

Achieving early detection
and diagnosis of
cardiovascular disease:
A manifesto for change



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ACHIEVING EARLY DETECTION AND DIAGNOSIS OF CARDIOVASCULAR DISEASE: A MANIFESTO FOR CHANGE

About this report

This is an initiative of Global Heart Hub, with support from The Health Policy Partnership in the research and drafting of this report.

This document summarises priority actions identified through a targeted literature search of existing calls to action, roadmaps and plans, results from a 2023 Global Heart Hub Affiliate survey, a series of exploratory discussions with international opinion leaders and consensus-shaping workshop discussions at the 2023 Annual Global Heart Hub Unite Summit. The priority actions outlined in this document are evidence-based and represent the consensus of patient representatives and policy, scientific and clinical experts.

The manifesto represents the main output from Global Heart Hub's 3rd Annual Unite Summit, held in Barcelona on 8 and 9 November 2023. The Summit was attended by 125 delegates from across 27 countries, including over 40 patient organisation representatives.

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In addition, several individual patient advocates attended the 2023 Annual Global Heart Hub Unite Summit and contributed to the manifesto.



The Manifesto is something that we really feel can make a difference. We are working together on a united front to reduce the burden of disease and promote cardiovascular health. It's so important that patient organisations are involved – together, the community can work towards better cardiovascular health.



Prof Fausto Pinto,

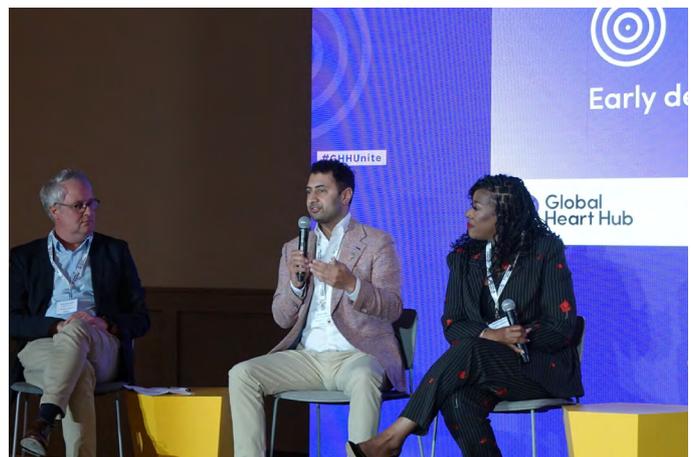
Immediate Past President, World Heart Federation;
Professor of Cardiology, University of Lisbon;
Head of Cardiology Department & Heart and Vascular Department,
Santa Maria University Hospital, Lisbon.



Contents

Foreword	1
Summary	2
Disease glossary	4
Why is early detection and diagnosis of cardiovascular disease (CVD) so important?	5
Actions	7
Action 1: Run public campaigns on the risk factors and symptoms of CVD	7
Action 2: Implement targeted early detection programmes for CVD, at different stages of life	9
Action 3: Adapt clinical processes to enhance early detection and diagnosis of CVD	11
Action 4: Leverage digital technologies to increase access to early detection and diagnosis of CVD	13
Action 5: Optimise workforce training and capacity for early detection and diagnosis of CVD	14
Action 6: Increase investment in research into early detection and diagnosis of CVD	16
Action 7: Advance policy development and international partnerships for early detection and diagnosis of CVD	18
Action 8: Promote equitable access to early detection and diagnosis of CVD	20
Conclusion	23
References	24

ACHIEVING EARLY DETECTION AND DIAGNOSIS OF CARDIOVASCULAR DISEASE: A MANIFESTO FOR CHANGE



Foreword

Global Heart Hub is committed to highlighting issues of importance to heart patients and their carers, and advocating for policy actions that help improve the lives of those living with or affected by cardiovascular disease (CVD). For too long, patients and their families have faced the substantial impact of missed and late detection and diagnosis, which delays treatment initiation and often results in worsened health and economic outcomes. Early detection and diagnosis of CVD can dramatically reduce the burden of illness, improve quality of life for patients and their families, reduce the overall societal cost of chronic disease and substantially enhance population health. Enduring system pressures, lack of infrastructure and more significantly the absence of comprehensive government-led strategies to tackle CVD have resulted in inadequate access and availability of diagnostic tests and technologies.

Political commitment to the early detection and diagnosis of CVD needs to become stronger in many countries. Despite recent advancements, leading stakeholders report continued misunderstanding and complacency among decision-makers as to the true cost of CVD to societies. This is coupled with a noticeable disparity in investment and innovation in this field compared to other diseases. A sustained, concerted effort is essential to not only boost early detection and diagnosis of CVD but also to secure proportional investment and innovation. Global Heart Hub is honoured to be a partner of the European Alliance for Cardiovascular Health, which is making promising advancements in this space, promoting the development of a Cardiovascular Health Plan for the European Union. With societies across the world facing the challenges of ageing populations, prioritising early detection and diagnosis of CVD through sufficient funding, research and policy change becomes crucial for supporting healthy and active ageing while minimising the impact of cardiovascular conditions on people's lives.

The creation of this new manifesto is directly in response to the concerns of those with lived experience of a missed or delayed cardiac diagnosis. Direct patient involvement has been

central to the development of this manifesto from concept to finalisation. Global Heart Hub has engaged with patients and their carers from across the world who have been affected by this issue, together with multiple stakeholder representatives, to collaboratively outline clear, tangible steps towards the goal of early detection and diagnosis of CVD. The patient voice holds great potential to act as a catalyst for change, by highlighting the lived experience of a missed or delayed diagnosis and exposing the inequity of access to and inadequate availability of diagnostic technologies. It is also important to support collaboration between patients and interested stakeholders in advocating for the early detection and diagnosis of CVD across the care continuum.

A united CVD community is a powerful one. As part of a comprehensive approach to primary and secondary prevention, all stakeholders need to come together with a shared commitment to early detection and diagnosis of CVD globally. The time for action is now. We hope this manifesto will help guide and support advocacy efforts to engage policymakers on the need for action and investment in achieving early detection and diagnosis of CVD for all.



A handwritten signature in black ink that reads "Neil Johnson". The signature is written in a cursive, flowing style.

