gaia-x

Health Data Space Event

4 APRIL 2022

Chapter 2a: Breakout Use cases

gaia-x

#2 Patient Driven Measurements and Outcomes

Welcome & opening

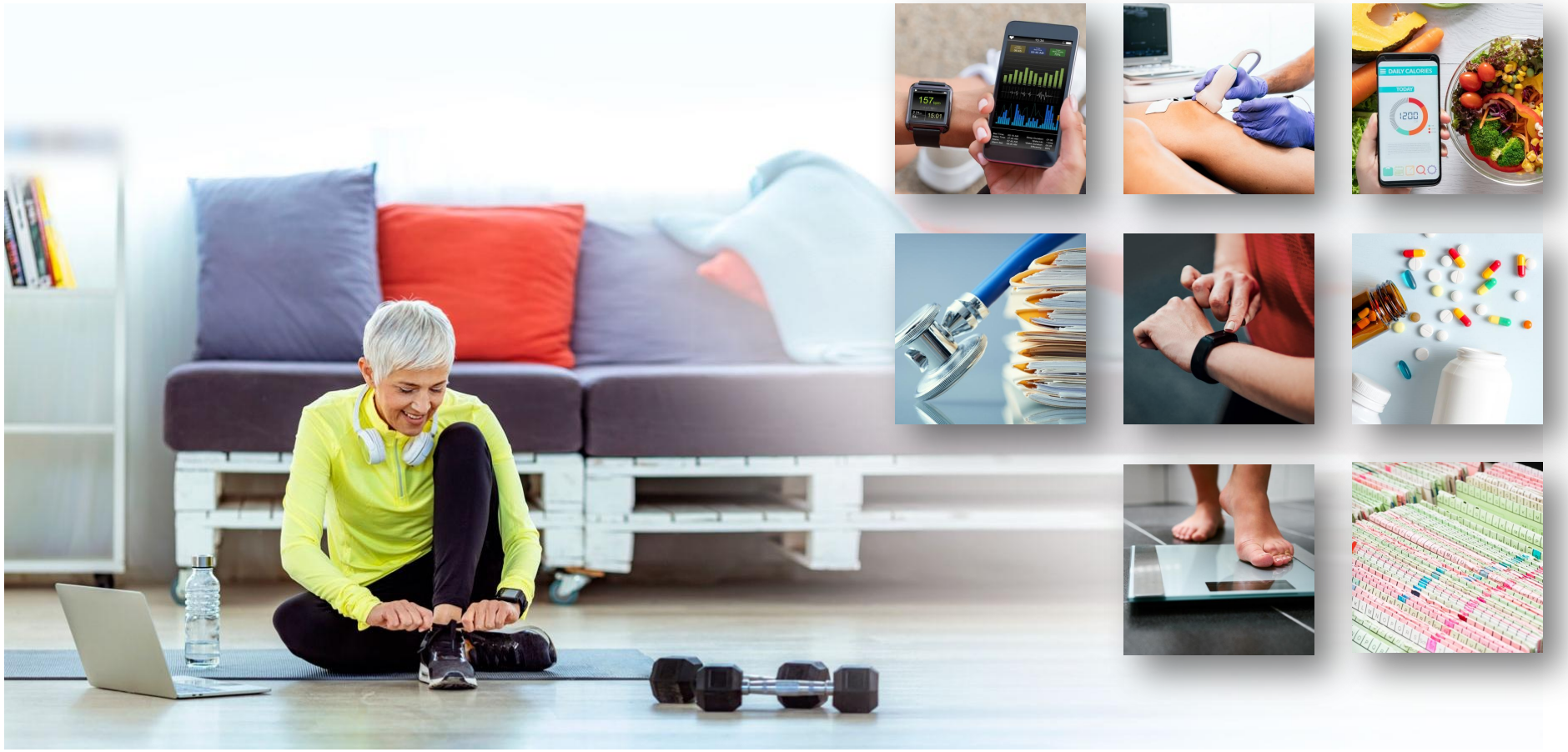
- **Dr Jasmin Schulz,** Strategic Programme Officer, Luxembourg Institute of Health

Gaia-X project: Health-X DataLoft

gaia-x

- **Prof. Dr. Roland Eils,** Founding Director, Center for Digital Health Berlin Institute of Health (BIH) at Charité – Universitätsmedizin Berlin

A Common Health Data Space: The Gap Between Reality and Fiction



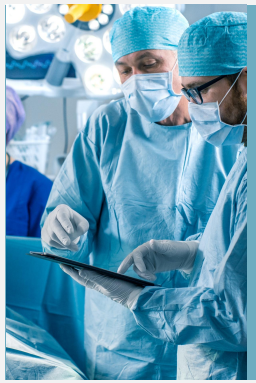
HEALTH-X dataLOFT: Building a dataspace platform for a Unified Health Domain

Gaia-X as the basis for a sovereign data space

- Alternative to the free-market approach seen in the US
  - Enabling many individual providers of data and services through the use of standardized interfaces and processes
  - IT Security, Privacy, Compliance, and Trust at the foundation of the platform
- Covering domain specific needs and requirements

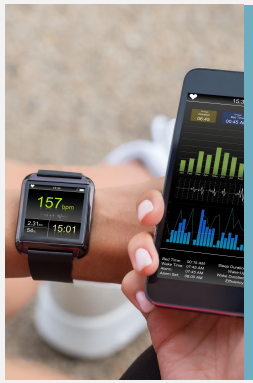
A European Health Data Space? Status Quo

CHARITÉ
UNIVERSITÄTSMEDIZIN BERLIN



Primary Health Sector

highly regulated and fragmented



Secondary Health Sector

dominated by the well known data monopolists

- Centralized data storage and processing not aligned with European values and regulations
- A European way to build a health data space needs to be built

Vision: The European Health Data Space

Radically transforming the Health Sector: Putting Citizens into the Driver‘s Seat

- Unified Access to all your Health Related Data
- Generating Trust and Acceptance by enabling Digital Sovereignty
- dataLOFT allows Citizens to know and control access to their data

⇒ **Citizens are transformed from Recipients of Care to Active Partners**

Secure and Trusted Use of Data across Europe

- Connecting data from the primary and secondary Health Sectors
- Collating Health Data via Data Donation
- Generating Ecosystems based on modular Platform Services
- Combining Personal Health Data with new and comprehensive approaches to Diagnosis, Therapy, and Clinical Care

=> Data based Real World Evidence Research will be wide-spread reality

Building the HEALTH-X Data Space

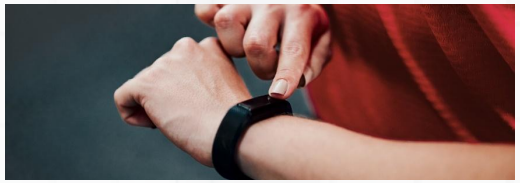
Based on existing national digital tansformation efforts in Germany

Primary Health Sector: Germany's Strong Foundation

MII (Medical Informatics Initiative)
- Clinical Health Data
- Opening up Data Silos
- Common Norms and Regulations
- Interoperability

ePA (elektonische Patientenakte)
- Primary Care Data
- Norms and Regulations from Gematik

Secondary Health Sector



Fitness and Health Data
- Partner Smart Health Devices
- **Cross sectoral engagement** with Gaia-X domains Mobility and Smart Living

☐ **Gaia-X as the common framework to enable federated health data economy within HEALTH-X**

HEALTH-X dataLOFT

Das Konsortium

AISBL Members

Fraunhofer

INTERNATIONAL DATA SPACES ASSOCIATION

plusserver

3 Founding Members of the AISBL

CHARITÉ UNIVERSITÄTSMEDIZIN BERLIN

1&1 IONOS

DELL

intel

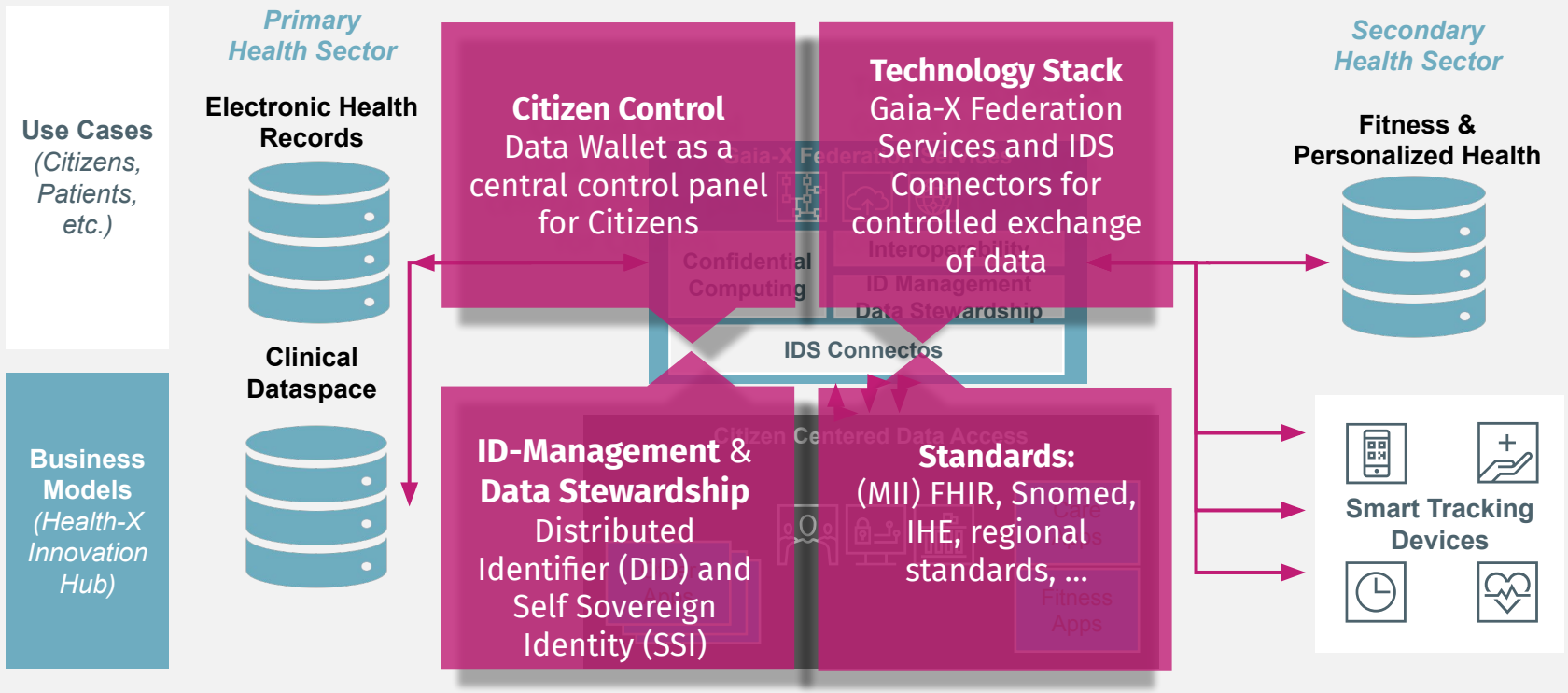
IBM

accenture

Day One Members

Berlin Institute of Health @Charité

HEALTH-X dataLOFT:
A Citizen-Centric Health Data Space



Berlin Institute of Health @Charité

HEALTH-X Use Cases

Prevention:

- Longterm self-tracking
- Digital Intervention and Early Warning System
- Personal Health Awareness

Clinical Companion:

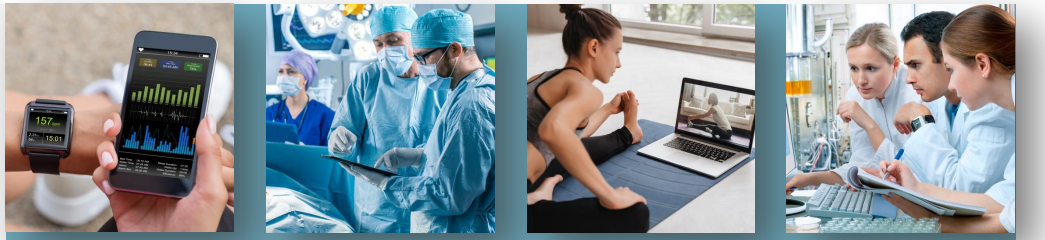
Addressing and reducing risk of surgical procedures via comprehensive pre/peri/post surgery assistance

Personalized Health Services:

Individualized therapy and
Day-to-Day training support

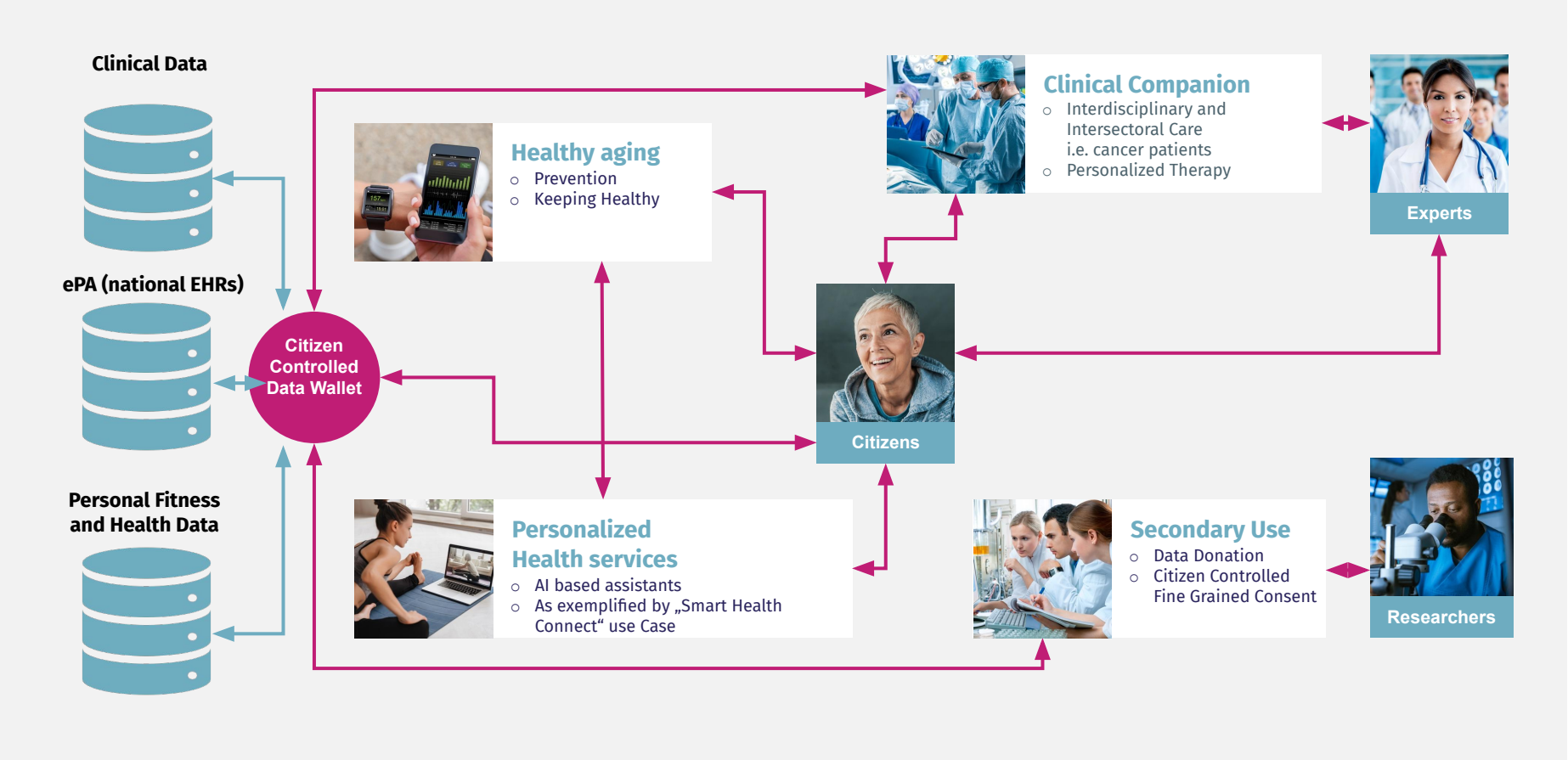
Secondary Use:

Self-determined data donation



- **High Potential**: Highly relevant use cases in different aspects of health with strong potentioal to improve individual care.
- **Human Centered**: Development and evaluation of use cases based on the needs of all participants in the healthcare system.
- **Sovereignty** about your personal data is the foundation of all methods of collecting, using, and sharing data.
- **Busines Models**: Enabling B2B und B2C models by getting stakeholders on board.

Vielfalt von Use Cases basierend auf einheitlichen Datenquellen, Technologien und Prozessen



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BIH Berlin Institute of Health @Charité

HEALTH-X Innovations Hub: *Use Case Driven Development of the Health Data Space*

Berlin Institute of Health @Charité

Thank You

Prof. Dr. Roland Eils
Founding Director
Center for Digital Health
Berlin Institute of Health (BIH) at
Charité – Universitätsmedizin Berlin

www.bihealth.org

Berlin Institute of Health @Charité

Gaia-X project: TEAM-X

- **Jochen Bauer,** Group Leader Home Automation, Lehrstuhl für Fertigungsautomatisierung und Produktionssystematik (FAPS), Friedrich-Alexander-Universität Erlangen-Nürnberg

TEAM-X

Trusted Ecosystem of Applied Medical Data eXchange

Health Data Space Event 04.04.2022

Gefördert durch:

Bundesministerium für Wirtschaft und Klimaschutz

aufgrund eines Beschlusses des Deutschen Bundestages

Agenda

13.17

Jochen Bauer

Group Leader Home Automation,
Lehrstuhl für Fertigungsautomatisierung und Produktionssystematik (FAPS),
Friedrich-Alexander-Universität Erlangen-Nürnberg
jochen.bauer@faps.fau.de

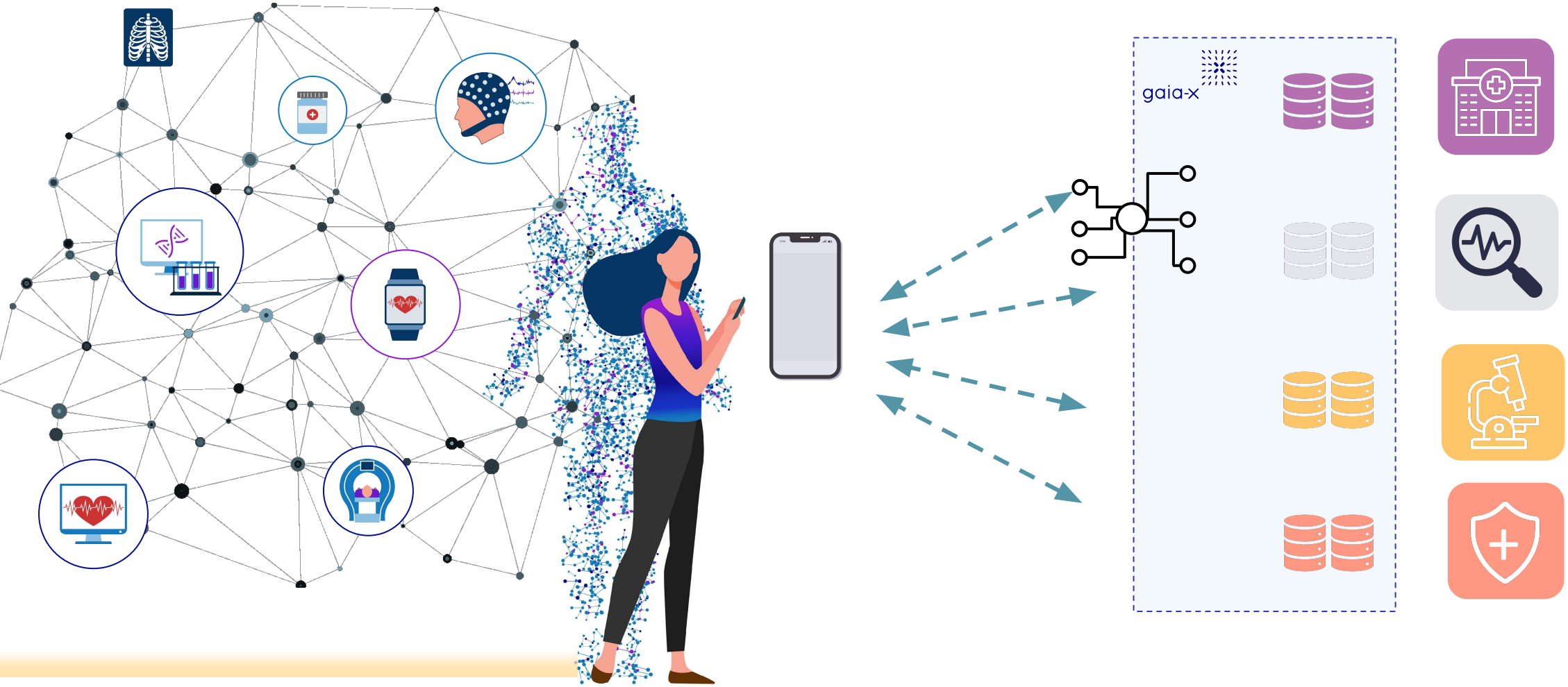
1. TEAM-X, the project: Gaia-X Förderwettbewerb
2. TEAM-X, the use cases: Health & Care
3. TEAM-X, the USP: Digital Responsibilty
4. TEAM-X, the team: from Bavaria to the GX-Community

What if …

Gaia-X becomes the Game Changer for the Health and Care domain?

… and we are able to decide what will happen to our data.

