# Safe Hearts, Connected Care:

## A Roadmap for Europe's Cardiovascular National Plans

PHILIPS





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# Executive summary

Cardiovascular disease (CVD) remains the leading cause of death and disability across Europe and continues to place substantial pressure on patients, health systems and national economies. While important progress has been achieved in cardiovascular care, considerable variation persists in prevention, diagnosis, treatment, and outcomes across European countries.

At the same time, European health systems face growing challenges, including population ageing, workforce shortages, increasing demand for care and persistent health inequalities. These challenges call for a renewed focus on cardiovascular health as a strategic policy priority.

To examine this, this paper applies a pathway-and-enablers framework to six government-issued national cardiovascular plans and strategies from Czech Republic, Latvia, Luxembourg, Poland, Romania and Spain. The framework assesses four stages of the cardiovascular pathway - prevention, early detection, treatment and follow-up - together with pathway integration, which captures the extent to which these stages function as a connected system. Five cross-cutting enablers are also assessed: data and digital infrastructure, financing, workforce, equity, and governance and adoption. Pathway integration is treated as a distinct dimension because strong activity within individual stages does not necessarily mean that patients can move smoothly between them.

The enabling conditions are similarly uneven. Czech Republic and Poland provide particularly strong examples of governance and adoption, while Latvia and Poland contain comparatively strong financing and implementation provisions.

Czech Republic and Luxembourg are among the stronger examples for data and digital infrastructure. No single national plan is strongest across the full framework; instead, different countries demonstrate strengths in different parts of the cardiovascular pathway and its enabling environment.

## THE CENTRAL FINDING

The main challenge is not a lack of policy ambition and activity, but the absence of connection between prevention, detection, treatment, and follow-up.

National plans increasingly define prevention, detection, treatment and follow-up activities, but less consistently specify referral routes, escalation criteria, responsibility for transitions and how clinical information follows the patient. As a result, care is often described as a set of components rather than as a functioning and holistically integrated system.

Even the strongest plans do not yet fully connect prevention, detection, treatment and follow-up into a continuous patient pathway.



Applying the framework identifies six recurring structural priorities for stronger national cardiovascular plans:

1. Early detection needs to connect more systematically to diagnosis and treatment, with clearer referral criteria, escalation routes and timelines.
2. Access to specialist cardiovascular care should be defined through explicit targets for timely and equitable diagnosis and treatment, rather than service availability alone.
3. National plans need stronger pathways for underserved and cross-specialty patient groups.
4. Financing should better support follow-up and long-term management as well as acute episodes of care.
5. Ambitions for AI and digital health need to be matched by a reliable interoperable data infrastructure.
6. Implementation architecture — including named responsibilities, timelines, milestones and accountability mechanisms — should be treated as part of national CVD plan design rather than as a downstream administrative step.

Together, these findings point towards a broader shift in cardiovascular policy: from strengthening isolated components of care towards building a system in which prevention, detection, treatment and follow-up operate as one continuous pathway.



## From findings to action

The national-plan analysis translates into ten policy recommendations spanning both the patient pathway and the system enablers required to make that pathway work in practice (Figure 1).

## Recommendations are mutually reinforcing

The recommendations are mutually reinforcing. Expanding health checks will have limited impact if abnormal findings do not trigger appropriate referral and treatment; advanced technologies cannot scale without interoperable data and workforce capability; and investment in acute care will not deliver its full long-term value if patients are lost during rehabilitation and follow-up. Financing and governance therefore need to support the pathway rather than individual services in isolation.

The objective is not simply to produce more cardiovascular policies or add further interventions to national plans. It is to create integrated cardiovascular care in which patients are identified earlier, guided reliably through diagnosis and treatment, and followed over time — with clear responsibility, continuity of information and accountability at every transition. This is what will help deliver better cardiovascular care for more people.

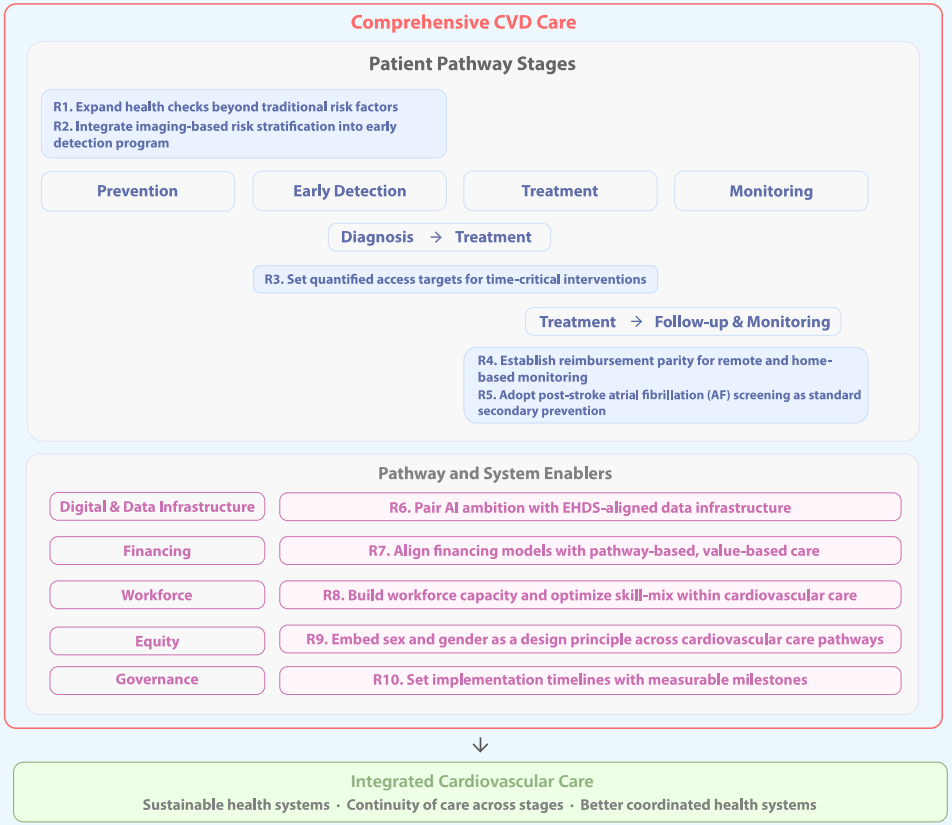



Figure 1. Recommendations for connected cardiovascular care pathways.

Note: AI = artificial intelligence; EHDS = European Health Data Space.

