Using an ontological representation of chemotherapy toxicities for guiding information extraction and integration from Electronics Health Records (EHRs)
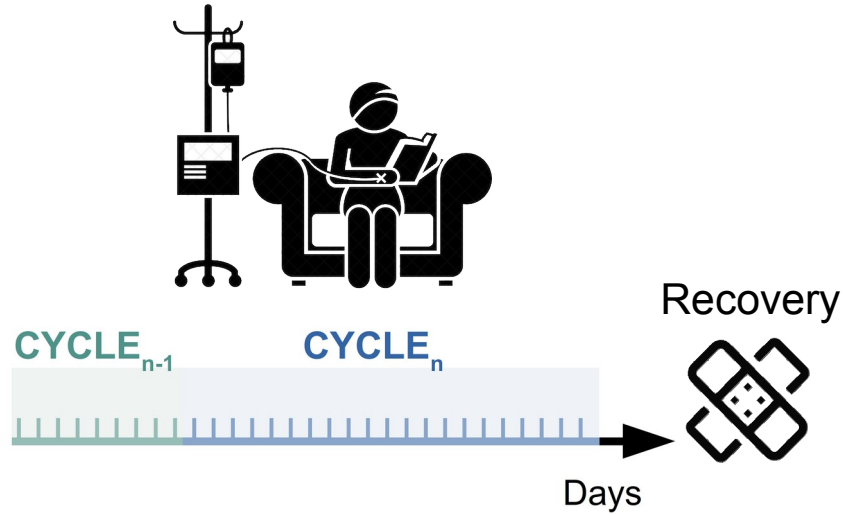
Alice ROGIER, Adrien COULET, Bastien RANCE

Context (1/2)

Adverse Drug Reaction (ADR) due to chemotherapy treatment

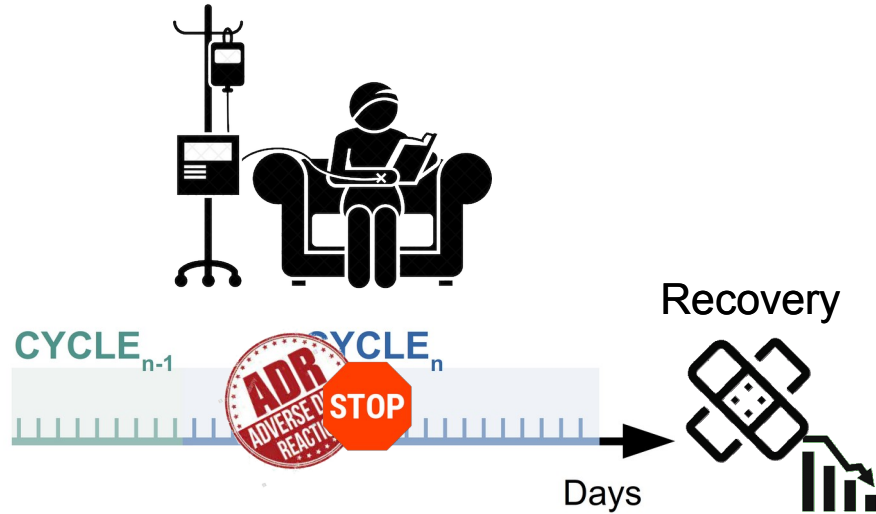**Chemotherapy treatment**

CYCLE$_{n-1}$ CYCLE$_{n}$ Recovery

Days

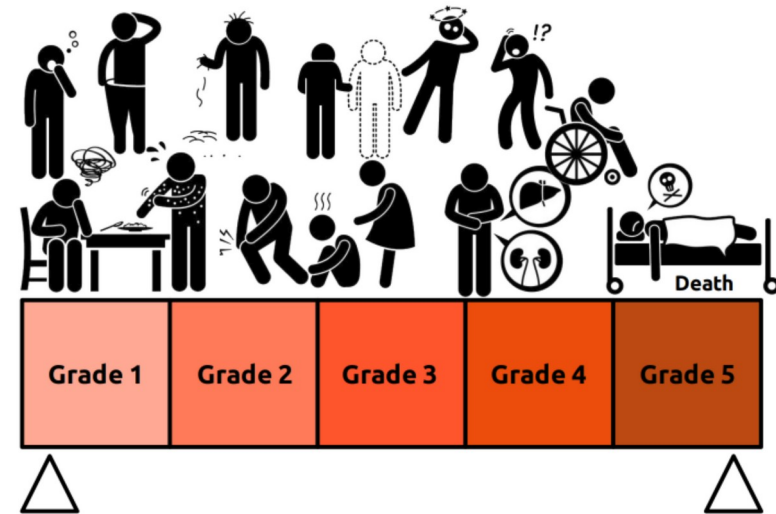# Context (1/2)

