



PHILIPS

Cardiology solutions

The Future of Cardiology

Issue 1: Exploring the short-term horizons and barriers for innovation across cardiac care

Digital, virtual, personalisation and intelligence-driven possibilities for cardiology

Exploring the short-term horizons and barriers for innovation across cardiac care

It's a silent epidemic, yet with its slow to show symptoms, cardiovascular disease (or all the diseases of the heart and circulation, including coronary heart disease, atrial fibrillation, heart attack, congenital heart disease and stroke) is still the biggest killer in the world.¹

According to the World Health Organization, cardiovascular disease takes the lives of 17.9 million people globally every year (that's 31% of all global deaths),² and the British Heart Foundation reports that 7.6million people in the UK are currently living with heart and circulatory diseases, with 450 deaths occurring every day from heart and circulatory diseases and one person having a stroke every 5 minutes.³

With more than 100,000 UK⁴ hospital admissions each year due to heart attacks and no cure for heart failure, cardiovascular disease is not only a deadly killer but an expensive one. Estimated to be one of the costliest medical conditions to treat in the world, the healthcare transformation accelerated by the COVID-19 pandemic has presented both wide reaching consequences and opportunities for cardiac care.

In this article, the first in a series of three forward-looking features, Ruben Olivier, Cardiovascular Solutions Lead at Philips UK&I, charts the changes in cardiac care likely to come into effect post COVID-19, and explores the horizon of innovation opportunities for cardiovascular care, such as improving pathways and enabling earlier and more targeted diagnosis and treatment. He also unpicks the mindset shift required by patients – supported by commercial and medical devices – to change the way we think about the role of our hearts in our lives.



Ruben Olivier, Cardiovascular Solutions Lead at Philips UK&I

£7.4 billion
Cardiovascular disease-related healthcare costs per year

Cardiovascular morbidity is a major issue for health and social care. Cardiovascular disease-related healthcare costs alone in England amount to an estimated £7.4 billion per year, and annual costs to the wider economy being an estimated £15.8 billion.⁵

£15.8 billion
annual costs to the wider economy

1 <https://www.who.int/news-room/fact-sheets/detail/the-top-10-causes-of-death> and <https://www.onmedica.com/posts/63108-coronary-heart-disease-remains-uk-s-biggest-killer>
2 https://www.who.int/health-topics/cardiovascular-diseases#tab=tab_1
3 British Heart Foundation https://www.bhf.org.uk/what-we-do/our-research/heart-statistics?gclid=Cj0KCQjws-OEBhCkARIsAPhOKIZ5CT3kPL4o2EPzIL6J64lyDan_Vf8X60UozJuEd-WbryNYFX4KngkaAhd1EALw_wcB&gclid=aw.ds
4 Facts and figures, updated July 2021, British Heart Foundation, <https://www.bhf.org.uk/what-we-do/news-from-the-bhf/contact-the-press-office/facts-and-figures>
5 <https://publichealthmatters.blog.gov.uk/2019/02/14/health-matters-preventing-cardiovascular-disease/>

2020: The year that changed everything

“In some cases, the crisis has accelerated change that was already anticipated, but in others completely new and imaginative solutions have been found to adapt service provision to the new environment. There is a widespread realisation that many innovations prompted by COVID-19 will be beneficial in the longer term and should be adopted into routine practice.”⁶

The Future of Cardiology, a paper produced by the British Cardiovascular Society working group, August 2020

For a national healthcare system struggling to transform, the global COVID-19 pandemic brought significant challenges for cardiology.

According to a study from the European Society of Cardiology,⁷ the number of heart attack patients seeking urgent hospital care dropped by more than 50% during the early months of the pandemic. Some sufferers stayed away due to fears of catching the virus, while others wanted to avoid becoming yet another patient for the NHS to care for. Sadly though, by not acting quickly and seeking immediate medical treatment, many individuals put their lives at risk. In all areas of cardiac care, the ability to act almost immediately is key, as the sooner an accurate diagnosis is made, the quicker a suitable treatment plan can be put in place, and the likelihood of a full recovery increases significantly.

