Luxembourg today

A launchpad for digital healthcare in the heart of Europe

A changing approach to health

OUR MISSION

The Luxembourg Institute of Health is a precision medicine institute.
We aim at generating direct and meaningful impact on people's health.

OUR VISION

To become a leading European institute for precision medicine.

OUR PERFORMANCE

Times Higher Education: LIH #15 worldwide, #7 Europe
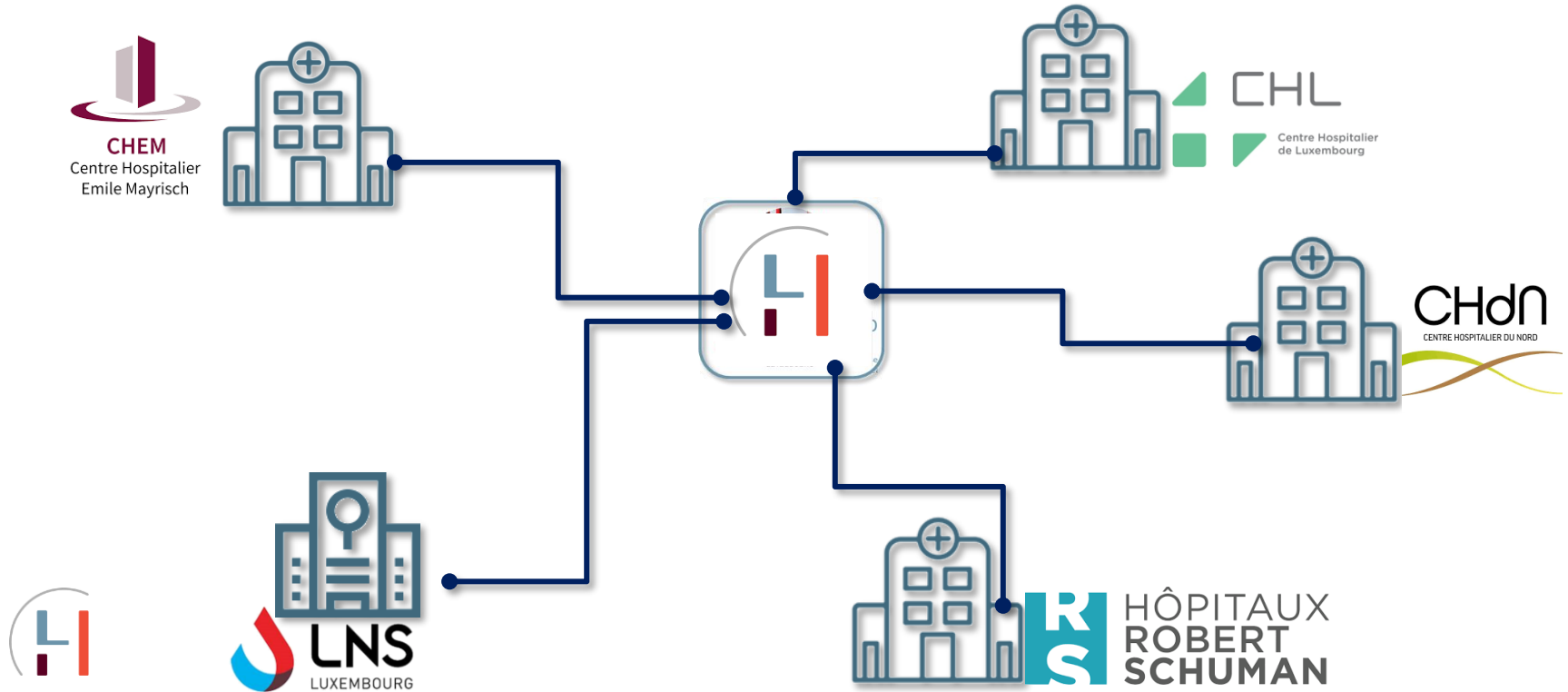(non-academic insitutions)

A changing approach to health

A changing approach to health

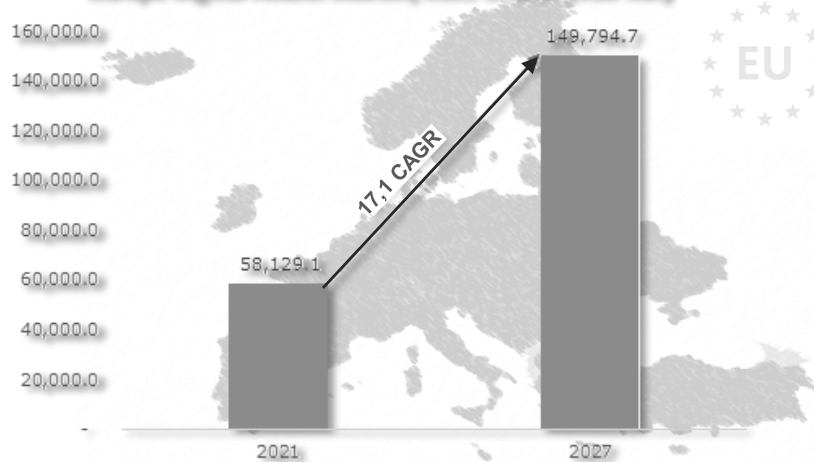# LIH anchoring a shared clinical research capacity....

TRENDS AND CONTEXT IMPACTING ON MEDICAL RESEARCH

potential of the digital health market in Europe

Europe Digital Health Market, 2021 & 2027 (USD Mn)

447.700.000

insured inhabitants 2021

- Public, centralized health insurance systems
- Excellent health care systems
- High quality data
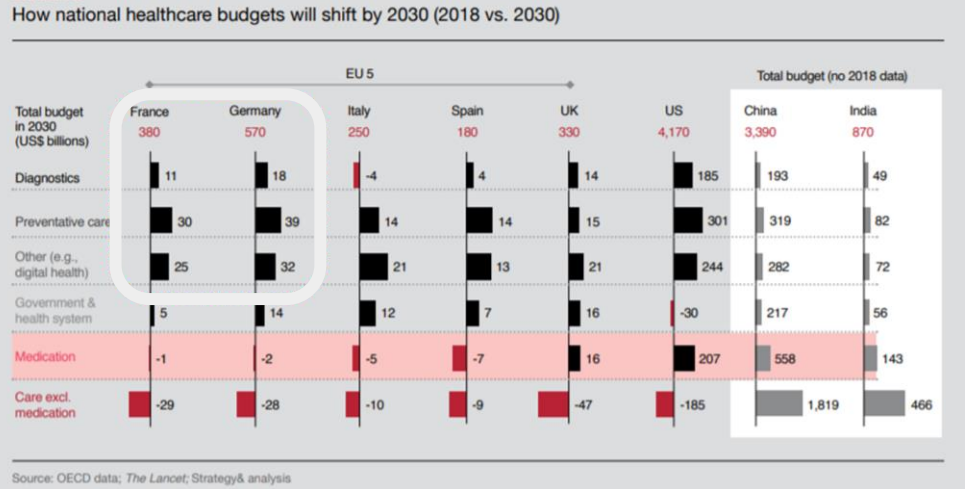- GDPR as a potential upside