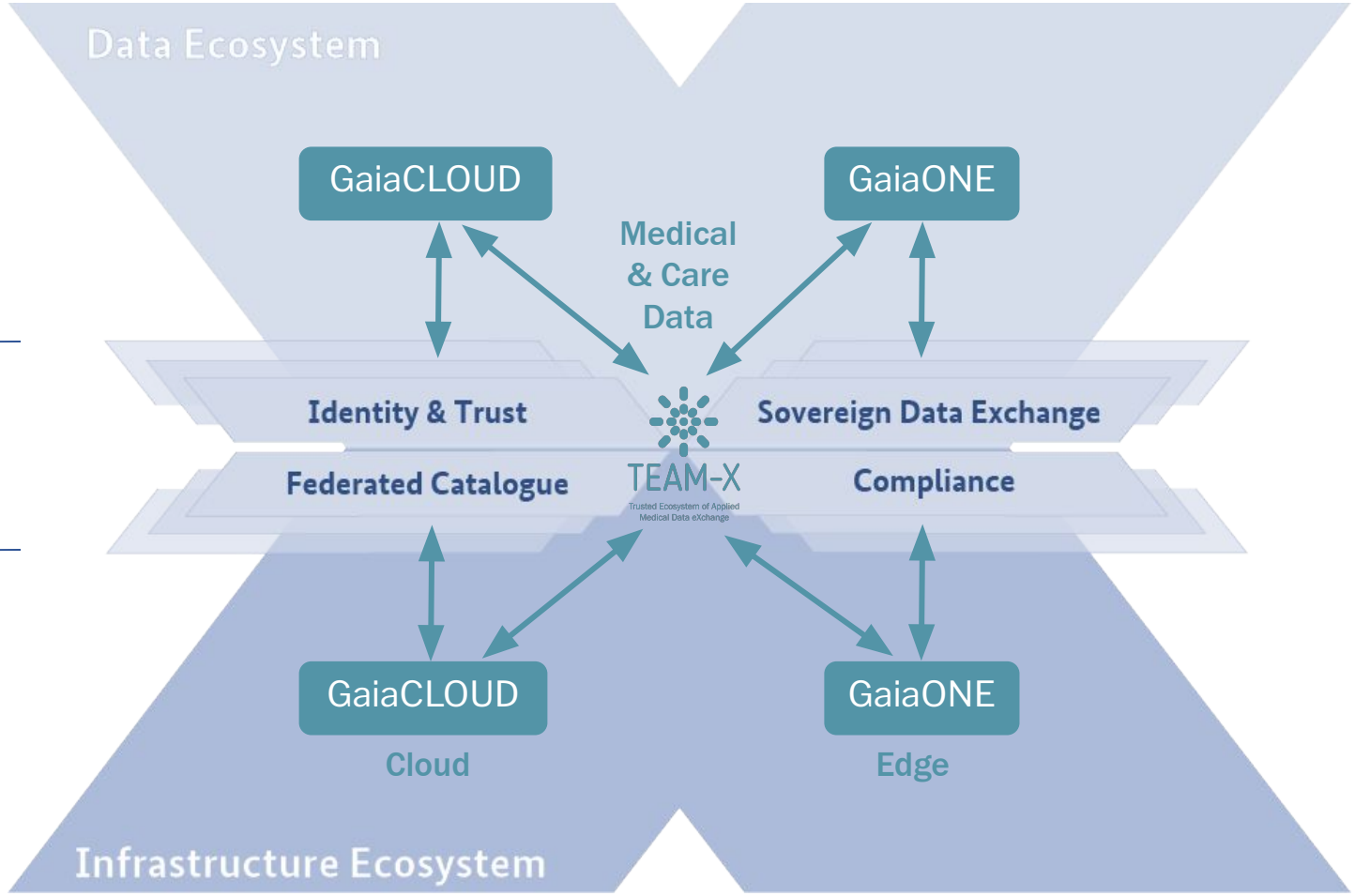
TEAM-X
Trusted Ecosystem of Applied Medical Data eXchange



TEAM-X offers both, a cloud- and an edge-based approach just to combine their strengths in a solution.

TEAM-X
Trusted Ecosystem of Applied Medical Data eXchange

GAIA-X Federation services
Federated & distributed for Interoperability Trust & Sovereignty services



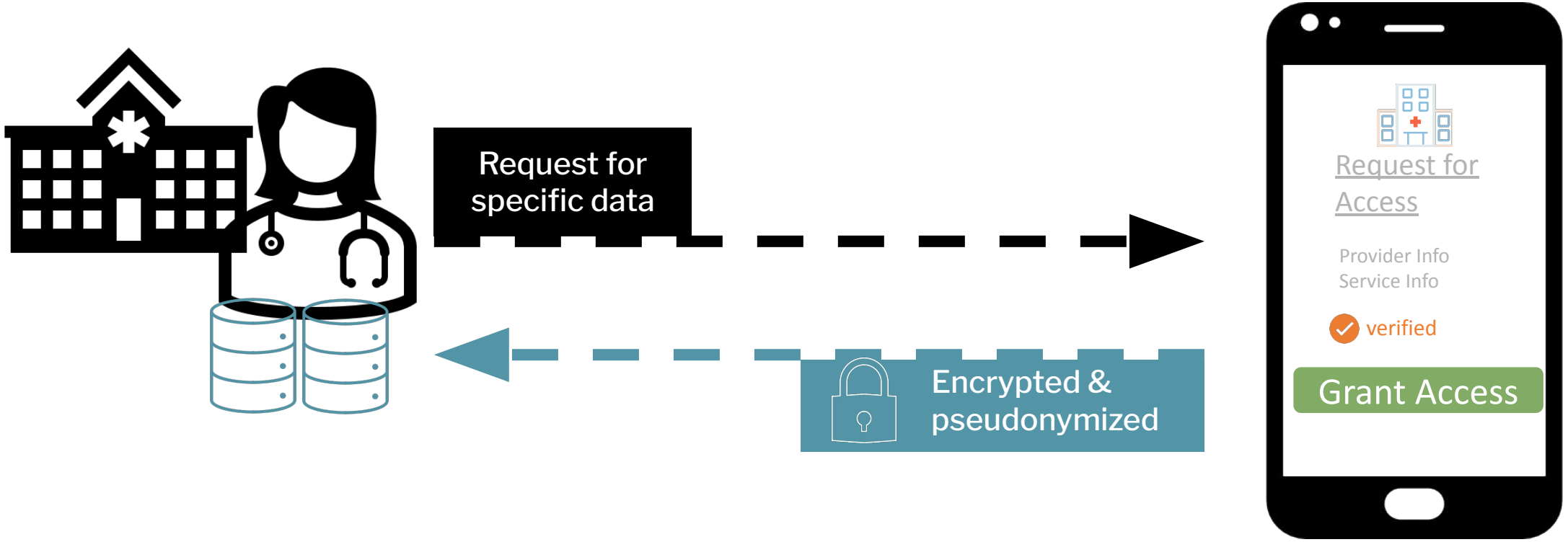
Sector specific Data Spaces for Health, Care and Smart Living / Ambient Assisted Living.

Usage of GXFS to increase interoperability on a semantic level

Extension of cloud-based architectures to the world of IoT.

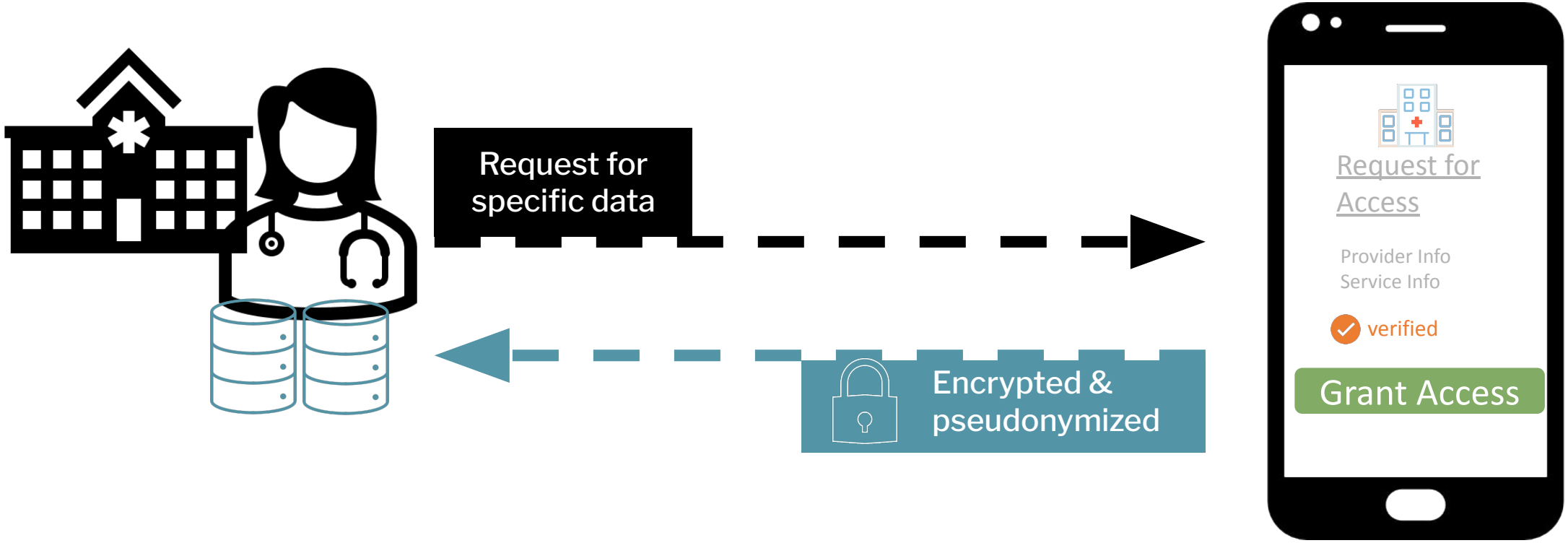
TEAM-X enables users to manage their data due to their own needs.

TEAM-X
Trusted Ecosystem of Applied Medical Data eXchange



TEAM-X enables users to manage their data due to their own needs.

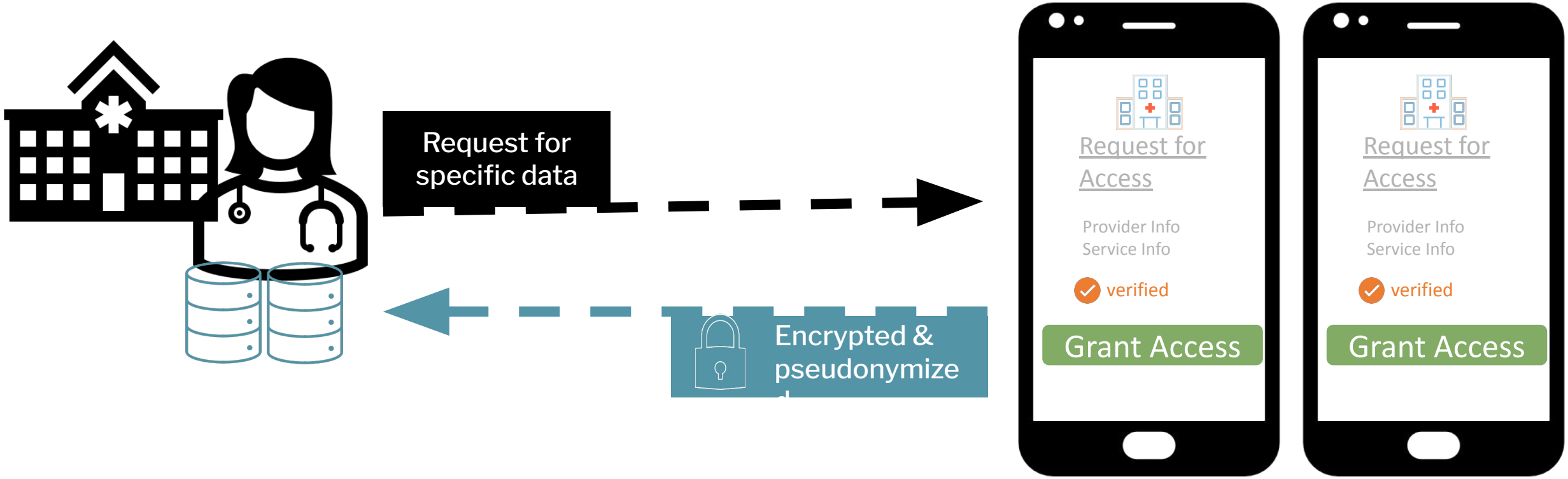
TEAM-X
Trusted Ecosystem of Applied Medical Data eXchange



Privacy Dashboard / Report

TEAM-X enables users to manage their data due to their own needs.