Additionally, an estimated 28,000⁸ scheduled cardiac appointments were missed during the outbreak – these appointments could have detected the early signs of an arrhythmia or other serious heart conditions – and it is likely that the NHS will face a spike in the number of patients suffering with severe cardiac problems further down the line.

And yet, as with any crisis, innovation was quick to take hold, with healthcare professionals adapting their ways of working, shifting to video consultations and virtual clinics so that they can continue treating patients.

Ruben Olivier is optimistic that the COVID-19 near-term legacy will finally herald a reduction in cardiovascular healthcare inequality:

“We’ll see imminent changes in access to cardiology in the next months, directly related to COVID-19 and the implementation of the NHS Long Term Plan which will go a long way to eliminating healthcare inequalities, such as the current postcode lottery.”

The plan has the ambition to deliver care to your front door, in your pocket (via your phone) or via telemedicine, reducing the geographical limitations to care and with the current vaccine roll out, it is evident that this is more than possible.

To explore the future of cardiology and the scope for ‘new and imaginative solutions’ as identified by the British Cardiovascular Society,⁹ Ruben Olivier has plotted the developments and innovations he identifies using McKinsey’s horizons for growth framework. Based on research into how companies sustain growth, this approach illustrates how to manage for current performance while maximising future opportunities for growth, and is useful when projecting innovations that demand the crossover between business and healthcare to be realised.

6 British Cardiovascular Society, The Future of Cardiology A Paper Produced by the British Cardiovascular Society, August 2020, https://www.britishcardiosocietysociety.org/_data/assets/pdf_file/0010/21142/BCS-Future-of-Cardiology-17-Aug-2020.pdf

7 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7357426/#B1>

8 <https://www.bbc.co.uk/news/health-52923771>

9 British Cardiovascular Society, The Future of Cardiology A Paper Produced by the British Cardiovascular Society, August 2020, https://www.britishcardiosocietysociety.org/_data/assets/pdf_file/0010/21142/BCS-Future-of-Cardiology-17-Aug-2020.pdf

Horizon 1: Immediate innovations to expect in cardiology.

Timeframe: Now to 1 year out.

A more digitally enabled and connected now

The much longed-for coming together of data from all different sources is finally being realised. COVID-19 brought home the fact that silos of isolated patient data just aren't useful nor practicable any more. Cloud based platforms, such as Philips HealthSuite digital platform, are closing the data gaps to make data accessible at the right time in the right place and are helping to drive data driven decision making to the highest level.

While specifically for modalities, such as cardiology, Philips IntelliSpace Cardiovascular Image and Information Management System is a patient-centric web-enabled image and information management system that captures the longitudinal patient journey and provides advanced tools for physicians to access, analyse, and share cardiovascular images and information anytime, from virtually anywhere.



Quick wins: Short term changes relate to the access to data. Having access to patient information across multiple care networks is essential. The intention is to create a more digitally informed care pathway utilising predictive analytics to reduce repeat diagnostics and accelerate care.

