Vertical LLMs in cardiology: from heart failure to the clinical copilot

Daniele Panfilo, PhD

CEO, Founder @ Aindo

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The Promise: Effortless assistance leveraging all of humanity's medical data

Dedicated design and data sources:

Domain expertise: knowledge extracted from multi-omics research, EHRs, disease ontologies, …

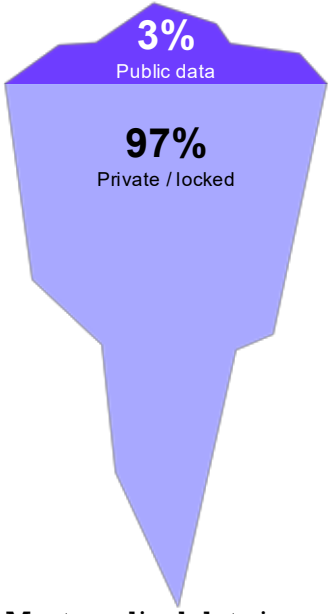
Regulatory compliance: designed to align with regulatory and institutional requirements

Interoperable: integrate with medical software effortlessly

Use cases include:

- Diagnostics & Prognostics
- Treatment optimization & personalized medicine
- Automated administrative support

The Problem: Domain intelligence requires domain-specific data



Most medical data is private and goes unused [WEF, 2024]

General Data Protection Regulation

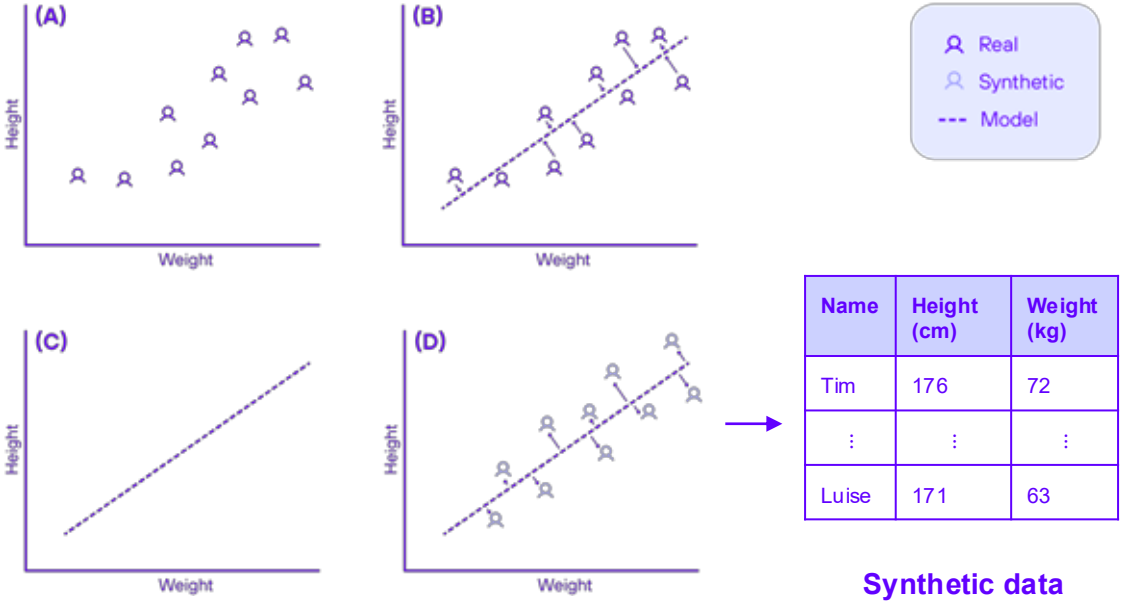
HIPAA
Health Insurance Portability & Accountability Act

- >95% of medical domain data is personal information;
- Such data cannot be re-used for AI training under privacy legislation and ethics protocols;
- ***Domain intelligence requires access to such data during training***;
- Furthermore, without proprietary innovation, EU data governance cannot be guaranteed.

The Solution: privacy-preserving data generation

Name	Height (cm)	Weight (kg)
John	181	77
⋮	⋮	⋮
Elsa	164	59

Real data



Name	Height (cm)	Weight (kg)
Tim	176	72
⋮	⋮	⋮
Luise	171	63

Synthetic data

The Demand: Recognized growing need for biomedical innovation

Dire need for medical innovation

Need for assessment of medical technologies

Medical innovation as public interest

European Health Data Space (EHDS) Regulation
Foster harmonized European framework for secondary data use for research, innovation, public health, policy-making and personalised medicine (effective 2029)

Health Technology Assessment (HTA) Regulation
Establish harmonized, faster procedures requiring Joint Clinical Assessments to be completed within 30 days after the authorisation of the medicine

Legge 132/2025
Enhance the secondary use (incl. AI) of health data already collected in clinical practice, registries, observational studies, and follow-ups.

