InoMed
Centrul pentru inovație
în medicină

INOMED's Response to the CALL FOR EVIDENCE on a European Cardiovascular Health Plan

2025

I. Executive summary

Cardiovascular diseases remain the leading cause of death in the EU, responsible for 1.7 million deaths annually and enormous economic losses. Tackling this challenge requires a comprehensive, equity-driven European Cardiovascular Health Plan that learns from successful EU-funded initiatives in both cancer and cardiovascular health. By embedding personalised prevention, equitable screening, explainable innovation, and citizen-driven governance, the Plan will not only reduce the CV burden but also close the East–West divide, strengthen health systems, and empower citizens.

Through projects coordinated or supported by INOMED, such as PERFECTO, FH-EARLY (cardiovascular), and 4P-CAN, ECHoS, ReThinkHPVaccination, EU-CIP, Curtain, MAYA, Guide.MRD (cancer), we have built a solid evidence base showing what works in prevention, screening, innovation, citizen engagement and addressing inequalities. Many of these models are directly transferable to EU Cardiovascular Health Plan, and their implementation would significantly reduce the burden of cardiovascular disease across Europe.

The European Cardiovascular Health Plan can become a game-changer if it builds on evidence from cancer and cardiovascular projects, as follows:

1. Primary Prevention & Health Literacy

➔ **Lesson:** Generic awareness campaigns are insufficient; prevention only works when personalised, culturally relevant, and trust-based.

➔ **Evidence:**

- ReThinkHPV, PERFECTO: personalised communication models (micro/meso/macro) increase uptake.
- 4P-CAN: Living Lab in rural Romania shows how combining behavioural and environmental risk interventions, schools, sports, and cultural anchors boosts prevention.
- EU-CIP & Curtain: health literacy must be addressed at both individual and organisational levels, using plain-language, multilingual, inclusive resources.

➔ **Transfer to CVH:**

- Adopt layered prevention models for cholesterol, hypertension, and diabetes risk factors; build literacy portals and co-create interventions with citizens, especially in rural and disadvantaged regions.
- Move beyond generic campaigns → adopt Personalised Communication Models (PCM) at micro/meso/macro levels (ReThinkHPV, PERFECTO).
- Strengthen CVH literacy at both individual and organisational levels, with multilingual plain-language resources (EU-CIP, Curtain).
- Anchor prevention in schools, sports, and cultural events through Living Labs (4P-CAN).

2. Early Detection & Screening

➔ **Lesson:** Systematic, equitable early detection saves lives but requires trust and accessibility.

➔ **Evidence:**

- PERFECTO: paediatric FH screening shows high citizen willingness if guided by trusted professionals.
- FH-EARLY: cascade screening and family involvement enable early diagnosis and tailored care.
- 4P-CAN: community-based screening via mobile check-points in rural areas increases access and participation.

➔ **Transfer to CVH:**

- Embed EU-level paediatric cholesterol testing and cascade screening guidance; scale community-based screening models; systematically engage GPs, nurses, and community leaders as trusted messengers.
- Establish EU guidance for paediatric cholesterol testing and cascade screening (PERFECTO, FH-EARLY).
- Engage trusted messengers (GPs, nurses, community leaders) to drive uptake (ReThinkHPV).
- Scale community-based/mobile screening models for rural and disadvantaged populations (4P-CAN).

3. Innovation, Digital Tools & AI

➔ **Lesson:** Innovation succeeds only if explainable, co-created, and embedded in real healthcare pathways.

➔ **Evidence:**

- MAYA: Living Labs co-design digital hubs (smart mirrors, wearables, conversational agents) for continuous CV monitoring.
- FH-EARLY: AI-driven profiling requires clinician mediation and plain-language explanations to build trust.
- EU-CIP: federated, multilingual portals interoperable with EHDS deliver accessible information at scale.
- 4P-CAN: network science and arts-based feedback loops transform prevention into community-owned change.

➔ **Transfer to CVH:**

- Establish explainability-first AI standards; build a federated EU CVH Knowledge Portal; co-develop tools in Living Labs; use network science to optimise cascade screening and behaviour change.
- Adopt an "explainability-first" standard for AI-enabled CVH tools, introduced by trusted clinicians (FH-EARLY).
- Build a federated EU CVH Knowledge & Literacy Portal interoperable with EHDS (EU-CIP).
- Co-create and test tools in Living Labs (wearables, avatars, coaching apps) (MAYA).
- Apply network science & arts-based feedback to cascade screening and behaviour change (4P-CAN).

4. Citizen Engagement, Living Labs & Community Activation

➔ **Lesson:** Communities are not passive recipients; they are co-creators of effective and trusted solutions.

➔ **Evidence:**
- ECHoS: National Mission Hubs (Pentahelix model) show how to institutionalise citizen engagement and connect local, regional and national action to EU missions.
- 4P-CAN: Living Labs demonstrate how to embed interventions in schools, sports clubs, and community rituals, fostering trust and inclusivity.
- Curtain: literacy initiatives designed with citizens reduce inequalities across socio-economic and geographic divides.

➔ **Transfer to CVH:**
- Establish National CVH Hubs, embed Living Labs across Member States, and institutionalise stakeholder mapping (Net-Map) to monitor governance, trust, and equity.
- Establish National CVH Hubs (multi-ministerial, Pentahelix) linked to an EU platform (ECHoS).
- Institutionalise stakeholder mapping (Net-Map) to monitor trust and governance dynamics (4P-CAN).
- Ensure co-creation with citizens and patients for legitimacy and uptake (Curtain, ECHoS).