Optimise the time to diagnosis through image guided therapy

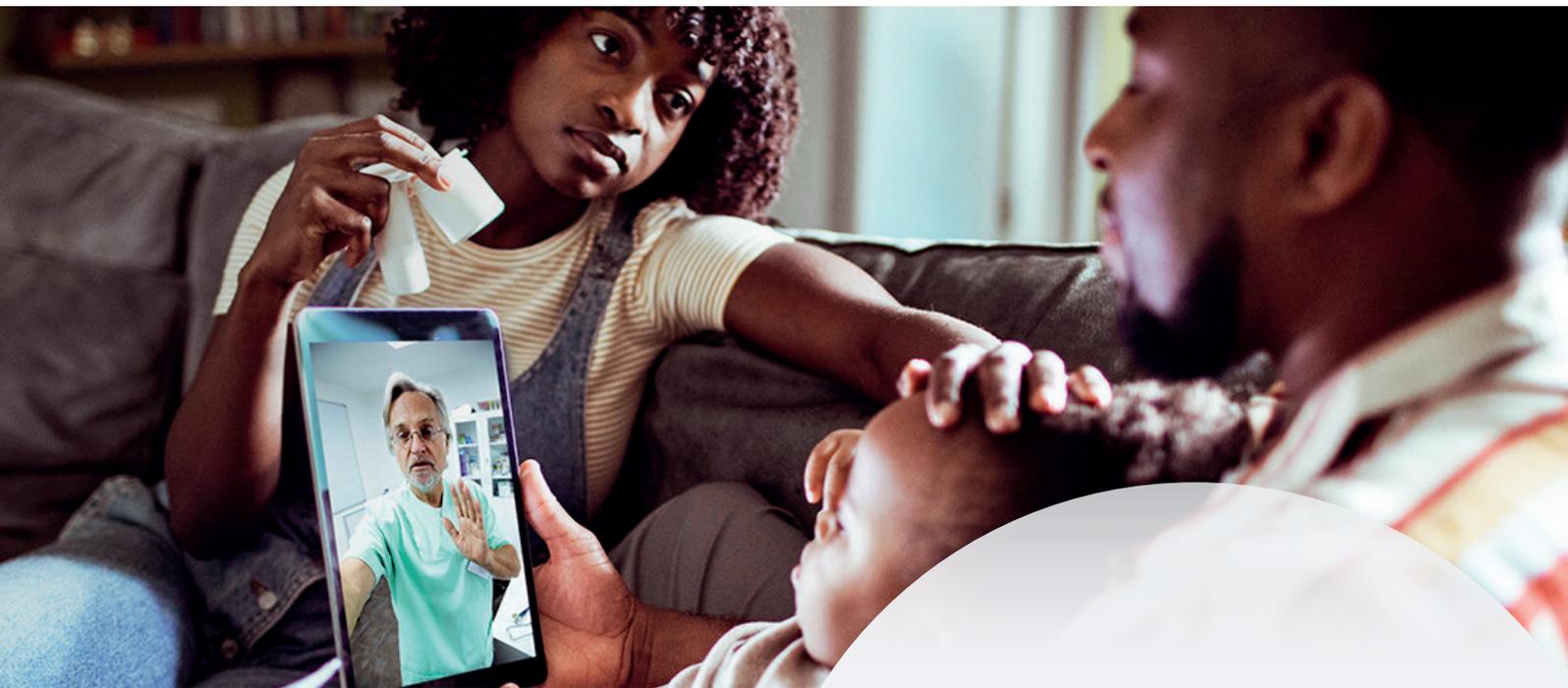
Optimising and innovating care pathways means optimising the time it takes to diagnose a patient. Ten to fifteen years ago treating a patient with an aortic aneurysm would have required five days in intensive care, seven days in hospital and 30 days of recovery. Today, the emergence of hybrid interventional suites has brought significant benefits to cardiovascular patients and practitioners, allowing multidisciplinary care teams to execute numerous clinical solutions in one convenient and practical setting.

Through image guided therapies available today, it is possible to effectively diagnose and treat patients with valvular heart disease and have them return home in two or three days.¹⁰

Ruben Olivier explains: “Traditionally patients who needed a new heart valve would have to undergo open heart surgery. The last ten years has seen an incredible evolution in less invasive therapies for structural heart disease, which wouldn’t have been possible if not supported by the advances in ultrasound imaging, such as the Philips introduction of 3D transoesophageal echocardiography. Because of this technology, we have seen a reduced prevalence of prosthesis mismatch. Thousands of patients can now be treated less-invasively through transcatheter prosthesis delivery, which dramatically improves the patient experience and reduces their length of hospital stay.”