Aiming for a patient centric data model

A changing approach to health

A REPOSITIONING OF RESEARCH IN THE MEDIUM TERM
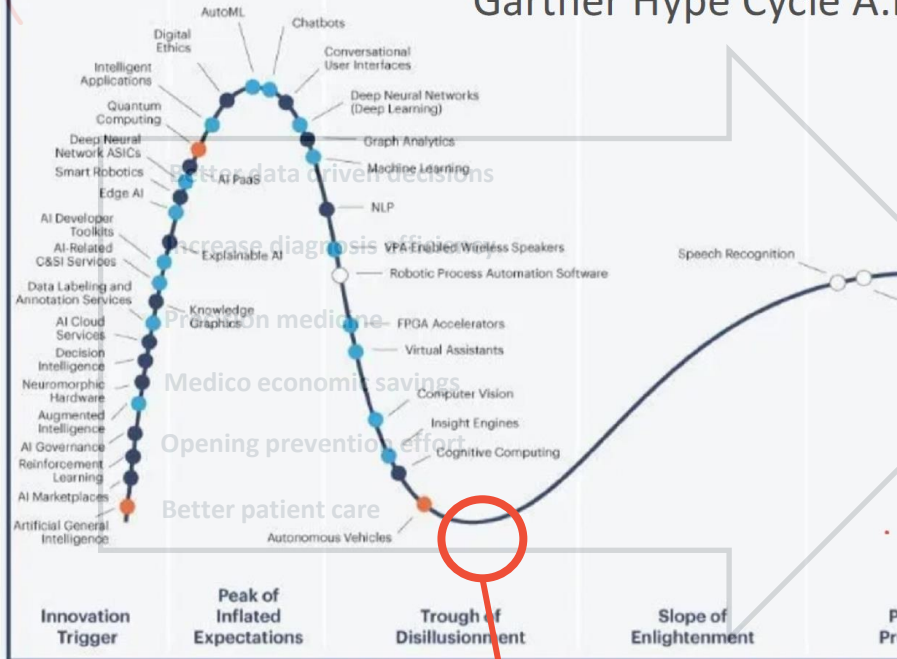
The future biomedical research has to impact in the areas of:

- personalized medicine

- smart diagnostic

- precision therapy

- disease prevention

How national healthcare budgets will shift by 2030 (2018 vs. 2030)

| | EU 5 | | | | | | Total budget (no 2018 data) | |
Total budget in 2030 (US$ billions)	France 380	Germany 570	Italy 250	Spain 180	UK 330	US 4,170	China 3,390	India 870
Diagnostics	11	18	-4	4	14	185	193	49
Preventative care	30	39	14	14	15	301	319	82
Other (e.g., digital health)	25	32	21	13	21	244	282	72
Government & health system	5	14	12	7	16	-30	217	56
Medication	-1	-2	-5	-7	16	207	558	143
Care excl. medication	-29	-28	-10	-9	-47	-185	1,819	466

Source: OECD data; *The Lancet*; Strategy& analysis

A.I. in Healthcare

Gartner Hype Cycle A.I. 2019

Better data driven decisions

Increase diagnosis efficiency

Precision medicine

Medico economic savings

Opening prevention effort

Better patient care

IBM Watson Oncology

IBM - Watson Health

- Truven insurance database 300Mio individuals
- Phytel Electronic health records 50Mio patients
- Memorial Sloan Kettering

7000 Employes
$ 5.000.000.000

IBM's Watson supercomputer recommended 'unsafe and incorrect' cancer treatments, internal documents show

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A.I. in Healthcare: Clean data

AI models are only as good as the data they are trained on

Clean data:

Reduced biases: Unprocessed data may contain biases and inconsistencies that can propagate through AI systems.

Enhanced patient safety: Inaccurate or incomplete data can lead to incorrect diagnoses, treatments, or predictions, potentially harming patients..

Faster decision-making: Clean data simplifies the process of analysis and decision-making, Improved interoperability:

Interoperability: Clean and standardized data facilitates seamless communication and data exchange between different healthcare systems, enhancing interoperability and collaboration.

Scalability: Clean data ensures that AI models can be effectively scaled

Build trust in AI systems among healthcare professionals and patients

producing clean structured data with "prospective" patient cohorts

LIH STRATEGY TOWARDS DATA DRIVEN IMPACT ON PATIENTS

the building blocks:

Integrating Luxembourg's Digital Strategy

Public/private
operationalization
interface
→ ACCESS

L
N
D
S

C-DIC

health/research data
integration center

Decentralized,
trusted
health data
hubs
→ TRUST

national data
exchange platform

EU
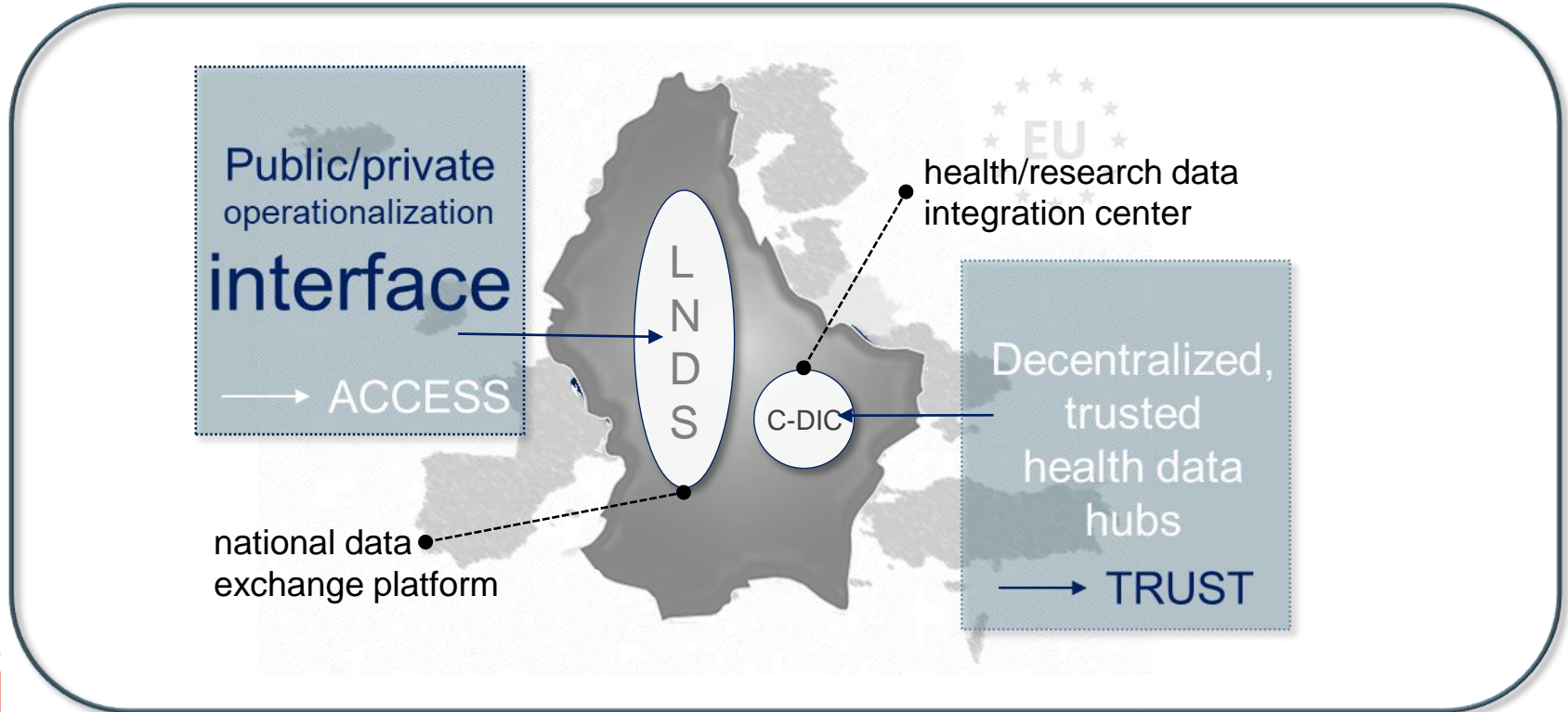
secure and regulated access to health data provides planning safety for use

