European Virtual Human Twins Initiative

EHTEL webinar
Virtual Human Digital Twins: a key tool for new patterns for prediction and prevention
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What are virtual human twins?

- A digital representation of a human health or disease state, built using software models and data
- Designed to mimic and predict behaviors of their physical counterparts

Advancing personalised care – core EU priority

European Leadership	Drug Discovery & Clinical Trials	Leveraging HPC & Quantum
Personalised Medicine	Medical Education & Training	Advancing Medical Research

The European Virtual Human Twins Initiative

An EU framework supporting the emergence and adoption of the next generation of virtual human twin solutions in health and care

The Initiative will:

- Foster an **inclusive and collaborative multi-stakeholder ecosystem**
- **Breakdown silos and support interoperability**, integration and scaling up of VHT-based solutions
- Build a **state-of-the-art platform** to enable modelling across scales of human anatomy
- Facilitate **advanced research and technology** development on virtual human twins, including AI foundational models
- Leverage the **power of novel computational methods** and advanced computing capacities
- Fully comply with **EU values and rules: private, safe and secure**

European Virtual Human Twins Initiative | Shaping Europe's digital future (europa.eu)

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The European Virtual Human Twins Initiative

Strategy and way forward

Ecosystem	Research	Infrastructure deployment	Uptake in clinical settings ("the last mile")

▪ EDITH
  ▪ Roadmap
  ▪ Advisory Group of Stakeholders
▪ 2023 VHT Manifesto
▪ Member States involvement
	▪ VHT for personalised disease management (Horizon Europe projects)
	▪ Improved prediction, detection, and treatment approaches for comprehensive stroke management (IHI topic)
		▪ Advanced VHT platform for model integration and validation
		▪ Federated European Infrastructure for Intensive Care Unit (ICU) data
			▪ Member states involvement
			▪ Regulatory science

Synergies with other EU Initiatives

Sustainability

Communication actions

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Ecosystem-oriented actions

EDITH CSA

Ecosystem

Framing an inclusive **ecosystem** of digital twins in healthcare - mapping of the existing relevant actors, initiatives, resources and barriers

Roadmap

Identifying the necessary building blocks to ensure the VHT's clinical application and formulate clear short- and mid-term policy recommendations.

Repository

Developing a federated and cloud-based **repository** of digital twins (data, models, algorithms, and good practices) in healthcare, providing a virtual collaboration environment

Simulation Platform

Developing the architecture of a **simulation platform** that will support the transition towards an integrated VHT, building on 5 use-cases (cancer, cardiovascular, intensive care, osteoporosis, brain) to be developed as prototypes

Virtual Human Twins Manifesto – launched December 2023

- Wide review by ecosystem: **132 organisations**
- More than **90 signatories** from industry, academia, research and clinical, and others TBC

Attain excellence in **R&I**

Identify clinical and scientific **use cases**

Enhance EU VHT **data** and **models** repository

Ensure VHT benefits are **equal** and **inclusive**

Foster trust in **intellectual property** management

A **Statement of Intent** on VHT Development, Evidence, and Adoption in Healthcare Systems, promoting **collaboration** in the VHT ecosystem

Involve citizens, patients, healthcare professionals, scientists, industry

Support clarity and evolution of the **regulatory landscape**

Understand VHT use across the **disease continuum**

Develop and implement advanced IT **platforms**

Generate **evidence** of VHT benefits to citizens to increase **adoption**

Advance **data** availability and access

www.virtualhumantwins.eu

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Research Actions

Horizon Europe RIA projects

HORIZON-HLTH-2023-TOOL-05-03: Integrated, multi-scale computational models of patient patho-physiology ("virtual twins") for personalised disease management – 80M EUR

GEMINI: a Generation of Multi-scale Digital Twins of Ischaemic and Haemorrhagic Stroke Patients

- Dec 2023-Nov 2029
- EUR 9.9M

CERTAINTY: A CEllulaR immunoTherapy virtuAl twin for personallsed cancer treatment

- Dec 2023-May 2028
- EUR 9.9M

CERTAINTY
A cellular immunotherapy virtual twin for personalised cancer treatment

VIRTUAL BRAIN TWIN: Virtual Brain Twin for personalised treatment of Psychiatric Disorders

- Jan 2024-Dec 2027
- EUR 10M

VIRTUAL BRAIN TWIN
A VIRTUAL BRAIN FOR EVERY PATIENT.

