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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**).

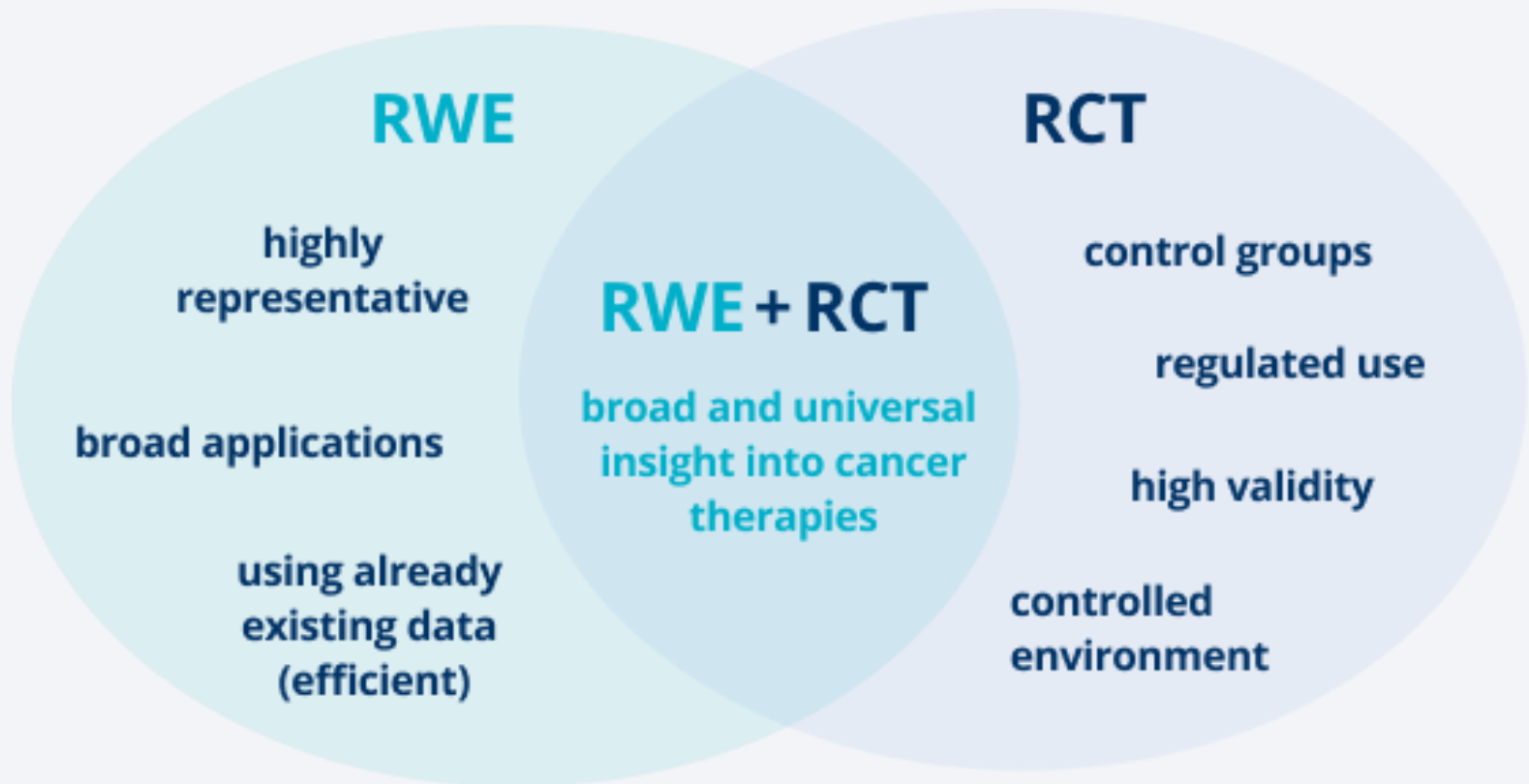


Figure 1. Characteristics of real-world evidence (RWE) studies and randomized clinical trials (RCT).