Quick wins: An example of this innovation is the Philips EPIQ CVxi with Heart Navigator:¹¹ Insightful planning and guidance for Structural Heart Disease Procedures, which overlays live three-dimensional ultrasound images on a two-dimensional fluoro acquisition during the intervention. This multi-modality imaging approach streamlines communication between the interventional cardiologist and the echocardiographer during complex interventional exams to improve patient care, while enabling precision planning workflow by delivering targeted diagnosis and reducing prosthesis mismatch.



Telemedicine for cardiology: The fundamental change in practice driven by COVID-19

The pandemic jump-started the shift to telemedicine. According to a recent study by Hackensack University Medical Center, New Jersey,¹² the rapid and large-scale transition from in-person to remote cardiovascular care during the COVID-19 pandemic has important implications for patient access to care and clinician practice patterns.

As the study's lead author is reported as saying: "As a substantial proportion of future cardiology ambulatory care will likely continue to be delivered through remote visits, these changes in care access and practice patterns will have substantial ramifications with regards to both the efficacy and cost of future cardiovascular care."

Additionally, the latest Cardiology NHS GIRFT report (Getting It Right First Time),¹³ titled, 'Clinical practice guide for improving the management of adult COVID-19 patients in secondary care: Shared learning from high performing trusts during COVID-19 pandemic, recommends virtual outpatients clinics by default.

Quick wins: Tools that support virtual care and diagnosis offer great support to patients with heart disease. The growing field of 'telecardiology' seeks to achieve real-time, remote diagnosis and treatment of heart disease — including congestive heart failure, cardiac arrest management and arrhythmia diagnosis and offer significant potential for Cardiac Rehab, reported to be "the only intervention that changes outcomes."¹⁴



12 Yuan N, Pevnick JM, Botting PG, et al. Patient use and clinical practice patterns of remote cardiology clinic visits in the era of COVID-19. JAMA Netw Open. 2021;4(4):e214157.
13 <https://www.gettingitrightfirsttime.co.uk/> and <https://www.gettingitrightfirsttime.co.uk/wp-content/uploads/2020/12/Covid19-Clinical-Practice-Guidance-S-FINAL.pdf>
14 <https://healthtechmagazine.net/article/2020/02/telemedicine-broadening-its-role-cardiac-care>

Restructuring interventional ways of working: How remote centres will release the pressure from hospitals and enable earlier and more accurate detection

Historically, we've been familiar with treating patients within hospitals, but the restructuring of interventional ways of working is also finally underway.

While higher risk procedures will still need to be within a supporting environment, low acuity, lower risk, high volume procedures are being moved outside of the traditional hospital environment. This shift sees patients with fewer comorbidities treated in remote centres where they are not exposed to potential hospital related pathogens which reduces the risk of contracting nosocomial diseases.

Ruben Olivier explains: "The imminent demand of Community Diagnostic Centres may not seem to directly impact interventional procedures at the moment, but it heralds a step change in the geographical treatment of care and paves the way for out of hospital diagnosis and care and potentially interventions in the UK. These remote centres are known as ambulatory surgical centres in the US, and I think we'll soon see qualified centres in the UK. After all, one innovation in the community starts to stimulate more."

The benefit these remote centres would bring to cardiovascular care is clear. They remove the bottleneck where the patient receives the treatment.

Ruben Olivier explains: "Before patients are scheduled for elective invasive procedures, they need to have multiple assessments and diagnostic procedures which take a lot of time, require the patient to see many different healthcare professionals and travel to and from hospital on multiple occasions. The moment you redirect the majority of the diagnostic procedures out of the hospital to community settings, you empower the interventional teams to deliver a more dedicated and targeted service

Add to that the possibility of CICs – Community Interventional Centres – which cover off the lower acuity interventional procedures (which can perform procedures such as pacemaker implants, loop recorder implants, diagnostic angiograms etc.), and you see a dramatic streamlining of the in-house process, enabling cost reductions and increased staff and patient satisfaction.