5. Reducing Inequalities & Bridging the East–West Divide

➔ **Lesson:** Inequalities are systemic, requiring EU-level coordination and local adaptation.

➔ **Evidence:**
- Curtain: identified disparities between Eastern and Western Europe, urban and rural, rich and poor.
- 4P-CAN: reduced rural barriers through local immersion, school-based actions, and sports-based engagement.
- PERFECTO: addressed low FH awareness in high-burden Eastern EU states.

➔ **Transfer to CVH:**
- Map health literacy disparities, co-create equity-focused interventions with vulnerable populations, and support implementation research in Eastern and rural regions to ensure EU-wide cohesion.
- Map and address health literacy disparities across regions, rural/urban, and socio-economic groups (Curtain).
- Co-create equity-focused interventions with vulnerable populations (4P-CAN, PERFECTO).
- Prioritise Eastern Member States and rural regions for implementation research and capacity building (PERFECTO, 4P-CAN).

IIa. Transferability of Lessons from Cancer Projects to Cardiovascular Health (CVH)

The following table summarises key lessons from EU-funded cancer projects coordinated or involving as partner INOMED and their transferability to EU CVH Plan. Although designed for cancer prevention, screening, literacy, and care, these projects offer tested models - such as personalised communication frameworks, Living Labs, health literacy portals, citizen engagement, community activation, deep involvement of social sciences and governance hubs - that can be directly applied to cardiovascular health. This evidence shows how the EBCP and EU Cancer Mission can serve as a blueprint for the EU Cardiovascular Health Plan.

CANCER PROJECT	KEY LESSON (CANCER)	TRANSFERABLE RECOMMENDATION (CVH)
ReThinkHPV	Awareness alone does not drive uptake; **trusted recommendation** is the strongest predictor. **The Personalised Communication Model (PCM)** (micro/meso/macro) improves engagement of citizens, patients and families.	Adopt **PCM for CVH prevention:** • *Micro:* family/household networks, women as health decision catalysts. • *Meso:* equip GPs, teachers, community leaders with tailored narratives. • *Macro:* national/regional campaigns integrating citizen insights and tackling misinformation.
EU-CIP, Curtain	Health literacy must be addressed at **two levels:** individuals and **health-literacy-responsive organisations**. Multilingual, plain-language content validated with patients increases equity.	Develop a **federated EU CVH Knowledge & Literacy Portal,** with national nodes, multilingual plain-language content, conversational support, interoperable with **EHDS/ MyHealth@EU.** Ensure health systems adapt processes to simplify tasks for low-literacy citizens.
4P-CAN	**Living Labs** and culturally anchored interventions (schools, sports, cultural events, walking football, Health Festival) increase participation and trust. **Mobile check-points** reduce rural access barriers.	Fund **community-based CVH screening models** (temporary/mobile points at schools, sports or cultural events). Embed prevention activities in trusted community settings and school curricula for sustainable habit formation.
Guide.MRD	**System & pathway mapping** (co-created with citizens, patients, clinicians, policymakers) identifies prevention and care gaps, inequalities, and adoption levers, making reforms sustainable.	Require system and **pathway mapping** in CVH pilots and policies. Use results to adapt prevention/ screening/ rehabilitation, address gender gaps, and build shared ownership for reforms.
MAYA	Digital/AI solutions must be **explainable and co-created:** clinician-mediated onboarding, plain-language visuals, avatar customisation, Living Labs iteration. Trust/ comprehension must be measured.	Establish an **"explainability-first" standard** for CVH AI tools: clinician-mediated introduction, plain-language/visual aids, KPIs on trust & comprehension. Test tools iteratively in **Living Labs** with citizens, patients and clinicians.
4P-CAN (network science)	**Network analysis** reveals clustering of health behaviours and neglected yet important stakeholders (local authorities); **arts-based feedback** (visualisation of anonymised networks) builds trust and stimulates dialogue and engagement on prevention and care.	Apply **network-guided cascade screening** (kinship mapping for cholesterol/lipids). Define **network-sensitive KPIs** (screening uptake along ties, behaviour change in ego-networks). Use **arts-based feedback loops** to raise literacy and reduce stigma.
ECHoS	**National Cancer Mission Hubs** (Pentahelix model, impact models, governance continuity) connect local action, regional implementation, national stakeholders, with EU-level strategy and ensure sustainability.	Establish **National Cardiovascular Health Hubs** (Pentahelix model of governance). Use shared KPIs (prevention, screening, literacy, equity) to ensure coherence and continuity beyond project cycles.

IIb. Transferability of Lessons from PERFECTO & FH-EARLY projects to Cardiovascular Health (CVH) Plan

The table below highlights the main evidence generated by the PERFECTO and FH-EARLY projects, which are already focused on cardiovascular prevention and familial hypercholesterolaemia (FH). Their findings provide direct policy lessons for early detection, cascade screening, patient engagement, and the responsible use of digital and AI-enabled tools. These insights can guide the design of the EU CVH Plan to ensure it is evidence-based, citizen-centred, and future-ready.

