CNIC participates in CHAIN, a new European initiative aims to accelerate AI in cardiovascular care

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The Carlos III Spanish National Centre for Cardiovascular Research (CNIC) is participating in CHAIN, the European Network for Data and Artificial Intelligence in Cardiovascular Health. This new flagship initiative, co-funded by the European Union's EU4Health programme and coordinated by the European Society of Cardiology (ESC), aims to harness health data and artificial intelligence throughout the entire cardiovascular care pathway.

Cardiovascular diseases (CVDs) remain the leading cause of mortality and disability in Europe, constituting the primary burden among non-communicable diseases (NCDs), with persistent inequalities across countries and institutions. Health data and AI offer major opportunities to improve CVD prevention, early detection and care. However, uptake is currently fragmented and standardised validation mechanisms are lacking.

The European Cardiovascular Health Data and AI Network (CHAIN) has been launched to close the gap, focusing on implementation, evaluation, governance and scale-up. The consortium brings together universities and research centres, hospitals and clinical networks, technology companies, national health ministries and patient organisations from 20 European countries.

A European collaboration to bring AI to cardiovascular care

CHAIN builds on ESC's EuroHeart registry network, which already unifies 18 ESC member countries with standardised data on cardiovascular care and outcomes, offering tools and frameworks that help countries monitor outcomes, compare practices and drive sustainable improvements in care.

Cecilia Linde, President of the ESC, from the Karolinska Institute, Sweden, said: "One in three deaths in Europe is caused by CVD and the €282 billion cost to the EU from CVD exceeds the EU's annual budget. The need to act is critical and CHAIN could not be more timely or important in that endeavour. CHAIN is about turning the promise of AI into better cardiovascular health for everyone. By helping trusted innovations reach patients safely and equitably, we can prevent disease earlier and give more people the opportunity to live longer, healthier lives."

On 7 and 8 October, CHAIN partners met at the European Heart House in Sophia Antipolis, France, to launch the project

Folkert Asselbergs, CHAIN Scientific Coordinator and Chair of the ESC AI Gateway, from the Amsterdam University Medical Centre, The Netherlands, said: "In this era of misinformation, patients and healthcare professionals are looking to medical societies like the ESC to lead the way: CHAIN will provide a framework for the implementation of trusted solutions that really add value beyond what is currently available."

According to Borja Ibáñez, scientific director of the CNIC, a cardiologist at the Fundación Jiménez Díaz University Hospital and group leader at the CIBER for Cardiovascular Diseases (CIBERCV), "the CNIC's joining CHAIN reinforces our commitment to cardiovascular research that leads to improvements for patients. Collaboration between research centres, hospitals and other European partners will enable us to evaluate artificial intelligence across different healthcare systems and bring solutions backed by sufficient evidence into clinical practice. At the CNIC, we will contribute our expertise to ensure that innovation progresses with scientific rigour and meets the needs of cardiovascular prevention and care."

The CNIC's contribution to data standards and quality

The CNIC's scientific team for this project comprises Héctor Bueno, coordinator of the Cardiovascular Research Area at i+12 and head of the Multidisciplinary Translational Cardiovascular Research Group at i+12, at the 12 de Octubre University Hospital; leader of a CNIC research group; and researcher at the Biomedical Research Network Centre for Cardiovascular Diseases (CIBERCV); and Fátima Sánchez-Cabo, Group leader at CNIC and coordinator of its Bioinformatics Unit.

On 7 and 8 October, the project partners met at the European Heart House in Sophia Antipolis, France, to launch the project and coordinate the initial activities.

The CNIC will contribute to Work Package WP4, 'Data standards and network', led by the University of Luxembourg and scheduled to run from months 1 to 36 of the project. This working group will establish a common framework for using health data from different centres, so that information recorded in different formats has a shared meaning, can be used jointly and meets agreed quality criteria.

Héctor Bueno emphasises: "Artificial intelligence must answer questions that are relevant to patient care. Before incorporating these tools into clinical practice, we need evidence of their usefulness and safety in different settings and among different population groups. CHAIN will enable us to work in a coordinated manner on this evaluation and on establishing the necessary conditions for this innovation to help improve cardiovascular prevention and care."

CHAIN's aim is to build a federated ecosystem aligned with the European Health Data Space (EHDS)

This work includes agreed definitions of the clinical characteristics under study, a catalogue of information on the available datasets and their terms of use, metrics for assessing their quality, and technical and security specifications for connecting to the network. This framework will facilitate the evaluation of AI solutions in different healthcare settings.

Fátima Sánchez-Cabo explains: "Evaluating an artificial intelligence solution requires an understanding of the quality and meaning of the data used to develop and validate it. At the CNIC, we will help to define common criteria so that information from different centres is comparable and can be used collectively. This foundation is essential for assessing how the models perform across different populations and for detecting potential biases."

A federated ecosystem and AI passports to identify trustworthy solutions

The aim of CHAIN is to build a federated ecosystem, CardioData@EU, aligned with the European Health Data Space (EHDS), for the safe, effective and scalable adoption of AI and health data for the improved management of CVDs and related NCDs. In concrete terms, this means securely connecting hospitals, health data hubs and disease registries across Europe, that will enable AI solutions to be tested, validated and deployed at scale. As a result, healthcare professionals will be able to identify disease earlier, make more informed decisions and deliver more consistent care to patients.

Validated AI tools will be made available through a European repository, supported by AI Passports that document their performance, safety and suitability for clinical use. Together, these resources will help build trust in AI by providing hospitals and healthcare authorities and professionals with clear evidence on which solutions work, for whom and in which clinical settings.

To demonstrate the approach in practice, six real-world use cases will be implemented across 13 countries, covering prevention, early detection, clinical decision support and the management of complex cardiovascular conditions. The assessment will take into account clinical utility, equity, ease of use and transparency, together with the conditions necessary for responsible implementation.

The federated ecosystem will contribute to the implementation of the Safe Hearts Plan, particularly its initiative on innovation and the integration of AI and digital technologies into cardiovascular care

Olivér Várhelyi, EU Commissioner for Health and Animal Welfare said; "The question is no longer simply what AI can do. The question is how we make it work safely and effectively for patients and health professionals in everyday healthcare. This is where CHAIN can make a real difference."

A roadmap for the adoption of AI in Cardiology

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cardiovascular care.

The launch of CHAIN comes at a time when the European Health Data Space, the Artificial Intelligence Regulation and developments in the European regulatory framework for medical devices – including legislation on pharmaceuticals, medical devices and in vitro diagnostic medical devices – are transforming the way in which AI is developed, assessed and implemented in healthcare in Europe.

CHAIN will draw on the experience of other European initiatives and seek synergies with EUCAIM, COMPASS-AI, AI4HF, DataTools4Heart and EHDEN, as well as with joint actions such as JACARDI, TEHDAS2 and Xt-EHR, to strengthen their complementarity and impact.

“Over the next three years, we hope to create a strategic roadmap for scaling AI adoption in cardiology across Europe,” concluded Folkert Asselbergs. “The infrastructure and standards will benefit research and industry, and the validated decision-support tools will help reduce the burden on healthcare systems. Ultimately, the availability of trustworthy tools should translate into earlier, more accurate diagnosis and safer, personalised care for patients.”

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