TEAM-X
Trusted Ecosystem of Applied Medical Data eXchange



Federated Learning Approaches

TEAM-X addresses two use cases to show the value and benefits for patients, clients and people.

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Female Health

Breast Cancer: Treatment-related data will be acquired and shared among physicians and researchers.

&

Digital Care Platforms

On-Site Care: support data acquisition and documentation for caregivers.

Off-Site Care: improve patients‘ comfort and safety at home.

TEAM-X considers responsibility by implementing the Digital Responsbility Goals framework.

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TEAM-X

Trusted Ecosystem of Applied Medical Data eXchange

bayern innovativ – Innovation leben.
FAPS Lehrstuhl für Fertigungsautomatisierung und Produktionssystematik – Prof. Dr.-Ing. Jörg Franke
ProCarement
FAU Friedrich-Alexander Universität Erlangen-Nürnberg
Universitätsklinikum Erlangen
Medical Valley de:hub Nürnberg Erlangen Digital Health
NeuroSys
C&S managing care.
d.hip Digital Health Innovation Platform
esec
Kommhaus – Wer kommuniziert, gewinnt.
Parmenides Foundation
REFINIO
Siemens Healthineers
Fraunhofer IIS
Machine Learning & Data Analytics
Identity Valley – It's all about trust.
Care Valley

Gefördert durch:

Bundesministerium für Wirtschaft und Klimaschutz

aufgrund eines Beschlusses des Deutschen Bundestages

Thanks!

TEAM-X

Trusted Ecosystem of Applied Medical Data eXchange

Trusted Ecosystem of Applied Medical Data eXchange

Q&A with the audience

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Clinnova – cross-border health innovation

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Dr Jasmin Schulz,

Strategic Programme Officer
Luxembourg Institute of Health

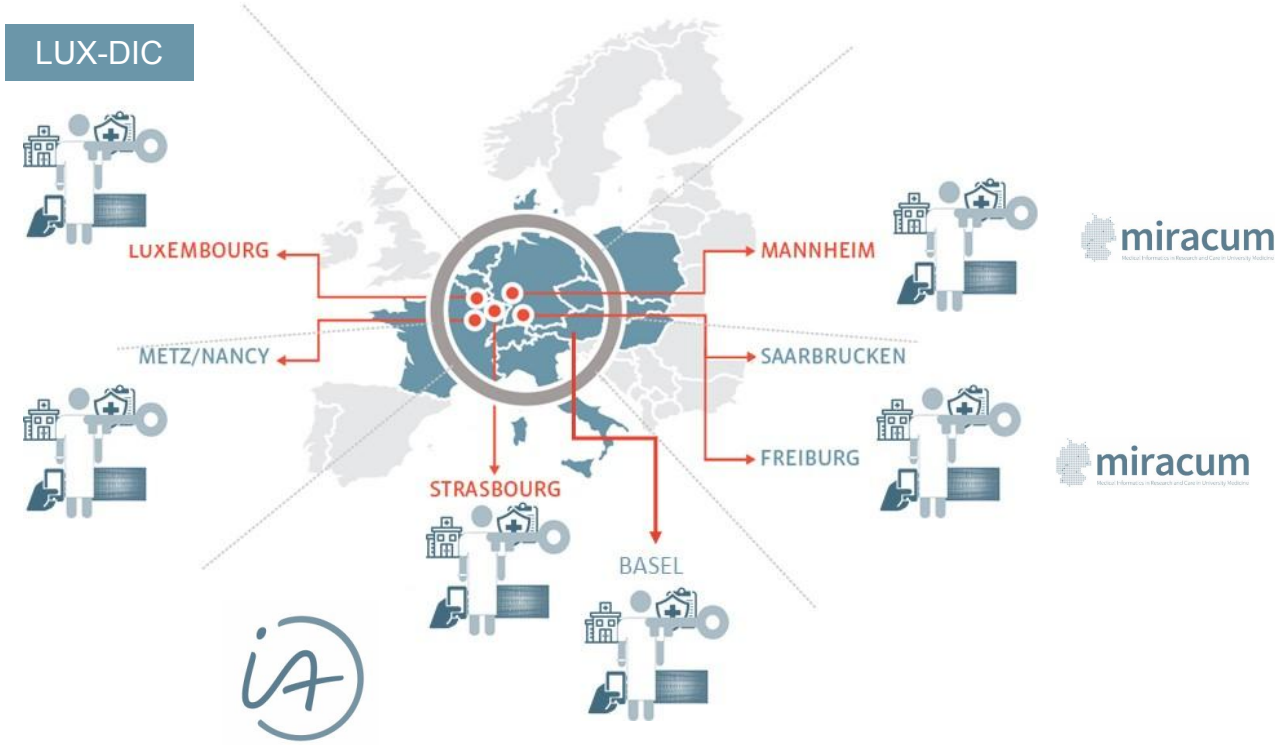
jasmin.schulz@lih.lu

Clinnova partners

Clinnova – connecting data spaces

Creation of a federated network of local data integration centres (DIC) to boost patient-centric research

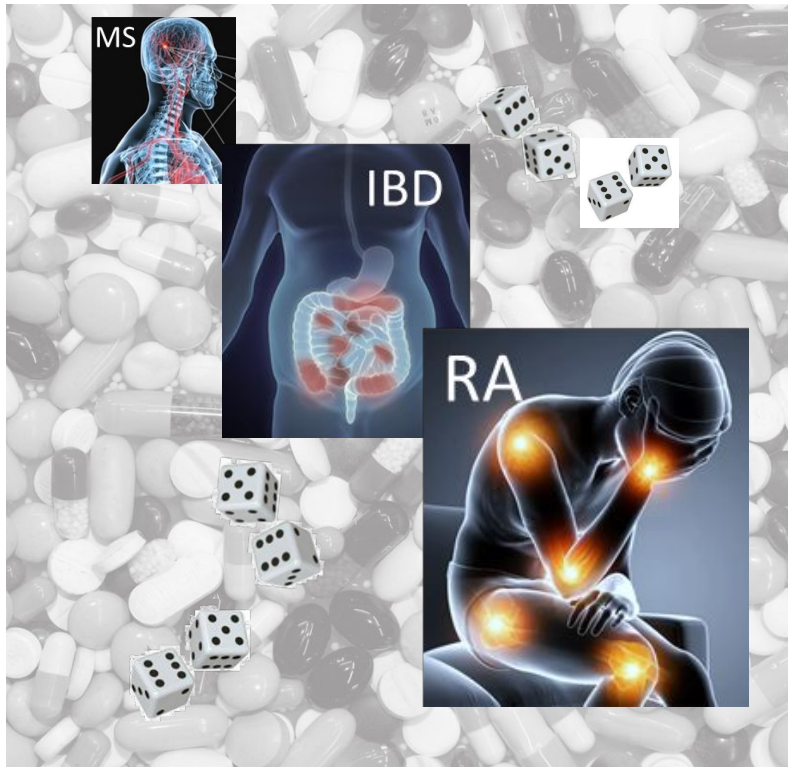
- Linking up data integration platforms between clinical and research centers across borders
- Federated computing: data remain in local data integration centres and analyses are performed remotely
- Links health data context with neighbours based on interoperability



Clinnova – use cases

CLINNOVA STARTS WITH 3 MEDICAL USE CASES

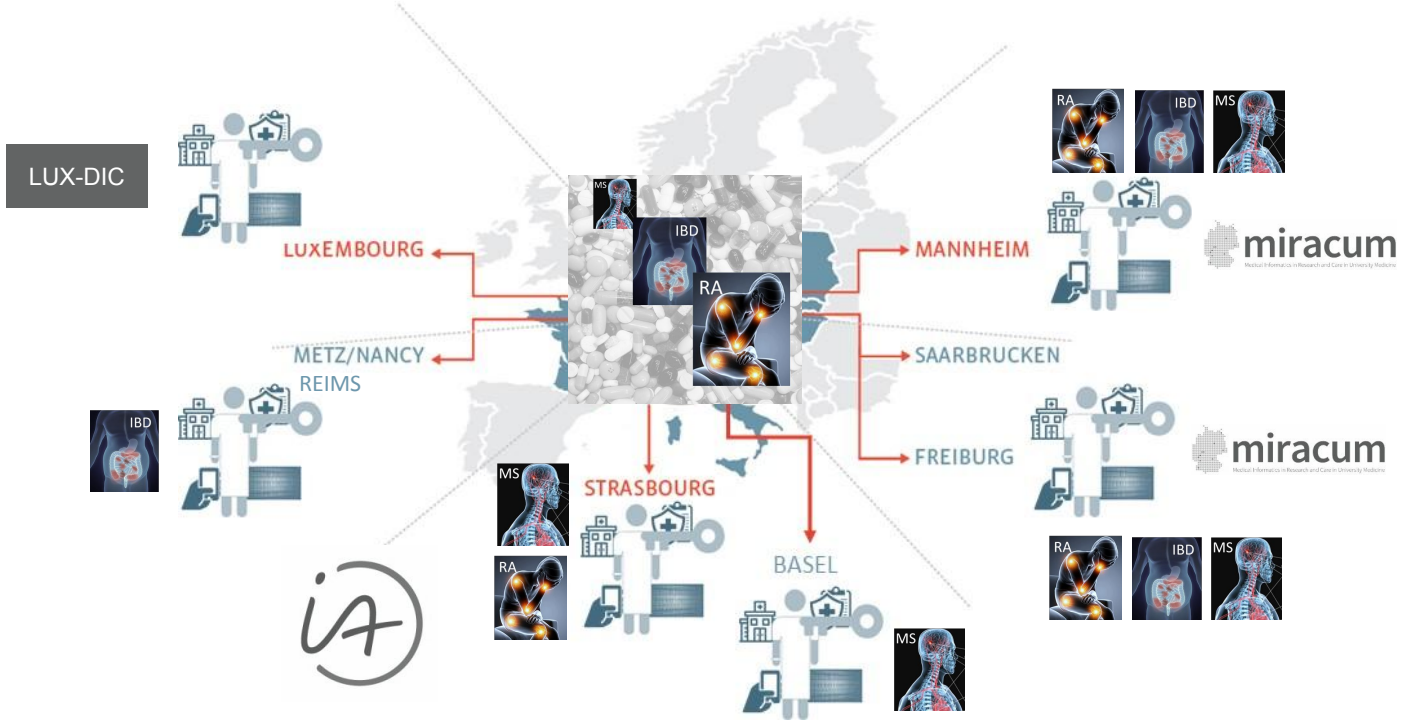
- RA, IBD and MS: 30Mio patients, €55Bn/ year market
- Standard of care drugs are abound, but it is not known which drug benefits what patient
- Clinnova's stratification approach will support precision medicine