Internal data interoperability
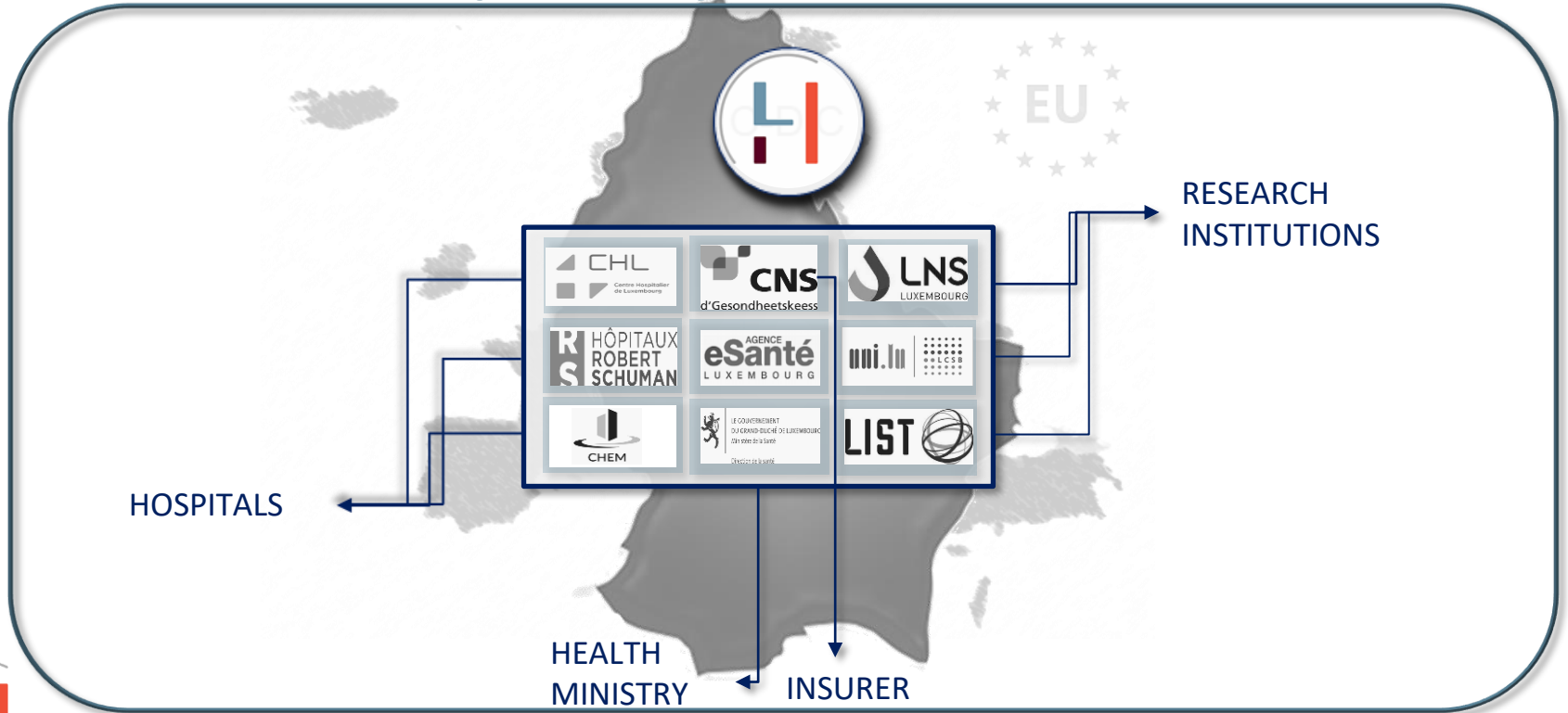
seamless integration of all stakeholders

Transborder interoperability
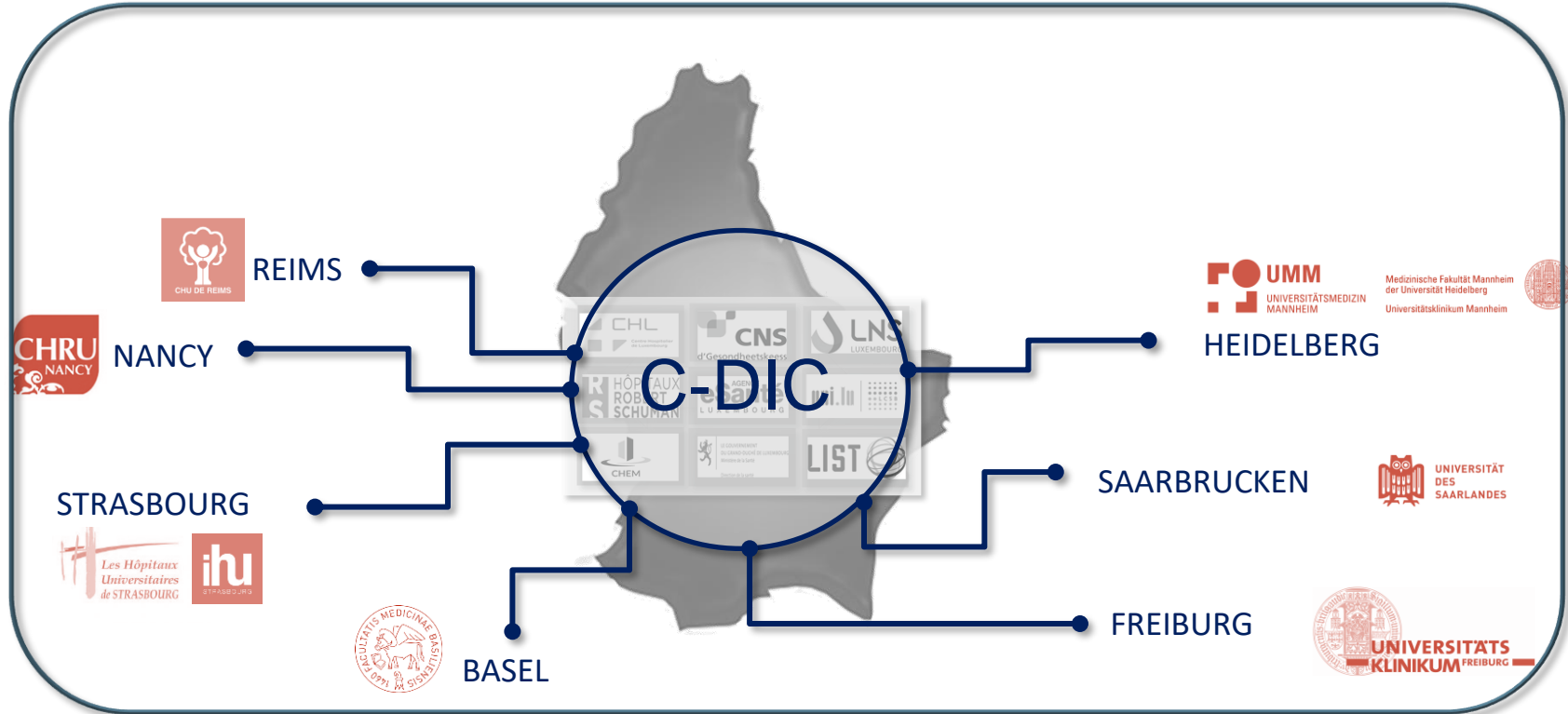
nucleating a European federated data space

