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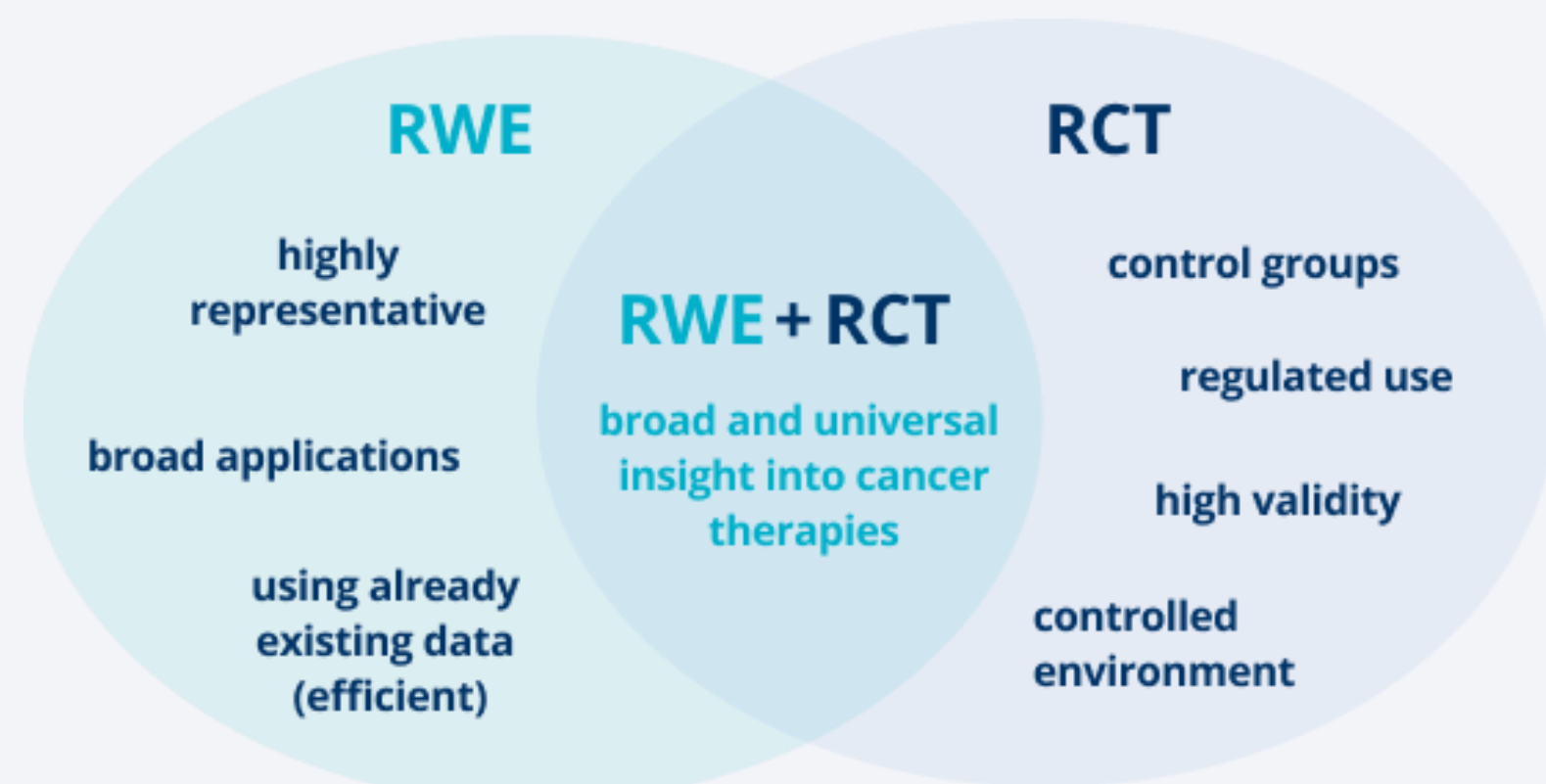
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## OBJECTIVES

Accessing and standardizing raw clinical data across multiple hospitals presents a challenge in Oncology. However, it is crucial to use real-world data sources such as electronic health records (EHR) to leverage untapped information (**Figure 1**).