Clinnova – use cases

USE CASE PARTNER NETWORK

- Patient data remain local
  - Clinical data
  - (e)PROs
  - Health trackers
  - Omics
  - Imaging
- Concept for Semantic and technical interoperability in preparation
- Data to be analysed by Trusted AI where feasible



Lux use case – clinician interface

integrated dashboard for real-time feedback

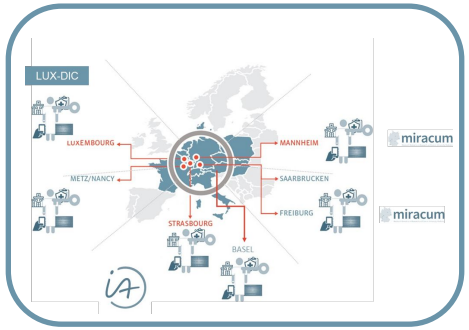
Dedicated interface for Clinnova physicians:

- It will be adapted from existing solutions, if possible
- It will align with hospitalization and insurance data sets
- It allows structured data entry for physicians in clinical or private practise context
- It will tie together competence beyond clinics

Clinnova – sustainability

Medico-economic savings

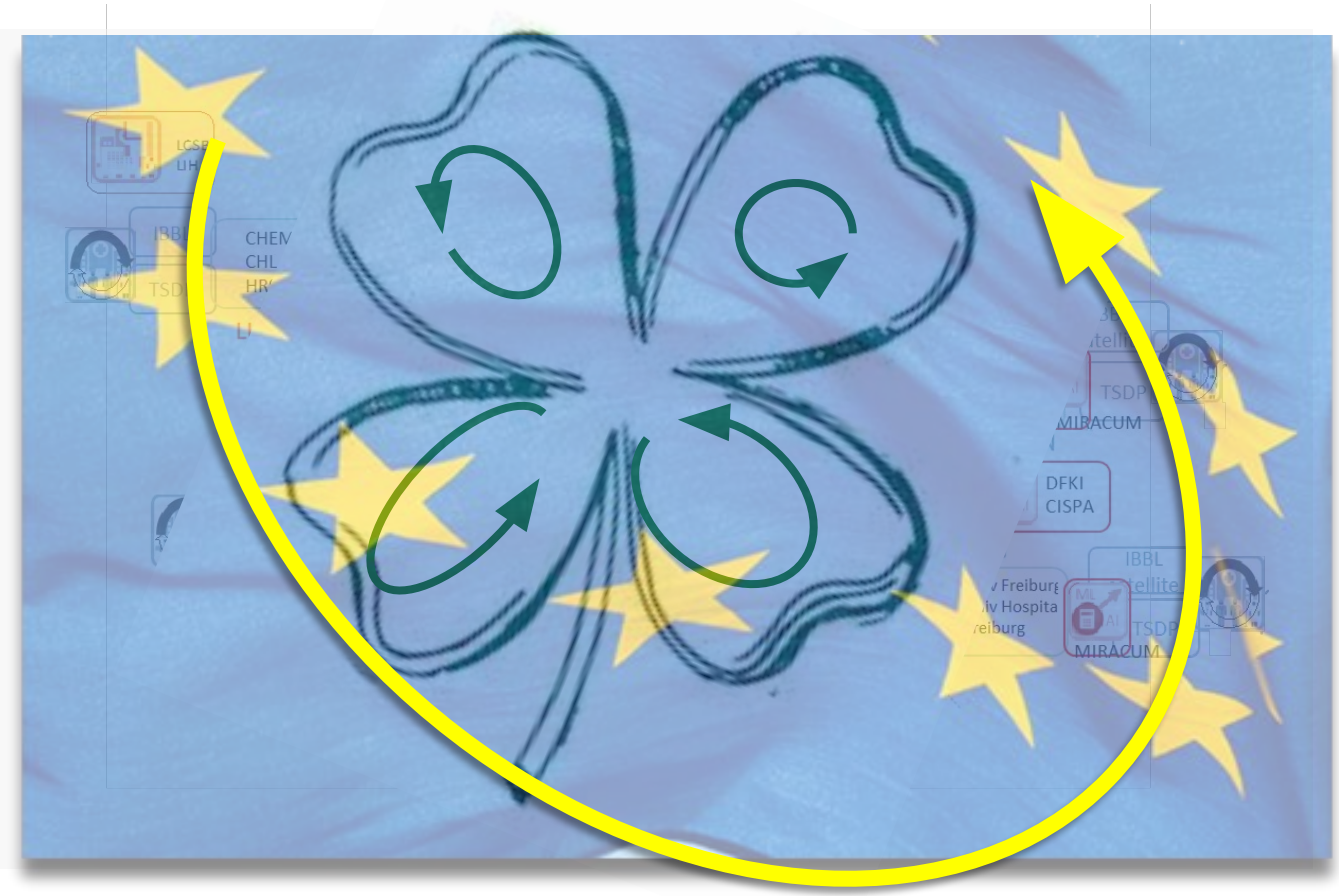
Improved patient care through novel treatments, precision medicine & real-time monitoring of patients



Regulated data access for collaborations

Support to pharma clients in identifying suituable patients for clinical trials

Clinnova – ross-border dimension



Cloverleaved operation: more than a sum of the single parts

- In principle, each region supports a Clinnova program that could function independently
- Through standardization and interoperability all partners get access to all data and all samples
- This leverages individual investments by multiples
- It further builds an integrated European Health Data infrastructure

Digital Health applications

gaia-x

- **Ronald Graefe,** Director of Patient and Provider Services**,** Kaia Health

Kaia @ Gaia-X Health event patient-driven measurements & outcomes

04.04.2022

Since 2016 we are democratizing healthcare by...

solving four of the largest challenges in healthcare:

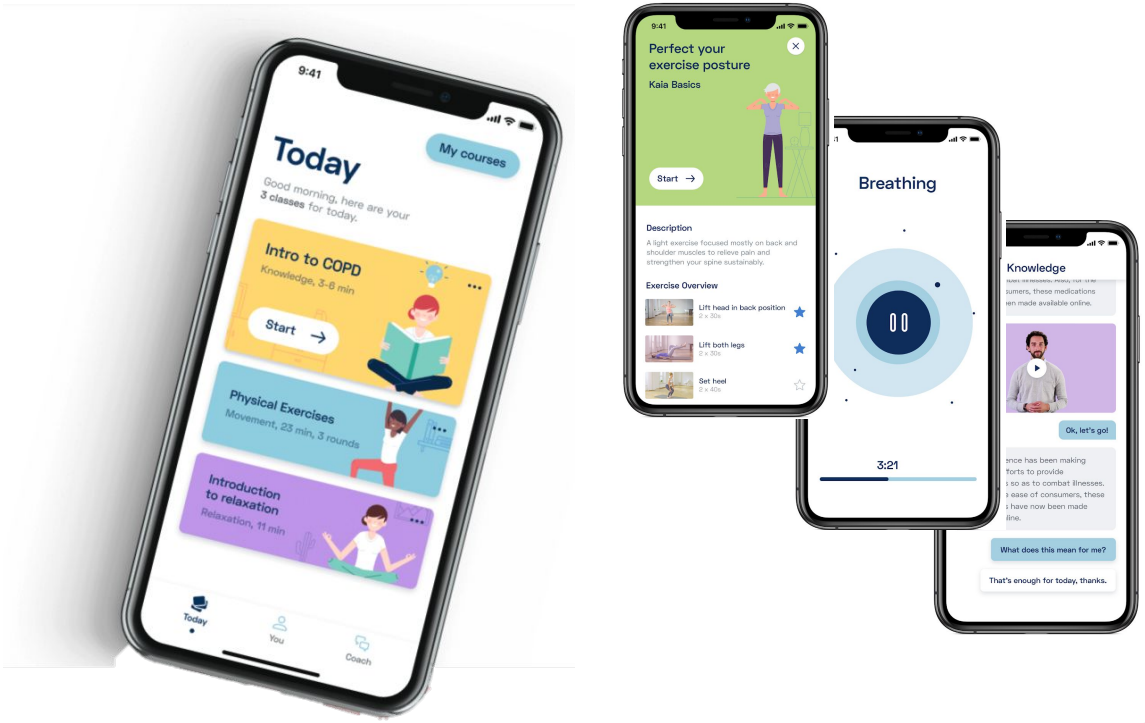
- access,
- quality,
- affordability,
- and health equity.

kaia health

How do we do this?

MSK - Multimodal Pain Management

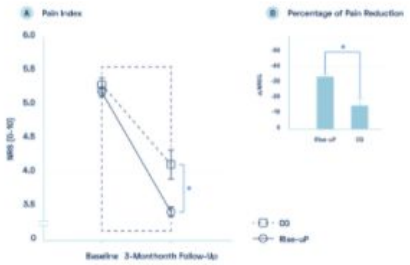
COPD – Home-based Pulmonary Rehabilitation



Kaia MSK – Patient Empowerment by an interactive multimodal Pain Management

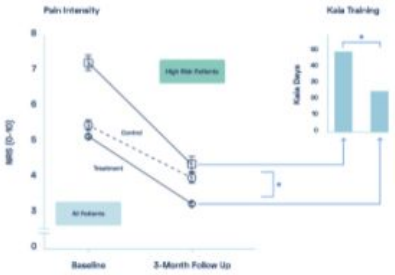
Clinical Evidence

-33% pain change



Kaia users experienced a **significant pain decrease at 3-month follow-up compared to traditional PT**.