Standardized data production

operational integration of bed-bench-bed capacities under one leadership

Pivot toward real world data beyond "-genomic"

Functional- /imaging

Voice-/ digital biomarkers

nutrition

exposome

immune-profile

psycho-/social data

microbiome

metabolome

whole genome
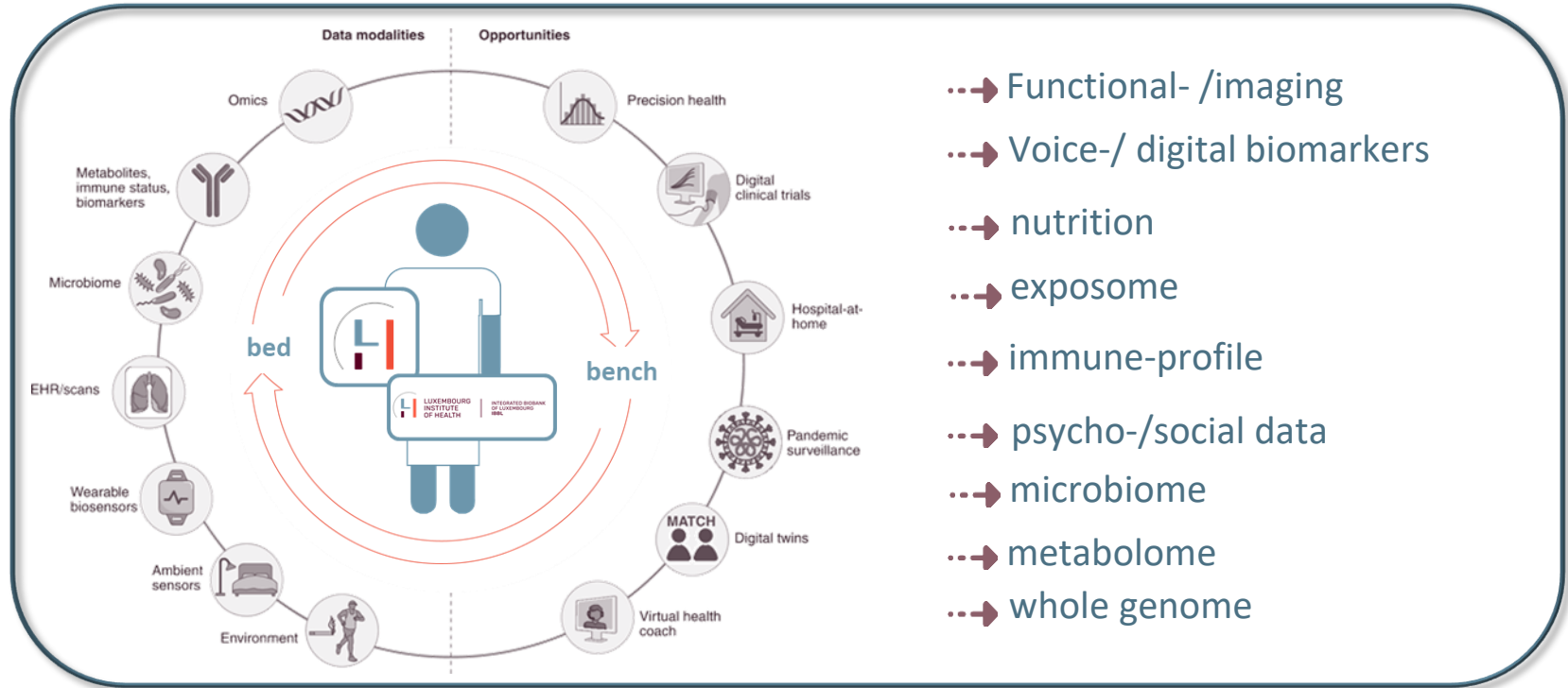
Integrating Luxembourg's Digital Strategy….

standardized data production
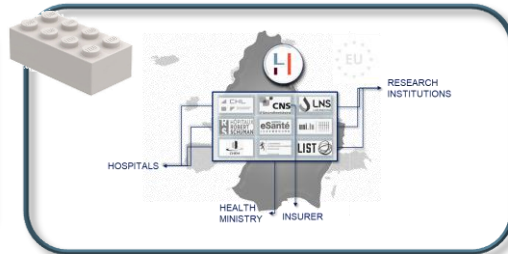
internal data interoperability
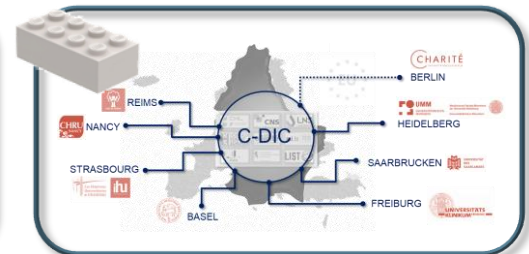
transborder interoperability
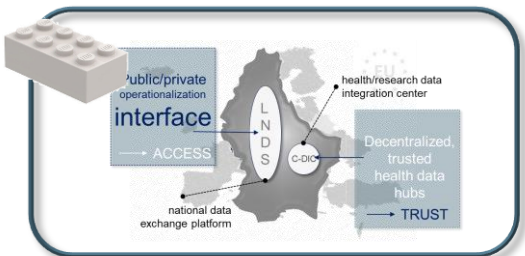
cross sector regulated access

shared clinical trial platform
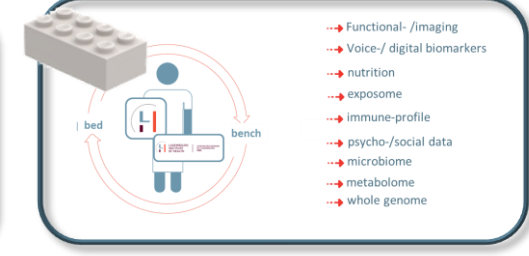
multi-modal data

