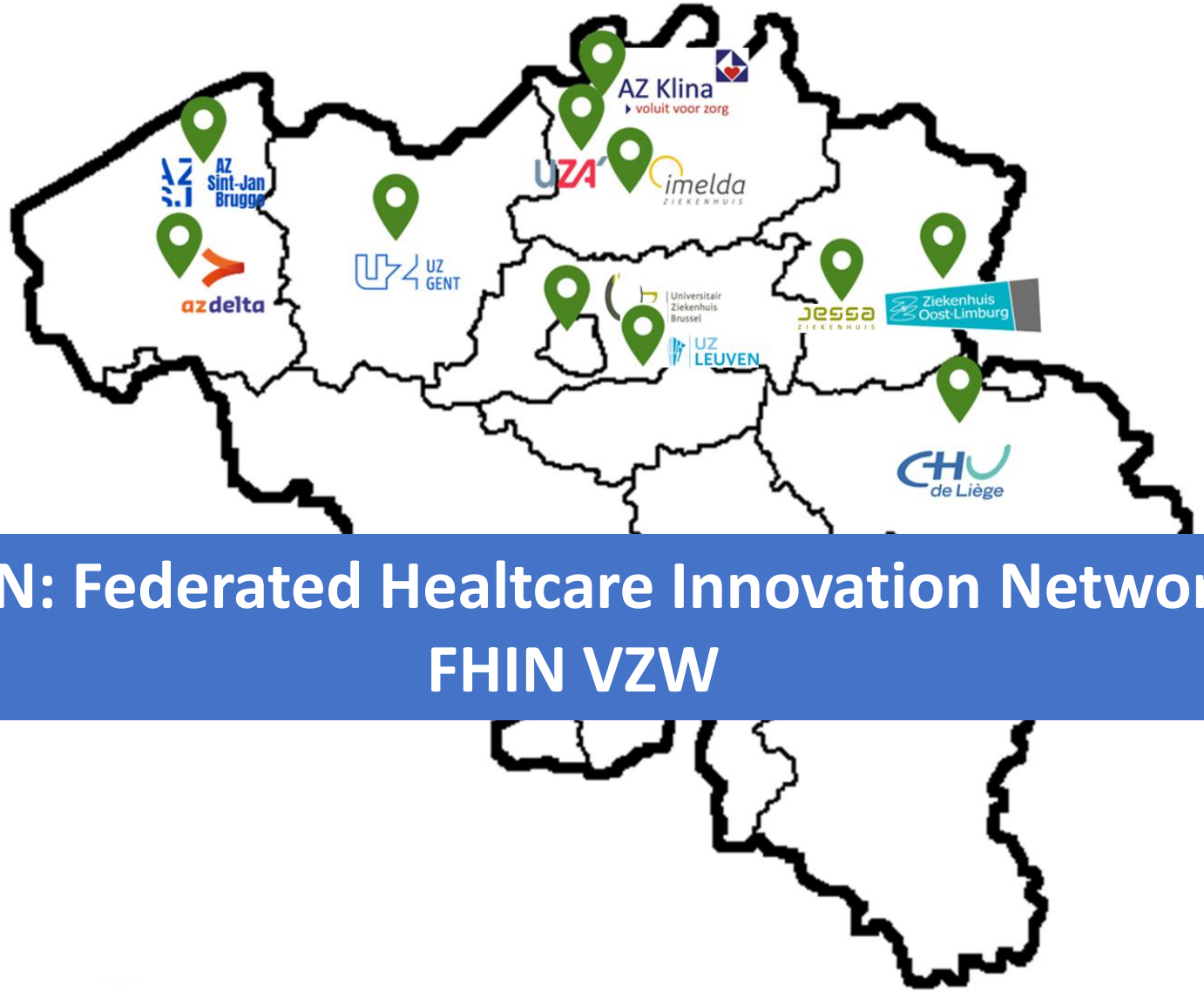
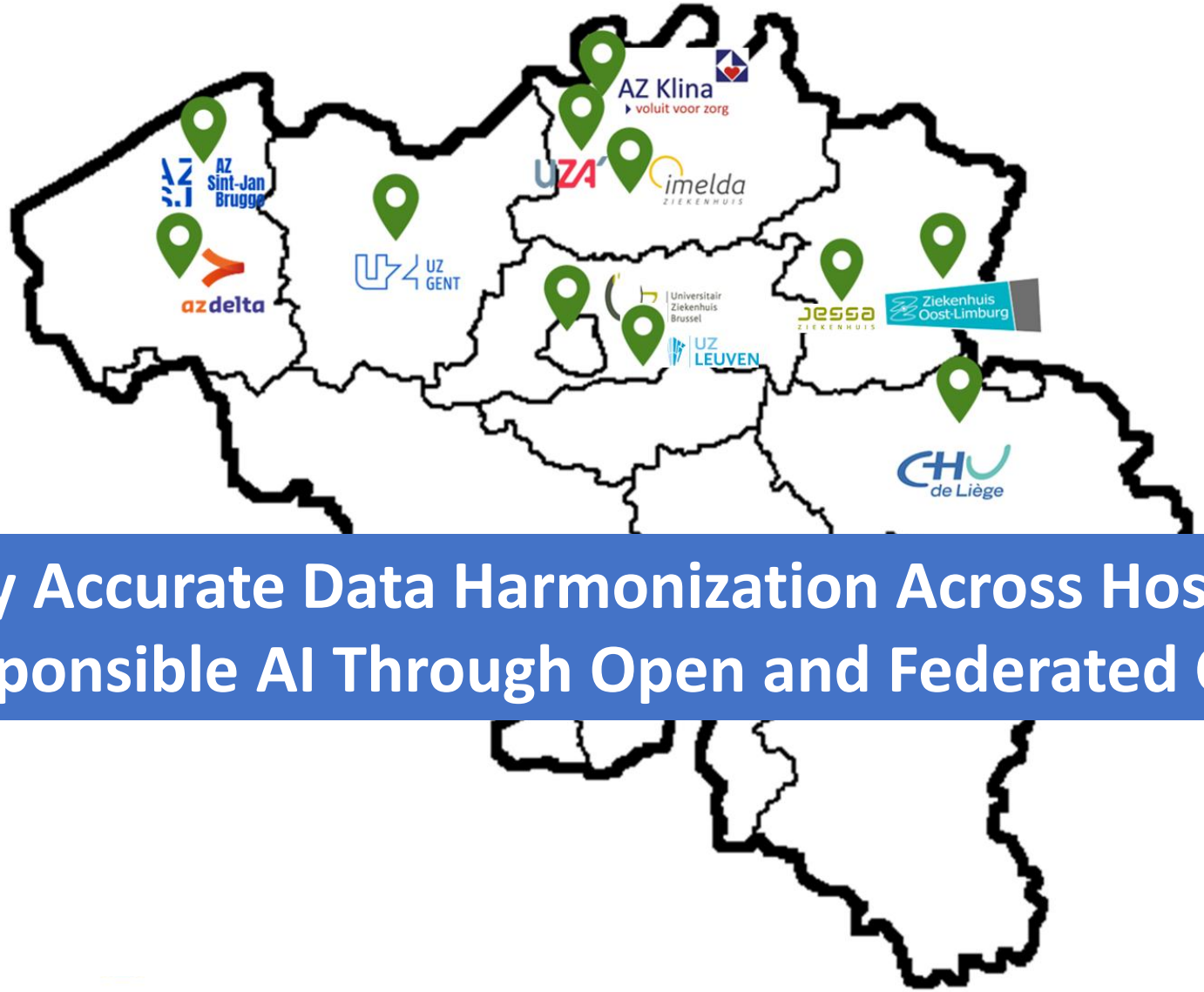
https://www.fhin.be
CONTACT: fhin@fhin.be



FHIN: Federated Healtcare Innovation Network
FHIN VZW

FHIN- 19/01/2026 – Peter De Jaeger/Kim Denturck

https://www.fhin.be
CONTACT: fhin@fhin.be



Clinically Accurate Data Harmonization Across Hospitals: Pioneering Responsible AI Through Open and Federated Collaboration

FHIN

FHIN- 19/01/2026 – Peter De Jaeger/Kim Denturck

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Table of contents

FHIN SOLUTION:

FHIN GOAL

- **Question 1:** Possible to achieve:
  - Clinically-computationally accurate **standardization and harmonization**
  - **Multimodal** data across multiple hospitals
  - Compatibility **(Belgian) SNOMED CT (ext.) + registries** enabling semantic layer
  - Compatibility **FHIR** exchange

- **Question 2:** Can this be done within a governance model:
  - Partners retain full control over their own data
  - Open source / Open science
  - Voluntary participation in projects
  - All partners are equal

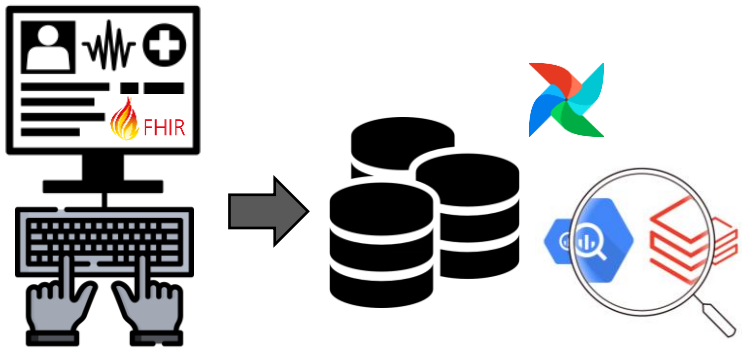
FHIN

FHIN SOLUTION:

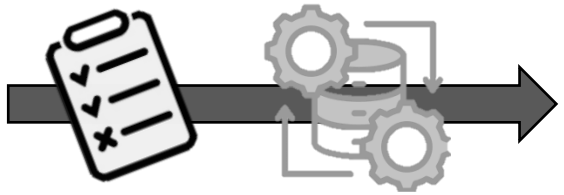
LOCAL FHIN PARTNER SOLUTION: STANDARDIZATION & HARMONIZATION

FHIN PARTNER PERSPECTIVE DATA FLOW

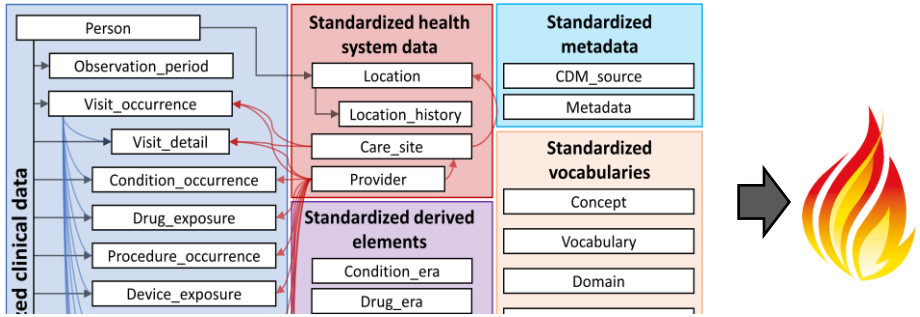
1 Unlocking data
Different raw data sources



2 Data transformation
Tooling + registries
ETL built to scale



3 Ready for harmonized collaboration
OMOP CDM or FHIR exchange



FHIN

FHIN partner safe & private environment

FHIN PARTNER PERSPECTIVE DATA FLOW

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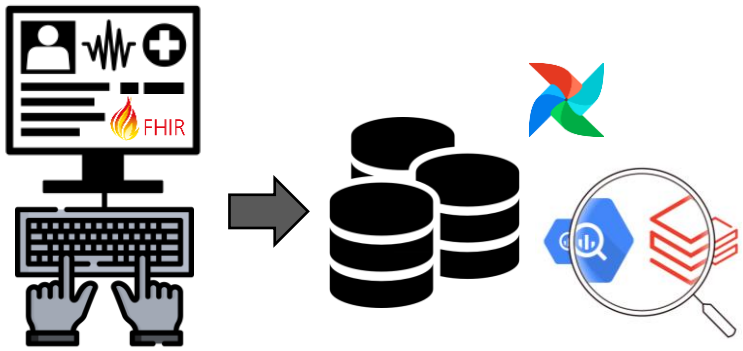

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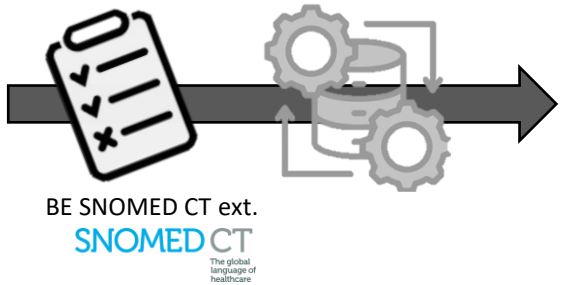

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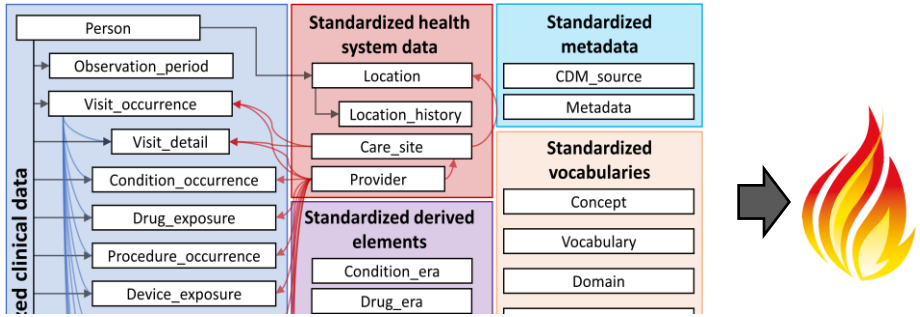


FLEXIBLE UNLOCKING

MULTIMODAL DATA

STANDARDIZED REGISTRIES

FLEXIBLE TOOLING

Be SNOMED CT ext TERMINOLOGY

DATA HARMONIZED

FHIN partner safe & private environment

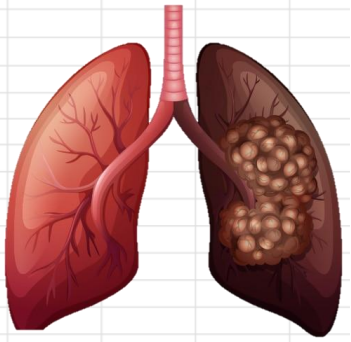
REGISTRIES

- A process in place to swiftly extend the registry library with new registries
  - Sharing internationally (OHDSI)
  - 670 agreed lung cancer datapoints in logical categories
  - 487 agreed lung cancer datapoints in logical categories

	A	B	C	D	E	F
1	concept_id	concept_name	unit_concept_id	vocabulary_id	concept_code	OMOP Table
2	3020460	C reactive protein [Mass/volume] in Serum or Plasma	mg/L	LOINC	1988-5	MEASUREMENT
3	3000963	Hemoglobin [Mass/volume] in Blood	g/dL	LOINC	718-7	MEASUREMENT
4	3000905	Leukocytes [#/volume] in Blood by Automated count	x10³/µl	LOINC	6690-2	MEASUREMENT
5	40763077	Lactate dehydrogenase [Enzymatic activity/volume] in Body fluid by Pyruvate to lactate	U/L	LOINC	60017-1	MEASUREMENT

ICD-0-3 diagnose | clinical TNM | WHO score | Smoking | Lab results | Detail chemotherapy | Detail immunother | Detail target the | Radiotherapy | comorb CPD | Measurement

Data catalogue lung cancer with >670 target datapoints



Open-Source Scalable Toolset in line with OHDSI (OMOP) standards

HOW DATA TRANSFORMS

RIAB ETL TOOL

RABBIT IN A BLENDER

ETL pipeline to transform EMR data to OMOP

Use of common data model

Applies registry & terminology

WHAT CONCEPTS EXIST

RABGIN VOCAB TOOL

RABGIN

Vocabulary tool for upload of existing and creation of custom vocabularies

Use of terminologies

BE SNOMED CT ext.

SNOMED CT
The global language of healthcare

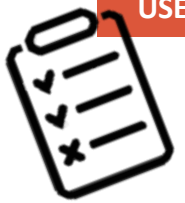
WHICH CONCEPTS TO USE

KEUN MAPPING TOOL

KEUN

Mapping tool for clinical concepts

USE of REGISTRIES

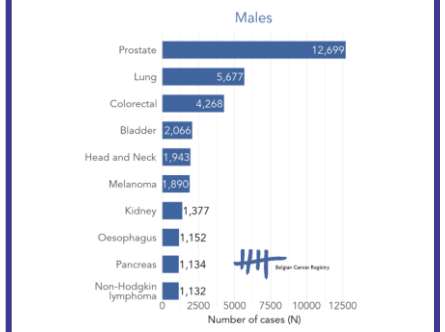


Scalable

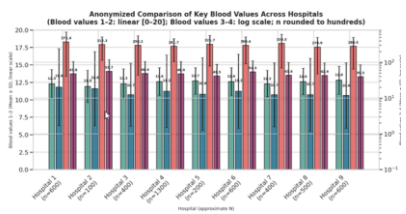
FHIN

FHIN VISION ANY SECUNDARY USE & ANY KIND OF DATA

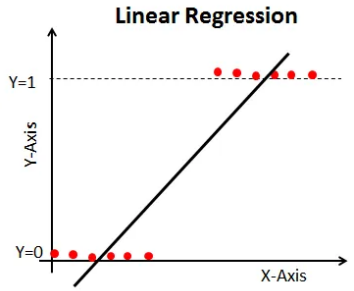
Reporting



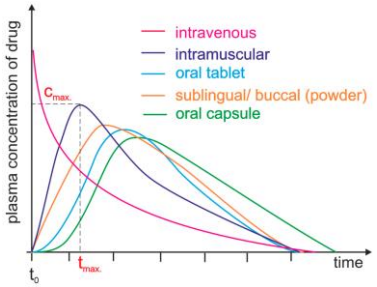
Benchmarking



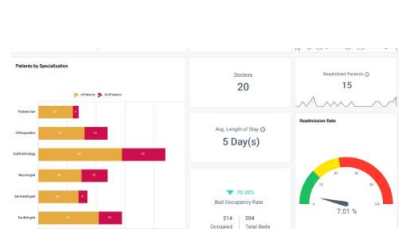
AI model training



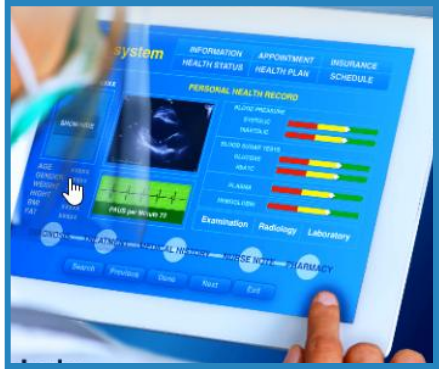
Ph 4 clinical studies



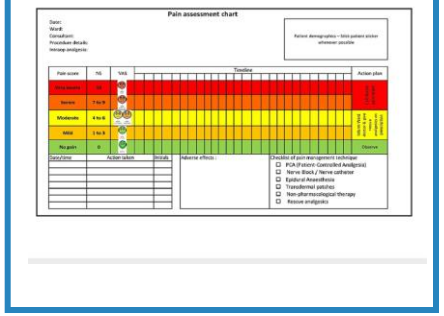
Operational intelligence



Medical data



Nursing & care



Financial

Logistics

Operational

FHIN SOLUTION:

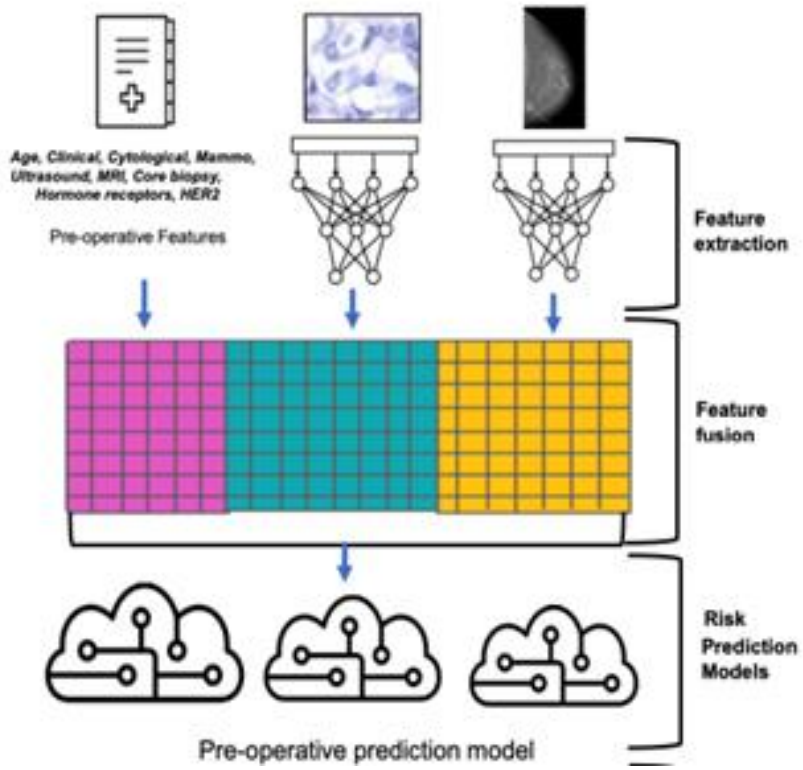
THREE FHIN COLLABORATION SOLUTIONS: CENTRALIZED, FEDERATED, FHIR

FHIN

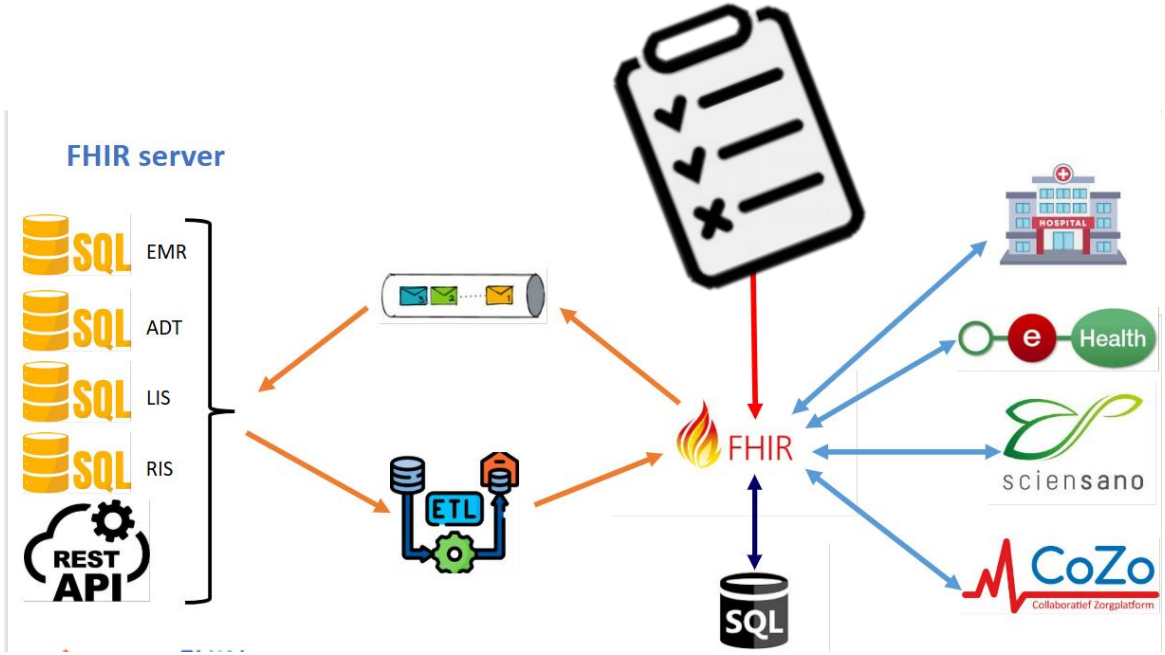
CENTRALIZED COLLABORATION

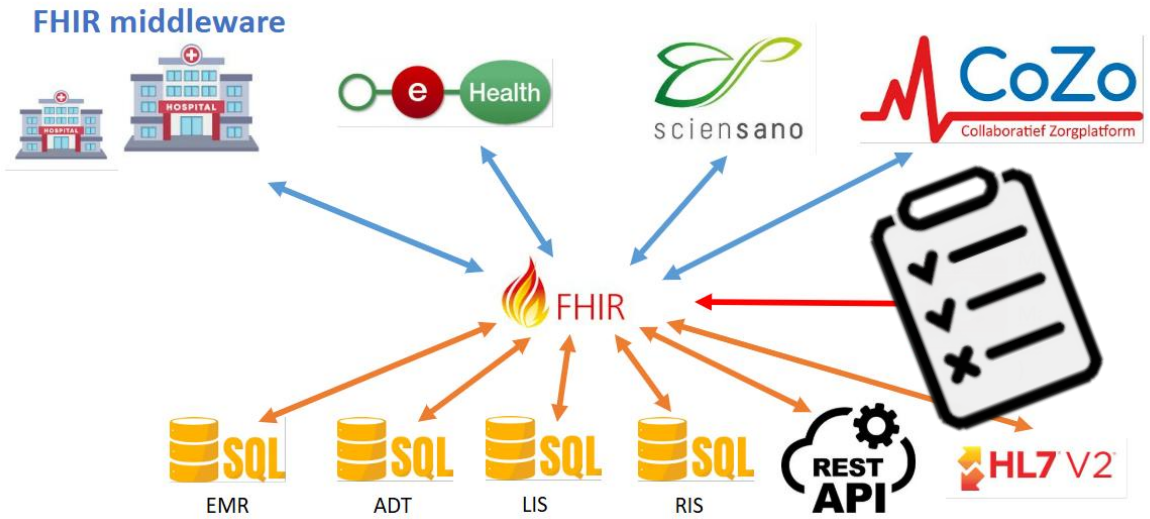
- Breast cancer: BreaCs project
- Legal & data framework
- Data is centralized
- Multimodal collaboration
- Prediction of pathological response to neo-adjuvant chemotherapy
  - support de-escalation of
    - Surgical
    - Radiotherapeutical
    - Systemic interventions

  when complete response



TWO FHIR setups tested

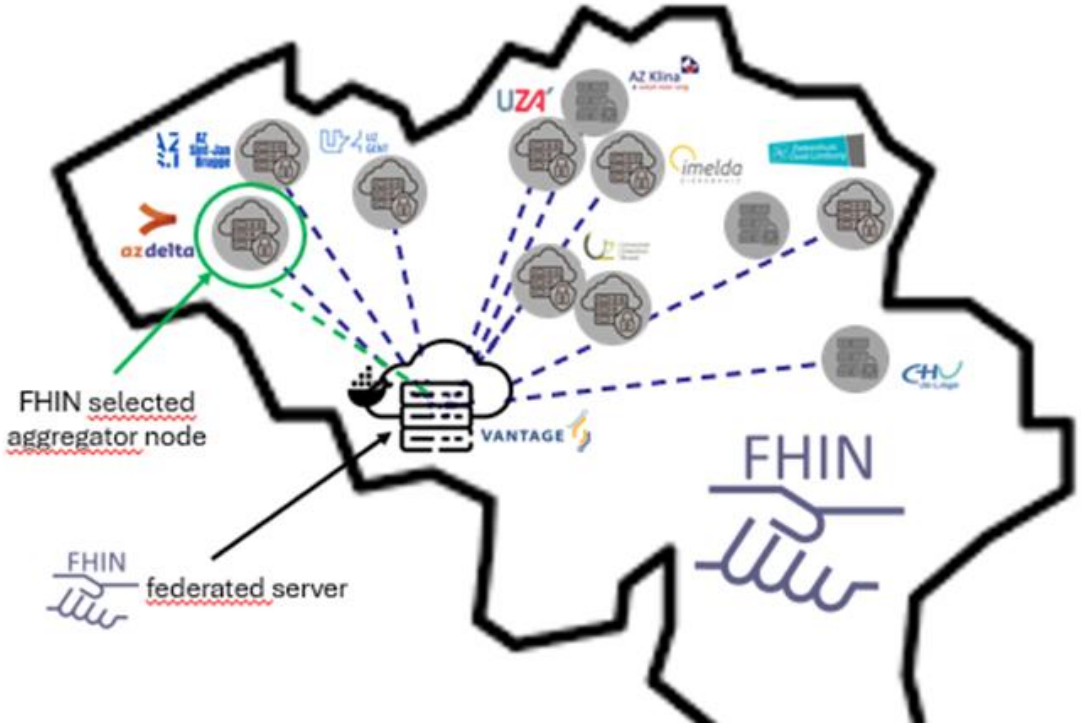




FHIN

Federated Analytics

- Capable for any data-requiring assignment
- Each FHIN partner has a node
- Patient data never leaves the hospital
- LOCAL node: each hospital/node runs the same analysis on its own data locally
- AGGREGATOR node: aggregated statistics or model coefficients
- AI training
  - CENTRAL part: feature selection, model aggregation,
  - LOCAL part: identical preprocessing, local training, evaluation of global model
- Vantage6 open source