Neil Johnson,
Executive Director,
Global Heart Hub

Summary

This manifesto outlines eight tangible actions that need to be taken by a united CVD community, including committed policymakers, to achieve early detection and diagnosis. The order of these actions does not indicate their priority. Instead, they cover the entire patient pathway for the detection and diagnosis of CVD as well as broader elements such as research and policy development. Implementing all eight actions is important to foster sustained progress and improved outcomes for people living with CVD. These actions will ensure that fundamental awareness, policies, research and clinical processes are in place, and that new opportunities are capitalised upon to achieve early detection and diagnosis of CVD.



INFORM

Action 1: Run public campaigns on the risk factors and symptoms of CVD.

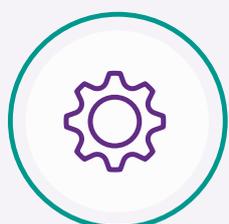
Launch long-term campaigns to improve understanding of CVD among the general public. These should be tailored to different cultural groups and use diverse media for widespread reach, focusing on empowering individuals to monitor their cardiovascular health and seek timely medical advice.



DETECT

Action 2: Implement targeted early detection programmes for CVD, at different stages of life.

Develop programmes to identify individuals and groups at high risk of CVD, using biomarker testing, clinical support tools and considering risk factors including those related to genetics, metabolism and lifestyle. Collaboration with patient organisations, medical societies and health authorities will help to ensure effective local adaptation of such programmes.



TEST

Action 3: Adapt clinical processes to enhance early detection and diagnosis of CVD.

Increase access to rapid, on-site point-of-care testing in primary care and community settings. Redesign patient care pathways to ensure potential cardiac symptoms, underlying causes and early indications of CVD are thoroughly and swiftly investigated.



GO DIGITAL

Action 4: Leverage digital technologies to increase access to early detection and diagnosis of CVD.

Encourage the use of mobile health interventions, wearable sensors and other tools to monitor risk and support early detection of CVD. Integrate these technologies into clinical practice and train patients and healthcare professionals in their effective use to support early detection and diagnosis.



TRAIN

Action 5: Optimise workforce training and capacity for early detection and diagnosis of CVD.

Implement comprehensive multidisciplinary training programmes for primary care physicians and other healthcare professionals to recognise people at high risk of CVD, interpret cardiac symptoms confidently and activate rapid referral pathways. Diversify the skillset of the healthcare workforce to facilitate nurse- or pharmacist-led care, and redesign roles, including the creation of data management and analysis positions.



RESEARCH

Action 6: Increase investment in research into early detection and diagnosis of CVD.

Boost funding for CVD research and innovation, focusing on developing better personalised risk assessment tools that leverage advanced technologies like artificial intelligence and take into account both magnitude and duration of exposure to CVD risk factors. Involve people living with CVD in the design and conduct of such research, ensuring equitable access among demographic groups.



GUIDE

Action 7: Advance policy development and international partnerships for early detection and diagnosis of CVD.

Develop national cardiovascular health plans that include robust, goal-driven strategies for the early detection and diagnosis of CVD to reduce preventable mortality and morbidity, and improve the efficiency of healthcare delivery. These should help reorientate the design of the health system towards early detection and diagnosis of CVD, including multisectoral collaboration and engagement with patient organisations and people living with cardiac conditions.



ACCESS

Action 8: Promote equitable access to early detection and diagnosis of CVD.

Implement targeted policies and programmes to improve equitable access to the early detection and diagnosis of CVD. These should aim to reduce inequalities in CVD mortality by addressing social determinants of health as well as gender, socioeconomic, racial and ethnic disparities in early detection and diagnosis of CVD.

Disease glossary

- **Atherosclerotic cardiovascular disease (ASCVD)** – a disease caused by the build-up of plaque in the walls of the arteries.¹
- **Cardiomyopathy** – a group of diseases of the heart muscle that are often passed down genetically and affect the heart’s ability to pump blood through the body.*
- **Familial hypercholesterolaemia** – a condition involving high levels of cholesterol in the blood, passed on from parents to their children.²
- **Heart failure** – an acute or chronic progressive condition where the heart is unable to sufficiently pump blood around the body.³
- **Heart valve disease** – a debilitating condition with a significant impact on quality of life. It occurs when there are structural or functional abnormalities in one or more of the four valves located in the heart. Valves are vital to the heart’s function, so any damage they sustain can cause debilitating symptoms.*



*This manifesto will be the first-of-its-kind...
patient-led – most importantly – from their own
lived experience.*

Prof Laurence Sperling,

Professor in Preventive Cardiology, Emory University School of Medicine;
Professor of Global Health, Rollins School of Public Health



* These are the disease definitions used by the respective Patient Councils of Global Heart Hub.

Why is early detection and diagnosis of cardiovascular disease (CVD) so important?

WHAT IS THE GLOBAL IMPACT OF CVD?

Cardiovascular disease (CVD), commonly referred to as heart disease, is an umbrella term for a group of conditions affecting the circulatory system. CVD affects the heart and blood vessels, including those supplying the heart muscle and brain.⁴ It includes genetically inherited conditions and conditions that develop during an individual's lifetime, such as heart failure, atherosclerosis, heart attack and stroke.⁵

CVD places pressure on health systems globally, and this burden is predicted to increase with ageing populations. Over the past 30 years, the prevalence of CVD has nearly doubled, reaching over 500 million cases worldwide.⁶ Concerningly, demographic shifts towards ageing populations mean the burden of non-communicable disease (including CVD) is growing.⁷ This brings significant human and economic cost; for example, in low- and middle-income countries, CVD and other non-communicable diseases are expected to result in \$7 trillion in economic losses between 2011 and 2025.⁸ This impact is also experienced in the European Union (EU), where CVD was estimated to have cost €282 billion in 2021, with related health

and long-term care accounting for 11% of total health expenditure.⁹ The growing burden of CVD also has a profound impact on the quality of life of people living with these conditions and their caregivers, such as through resultant discomfort, psychological stress or mobility issues.^{10,11} Globally, the annual number of CVD-related deaths is projected to rise by more than 60% between 2020 and 2050.¹² The implications of this estimate are far reaching, as these levels of prevalence and mortality will affect not only population health but also workforce productivity and the economic sustainability of health systems and wider society. For example, research demonstrates that more than half of the life years lost from CVD occur in working-age adults in the EU, with this demographic group (25–65 years) accounting for over 65% of the death rate from avoidable CVD.¹³ Action to improve the early detection and diagnosis of CVD is therefore essential.