a need to amortize the investments

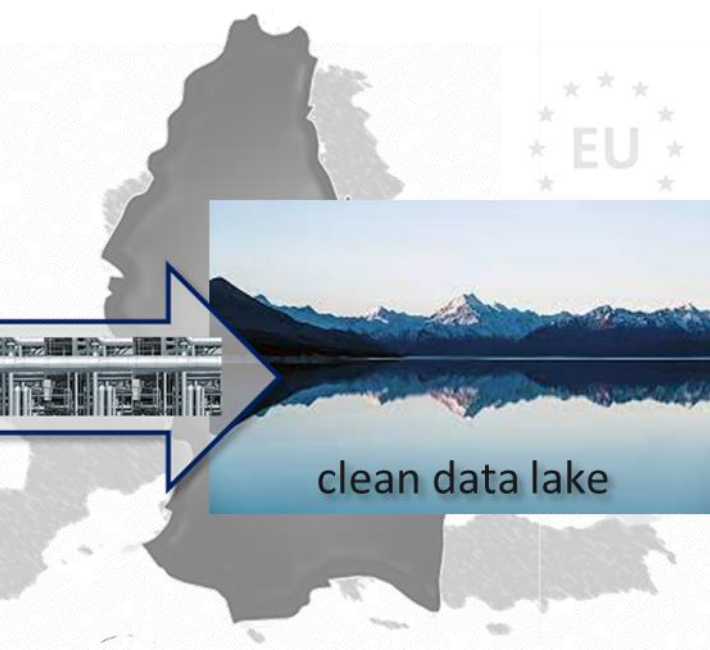# .....linking up to real world data in the heart of Europe
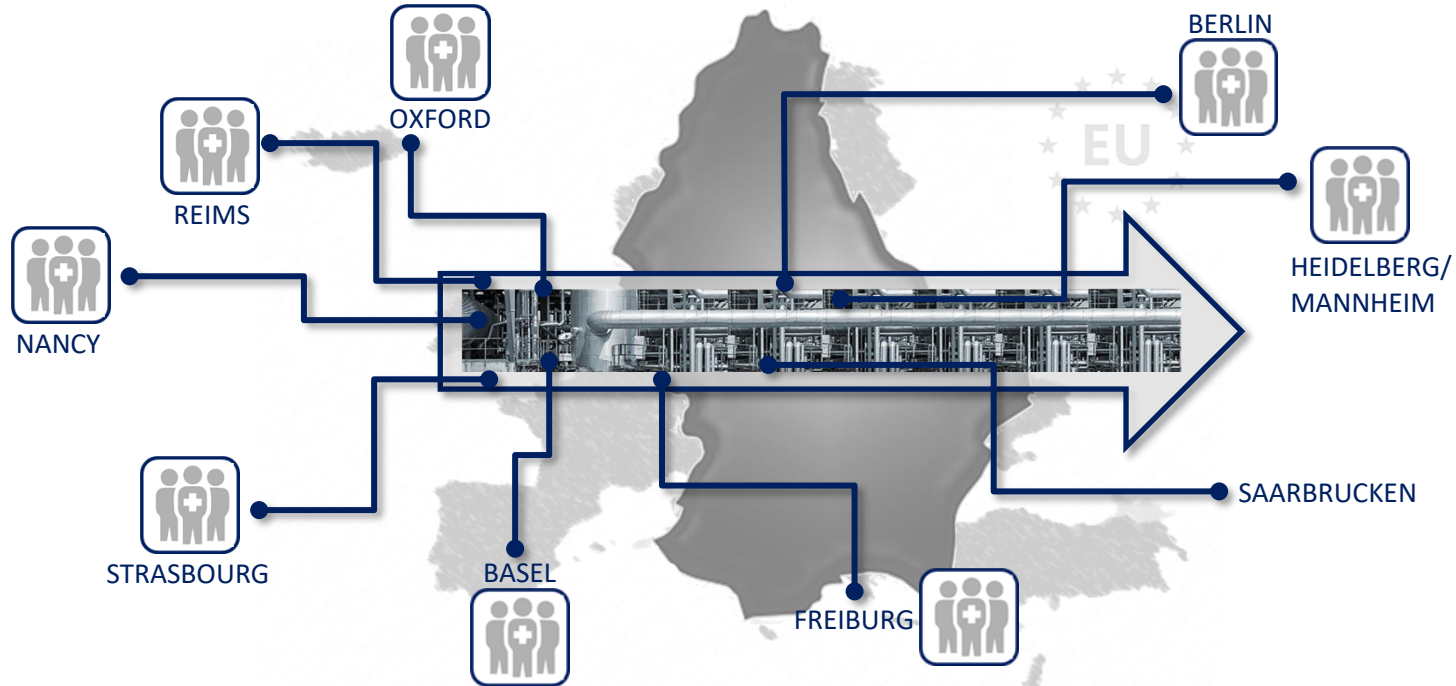
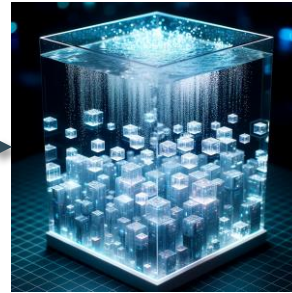Standardized and quality controlled patient data for personalized medicine

Integrating Luxembourg's Digital Strategy

NANCY

HEIDELBERG

REIMS

BASEL

FREIBURG

STRASBOURG

SAARBRUCKEN

clean data lake

LNDS

clients collaborators
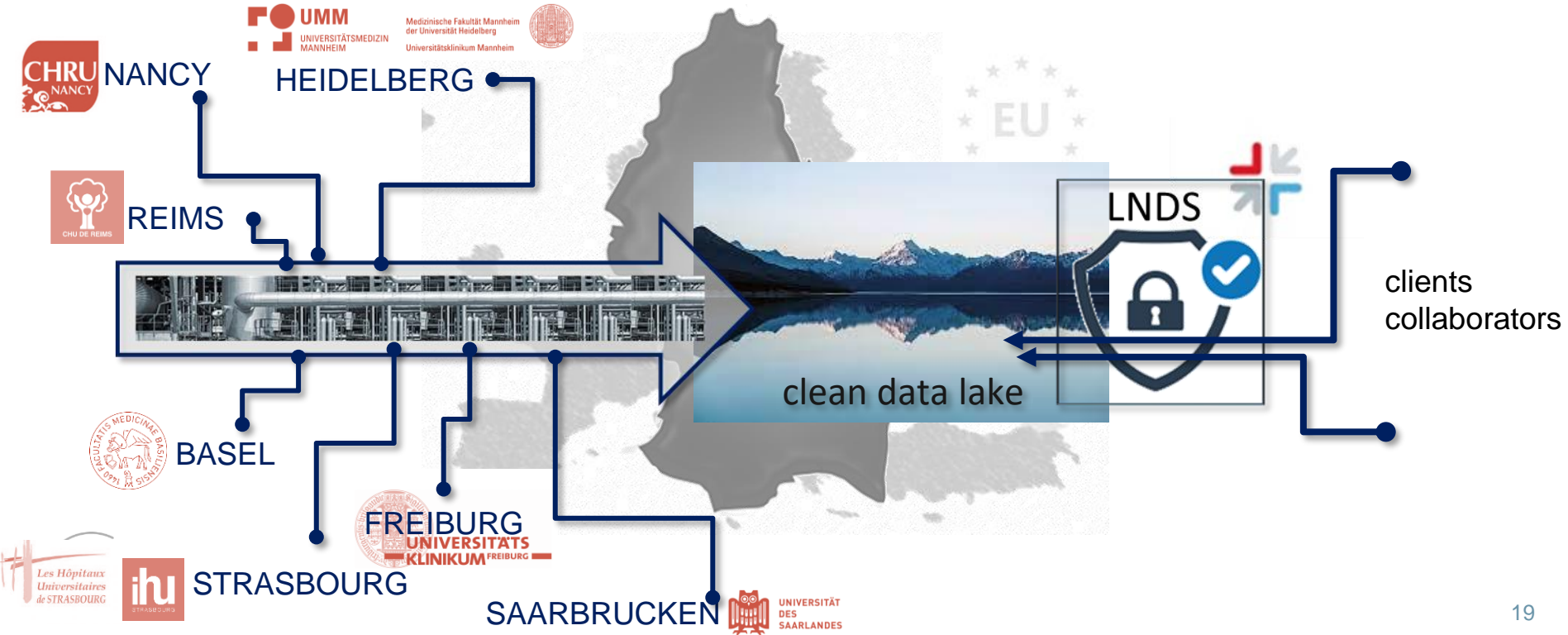
Digital Strategy towards deep digital phenotyping (DDP)