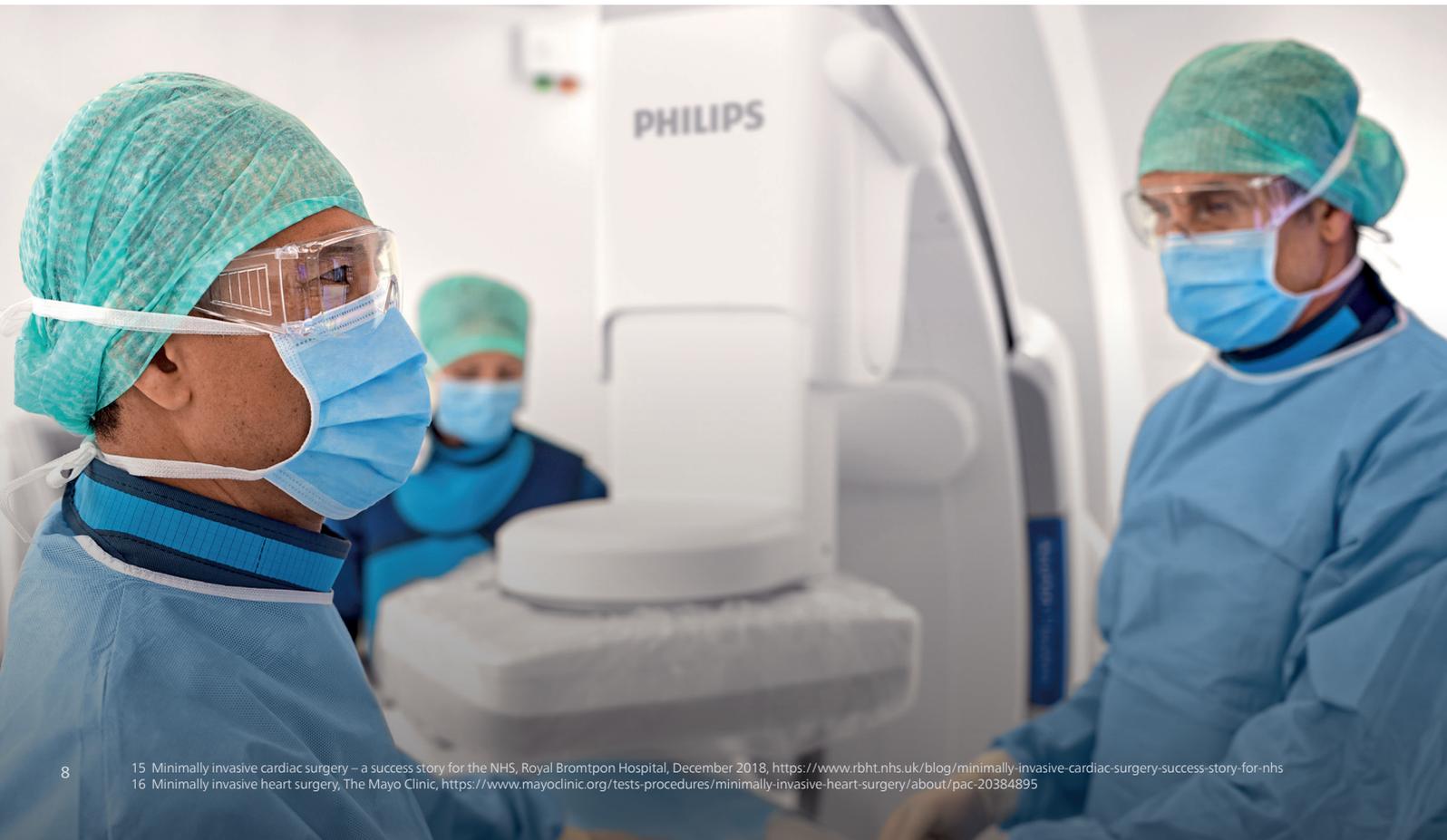
Quick wins: The key to improving cardiology outcomes is through earlier and more accurate detection. As with many cardiac-related conditions, timeliness of a diagnosis is essential. The move to out of hospital and out of the Cath Lab will not only relieve pressures on the hospitals, but will improve the patient experience with fewer journeys, easier access and earlier diagnosis and treatment.