Adverse Drug Reaction (ADR) due to chemotherapy treatment

Chemotherapy treatment

Adverse Drug Reaction (ADR)

CYCLE$_{n-1}$ CYCLE$_n$

ADR ADVERSE REACTION STOP
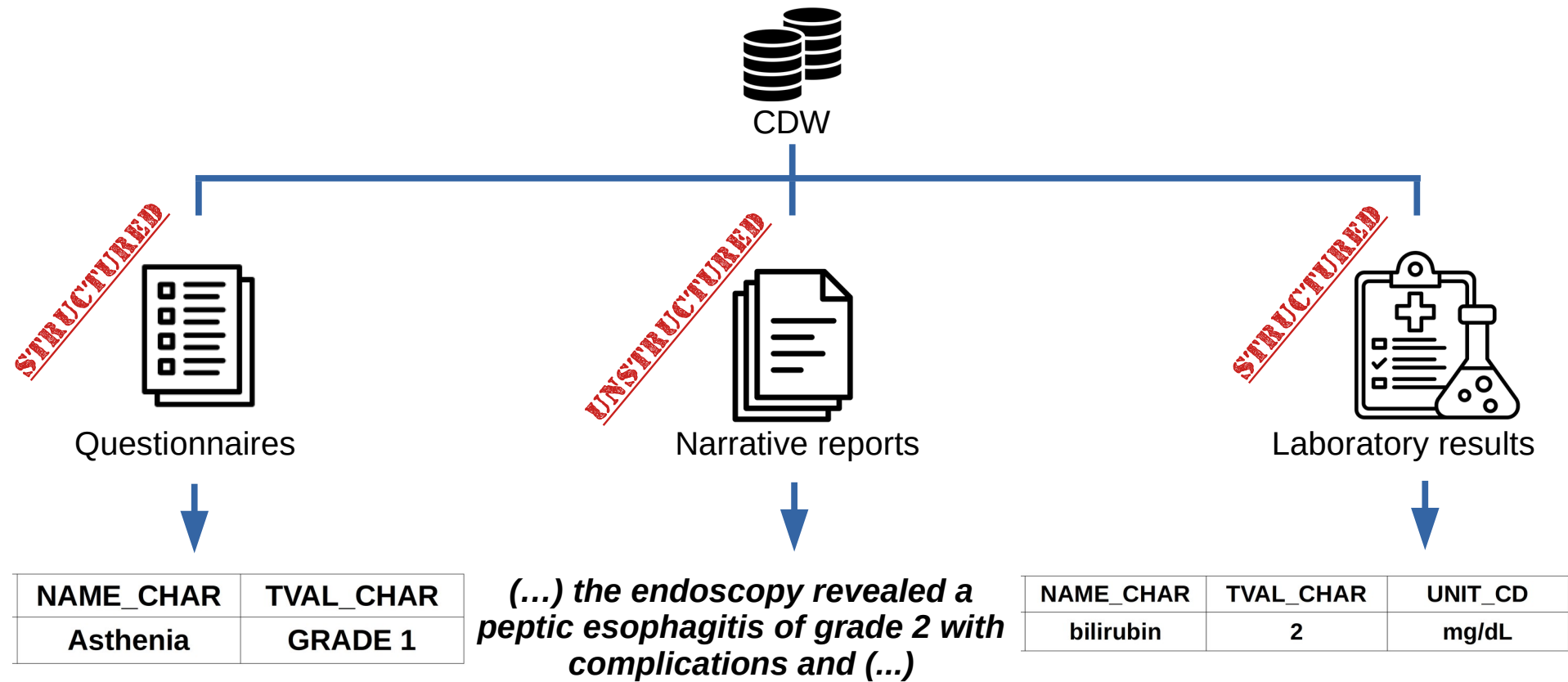
Recovery

Days

Death

| Grade 1 | Grade 2 | Grade 3 | Grade 4 | Grade 5 |

Context (2/2)

