materials, computing and nanotechnology are likely to form the basis of the next generation of CVD medical technologies.
  - The unified approach for both medications and device therapeutic innovation would integrate NHS and academic strengths, training the next generation of therapeutic innovators. The vision would allow the recruitment of leading established and developing researchers to complement the existing strengths within the partnership.
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## 9 What this vision means for our patients and our population

Achieving this vision would deliver considerable benefit for our patients and our population, including the following;

**Prompt access to treatment.** The new centre at St Bartholomew's Hospital would have the capacity across all departments to provide prompt access to treatment. Prolonged waits and cancellations of procedures would no longer be a problem.

**A high quality environment.** Patients in both north and east London would have their treatment given in a high-quality environment, with state of the art equipment in all departments. The two populations would not experience a different standard of care.

**Expert multidisciplinary teams.** Patients would be treated by expert teams, with the accumulated knowledge and understanding that results from treating high volumes of similar conditions, even for rarer interventions such as mitral valve repair and aortic dissection, where greater specialisation would be possible for clinicians.

**Expert care for patients with rare disease.** Patients with rare diseases would know that they are being treated by teams who see some of the highest numbers of patients in the world with their condition, making clinical and research breakthroughs more possible.

**Expert emergency 24/7 teams.** Emergency services would consistently be provided 24/7 by highly skilled individuals, with experience in treating high numbers of patients. More services can be delivered seven days a week and in extended hours, due to the greater infrastructure of staff.

**Integrated services – specialist and local care working.** Patients would be treated by a specialist service that is working with DGHs, GPs and community services to support prevention, early identification, diagnosis, treatment and rehabilitation and ensure that patients would have on-going support, with a clear management or care plan for patients that is understood by all contributing to their care. Patients would be given information to help them make informed choices about their treatment and work with clinicians to speed up their recovery. Networked services such as satellite clinics can be enhanced due to the greater critical mass of staff at the specialist centre.

The UCLPartners Integrated Cardiovascular System provides a framework for ongoing planning and development, and for measuring improved outcomes, both clinical and of the patient experience.

**Innovation and leading edge care.** Patients would have the opportunity to participate in a much wider range of clinical trials, across clinical departments. They would know they are being treated by teams working at the forefront of innovation. Patients would be able to contribute to and benefit from the development of new technologies. Staff working in the organisation would be confident that they are working in a service with a sufficient critical mass; with essential co-dependent services this provides significant opportunities.

## 10 What happens next?

The clinical and academic vision for specialist services has been developed by over 100 clinicians across the partnership as part of the co-creation of the integrated cardiovascular system. In November 2012, an event was held with over 80 stakeholders including local GPs. More than 100 clinicians initiated the development of clinical and academic proposals covering seven specialities, and a further three work streams were added in early 2013 in response to further consultation and discussion with clinicians.

The ambition of UCLPartners is to provide whole life and whole pathway care for patients with cardiovascular disease, ensuring they have access to the most innovative care, and in so doing to be leaders in international cardiovascular medicine.

While the clinicians working in our hospitals have recommended to commissioners that patient outcomes and the quality and sustainability of services would be improved by the consolidation of specialist services, no decisions will be made until wider engagement has taken place. This process will be led by commissioners and will involve understanding the views of local authorities, GPs, clinical commissioning groups, patient groups and the general public.

This process of engagement and consultation will be led by NHS England and will be supported by UCLPartners and its clinicians. Following such engagement, a decision will be made by NHS England and clinical commissioning groups, as appropriate, based on how best to ensure that we can deliver a world-class service for our population now and in the future.

# Appendix

## A1 Information on the Trusts

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a. Cardiovascular services at Bart's Health are currently provided across five sites:

### London Chest Hospital

- Cardiac Imaging (CT, CMR and echo)
- Cardiac Surgery
- Cardiac Intervention
- Electrophysiology
- Heart Attack Centre
- Inherited cardiovascular disease (Heart Muscle Disease)
- Rapid Access Chest Pain clinic and Low Risk Chest Pain clinic
- Structural Intervention including percutaneous aortic valve replacement

### St Bartholomew's Hospital

- Cardiac imaging (CMR and echo)
- Cardiothoracic surgery
- Electrophysiology

### Royal London Hospital

- Acute general cardiology
- Cardiac imaging (echo)
- Vascular surgery

### Whipps Cross

- Diagnostic angiography and pacing
- General cardiology and cardiac imaging (echo)

## Newham University Hospital

- Acute general cardiology

### b. Cardiac services at UCLH currently include:

- The Heart Hospital
- Cardiac Imaging (CT CMR and Echo)
- Cardiac Surgery
- Cardiac Intervention
- Electrophysiology
- Heart Attack Centre
- Specialist Heart Failure
- Structural Intervention including percutaneous aortic valve replacement

### Specialist services run by The Heart Hospital include:

- Established PCI programme
- Adult Congenital Heart Disease including Electrophysiology and structural intervention
- National Inherited Cardiovascular Disease Centre

### c. Patient activity

Between them, the two Trusts see the cardiovascular activities set out in the Figure below.