50 federated runs → FEDERATED PLATFORM FULLY OPERATIONAL

FHIN

3

FHIN SOLUTION:

AI USE CASES DEMONSTRATING OUR EXCELLENT-ACCURATE STANDARDIZATION & HARMONIZATION SOLUTION

REAL WORLD USE CASES FHIN (DATA QUALITY BASED ON REGISTRIES)

LUNG CANCER REGISTRY

PREDICT SIX WEEK SURVIVAL AT START OF FIRST TREATMENT AS A BINARY OUTCOME (survived/died)

- PERSON TABLE
  - AGE
- DEATH TABLE
- PROCEDURE OCCURRENCE
  - RADIOTHERAPY
- CONDITION OCCURRENCE
  - LUNG DIAGNOSES
  - COMORBIDITIES
- MEASUREMENT TABLE
  - LAB RESULTS
  - BMI
- DRUG EXPOSURE TABLE
  - CHEMOTHERAPY
  - IMMUNO THERAPY
  - TARGETED THERAPY
- OBSERVATION TABLE
  - SMOKING STATUS
  - WHO SCORE
  - CLINICAL TNM

PROSTATE CANCER REGISTRY

PREDICT RISK AT PROSTATE BIOPSY DATE OF CLINICALLY SIGNIFICANT PROSTATE CANCER (GLEASON SCORE >= 7? YES OR NO)

- PERSON TABLE
  - AGE
- PROCEDURE OCCURRENCE
  - MRI OF PROSTATE
  - BIOPSY OF PROSTATE
- MEASUREMENT TABLE
  - PSA
- NOTE & NOTE-NLP TABLE
  - PI-RADS SCORE
  - GLEASON SCORE
- OBSERVATION TABLE
  - GLEASON SCORE
  - PI-RADS SCORE

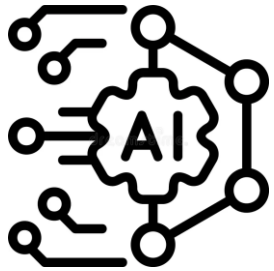
Build the query once, generate insights across all local OMOP CDMs

FHIN

FHIN USE CASES LUNG & PROSTATE CANCER

LUNG_AI_LCC

Use Case 1
LUNG CANCER
~4,300 Patients
9 hospitals



PROSTATE

Use Case 2
PROSTATE CANCER
~4,800 Patients, 9 hospitals
“100% REUSE of platform & tools”

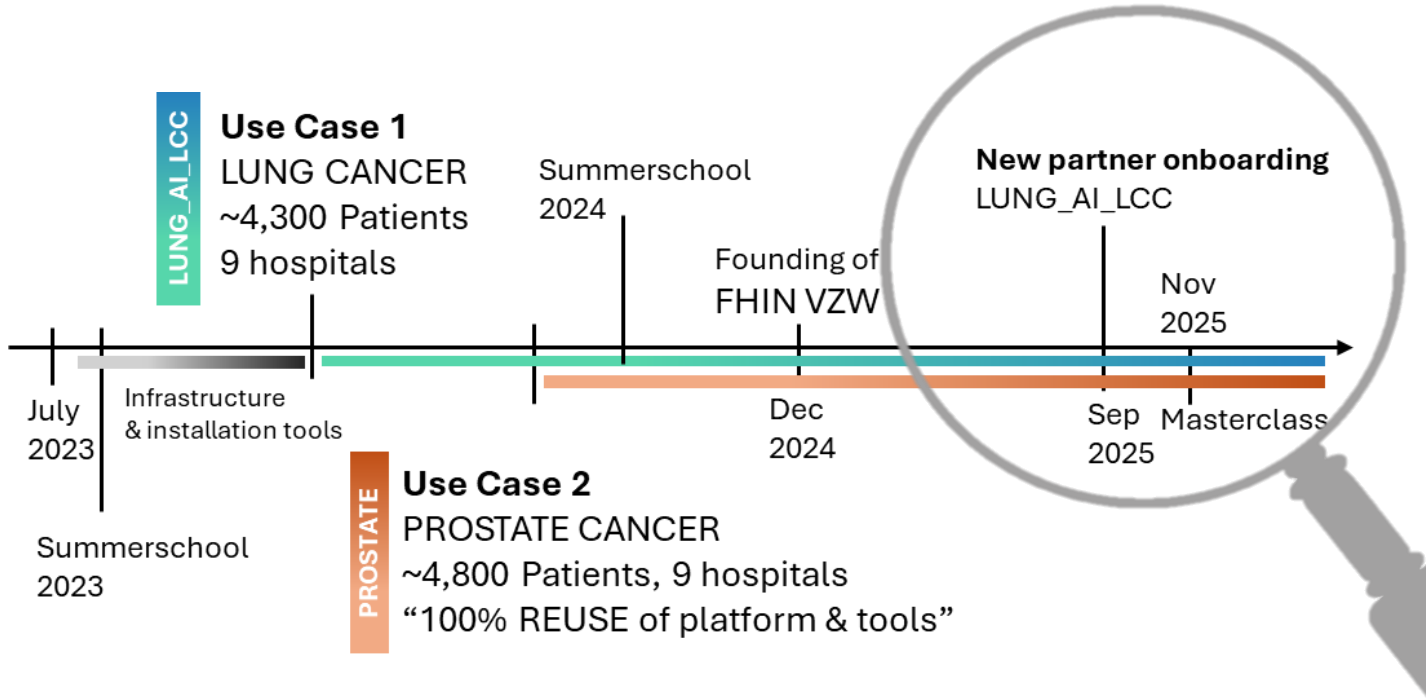
Predicting lung cancer mortality:
*Multicenter retrospective study
*Consistent AI performance across hospitals, robust!
*Coefficients align with clinical expectation
*Cross validation new FHIN partner Jessa confirms robustness

Predicting clinically significant prostate cancer:
*Consistent AI performance across hospitals
*Coefficients align with clinical expectation
*Opportunity for LLM based data enrichment

FHIN

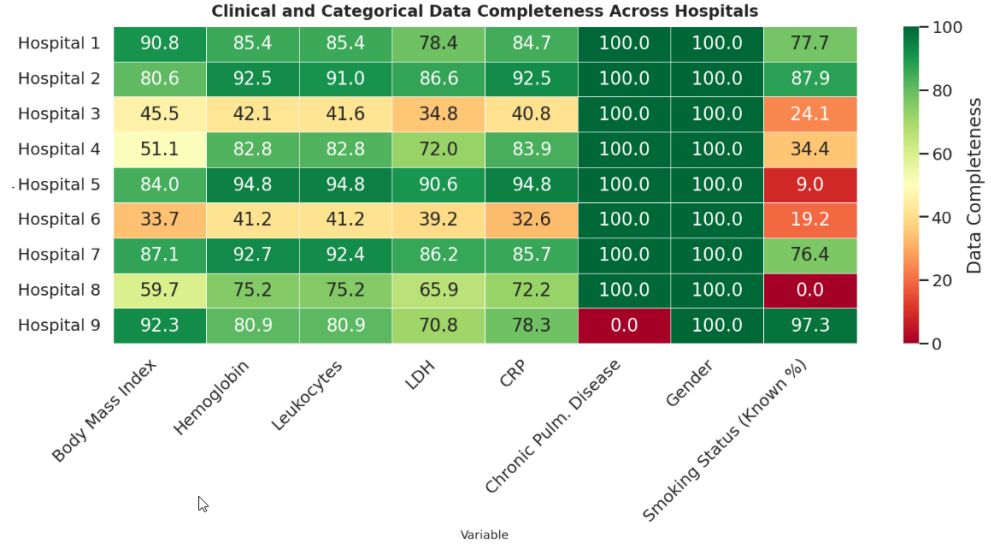
FHIN NEW PARTNER ONBOARDING & VALIDATION

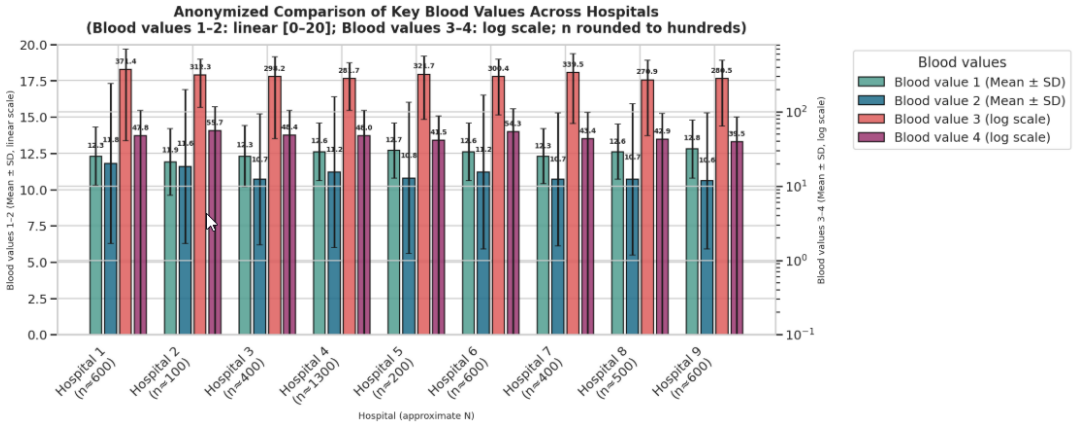
- New partner onboarding Jessa Hospital
- Ultimate scalability test
- Onboarding time 1 month
- External validation site
  - FHIN_AI_LCC protocol
  - True test of model robustness
  - Bias checks



