RSU RESEARCH WEEK 2025

MDR in AIS

Evaluating a Telemedicine-Integrated Workflow to Enhance Acute Ischemic Stroke Care:

A Protocol for An Observational Multicenter Study

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Track | Knowledge for Use in Practice

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This project is part of the European Partnership on Transforming Health and Care Systems (THCS), which has received funding from the European Union under the Horizon Europe Framework Programme – Grant Agreement No. 101095654 (FFG grant agreement No. 50773503).

Background

Acute Ischemic Stroke (AIS)

1. the first cause of **disability** worldwide.
2. the second leading cause of **mortality** *(WHO Global Stroke Fact Sheet 2019).*

1.7% of total **health care expenditures** in Western countries are spent on stroke *(Lucas-Noll et al., 2023).*

Time is brain

⇩

Time-dependent networks

Functional, clinical, and technical outcomes

are in close association with

in-hospital stroke workflow timing

Time-dependent networks

- **Collaboration across hospitals:** of different levels of care and regions,
- **Timely treatment:** the best possible treatment in the shortest possible time,
- **Access and quality:** reconciling access time with the quality, safety, and efficacy of treatments,
- **Personalized strategies:** shared diagnostic and therapeutic plans based on the patient's risk profile,
- Utilizing available **structural and logistical resources**.

CHALLENGES

Treatment Timeliness

Streamlining the workflow for secondarily transferred patients minimizes time to treatment, preserving brain function, reducing disability and long-term costs.

Complex Time-Dependent Stroke Networks Implementation

Optimizing coordination between primary stroke centers (PSCs), CSCs, and healthcare system. Addressing delays in recommended time targets for MT.

Feasibility and Implementation of Streamlined Pathways

Proposing a direct transfer pathway bypassing CSC's ED to reduce door to-groin(DTG)time and improve outcomes.

Variations in Healthcare Systems and Practices

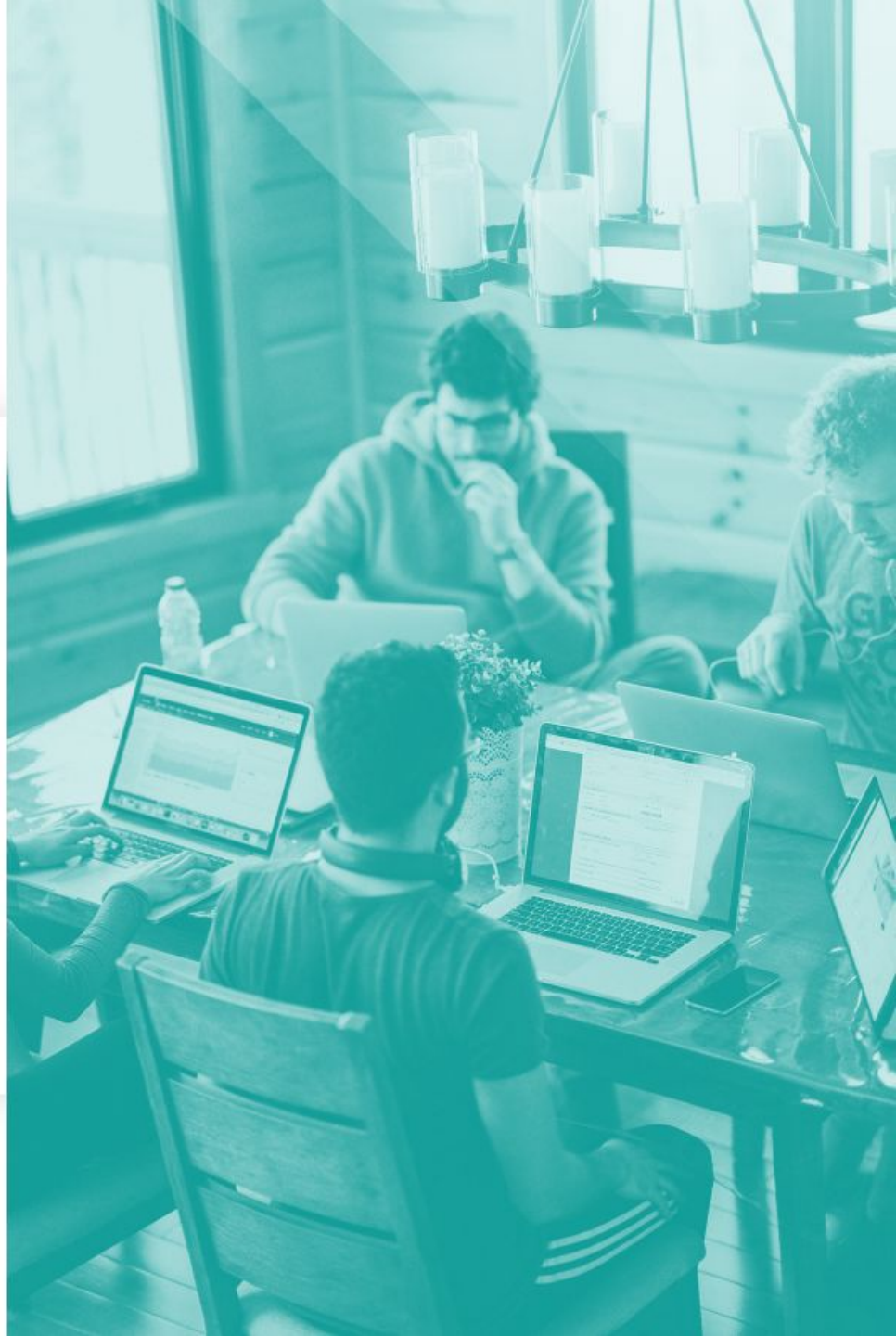
Recognizing unique challenges due to variations among different healthcare systems, and considering evidence-based strategies adaptable to diverse settings.