**Figure 10: Inpatient and Outpatient Activities by the Trusts**

INPATIENT	The Heart Hospital	Bart's and The London	Whipps Cross	Newham
Cardiac Surgery				
Day Case	2	1	0	0
Elective	735	940	0	0



Non Elective	65	173	0	0
Non-Elective Non-Emergency	279	277	0	0
<b>TOTALS</b>	<b>1081</b>	<b>1391</b>	<b>0</b>	<b>0</b>
Cardiology				
Day Case	1090	2684	2015	53
Elective	1679	985	90	39
Non Elective	654	2170	777	560
Non Elective Non Emergency	1116	1584	35	0
<b>TOTALS</b>	<b>4539</b>	<b>7423</b>	<b>2917</b>	<b>652</b>
<b>OUTPATIENT</b>	<b>The Heart Hospital</b>	<b>Barts and The London</b>	<b>Whipps Cross</b>	<b>Newham</b>
Cardiothoracic Surgery				
New	1302	1400	0	0
Follow Up	1017	2971	0	0
<b>TOTALS</b>	<b>2319</b>	<b>4371</b>	<b>0</b>	<b>0</b>
Cardiology				
New	11207	6988	6264	4070
Follow Up	25475	18347	5155	3536
<b>TOTALS</b>	<b>36682</b>	<b>25335</b>	<b>11419</b>	<b>7606</b>

## A2 Letter of support from C&E

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David Fish  
MD, UCLPartners  
3<sup>rd</sup> Floor, 170 Tottenham Court Road  
W1T 7HA



7<sup>th</sup> January 2013

Dear David,

We are delighted to enclose a series of proposals for integrated clinical and academic Cardiovascular services across UCLP. These cover virtually the whole of the spectrum of Cardiology (inherited cardiac diseases, heart failure, cardiac imaging, cardiac rhythm management, and adult congenital heart disease). We also enclose a letter setting out plans to develop a proposal in cardiac intervention and we are aware that similar proposals are in preparation for cardiac surgery but felt that you would wish to see the Cardiology work that has been completed without delay.

These proposals represent a spontaneous initiative from 83 clinical cardiovascular specialists. The proposals have been produced spontaneously and without managerial support. This work has arisen from clinicians in each of the cardiology services taking the opportunity provided by the creation of the UCLP ICVS to agree a way forward with colleagues across UCLP in a collaborative and cooperative fashion. As such we believe that this represents very significant clinical backing for the concept of integration of Cardiovascular services within UCLP.

The key message of the proposals might be best summed up (to borrow a phrase from the imaging proposal) as '**Better together: a united vision**'. However, a number of key themes emerge:

- 1. A unique population – a unique opportunity**

The population served by UCLP is uniquely varied in terms of ethnicity and deprivation with high levels of unmet cardiovascular need. The trusts within UCLP are uniquely structured to have the potential to provide whole life and whole pathway cardiovascular care. We have the opportunity to bring the best in cardiovascular medicine and research to the people that need it the most and to ensure that we offer best value care for patients across the entire course of their medical condition.

- 2. A strong clinical and academic base to build on**

Cardiovascular clinical and academic services within UCLP are already very strong. Units provide some of the best times to treatment and outcomes for heart attack patients in the UK with the highest levels of appropriate device implantation in the country. Heart Failure patients receive above average care. We lead nationally in inherited cardiac diseases and adult congenital heart disease. UCL is in the top ten most productive cardiovascular publishers in the world 2006-12, with QMUL at 15<sup>th</sup>.

### 3. Huge potential benefits from integration

All the clinical and academic service lines see significant benefits from integration of services. Together, UCLP universities would rank in the top 5 most productive cardiovascular publishers. Our services together would be the largest adult congenital heart disease unit in the world, and the largest in the UK for cardiovascular imaging, inherited cardiac disease, cardiac intervention and electrophysiology. All this offers the opportunity to bring the benefits of critical mass to our patients.

### 4. Additional benefits from co-localisation

Several groups point out the additional benefits from co-localisation of some cardiovascular services over and above those acquired from creating a 'virtual' UCLP cardiovascular centre by service integration. (e.g. an advanced Heart Failure unit, a centre for inherited cardiac disease and a centre for adult congenital heart disease). In addition to clinical co-localisation there are great opportunities for enhanced research and wealth creation from the creation of clinical and academic shared space on a single campus.

We are committed to working with you at UCLP to turn the high level of clinical and academic support for Cardiovascular service integration into a reality.