CANCER PROJECT	KEY LESSON (CARDIOLOGY)	TRANSFERABLE RECOMMENDATION (CVH POLICY)
PERFECTO	Public awareness of lifestyle risks is relatively high, but knowledge of genetic risks (like familial hypercholesterolaemia – FH) remains very low (22–28% awareness). Despite this, citizens show strong willingness (>70%) to undergo cholesterol/genetic testing if recommended by trusted professionals. The Personalised Communication Model (PCM) – micro/meso/macro – improves engagement, trust, and follow-up.	Adopt the PCM at EU/national/regional level for cholesterol testing and FH screening. Operationalise cascade testing (paediatric + family-based) across Member States. Make trusted professional recommendation the trigger for testing. Prioritise disadvantaged groups (rural, low-income, women).
FH-EARLY	Innovative tools for early FH detection (chip array, biomarker assay, XAI-driven risk profiling) are promising but trust in AI is low. Patients only accept them when explained by trusted clinicians and supported with plain-language, visual aids. Co-creation with patients and families builds legitimacy and ensures usability.	Set EU standards for "explainability-first" AI-enabled CVH tools. Require clinician-mediated introduction and plain-language/ visual explanations. Establish EU-wide co-creation protocols with patients and families for digital/AI CVH tools. Track KPIs on trust, comprehension, and uptake of such innovations.

III. Details on the projects considered for this evidence-generation exercise

The projects (either coordinated or supported by INOMED) are detailed below:

(1) ReThinkHPVaccination (https://rethink-hpv.eu/en/) - supports Member States and other countries in rethinking their HPV vaccination campaigns, with the aim to achieve the HPV vaccination and cancer prevention objectives of Europe's Beating Cancer Plan and Mission on Cancer. The specific objectives of the project are to: a) develop a virtual HPV vaccination knowledge centre for countries with low vaccination rates and ensure synergy with the EU Knowledge Centre on Cancer; b) create a communication strategy for Romanian needs and an HPV vaccination behaviour matrix; c) develop and share guidelines for combating fake news about HPV vaccination and disseminate a handbook in Romanian during an online media event; and d) design, develop and share international training courses for HPV vaccination communication based on the behaviour matrix.

(2) PERFECTO (https://perfecto-fh.eu) - focused on childhood screening programs for inherited high cholesterol (paediatric familial hypercholesterolaemia), which runs in families. screening in Europe. PERFECTO's primary goal is to promote the use of FH Paediatric Screening throughout Europe. With a special emphasis on countries with the

greatest rates of cardiovascular disease and low levels of public knowledge of FH, the project seeks to establish a supportive and enabling environment. PERFECTO aims to present concrete proof of the beneficial effects that preventative measures, such as FH Paediatric Screening, have on individuals and their families, on population health, and healthcare systems.

(3) FH-EARLY (https://fh-early.eu) - focused on improving early detection and management of familial hypercholesterolaemia (FH), one of the most common inherited metabolic disorders. The project aims to deliver a chip array for earlier, cheaper diagnosis, a signature biomarker assay for risk stratification, and a XAI driven integrative precision health profiling tool. The project uses co-creation methods to involve FH patients, families and care teams, so as to better understand their needs and preferences.

(4) MAYA (https://maya-horizon.eu) - empowers Adolescents and Young Adults (AYA) cancer survivors to manage their cardiovascular (CV) health through digital tools that address cardiotoxic-related late effects of cancer treatment. The project employs living labs, smart technology, patient and citizen participation, and the Penta Helix model, which unites businesses, the health and care sector, academia, public administration and citizens and civil society to co-create solutions that enhance prevention, monitoring, and care. The project envisions using the iCARE health hub, which integrates a smart mirror and an AI-powered conversational agent, to deliver personalised care and continuous monitoring.

(5) EU-CIP (https://cancerinfoportal.eu) - to empower patients, increase health literacy, and lessen disparities in access to cancer care information throughout Europe, the project seeks to establish a patient-centric cancer information portal. The main objective of the EU-CIP is to improve cancer patient care and quality of life by increasing access to general and personalized knowledge, providing thorough information on cancer prevention, early detection, diagnosis, and treatment options, including risks, side effects, and late effects, as well as information on palliative care, rehabilitation, and recurrence management. High-incidence malignancies, those with a poor prognosis, and pediatric cancers are given priority under EU-CIP.

(6) ECHoS (https://cancermissionhubs.eu) - fosters the creation of National Cancer Mission Hubs in Members States and associated countries, with the aim of facilitating policy dialogues between individual citizens and stakeholders. The project entails developing general models and guidelines to support the development of the hubs, knowledge exchange programmes, impact models and training sets to help efficiently engaging with distinct stakeholders, a toolkit of synergies for improving collaboration with other individual initiatives, a business continuity model, and a calendar of events to raise awareness about the hubs.

(7) 4P-CAN (https://4p-can.eu) - builds on the recommendations of the European Code Against Cancer to provide an innovative vision in understanding the complex system that surrounds each citizen and how this increases the risk for cancer. The focus is on three levels: macro - the national level, meso - the community level and micro - the individual level. The project intends to deliver personalized tools for primary prevention of cancer in Central and Eastern European countries, making use of living labs, as spaces for co-creation, and personalized communication on cancer prevention.

(8) Guide.MRD (https://www.guidemrd-horizon.eu) - tackles the critical questions in relation to personalised approaches in cancer therapy by developing reference standards for ctDNA diagnostics, clinically validate promising ctDNA diagnostics and develop data to guide the use of multi-modal therapies with a non-invasive diagnostic test. With a robust engagement with regulatory authorities, payers and, most importantly, patients themselves, the

project aims to develop recommendations and guidelines based on objective data to use ctDNA diagnostics to guide multi-modal therapy selection to improve patient outcomes.

