Cardiovascular care

Transforming cardiology service

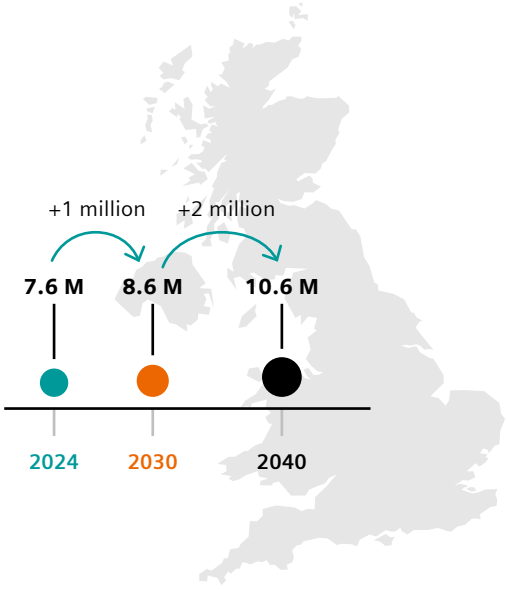
Improving cardiac care in the UK and beyond

SIEMENS Healthineers

Cardiovascular disease is the leading opportunity for the UK to save lives by 2030[1]

Cardiovascular disease (CVD) remains the leading cause of morbidity and mortality in the UK, affecting approximately 7.6 million people.[2] With an ageing population and an increase in associated risk factors such as hypertension, obesity, diabetes, and lifestyle-related conditions, the burden of CVD is expected to rise significantly over the coming decades.

Demographic projections estimate that by 2040, as many as 10.6 million people in the UK will be living with cardiovascular disease.[2]



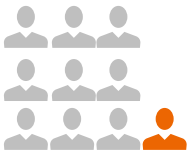
Projected growth of CVD cases in the UK: case numbers are expected to rise by more than two percent annually, adding three million cases by 2040.

Limited access to cath labs is undermining timely, life-saving care

While there is ongoing commitment across the UK to strengthen cardiovascular care, several systemic challenges persist. This is particularly evident in the provision of catheterisation laboratories (cath labs) services, where strain across the cardiac care pathway is having negative spillover effects.

A recent survey from experts claims that longer wait times for cath labs, induced by capacity constraints and operational inefficiency, are contributing to an increasing number of people dying while awaiting treatment.[3]

Addressing these barriers is crucial to meeting CVD care standards, improving survival rates, and reducing the socioeconomic burden of CVD on the UK's healthcare system and broader society.



1 in 10

living with CVD in the UK

1 in 4

deaths annually

28%

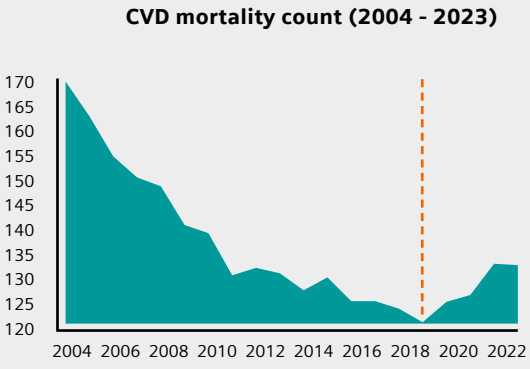
CVD deaths preventable

CVD gains are reversing

Over the last two decades, the UK made significant progress tackling CVD, bringing down premature deaths and stabilising prevalence rates for conditions like coronary heart disease. However, that momentum is fading – and in some areas, reversing.[2]

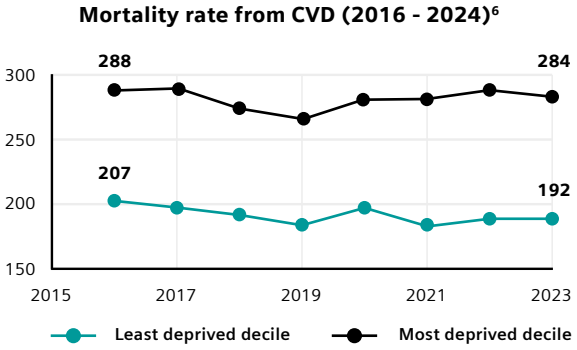
- The decline in coronary heart disease has stalled, and conditions like heart failure (HF) are on the rise.
- Since 2019, CVD mortality has been steadily increasing and now accounts for over 175,000 deaths annually. CVD is the second leading cause of avoidable death, responsible for 1 in 5 preventable and 1 in 2 treatable deaths. Nearly 30% of these are premature.[4]