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

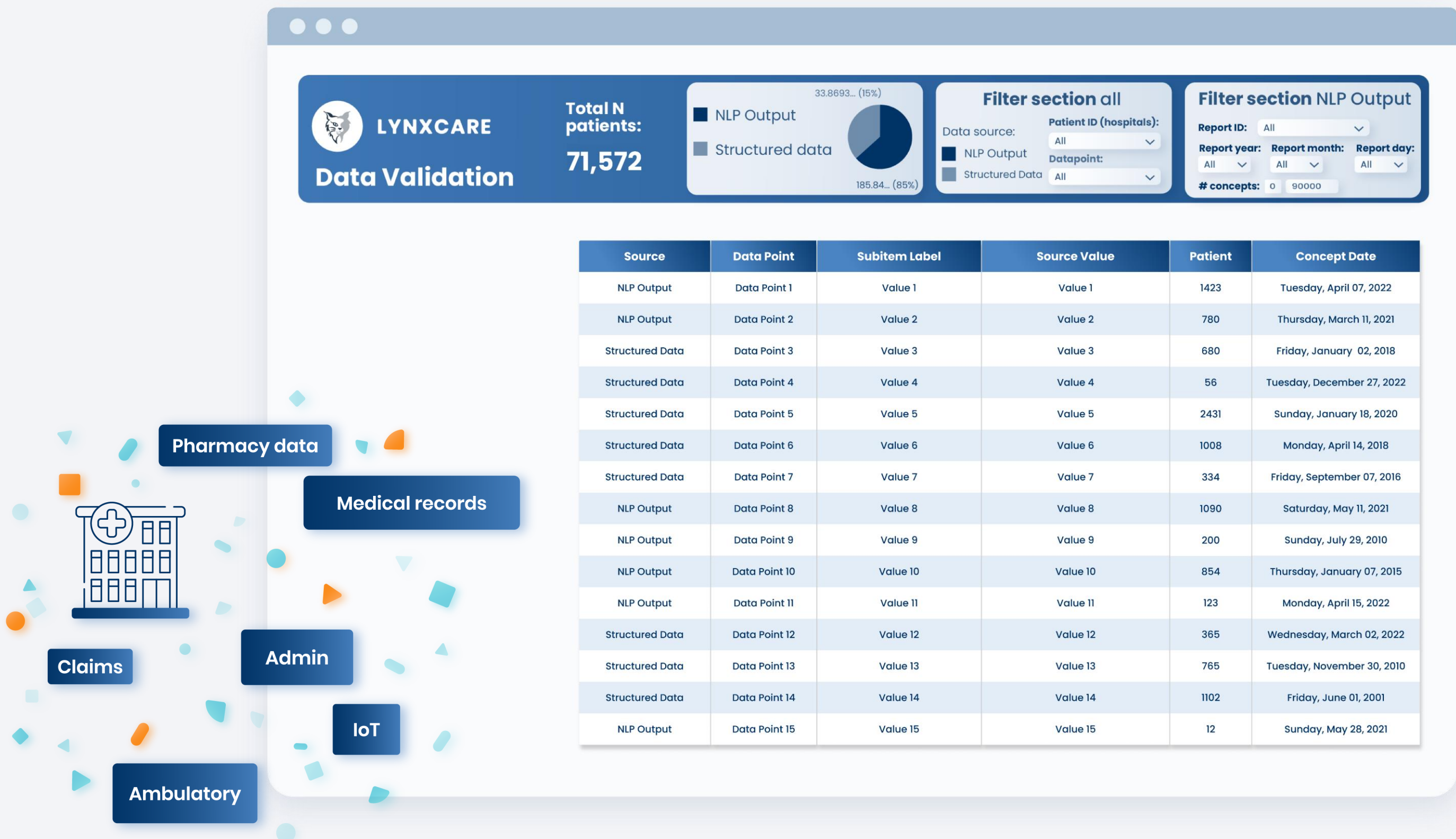


Figure 5. GDPR-compliant federated data networks for Oncology RWE insights

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**).