Technological Advancements and Implementation

Acknowledging telemedicine potential in streamlining AIS care workflows.

Resource Allocation Optimization

Implementing distributed health and care models to optimize resource allocation in time-sensitive and critical settings such as stroke care.



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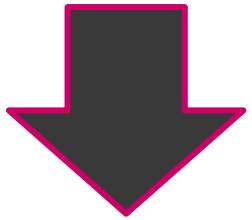
Technology-Driven Solutions for Stroke Care Optimization

Telemedicine & AI: Assisted telemedicine, mobile videoconferencing, and AI enhanced coordination.

Faster Patient Selection via improved triage: ensuring quicker and more accurate patient identification.



Optimized Workflow: Enhancing communication and decision-making speeds up stroke treatment processes.

OBJECTIVES

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The study aims to investigate the impact of a **telemedicine-integrated care pathway** tailored for the "drip-and-ship" model on reducing treatment delays and improving clinical outcomes in patients with acute ischemic stroke due to large vessel occlusion (AIS-LVO).

To assess:

- **Efficacy** (successful recanalization and mRS at 3 months)
- **Safety** (mortality, intracerebral hemorrhage and of procedural complications)
- **Health economic outcomes** (hospitalization length of stay and unscheduled re-hospitalizations)

To compare:

- prospectively collected results compare to retrospective data for Drip-and-ship patients who underwent mechanical thrombectomy from 2018 to 2022.

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Materials and Methods:

Multicenter Prospective Study on Optimizing Stroke Care Pathways

European Collaboration: Involves multiple primary and tertiary stroke centers across Europe.

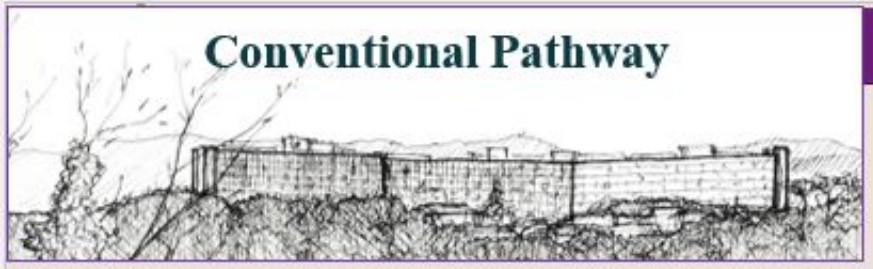
Telemedicine Integration: Utilizes a real-time platform Brainomix (Mallon et al., 2024) for clinical and imaging data sharing, improving coordination.

Direct Transfers: Aims to bypass emergency department delays by transferring eligible patients directly to neurointerventional suites.

Workflow Optimization: Enhances interprofessional collaboration to accelerate stroke treatment and improve patient outcomes.

