Concept Note

Project Title: Transformative Generative AI for Precision Care in Cardiovascular, Cancer, and Cognitive Disorders

Project Acronym: PRECISION^3

Call: End user-driven application of Generative Artificial Intelligence models in healthcare (GenAI4EU)

(https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/HORIZON-HLTH-2025-01-CARE-01)

Healthcare professionals and health systems across Europe currently grapple with challenges such as inefficiency, limited resources, varied patient safety standards, and inconsistencies in personalized patient care. Recent advances in Generative Artificial Intelligence (AI) offer a transformative opportunity to significantly enhance clinical practice, patient outcomes, and system sustainability. However, translating these technological capabilities into real-world clinical scenarios requires rigorous validation, ethical oversight, and careful integration into existing healthcare practices. This proposal strategically expands into novel areas that are in the top five diseases with the highest mortality, specifically addressing cardiovascular disease, cancer, and dementia—three critical healthcare challenges with high societal impact.

This project aims to deliver validated, robust, user-centric virtual assistant solutions based on Generative AI, specifically tailored to:

- Enhance clinical decision-making and personalized care pathways.
- Support healthcare professionals in providing high-quality patient care.
- Deliver measurable improvements in patient outcomes and healthcare efficiency across three selected clinical areas: cardiovascular disease, cancer, and dementia

The expected outcomes of the project are related with the Healthcare Professionals, Patients and Healthcare Systems. More specifically:

- Healthcare Professionals: Access to practical, robust, and reliable virtual assistant solutions that improve clinical accuracy, efficiency, and patient safety.
- Patients: Improved quality of care, personalized therapeutic interventions, enhanced safety, and increased patient engagement and satisfaction.
- Healthcare Systems: Demonstrable benefits through superior clinical outcomes, cost-effectiveness, and improved resource utilization compared to current standards of care.

Project Scope & Key Activities:

1. Development of Virtual Assistant Solutions:
    - Designing, optimizing, and deploying trustworthy Generative AI models augmented with other AI tools, utilizing multimodal health datasets from structured and unstructured data (clinical, epidemiological, genomic, proteomic, molecular, and imaging).
        - Propose RAGs units, utilize medical guidelines for enhanced performance, measure the effectiveness of included sources
        - Propose LLM finetuning, generate custom open source, health focused LLMs
        - Propose agentic tools that enhance the model capabilities, for example GenAI for document digitalization, NLP for transforming medical text to structured data etc.
    - Implementing a federated governance approach to ensure data protection, interoperability, and compliance with EU data regulations (GDPR).

2. Validation in Clinical Settings (Use Cases):

   Conduct rigorous validation of the developed AI-based virtual assistants within three clearly defined healthcare use cases:

   - Cardiovascular Disease: Personalized risk assessment and predictive modeling for prevention and management strategies.
   - Cancer: Individualized therapeutic decision-making, improved diagnostics, and patient stratification.
   - Dementia: Early identification, progression monitoring, and personalized patient-caregiver-professional interactions.

   Healthcare professionals, patients, and caregivers will actively participate throughout solution development and validation phases to ensure practical utility and acceptability.

3. Continuous Evaluation and Regulatory Alignment:

   - Implement a robust evaluation framework to continuously monitor the virtual assistant's clinical effectiveness, trustworthiness, technical reliability, transparency, and explainability.
   - Engage proactively with regulators and relevant EU bodies for compliance and integration into European healthcare standards.

4. European Collaboration and Sustainability:

   - Adhering strictly to FAIR data principles, GDPR compliance, and leveraging European data infrastructures such as EHDS, EOSC, and EBRAINS.
   - Exploiting synergies with existing EU-funded projects to enhance outcomes and sustainability.

Deadline: September 16th, 2025