CVD mortality trend:
The decline reversed – CVD mortality is rising again after years of progress



Source: European Society of Cardiology (2024)

Inequity in CVD mortality:
Persistent inequities – deprived populations face higher and worsening CVD mortality



Source: UK Gov, Mortality Profile (2024)

Geographic inequalities persist

A major factor contributing to worsening outcomes is the disparity in access to diagnostic and interventional cardiology services.[5] Individuals living in the most deprived areas of the UK are four times more likely to die prematurely from CVD than those in wealthier localities.[6] These inequalities are compounded by regional variations in the availability of cath labs, with some areas struggling to meet patient demand.[3]

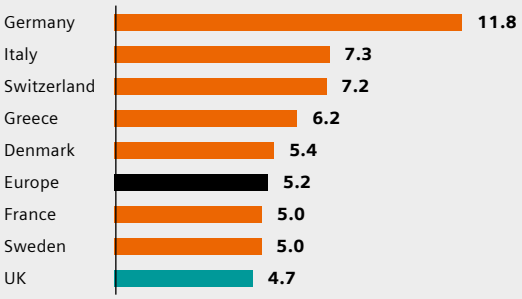
The impact on cath lab efficiency and patient outcomes

The limited availability of cath labs is directly affecting patient outcomes. Waiting times for elective cardiovascular procedures have increased substantially in recent years[7]. Compared to 2019/20, the average wait time for cath lab treatments has risen by nearly three weeks, with some patients waiting significantly longer depending on their location and the complexity of their condition.

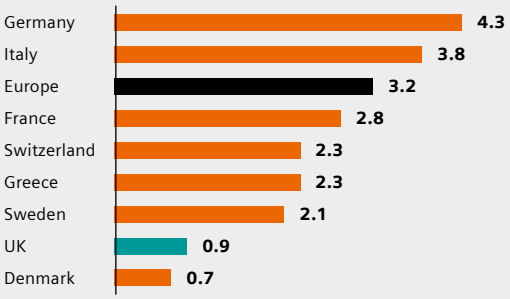
This shortage leads to delays in essential procedures such as percutaneous coronary interventions (PCI), diagnostic angiographies, and structural heart interventions, ultimately resulting in poorer patient outcomes and increased hospital admissions for cardiovascular emergencies.

European comparison of cath lab coverage:
Falling short – UK cath lab coverage below European average