Ischemic stroke

Conventional Pathway



ED Triage Shock room

ED SWPHS
Stroke UNIT MD

CT scan

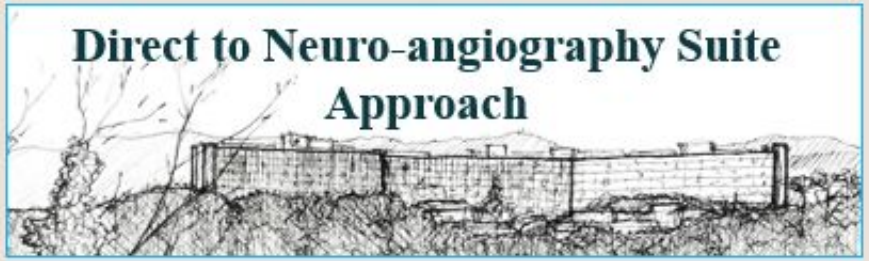
Neuro-angiography Suite

NRX Technician
NRX MD
NRX Anesthesiologist
NrxINT MD
NrxINT Nurse

Share information when the patient arrives at the Hospital

ED Nurse
ED MD
ED SWPHS*
Stroke UNIT MD

Direct to Neuro-angiography Suite Approach



Neuro-angiography Suite

NRX Technician
NRX MD
NRX Anesthesiologist
NrxINT MD
NrxINT Nurse

CT scan

Share information before the patient arrives at the Hospital

ED* Emergency Department
MD* Medical Doctor
SWPHS* Social Worker in Public Health Service
CT* Computed Tomography
NRX* Neuroradiology
NrxINT* Interventional Neuroradiology
IVT* Intravenous Thrombolysis

Key outcomes

Data Collection: Retrospective data analysis and a prospective database for future telemedicine evaluation.

Expected Impact: Aims to reduce DTR times by 20–30% and improve functional independence rates.

Primary Outcomes: DTG and DTR times, successful recanalization (mTICI ≥ 2b), and functional independence (mRS ≤ 2) at 3 months.

Secondary Outcomes: Protocol adherence, technology usability, and healthcare equity.

Impact and Innovation

1. Shortening of reperfusion **times.**
2. Valuable, time-saving **support for critical patients** in acute need of mechanical thrombectomy.
3. More patient treated, faster and better, improving **long-term clinical outcomes** and **reducing hospitalization length of stay.**

BROADER IMPACTS AND BENEFITS

Key information

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Multicenter Collaboration

- Evaluating the optimized pathway across different clinical settings
- Sharing knowledge and improving stroke management on a broader scale

Economic Sustainability

- Assessing efficacy, safety and economic sustainability of the optimized workflow
- Providing evidence for cost reduction and resource optimization

Policy and Societal Impact

- Informing evidence-based policies and guidelines for stroke care
- Reducing disability and morbidity associated with AIS
- Enhancing the quality of life for stroke patients

References

- Lindsay MP, Norrving B, Sacco RL, et al. World Stroke Organization (WSO): Global Stroke Fact Sheet 2019. Int J Stroke Off J Int Stroke Soc. 2019;14(8):806-817. doi:10.1177/1747493019881353

- Lucas-Noll, J., Clua-Espuny, J.L., Lleixà-Fortuño, M. et al. The costs associated with stroke care continuum: a systematic review. Health Econ Rev 13, 32 (2023). https://doi.org/10.1186/s13561-023-00439-6

- Benjamin EJ, Blaha MJ, Chiuve SE, et al. Heart Disease and Stroke Statistics-2017 Update: A Report From the American Heart Association. Circulation. 2017;135(10):e146-e603. doi:10.1161/CIR.0000000000000485

- Saver JL, Goyal M, van der Lugt A, et al. Time to Treatment With Endovascular Thrombectomy and Outcomes From Ischemic Stroke: A Meta-analysis. JAMA. 2016;316(12):1279-1288. doi:10.1001/jama.2016.13647

- Jahan R, Saver JL, Schwamm LH, et al. Association Between Time to Treatment With Endovascular Reperfusion Therapy and Outcomes in Patients With Acute Ischemic Stroke Treated in Clinical Practice. JAMA. 2019;322(3):252-263. doi:10.1001/jama.2019.8286

- Katan M, Luft A. Global Burden of Stroke. Semin Neurol. 2018 Apr;38(2):208-211. doi: 10.1055/s-0038-1649503. Epub 2018 May 23. PMID: 29791947.

- Dermot Mallon, Matthew Fallon, Eirini Blana, Cillian McNamara, Arathi Menon, Chak Lam Ip, Jack Garnham, Tarek Yousry, Peter Cowley, Robert Simister, David Doig - Real-world evaluation of Brainomix e-Stroke software: Stroke and Vascular Neurology 2024;9:.