Upskilling of ancillary workers aligned with the rapid advancement in non-invasive technology

Highly complex procedures are moving out of Cath Lab, bringing treatment to a larger population. This shift has been made possible through the training and upskilling of ancillary workers. Coupled with rapid advancements in non-invasive technology, these developments will help to reduce costs and improve patient experiences.

Ruben Olivier explains: "Phenomenal progress has been made in the field of less invasive treatment. Today, normal skin electrodes deliver the same results as implanted diagnostic tools. Keyhole surgery has replaced open heart surgery with similar or even better results. All of these minimally invasive treatments improve the patient recovery time, reducing the length of stay in hospital."^{15,16}

Quick wins: Adopting everyday consumer diagnostics to compliment pre-admissions and post-discharge recovery technology available via mobile phones, digital watches and supported cardiac rehabilitation sessions.



Cardiology solutions that span the entire care continuum and reduce the need for invasive interventions

An integrated cardiology ecosystem of data and devices, working together to provide efficient and effective cardiac care in the appropriate setting is already available. For example, through strategic and targeted acquisitions, Philips has an extensive, solution-

focused portfolio that spans everything from an electric toothbrush that reduces dental decay (versus a manual toothbrush), through to large imaging equipment such as CT and MR.

From structural heart disease and coronary artery disease to electrophysiology, Philips cardiology solutions capture the entire patient journey from pre-onset to post-discharge.

Quick wins:

Stand out innovations include:

- Philips FORS. Fibre Optic RealShape (FORS) is a groundbreaking technology platform which enables real-time 3D visualisation of the full shape of devices inside the body, without the need for stepping on the fluoro pedal. This technology platform consists of equipment which sends pulses of light through hair-thin optical fibres that run within minimally invasive devices. This platform integrates with the Philips interventional X-ray systems.¹⁷
- Philips IVUS is a catheter-based imaging technology that allows cardiologists to visualise blood vessels from the inside out with the use of ultrasound. Cross-sectional images help assess the presence and extent of disease, plaque geometry and morphology as well as guide wire position during lesion crossing and stent deployment and positional confirmation post intervention.¹⁸
- Philips KODEX-EPD system for cardiac imaging and mapping. The KODEX-EPD system is a completely new approach to cardiac imaging and mapping that has been developed to address key unmet needs in electrophysiology (EP) procedures today. It is an open system that works with any qualified EP catheter, both diagnostic and therapeutic. KODEX-EPD uses dielectric imaging technology to visualise highly detailed cardiac anatomy, including wall thickness and lesion depth in real-time, and helps physicians identify anatomical variations. As a result, KODEX-EPD has the potential to greatly simplify navigation and improve targeted accuracy to support personalised ablation planning and delivery, with less exposure to the potential side effects associated with fluoroscopy and contrast media.¹⁹

These are Ruben Olivier's immediate term innovation projections for the future of cardiology. For mid and longer term innovation projections, read the additional articles in this Future of Cardiology series. »

¹⁷ <https://www.philips.com/a-w/research/research-programs/fors.html>

¹⁸ <https://www.philips.co.uk/healthcare/education-resources/technologies/igt/intravascular-ultrasound-ivus>

¹⁹ <https://www.philips.com/a-w/about/news/archive/standard/news/press/2020/20200826-philips-announces-new-imaging-and-workflow-enhancements-for-kodex-epd-cardiac-imaging-and-mapping-system-to-treat-heart-rhythm-disorders.html> and <https://www.philips.co.uk/healthcare/product/HC733015/kodex-epd-cardiac-imaging-and-mapping-system>

Interested to learn more?

Lets talk. Even better, lets collaborate

We'd love to help you apply Operational Intelligence to help solve your key people, process and technology challenges. For more information, please visit <https://www.philips.co.uk/cardiologysolutions>



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* OCT 2021

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