# List of abbreviations

| Abbreviation | Full term |
|---|---|
| AF | Atrial fibrillation |
| AI | Artificial intelligence |
| CT | Computed tomography |
| CVD | Cardiovascular disease |
| ECG | Electrocardiogram |
| EHDS | European Health Data Space |
| EHR | Electronic health record |
| ESCAV | Estrategia en Salud Cardiovascular del Sistema Nacional de Salud (Cardiovascular Health Strategy of the National Health System) |
| EU | European Union |
| HIC | High-income country |
| MRI | Magnetic resonance imaging |
| NCD | Noncommunicable disease |
| NKVP | Národní kardiovaskulární plán České republiky (National Cardiovascular Plan of the Czech Republic) |
| NPChUK | Narodowy Program Chorób Układu Krążenia (National Programme for Cardiovascular Diseases) |
| OECD | Organisation for Economic Co-operation and Development |
| PHSSR | Partnership for Health System Sustainability and Resilience |
| PCI | Percutaneous coronary intervention |
| PN-MCNV | Plan national maladies cardio-neuro-vasculaires (National Plan for Cardio-Neuro-Vascular Diseases) |
| SNBCC | Strategia națională pentru combaterea bolilor cardiovasculare și cerebrovasculare (National Strategy for Combating Cardiovascular and Cerebrovascular Diseases) |
| TAVI | Transcatheter aortic valve implantation |
| UN | United Nations |
| WHO | World Health Organization |



# Better cardiovascular care for more people

The European Union (EU) cardiovascular health plan, the Safe Hearts Plan, represents a strategic response to Europe's leading health challenge. It aims to deliver tangible benefits for citizens, health systems, and society through a focused set of ambitious, high-impact actions. The Plan is organized around three core pillars: prevention, early detection and screening, and treatment and care, including rehabilitation. These are supported by cross-cutting priorities on digital innovation, research and knowledge, and the reduction of socioeconomic, geographic and gender inequalities. Overarching national Member State plans are needed to address the challenge of this complexity and scale.

The burden of CVD and the capacity of health systems vary substantially across EU Member States, making inequalities in access, treatment and outcomes an urgent policy challenge. The Safe Hearts Plan provides an important EU-level framework for strengthening cardiovascular health. It also recognizes the role of comorbidities, including diabetes and obesity, and identifies flagship initiatives and enabling tools to support implementation. However, while the Safe Hearts Plan sets a strategic direction, it does not provide detailed practical guidance on how its ambitions should be translated into national cardiovascular plans. A thorough analysis of existing national plans may help with mutual policy learning across Member States.

Thirteen EU Member States have a national CVD control plan, while 10 have a national stroke plan (Annex A, Table A).[1] This count should be read with caution, as what qualifies as "having a plan" varies widely across countries. In some cases, the listed instrument is embedded within a broader national health or noncommunicable disease (NCD) strategy rather than issued as a standalone cardiovascular plan; in others it predates current clinical and policy priorities and has not been formally updated; and in a few cases a plan is reported to exist but could not be verified as publicly available.

Philips is a leading global provider of medtech solutions that help prevent, detect, diagnose, treat and monitor cardiovascular disease.

This includes prevention of CVD cardiovascular disease (including sleep and oral health), early detection, imaging and (advanced) diagnosis, image-guided cardiac and stroke treatments, inpatient and ambulant monitoring solutions, rehabilitation, and healthcare informatics across the patient pathway and all healthcare settings.

This paper presents a Philips policy perspective, informed by analysis of national cardiovascular plans and external evidence, on how to improve access, workflow efficiency and continuity of care through better connected care.

The Safe Hearts Plan seeks to reduce premature mortality of CVD by 25% in 2030. Globally, the 2025 UN General Assembly political declaration on NCDs calls for essential action to achieve the 2030 goal of reducing premature mortality from NCDs by one third. These goals align strongly with Philips mission is to improve 2.5 billion lives worldwide by 2030, which focuses its practical contribution on better outcomes and better access to care, optimization of costs and efficiencies of existing care workflows, giving time back to clinicians, and minimizing environmental impact. Helping health systems deliver high-quality care from hospital to home for a growing number of complex patients, while improving departmental efficiency, is paramount to easing the burden of CVD.

## A new EU policy agenda: The Safe Hearts Plan

According to the Partnership for Health System Sustainability and Resilience (PHSSR), health systems continue to face challenges in acting early on non-communicable diseases, often leading to reliance on late-stage treatment and management. PHSSR findings highlight the importance of strengthening prevention, early detection, and timely intervention to improve population health outcomes and support long-term health system sustainability.[2]

CVDs are accountable for one-in-three deaths across the EU[3]. However, the burden of CVDs and the capacity of health systems vary substantially across member states. Tackling inequalities and improving access to detect and treat CVDs is an urgent challenge, and an EU CVD health inequalities dashboard will be developed.

The three main pillars of the Safe Hearts Plans are:

1. prevention
2. early detection and screening (health checks), and
3. treatment and care (EU-wide network of CVD centres).

Digital innovation, with a focus on AI-based solutions, is integral to all three pillars and central/key to the EU-wide strategy.

*To improve cardiovascular health, EU member states are called to design and implement national plans by 2027*

The Safe Hearts Plan calls on Member States to develop or implement standalone or integrated national cardiovascular health plans by 2027. The commitments of the EU establish a clear direction of travel. CVD plans should meaningfully improve cardiovascular health and include comprehensive health checks that go beyond the measurement of blood pressure and cholesterol.[4] Investment in technology and creating an AI infrastructure in CVD care are necessary, while remote care should be encouraged.

In some cases, the limited availability of treatment capacity seems to be a pressing issue.[5] Across the EU, inequalities exist in access to advanced cardiac treatments. The intercountry gaps between the highest and the lowest penetration of newer technologies are large: (Percutaneous Coronary Interventions (PCI): 2330 versus 1355 per million; Transcatheter Aortic Valve Implantation per million (TAVI): 153.4 versus 4; per million pacemaker: 831.9 versus 147).[6] Median numbers of cardiologists per million are increasing, although this has mainly been driven by the most wealthiest countries.[7]

# European burden of cardiovascular disease

*Cardiovascular disease affects 62 million Europeans and causes almost four million deaths each year, accounting for approximately one in three deaths in the EU*

CVD affects 62 million Europeans and causes almost four million deaths per year.[8] It accounts for approximately one in three deaths in the EU and remains the region's leading cause of mortality and disability. Yet, despite its substantial health, societal and economic impact, investment in cardiovascular research and innovation continues to lag other therapeutic areas.[9] The burden of CVD remains uneven across Europe. Member States in Eastern Europe continue to experience a higher burden, while reductions in age-standardized mortality have been substantially greater in the highest income countries (>50%) than in less wealthier countries (<12%).[10]