(9) Curtain (https://curtainproject.eu/) - aims to reduce cancer-related inequalities across Europe, by improving cancer literacy among citizens, patients, healthcare professionals and various organizations. The project develops a cancer-specific literacy tool that guides literacy campaigns, so as to build the capacity of patients to navigate cancer care systems and technologies, and to develop trainings intended for healthcare professionals.

IV. Evidence pack: detailed lessons, evidence and transferability to CVH

A list of evidence produced as part of our projects is provided below. These are grouped around the key action areas (with the most potential for EU-added value) of the EU CVH plan:

(I) prevention (e.g. by addressing unhealthy behaviours to reduce risk factors);
(II) early detection and screening (e.g. through an EU protocol on health checks or EU guidance on using digital tools for personalised treatment and remote monitoring);
(III) management, care, and rehabilitation;
(IV) emerging technologies (including digital health tools), data-driven approaches, artificial intelligence and virtual human twins;
(V) innovative, patient-centred and personalised solutions to help prevent, detect as early as possible, and treat cardiovascular diseases.

(I)Prevention (e.g. by addressing unhealthy behaviours to reduce the risk factors)

(1) ReThinkHPVaccination

The experience with the ReThinkHPVaccination project shows that even when effective preventive tools exist, their impact is limited if communication, trust, and equity gaps are not addressed. HPV vaccination and cardiovascular disease prevention differ in clinical scope, but they share common barriers: low awareness, uneven uptake, misinformation, and strong influence of socio-economic and cultural determinants. The ReThinkHPVaccination project showed that awareness is not enough: although 79% of Romanians had heard of HPV, less than 10% were vaccinated. The main reason was the lack of recommendations from trusted professionals, combined with misinformation and cultural specificities. Drawing on these lessons, we believe the CVH Plan can avoid similar pitfalls by embedding personalised communication, proactive professional engagement, and equity-driven approaches into its design.

→ **For CVH:** *Prevention strategies must go beyond generic awareness raising campaigns. We recommend adopting a personalised communication model for cardiovascular prevention, as "one-size-fits-all" messaging often fails. In addition, prevention strategies should integrate personalised communication models, tackle misinformation around diet, obesity, smoking, or hypertension, and empower healthcare professionals to proactively recommend preventive measures such as cholesterol or blood pressure checks. Empowering healthcare professionals to proactively recommend CVH risk assessments is a significant advantage, as trusted recommendation was the strongest predictor of HPV vaccine uptake.*

(2) PERFECTO

Through surveys, consultations, and focus groups conducted in Romania and Cyprus, the project generated new evidence on public perceptions, behaviours, and barriers to early detection. Findings revealed that while awareness of lifestyle risk factors is high, knowledge of genetic risks such as FH remains strikingly low (only 22% of Romanians and 28% of Cypriots had ever heard of FH). At the same time, citizen willingness is strong: over 70% of respondents said they would participate in cholesterol or genetic testing and recommend it for their children and relatives. To address these gaps, PERFECTO developed a Personalised Communication Model (PCM), a scalable framework that tailors messages to different audiences and contexts. The model uses data-driven personas and clusters to adapt communication at three levels: micro - engaging families and close networks; meso - empowering family doctors, teachers, and community leaders; macro - leveraging media, digital platforms, and national campaigns. This layered approach responds to inequalities revealed by the project: rural and socioeconomically disadvantaged groups are less engaged with prevention, while women often lead health decisions but carry disproportionate responsibility. By adapting strategies to these realities, the PCM helps build trust, improve follow-up after testing, and reduce health inequalities

→ **For CVH:** *Adopt a layered, personalised prevention strategy that operationalises communication and engagement across three levels to close gaps in awareness and uptake of cardiovascular health (CVH) measures. Building on the Personalised Communication Model (PCM), interventions could focus on: the micro level (family and close networks) to promote testing through trust-based dialogues within households and close networks (accounting, as well, for women's important role in health-decision making); meso (community and frontline professionals) - equip family doctors, teachers, and community leaders with tailored tools and culturally relevant narratives to increase early detection, particularly in rural and socioeconomically disadvantaged areas where engagement is lowest; macro (societal and system-wide) - implement national and regional campaigns that combine traditional media, digital platforms, and public institutions to normalise prevention behaviours, destigmatise genetic testing, and integrate citizen-driven insights into health policy.*

(4) MAYA

As part of the MAYA project, Living Labs are in the process of being established in nine European countries (Poland, Germany, Spain, Portugal, Italy, Finland, UK, Greece, Romania), with the aim of better understanding and addressing the cardiovascular late effects of cancer treatment among adolescents and young-adult survivors. The Living Labs serve as participatory environments where healthcare professionals, survivors, and caregivers collaborate to share knowledge and experience, ensuring that the instruments and tools being developed as part of the project reflect the real-world challenges faced by AYA survivors. As part of the Living Labs, multiple co-creation activities and testing exercises are expected to unforld, all centered around the iCARE health hub, a system that combines smart mirrors, wearables and an AI-powered conversational agent to support continous monitoring of modifiable cardiovascular risk factors such as hypertension, obesity, and diabetes, while also promoting healthier lifestyles through tailored guidance on physical activity, nutrition, and stress management. Furthermore, by co-creating interventions with young survivors, the project improves awareness and skills needed to make healthier lifestyle choices, thus strenghtening primary and secondary prevention.