clean data lake

- Connected med. devices
- Wearables
- Social media
- Digital footprint
- Digital biomarkers
- **Real-world data**

feature extraction & combination

DDP

- Biological
- Genetic
- Omic
- Clinical
- eHealth records
- **Biomedical data**

Digital Strategy towards deep digital phenotyping (DDP)

new & digital: *fast, economic*
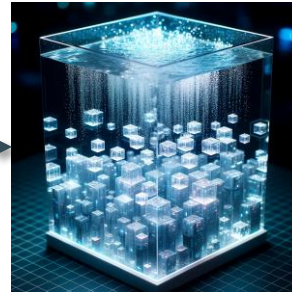
- Connected med. devices
- Wearables
- Social media
- Digital footprint
- Digital biomarkers
- **Real-world data**

clean data lake

train A.I. algorithms

"digital avatar"

- Biological
- Genetic
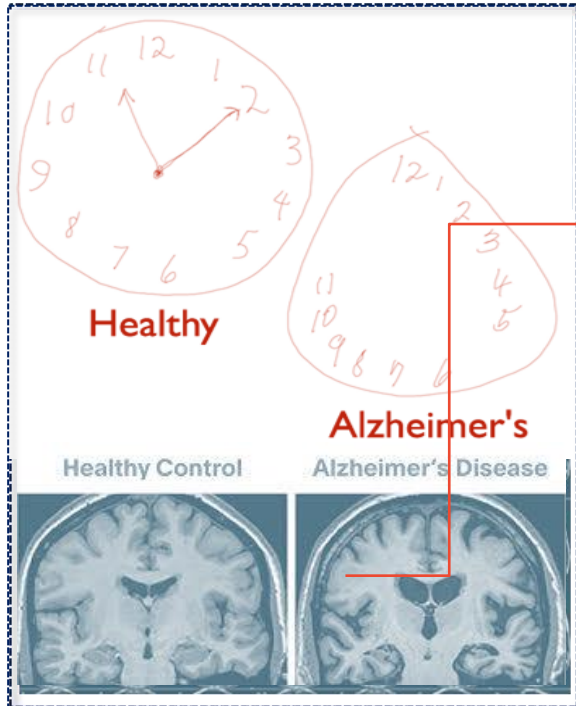- Omic
- Clinical
- eHealth records
- **Biomedical data**

reference platform

classical, biomedical/clinical
slow, expensive

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A.I. in Healthcare

Healthy

Alzheimer's
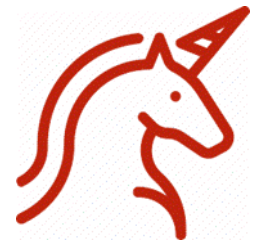
Healthy Control   Alzheimer's Disease

digital cognitive assessment (15min)

95% accurate, early detection of Alzheimer's disease
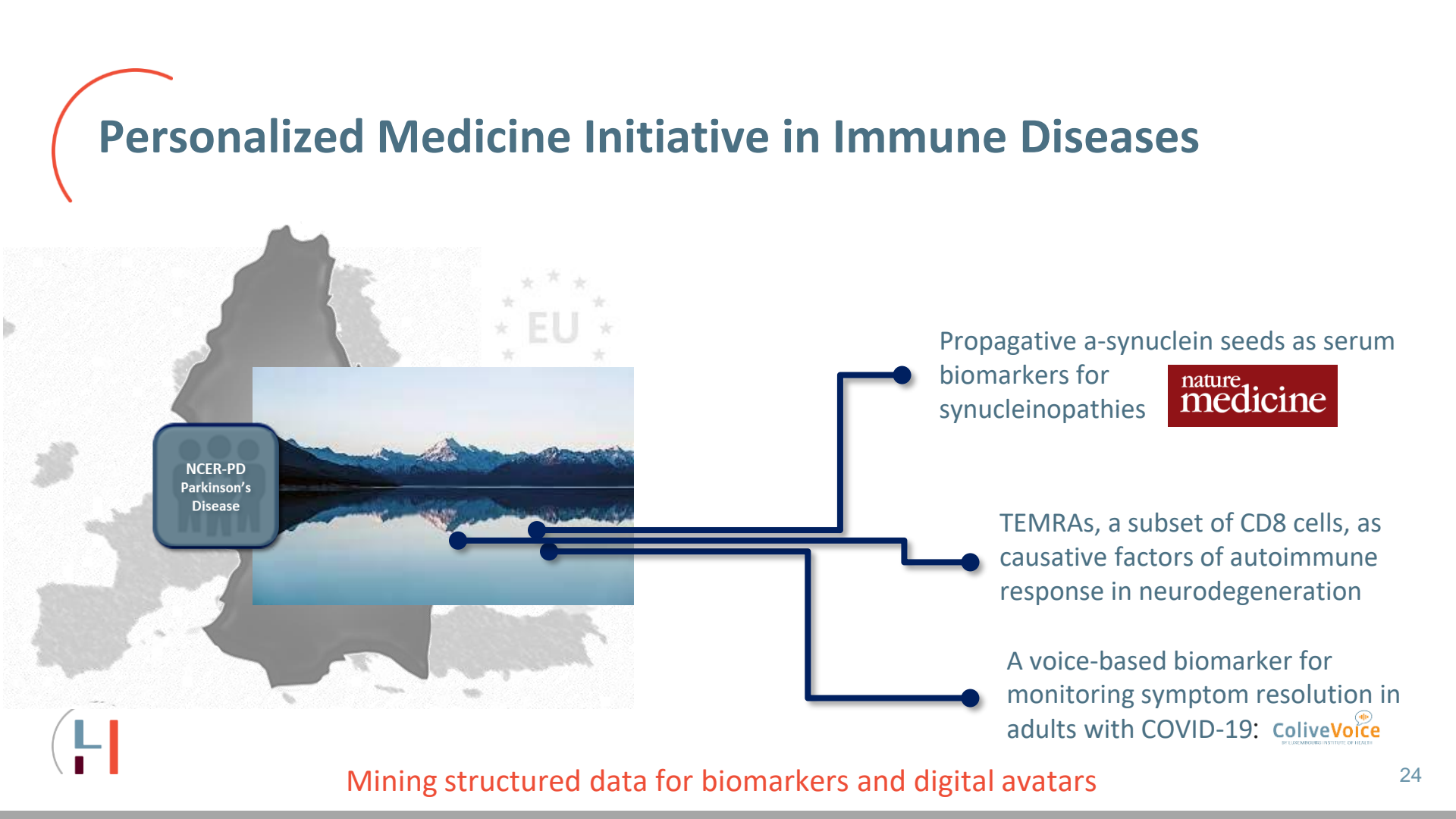
LINUS HEALTH