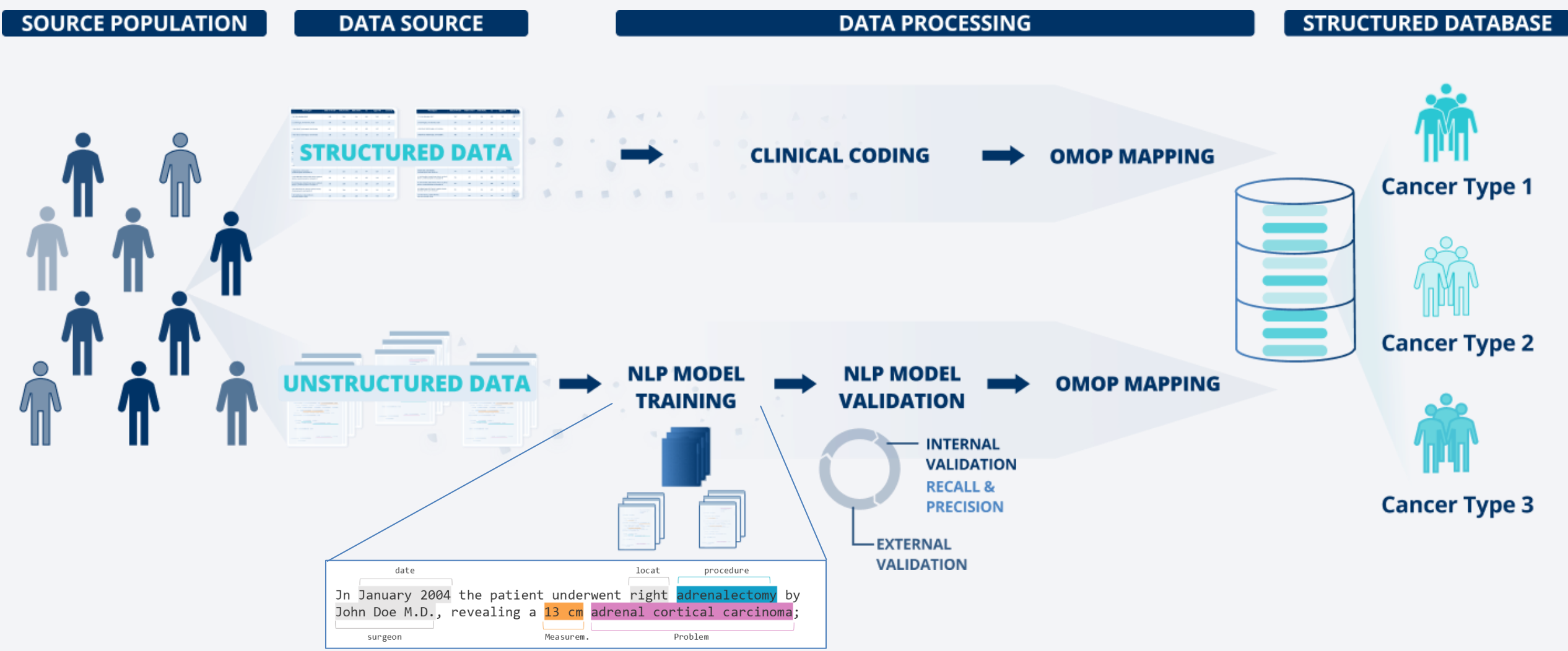