Powerful, independent validation of entire FHIN methodology

Data quality lung & dashboarding





4

FHIN SOLUTION:

DIGITAL ASSETS

FHIN digital assets

DATA ASSETS

- Lung cancer registry
- Prostate cancer registry
- Synthetic datasets

INTEROPERABILITY ASSETS

Software tools

- RIAB ETL tool
- RABGIN vocabulary tool
- KEUN mapping tool
- Pathology trajectory tool
- FHIR middleware solution
- Google Cloud platform FHIR test environment

Web applications

- KEUN web application
- FHIN federated learning user interface

AI & FEDERATED ANALYTICS ASSETS

AI model code assets

- Model Training Pipelines
  - -Lung Cancer AI Model
  - -Prostate Cancer AI Model
- Model preprocessing, training pipelines
  Internal & external validation
- Federated Learning algorithms
  Vantage6-compatible code for training

Federated technology

- V6 GCP terraform code, ansible
- V6 OMOP seeder
- Deployment scripts: docker images
- Federated learning setup & exercises

5

FHIN SOLUTION:

DISSEMINATION

FHIN DISSEMINATION

-FHIN paper under construction (FHIN_AI_LCC)
-Summerschool 2023, summerschool 2024 & masterclass 2025
-Presentation to New Potential Partners: 22/08/2025
-Presentations to public:

-OHDSI conference Washington	14/10/2022	Peter De Jaeger – Kim Denturck
-Pfizer advisory board	13/02/2024	Peter De Jaeger
-BeSTRO	26/04/2024	Peter De Jaeger
-GSK	27/06/2024	Peter De Jaeger
-EIT Health keynote	sept 2024	Kim Denturck – Annelies Verbiest
-pharma.be	26/10/2023	Peter De Jaeger – Kim Denturck
-Arisal of data spaces	24/04/2024	Annelies Verbiest
-EmP2024	28/05/2024	Kim Denturck
-Health Data Forum Pharma	25/11/2024	Peter De Jaeger – Annelies Verbiest
-All.can	26/11/2024	Annelies Verbiest
-OHDSI Belgium winterevent	16/12/2024	Kim Denturck – Annelies Verbiest
-I~HD Health summit	19/03/2025	Annelies Verbiest – Peter De Jaeger
-Google AI circle & SuperNova	27/03/2025	Kim Denturck -Nathalie Mertens
-HDA symposium	14/04/2025	Annelies Verbiest
-Eufemed	23/05/2025	Kim Denturck- Annelies Verbiest
-OHDSI Europe 2025	06/07/2025	Annelies Verbiest
-BeCRA launch	07/10/2025	Annelies Verbiest
-Kwaliteit blijft & leeft	22/10/2025	Karel Van Brantegem- Annelies Verbiest - Peter De Jaeger
-RADar masterclass	19/11/2025	Kim Denturck – Peter De Jaeger

OHDSI
OBSERVATIONAL HEALTH DATA SCIENCES AND INFORMATICS

Home › 2022 Collaborator Showcase

2022 Collaborator Showcase

SOFTWARE DEMOS

1 – Simple and practical EMR to OMOP CDM ETL tool (Pieter-Jan Lammertyn, Stijn Dupulthys, Louise Berteloot, Peter De Jaeger,Kim Denturck, Nathalie Mertens)

6

FHIN SOLUTION:

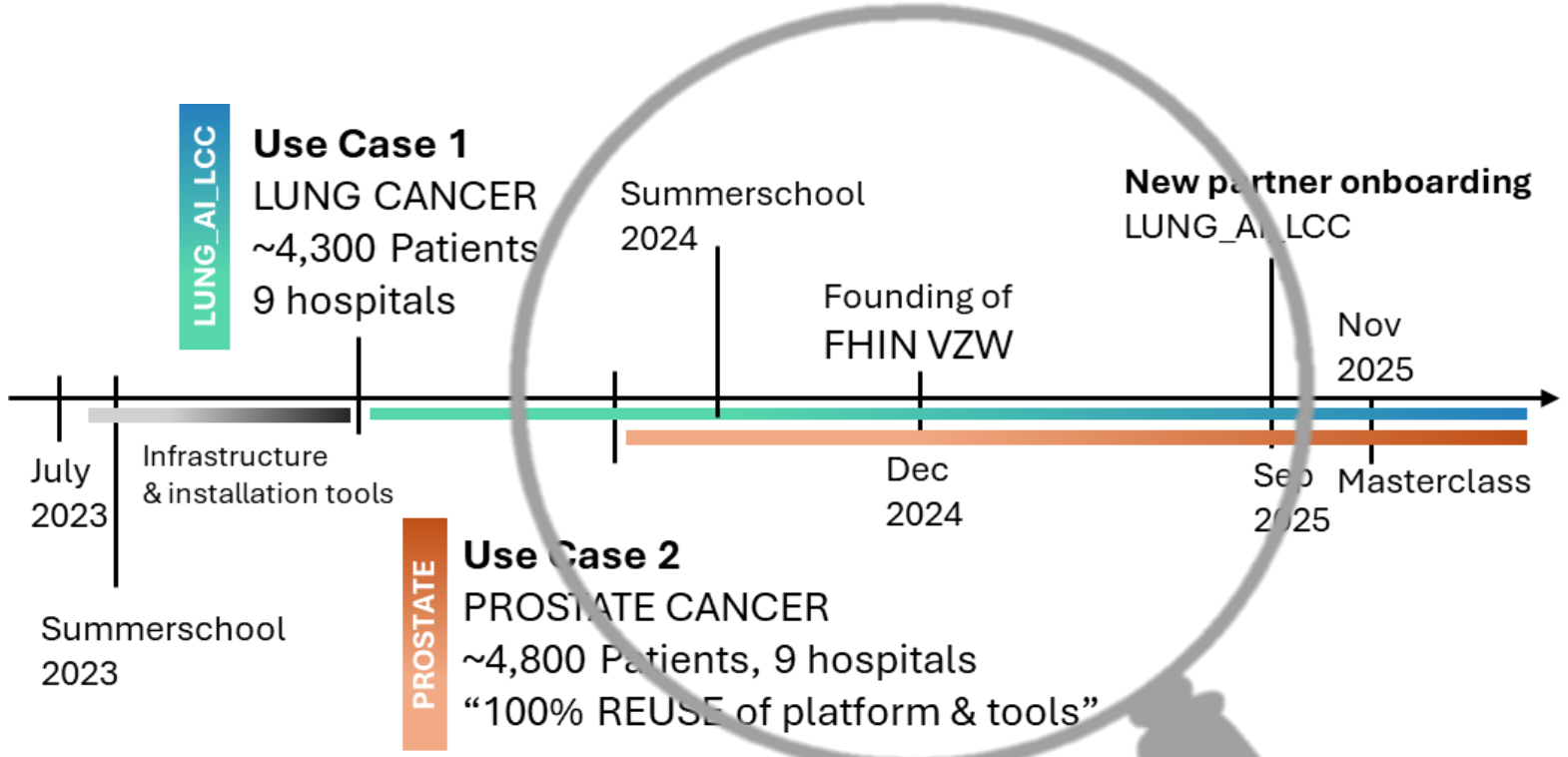
FHIN TEAM & FHIN VZW

FHIN TEAM

Name	Organisation	Role within project
Kim Denturck	AZ Delta	Project lead FHIN
Peter De Jaeger	AZ Delta	Chair – President board FHIN VZW
Dr. Kirsten Colpaert	UZ Gent	Co-Chair – vice President board FHIN VZW
Dr. Annelies Verbiest	UZA	Member board FHIN VZW
Dr. Peter Heirman	CHU Liège	Member board FHIN VZW
Dr. Hilde Philips	AZ Klina	Member board FHIN VZW
Muriel Verreth	Imelda	Member board FHIN VZW
Noëlla Pierlet	ZOL	Member board FHIN VZW
Hans Leempoels	UZ Brussel	Member board FHIN VZW
Bart Hamers	UZ Leuven	Member board FHIN VZW
Hilde Goossens	Jessa	Member board FHIN VZW
Isabelle Dhelft	AZ Sint-Jan Brugge	Member board FHIN VZW
Dr. Ingel Demedts	AZ Delta	Coordinating principal investigator (FHIN_AI_LCC study)
Dr. Vincent Geldof	AZ Klina	Principal investigator (FHIN_AI_LCC study)
Dr. Anne Sibille	CHU Liège	Principal investigator (FHIN_AI_LCC study)
Dr. Saartje Verfaillie	Jessa	Principal investigator (FHIN_AI_LCC study)
Dr. Nele De Brucker	Imelda	Principal investigator (FHIN_AI_LCC study)
Dr. Annelies Janssens	UZA	Principal investigator (FHIN_AI_LCC study)
Dr. Lore Decoster	UZ Brussel	Principal investigator (FHIN_AI_LCC study)
Dr. Steven Dieter	UZ Gent	Principal investigator (FHIN_AI_LCC study)
Dr. Maarten Criel	ZOL	Principal investigator (FHIN_AI_LCC study)
Dr. Rebecca De Pauw	AZ Sint-Jan Brugge	Principal investigator (FHIN_AI_LCC study)
Mieke Deschepper	UZ Gent	Data scientist
Robin Goesseye	UZ Gent	Data scientist
Bert Cappelle	UZ Gent	Data scientist
Pieter-Jan Lammertyn	AZ Delta	Data scientist – IT architect
Bram De Caluwe	AZ Klina	Data manager
Lore Vermeylen	AZ Klina	Data scientist from edenceHealth – partner in participating hospital
Elyne Scheurwegs	UZA	Data scientist – data engineer
Pravesh Gurung	UZA	Data scientist
Jérôme Seghers	CHU Liège	Data scientist – IT
Faustin Murego	CHU Liège	Data scientist – IT
Ben Goethuys	ZOL	Data scientist – data engineer
Sofie Vandemoortele	ZOL	Data scientist
Andre Vital Serafim Silva	UZ Brussel	Data scientist
Bert Remmerie	UZ Brussel	Data scientist
Yves Thorrez	UZ Brussel	Data manager- IT
Wouter Willems	AZ Sint-Jan Brugge	Data scientist
Tinus Scheppers	AZ Sint-Jan Brugge	Data engineer-IT
Hartwig Maes	AZ Sint-Jan Brugge	Data engineer-IT
Karel van Brantegem	Imelda	Data scientist – data engineer
Dr. Els Dufraimont	Imelda	Clinical advice – steering committee
Louise Berteloot	AZ Delta	Data scientist FHIN_AI_LCC study, summerschool – Masterclass dissemination
Fanny D'Hondt	AZ Delta	Summerschool – Masterclass dissemination
Siel Depestele	AZ Delta	Summerschool – Masterclass dissemination - BELFHINDA
Luis Sanchez Gomez	Medical Data Works	Technology partner support for setting up federated technology
Tim Hendriks	Medical Data Works	Technology partner support for setting up federated technology
Heidi Diet	AZ Delta	Legal support FHIN FOD Data capbilities, FHIN VZW, BELFHINDA, FHIN-LLM HDA
Sofie De Wilder	UZA	Legal support FHIN FOD Data capbilities, FHIN VZW
Sofie Depauw	UZ Gent	Legal support FHIN FOD Data capbilities, FHIN VZW
Simon Van Damme	UZ Gent	Legal support FHIN FOD Data capbilities, FHIN VZW
Catherine Beele	UZ Gent	Legal support FHIN FOD Data capbilities, FHIN VZW
Evelyn Vandermeersch	UZ Brussel	Legal support FHIN FOD Data capbilities, FHIN VZW
Sophie Tenaerts	AZ Sint-Jan Brugge	Legal support FHIN FOD Data capbilities, FHIN VZW
Myriam Goemans	ZOL	Legal support FHIN FOD Data capbilities, FHIN VZW
Manon Pilat	CHU Liège	Legal support FHIN FOD Data capbilities, FHIN VZW
Anse Boogaerts	Imelda	DPO
Wannes Depondt	AZ Delta	DPO

FHIN VZW

- Equal partnership
- Open for collaborations
- Legal & DPO teamwork
- BELFHINDA partnership
- Framework agreements for new feasibility studies



START OF FHIN non-profit organization dec 2024

– Foto getekend

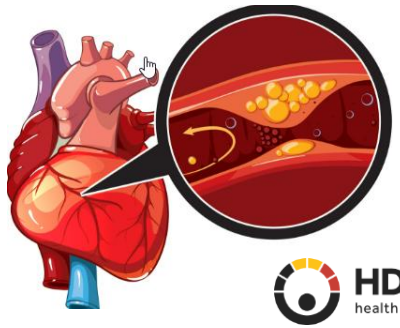
7

FHIN SOLUTION:

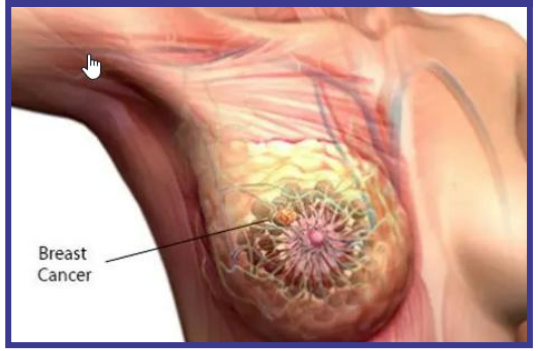
NEXT STEPS: NEW REGISTRIES & NEW PARTNERSHIPS

NEW REGISTRIES

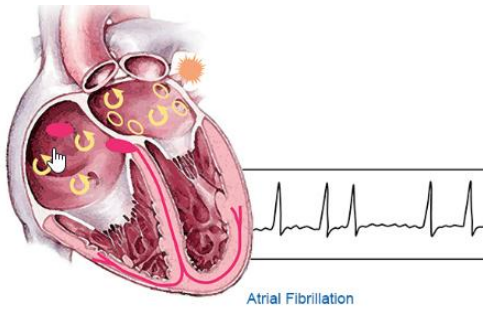
Coronary artery disease



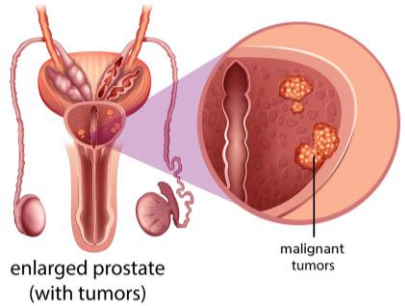
Breast cancer



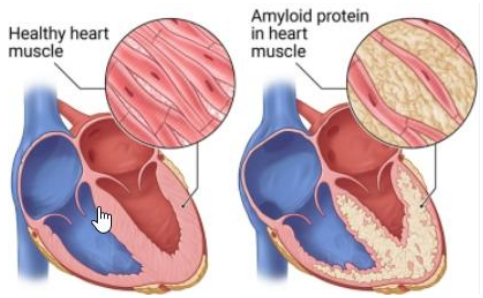
Atrial fibrillation



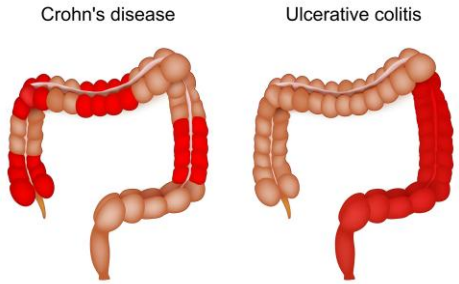
Prostate cancer



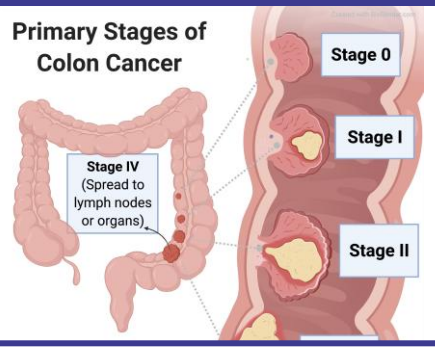
Cardiac amyloidosis



IBD



Colon cancer



Voice disorder

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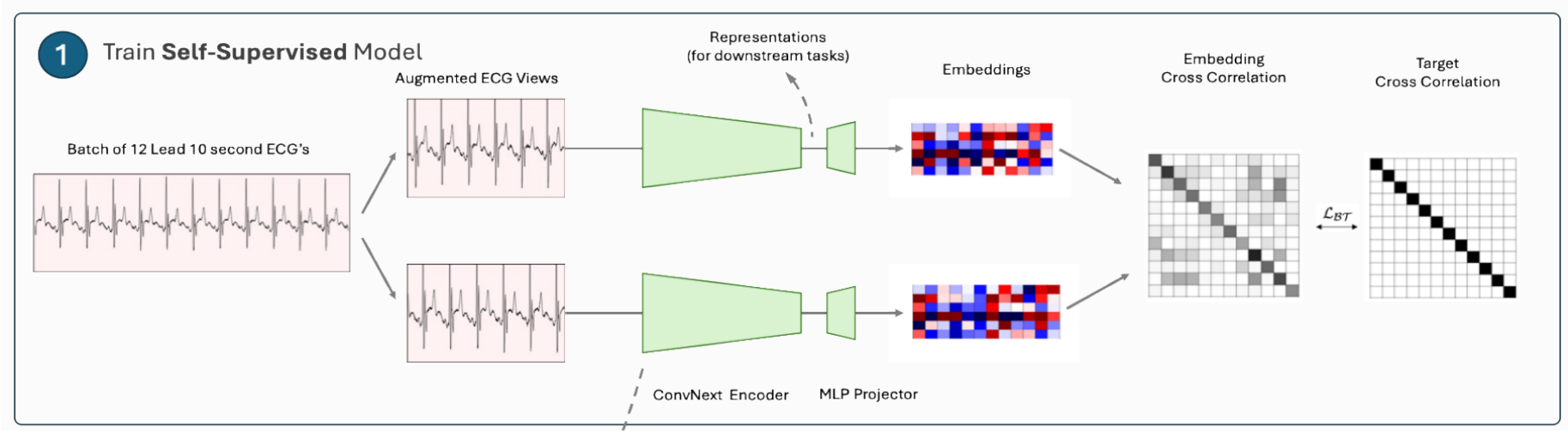
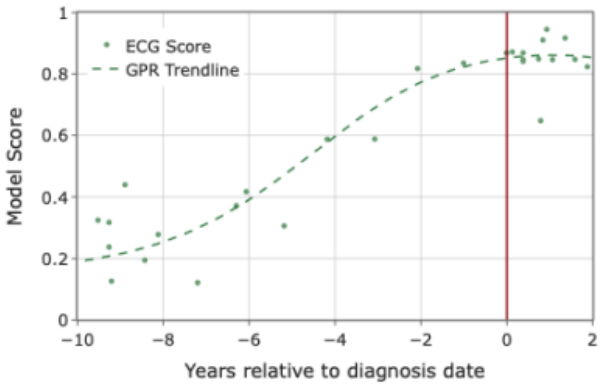
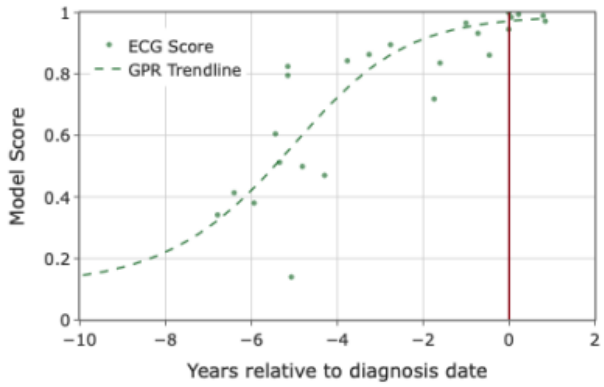
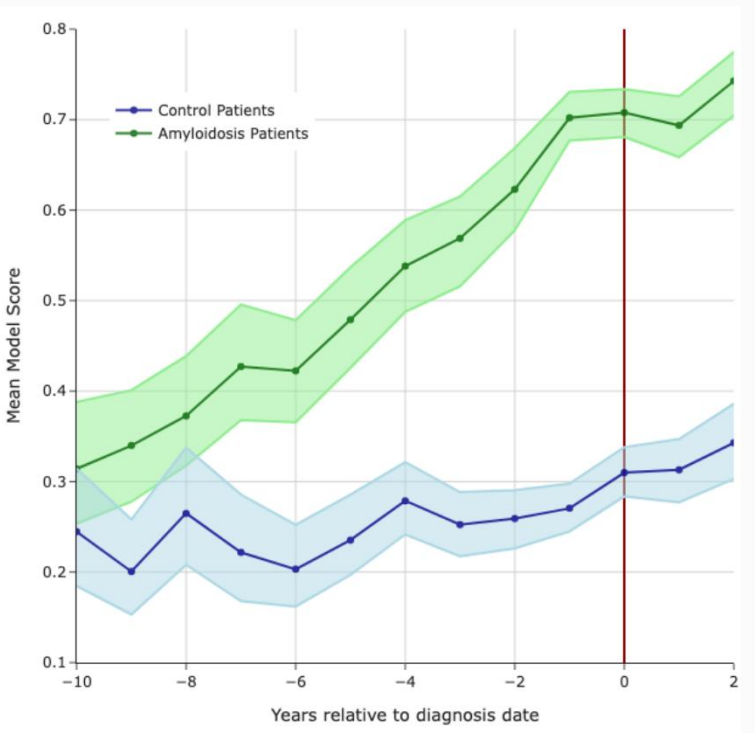
Cardiac Amyloidosis









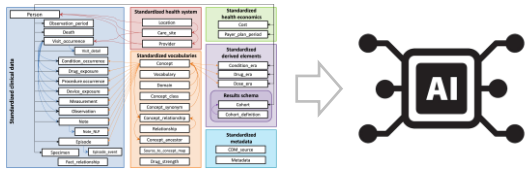
Creating synergy

EUROPEAN HEALTH DATA SPACE

HDA health data agency

Data Catalog | Data Request | Data Delivery

Source Data | OMOP CDM | Federated Learning



AI

Data Discoverability

Data Interoperability

Data Governance

Privacy-Preserving Collaboration

Trusted Data Access

Advanced Secure Analytics

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An ecosystem for Belgian hospitals:

- building data capabilities to collaborate on secondary use
- becoming ready for EHDS by 2029

SPECTRE-HD

MINE MINE MINE MINE MINE MINE MINE MINE

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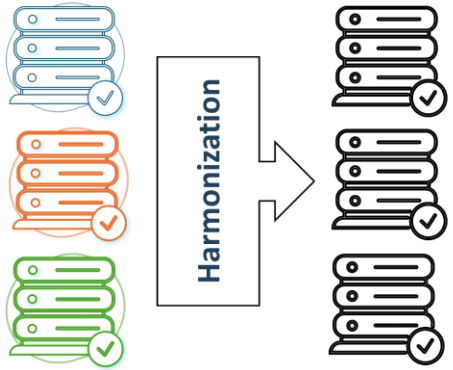
Local data, global insights…

FHIN & INAH technical harmonization is already enabling truly global collaborative research