How could early detection and diagnosis of CVD improve the current outlook?

Delayed or missed detection and diagnosis of CVD significantly increases morbidity, mortality and healthcare costs. It often leads to an avoidable progression of the disease to more advanced stages, making treatment more complex and less effective, and can result in severe health complications, including increased risk of heart attacks, strokes and other life-threatening events.^{14, 15} CVD accounts for more than 30% of global deaths annually,¹⁶ but this figure could be reduced through the implementation of comprehensive strategies to achieve early detection and diagnosis.¹⁷ For example, in England, nearly 80% of heart failure cases are currently diagnosed in hospital settings, despite 40% of people experiencing prior symptoms that could have triggered earlier assessment.¹⁷ Similarly, as many as 50% of all heart valve disease cases in people over 65 years may also be going undetected in routine primary care.¹⁸

There is now a wide range of cost-effective ways to detect and diagnose CVD in a timely manner. Accompanying traditional approaches, the recent advances in genetics and artificial intelligence (AI), and emerging technologies in cardiovascular health, all present opportunities for earlier detection and diagnosis. Despite this, shortcomings in the early detection and diagnosis of CVD are persistent. Proactive initiatives, taking full advantage of both traditional and emergent approaches to the detection and diagnosis of CVD, could help identify early-stage symptoms and improve outcomes for people living with CVD, particularly for chronic progressive conditions such as heart failure.¹⁹



Early detection is a lifesaver. I knew something was wrong, but it took over a year for anyone to believe me. If only my condition had been diagnosed earlier, the pain and suffering could have been avoided.

Debra Clare,
Community Ambassador, Her Heart, Australia





ACTIONS

Action 1: Run public campaigns on the risk factors and symptoms of CVD

WHAT CAN POLICYMAKERS DO?

We call on policymakers to support public campaigns on the risk factors and symptoms of CVD, partnering with patient organisations and interested stakeholders, to maximise impact. It is important for policymakers to facilitate such long-term campaigns to improve understanding of CVD among the general public. We recommend that governments allocate funding for public information campaigns on CVD that are accessible to diverse populations, advising members of the public about heart health checks, risk factors and symptoms of CVD and when and how to seek medical advice. We encourage policymakers to implement these campaigns in various settings, including schools and workplaces, as this is key to increasing awareness of CVD on a large scale.²⁰⁻²² It is important for policymakers to also collaborate with patient organisations and other key players, such as health insurance companies and healthcare providers, when developing these campaigns to enhance their reach and effectiveness.

WHY IS THIS IMPORTANT?

Lack of awareness of the risk factors and symptoms of CVD among the general public is a significant barrier to early detection and diagnosis. Despite being the leading cause of death globally,⁴ research consistently reveals worryingly low public knowledge about CVD conditions and their symptoms, such as myocardial infarction, heart valve disease and heart failure.²³ Low awareness of symptoms can contribute to later presentation to healthcare professionals and

delayed detection and diagnosis, which can have a negative impact on patient outcomes due to later treatment initiation.²⁴

IMPLEMENTATION TIPS

We encourage campaigns around risk factors for CVD and its symptoms to:

- **use powerful messaging**, with simple and accessible language, as well as messaging that has been tested with and tailored to target populations. The development of campaigns should also involve patient representatives who have lived experience of CVD and can add impact with personal stories.
- **leverage a variety of platforms, with consistent messaging.** Using various media platforms (e.g. social media, print) effectively will have the furthest reach for the different target groups, while building on consistent messaging and seizing synergies across local, national, regional and global levels.
- **provide accurate information about CVD and how to monitor risk**, covering not only prevalence, symptoms and risk factors – including those related to genetics, metabolism and lifestyle – but also addressing misconceptions about CVD (such as it being ‘self-inflicted’). The information provided should empower people to understand and monitor their own cardiovascular health (for example via at-home blood pressure or EKG monitoring) and encourage them to seek medical advice when needed.

Focus: Familial hypercholesterolaemia (FH)

With hereditary conditions such as FH, there is poor public knowledge of how important it is to understand family history of CVD and how this plays into one’s own risk profile.²⁵ Public information campaigns on this topic are therefore needed, for example on knowing one’s family history of cardiac events, including unexpected or premature death, and understanding how this may indicate increased cardiovascular risk due to genetic inheritance. This could help support detection of FH at an earlier age and improve outcomes.

This call is reiterated in the Prague Declaration on achieving FH paediatric screening across Europe. The declaration encourages governments to mobilise significant investment in initiatives that raise awareness and encourage the uptake of FH childhood screening opportunities.²⁶

ACHIEVING EARLY DETECTION AND DIAGNOSIS OF CARDIOVASCULAR DISEASE: A MANIFESTO FOR CHANGE



We really need this Manifesto to help guide us as patient organisations to not only map out the work that we do, but also to influence policy makers to put more funding and more focus on cardiovascular care, both in terms of early diagnosis and through to the full treatment pathway. It's incredible exciting and I'm pleased to be a part of this initiative.

Tanya Hall,
Patient and CEO, Hearts4heart





Action 2: Implement targeted early detection programmes for CVD, at different stages of life

WHAT CAN POLICYMAKERS DO?

We call on policymakers to establish targeted early detection programmes for CVD, tailored to local needs and resources, with ongoing evaluation and improvement to optimise uptake. It is important for targeted detection programmes, such as heart health checks, to be introduced to identify individuals at high risk of specific cardiovascular conditions, adapted to the capacity and resources of the health system.^{23,27} This could involve a tiered approach, for example prioritising individuals most at risk (e.g. those with known genetic, metabolic or lifestyle risk factors for CVD). We encourage governments to work with patient organisations, medical societies and health authorities to help to ensure these programmes meet local needs and are effectively implemented in community settings such as primary care facilities and pharmacies. We recommend that such initiatives be accompanied by training on programme delivery for healthcare and allied professionals who work in these settings, to enhance the effectiveness of programme implementation. It is also important for these initiatives to be continually assessed and adapted to optimise uptake among the target population.²³ Policymakers could also draw lessons from existing successful detection programmes for other conditions, such as cancer screening initiatives.

WHY IS THIS IMPORTANT?