Early results and benchmarks for LIH strategy

Personalized Medicine Initiative in Immune Diseases

NCER-PD Parkinson's Disease

EU

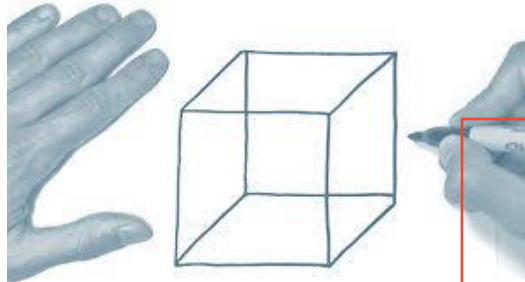Propagative a-synuclein seeds as serum biomarkers for synucleinopathies

nature medicine

TEMRAs, a subset of CD8 cells, as causative factors of autoimmune response in neurodegeneration

A voice-based biomarker for monitoring symptom resolution in adults with COVID-19: ColiveVoice

Mining structured data for biomarkers and digital avatars

Personalized Medicine Initiative in Immune Diseases

standardized blood test

Propagative a-synuclein seeds as serum biomarkers for synucleinopathies
nature medicine

digital cognitive assessment

early detection of Parkinson's disease

Personalized Medicine Initiative in Immune Diseases
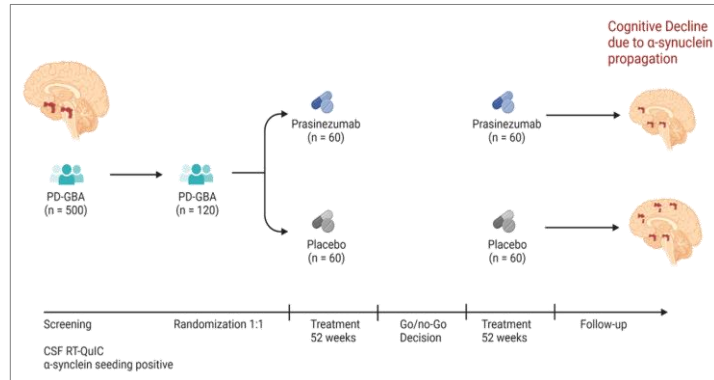
Propagative a-synuclein seeds as serum

Valorisation on 'trial-ready' deep-phenotyped cohorts

➢ Emerging collaboration with Roche Pharmaceuticals

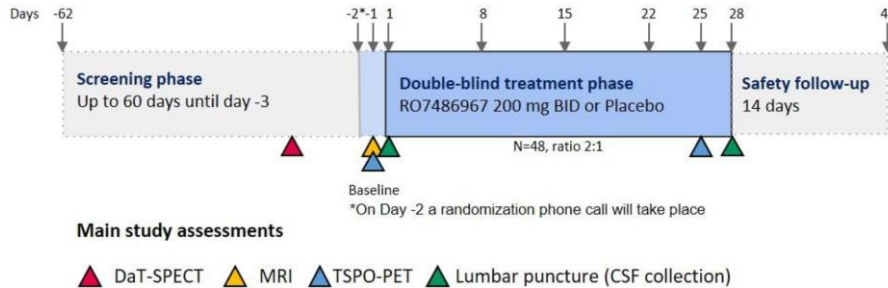• Support of a MJFF-funded multicentre- trial on precision medicine in patients with GBA mutations

Valorisation on 'trial-ready' deep-phenotyped cohorts

➤ Emerging collaboration with Roche Pharmaceuticals

Roche

• First phase I clinical trial for people with Parkinson's disease

Days -62   -2*-1 1   8   15   22   25 28   42

| | | | | | |
Screening phase
Up to 60 days until day -3

Double-blind treatment phase
RO7486967 200 mg BID or Placebo

Safety follow-up
14 days

N=48, ratio 2:1

Baseline
*On Day -2 a randomization phone call will take place

Main study assessments

🔺 DaT-SPECT   🔺 MRI   🔺 TSPO-PET   🔺 Lumbar puncture (CSF collection)

1.   **PROTOCOL SUMMARY**

1.1   **SYNOPSIS**

PROTOCOL TITLE: A PHASE 1B, ADAPTIVE, MULTI-CENTER, RANDOMIZED, DOUBLE BLIND, PLACEBO-CONTROLLED, PARALLEL DESIGN STUDY TO INVESTIGATE THE SAFETY, TOLERABILITY, PHARMACOKINETICS AND PHARMACODYNAMICS OF RO7486967 IN PARTICIPANTS WITH EARLY IDIOPATHIC PARKINSON'S DISEASE

SHORT TITLE: First study of RO7486967 in participants with early idiopathic PD

Valorisation on 'trial-ready' deep-phenotyped cohorts

➤ Emerging collaboration with Roche Pharmaceuticals

• Collaboration in the Moonshot Initiative to establish a blood biomarker for neurodegeneration
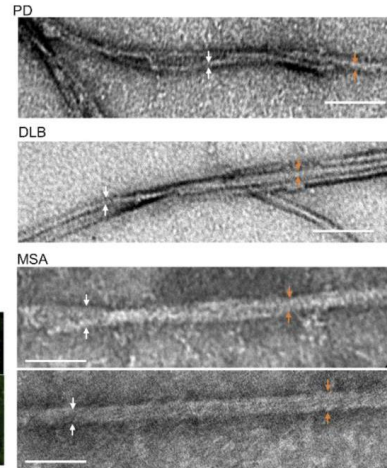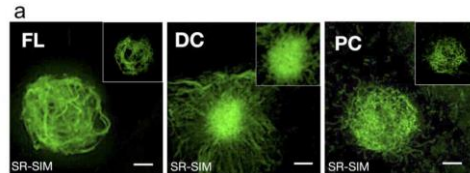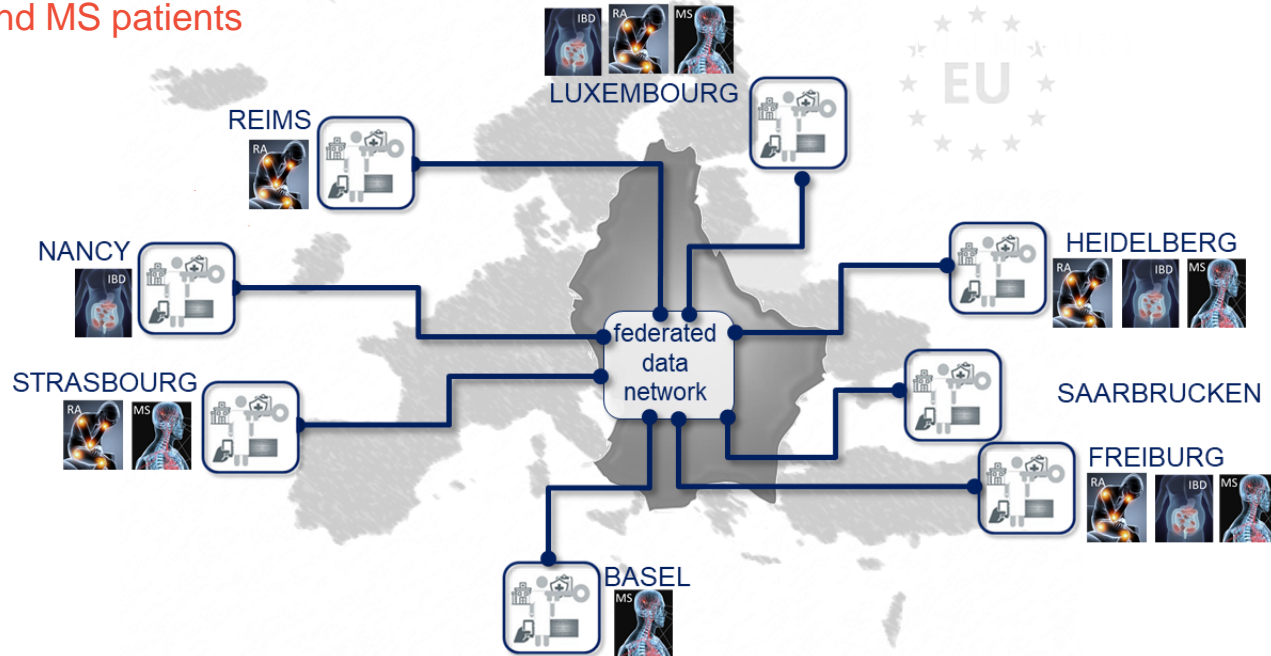