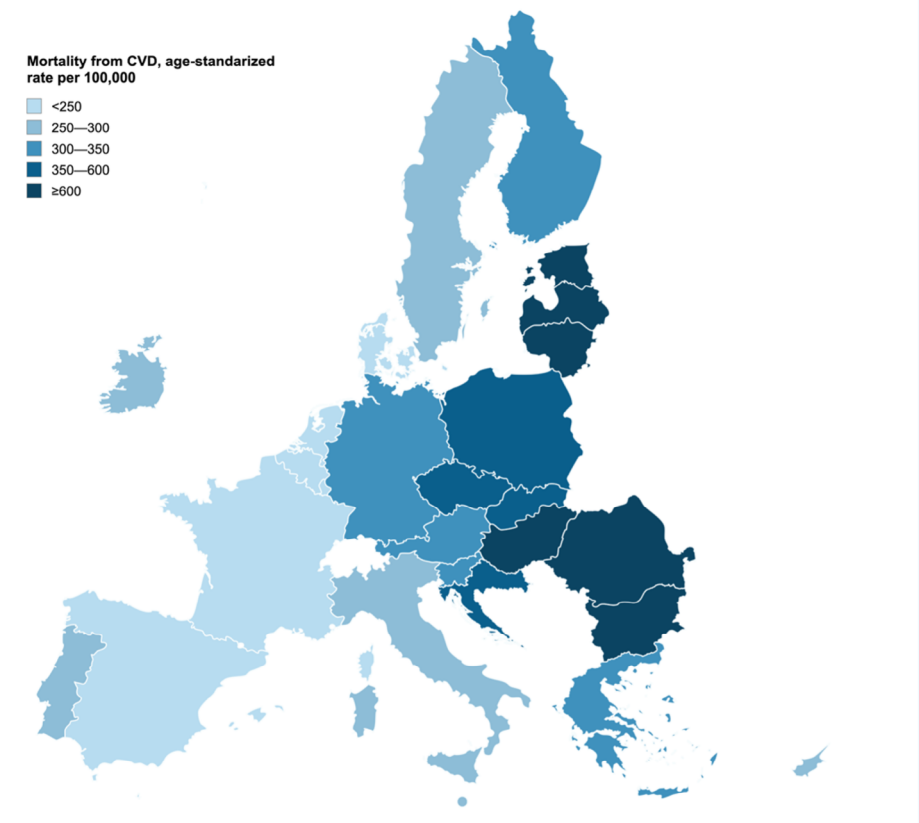



Figure 2. Cardiovascular mortality rises broadly from west to east across the EU. Adapted from Timmis et al., European Society of Cardiology: the 2023 Atlas of Cardiovascular Disease Statistics (2024), using WHO mortality data.

Note: Data represent age-standardized CVD mortality rates per 100,000 population.[11]

## A substantial share of CVD burden is preventable

Between 40% and 72% of all CVD deaths are associated with modifiable risk factors, including smoking, unhealthy diets, physical inactivity, and air pollution. Well-established CVD clinical risk determinants include hypertension (high blood pressure), hypercholesterolemia (high cholesterol), diabetes, and obesity.[12] However, growing evidence highlights the contribution of lesser-known determinants - such as oral health[13] and sleep apnea,[14] - to be recognized in many prevention strategies. The CVD challenge is further complicated by multimorbidity: patients with heart failure commonly live with one or more additional chronic conditions. On top of that, genetic and hereditary factors – such as inherited cardiomyopathies - also contribute to cardiovascular risk and may require targeted family-based detection.[15] Long-term cancer survivors also face increased cardiovascular risk as a result of cardiotoxic cancer therapies.[16] These cardiovascular risks are amplified by climate change: heatwaves are linked to roughly a 12% rise in cardiovascular mortality, making climate adaptation part of a sustainable CVD response.[17]

## Less well-being

Beyond its clinical impact, CVD places a substantial psycho-social burden on European citizens. People living with CVD consistently report poorer physical health, mental well-being, and social functioning than the general population across participating European countries.[18] As a result, many patients experience limitations in daily activities, reduced independence, lower quality of life, and diminished participation in work and society.

## Severe gender disparities

CVD is the leading cause of death among women, accounting for 35% of female mortality. Despite this, women remain underdiagnosed, undertreated, and underrepresented in clinical research. Female diagnosis can take up to six times longer than for men, and women are approximately 20% more likely to die following a myocardial infarction.[19] These inequalities are amplified by socioeconomic and geographic differences. Women in most eastern European Member States experience nearly double the 30-day mortality after myocardial infarction.[20] Addressing these disparities represents one of the most tractable opportunities to reduce avoidable cardiovascular mortality.

With its huge scale, and with progressing ageing and multimorbid populations, cardiovascular care is a question of financial sustainability as much as clinical need. OECD estimates an economic burden of 282 billion EUR (2021) of which 47 billion EUR is tied to lost labor productivity and a loss of 1.3 million working days. Total direct costs in the EU are 11% of all health care spending.[21]

Despite substantial advances, important gaps remain across the CVD care pathway. An estimated 20–40% of all heart attacks occur in previously undiagnosed patients.[22] At the diagnostic stage, approximately 60% of angiography patients show no obstructive disease, suggesting opportunities to improve patient selection and diagnostic efficiency.[23]

Following treatment, 35% of heart failure patients are readmitted to hospital within 30 days.[24]

*Cardiovascular diseases have shown to be an exemplary illustration of the power of medical technology*

## Innovation as a driver of better cardiovascular care

Innovation has played a major role in reducing the burden of CVD. Since the 1990s, advances in minimally invasive procedures such as PCI, together with improved treatment of hypertension and hypercholesterolemia, have contributed substantially to better cardiovascular outcomes across Europe.[25] However, access to and adoption of newer interventions remain uneven. Penetration rates for complex PCI, structural heart disease interventions, atrial fibrillation treatment, renal denervation, and stroke therapies remain low in many countries.[26] This suggests that the challenge is not only technological availability, but also adoption in clinical practice, including standardization, clinician training, reimbursement, and integration into care pathways.

## AI brings promising opportunities

AI can support cardiovascular care in several ways, from improving workflows to informing clinical decisions across the patient pathway. Administrative and documentation tasks account for a substantial share of clinicians' working time, reducing capacity for direct patient care.[27] AI-assisted documentation and administrative automation offer opportunities to ease this burden.

Large amounts of data on heart function can now be gathered to improve predictive analysis. Imaging, ECG and monitoring data can support cardiovascular risk assessment, treatment planning and follow-up. Integrating predictive tools into connected care can also support population-health management.[28]
These applications require standardized, high-quality data, robust information technology infrastructure, effective governance and regulatory implementation, and clinician training.