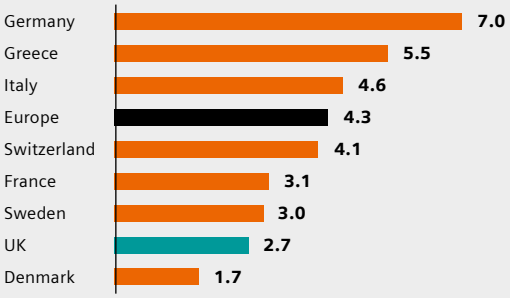
Total cath labs, per million



Hospitals with 24/7 cath labs, per million



Hospitals with cath labs, per million



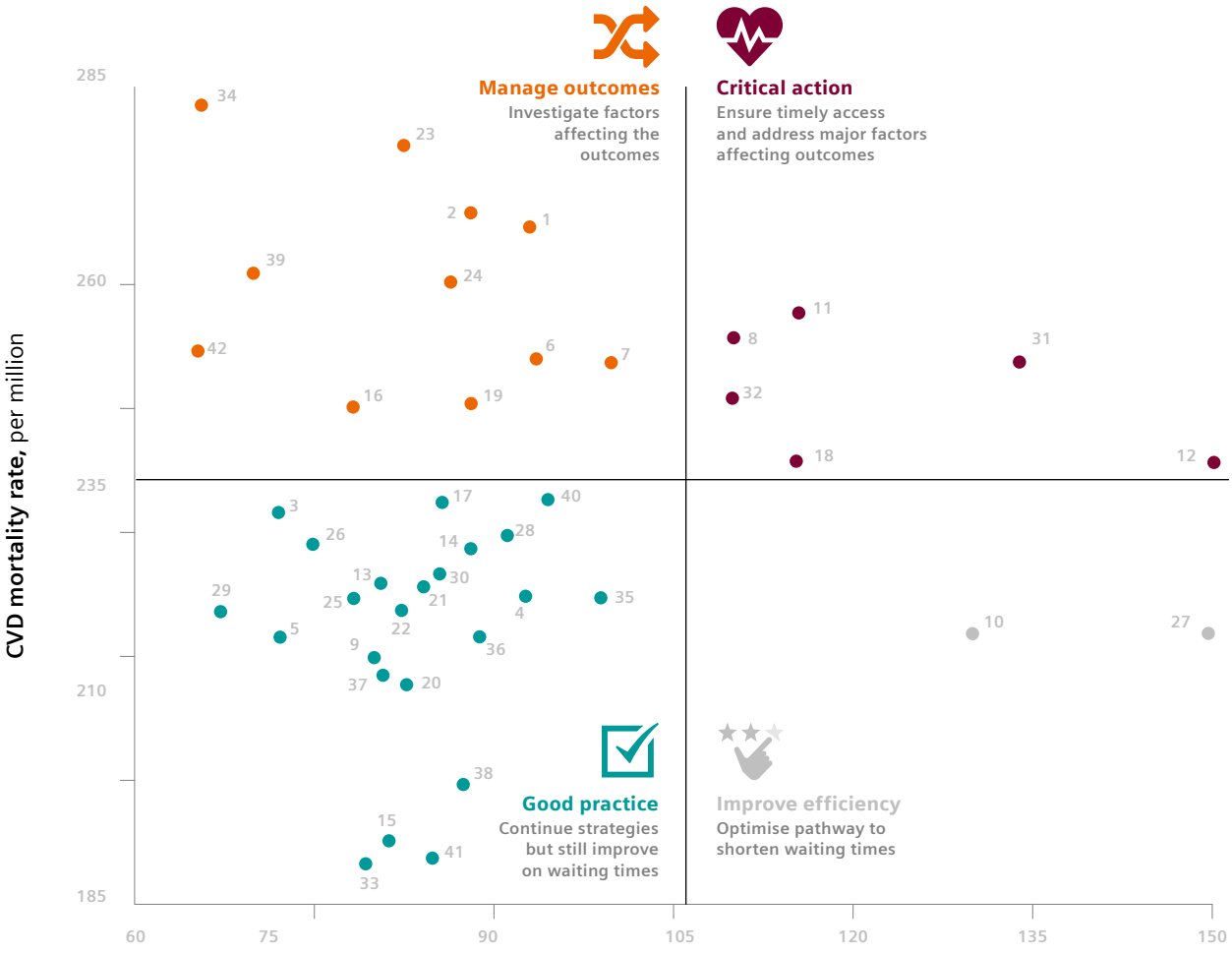
UK CVD care behind peers

Access to cath labs in the UK remains strained, with below- regional performance in measures of access to cath lab infrastructure and treatment. The UK ranks last in the number of cath labs per million population, with the latest regional estimates recording 4.7 cath labs per million. Access to PCIs in particular is well below regional averages, with the UK recording 1,459 per million procedures, compared to 2,383 per million for the EU.[8]

Improving cardiovascular outcomes by addressing regional variations across UK Integrated Care Boards

The analysis of the 42 UK Integrated Care Boards (ICBs), mapped by CVD mortality rates against the average weighted time for relevant procedures, reveals distinct patterns that suggest varying priorities across regions. Depending on their position within the four quadrants of this scatter plot, each ICB faces different challenges- some with higher mortality but longer procedure times, others with lower mortality but potential inefficiencies.