Cardiology Clinical LLM: Building clinical-grade assistance

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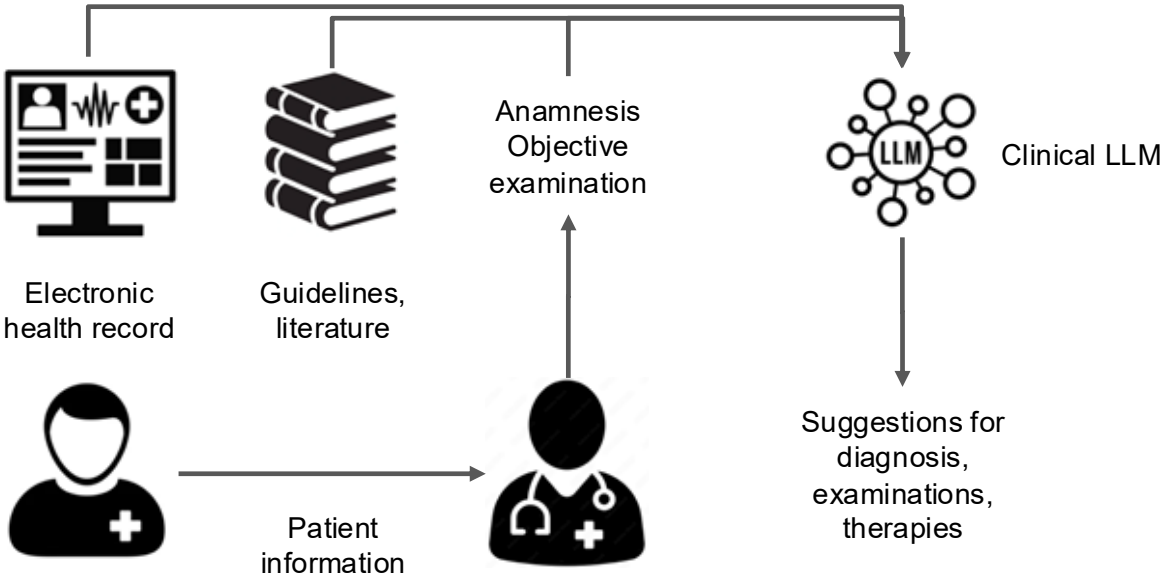

Demo

aindo

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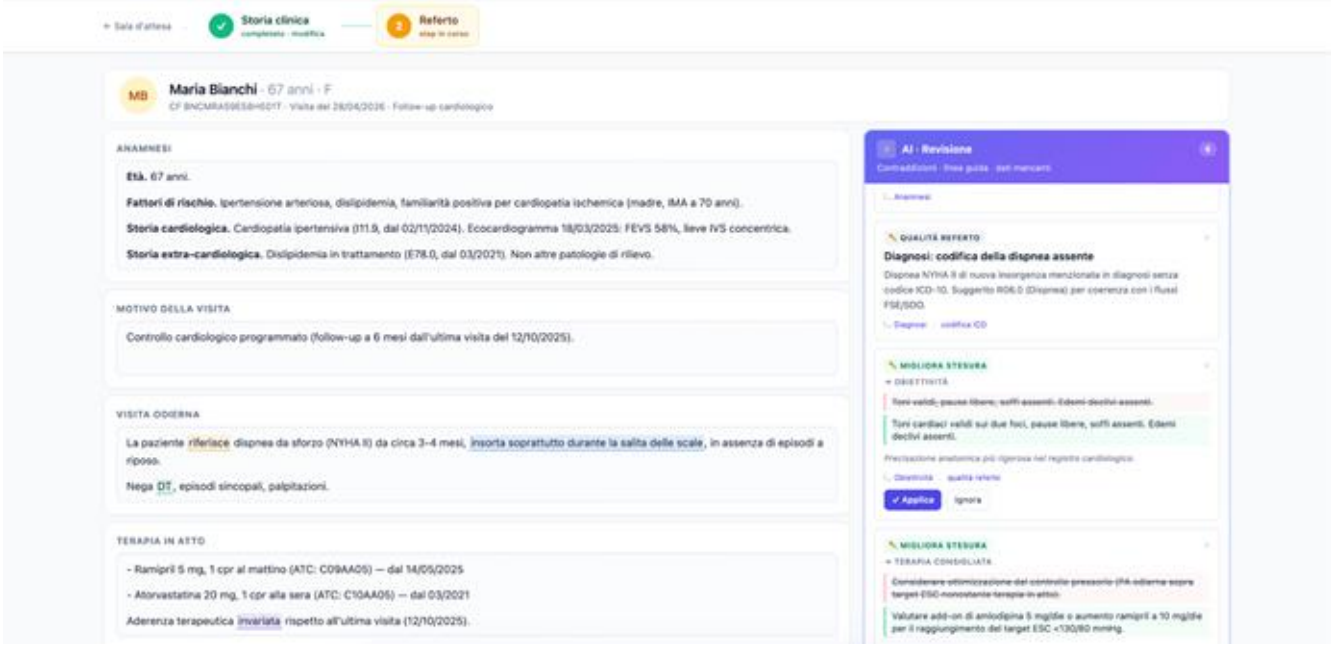

The Opportunity: Invest in secure federated data infrastructure

Within 3-5 years:

- EHDS secondary use roll-out;
- AI Act's high-risk provisions come into force;
- Regulatory agencies publish guidance.

Meanwhile:

- Federated architectures and synthetic data technologies achieve clinical-grade utility;
- These foster infrastructures and institutional partnerships for evidence propagation.

The organizations that understand today that federated infrastructure, privacy-preserving data generation, and documented AI governance are **not compliance costs but strategic assets** will find, in 2028, that they have already built what the regulation will then require.

A Global Echo, Not a European Peculiarity

US
Sentinel 3.0

EU
DARWIN

JAPAN
MID-NET

CHINA
Hainan Boao Lecheng