## Cardiovascular care shifts out of the hospital

Hospitals spend a substantial number of resources on CVDs, and 14% of hospital discharges across Europe were associated with cardiovascular diagnosis.
These numbers are higher in central and eastern European countries.
People with CVD are twice as likely to visit the emergency department and twice as likely to be hospitalized. Hospitals are also the key providers of advanced diagnosis and (elective) cardiac procedures. Variations in hospital cardiac admissions are substantial across countries in the EU.[29]

Cardiology is uniquely suited for out-of-hospital care due to its high reliance on data and monitoring that can now easily be provided in ambulatory settings. Moreover, as early CVD detection increases, there is less need for emergency presentation and therefore greater potential to diagnose and treat patients out of hospital or in-hospital day care, where patients are admitted and discharged on the same day. Inpatient care is already declining, and outpatient and elective treatment and monitoring continue to gain importance. On average, 11% of angioplasty procedures are in hospital day care, and in EU frontrunner countries, Finland and the Netherlands, this number is close to 40%. Ambulatory CT and MR scanners are increasing more rapidly than the installed base inside hospitals.[30]

Reducing the level of avoidable hospital admissions towards the lowest level among the Member States, can reduce hospital spending across the EU by a staggering 45 billion EUR, with OECD modelling, estimating that health systems with a large amount of inpatient CVD capacity such as Poland, Hungary, and Lithuania to have the largest relative potential.[31] However, hospitals may feel uncomfortable shifting such patient volume out of their facilities. Thus, robust and supported policy plans regarding a viable future of (smaller) hospitals are important enablers to build resilient and effective systems for cardiovascular healthcare.

A substantial shift of cardiac care out of the hospital requires updating and investing in primary care systems, alongside more integrated models that bridge primary and secondary care and bring specialist expertise, diagnostics and follow-up into community settings. Many health systems already struggle to meet the needs of the rising numbers of multimorbid patients (only 44% of people with CVD report having a care plan[32]). National health check programs may help to close such gaps. CVDs are highly suitable for integrated diagnostics that, among people with comorbidities, may also create scope efficiencies, as here combinations of medical imaging, blood tests and pharmaceutical therapies are typically required.
One example is that CT scans for lung cancer can also register the coronary artery calcium scoring, which saves costs and radiation.



# National policy landscapes

*National policies are insufficient to deliver on the ambition to reduce premature mortality by 25% in 2030.*

We have analyzed a sample of government-issued national plans and strategies and found substantial variations in legal form, implementation and operational specify between them (Table 1). First, national CVD plans are not directly comparable, as they represent different types of instruments and focus, including national plans, strategic frameworks, action plans, and professional society documents (Annex B). Second, many stated policies seem to have limited operationality, lacking defined budgets, implementation mechanisms, or measurable indicators.

To enable consistent analysis across this heterogeneous landscape of national plans, this paper applies a framework (Figure 3). Operational definitions of each component are provided in Annex C.



| Country | Document name | Type | Implementation period | Document scope | Issuing body |
|---|---|---|---|---|---|
| Czech Republic | National Cardiovascular Plan 2025–2035 (NKVP) | Standalone national CVD plan | 2025-2035 | National strategic plan: government-approved, system-level policy framework covering prevention, diagnosis, treatment, follow-up care, social services, and palliative care | Ministry of Health (Government of the Czech Republic) |
| Latvia | Action Plan for Improving Cardiovascular Health for 2026–2027 (Sirds un asinsvadu veselības uzlabošanas rīcības plāns 2026.–2027. gadam) | Standalone government CVD action plan | 2026–2027, with selected financing and service-volume projections extending beyond 2027 | Short-term operational plan covering CVD prevention, risk detection and diagnosis, medicines, acute and specialist treatment, follow-up, rehabilitation, quality of care and healthcare-professional training | Cabinet of Ministers of the Republic of Latvia; implementation coordinated by the Ministry of Health |
| Luxembourg | National Plan for Cardio-Neuro-Vascular Diseases 2023-2027 (PNMCNV) | Standalone government-led cardio-neuro-vascular plan; formal adoption status of the 2023 revision requires confirmation | 2023-2027 | Dedicated national plan organized around five axes: governance, data, prevention, screening and care pathways; 19 measures and 58 actions | Direction de la Santé, Ministry of Health and Social Security |
| Poland | National Program for Cardiovascular Diseases 2022–2032 (NPChUK) | Standalone multi-year government program | 2022-2032 | Multi-year government program was organized around five investment pillars: workforce, education and prevention, patient, science and cardiac care system | Council of Ministers / Ministry of Health |
| Romania | National Strategy for Combating Cardiovascular and Cerebrovascular Diseases 2025–2030 (SNBCC) | Sectoral strategy integrated within the National Health Strategy 2023–2030 | 2025-2030 | Sectoral strategy explicitly integrated into the National Health Strategy 2023–2030; described by the Ministry of Health as the first dedicated cardiovascular and cerebrovascular strategy in Romania's history | Ministry of Health (Government of Romania) |
| Spain | Cardiovascular Health Strategy of the National Health System 2022 (ESCAV) | Standalone national CVD strategy within the NHS strategic framework | 2022 (no fixed end date) | National health strategy organized around seven thematic axes, three transversal axes, 136 actions, and 61 monitoring indicators; implementation devolved to 17 Autonomous Communities | Ministry of Health (Ministerio de Sanidad), approved by the Interterritorial Council of the National Health System |

Table 1. Overview of the six government-issued national cardiovascular policy documents included in the comparative analysis.

Note: The documents differ in legal form, implementation horizon, scope and operational specificity; detailed classifications are provided in Annex B.

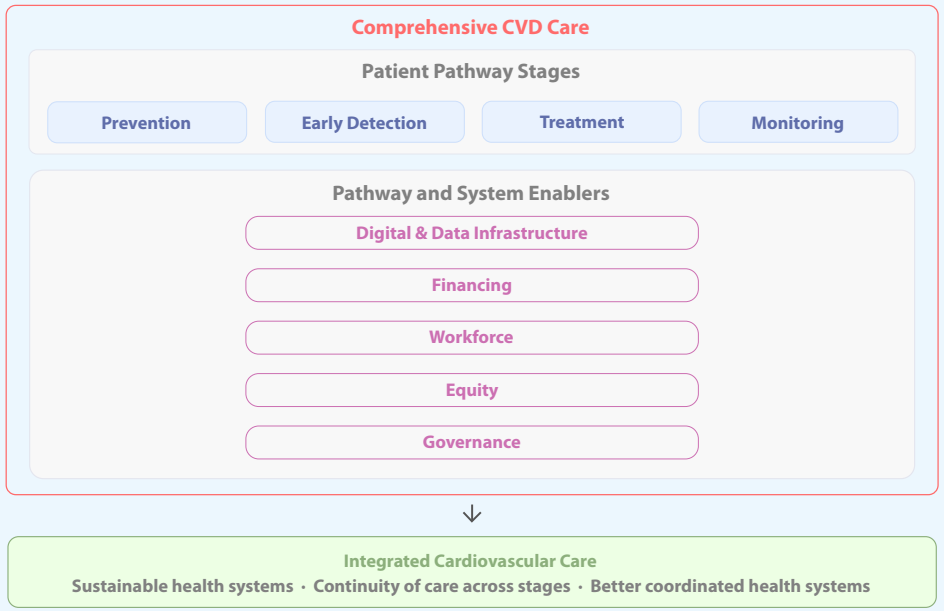



Figure 3. The pathway-and-enablers framework.