Acknowledgment

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CONSORTIUM

Partners map

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AZIENDA OSPEDALIERO UNIVERSITARIA SENESE 1

Siena
Italy

USL TOSCANA SUD-EST 2

Arezzo
Italy

CENTRE HOSPITALIER UNIVERSITAIRE VAUDOIS 3

Lausanne
Switzerland

BIOMEDICAL RESEARCH INSTITUTE OF MALAGA AND PLATFORM IN NANOMEDICINE 4

Malaga
Spain

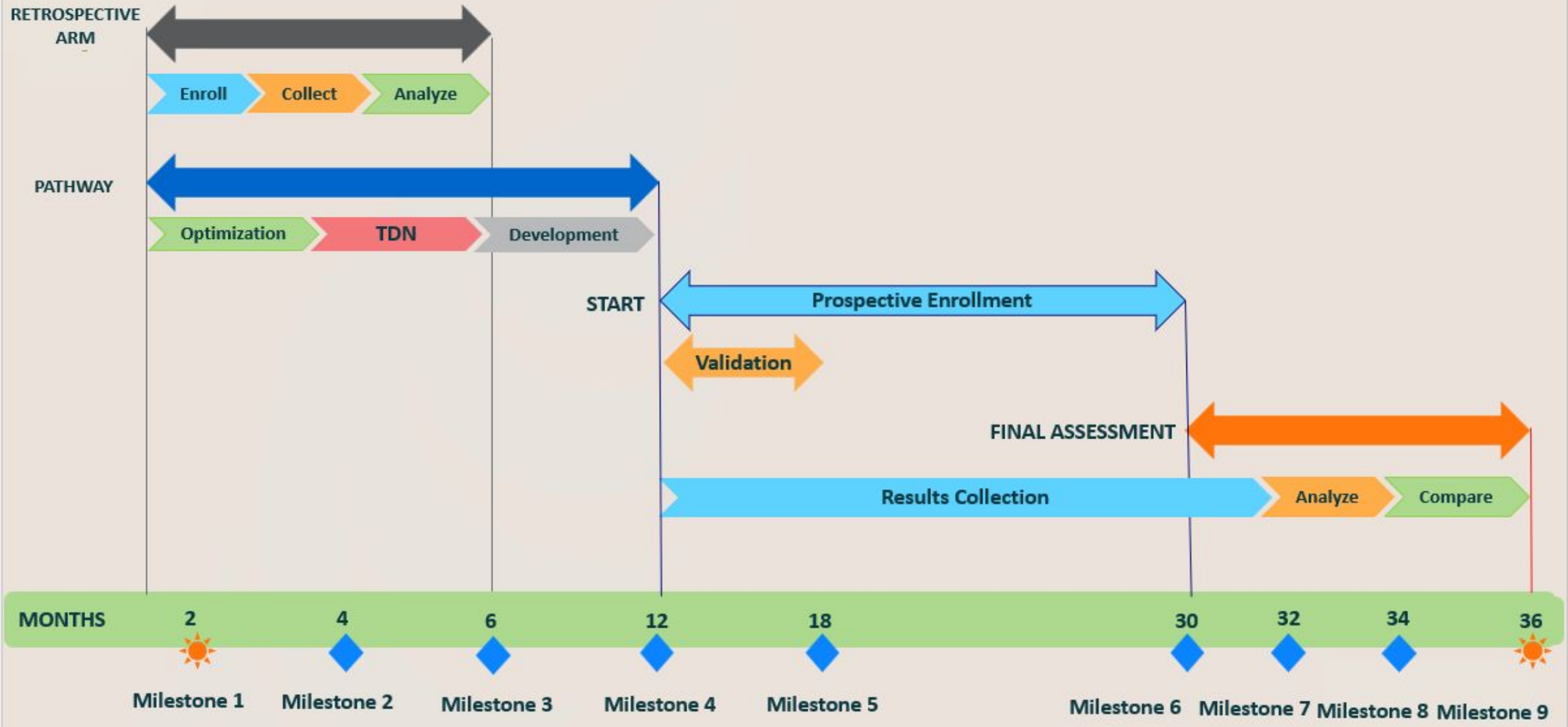
RĪGA STRADIŅŠ UNIVERSITY 5