Targeted detection is crucial for identifying CVD early in groups who are at increased risk of developing cardiovascular conditions.²⁸

Some people are at higher risk of CVD due to a combination of factors, such as age, genetics (including family history of cardiac events), lifestyle and metabolism.²⁹ Identifying these groups and ensuring timely access to detection programmes facilitates early diagnosis and treatment for CVD, helping to mitigate the risk of serious cardiovascular events.²⁸ This approach has been evidenced as a cost-effective strategy, for example in the case of familial hypercholesterolaemia.³⁰

IMPLEMENTATION TIPS

We encourage targeted detection programmes for CVD to:

- **adopt a life-course approach**, providing targeted assessment of groups at high risk that takes into account risk factors including those related to genetics, metabolism and lifestyle, alongside both the magnitude and duration of exposure to such risk factors.³¹ Programmes should also recognise the possibilities of heightened risk at various stages in life, from congenital CVD in childhood to elevated risk through pregnancy, menopause or increasing age.^{21, 31, 32} For example, national standards could introduce paediatric screening for conditions such as familial hypercholesterolaemia and other inherited cardiac conditions in newborns and younger children who have been identified as being at increased risk of CVD due to genetic factors. Targeted detection programmes could also be introduced at other key ages throughout an individual's lifetime in which CVD risk may be elevated. For those over 65 years, for example, this could include making stethoscope checks an integrated part of medical consultations.³³
- **include comprehensive testing**, using a range of diagnostic tools, adjusted to local capacity and resources and designed to target specific CVD conditions and risk factors. This may include blood testing (e.g. for lipids), stethoscope checks (e.g. for heart valve disease), biomarker testing (e.g. for ASCVD and heart failure), genetic testing (e.g. for cardiomyopathy) and invasive diagnostic procedures where necessary. Clear guidance on who to test, for what, and at which stages of life could help healthcare professionals deliver optimal and efficient CVD detection programmes. It is important for recommendations to take into account the capacity of the local health system when determining the regularity of repeat testing. It is also important for these testing initiatives to be supported by strategic, sustained government investment to ensure continuity.
- **be linked to digital decision-support systems and care pathway guidelines**, including mandatory investigation of family history, systematic examination of metabolic and lifestyle risk factors and post-diagnosis follow-up. This will help to improve healthcare professionals' confidence in diagnosing CVD and actioning next steps.²³

ACHIEVING EARLY DETECTION AND DIAGNOSIS OF CARDIOVASCULAR DISEASE: A MANIFESTO FOR CHANGE

Focus: Cardiomyopathy

It is important to set standards for the genetic testing of first-degree family of people living with cardiomyopathy and to streamline the pathways for family assessment.³⁴ Genetic testing should only be implemented where strong evidence demonstrates it will have net benefit and be cost-effective, and guidelines should be mindful of the clinical utility of genetic testing for different types of cardiomyopathy (e.g. dilated, hypertrophic).³⁵ Long-term follow-up plans are also required to ensure that people who discover they have a predisposition for CVD are properly supported, and that healthcare professionals understand the care protocols for how this should be managed. This is particularly important given that undiagnosed cardiomyopathy can lead to other cardiac conditions, such as sudden cardiac arrest.³⁶

Focus: Type 2 diabetes and CVD

CVD is the leading cause of disability and death among people living with type 2 diabetes,³⁷ with this population being two times more likely to have a heart attack or stroke than people without type 2 diabetes.³⁸ It is therefore important to focus on addressing cardiovascular risk in people living with type 2 diabetes and improving the early detection and diagnosis of both conditions, such as by implementing joint diabetes and heart health checks. These can provide a cost-effective way to enhance early detection and diagnosis, improve health outcomes and reduce healthcare costs.³⁹ In the UK, for example, the NHS Health Check utilises simple measurements to identify individuals at risk of CVD, stroke, diabetes and kidney disease.⁴⁰ Such checks have been shown to be effective in reducing the incidence of disease across multiple organ systems, with a 23% lower risk of all-cause and cardiovascular death.⁴⁰

Box 1. Considerations for implementing comprehensive CVD risk assessment

Existing risk assessment tools for CVD often have limitations and can be biased towards older age groups and treatment that focuses on short-term outcomes.⁴¹ The implementation of accurate risk assessments, which are sensitive to the magnitude and duration of exposure to CVD risk factors, is important for predicting the onset of CVD conditions. Risk assessments can also facilitate closer monitoring and earlier detection of cardiac symptoms, which can slow disease progression and improve patient and societal outcomes.

We encourage policymakers to support the implementation of comprehensive risk assessment strategies that:

- deploy predictive risk assessment and stratification tools to ensure cost-effectiveness and support efficient resource allocation, such as 10-year ASCVD risk estimator models or QRISK.^{21 42}
- cover groups at heightened risk of progressing to more severe cardiac conditions. This includes people with an established diagnosis of CVD, those who have previously experienced a cardiac event, people with family history of known CVD including conditions such as ASCVD, heart attack, stroke, atrial fibrillation, heart valve disease, cardiomyopathy and familial hypercholesterolemia, as well as associated conditions known to elevate risk of CVD (such as diabetes, obesity, chronic kidney disease and cancer).



Action 3: Adapt clinical processes to enhance early detection and diagnosis of CVD

WHAT CAN POLICYMAKERS DO?

We call on policymakers to facilitate the redesign of patient care pathways across medical specialities to ensure early signs and symptoms of CVD are consistently detected and appropriately investigated. It is important that governments encourage the implementation of comprehensive pathways and guidelines for CVD across various healthcare settings.²³ These should be further supported by clear protocols to ensure healthcare professionals are prompted to 'think cardiovascular' and cardiac causes are investigated routinely.^{33, 34} This would help to ensure that people with risk factors for CVD, or those who are presenting with signs of CVD that may not manifest as symptoms felt in the heart area, are investigated for cardiac causes and referred to appropriate specialists for further investigation and treatment.

As part of this pathway redesign, it is important for policymakers to ensure wider availability of rapid-access diagnostics across a variety of settings. We call on governments to improve the availability of key point-of-care diagnostics (e.g. electrocardiography, echocardiography, blood pressure testing, low-density lipoprotein cholesterol testing and other key biomarker investigations) in primary care facilities or local diagnostic centres, including pharmacies or community centres.^{15, 23, 43} Barriers within referral pathways also need to be addressed. For example, implementing open-access echocardiography would allow GPs to refer people directly for imaging, bypassing delays often encountered with specialist referral processes.²⁷

Box 2: What is point-of-care testing (POCT)?