Note: The framework structures the analysis along two dimensions: the four stages of the patient pathway (prevention, detection, treatment, and follow-up) and five cross-cutting enablers that determine whether those stages function as a connected system (data and digital infrastructure, financing, workforce, equity, and governance and adoption). It is used to assess not only whether plans address individual stages, but whether they define the links between them. Operational definitions for each pathway stage and enabler are provided in Annex C.

A consistent pattern emerges - as reflected in the comparative assessment in Tables 2 and 3 and in the detailed country annexes (Online Annex A); national plans tend to describe activities within individual stages of care, but less frequently define how these stages are connected in practice. While prevention, treatment, and follow-up are addressed, fewer policies operationalize referral pathways, data continuity or escalation mechanisms for higher-risk patients. As a result, care is described as a set of components rather than as a functioning and holistically integrated system.

This limitation is consistent across different types of national plans. Even the more operational programs, such as Poland's national cardiovascular program do include governance structures, coordination mechanisms, and monitoring frameworks, but still organize interventions largely within thematic areas rather than along a connected patient pathway. Spain's cardiovascular health strategy provides a more integrated vision of care, including continuity across settings, but lacks measurable targets and implementation mechanisms. Other strategies, including Romania's national cardiovascular strategy, provide detailed analyses of system challenges but rely on existing financing structures and do not fully specify delivery mechanisms.

# Comparative assessment of national cardiovascular policy components

| Country | Prevention | Detection | Treatment | Follow-up | Pathway integration |
|---|---|---|---|---|---|
| Czech Republic | *** | **** | **** | *** | *** |
| Latvia | **** | **** | **** | *** | *** |
| Luxembourg | *** | ** | *** | *** | *** |
| Poland | **** | *** | **** | *** | *** |
| Romania | **** | *** | **** | **** | *** |
| Spain | **** | *** | *** | *** | **** |

Table 2. Comparative assessment of national cardiovascular policy components across the four patient pathway stages and their integration, scored on a five-point Likert scale. Scoring D defines the scoring criteria.

| Country | Financing | Data & digital | Workforce | Equity | Governance & Adoption |
|---|---|---|---|---|---|
| Czech Republic | *** | **** | *** | *** | ***** |
| Latvia | **** | ** | *** | *** | **** |
| Luxembourg | ** | **** | *** | *** | **** |
| Poland | **** | *** | **** | *** | ***** |
| Romania | *** | *** | *** | *** | *** |
| Spain | ** | *** | *** | **** | *** |

Table 3. Comparative assessment of national cardiovascular policy components across five cross-cutting enablers, scored on a five-point Likert scale. Scoring criteria are defined in Annex D.

# Structural priorities for strengthening national cardiovascular (health) plans

Applying the pathway-and-enablers framework highlights six recurring structural priorities for strengthening national CVD plans. Across countries, policies tend to define interventions and system objectives but less frequently specify how patients, data and clinical decisions move across the cardiovascular care pathway. The first five priorities reflect common areas where stronger pathway integration could help translate policy ambition into improved cardiovascular outcomes, while the sixth addresses the implementation architecture needed to translate plan commitments into delivery. The country examples below are drawn from the national-document analysis in Online Annex A.



### Priority 1. Operationalization of the patient pathway: Early detection to diagnosis and treatment

As emphasized by a recent PHSSR comparative country study, [33] early detection is widely recognized as a priority, yet it is rarely implemented as a structured pathway that connects risk identification to diagnosis and treatment. Recent OECD analysis similarly emphasizes that cardiovascular health checks should serve as an entry point into integrated care pathways, with clear links to referral, treatment and follow-up.[34] Most plans focus on traditional risk-factor screening without defining subsequent steps in the care pathway, including referral, diagnostic assessment, and access to appropriate treatment. In addition, referral protocols, escalation criteria, and timelines for specialist assessment are often only partially specified. In addition, screening protocols remain limited in scope, rarely incorporating emerging risk areas such as kidney disease, familial hypercholesterolemia, cardiomyopathies, oral-health or sleep apnea, despite growing clinical and policy recognition of their importance.

Case study: Spain's ESCAV and Poland's NPChUK both show complementary approaches to moving beyond screening as a standalone activity towards a more connected pathway approach. Spain provides one of the most developed examples of operationalizing early detection through electronic health records (EHR)-linked alerts and patient recall systems, combined with telematic consultation for treatment escalation.[35, 36] Poland focuses on the coordination side: the National Cardiology Network (Krajowa Sieć Kardiologiczna, KSK) is designed to link screening to specialist referral, with model patient pathways under development. [37]

Together, these two programs illustrate two components that a complete early detection pathway needs: the right tools and a defined route from detection to care. In both cases, the next step is national referral protocols and coverage standards. However, advanced imaging-based risk stratification is not systematically embedded, reflecting a broader gap across national policies where clinically supported approaches, such as coronary calcium scoring and AI-enabled ECG, are not yet integrated into national screening pathways.

### Priority 2. Define access to specialist care through measurable targets

While most national plans recognize the importance of specialist cardiovascular services and most describe networks of centers, multidisciplinary teams, or emergency referral systems, they rarely define measurable access targets for time-critical interventions. The availability of services does not necessarily translate into equitable or timely access, and improvements in infrastructure may not consistently lead to better outcomes. This is particularly evident in areas such as thrombectomy, where current treatment rates remain significantly below clinically recommended levels. [38]

Case study:  Poland's NPChUK sets quantified targets for the geographic availability of specialist cardiovascular centers, providing an example of how access can begin to be operationalized within national policy. However, even in this case, measurable standards for timely access to diagnosis and treatment remain less clearly defined.

### Priority 3. Develop pathways for underserved patient groups

Certain clinical areas, including cardio-oncology and out-of-hospital cardiac arrest, are largely absent from national cardiovascular policies. These gaps reflect limitations in how care pathways are defined, particularly for populations that fall outside traditional cardiology structures, despite strong clinical evidence and growing patient needs.

Case study: The Czech NKVP includes dedicated cardio-oncology centers, representing a leading example of integrating this emerging field into national policy.[39] However, such approaches remain rare, and similarly, structured system-level responses to out-of-hospital cardiac arrest, such as community first-responder systems and AED coverage, are not consistently embedded in national plans, despite evidence of their impact on survival outcomes.



### Priority 4. Align financing models with follow-up and long-term care

Follow-up and long-term care remain relatively underdeveloped stages across national cardiovascular policies. While many plans recognize the potential of telemedicine, remote monitoring, and home-based care, these approaches are rarely supported by reimbursement models that enable large-scale implementation. This may create a structural barrier to scaling continuous, technology-enabled care and limit the ability to prevent complications and reduce hospital readmissions.