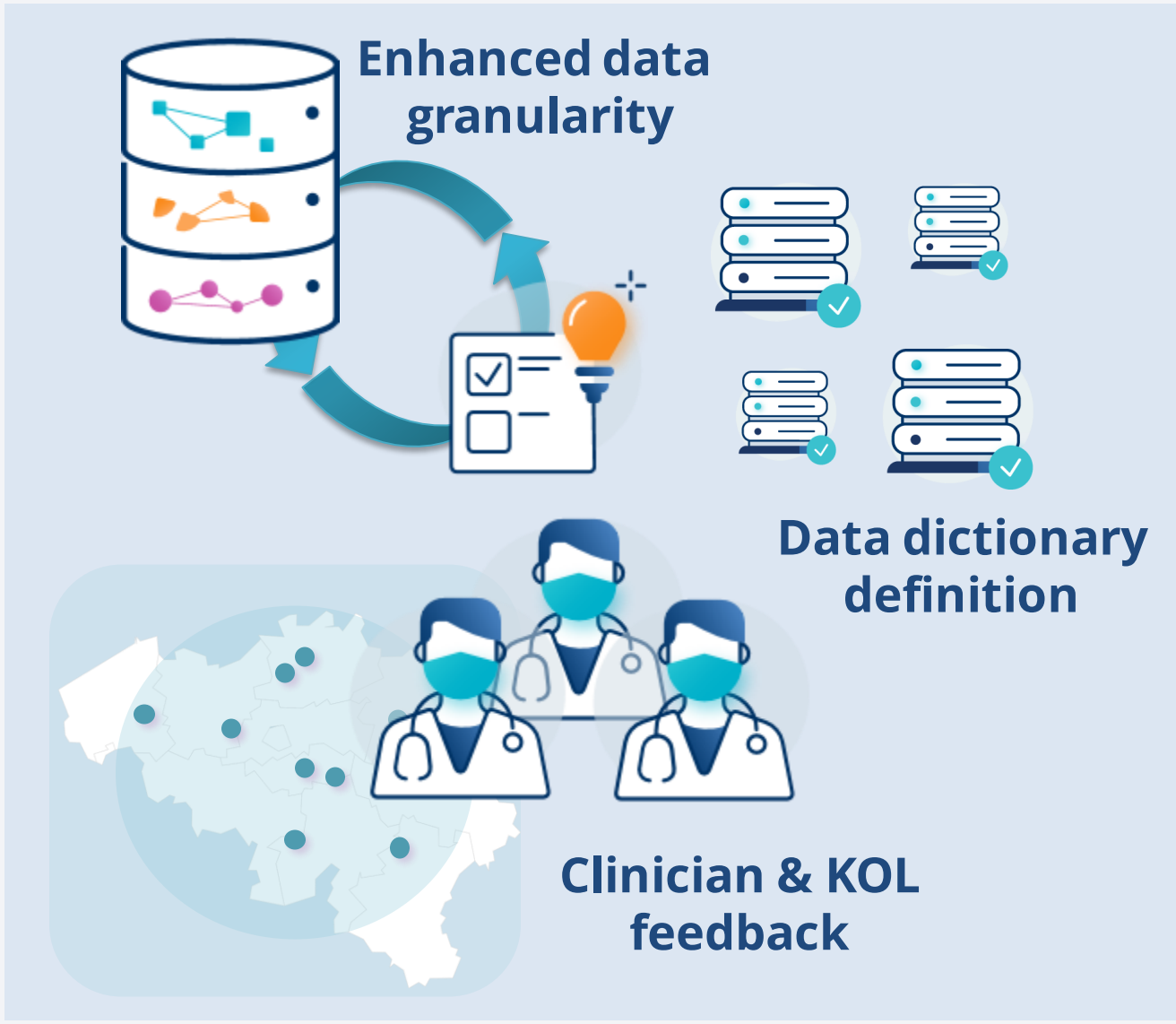