POCT is performed close to patients, in non-laboratory settings such as GP surgeries, pharmacies, nursing homes, and even community locations such as offices or retail spaces. It can significantly speed up the diagnostic process,⁴⁴ for example by using saliva or finger prick blood tests which provide results almost immediately and support triage for further investigation. This can considerably reduce the time to receiving critical care. Despite its benefits, POCT in key areas of cardiovascular diagnostics remains underutilised.²¹

WHY IS THIS IMPORTANT?

Silos in healthcare can prevent people from receiving appropriate management of their risk and symptoms of CVD. In many health systems across the world, care pathways are often compartmentalised, with disease specialists primarily focusing on their area of expertise. This siloed approach can mean that an individual's risk of CVD is not picked up or sufficiently addressed in people presenting with cardiovascular symptoms, who are living with coexisting health conditions. This could, for example, lead to an endocrinologist managing a person with diabetes, but sidelining their risk of CVD. Similarly, it is commonly reported that people with breathlessness, a major 'red flag' symptom for heart failure, experience major

delays to detection and diagnosis due to being investigated for respiratory conditions only.^{34, 45}

POCT presents a solution to systemic delays in CVD detection and diagnosis. People often face long waiting times for diagnostic tests, leading to serious and sometimes life-threatening delays in diagnosis of CVD.^{34, 46} POCT can help to support the early detection of CVD outside of specialist settings, ensuring subsequent timely access to further investigation, diagnosis and treatment. Validation of the performance and reliability of POCT devices is important before introducing them into care pathways.

ACHIEVING EARLY DETECTION AND DIAGNOSIS OF CARDIOVASCULAR DISEASE: A MANIFESTO FOR CHANGE

IMPLEMENTATION TIPS:

We encourage adapted clinical processes to be:

- **developed in consultation** with patient groups, medical societies and industry representatives to ensure sufficient investigation into cardiac causes.²³
- **supported by clear protocols** to ensure all healthcare professionals are prompted to 'think cardiovascular' and cardiac causes are investigated routinely, including by non-cardiac specialists.^{33, 34}
- **supported by return-on-investment research** to assess the cost-effectiveness of changes to healthcare delivery for CVD. For example, research into the cost effectiveness of POCT could support its roll-out.



Example: Heart failure

To support the detection of heart failure, access to biomarker testing, including for N-terminal pro B-type natriuretic peptide (NT-proBNP) and cardiac troponin, could become part of the blood panels available in primary care settings and mobile testing facilities to help triage people for further investigation and diagnosis.³⁴ For example, measuring NT-proBNP levels in the bloodstream can indicate the heart is struggling to sufficiently pump blood.⁴⁷ Widening access to NT-proBNP testing in primary care can therefore improve the early identification of heart failure and assessment of its severity, helping to determine how urgently a specialist diagnostic assessment is needed and to speed up treatment initiation to improve outcomes for people living with heart failure.⁴⁸ To support this, reimbursement of biomarker testing and access to affordable testing devices is important.⁴⁸

Example: Stroke

It is important to assess the CVD risk profile of all people diagnosed with stroke prior to hospital discharge, even if they are admitted to neurology departments in the first instance.³⁴ This is because cardiovascular risk factors are involved in stroke episodes and strokes can also have severe cardiac complications.³⁵ It is also crucial to consider lifestyle risk factors within such assessments, alongside the implication of structural, functional and arrhythmogenic predictors of stroke on CVD risk.



Action 4: Leverage digital technologies to increase access to early detection and diagnosis of CVD

WHAT CAN POLICYMAKERS DO?

We call on policymakers to support the integration of digital tools into clinical practice for detecting and diagnosing CVD. It is important for governments to fund implementation research into the effectiveness of digital tools, such as mobile health applications and wearable sensor devices, and how to best integrate them into health systems to optimise early detection and diagnosis of CVD. We recommend that this also includes digitising health records, where feasible, to facilitate seamless data exchange between primary and secondary care settings.⁴⁹ Where necessary, this may require legislative change to facilitate data sharing between different healthcare settings, whilst adhering to data protection laws. To support the use of digital tools and technologies for early detection and diagnosis of CVD, we suggest that governments encourage the development of training resources for both patients and the healthcare workforce.⁴⁹

WHY IS THIS IMPORTANT?

Digital technologies can improve the efficiency of healthcare delivery, address inequalities and facilitate CVD monitoring. Many people face barriers to accessing timely detection and diagnosis of CVD due to geographic, language, economic or cultural barriers.^{50, 51, 52} Efficient utilisation of resources is increasingly critical as global health systems grapple with challenges like shortages in the health workforce. The integration of digital tools into cardiovascular care could help to improve early detection and diagnosis, such as by increasing the potential for patient self-tracking of symptoms and heart rhythm, and streamlining communication between people living with CVD and health professionals.⁵³

IMPLEMENTATION TIPS:

To maximise the potential of digital technologies, it is important to:

- **engage in multi-stakeholder partnerships**, including patient advocates (particularly in Health Technology Assessments to ensure the practicality of technologies for people living with CVD), professional bodies (to assess and integrate new technologies into care pathways) and public-private partnerships (to improve and increase access).
- **explore the integration of mobile applications, SMS and self-tracking sensor (e.g. photoplethysmography) data** into assessments to help identify individuals at high risk of CVD, ultimately improving outcomes.^{20, 49} For example, mobile applications could encourage people to attend cardiovascular health checks.²⁷ Additionally, AI technologies hold potential for optimising detection and could be used to more efficiently examine electronic health records to flag people at high risk of CVD.^{20, 49} It is important for governments to also address gaps in internet access and broadband coverage to ensure equal benefits from the integration of such digital tools are gained by all.
- **promote self-assessment of CVD risk among the general population** using validated digital technologies such as smart watches and wearable sensor devices.

Example: Heart failure

Rapid and accurate testing for heart failure at the point of care presents significant challenges. The contemporary development of AI-assisted echocardiography tools, however, holds potential to support the timely detection and diagnosis of heart failure, particularly in community settings, when used alongside additional diagnostic testing.⁵⁴

Action 5: Optimise workforce training and capacity for early detection and diagnosis of CVD

WHAT CAN POLICYMAKERS DO?