This nuanced distribution underscores the need for tailored strategies rather than a one-size-fits-all approach. Crucially, the data highlight an urgent system-wide imperative: to enhance access to therapy for cardiovascular patients while simultaneously optimising resource utilisation. The persistently high mortality rates in certain ICBs call for deeper investigation into underlying causes, including socio-economic factors and care delivery disparities. Addressing these issues will require collaborative partnerships between healthcare providers and industry stakeholders, focusing on innovations that improve both efficiency and patient outcomes. This approach aligns with the broader context of rising CVD mortality in recent years and the established recognition that cardiovascular disease remains the leading area where the UK can save lives by 2030, as emphasised earlier in this paper.



1 Lancashire and South Cumbria
2 South Yorkshire
3 Herefordshire and Worcestershire
4 Mid and South Essex
5 Bedfordshire, Luton and Milton Keynes
6 Birmingham and Solihull
7 North East and North Cumbria
8 Derby and Derbyshire
9 Suffolk and North East Essex
10 Devon
11 Lincolnshire
12 Leicester, Leicestershire and Rutland
13 South East London
14 Kent and Medway
15 Hertfordshire and West Essex
16 North East London
17 North Central London
18 Norfolk and Waveney
19 Staffordshire and Stoke-on-Trent
20 Frimley
21 Sussex
22 Shropshire, Telford and Wrekin
23 Greater Manchester
24 Humber and North Yorkshire
25 Bath and North East Somerset, Swindon and Wiltshire
26 Northamptonshire
27 Gloucestershire
28 Hampshire and Isle of Wight
29 North West London
30 Somerset
31 Nottingham and Nottinghamshire
32 Cornwall and the Isles of Scilly
33 Buckinghamshire, Oxfordshire and Berkshire West
34 Black Country
35 Cambridgeshire and Peterborough
36 Bristol, North Somerset and South Gloucestershire
37 Dorset
38 South West London
39 West Yorkshire
40 Coventry and Warwickshire
41 Surrey Heartlands
42 Cheshire and Merseyside

How Siemens Healthineers can support the evolving needs of cardiology networks in the UK

Transforming cardiovascular care in the UK requires a coordinated strategy that empowers health systems to optimise resources. At Siemens Healthineers, we are committed to supporting healthcare systems transform through our extensive portfolio of solutions. Built to support better outcomes at every stage of care, our technologies and expertise help accelerate change by enabling enhanced clinical precision, improved operational efficiency, and integration across different care settings.

Our transformation strategy is grounded in three strategic pillars – Clinical precision, Operational efficiency, and System transformation. These pillars shape the foundation for four critical execution priorities that address the most urgent gaps in cardiovascular care delivery.

Clinical precision

Making confident diagnostic and therapy decisions fast

Operational efficiency

Enhancing productivity and operational excellence

System transformation

Deliver care regardless where patients are

Clinical precision

Making confident diagnostic and therapy decisions fast

Priority 1:
Accelerate adoption
of CT-first guidelines

According to a study done with photon-counting CT, "invasive coronary angiography could have been avoided in 37 of 68 (54%) participants, signifying a potential benefit".[9]

Emerging technologies like the **NAEOTOM® Alpha** class and its photon-counting Quantum Technology® are transforming cardiac imaging by overcoming challenges posed by heavy coronary calcifications. With thinner 0.2 mm slice thicknesses than conventional CT, they enable clinical teams to see what was previously unseen, offering optimised results without a dose penalty.

Quantum Spectral Imaging delivers detailed spectral maps in every scan – enabling functional evaluation with high precision and conclusiveness even in patients previously excluded from CT, such as patients who cannot hold their breath or have a high calcium load.

Additionally, **myExam Companion** provides guidance and navigation for an intelligent, patient-centric scan and reading workflow, and helps users achieve consistent results. AI-driven automated preparation and acquisition workflows provide critical time-savings and reduce the burden on staff.