→ **For CVH:** *For younger groups of the population, we encourage targeting lifestyle risk factors through personalised, engaging digital coaching instruments. These (especially wearables and apps) have an important impact on embedding prevention habits into patients or ex-patients' daily routines. Within this context, enhancing health literacy is a must, so that prevention becomes more actionable and inclusive.*

(5) EU-CIP

The project promotes health and digital literacy by providing easy-to-understand, evidence-based cancer information in multiple formats (texts, infographics, videos) and languages. Special focus is placed on vulnerable and low-literacy populations, with inclusive design and patient-centred validation. EU-CIP provides information on the entire cancer journey - from prevention and early detection to treatment, survivorship, and palliative care. This content is designed to be easy to understand, using plain language and supported by visual formats such as infographics and videos. The portal avoids medical jargon and ensures that users can grasp complex topics without needing specialist knowledge. To ensure broad accessibility, the content is translated into multiple national languages using AI-assisted tools. These translations are reviewed and adapted to reflect local healthcare systems, cultural contexts, and linguistic nuances. Special attention is given to low-literacy populations, older adults, and socially disadvantaged groups. The portal's design prioritises usability, clarity, and inclusivity, ensuring that everyone, regardless of education level or digital skills, can benefit from the information provided. Features such as simplified navigation, visual aids, and tailored responses help make the portal accessible to all. By improving health and digital literacy, EU-CIP empowers users to make informed decisions about their care. The portal supports shared decision-making, encourages dialogue between patients and healthcare providers, and helps users understand their rights, treatment options, and long-term health implications.

→ **For CVH:** *Prevention and literacy should be strengthened by making cardiovascular risk factors understandable, actionable, and accessible for all citizens. All literacy solutions should promote equity and inclusivity, with tailored strategies for women, older adults, and vulnerable or disadvantaged groups. A multi-lingual reviewed format should be adopted to make information accessible across diverse literacy levels and cultural contexts. Furthermore, literacy solutions should be co-created together with citizens and patients to ensure that interventions are relevant, trusted, and grounded in real community needs.*

(7) 4P-CAN

A Living Lab have been established as part of the project, to better understand and address, in an integrated manner, barriers to cancer primary prevention - particularly modifiable risk factors, like smoking, alcohol use, physical inactivity, excess weight, infections (HPV, HBV) and environmental pollution. The Living Lab in Romania is in the village of Lerești, Argeș County, where researchers have implemented an iterative process of multiple waves of personal network data collection and community engagement. The project contributes to cancer prevention by addressing health, social, digital, economic, and knowledge inequalities in this rural community with limited healthcare access. It is structured on a five-iteration engagement cycle with activities and interventions that are meant to identify community's priorities and test solutions in real-life settings. Some of these activities and interventions are the Health Festival, the walking football competition, school partnerships, and targeted workshops that promote the messages of the European Code Against Cancer (ECAC), messages on early detection, and

healthy lifestyles. The activities and interventions are not only culturally anchored and socially acceptable, but they were as well designed together with the community (plus other relevant actors of the Pentahelix, especially local public authorities) to leverage local assets (schools, events, peer networks), so as to increase effectiveness and uptake. These activities and interventions are complemented by waves of data collection, that seek to identify change in health-related perceptions and behaviours and provide input for adapting activities and interventions. The Lerești Living Lab in now in the process of being scaled up in the South-Muntenia Region and in Bulgaria. Some of the main findings of the project - in terms of prevention - are: 1) tackling both behavioural and environmental risks provides a more comprehensive understanding of health-related barriers; 2) complementing traditional interventions with socially engaging and inclusive activities that were prioritized together with citizens (and other entities of the Pentahelix) increases participation (reaching more diverse groups of the population), fosters trust, and turns prevention into a positive experience, as opposed to seeing these in connection to the medical act; 3) early engagement with schools (which are perceived as trusted hubs within the community, where all children, regardless of socioeconomic background may be reached) ensures that prevention habits are formed from childhood and afterwards spread within the family; 4) grounding activities in the ECAC leads to standardised and transferable messages that, if needed, can be further tailored for and with the community, but remain easily transferable to other Living Labs (e.g. Bulgaria); 5) conducting face-to-face interviews with a personal network analysis component allows to identify the structure and composition of local support networks, as well as patterns of access to health-related information and social influence. Social clustering was identified around dietary and other health-related habits (e.g., assortativity in unhealthy behaviours, as eating processed food or smoking) and pointed towards the presence of strong informal ties that could be leveraged in interventions.

→ **For CVH:** *Integrate community-driven strategies into EU and national prevention policies aimed at reducing risk factors, with special attention to rural and disadvantaged groups. ECAC may serve as the backbone of EU prevention communication, as it ensures consistency across Europe, while maintaining flexibility to adapt to community contexts. For a stronger impact, prevention messages should be anchored in the community's identity, with cultural and sports events (and possibly others, depending on the community's profile) serving as recognised platforms to promote cardiovascular and cancer prevention. In addition, encouraging the development of partnerships between education and health authorities may ensure access to consistent and long-term preventive education. We also recommend developing prevention programs not only focused on individuals, but also on the groups and communities to which they belong - encouraging respected community members or family leaders to adopt healthier habits could help spark positive change in others.*

(9) Curtain

The project aims to equip both individuals and healthcare systems with the knowledge and tools needed to tackle the disparities between European regions (Eastern and Southern/Western Europe), geographical settings (urban and rural areas) and different socio-economic groups, in relation to cancer prevention, diagnosis and care. The project acknowledges the fact that low levels of health literacy are generally linked to negative health behaviours, such as higher tobacco use, poor diet, and physical inactivity (well known risk factors for both cancer and CVDs) and, in this context, aims to improve health literacy both at the individual and organizational level. Traditionally, health literacy efforts have been focused on individuals' ability to find, understand, and use health information for decision-making. However, the project ascertains that health literacy-responsive organizations can play a

critical role by adapting their structures, policies, and processes to make health-related tasks more accessible, compensating for individual gaps in understanding. Organizational measures are crucial for enabling health literacy, enhancing the effectiveness and quality of healthcare, particularly for vulnerable socio-economic populations who face greater health risks and barriers to care. This dual focus on the individual and organizational levels reinforces people-centred care and offers a cost-effective strategy for reducing cancer inequalities and improving health outcomes.