**Figure 1.** Characteristics of real-world evidence (RWE) studies and randomized clinical trials (RCT).

### AIMS:

- To build a federated data network in Oncology (**Figure 2**).
- To facilitate GDPR-compliant data exchange of large datasets, with hospitals as owners.
  - Governed by a common data model (CDM)
  - Multicenter, observational, real-world evidence (RWE) studies in Oncology, with breast cancer, lung cancer, and immunotherapy as therapeutic areas of focus.

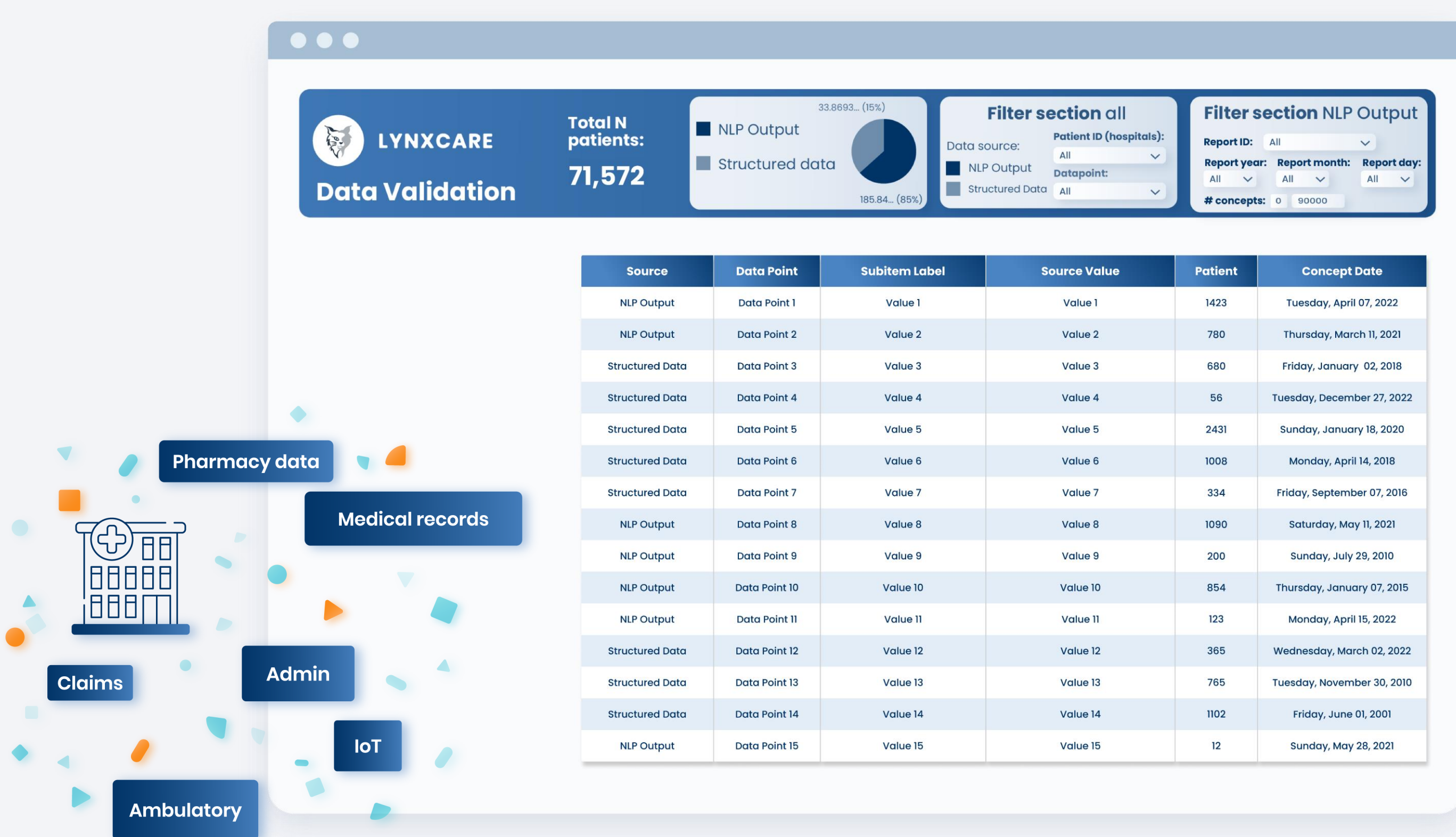


**Figure 2.** Building GDPR-compliant federated data networks for Oncology RWE

## EXPECTED RESULTS

Oncology data network to date (mock data visualization in **Figure 5**):