Evidence:

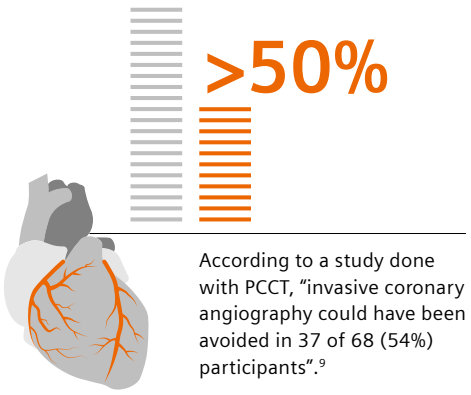
- According to a study done with photon-counting CT, "invasive coronary angiography could have been avoided in 37 of 68 (54%) participants, signifying a potential benefit".[9]
- NICE guidelines recommend CT coronary angiography as the first-line test for stable chest pain, shifting diagnostics upstream.[10]
- Photon-counting CT supports advanced dose management while improving diagnostic clarity in patients with high calcium scores.[11]

Priority 2:
Modernise your cath lab infrastructure
with the latest technology

Access to cath lab capacity and aging of existing infrastructure are two of the main issues affecting several cardiac networks across the UK. Emerging technology like the **ARTIS icono** and **ARTIS pheno** angiography systems can significantly enhance performance of cardiac services by delivering (i) enhanced image quality, (ii) reduced radiation exposure, (iii) integrated multi-modality imaging and (iv) real-time procedural intelligence.

In conventional cath lab technology, systems adjust two to four radiation exposure parameters to maintain a constant detector dose. Conventional systems then may produce images of declining quality or emit suboptimal dose levels as patient thickness increases.

Following its tradition of innovation, Siemens Healthineers took a new approach of redefining how exposure controlled automatically. With **OPTIQ**, clinical teams can set and experience enhanced and constant image quality based on CNR, independent of patient thickness and system angulation.*

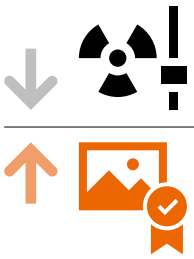


According to a study done with PCCT, "invasive coronary angiography could have been avoided in 37 of 68 (54%) participants".[9]

The level of visibility required throughout an intervention can be set for each particular clinical task. OPTIQ then uses a database of 300 million entries containing all possible combinations of exposure parameters, adjusting not two, three, nor four, but five of them to deliver the As Low as Reasonably Achievable (ALARA) dose.

Additionally, integration of multiple imaging modalities such CT, MRI, and angiography into clinical routine has significantly increased in need and complexity over the last few years.

Enhanced computational power, integrated software packages and simplified integration workflows are some of the main benefits that more modern cath lab systems can bring to enable multi-modality imaging during clinical procedures.



Constant CNR independent of C-arm angulation and patient size - always with ALARA dose*

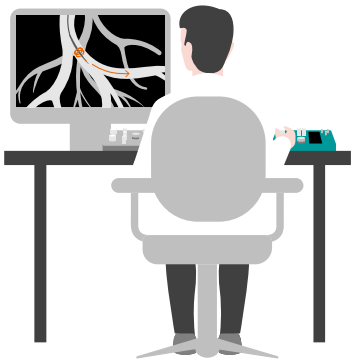
Evidence:

- OPTIQ can deliver constant CNR independent of C-arm angulation and patient size - always with ALARA dose.*
- In a single-center study of 1,600 patients at Barts Health NHS Trust, the MACE rate dropped from 22.3% to 12.5% in patients who underwent ClearStent-guided PCI compared to those who did not.[12]

Impact:

This approach accelerates diagnosis, reduces unnecessary interventions, minimises patient radiation exposure, and ensures that cath lab resources are reserved for high-impact therapeutic cases.

Reduction in MACE from **22.3% to 12.5%** during stent implants enabled by ClearStent in a single-center study



**The constant CNR is achieved within the physical limit of the x-ray tube.*

Operational efficiency
Enhancing productivity and operational excellence

Priority 3:
Operational efficiency - increasing throughput and reducing delays

To unlock untapped cath lab capacity, it's essential to focus on automating and standardising workflows. Clinical software applications for ARTIS icono can enable clinical teams accelerate procedural times, further reduce contrast and radiation usage, and enhance outcome quality.