-43% pain change in high-risk patients

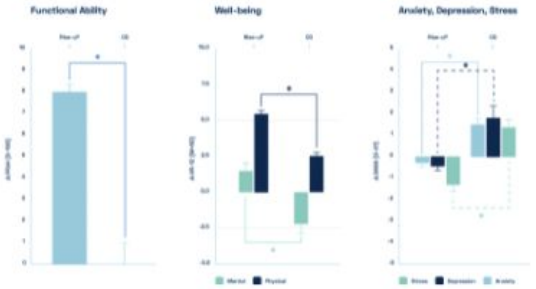


Outcomes were even **greater among high-risk patients** (using the Kaia app)

+80% Functional ability

+50% physical wellbeing

+20% mental wellbeing



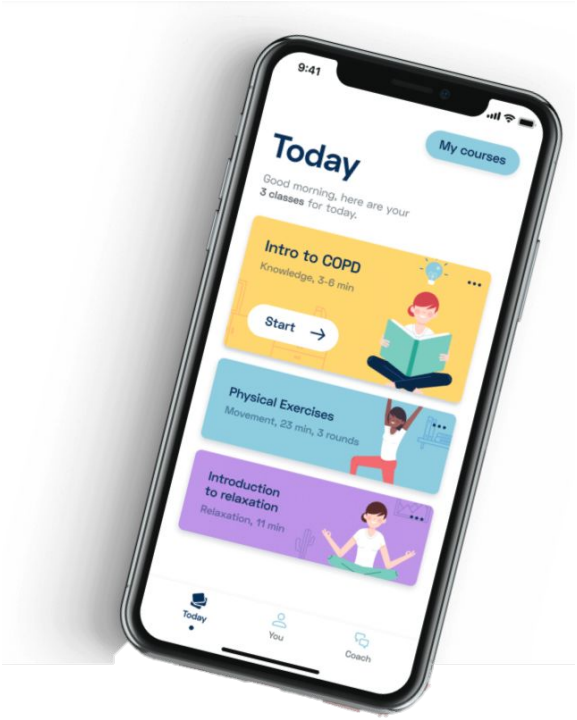
Significant **improvement** seen in secondary outcomes, while control groups stagnated or suffered:

- Functional ability
- Wellbeing (physical & mental)
- Anxiety, depression, & stress

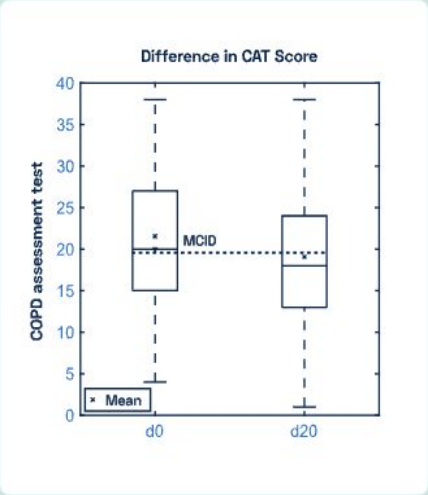
Published in the Journal of Pain Research
https://www.dovepress.com/digital-treatment-of-back-pain-versus-standard-of-care-the-cluster-ran-peer-reviewed-article-JPR

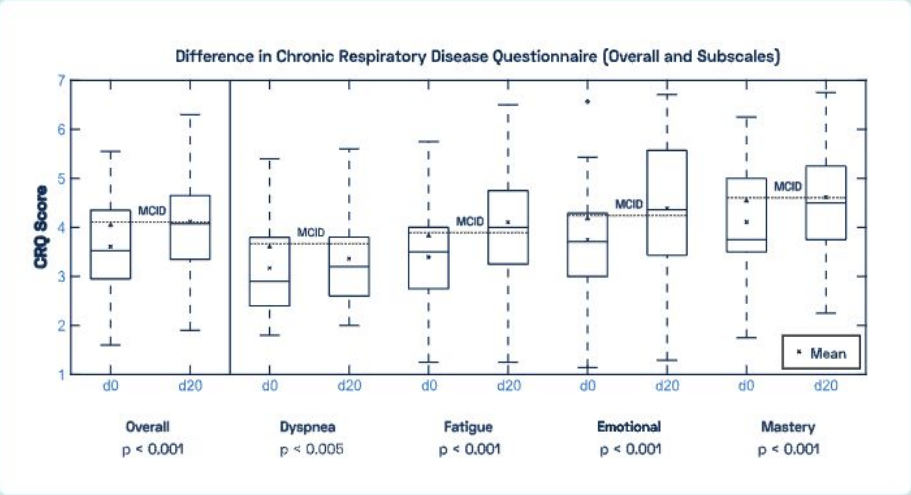
kaia health

Kaia COPD – Home-based Pulmonary Rehabilitation, reinvented.



Clinical Evidence





Users who fulfilled inclusion criteria: 56
Users who finished exercise day 20 at the time of the analysis: 34 (61%)
Mean age: 57.5 ± 7.8; 80% females

Users finishing the 20-day program reduced:
CAT-scores: mean improvement -2.5 points from 21.6 ± 7.7 to 19.1 ± 8.4; p= 0.008
CRQ-scores: mean improvement 0.5 points from 3.6 ± 1.0 to 4.1 ± 1.1; p< 0.001

Digitalizing multidisciplinary pulmonary rehabilitation in COPD with a smartphone application: an international observational pilot study, ncbi.nlm.nih.gov/pmc/articles/PMC6260122/

kaia health

Kaia in numbers

2016

Founded in Munich by Konstantin Mehl and Manuel Thurner

60m

lives covered worldwide

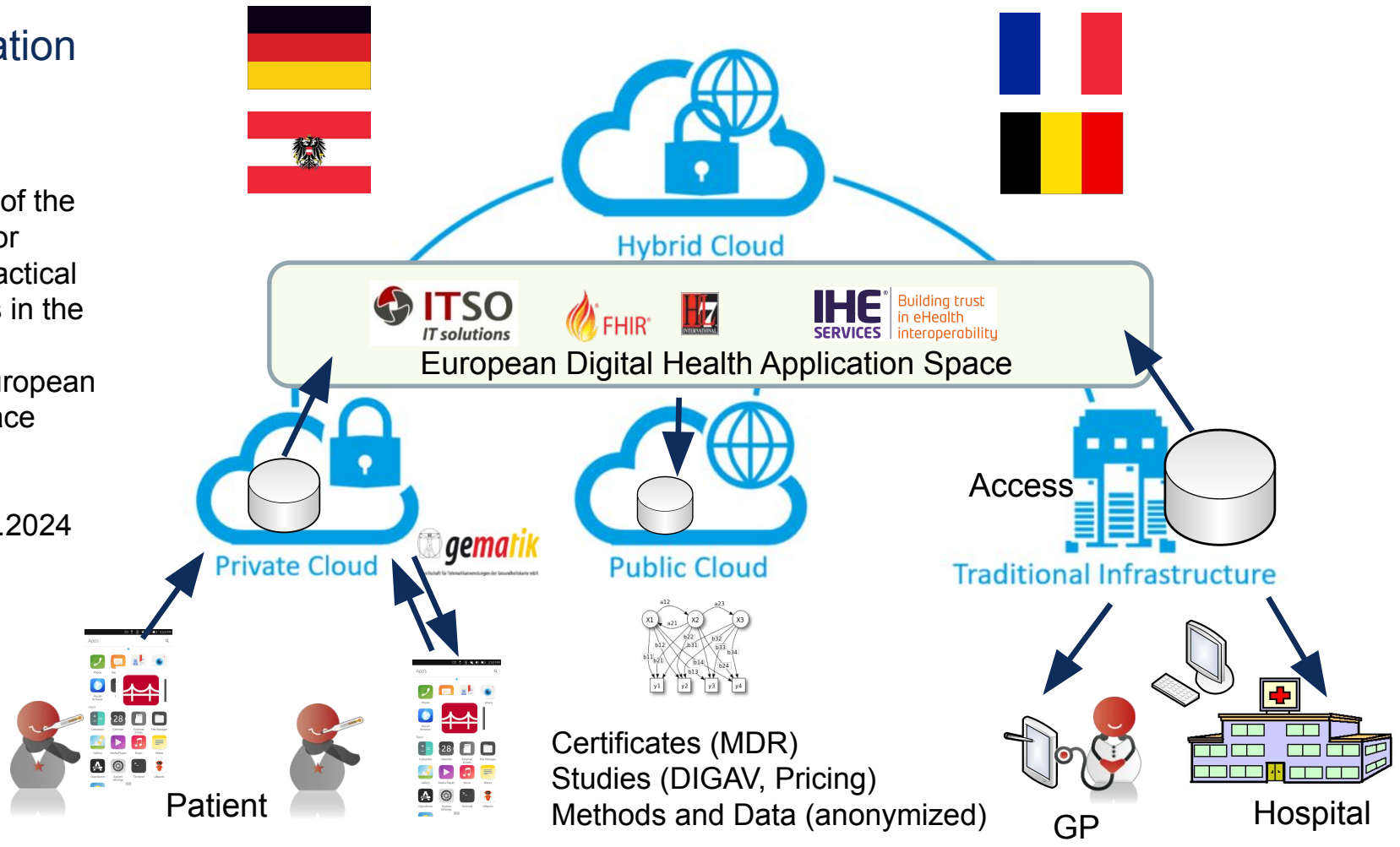
+500k

Kaia users worldwide

Model for European Digital Health Application Space by HLAN*

Project outline in the context of the German-BMWi-funding call for proposals: Innovative and practical applications and data spaces in the digital ecosystem GAIA-X.
Title of the project outline: European Digital Health Application space
Project acronym: EDHA

Duration: 01.01.2022 - 31.12.2024



*HLAN - Health Reality Lab Network

As Digital Health Application Vendor we value

- A harmonized open Infrastructure across Europe that helps in building and scaling up impactful applications by the seamless interconnection of sensitive health data within the local health ecosystems

- Leveraging the synergies of harmonized European Data Space and Market Access requirements for the approval, ongoing validation, and further development of digital health applications

- Support in recruitment for localized product evaluations

kaia health

Thank you.

Contact
Ronald Graefe
Director of Patient and Provider Services
Ronald.Graefe@kaiahealth.com

Learn more
Kaiahealth.com

Secur-e-Health

gaia-x

- **Sarah van Drumpt**, Consultant Cybersecurity & Robustness, TNO

SECUR-E-HEALTH
Project presentation for Gaia-X

ORIGINAL PROJECT IDEA: BIGMEDILYTICS

SECUR-E-HEALTH IS BASED ON AND A SEQUEL OF BIGMEDILYTICS

BigMedilytics = Big data for medical analytics, an H2020 project for predicting heart failure hospitalizations with the multi-party computation (MPC) technique.

Problem	Solution	Need	Challenge
Current health care system is not sustainable, espacially for CVD	Early detection and personalized treatments based on a predictive model	Cross-organizational data for evidence-based analytics	Conflict of interest, privacy and regulation, consent forms, GDPR...