Riga
Latvia

SYNYO GMBH 6

Vienna
Austria

Ischemic stroke



PROJECT WEBSITE

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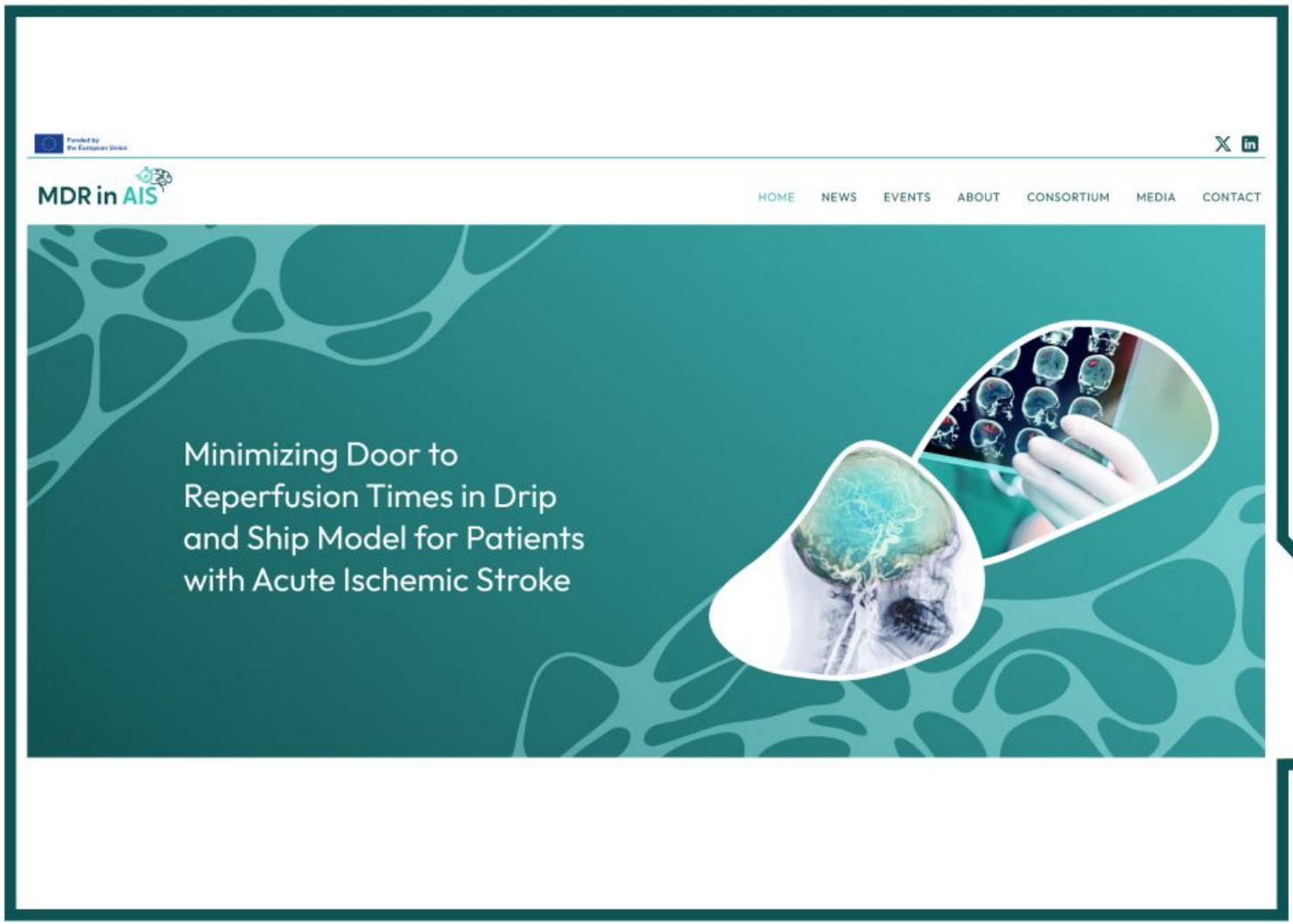

SCAN ME


THANK
YOU
GRAZIE
ASANTE
KIITOS
WELALIN
VINAKA
MATONDO
MERCI
MULTUMESC
MAAKE
ARIGATO
OBRIGADO
SPASIBO
PALDIES
DANK JE
CHOKRANE
MATUR NUWUN
TERMA KASIH
RAIBH MAITH AGAT
JUSPAXAR
KIA ORA
MOCHCHAKKERAM
UA TSAUG RAU KOJ
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