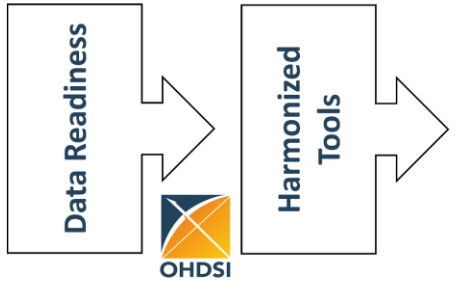
22 sites – 14 countries – 3 continents

>100,000 patients
Metastatic non-small cell lung cancer

Local harmonization to OMOP

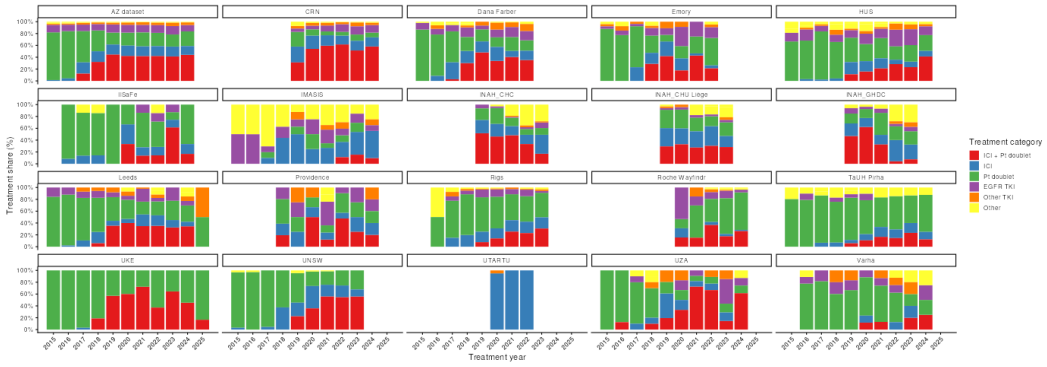


Iterative data readiness and result refinement

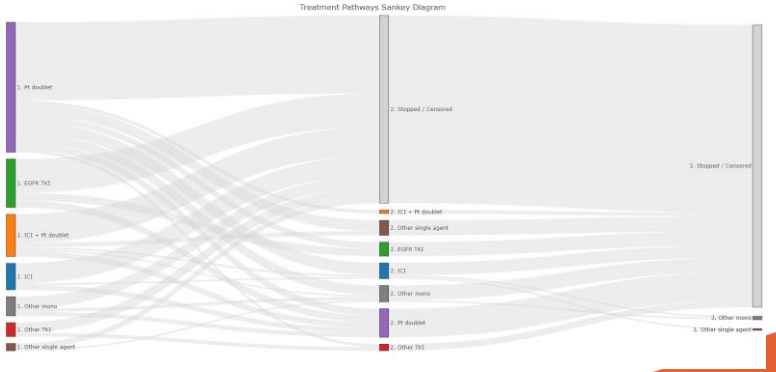


Secure local analysis
Shared global results

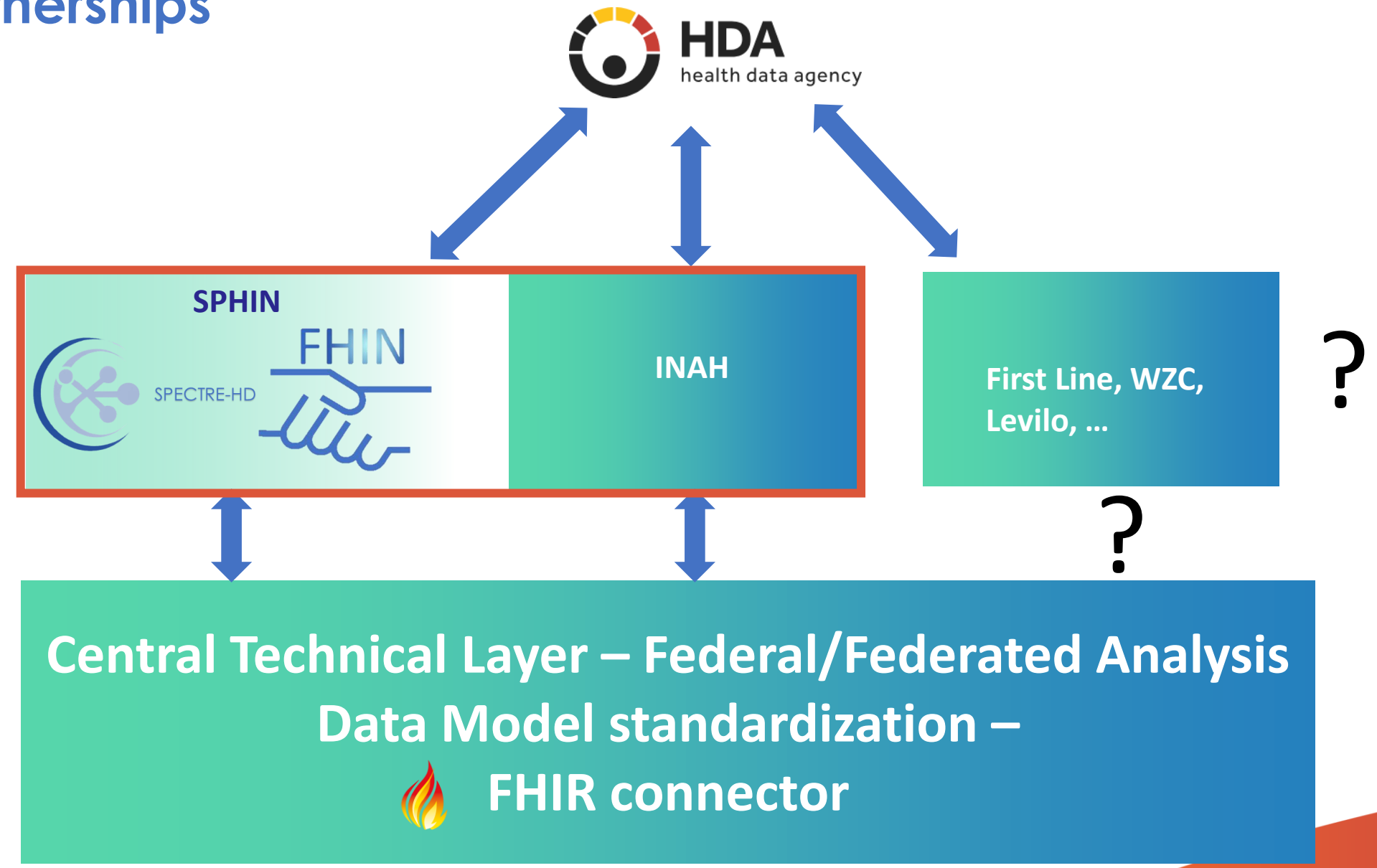
Global treatment evolution



Treatment pathways



New partnerships



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Principles

Principle	What It Means	Why It Matters
Open-source foundation	All core components published openly	No vendor lock-in; community sustainability
Local-first design	Data (including results) stay at hospitals until explicitly shared	Hospitals retain full sovereignty
EHDS-ready	Built to standards like SATRE and HealthDCAT-AP	Compliant before the deadline
Modular adoption	Hospitals can implement components individually	Lower barrier to entry

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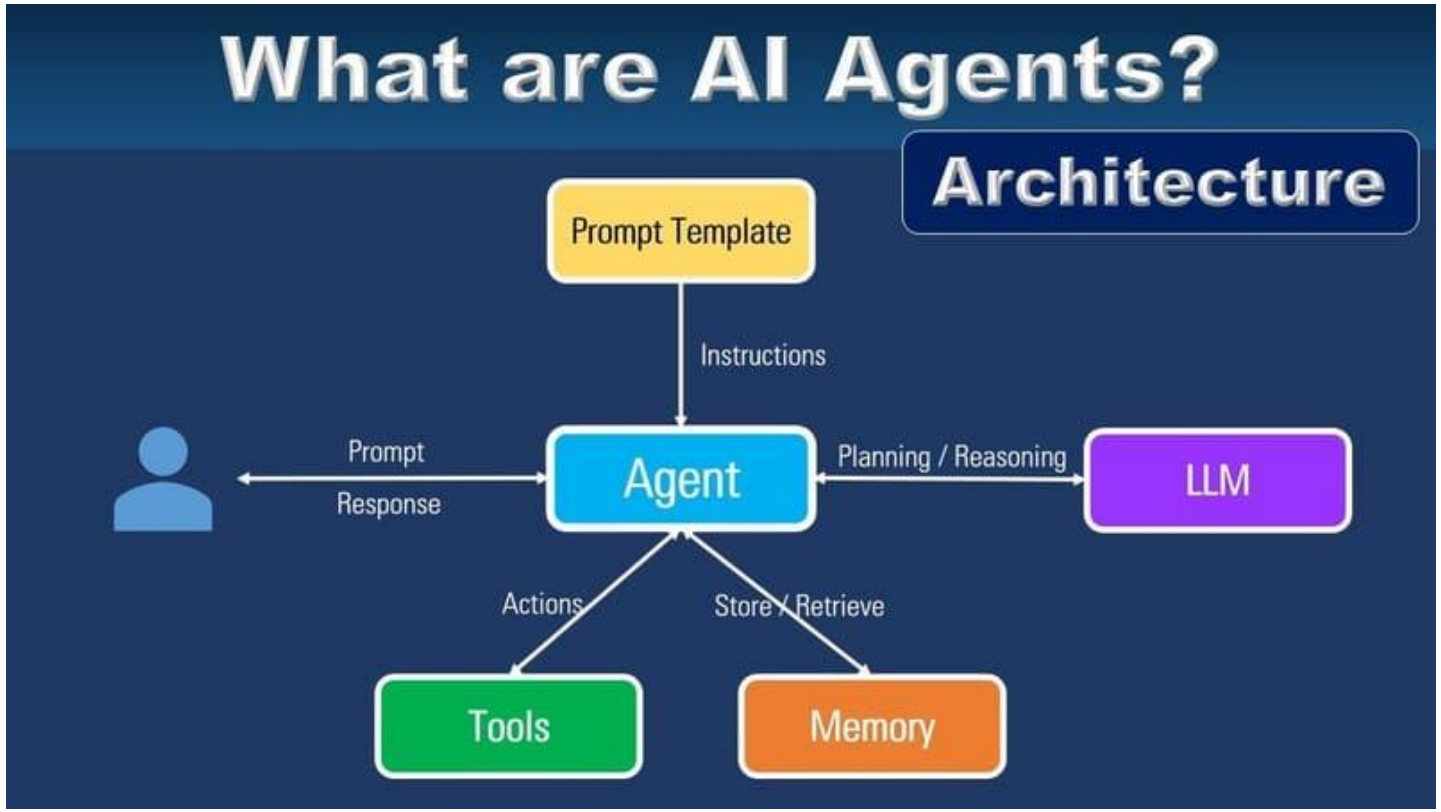
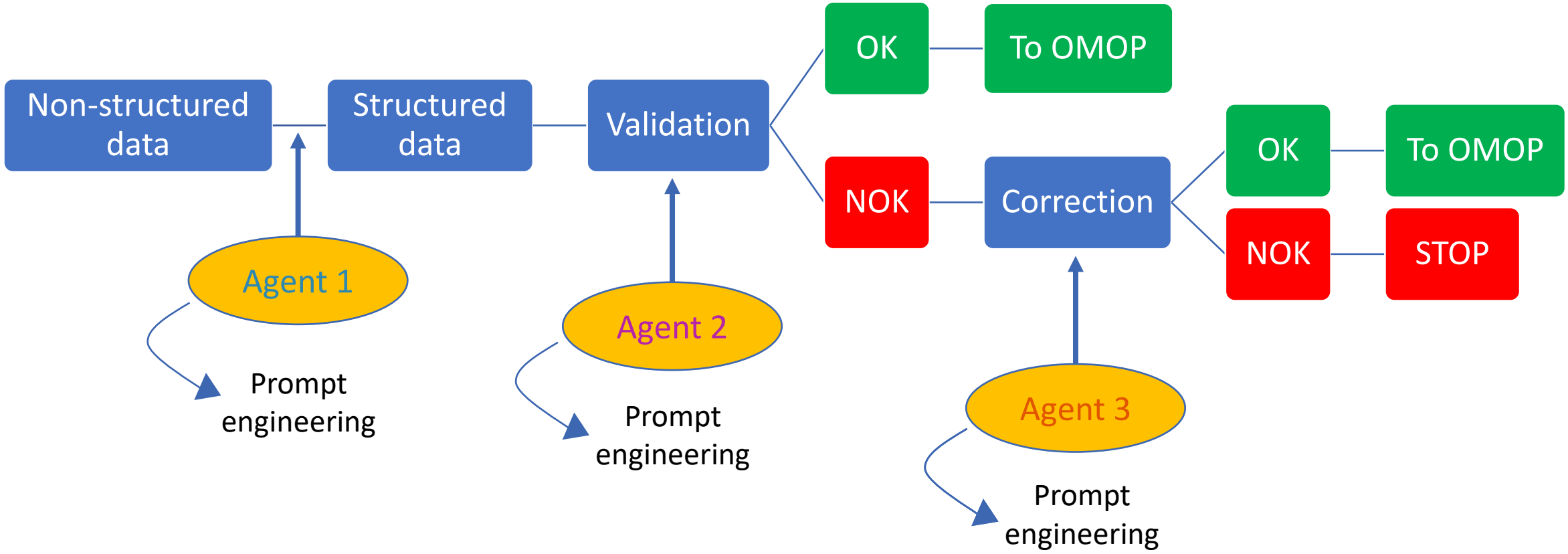
Agentic Orchestration - LLM



- Agent 1: Orchestrator
- Agent 2: Data Extraction
- Agent 3: Validation
- Agent 4: Correction
- Agent 5: Save

Large Language Model
LLM workflow



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Let’s talk

FHIN@FHIN.BE

HEALTHCARE ORGANISATION GENERATING HEALTH DATA?
Welcome to join the FHIN network!