ERN | EuroBloodNet

13th June 2025 - EHA Congress

AI Federated platform for hematological malignancies

Speaker: Matteo Della Porta

European Reference Network | Hematological Diseases (ERN EuroBloodNet)

Funded by the European Union

Disclosure of Conflict of Interest

The speaker declares no conflicts of interest.

Personalized medicine in Hematological Neoplasms - The need

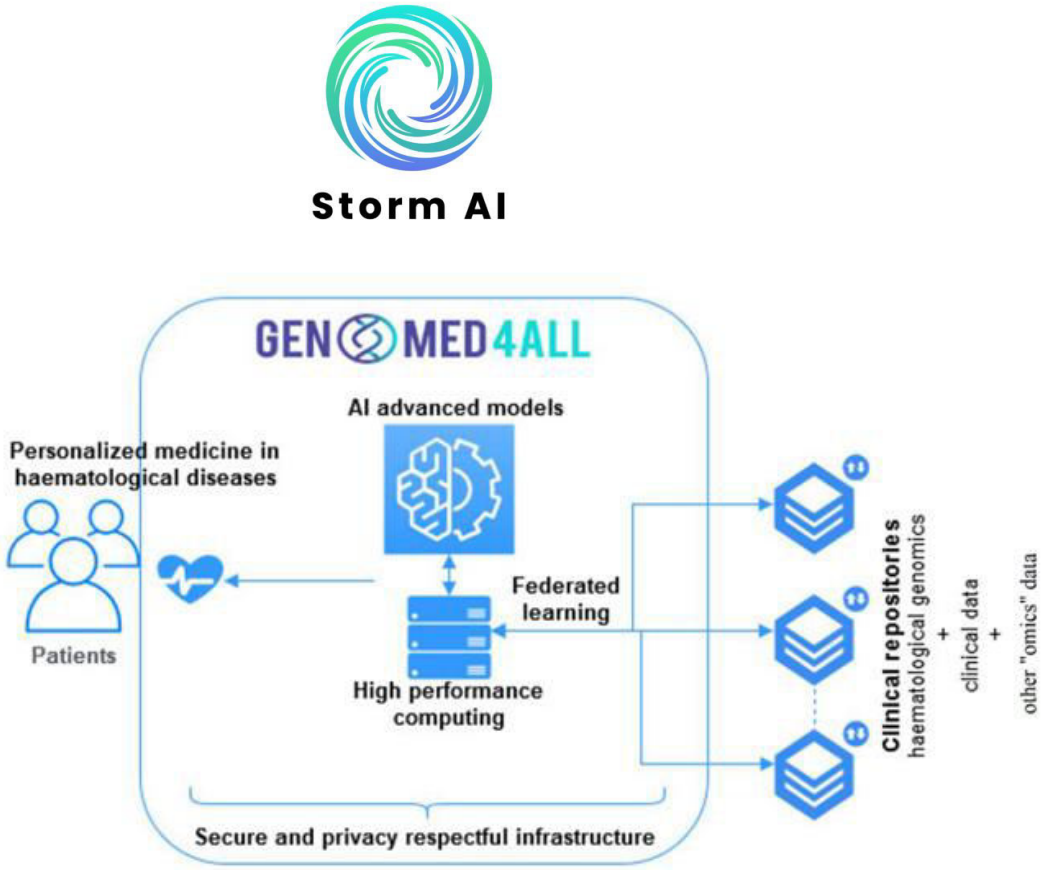
1) **Improving access to and sharing** of real-world clinical and omics data to generate new insights and advance knowledge.

2) Supporting **prospective (longitudinal)** initiatives aimed at validating the generated knowledge and enabling the clinical implementation of next-generation tools for decision-making.

3) Shifting the focus from the natural history of the disease **to patient-centered treatment approaches to improve outcomes**.

4) **Leveraging advanced technologies, particularly AI** to extract greater scientific and clinical value from data and to accelerate research timelines.

The solution - STORM_AI: Supporting innovaTion in hematOlogical neoplasms by Reliable Multimodal AI