Case study: Latvia's Action Plan combines indicative financing with a planned five-institution intensified follow-up program for 5,000 patients after acute cardiovascular events or vascular interventions. Poland's NPChUK includes structured governance and funding allocation mechanisms, as well as provisions for heart failure day-care units and home-based remote monitoring. Luxembourg's PNMCNV similarly promotes telemedicine and the shared care record (Dossier de Soins Partagé) as tools for continuity of care.[40] However, as in most countries, reimbursement models remain oriented towards episodic, in-person care, limiting the large-scale deployment of remote monitoring solutions.

### Priority 5. Match AI ambition with adequate data infrastructure

Cardiovascular care generates extensive imaging, ECG, laboratory and monitoring data, often collected repeatedly over a patient's lifetime. Connecting these data creates opportunities for AI to support diagnosis, risk assessment and treatment decisions. Although AI is increasingly referenced in national strategies, the data infrastructure required to support it, such as interoperable electronic health records, registries, and alignment with the European Health Data Space, is often underdeveloped. Without adequate data infrastructure, AI risks remaining a strategic aspiration rather than an operational capability across cardiovascular care.[41]

Case study: Romania's SNBCC provides one of the clearest examples of treating data infrastructure as a prerequisite for cardiovascular system improvement, including plans for a National Registry of High Vascular Risk Patients and patient-facing digital platforms.[42] The Czech Republic's National Cardiovascular Information System is already operational, with cross-provider sharing of laboratory results, imaging, and ECG data identified as a priority. However, even in these cases, the mechanisms needed to achieve fully interoperable and connected cardiovascular information systems remain only partially defined.



### Priority 6. Build robust implementation strategies

The analyzed plans show that implementation strategies and operational details are uneven. Some national plans are better embedded in regular policy cycles than others. Plans are strongest where commitments are translated into named responsible bodies, timelines, financing or reimbursement mechanisms, measurable indicators and mechanisms for organizational adoption. Where these elements are deferred to future action plans or left to existing health-system structures, implementation becomes harder to track and accountability is less clear. Policies only become reality through their implementation and therefore a robust implementation strategy is crucial and should be treated as part of national CVD plan design rather than as a downstream administrative step.

Case study: Latvia's 2026-2027 Action Plan provides a relatively operational model, with measure-level responsibilities, deadlines, outputs, indicators and indicative financing across several parts of the cardiovascular pathway. At the same time, its moderate pathway-integration score illustrates that detailed implementation architecture does not automatically guarantee continuity between prevention, detection, treatment and follow-up.

Across these six priorities, the same conclusion holds: individual components of cardiovascular care are increasingly present, but stronger continuity and implementation architecture are needed to make them function as a connected pathway.



# Recommendations for connected cardiovascular care pathways

*The central challenge is not the structure of the pathway itself, but how the system performs at key transition points and across enabling conditions. The effectiveness of care depends on the ability to connect stages, maintain continuity, and escalate care appropriately, supported by cross-cutting enablers.*

Cardiovascular care is often presented as a linear pathway from prevention to long-term management. In practice, patients may enter the system at different points and move between stages over time. Effective cardiovascular care can best be understood as a connected pathway rather than a series of isolated interventions. Actions taken at one stage only improve outcomes if they are linked to subsequent steps. Expanding screening or introducing new diagnostic tools only delivers value if it is accompanied by clear protocols for follow-up, diagnosis, and treatment. The effectiveness of the connected pathway depends on the strength of cross-cutting enablers, including data infrastructure, financing models, workforce capacity, governance and organizational adoption, and equity considerations.[43]

Effective national cardiovascular plans need to take these lessons into account. They need to catalyze and be supportive in strengthening both the connectivity of the cardiovascular pathway and the cross-cutting system enablers. The prioritization and details of such an endeavor will vary country by country depending on the characteristics of the health system, local specifics, and the relative availability of resources. Based on this analysis, ten recommendations on a higher-level are suggested to steer such national cardiovascular plans (Figure 4).

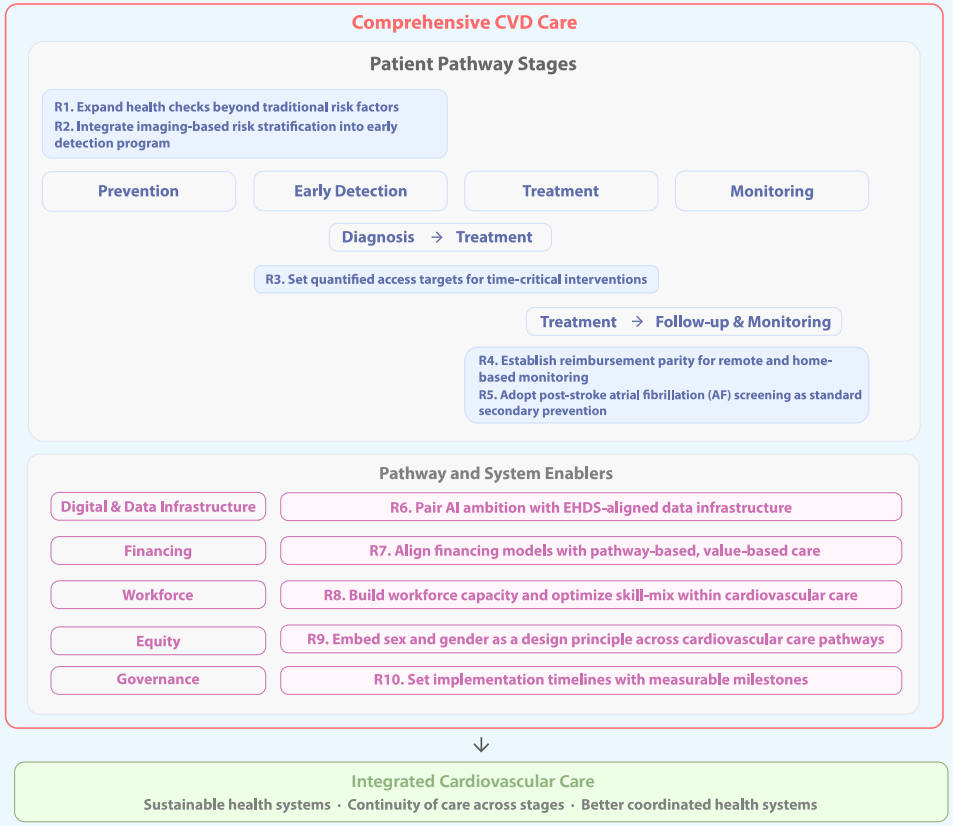



Figure 4. Recommendations for connected cardiovascular care pathways mapped to the pathway-and-enablers framework (Figure 3).