→ **For CVH:** *As a first step, we recommend mapping cardiovascular health literacy needs, disparities and inequalities across European regions, rural and urban areas, across socio-economic groups. Next, it is essential to co-create solutions with vulnerable populations to ensure interventions are culturally relevant, accessible, and impactful. Building on the project's expected outcomes, cardiovascular health literacy initiatives should target both the individual level (empowering citizens to make informed health decisions) and the organizational level (ensuring healthcare systems are responsive and supportive) thereby maximizing effectiveness and equity.*

(II) Early detection and screening (e.g. through an EU protocol on health checks or EU guidance on using digital tools for personalised treatment and remote monitoring)

(1) ReThinkHPVaccination

Survey data in HPV vaccination highlighted inequalities by income, education, and rural/urban divide, with disadvantaged groups the least likely to access preventive services. Differently put, access and uptake are stratified by income, education and rural/ urban. Our communication matrix demonstrated that interventions must be tailored across micro (family), meso (community), and macro (societal) levels.

→ **For CVH:** *Early detection of risk factors (hypertension, high cholesterol, diabetes) requires the same multi-level personalised approach, ensuring equitable access in underserved regions. Trusted messengers such as family doctors, nurses, and community leaders should be systematically engaged. We recommend addressing inequalities by tailoring interventions to vulnerable groups (low-income, rural, women-specific risks), using community-based communication and engagement (employing the micro/meso/macro communication matrix for lipids, diabetes checks).*

(2) PERFECTO

PERFECTO shows that citizens are ready to act on early detection if systems provide access, guidance, and trusted communication. Family doctors and community influencers have an important role in building trust and ensuring follow-up.

→ **For CVH:** *Establishing EU-level guidance on paediatric cholesterol testing and cascade screening would ensure systematic early detection across EU Member States. Embedding this into the EU Cardiovascular Health Plan would prevent thousands of premature CVD deaths, reduce inequalities, and establish screening as a model for personalised prevention across Europe. The CVH plan should harness the European Health Data Space to enable predictive, personalized cardiovascular care.*

(7) 4P-CAN

The findings produced as part of the Living Lab show that local social, economic, and infrastructural determinants hinder access to preventive checks. In this context, barriers are linked to the absence of healthcare services in the community, the lack of public transportation to the nearest hospital, limited trust in healthcare institutions, and competing priorities in disadvantages households. There barriers are common to rural settings across Eastern Europe, leading to missed opportunities for early detection. The Living Lab developed in Lerești offers community anchored pathways to overcome these barriers, by co-developing and making available mobile-based screening models. More specific, temporary check-up points (testing for cardiovascular health, pulmonary health, dermatological and blood testing) were made available as part of the Health festival. Such approaches integrate preventive checks into the daily routines of citizens, making screening more accessible, acceptable, and enjoyable.

→ **For CVH:** *In order to strengthen early detection, especially in rural, marginalized areas, the CVH plan may support scalable community-based screening models. Embedding preventive checks in familiar and trusted community environments can increase participation, build trust, and reduce inequalities (related to transportation, access, competing priorities etc.), in access to early detection services across EU Member states.*

(III) Management, care, and rehabilitation

(1) ReThinkHPVaccination

The consensus strategy for HPV vaccination emphasised the need for multi-stakeholder networks, digital platforms, and consensus-building across Member States to sustain progress.

→ **For CVH:** *sustainable management should include European-level knowledge centres on cardiovascular prevention, integration of digital tools for monitoring (including wearables and AI-assisted risk prediction), and EU-supported patient and citizen engagement networks. We thus recommend leverage digital health and data spaces to personalise prevention and track outcomes, similar to how EU cancer initiatives foster knowledge sharing and ensuring sustainability through EU-level platforms and cross-country collaboration, to prevent fragmentation of efforts.*

(8) Guide.MRD

The project explores how circulating tumour DNA (ctDNA) testing for minimal residual disease (MRD) can be integrated into cancer care. Beyond technology, the project applies a systems perspective, recognising that innovation succeeds only when it fits real healthcare pathways, responds to patient needs, and is supported by health system structures. As part of the project, a healthcare pathway map (patient journeys from diagnosis to follow-up) and a system map (actors, policies, incentives) were created. These were designed in a co-creation process with patients, healthcare professionals, policymakers, and industry, ensuring they reflected lived experiences and practical constraints. The work conducted up to now shows that mapping pathways and systems with stakeholders: (i) identifies patient key points and gaps in current care, (ii) reveals inequalities such as gender- or socio-economic barriers, (iii) highlights the policy and organisational levers that enable adoption, and (iv) builds shared ownership, making reforms more sustainable.