Toxicity sources in Clinical Data Warehouses (CDW)

Information about toxicities is available in CDW, but in heterogeneous forms

CDW

STRUCTURED

Questionnaires

UNSTRUCTURED

Narrative reports

STRUCTURED

Laboratory results

NAME_CHAR	TVAL_CHAR
Asthenia	GRADE 1

(...) the endoscopy revealed a peptic esophagitis of grade 2 with complications and (...)

NAME_CHAR	TVAL_CHAR	UNIT_CD
bilirubin	2	mg/dL

Objective

Integrating chemotherapy toxicities information in a **common data model**

Our contributions :
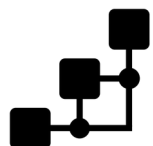
Creation of OntoTox, an **ontology** for chemotherapy toxicities guided by data
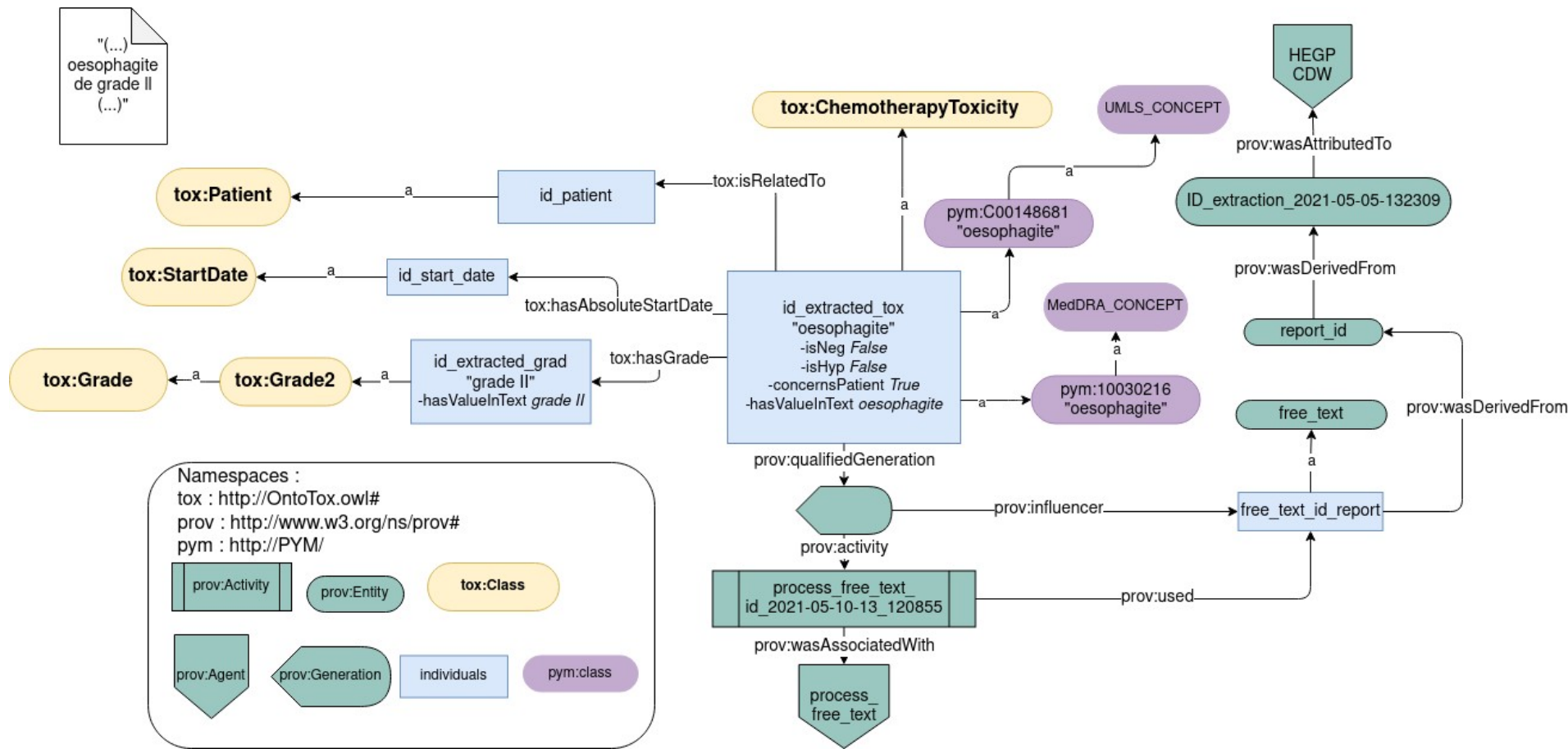
Toxicity **extractions** from different data sources