BigMedilytics project

Goal: Identify heart failure patients with high risk of early hospitalization.
- Reduce costs
- Improve patient outcomes
- Deliver better access to healthcare facilities

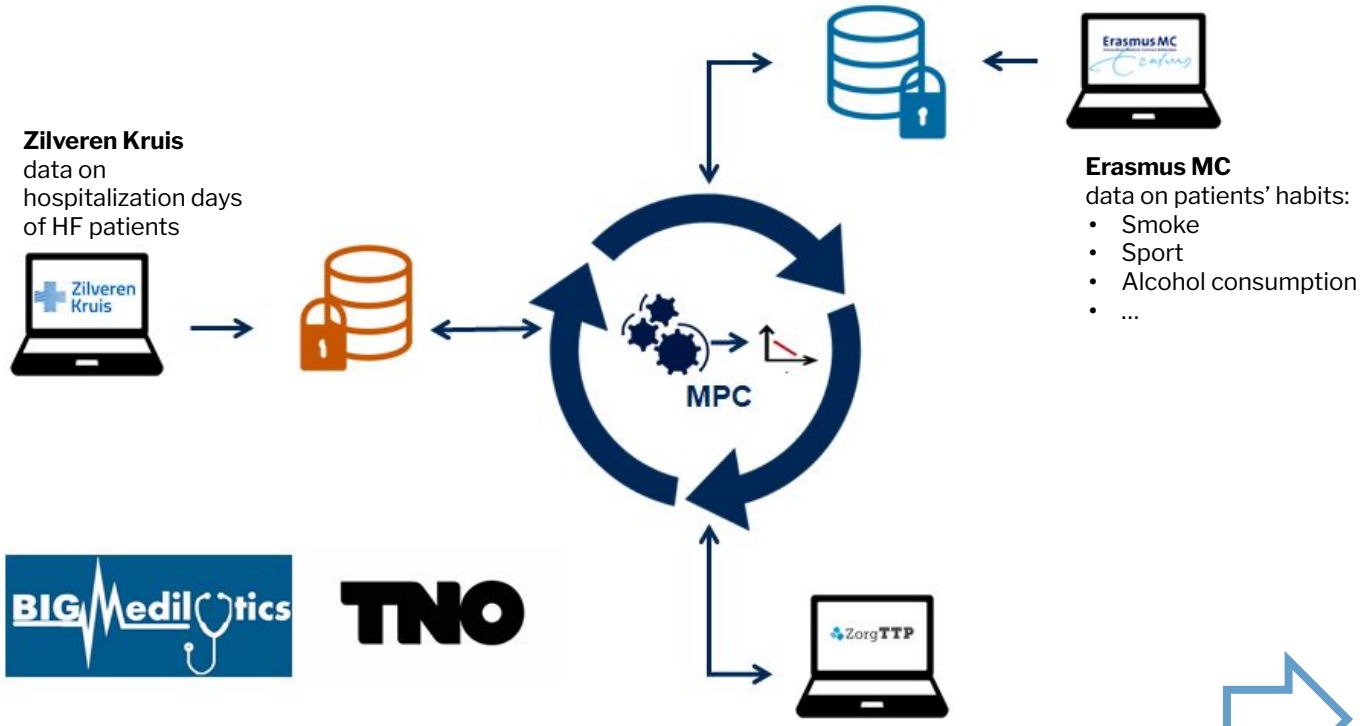
How: Develop hospitalization prediction model on combination of insurance data and hospital data, to identify risk factors for heart failure.

The model is a result of advanced analytics based on an extensive dataset, including data from different organisations. The dataset is combined using the MPC technique; secure inner join combined with secure lasso regression!

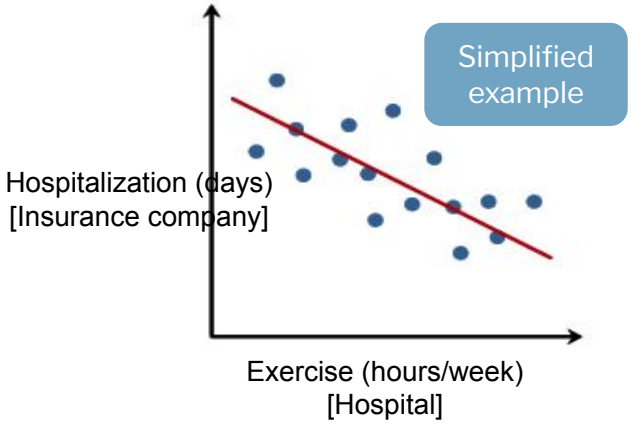
WEBSITE

BIGMEDILYTICS
VISUALISATION OF THE PROJECT

PROCESS: COMBINING DATABASES



RESULT: PREDICTIVE MODEL



= input data on heart failure patients (not shared!)

= resulting prediction model (shared!)

FROM HORIZON-2020 TO ITEA3

Horizon 2020 (and Horizon Europe) focused on ground-breaking research covering **major European challenges.**

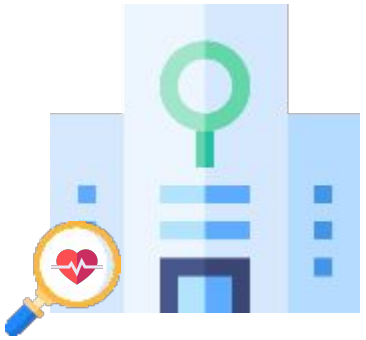
ITEA3 is a EUREKA cluster that funds **industry-driven** R&D&I projects:

- Consortia should be **balanced** in terms of universities, RTOs, and industrial partners;
- Having **strong national value chains** is mandatory for success, with challenges stemming from industry adoption of innovation;
- Projects focus on **software-intensive innovations** with a high potential for societal benefits and economic growth.

With this, ITEA3 was a natural follow-up to bring the innovations from Bigmedilytics further to the market. Thus, Secur-e-Health was born.

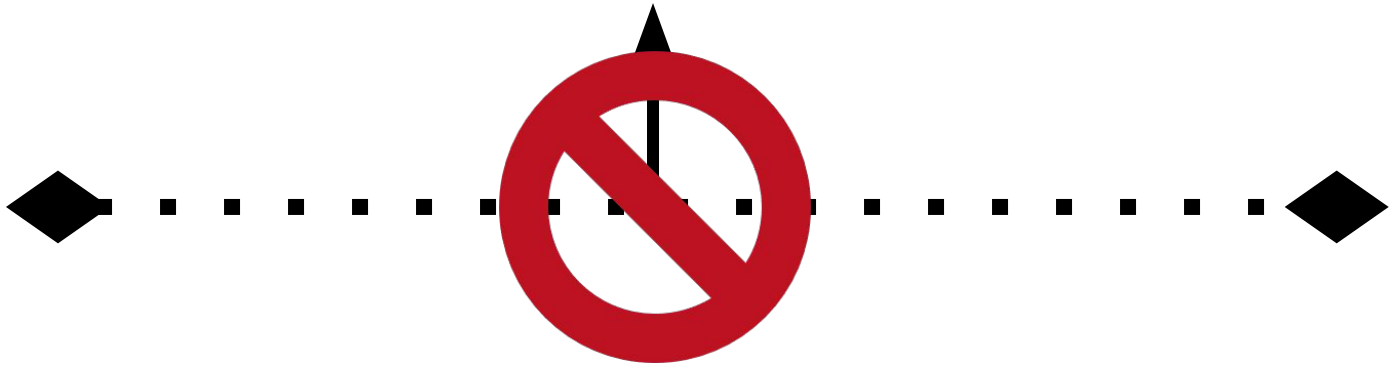
SECUR-E-HEALTH
PROJECT SCOPE

Privacy preserving, cross-organizational analytics



CT result

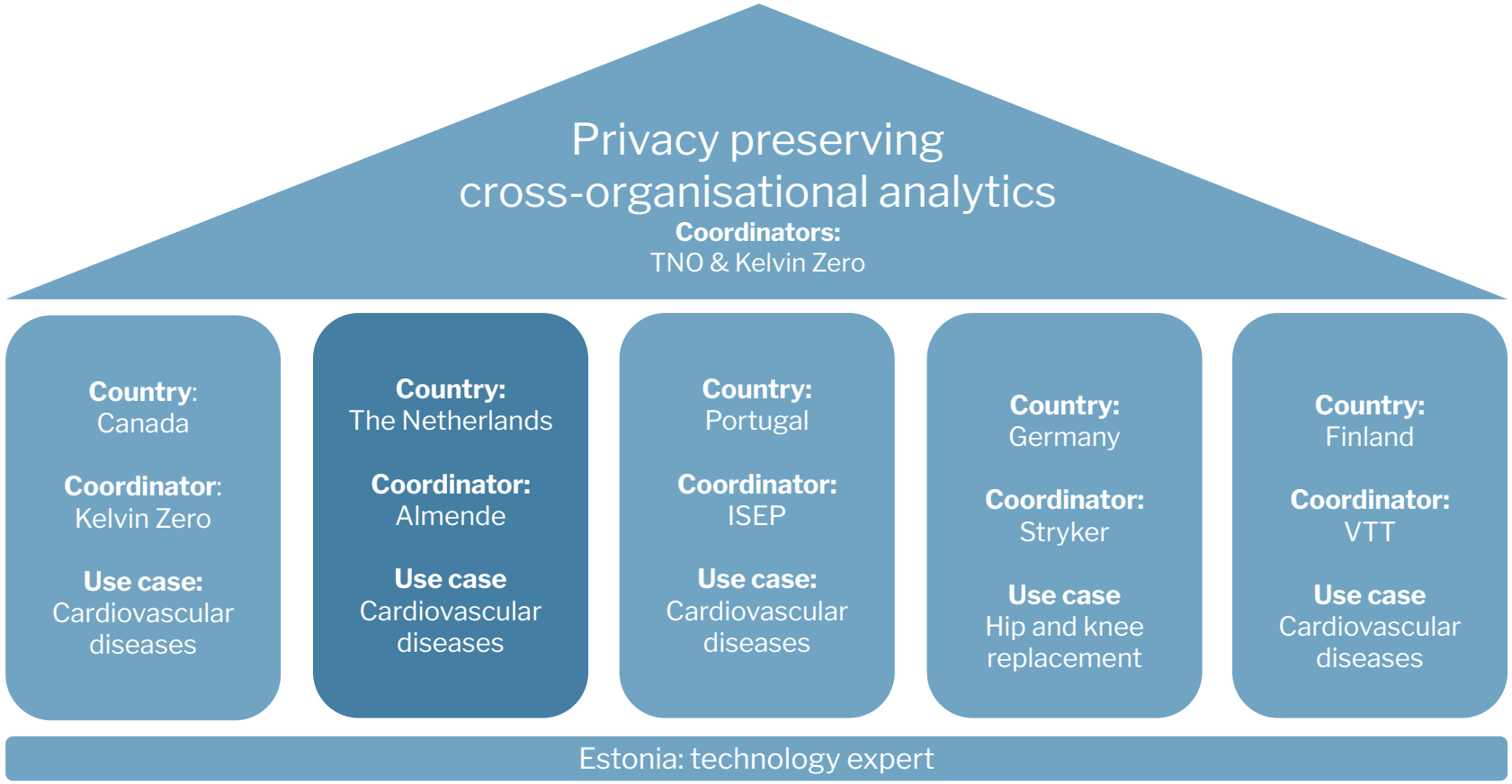
Blood pressure



Diabetes

Atrial fibrillation

SECUR-E-HEALTH
CONSORTIUM OVERVIEW



SECUR-E-HEALTH IN THE NETHERLANDS

BACKGROUND

The Netherlands has one of the highest healthcare costs, and costs have been rising;

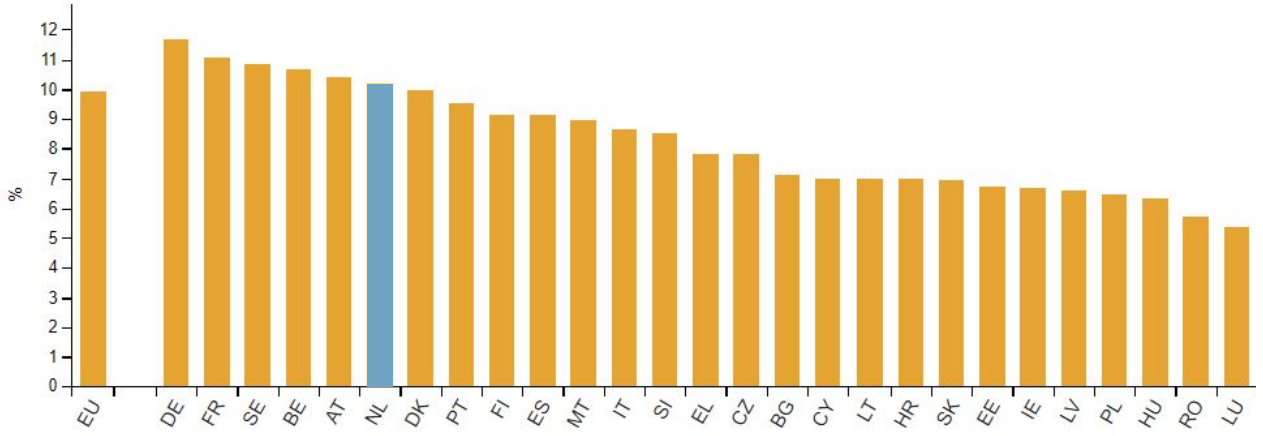
A large part of this cost is due to inefficiency – under- and overtreatment, lack of personalized care, and lower care capacity in specific sectors leads.