We call on policymakers to implement comprehensive, multidisciplinary training programmes and expand roles and accreditation for all healthcare professionals involved in the detection and diagnosis of CVD.^{20, 21, 27, 31, 33}

It is important for frontline professionals, including primary care practitioners, to be equipped with the necessary skills and knowledge to recognise people at high risk of CVD, interpret early symptoms accurately across all patient groups without bias, and initiate rapid referral pathways when necessary. We therefore ask policymakers to support the implementation of dedicated training for medical students and continual training for practicing healthcare professionals, particularly non-cardiac specialists, to diversify skillsets.^{27, 33} Allied healthcare professionals involved in the detection and diagnosis of CVD (e.g. imaging professionals, data analysts) should also be provided with clear protocols and accreditation to ensure the standardisation and quality assurance of such roles.

WHY IS THIS IMPORTANT?

Shortages in the healthcare workforce and a lack of training often hinder widespread access to CVD diagnostic tools and the early detection of cardiovascular conditions. In most health systems, GPs, nurses, pharmacists and other healthcare professionals are the first point of contact for people with symptoms of CVD.⁵⁵ Many diagnostic tasks traditionally provided by specialists can be facilitated or even led by other healthcare professionals, supported by digital clinical support tools to help detect and manage people at high risk.⁵⁶ However, among non-specialist professionals there is often a gap in the awareness and understanding of CVD symptoms that hinders task shifting.³⁴

IMPLEMENTATION TIPS:

When boosting workforce training and capacity for CVD detection, it is important to:

- **encourage the expansion of nurse, pharmacist and allied professional-led CVD care**, allowing these professionals to play a more prominent role in early detection.
- **explore the creation of new roles**, such as health data managers and analysts who can manage data from electronic health records and sensors, and flag individuals at high risk of CVD.
- **promote task shifting** by expanding the remit of healthcare professionals not traditionally involved in CVD detection, including pharmacists, community health workers, laboratory technicians, opticians and podiatrists. This could alleviate the burden on physicians and ensure early symptoms are identified by a wider range of healthcare professionals.^{20, 43}
- **shift away from a 'one-doctor diagnosis' approach towards a multidisciplinary team model where feasible**, to acknowledge the complex and multifaceted nature of CVD and leverage the diverse skills of healthcare professionals for integrated care.³⁴
- **enhance the communication skills of healthcare professionals** and promote person-centred interactions with people going through CVD risk assessment or diagnosis, to encourage them to engage in the next stages of care.³⁴



Example: Heart valve disease

Accurate echocardiography is important for detecting abnormalities in heart valve openings and making a diagnosis of heart valve disease. It would be beneficial for all imaging personnel to acquire recognised accreditation in the imaging of heart valve disease, to ensure accurate detection of this condition and that quality standards are consistently met.³³



Even though I went to my GP regularly, she never auscultated my heart in a period of ten years. I remember once she sent me to a cardiologist and he also didn't auscultate my heart. Both of them didn't even consider that there might be something wrong with my aortic valve.

At the age of 42, Jens was finally diagnosed with severe aortic stenosis and received treatment.

Jens Näumann,
CEO, Initiative Herzklappe, Germany



Action 6: Increase investment in research into early detection and diagnosis of CVD

WHAT CAN POLICYMAKERS DO?

We call on policymakers to invest in research into CVD, and incentivise the implementation of innovations where appropriate, to accelerate progress in early detection and diagnosis of cardiovascular conditions. Additional investment could help to streamline diagnostic pathways, conserving vital healthcare resources for those who need them, and proactively identify people at risk of CVD.^{27,49} Bringing together cross-disciplinary and international research consortia could help to boost progress in early detection and diagnosis, with public-private partnerships supporting the expansion of research capacity.⁵⁷ To accompany this, we also ask governments to create supporting policies to encourage better uptake of validated innovative technologies for the early detection and diagnosis of CVD.

WHY IS THIS IMPORTANT?

Despite CVD being the leading cause of death worldwide and incurring significant economic and societal cost,⁴ there is relative underinvestment in CVD research and innovation. CVD often receives less funding compared to other major diseases such as cancer or infectious conditions.^{58,59} For example, in the United States (US), CVD research receives 86% less National Institutes of Health funding than breast cancer, relative to the number of deaths caused.⁶⁰ This is surprising, considering that in 2020, breast cancer accounted for approximately 42,000 deaths in the US whereas CVD accounted for over 695,000.⁶¹ ⁶² This discrepancy may be influenced by public and political gaps in awareness of the significant burden of CVD compared to other diseases, or misconception that sufficient action has already been taken to improve the detection and diagnosis of CVD. Investing more in CVD research could help identify innovative approaches for early detection and diagnosis, thus contributing to a reduction of the burden these conditions place on individual wellbeing, health systems and society.

IMPLEMENTATION TIPS:

Priorities for research into CVD include:

- **involving people living with CVD equitably in research and service design** to ensure diagnostic pathways are tailored to their needs and preferences. Additional support or adaptations (e.g. transportation, flexible time slots) should be offered to underrepresented groups in particular, to facilitate their participation.
- **improving detection and diagnosis of CVD across the lifespan.** Research should investigate how to detect CVD early among younger populations,⁵⁷ as well as looking at developing more detailed and personalised risk profiling tools for groups at high risk (such as people living with co-morbidities) and exploring how to use biomarkers and cost-effective tools for rapid patient profiling.
- **harnessing the potential of new technologies** (e.g. predictive algorithms, AI, high-resolution imaging, Big Data) to develop better personalised risk assessment tools that take into account the magnitude and duration of exposure to CVD risk factors, identify new biomarkers,^{49,31,57} and increase the accuracy of detection and diagnosis.^{31,57,63}
- **producing return-on-investment data** to clearly show where government spending will yield the greatest results.
- **developing best-practice standards** for key delivery components, such as awareness-raising and education,³¹ and increasing equity in access to and implementation of CVD innovations in real-world settings.⁶³ It is essential that both evidence generation and implementation science are pursued for all research priorities.