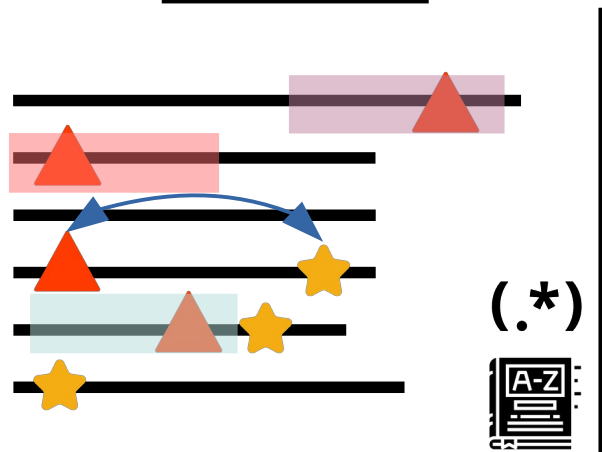Demonstration of OntoTox interest with a **clinical use case**

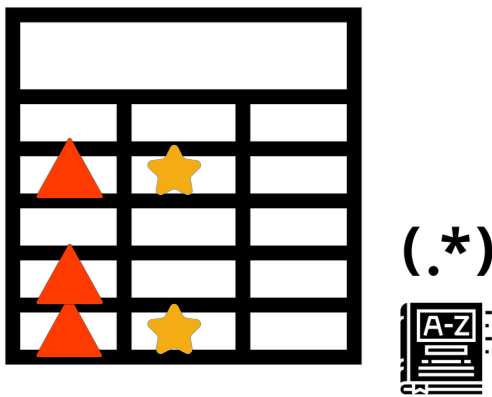# OntoTox: an ontology to guide data integration
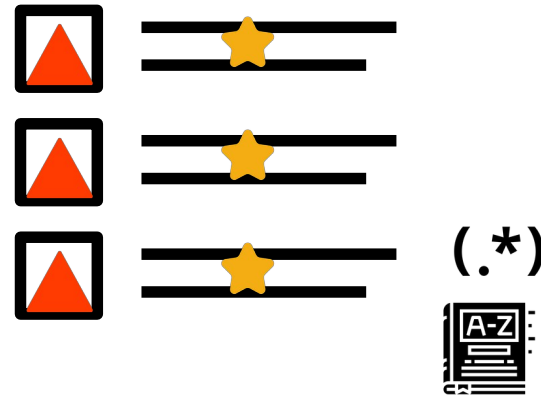
Toxicity extraction processes

Free text

Table

Questionnaire

(.*)

(.*)

(.*)

Entity recognition :

Context detection:

▲ : toxicity ------- 📖A-Z : 4,038 toxicity term dictionary
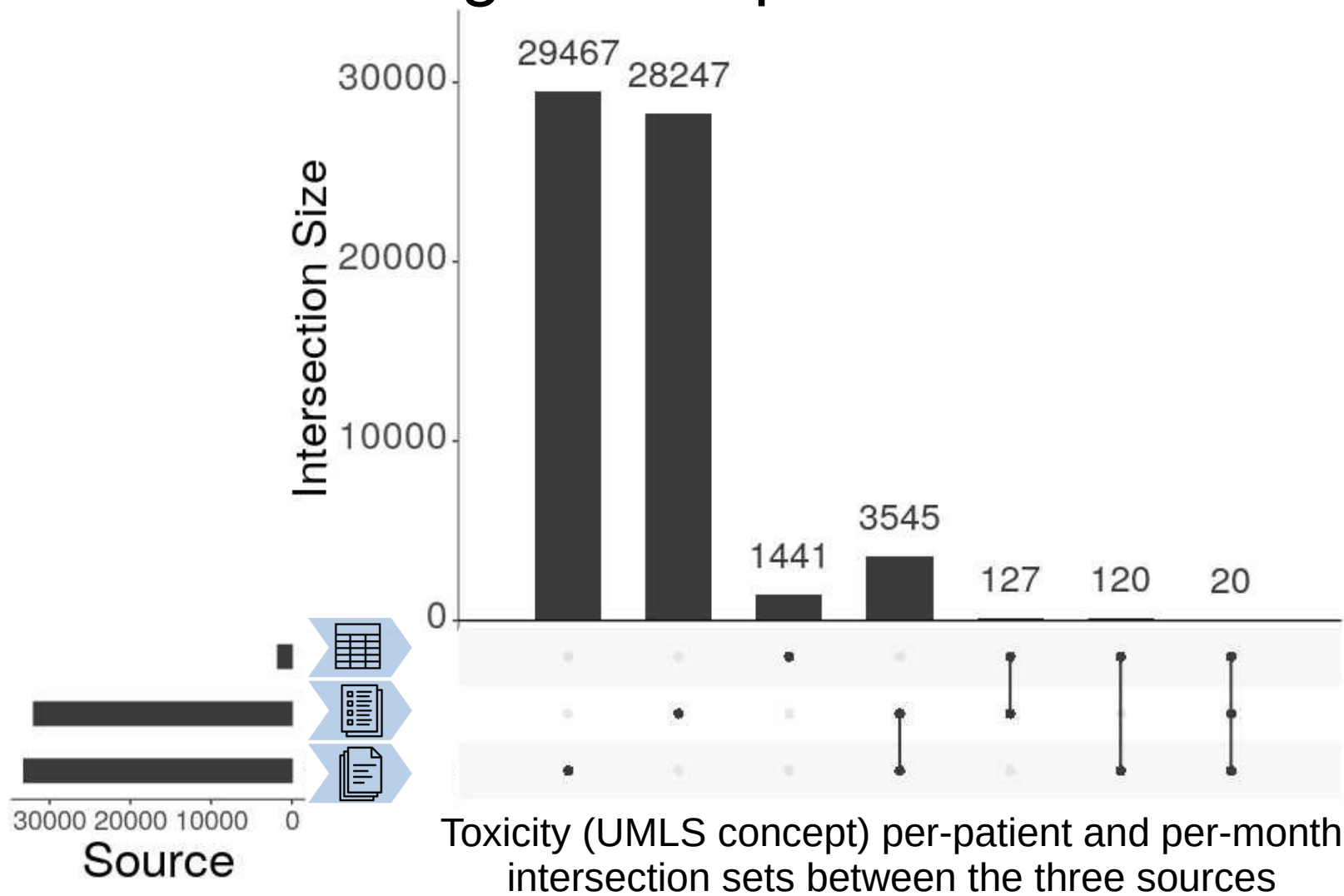
★ : grade ------- (.*) : regular expression

negation

hypothesis
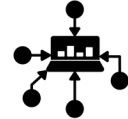
family

: Link between entities with dependency parsing

Results for 330 lung cancer patients

Toxicity (UMLS concept) per-patient and per-month intersection sets between the three sources

Conclusion

OntoTox...

very first ontology for **chemotherapy toxicities**

guides the data integration from **various sources**

will be be **enriched**

will further serve as a brick for **clinical decision support systems**

Thank you !

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OntoTox GitHub:
https://github.com/TeamHeka/OntoTox

OntoTox BioPortal:
https://bioportal.bioontology.org/ontologies/ONTOTOX