With best wishes,



Dr Clare Dollery  
Divisional Director  
Heart Hospital



Dr Charles Knight  
Cardiovascular Group Director  
Barts Health

## **A3 Letter of support from Transformational Leads**

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**Dr Anne Rainsberry**  
**Regional Director**  
**NHS England (London Region)**  
**Southside, 105 Victoria Street**  
**London SW1E 6QT**



**Dr Andy Mitchell**  
**Regional Medical Director**  
**NHS England (London Region)**  
**Southside, 105 Victoria Street**  
**London SW1E 6QT**

16<sup>th</sup> August 2013

Dear Dr Rainsberry and Dr. Mitchell

We are writing as the Clinical, Academic and Nursing Leads of Cardiovascular Services at University College Hospitals and Barts Health in support of the Cardiovascular Case for Change to integrate cardiovascular care for the people of North East and North Central London in a new state-of-the-art facility at the St Bartholomew's Hospital site.

We are all very proud of the achievements within our two cardiovascular units, which have some of the best outcomes in terms of patient care and satisfaction in the country. However, there remains a high prevalence of cardiovascular disease among the population in NE and NC London, and high levels of unmet need, with care often fragmented. Across the region, there is a lack of capacity to meet current need for cardiovascular care, or the expected increasing demands over time. With our current medium-sized specialist units, there is also a risk that we won't be able to meet future expectations for sub-specialisation, increased cost-effectiveness and truly 24/7 care.

We know we can do better and bring world-class cardiovascular care to the people of London. We want to be at the forefront of research, teaching and innovation as this will transform patient care now and in the future. We currently have this opportunity to create a joint academic and clinical centre that would become pivotal in driving UK Cardiovascular innovation and research. For this reason over the past 12 months over 100 cardiovascular clinicians have come together to explore how we can deliver world-class specialist cardiovascular care for the people of NE and NC London, an initiative which has been clinically driven by our desire to improve services.

We are planning a system of integrated care which will see improvements delivered across whole pathways from the community setting to the most advanced heart treatments. To do this effectively we know that we need to concentrate specialist services at a state-of-the-art hospital. Such a facility is being built at St Bartholomew's. This would enable us to build upon the improvements in cardiovascular care which have been seen over the last few years in London while giving the people of NE and NC London access to the best specialist cardiovascular care in the world.

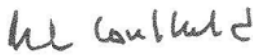
We fully endorse the Case for Change and urge you to support it.



Dr Charles Knight  
Group Director, Cardiovascular CAG, Barts Health



Dr Edward Rowland  
Clinical Director, Cardiovascular Services  
The Heart Hospital, UCLH



Professor Mark Caulfield  
Director, William Harvey Research Institute  
and National Institute for Health Research  
Barts & The London School of Medicine and Dentistry



Professor Aroon Hingorani  
Director, UCL Institute of Cardiovascular  
Science



Professor Bill McKenna  
Consultant Cardiologist  
Interim UCLP Programme Director



Professor John Deanfield  
BHF Vandervell Chair of Congenital Heart  
Disease Director, National Centre for  
Cardiovascular Prevention and Outcomes  
Director, National Institute for  
Cardiovascular Outcomes Research



Louise Crosby  
Director of Nursing and Governance  
Cardiovascular, Barts Health



Paul Fish  
Deputy Chief Nurse, Specialist Hospital  
Board, UCLH



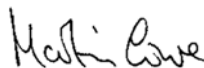
Professor Anthony Mathur  
Cardiology CD, Barts Health  
Transformation Lead



Professor Chris MacGregor  
Director of Surgery, the Heart Hospital, UCLH  
Transformation Lead



Dr Ben O'Brien




Dr Martin Lowe

Perioperative Medicine CD, Barts Health  
Transformation Lead



Professor Richard Schilling  
Director of CV Research, Barts Health  
Transformation Lead

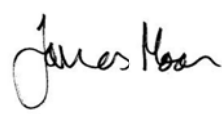
Consultant Cardiologist and Electrophysiologist,  
The Heart Hospital, UCH, GOSH  
Transformation Lead



Dr Fiona Walker  
Consultant Cardiologist, The Heart Hospital, UCLH  
Head of Maternal Cardiology  
Service Lead Grown Up Congenital Heart Disease  
Transformation Lead



Dr Mark Westwood  
Director of CV Education, Bart's Health  
Transformation Lead



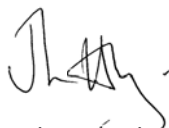
Dr James Moon  
Consultant Cardiologist  
Director Cardiac MRI Service  
Heart Hospital, UCLH  
Transformation Lead



Professor Perry Elliott  
Head of ICVD Unit  
Heart Hospital, UCLH  
Transformation Lead



Dr Simon Woldman  
Consultant Cardiologist  
Heart Failure Lead  
Heart Hospital, UCH  
Transformation Lead



Jonathan Hanbury  
Lead Nurse  
The Heart Hospital, UCLH

cc:

David Fish, Managing Director, UCLPartners  
Sir Robert Naylor, Chief Executive, UCH  
Richard Murley, Chair, UCH  
Peter Morris, Chief Executive, Barts Health  
Sir Stephen O'Brien, Chair, Barts Health  
Professor Richard Trembath  
Professor Sir John Tooke