Example: Genetically driven ASCVD

Biomarker testing, such as for lipoprotein (a), with a simple blood test can indicate the development of ASCVD and help to support early detection and diagnosis.⁶⁴ To help reveal new biomarkers which can improve this process, automated, machine learning-based analysis could be used to discover image-based cardiac markers from large-scale imaging studies.⁶⁵

Example: Cardiomyopathy

Accurately assessing the heart's electrical activity can support the early detection and diagnosis of cardiomyopathy.⁵⁰ Implementing robust validation of advanced echocardiographic techniques (e.g. deformation imaging), which facilitate this, can improve detection.⁶⁶



Like many people living with dilated cardiomyopathy, I was initially undiagnosed and misdiagnosed. Nothing was done. Finally in 2014 I was diagnosed, but at that point, medication and therapies didn't work, so I was transplanted in 2021. It is so important that patients are diagnosed early and accurately so they can avoid death and transplantation.

Greg Ruf,

Executive Director, DCM Foundation, USA



Action 7: Advance policy development and international partnerships for early detection and diagnosis of CVD

WHAT CAN POLICYMAKERS DO?

We call on policymakers to develop national cardiovascular policies and allocate funding to establish accountability for the detection and diagnosis of CVD. It is important for every country to have a dedicated national cardiovascular health plan, spanning primary and secondary care, to help reorientate the health system towards supporting the early detection and diagnosis of CVD. We recommend that such plans include measurable goals for improving prompt access to detection and diagnostic processes in different patient groups and settings.³¹ The progress measured should be used to inform priority areas for future investment. We also call on governments to give the development of national CVD plans the same political attention as plans for cancer and ensure policies are supported by a national CVD financing strategy. It is important for this to involve key ministries (such as economic, health, equity, and science or innovation) to ensure long-term funding of CVD diagnostics,^{15, 31} including genetic testing,²¹ and provide sufficient reimbursement where applicable. We also encourage governments to make sure that these plans consider the invasiveness, affordability and patient preference for different diagnostics, as well as improve utilisation and implementation of traditional strategies for early detection and diagnosis of CVD whilst integrating emerging, innovative approaches.

WHY IS THIS IMPORTANT?

Advancements in improving life expectancy, reducing premature mortality and enhancing innovations for CVD have stalled in recent years,⁶⁷ fuelled by a lack of political prioritisation across the globe. Many existing national CVD plans are out of date and there is a lack of substantial investment in or commitment to implementation.⁶⁷ These issues also persist at the regional level, demonstrated, for example, by the absence of European health policy initiatives on CVD.⁶⁷ This is concerning, particularly given that addressing CVD forms an important component of achieving the United Nations' Sustainable Development Goal 3.4.⁶⁷ Advancing policy development is therefore essential, and it is encouraging to see opportunities

emerging for this, such as the mounting calls for a European Cardiovascular Health Plan among the CVD community in the EU.

IMPLEMENTATION TIPS:

To ensure that progress is made, it is important to:

- **incorporate accountability measures** into policy via quality assurance legislation, registries, national audit reports and annual policy reviews.³⁴
- **adopt a multi-sectoral approach and encourage long-term cross-sectoral collaboration** supported by annual progress reports and sustained funding. This should involve consulting patient organisations and healthcare professionals to ensure applicability of policies in real-world settings. This could also involve fostering public-private partnerships to increase access to diagnostic resources, and to address socioeconomic and environmental factors (e.g. air pollution⁶⁸) that increase the risk of CVD.
- **utilise international multi-stakeholder partnerships**, global networks and shared leadership to increase political attention to the early detection and diagnosis of CVD.^{27 31} Global and regional forums (such as G20, WHO, EU and the Association of Southeast Asian Nations (ASEAN)) present important opportunities for this.



Early detection and diagnosis is absolutely critical. The manifesto is going to be a valuable tool for taking to politicians and multilateral and international organisations.

Alan Donnelly,

Convenor of The G20 Health and Development Partnership;
Executive Chairman, Sovereign Sustainability and Development



Action 8: Promote equitable access to early detection and diagnosis of CVD

WHAT CAN POLICYMAKERS DO?

We call on policymakers to address disparities in the early detection and diagnosis of CVD.

To promote equity, it is important to implement policies and programmes targeted to the needs of specific subgroups in the population. We encourage policymakers to ensure these initiatives span awareness and health literacy campaigns, training programmes, further research and financial investments.



GENDER DISPARITIES IN EARLY DETECTION AND DIAGNOSIS OF CVD

WHY IS THIS IMPORTANT?

There are gender disparities in the awareness, detection and diagnosis of CVD, leading to underdiagnosis and undertreatment in women.⁶⁹

CVD presents differently in males and females, yet there is a significant lack of awareness about these sex differences among both the general public and healthcare professionals.⁶⁸ These disparities are particularly concerning as women face increased risk of CVD during specific life stages, such as pregnancy and menopause.³² Evidence also suggests that women are less aware than men of their cardiovascular risk, and are less likely to ever have had a CVD screening test.⁷⁰ Additionally, healthcare professionals often manage symptoms of CVD in women differently, partly due to implicit gender biases and a lack of understanding of differences in their symptoms.^{69,71}

IMPLEMENTATION TIPS:

To address gender disparities, it is important to:

- **implement training programmes** for healthcare professionals to improve their understanding of CVD presentations in women, aiming to reduce implicit biases and enhance equitable early detection and diagnosis of cardiovascular conditions.⁶⁹
- **fund more research on women's cardiovascular health.**^{69,71} This requires harmonising data collection on prevalence, detection and diagnosis, and management of CVD among women.⁶⁹ This will also require addressing the underrepresentation of women in clinical trials by adapting research designs and protocols accordingly to remove barriers to participation.⁶⁹
- **develop and support targeted communication campaigns** that effectively raise awareness about gender differences in CVD, specifically aiming at women. For example, these could include information on the increased cardiovascular risk faced by women entering pregnancy or menopause.^{32,72}



ETHNIC, RACIAL AND SOCIOECONOMIC DISPARITIES IN EARLY DETECTION AND DIAGNOSIS OF CVD

WHY IS THIS IMPORTANT?

People face disparities in CVD based on their socio-demographic characteristics, leading to unequal health outcomes in many countries.