For example, **syngo® Electrophysiology Guidance** optimises EP workflows by integrating preprocedural cardiac CT/MR images or intraprocedural *syngo* DynaCT Cardiac images into daily routine. While performing ablations *syngo* Electrophysiology Guidance improves and speeds up your examinations and provides images for planning, therapy, and follow-up of AFib ablation procedures. the comprehensive service packages offered by Siemens Healthineers can enable clinical teams by augmenting their capabilities and simplifying their work, sustainably.

Our education platform **PEPconnect** is designed for healthcare professionals and offers over 19,000 learning activities. This extensive catalogue can be used by our customers to customise their own learning experience, according to their role, learning behavior, level of competency and time available.

Our collaboration platform **teamplay** enables digitally supported consultation by connecting peers and care teams across institutions and settings – helping bridge expertise gaps and support clinical decision-making. End-to-end digital workflows standardise documentation and reporting of system's maintenance issues, reducing administrative overhead and freeing clinical staff to focus on patient care.

Advanced services like the **Guardian Program** enable continuous real-time system monitoring with predictive algorithms to proactively detect and resolve issues, minimising workflow disruptions and supporting consistent, high-quality care while minimising the return on technology investments.

Evidence:
- NHS pilots reported throughput increases of up to 30 percent using AI-supported scheduling and digital workflow solutions.[13]
- Remote-enabled triage and follow-up reduced hospital visits and improved patient satisfaction.[14]
- Centers implementing integrated imaging platforms experienced faster case preparation and more predictable procedure planning.[15]
- Health systems applying Service Operation Excellence principles reported higher equipment uptime and reduced unplanned downtime, directly improving care continuity.[16]

Impact:
These measures reduce waiting times, increase daily case volumes without requiring additional resources, and improve the quality and consistency of care. Clinicians benefit from greater workflow efficiency and reduced administrative workload, while health systems gain improved asset utilisation and financial sustainability.

System transformation

Deliver care regardless where patients are

Priority 4:
Enable System Transformation through appropriate and centrally coordinated distribution of funding

Achieving sustainable improvements in cardiovascular care requires structural reform. Establishing a Cardiology Transformation Fund can accelerate technology adoption and enhance productive capacity, particularly in underserved regions. Implementing hub-and-spoke care models ensures that complex procedures remain centralised, while routine diagnostics and follow-up care are delivered closer to patients' homes.

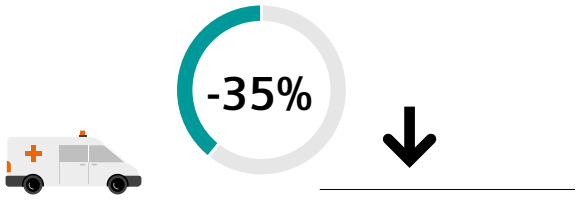
Expanding access to cardiovascular care requires system-wide transformation guided by data and collaboration. Robust ICB-level modelling will be required identify disparities and enabling data-driven resource allocation across regions. To turn these insights into action, our enterprise platforms teamplay can enable secure, remote collaboration between peers and institutions while providing access to a broad range of digital health and AI tools to enable decision making. As part of an end-to-end digital ecosystem, teamplay also supports standardised documentation, centralised data access, and performance transparency – laying the foundation for more equitable and efficient care delivery.

Scaled adoption of integrated cardiovascular imaging and reporting platforms can significantly improve diagnostic accuracy, reduce reporting delays, and enhance coordination across multidisciplinary teams. Solutions like **syngo Dynamics** support this by centralised access to multimodality cardiovascular imaging, enabling structured reporting, and improving data continuity across the care pathway. This strengthens collaboration among clinical teams, reduces documentation burden, and ensures consistency across institutions. Embedding remote monitoring and virtual care pathways reduces pressure on acute care facilities and supports long-term system resilience.

Evidence:

- Germany's infrastructure investments resulted in higher procedural rates and improved emergency access.[17]
- France's regional imaging strategy reduced emergency transfers by 35 percent, increasing diagnostic access at local levels.[14]
- NHS programmes adopting integrated digital tools achieved measurable improvements in operational efficiency and care coordination.[1]

Impact:
System-wide transformation narrows regional and socioeconomic disparities, reduces preventable hospitalisations, and establishes a resilient, digitally enabled cardiovascular care network prepared for future challenges.