- N = 71,572 patients
- 5 million unstructured records processed
- 27,149 mappings from structured data sources, e.g.:
  - Administered and prescribed medication
  - Laboratory parameters
  - Multidisciplinary Oncology consults
  - Mortality
- More than 1000 quality-controlled variables
- Continuous measurements lead to:
  - Identifying patterns and trends
  - Associations between datapoints and patient outcomes

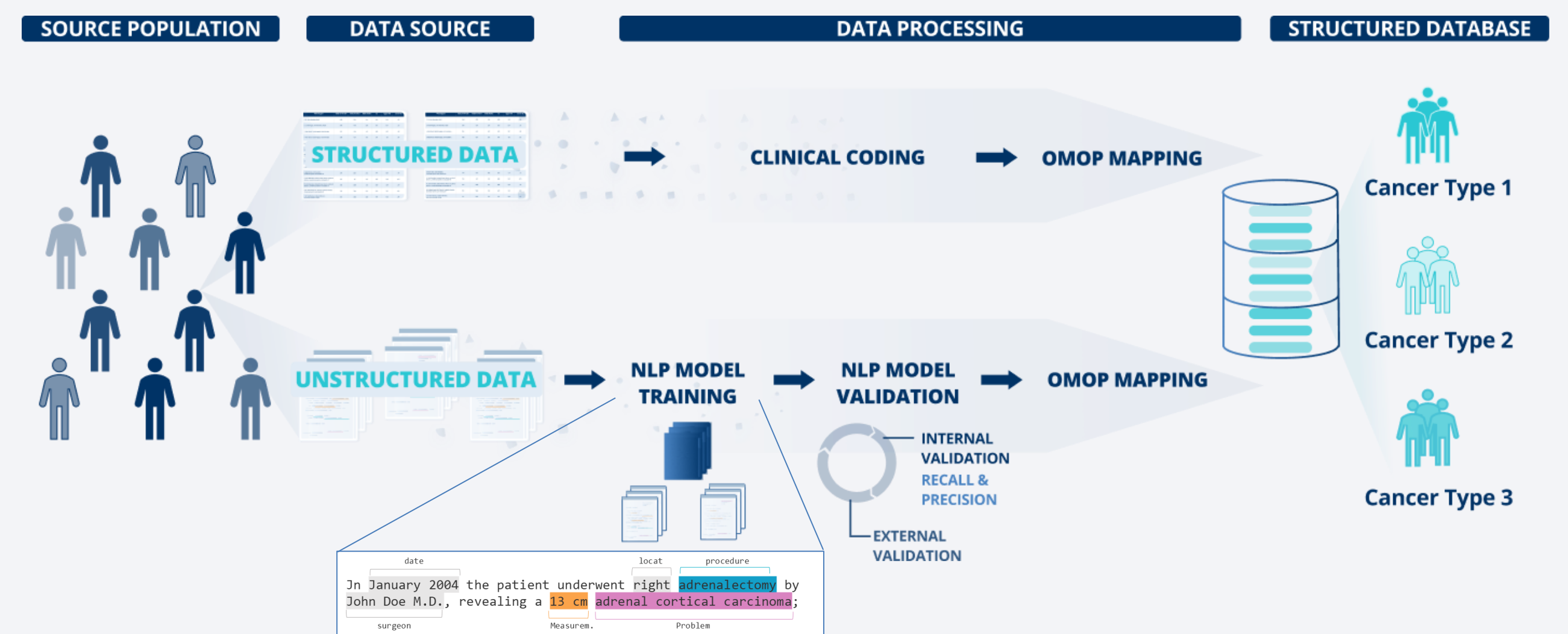


**Figure 5.** GDPR-compliant federated data networks for Oncology RWE insights

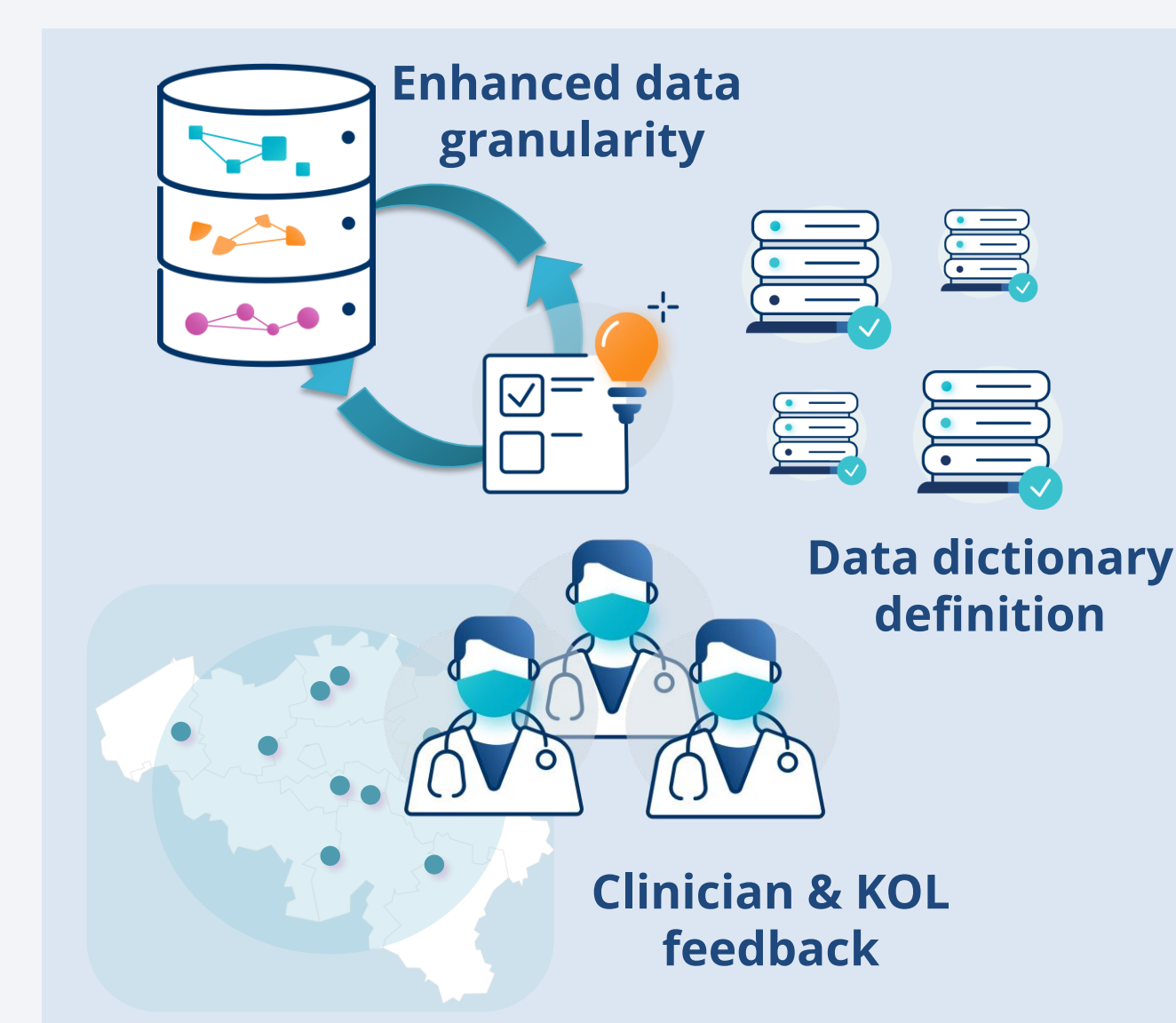
## METHODS

Oncology studies are ongoing in participating Belgian hospitals:

- LynxCare data processing technology on 4 different EHR systems
- Automatic processing of structured and unstructured data (via NLP)
- Generation of OMOP-CDM databases (**Figure 3**).



**Figure 3.** OMOP-CDM database generation.



**Variables** (n = 1056):

- Demographics
- Comorbidities
- Cancer diagnosis
- Tumor staging
- Performance status
- Oncology treatments (including immune checkpoint inhibitors)
- Procedures
- Anatomical pathology data
- Adverse events