Minority ethnic groups, indigenous groups and communities with low socioeconomic position, for example, often experience higher rates of CVD,^{73 74 75} so ensuring access to early detection and diagnosis among these groups is essential. It is also important to recognise how some communities experience compounded inequalities through the intersection of their personal characteristics. People with particular combinations of racial, ethnic, gender and class identities (e.g. Black women) can experience exacerbated health inequalities.⁷⁶ For example, while ethnic disparities in CVD mortality are shrinking in the United States, Black women under 65 years are still more than twice as likely to die prematurely from CVD than White women.⁶⁰

Investment in targeted programmes and policies is important for improving equal access to early CVD detection for all.^{27 20 23} Delayed diagnosis can result in higher mortality rates,⁷⁷ so it is particularly important to ensure early detection and diagnosis among underserved groups who face high prevalence of CVD.

IMPLEMENTATION TIPS:

To address inequalities due to ethnic, racial or socioeconomic characteristics, it is important to:

- **develop dedicated policy designed to address area-specific ethnic disparities** in CVD mortality from delayed detection and diagnosis.⁷⁷ This should be supported by comprehensive data collection to ensure full understanding of inequities among different sub-populations in the region.⁷⁸
- **carefully design risk-assessment programmes** that are tailored to underserved groups, who are often at particularly high risk of CVD,⁴⁹ and target local needs informed by data on local health inequalities.⁴³
- **engage multiple sectors** to address the social determinants of health that can delay access to diagnostic consultation.²³
- **standardise the reimbursement** for CVD investigation to enhance equity in access.²³
- **implement support programmes** to facilitate engagement in CVD testing, such as for transportation or childcare.

Example: Heart valve disease

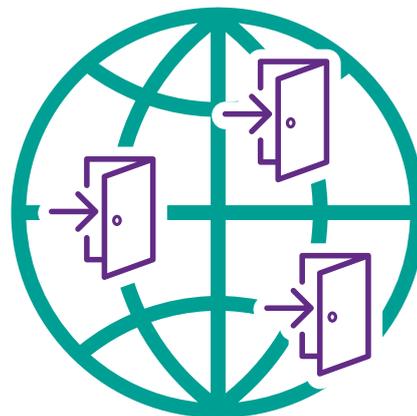
It is important for policy to be developed to help address inequalities specific to different CVD conditions. For example, research indicates that diagnosis of aortic stenosis, a type of heart valve disease, is lower among racial and ethnic minorities compared with White patients.⁷⁹ In particular, this research reveals ethnic inequality in evaluation by a cardiothoracic specialist, which highlights the importance of assessing and adapting referral protocol as necessary, to ensure equity in access to early diagnosis.⁷⁹

ACHIEVING EARLY DETECTION AND DIAGNOSIS OF CARDIOVASCULAR DISEASE: A MANIFESTO FOR CHANGE

DISPARITIES IN EARLY DETECTION AND DIAGNOSIS OF CVD IN LOW-RESOURCE SETTINGS

WHY IS THIS IMPORTANT?

There are disparities in the early detection and diagnosis of CVD across different regions. In particular, there is urgent need to support early detection and diagnosis in low- and middle-income countries, where 80% of the world's CVD-related deaths occur.⁸⁰ These countries often face unique challenges, including low health literacy, limited access to and availability of healthcare services, and insufficient healthcare infrastructure. These barriers can lead to late presentation of CVD cases and delayed diagnoses, which result in more expensive and less effective treatments due to disease progression.⁸¹ Regional disparities can also exist within countries, such as rural populations having more limited access to diagnostic services.¹⁵



IMPLEMENTATION TIPS:

To address disparities in low-resource settings, it is important to adopt a multifaceted approach, including:

- **increasing health literacy around symptoms of CVD** to enhance public awareness and encourage people to seek medical advice.
- **mapping CVD services** to identify gaps in provision and key focus areas for early detection and diagnosis of CVD. High-quality epidemiological research is important to inform the development of context-specific, effective interventions.⁸²
- **investing in physical infrastructure** to support diagnostic services, particularly in remote areas. This includes ensuring access to electricity, water and reliable internet connection.¹⁵
- **implementing health financing plans** to reduce out-of-pocket expenditure for patients, increasing the accessibility of CVD diagnostics.⁸²
- **developing and distributing diagnostic equipment and tools** that are suitable for remote or under-served areas (e.g. portable echocardiography, wearable sensor devices, handheld digital rhythm strips and adapted telemedicine infrastructure to facilitate the transfer of electrocardiogram results from rural areas to urban clinics).^{20, 23} In addition, it is also important to increase system capacity to adopt new technologies developed specifically for low-resource settings.^{15, 20}
- **integrating mobile travelling clinics** as a part of CVD detection programmes, to meet the needs of remote and rural populations.



Conclusion

Tackling CVD requires a cohesive, global approach. Bridging gaps in the early detection and diagnosis of CVD is an important component of such efforts, particularly with regard to eliminating disparities across gender, ethnic and geographic lines. The eight actions in this manifesto provide a strategic approach that spans the entire pathway for the detection and diagnosis of CVD, including public awareness, clinical adaptation, workforce enhancement and research. Commitment to these actions will not only shape improved health outcomes for people living with CVD, but also foster economic resilience and public health globally.

We call on policymakers to foster cross-sectoral collaboration, with strong patient involvement. No single stakeholder can address the multifaceted nature of achieving early detection and diagnosis of CVD alone. It requires the concerted efforts of governments, healthcare professionals, researchers, patient groups and industry representatives. To make early detection and diagnosis universally accessible, we encourage policymakers to act as a driving force in such efforts, championing change that integrates best practices into national healthcare strategies.

As part of this, we strongly recommend that policymakers guide and support the development and implementation of a well-defined cardiovascular health plan, adapted to the country or regional context.

Global Heart Hub is working with over 100 patient organisations across the globe, using the eight actions outlined in this manifesto to advocate for people living with or affected by CVD.

Early detection and diagnosis of CVD have the potential to dramatically improve quality of life for people living with these conditions. Implementing the proactive measures outlined in this manifesto can help to identify early-stage symptoms of CVD and enhance patient outcomes, particularly for chronic progressive conditions.

Join us in our ambition to achieve the implementation of these eight manifesto actions to make early detection and diagnosis of CVD a reality for all.

ACHIEVING EARLY DETECTION AND DIAGNOSIS OF CARDIOVASCULAR DISEASE: A MANIFESTO FOR CHANGE

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ACHIEVING EARLY DETECTION AND DIAGNOSIS OF CARDIOVASCULAR DISEASE: A MANIFESTO FOR CHANGE

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