SMASH-HCM: Stratification, management and guidance of hypertrophic cardiomyopathy patients using hybrid digital twin solutions

- Jan 2024-Dec 2027
- 8M

TARGET: Health virtual twins for the personalised management of stroke related to atrial fibrillation

- Jan 2024-Dec 2028
- EUR 7M

TARGET

ARTEMIS: AcceleRating the Translation of virtual twins towards a pErsonalised Management of fatty lIver patients

- Jan 2024-Dec 2027
- EUR 9.3M

dAIbetes: Federated virtual twins for privacy-preserving personalised outcome prediction of type 2 diabetes treatment

- Jan 2024-Dec 2028
- EUR 8.9M

dAIbetes

VITAL: Virtual Twins as tools for personalised clinical care

- Jan 2024-Dec 2028
- EUR 8.7M

VITAL

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Actions under the Innovative Health Initiative (**IHI**)

Predictive computational models for preventive stroke management

- EU co-funding 20M EUR

innovative health initiative

Develop innovative tools and approaches, **for example 'virtual human twin' model approaches** and AI/ML for enhanced computational modelling, optimised for transparency to users and non-users, federated data analytics, and visualisation for enhanced output/results view and interpretation. These tools aim at appropriate risk stratification, timely prediction of stroke and stroke recurrence, faster diagnosis, and treatment.

Propose approaches to improve implementation and scale-up of treatment in Europe relying on **multimodal clinical data capture** and their better interpretation and use in patient management and clinical decision-making. This should include consideration of the regional differences in stroke management and access to treatment options across Europe.

EU Funding & Tenders Portal (europa.eu)

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Infrastructure-deployment actions

European Virtual Human Twins

Federated European Infrastructure for Intensive Care Unit (ICU) Data

- DIGITAL, WP 2023-2034, 5 MIO EUR co-funding
- Data intensive computational model-based tools for decision support and risk prevention
- Goal to identify personalised interventions in real-time
- 6 clinical use cases, including one involving VHT creation

➢ Demonstrate ICU dataset integration and use with VHT models in 4+ clinical domains

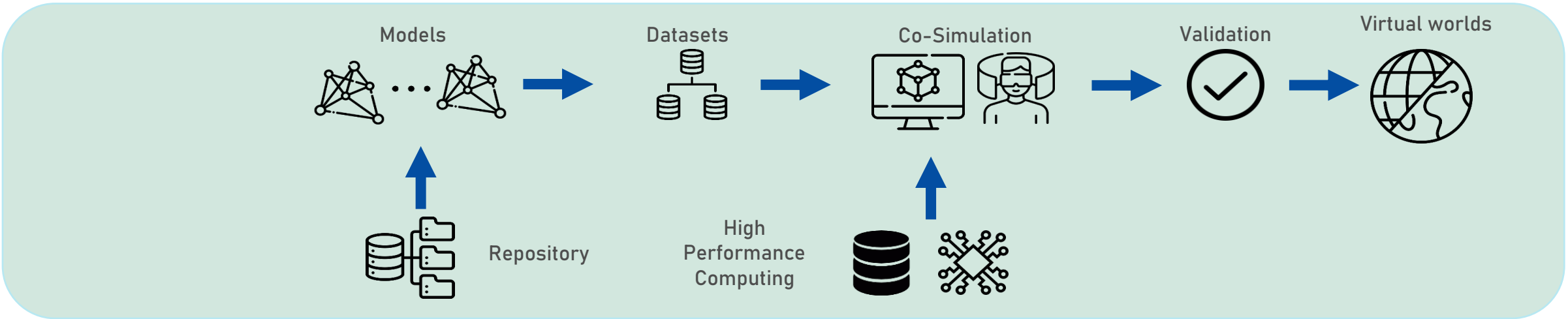
Advanced Platform for VHT Models Integration & Validation

Procurement action, DIGITAL EUROPE Work Programme 2023-2024

Develop a distributed platform making available to users:

- a federated repository of VHTs related resources;
- a combined set of open-source software toolkits;
- access to computational services to develop, test and integrate VHT models

Platform used for developing, testing and integrating VHT models; fully interoperable with augmented and virtual reality environments



Uptake of VHTs in clinical settings
– *the “last mile”*

Uptake of VHTs in clinical settings – *the "last mile"*

Focus on the uptake of integrated VHT technologies in health and care, to benefit patients, promote personalised medicine, foster equal access to healthcare, speed-up pharma and medical device developments and clinical trials

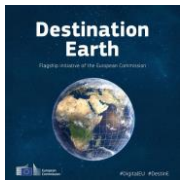
Strengthening synergies with other EU initiatives

European Health Data Space Regulation (**EHDS**)

Cancer Imaging Initiative
Cancer Image Europe Platform

1+ Million Genomes Initiative
Genomic Data Infrastructure

DestinE Platform



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Commission Communication on boosting startups and innovation towards **trustworthy AI**

Commission Communication on **Virtual** Worlds

Thank you

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