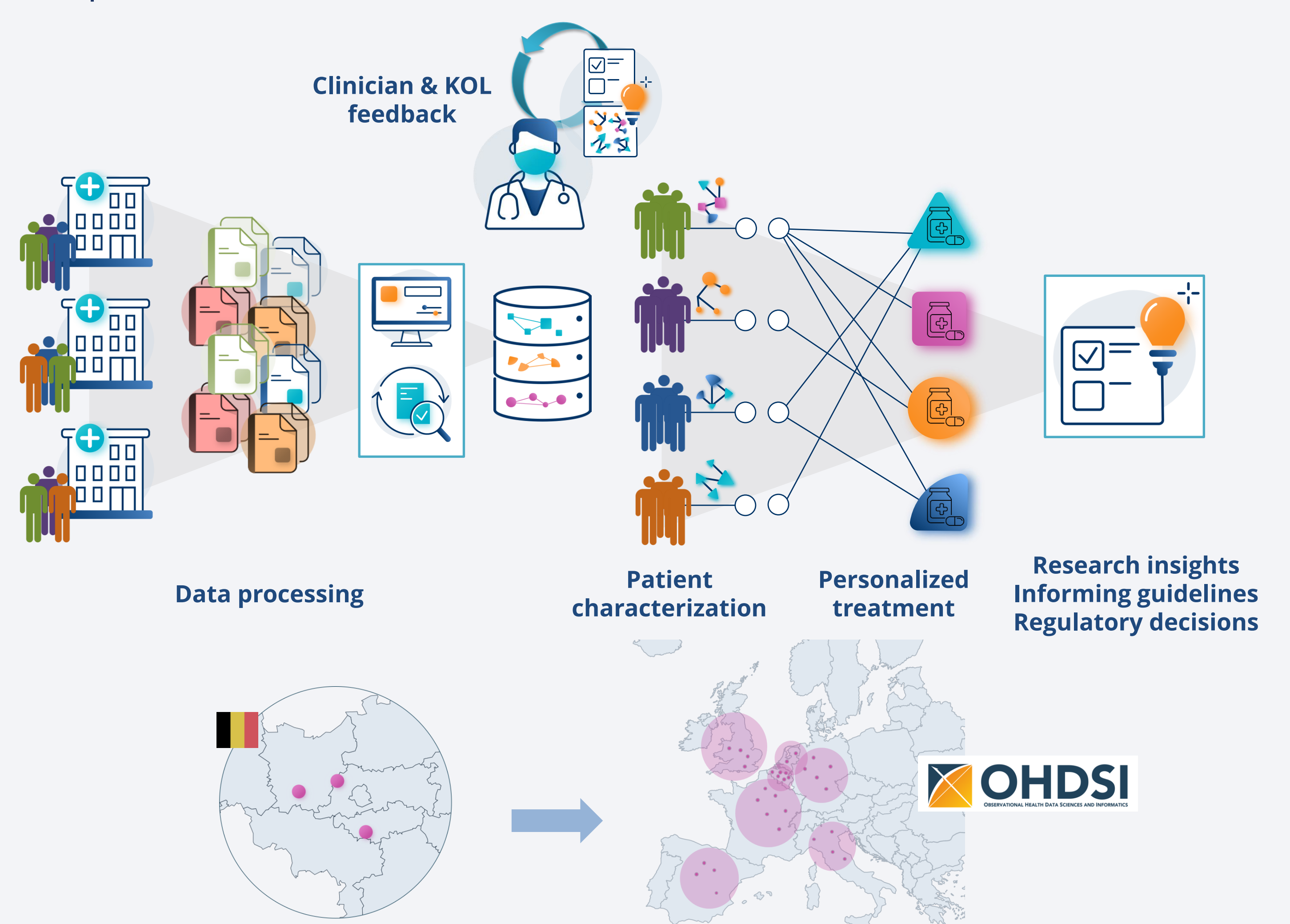
**Figure 4.** Belgian Oncology research group

- Collaboration with key opinion leaders (KOLs)
- Establishment of Oncology research group in Belgium (**Figure 4**)
  - Redefining data dictionaries
  - Establishing shared comprehension per variable
  - Enhancing data granularity

## CONCLUSIONS

Leveraging the resulting RWE (**Figure 6**):

- To develop personalized treatment plans based on patients' specific characteristics, disease progression, and prognostic factors.
- To inform evidence-based guidelines and regulatory decisions.
- To expand the groundbreaking initiative to other European countries
- To provide a sandbox of federated data networks for multicenter RWE studies in Oncology, paving the way towards precision medicine.



**Figure 6.** Leveraging RWE for personalized medicine throughout Europe

## REFERENCES:

1. Neuraz et al. Natural Language Processing for Rapid Response to Emergent Diseases: Case Study of Calcium Channel Blockers and Hypertension in the COVID-19 Pandemic. J Med Internet Res. 2020 Aug 14;22(8):e20773.