nature medicine

Article   https://doi.org/10.1038/s41591-023-02358-9

Propagative α-synuclein seeds as serum biomarkers for synucleinopathies

Personalized Medicine Initiative in Immune Diseases

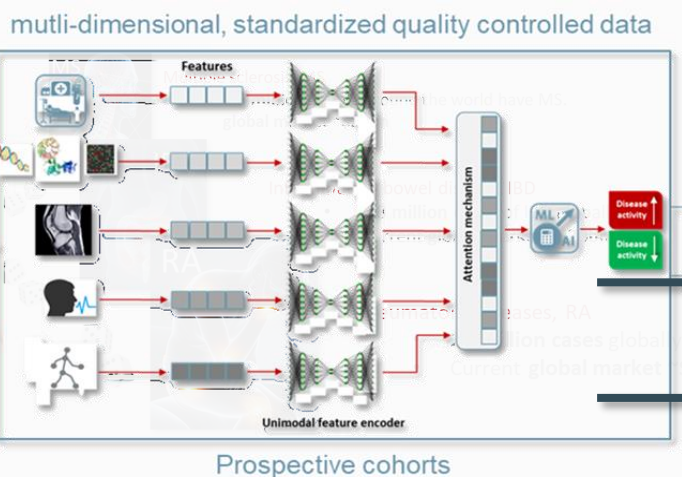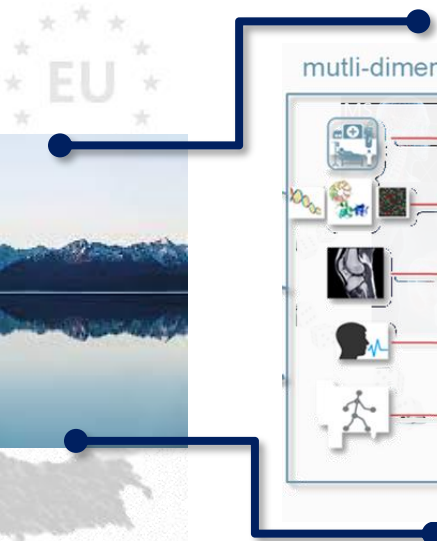Clinnova: Precision treatment for
IBD, RA and MS patients

€50Mio funding secured

Personalized Medicine Initiative in Immune Diseases

Mining structured data for biomarkers and digital avatars

Are we competitive on an international level?

Key factors for Europe's competitiveness in digital health

data quality

LNDS

data security, regulated access and planning safety

EU

TRUSTED AI

assuring trust in A.I. driven process
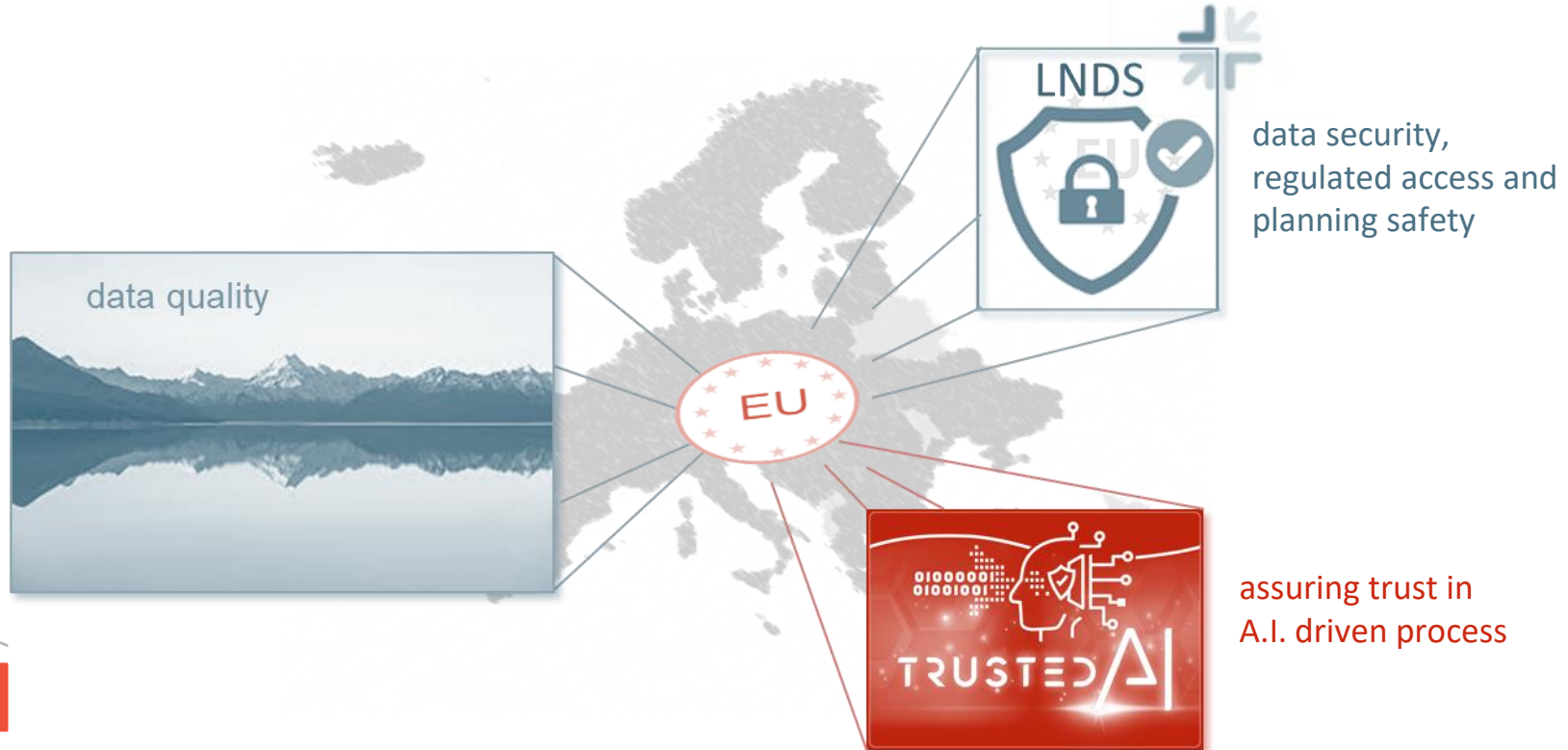
Luxembourg as a gate to Europe's digital health market

regulated, secure access

Luxembourg as a gate to Europe's digital health market