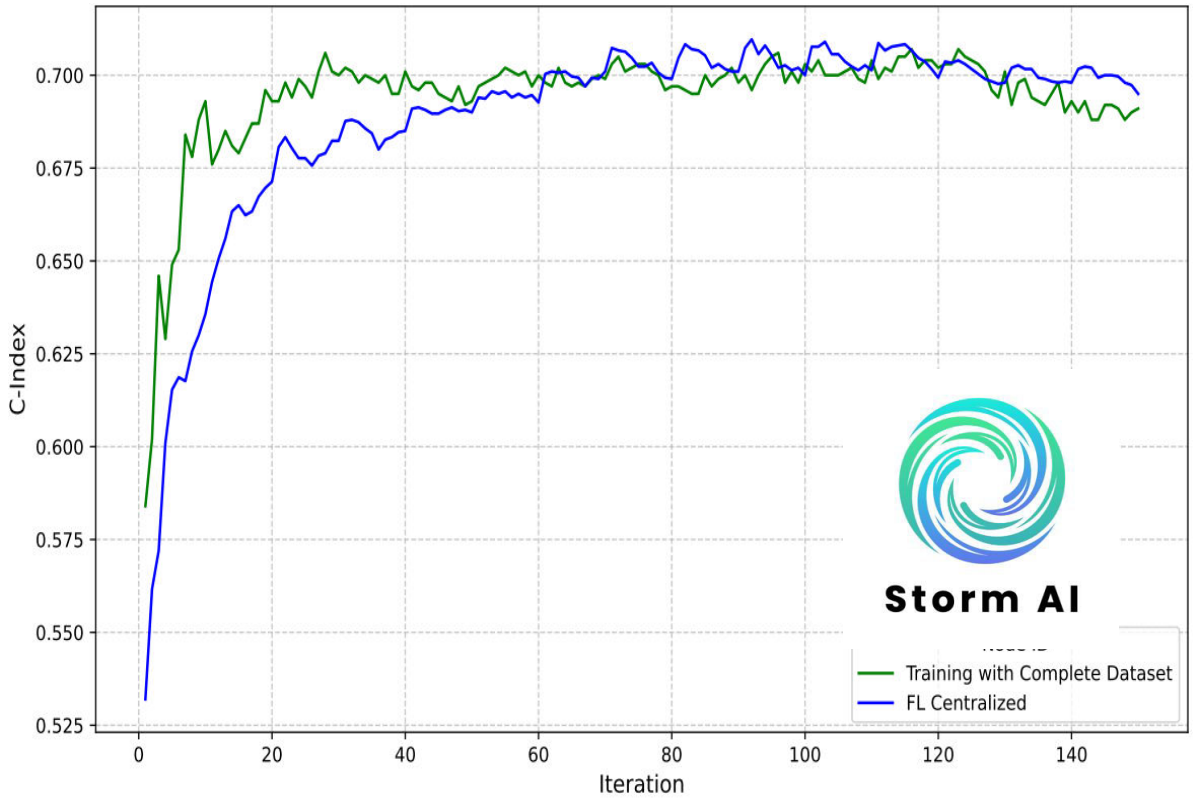


Federated Learning by AI

- Innovative technologies for data collection and analysis to preserve data privacy are required for implementing personalized medicine
- Federated learning addresses privacy concerns by collaboratively training algorithms without sharing data.

Storm AI Platform - federated IPSS-M in 5 EU centers

IPSS-M C-index progression
Centralized dataset vs. Federated model



Storm AI Platform: advantages

- **Opensource design -** built entirely using opensource components
- **Scalability and flexibility -** the platform adopts a modular approach, making it highly configurable and adaptable to changing functional requirements;
- **Standardization -** it employs internationally recognized and approved standards for data harmonization and homogenization

- Federated model performs comparably with centralized one, without moving patient data beyond the firewalls of the institutions in which they reside

Asti G, et al. Blood 2024; 144: 4989.

Personalized medicine by FL approach

Use case	N of patients	Type of data included in the model	Federated model trained	Clinical Endpoint	N of worker nodes	CI of the federated model	CI of the reference scoring system in clinical practice
MDS	4427	Clinical and molecular	Deepsurv	Probability of OS	5	**0.72**	**0.70**
MDS	860	Clinical, molecular and **DIGITAL PATHOLOGY**	SAVAE	Probability of OS	3	**0.79**	**0.70**
AML	1547	Clinical and molecular	SAVAE	Probability of OS	3	**0.67**	**0.64**
CMML	1737	Clinical and molecular	Deepsurv	Probability of OS	3	**0.65**	**0.62**
MM	1005	Clinical, molecular and **PET-CT**	SAVAE	Probability of OS	3	**0.74**	**0.61**

The PATHroclus project supported by EHA

Specific project's aims:

1) Deploy the federated platform
2) Utilize innovative AI algorithms to create next-generation diagnostic and prognostic tools
3) Develop a comprehensive database integrating digital pathology, clinical and genomic information to design next-generation classifications for myeloid and lymphoid malignancies
4) Develop a virtual atlas for hematological malignancies as an educational resource to improve diagnostic standards and reproducibility across Europe

Consortium:

- *M Della Porta - Humanitas*
- *P Harrington – King's UK*
- *A Turki – Essen DE*
- *JM Middeke – Dresden DE*
- *A Mosquera Orgueira - ES*
- *José Cardia – Lisbon PT*
- *M Ponzoni – OSR, IT*

Della Porta M – EHA innovation Grant 2025

THANK YOU!

European Reference Network | Hematological Diseases (ERN EuroBloodNet)

Funded by the European Union