Emergency transfers reduced by 35 percent through regional imaging strategy

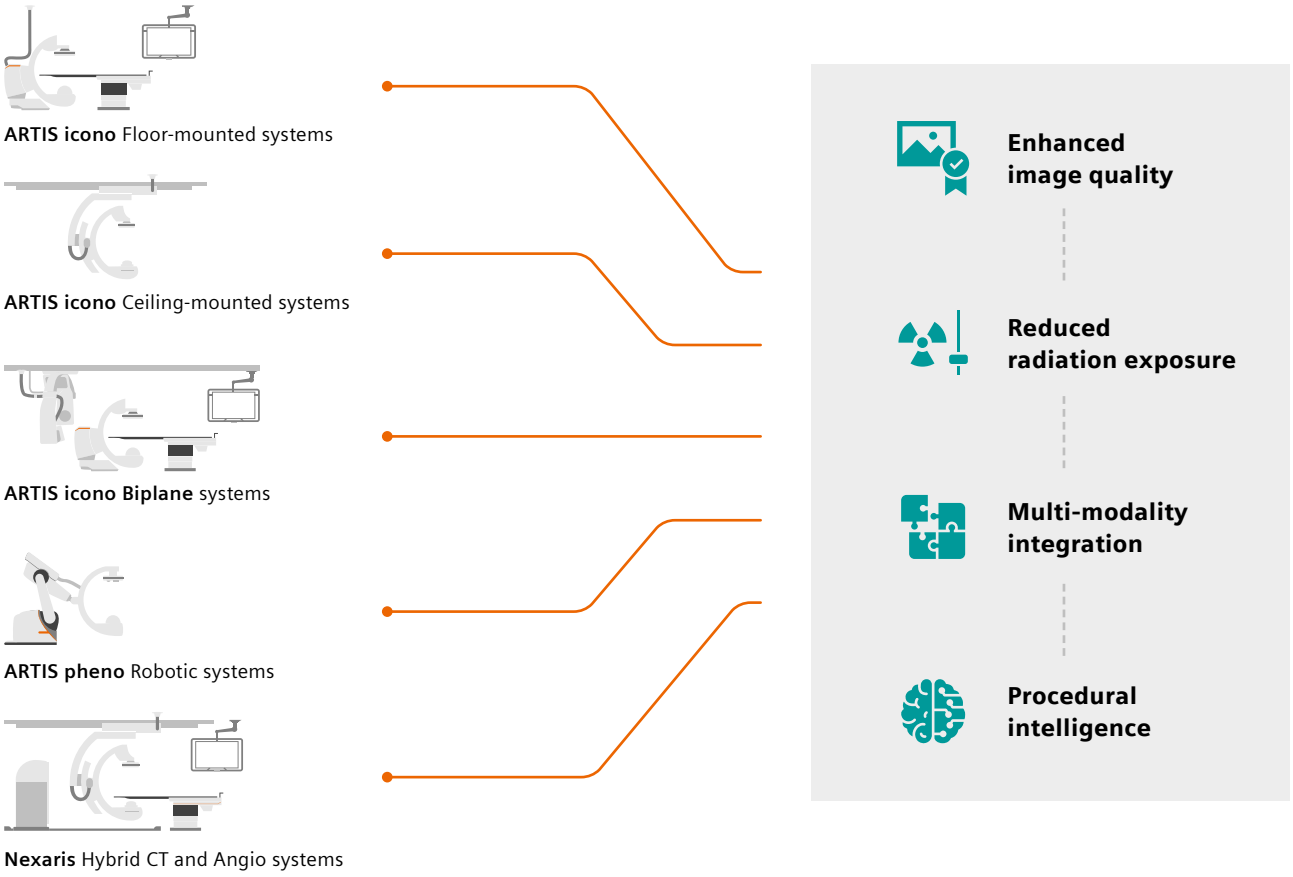
Lessons for other healthcare systems

While the UK faces unique pressures due to its NHS structure and resource limitations, its struggles with cath lab access are not isolated. Many European and North American healthcare systems are grappling with similar issues, albeit at different scales. Some key takeaways that other nations can learn from include:

- **Investing early in infrastructure expansion:** Countries with proactive cath lab expansion policies, such as Germany and France, have seen better patient outcomes and fewer access-related delays.
- **Prioritising preventative and community-based care:** Reducing the burden on cath labs requires strengthening preventative cardiovascular programmes and ensuring patients receive timely risk assessments before urgent intervention is needed.
- **Optimising digital pathways:** Nations that integrate digital patient management tools and AI-driven workflow solutions can streamline patient flow and reduce inefficiencies in cath lab scheduling.
- **Ensuring equitable access across regions:** Addressing healthcare disparities through targeted policy interventions.

By observing these principles, other countries can avoid some of the pitfalls that have challenged the UK. In turn, as the UK implements its reforms, it can provide a valuable case study in how to turnaround cardiovascular outcomes through focused strategy. Global knowledge-sharing in healthcare is crucial: a best practice in one place can inspire improvements everywhere.

A modern cath lab platform with solutions for all kinds of needs is required to excel in four major objectives.



Conclusion

The current challenges facing cardiovascular care in the UK highlight an urgent need for strategic reform to improve access to catheterisation laboratories and associated services. By expanding cath lab capacity, integrating advanced imaging and workflow solutions, and optimising patient pathways, healthcare leaders can begin to address the growing burden of cardiovascular disease and reduce preventable deaths. An evidence-based, data-driven approach that prioritises both efficiency and equity will be essential for building a sustainable cardiac care system for the future.

For clinical directors, cath lab managers, interventional cardiologists, and policymakers alike, the time for action is now. Each stakeholder has a role to play: implementing innovative technologies that enhance precision, streamlining operational workflows to improve patient access, and championing policies that ensure no patient is left behind. By embracing new techniques (like CT-first and remote monitoring), upgrading facilities and equipment, and insisting on equal access across regions, the healthcare system can make meaningful strides toward reducing the impact of cardiovascular disease and saving lives across the UK.

This vision is ambitious but achievable. It offers not only a roadmap for improving cardiac care in the UK but also a model for other countries seeking to avoid similar system bottlenecks. In tackling this challenge, the UK has the opportunity to once again drive down CVD mortality as it did in decades past – only this time, with modern tools and a renewed commitment to timeliness and excellence.

By taking decisive steps now in urgency, clinical precision, operational efficiency, and system-wide transformation, we can create a future where heart patients receive the care they need promptly and effectively. The result will be longer, healthier lives and a stronger health system prepared to meet the demands of the 21st century. The path forward is clear - and prompt action is essential.

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At Siemens Healthineers, we pioneer breakthroughs in healthcare. For everyone. Everywhere. Sustainably. As a leader in medical technology, we want to advance a world in which breakthroughs in healthcare create new possibilities with a minimal impact on our planet. By consistently bringing innovations to the market, we enable healthcare professionals to innovate personalised care, achieve operational excellence, and transform the system of care.

Our portfolio, spanning in vitro and in vivo diagnostics to image-guided therapy and cancer care, is crucial for clinical decision-making and treatment pathways. With the unique combination of our strengths in patient twinning[1], precision therapy, as well as digital, data, and artificial intelligence (AI), we are well positioned to take on the greatest challenges in healthcare. We will continue to build on these strengths to help overcome the world's most threatening diseases, enable efficient operations, and expand access to care.

We are a team of more than 73,000 Healthineers in over 70 countries passionately pushing the boundaries of what is possible in healthcare to help improve the lives of people around the world.

[1] *Personalisation of diagnosis, therapy selection and monitoring, aftercare, and managing health.*

The products/features mentioned herein are not commercially available in all countries. Their future availability cannot be guaranteed.

The statements by customers of Siemens Healthineers described herein are based on results that were achieved in the customer's unique setting. Because there is no typical hospital and many variables exist (e.g., hospital size, case mix, level of IT and/or automation adoption) there can be no guarantee that other customers will achieve the same results.

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