Figure 3. OMOP-CDM database generation.



- 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.

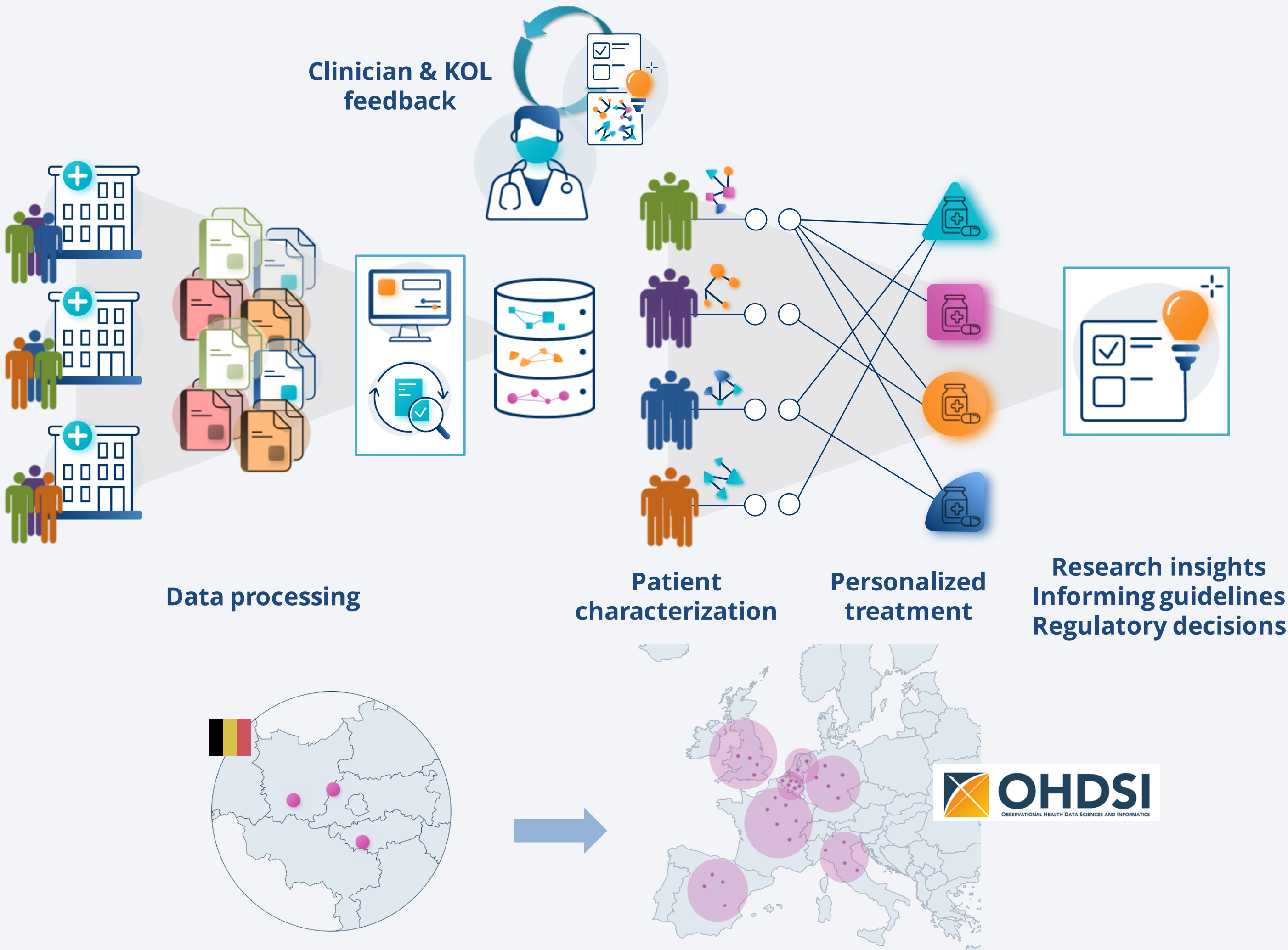


Figure 6. Leveraging RWE for personalized medicine throughout Europe

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.