→ **For CVH:** *In order to deliver integrated and equitable cardiovascular care across the EU, the CVH could integrate co-created pathways and system mapping into the design of cardiovascular screening and rehabilitation. Mapping results can be used to address systemic barriers like fragmented care or lack of gender-specific data. At the same time, actions should be grounded in real patient and clinician needs. Not only in policy or technology goals. We also recommend fostering multi-stakeholder co-creation at EU and national level to build commitments and sustainability.*

(IV) Emerging technologies (including digital health tools), data-driven approaches, artificial intelligence and virtual human twins

(4) MAYA

As part of MAYA, an iCARE health hub will be employed, which integrates a smart mirror and an AI-powered conversational agent, to deliver personalised care and continuous monitoring. The iCARE health hub comprises the smart mirror with an AI conversational avatar, home sensors (e.g., ECG, smart band, scale), and a cloud that stores data in a secure FHIR server for interoperability. On top sits iCARE Onto (a clinical knowledge layer and knowledge graphs) and a RAG-guided large-language-model avatar that explains, coaches, and adapts to each person. Moreover, the iHEART module builds ML/DL risk models (including signals from wearables) to spot cardiotoxicity and CV risk early; iLIFE handles day-to-day monitoring and feedback. Trustworthiness (privacy, security, reliability) is designed in, and everything is co-created and iterated in Living Labs (following a Pentahelix framework) and evaluated with a dedicated impact framework. The aim is to provide personalised prevention and follow-ups that can cut major cardiac events and improve quality of life for AYA survivors.

→ **For CVH:** *It is important to plan for plain language and avatar customisation (age/gender) to boost acceptance, which is especially important for underserved or rural users. Moreover, an iterative process (via Living Labs) is needed in relation to any technology deployed - improve the instruments together with patients, clinicians, and IT staff (and, if needed, with other relevant actors of the Pentahelix), at each phase of the process, publish changes to the ontology, and avatar prompts.*

(5) EU-CIP

EU-CIP provides evidence-based, accessible cancer information sourced from trusted databases such as the Knowledge Centre on Cancer (KCC), the European Cancer Information System (ECIS), national cancer registries, and European guidelines. It covers the entire cancer journey, from prevention to early detection, diagnosis, treatment, survivorship, recurrence, rehabilitation, and palliative care. The content is presented in clear formats, created by a Content Creation Group and validated by a Content Editorial Board to ensure quality, readability, and accessibility. The portal integrates AI-assisted tools to simplify scientific information, enable multilingual translation (at least seven languages), and provides personalised support through a conversational assistant. It is built on a federated infrastructure with a Common Library of Contents and national nodes, ensuring interoperability with the European Health Data Space, MyHealth@EU, and HealthData@EU, while allowing national adaptation. The EU-CIP national nodes are localized implementations of the European Cancer Information Portal (EU-CIP), designed to deliver tailored, evidence-based cancer information to citizens across EU Member States. These nodes form part of a federated infrastructure that ensures interoperability, scalability, and alignment with national healthcare

systems. National nodes are supported by a shared EU-CIP Library of Contents and governance framework. They are designed to be scalable and replicable, with open-source tools and templates. Ongoing collaboration with European initiatives (e.g., KCC, ECIS, ECHoS) ensures harmonization and continuous improvement.

→ **For CVH:** *Embed governance, quality, and ethics frameworks to guarantee transparency and trust in digital and AI-enabled cardiovascular tools. In addition, we recommend adopting a federated yet harmonised approach that links national systems with EU-wide infrastructures such as the European Health Data Space, enabling predictive and personalised care.*

(7) 4P-CAN

As part of the project, we employed network science (personal network analysis) to understand community structures and dynamics, which is an innovative approach that has been essential for designing more effective interventions. This is particularly relevant given the strong evidence that health cannot be understood in isolation, and that individuals' habits and lifestyles are shaped through interactions. Data collection is performed with Network Canvas, which supports digital engagement and helps involve a wider audience in the project. Its visually engaging interface keeps participants interested by displaying their network of connections in real time. This helps citizens grasp the purpose and meaning of the questions, see the immediate value of their input, and refine answers on the spot. Recently, a new component was added to the iterative process of co-creation - data collection - intervention, one that connects all three with artistic expression: the digitally collected data has been translated into powerful visualizations (paintings and art installations - 3D networks - displayed in a public gallery in Lerești), depicting citizen's anonymised personal networks. These works made the social determinants of health more tangible, sparked community dialogue, and built trust - especially of impact in rural settings, where conventional outreach tends to underperform. This integrated approach – face-to-face elicitation, with digital tools, plus arts-based feedback - turns abstract prevention messages into concrete, community-owned insights that can shift norms and behaviours.

→ **For CVH:** *Cascade screening may be improved by employing a network science approach – this would entail systematically tracing and inviting relatives or close contacts for testing (including for cholesterol testing) and follow-up, guided by mapped kinship ties. Furthermore, network-sensitive KPIs may be developed, measuring screening uptake along network ties, behaviour change within ego networks (smoking, diet, activity), adherence supported by peer/family nodes, and trust/engagement shifts after public feedback. In addition, we recommend adopting arts-based public feedback loops - turning aggregated, anonymised findings into exhibitions that raise literacy, reduce stigma, and invite citizen input - as an adds-on to traditional campaigns.*

(9) Curtain

By combining personalized tools, stakeholder involvement, and cutting-edge technology, the project aims to create cancer-literate organizations and environments that support individuals in understanding and navigating the complex cancer landscape, ultimately driving better cancer control outcomes and promoting equality in cancer care across Europe. Measuring health literacy in the population is essential for developing comprehensive strategies to improve it. To effectively improve health literacy, interventions must be multifaceted and tailored to the specific

needs of the population. These efforts should include both strengthening individuals' competencies and reducing the complexity of health-related tasks. Building on the potential of digital tools, the project creates the first cancer-specific Cancer Literacy SCORE (CLS), an instrument designed for measuring and improving cancer literacy. In order to address knowledge gaps and reduce inequalities in cancer literacy the project makes use of large language models (LLMs). Co-creation activities to develop real-life use models for these digital tools is also employed, so as to ensure that they are accessible and safe for diverse populations, including vulnerable groups such as the elderly, rural residents, and migrants.