# Patient pathway stages

### Prevention and early detection

- R1. Expand health checks beyond traditional risk factors, ensuring broader identification of at-risk populations—including conditions such as kidney disease, familial hypercholesterolaemia, cardiomyopathies and sleep apnoea—and establishing clear pathways for follow-up, diagnosis and treatment. Recent OECD analysis reinforces this shift: health checks should act as a gateway into coordinated care, not as an endpoint in themselves.[44]
- R2. Integrate imaging-based risk stratification into early detection programs, including structured use of coronary calcium scoring, coronary CT angiography, carotid ultrasound for plaque assessment, and AI-enabled ECG, to enable escalation from basic risk assessment to advanced diagnostics for high-risk patients and improve early identification of clinically actionable disease.[45]

### Diagnosis → Treatment transition

- R3. Set quantified access targets for time-critical interventions, including defined timelines for diagnosis and treatment, aligned planning (such as catheterization labs, imaging infrastructure, and workforce), and monitoring frameworks.

### Treatment → Follow-up

- R4. Establish reimbursement parity for remote and home-based monitoring, enabling large-scale deployment of validated digital and wearable-based care models, supporting continuous follow-up, earlier intervention and reduction of avoidable hospital admissions.
- R5. Adopt post-stroke atrial fibrillation (AF) screening as standard secondary prevention, including structured use of extended-wear monitoring technologies to enable early detection of AF and prevention of recurrent stroke.[46]

# Cross-cutting enablers

### Digital infrastructure and AI

- R6. Pair AI ambition with EHDS-aligned data infrastructure, including interoperable electronic health records, national registries, and secure data-sharing mechanisms, to enable continuity of patient data across the pathway and support scalable deployment of data-driven care.[47]

### Financing models

- R7. Align financing with connected, pathway-based care, moving beyond reimbursement concentrated on acute episodes toward models that support prevention, early diagnosis, care coordination, rehabilitation, remote monitoring and long-term follow-up, including dedicated funding for shared data and coordination infrastructure.

### Workforce capacity and skill-mix

- R8. Build workforce capacity and optimize skill-mix within cardiovascular care pathways, including multidisciplinary team models, task redistribution and targeted training programs to support delivery of advanced diagnostics, interventions and long-term management.

### Equity as a system design principle

- R9 Embed socio-economic status and gender as a design principle across cardiovascular care pathways, including disaggregated data, tailored screening and diagnostic protocols, and equitable access to treatment, to address persistent disparities in outcomes.

### Governance and adoption

- R10. Set implementation timelines with measurable milestones, including defined accountability structures, regular monitoring and performance indicators to ensure that national cardiovascular policies translate into operational delivery. A national cardiovascular implementation dashboard could provide a practical mechanism for tracking progress across pathway stages and enablers, consistent with PHSSR's emphasis on measurable goals and structured monitoring.

*The impact of these recommendations varies by country and depends on a robust implementation strategy. Isolated interventions, whether in screening, diagnosis, or treatment, do not translate into improved outcomes unless they are linked through clear referral, data and follow-up mechanisms.*

## How to get there? Bundling policy levers and free-up resources to invest

Investments in better cardiac care should not be treated as cost centers. On the contrary, policymakers should prioritize high-value cardiac care. People value good healthcare and if health systems deliver better care, societal acceptance to contribute to cost of improved cardiac care will also increase. The adoption of value-adding technologies and treatments should be spread more rapidly. For example, both mechanical thrombectomy in large vessel ischemic strokes[48] and detection of atrial fibrillation with patches do increase health while saving costs.[49]

Financial investment to increase capacity is not the only policy lever that needs to be pulled. A successful implementation strategy depends on a broad set of policy levers that are complementary and create leverage. This also includes communication and knowing your risk indicators, such as blood pressure and cholesterol, developing and implementing better protocols, advanced training facilities for better screening and evidence-based treatment, updating payment models and building equity flags into the institutions that shape regular cardiac care and others. It is the parallel introduction of such levers that will create real change.

National cardiovascular plans that seek to deliver the ten recommendations in this paper will (in the case of many countries) require sustained financial support beyond national health budgets. The transformation of cardiovascular care pathways, particularly the expansion of diagnostics, infrastructure capacity, and data systems, depends on investment on a scale that many Member States cannot achieve independently. The EU's Multiannual Financial Framework therefore represents a critical instrument for supporting implementation. Aligning EU funding with the objectives of national cardiovascular policies and the Safe Hearts initiative will be essential to translating policy ambition into improvements in cardiovascular outcomes, including the objectives of the Safe Hearts initiative.[50]

# Annexes

## Annex A. Comprehensive overview of national policies to address NCDs and CVD

| Country | NCDs policies are part of National Health Plans | National NCDs Prevention Programmes | National NCDs Management Programmes | National CVD Control Plan | National Diabetes Control Plan | National Stroke Plan | Disease Management Programmes for CVD |
|---|---|---|---|---|---|---|---|
| Austria | | | | | ✓ | ✓ | |
| Belgium | | | | | | | |
| Bulgaria | | ✓ | | | | ✓ | |
| Croatia | | ✓ | ✓ | ✓ | ✓ | | |
| Cyprus | | | | | | | |
| Czechia | | | | ✓ | | ✓ | |
| Denmark | | | | | | ✓ | |
| Estonia | ✓ | | | ✓ | | ✓ | |
| Finland | ✓ | ✓ | ✓ | | ✓ | ✓ | |
| France | ✓ | ✓ | ✓ | ✓ | | | |
| Germany | ✓ | | | | | | ✓ |
| Greece | | | | | ✓ | | |
| Hungary | | | | | | ✓ | |
| Ireland | ✓ | ✓ | ✓ | | | ✓ | ✓ |
| Italy | ✓ | ✓ | ✓ | | ✓ | | |
| Latvia | ✓ | | | ✓ | | | |
| Lithuania | | | | | | ✓ | |
| Luxembourg | | | | ✓ | | | |
| Malta | | | | | ✓ | | |
| Netherlands | | | | ✓ | ✓ | | |
| Poland | | | | ✓ | | | |
| Portugal | | | | ✓ | ✓ | | |
| Romania | | | | ✓ | ✓ | | |
| Slovak Republic | | | | | ✓ | | |
| Slovenia | ✓ | ✓ | | | ✓ | | |
| Spain | | ✓ | | ✓ | ✓ | ✓ | |
| Sweden | | | | ✓ | | ✓ | |
| Iceland | | | | | | | |
| Norway | | | | ✓ | | ✓ | |
| Canada | | | | | ✓ | | |
| Japan | | | | ✓ | | | |
| Türkiye | | | | ✓ | ✓ | ✓ | |
| United Kingdom | | | | ✓ | | ✓ | |

Table A Comprehensive overview of national policies to address NCDs and CVD

Note: Disease management programs are the process of care co-ordination of patients suffering from specific chronic conditions during their care transitions, which has been proposed as a model to optimize care for patients with complex health needs.[51]

## Annex B. Types and scope of national cardiovascular policy documents

The six national policy documents assessed in this paper are not directly comparable instruments. They differ in legal status, scope, time horizon, and level of operational detail, and they represent several distinct types of policy instrument. This heterogeneity is itself a finding: the absence of a common instrument for cardiovascular policy across Member States is one reason cross-country comparison is difficult, and coordinated progress is hard to measure. The framework (Annex C) is therefore applied to assess what each document specifies, not to rank the maturity of the underlying health systems. Full document details, name, type, period, scope, and issuing body, are provided in Table 1.