Cross-organization learning can lead to better treatment outcomes, however sharing of data is made difficult because:

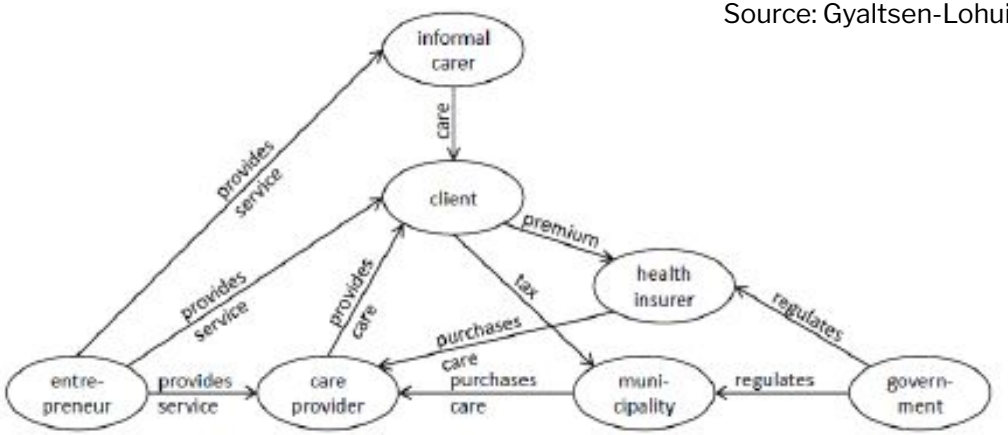
- The health landscape is fragmented;
- Data is sensitive, and rests with multiple organizations;
- Incentives to learn & share are not always aligned properly.

Current healthcare expenditure relative to GDP, 2019

Source: Eurostat (2019)



Source: Gyaltsen-Lohuis et al (2014)



SECUR-E-HEALTH IN THE NETHERLANDS

USE CASE & AMBITION

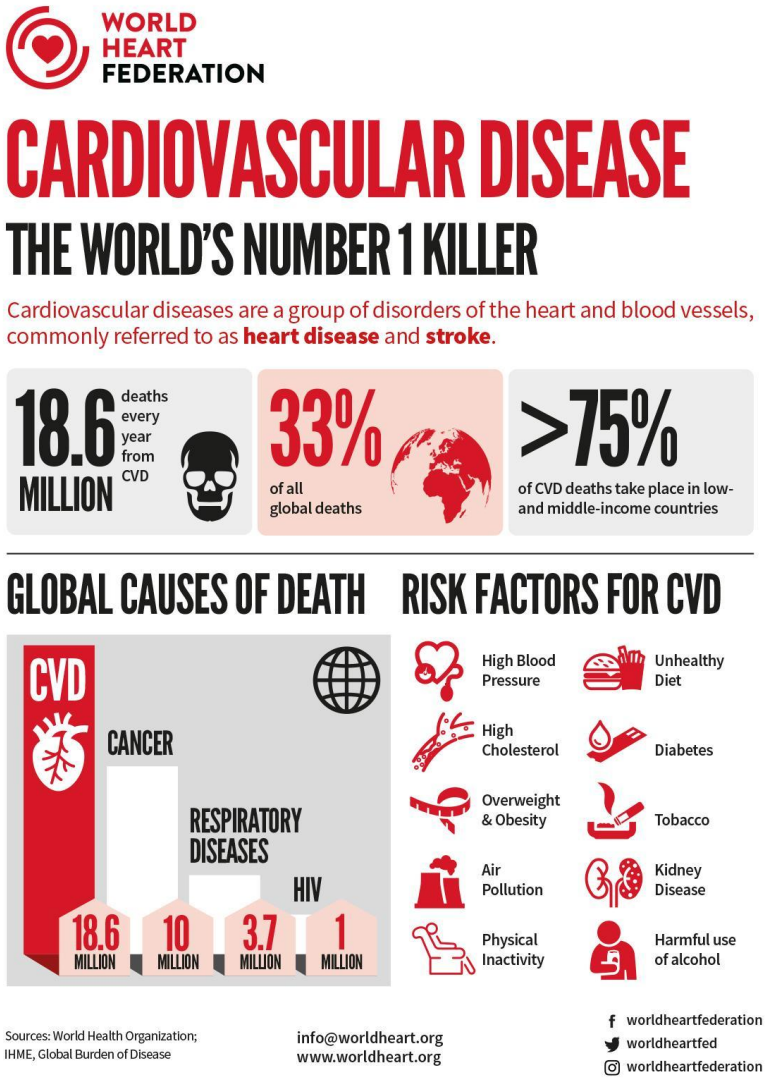
Use case: Cardiovascular diseases (especially risk prediction)

- Most important cause of death & loss of productivity in the EU;
- Prominent disease domain with 273,000 hospitalizations annually.

Ambition:

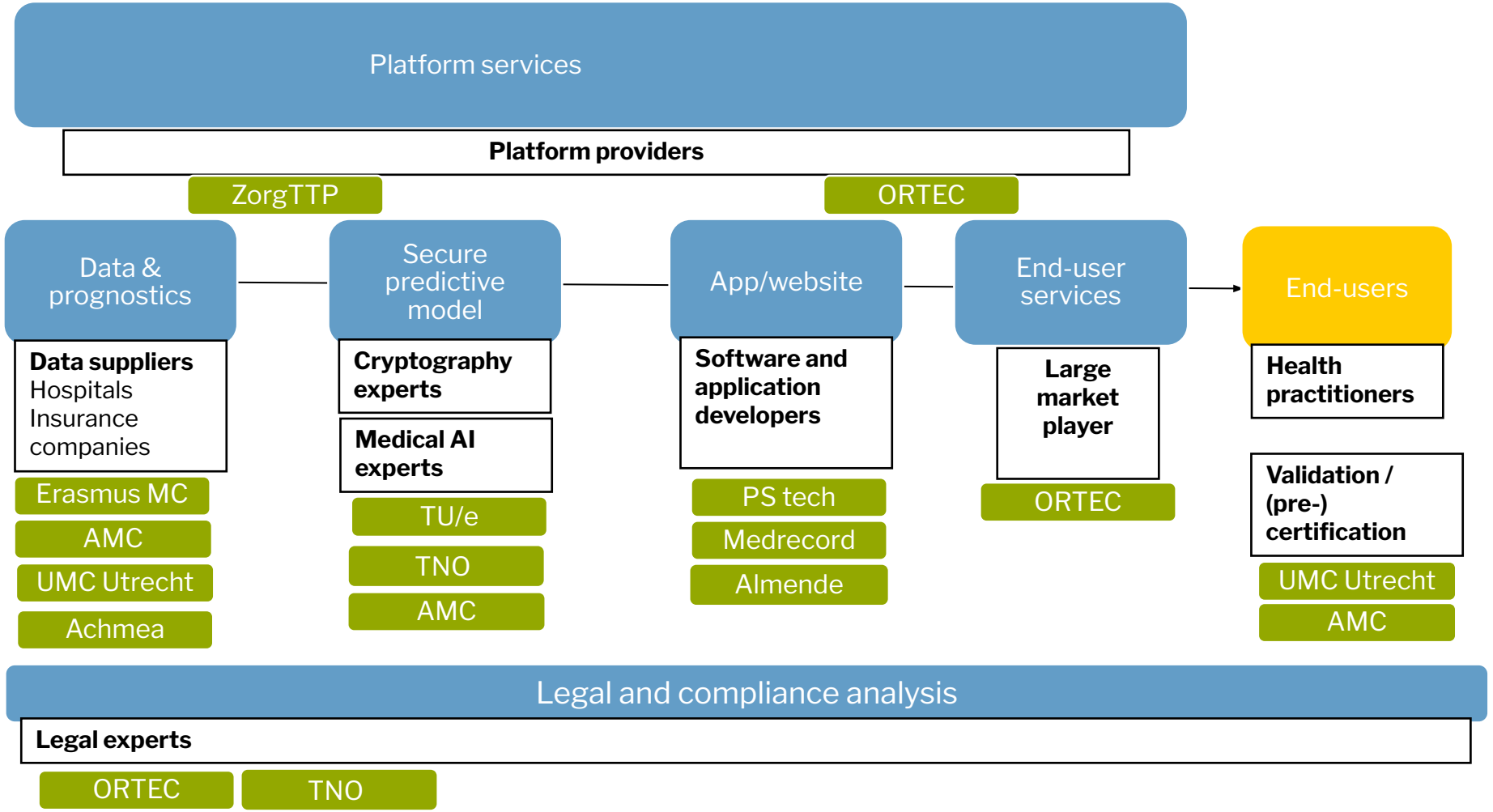
- **Develop** a toolbox for cross-organizational data analysis based on MPC and federated learning;
- **Implement** the tool box in a clinical setting with multiple hospitals;
- **Demonstrate** the use of cross-organizational learning for cardiovascular disease.

The above will be used to strengthen a commercial proposition for cardiovascular risk prediction, via ORTEC.



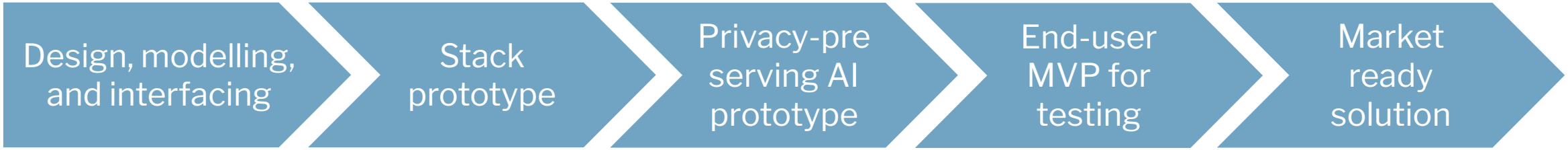
SECUR-E-HEALTH IN THE NETHERLANDS

PARTNERS & VALUE CHAIN



SECUR-E-HEALTH IN THE NETHERLANDS

PROJECT TIMELINE



01/01/2022 30/11/2023 31/12/2024

QUESTIONS?

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Q&A with the audience

gaia-x

Compile session summary