→ **For CVH:** *The potential of digital tools and LLMs may be leveraged to drive improved cardiovascular health literacy results. We also recommend deploying comprehensive tools to assess cardiovascular health literacy levels in populations, in order to evaluate the impact of certain interventions and to inform more nuanced and targeted approaches that would improve cardiovascular outcomes.*

(V) Innovative, patient-centred and personalised solutions to help prevent, detect as early as possible, and treat

(3) FH-EARLY

As part of the project, three innovative tools - a chip array for earlier, cheaper diagnosis, a signature biomarker assay for risk stratification, and a XAI driven integrative precision health profiling tool - will be developed. The chip array is intended to be a comprehensive, yet cheap solution that allows to identify monogenic, polygenic, and other causes of inherited dyslipidaemia, and is designed for a quick interpretation in routine care. The signature biomarker assay is a cellular readout distilled into 28 core features capturing lipid uptake/ storage in lymphocytes and monocytes – used for stratifying therapy and assessing risk. The XAI tool intends to fuse multi-modal data (clinical, genomics, imaging, biomarkers) to predict risk and support care plans. As part of the project, an Involvement Protocol for FH Patients and Families was developed, that embeds ethical, patient-centred co-creation into FH-EARLY, detailing how patients and families are consulted in relation to the tools to be developed. Up to now, a concept pre-test of the planned instruments was conducted with FH patients. It revealed low baseline trust in AI-based tools unless they are recommended and discussed by a trusted healthcare professional and highlighted the need for plain-language descriptions supported by visuals where possible.

→ **For CVH:** *Adopt a mediated, explainability-first approach for AI-enabled CVH tools. We recommend requiring introduction via trusted healthcare professionals, providing standard plain-language descriptions and visual aids co-designed with patients, and - if possible - tracking KPIs on trust and comprehension.*

(6) ECHoS

The project supports the EU Mission on Cancer. Its aim is to set up National Cancer Mission Hubs across Europe as coordination and engagement platforms, connecting policymakers, professionals, businesses, civil society, and citizens. By testing governance models, citizen engagement, and impact assessment, ECHoS has generated lessons that apply beyond cancer - notably to cardiovascular disease, the leading cause of death in Europe. ECHoS proved the strength of the Pentahelix model, which brings together all relevant actors. Complex health

challenges cannot be solved by the health system alone - they need joint action across government, science, business, civil society, and citizens. Moreover, citizen engagement was central to the project. The hubs were not top-down structures but people-centred spaces where citizens could co-design, co-implement, and evaluate activities. This raised trust, improved legitimacy, and encouraged uptake of solutions. Equally important were impact models. ECHoS developed KPIs to measure progress in prevention, detection, treatment, and quality of life. Finally, governance was at the core. The National Cancer Mission Hubs were designed as formal yet flexible structures - consortia, legal entities, or national actions - ensuring sustainability and linking national initiatives with the European network. In short, ECHoS offers a roadmap for turning ambitious EU health missions into practice.

→ **For CVH:** *By applying the Pentahelix model, embedding citizen engagement, setting up Living Labs, using impact models, and establishing sustainable hubs, the EU Cardiovascular Health Plan can become a comprehensive and lasting framework for reducing Europe's cardiovascular burden. Applying such approaches to cardiovascular health would be beneficial for areas like lifestyle change, adherence to therapies, and awareness of gender- and age-specific risks. These would further ensure that prevention, screening, and digital tools are shaped not only by experts but also by the communities most affected, which raises trust and legitimacy. For cardiovascular health, a similar monitoring approach would allow the plan to track outcomes such as early hypertension diagnosis, health literacy gains, or reductions in regional inequalities, making progress visible and measurable. Moreover, cardiovascular health could replicate this model by creating National Cardiovascular Hubs, securing multi-ministerial support and continuity beyond project cycles.*

(7) 4P-CAN

In its initial phases, the 4P-CAN project carried out community immersion and stakeholder mapping making use of the Penta Helix approach (involving citizens, public institutions, academia, civil society, and private actors). This process helped to reveal governance dynamics at the local, national and international levels and strengthen partnerships. To better understand the interactions and relative influence of stakeholders, the project applies the Net-Map methodology, which provided insights on the relationships of power, funding flows, and communication channels. This has proven useful in identifying which stakeholders exert the greatest influence on health outcomes. Findings show that local actors often lack visibility in national strategies, even though there are existing forms of collaboration between local authorities, schools, and healthcare professionals. This gap points to the need for stronger integration of local voices into national and European policy frameworks.

→ **For CVH:** *Strengthen the role of local actors (municipalities, schools, community health professionals) in the design and implementation of CVD-related prevention strategies, making them more responsive to community needs. In addition, policy coherence may be enhanced by embedding the insights from local-level collaborations into national cancer and cardiovascular prevention strategies, ensuring that community-based assets are recognised and scaled. Stakeholder mapping exercises may be institutionalized at EU and national levels to continuously monitor governance dynamics and trust in relevant health decision-makers in CVH.*

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INOMED's Response to the CALL FOR EVIDENCE on a European Cardiovascular Health Plan