The six documents fall into four broad instrument types:

**Standalone national cardiovascular plans.** Dedicated, government-approved instruments addressing CVD as their primary subject. The Czech National Cardiovascular Plan 2025–2035 (NKVP), Latvia's Action Plan for Improving Cardiovascular Health 2026–2027, Luxembourg's National Plan for Cardio-Neuro-Vascular Diseases 2023–2027 (PNMCNV), and Poland's National Programme for Cardiovascular Diseases 2022–2032 (NPChUK) are of this type. These tend to be the most operationally detailed, with defined governance, measures, and, in some cases, funding mechanisms.

**Sectoral strategy is integrated within a broader health strategy.** Romania's National Strategy for Combating Cardiovascular and Cerebrovascular Diseases 2025–2030 (SNBCC) is explicitly embedded in the National Health Strategy 2023–2030. It provides a dedicated cardiovascular focus but relies on the parent strategy's governance and financing structures.

**Standalone national strategy within a national health-system framework.** Spain's Cardiovascular Health Strategy of the National Health System 2022 (ESCAV) is a dedicated national strategy, but without a fixed end date and with implementation devolved to the 17 Autonomous Communities, which affects how far central commitments translate into uniform delivery.

Because these instruments differ in kind, a low score on any framework dimension (Annex C) should be read as the degree to which that document specifies the component, not as evidence that the country's cardiovascular care is weak. A country may address a component through instruments outside the document analyzed here.

## Annex C. Operational definitions of the framework (Figure 3) components

Purpose of the framework

This paper applies a structured analytical framework to assess national cardiovascular policies in a consistent and comparable manner. It draws on two established models of health-system organization, reflecting how cardiovascular care is delivered in practice - through the interaction of clinical stages and system-level enabling conditions.

The patient-pathway dimension reflects the continuum of care set out in the WHO Framework on Integrated People-Centered Health Services, which defines integrated care[52] as a continuum spanning health promotion, prevention, diagnosis, treatment, disease-management, and rehabilitation, coordinated across levels and sites of care. The cross-cutting enablers correspond to the WHO health-system building blocks: workforce, health information, financing, and governance, with equity treated as a c ross-cutting principle consistent with the framework's people-centered orientation.

Those determine whether services can be delivered effectively and at scale.[53]
The framework therefore does not introduce new concepts but applies these established structures to the analysis of national cardiovascular policy.

Each component below was assessed against the five-point scale in Annex D, based on the degree to which the plan specified and integrated that component. This is what makes the definitions operational: they set out what counts as evidence of each component when scoring a plan.

### 1. Patient-pathway stages

The patient pathway represents the sequence of care from risk identification to long-term management. While presented as distinct stages, the pathway reflects a dynamic system in which patients may enter at different points and move between stages over time.

**Prevention**
Population-level prevention and health promotion aimed at reducing cardiovascular risk before disease develops, including action on behavioral and environmental risk factors.

**Detection**
Individual-level risk identification and early detection, including risk-factor screening (e.g. blood pressure, cholesterol) and the early identification of cardiovascular risk or asymptomatic disease.

**Treatment**
Confirmation of disease and delivery of appropriate clinical interventions. This stage covers diagnostic procedures, specialist referral, acute care (e.g. myocardial infarction, stroke), and interventional or pharmacological treatment.

**Follow-up**
Ongoing management of cardiovascular conditions following initial treatment, including secondary prevention, monitoring, rehabilitation, and management of chronic conditions to prevent complications and recurrence.

**Pathway integration**
The extent to which a plan connects the four stages into a continuous pathway rather than addressing them in isolation. This includes defined referral routes, escalation criteria, data continuity across settings, and mechanisms ensuring that patients move smoothly from prevention and detection through treatment to follow-up. Pathway integration is assessed as a distinct dimension because activity within individual stages does not guarantee that the stages function as a connected system.

### 2. Cross-cutting enablers

Cross-cutting enablers are system-level conditions that support the functioning of the patient pathway. They operate across all stages and determine whether care can be delivered effectively, consistently and at scale.

**Data & digital infrastructure**
The availability and interoperability of electronic health records, registries and data-sharing mechanisms. This enabler supports continuity of care, monitoring, and the use of advanced analytics and artificial intelligence.

**Financing**
The structure of reimbursement and funding mechanisms that support healthcare delivery. This includes incentives for prevention, early detection, and long-term management, as well as the ability to scale new care models such as remote monitoring.

**Workforce**
The availability, distribution, and skill-mix of healthcare professionals.
This includes multidisciplinary care models, task redistribution, and the training required to support modern cardiovascular care pathways.

**Equity**
The extent to which cardiovascular care is accessible and appropriate for all population groups, including differences by sex, gender, socioeconomic status and geography.
This includes the use of sex-disaggregated data and tailored approaches to diagnosis and treatment.

**Governance & Adoption**
The presence of clear accountability structures, implementation plans, timelines and monitoring mechanisms, together with the organizational readiness required for provider organizations to adopt new pathways in practice. Governance determines whether responsibilities and milestones are defined; adoption determines whether care organizations are able and prepared to put them into everyday practice — through clinician engagement, standardization, and training-to-practice. This enabler determines whether policy commitments translate into operational delivery and sustained change in clinical practice.

## Analytical application

The framework is used to assess national cardiovascular policies not only in terms of stated priorities, but in terms of how effectively they support the functioning of a connected care pathway. In particular, the analysis focuses on: how policies address individual pathway stages; whether they define connections between stages (e.g. referral, escalation, follow-up); and whether cross-cutting enablers are sufficiently developed to support implementation. This approach allows structural gaps to be identified at the level of system design, rather than within isolated components of care.

## Link to policy recommendations

The framework also provides the basis for the policy recommendations.
Each recommendation is mapped to one or more pathway stages and enabling conditions, ensuring that proposed actions address both clinical processes and system-level requirements. This alignment supports the objective of translating policy ambition into operational, scalable cardiovascular care, in line with the goals of the EU Safe Hearts Plan.



## Annex D. Examination of differences in various policy documents, different models of policy organization

| Score | Label | Meaning |
|---|---|---|
| * | Not specified / minimal | The component is absent or only mentioned indirectly. |
| ** | Limited | The component is mentioned, but with little detail, limited operational clarity, or no clear implementation mechanism. |
| *** | Moderate | The component is addressed with some concrete measures, but remains partial, uneven, or mainly strategic. |
| **** | Strong | The component is clearly described, supported by specific measures, and linked to system structures or implementation mechanisms. |
| ***** | Very strong | The component is highly specified, operationally detailed, and embedded in governance, financing, monitoring, or defined care structures. |

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