

Detection of chemotherapy toxicity and response from Electronic Health Records (EHRs)

Alice ROGIER, Adrien COULET, Bastien RANCE



Hôpital européen Georges-Pompidou



Knowledge representation for the study of responses to chemotherapy

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Thesis subject

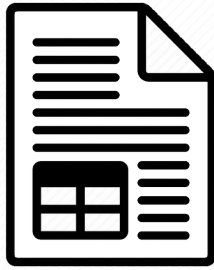
Detection of chemotherapy toxicity and response from Electronic Health Records (EHRs)



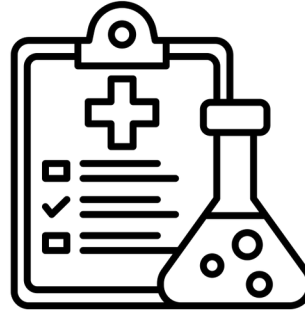
Clinical data
warehouse
(CDW)



Questionnaires



Narrative reports



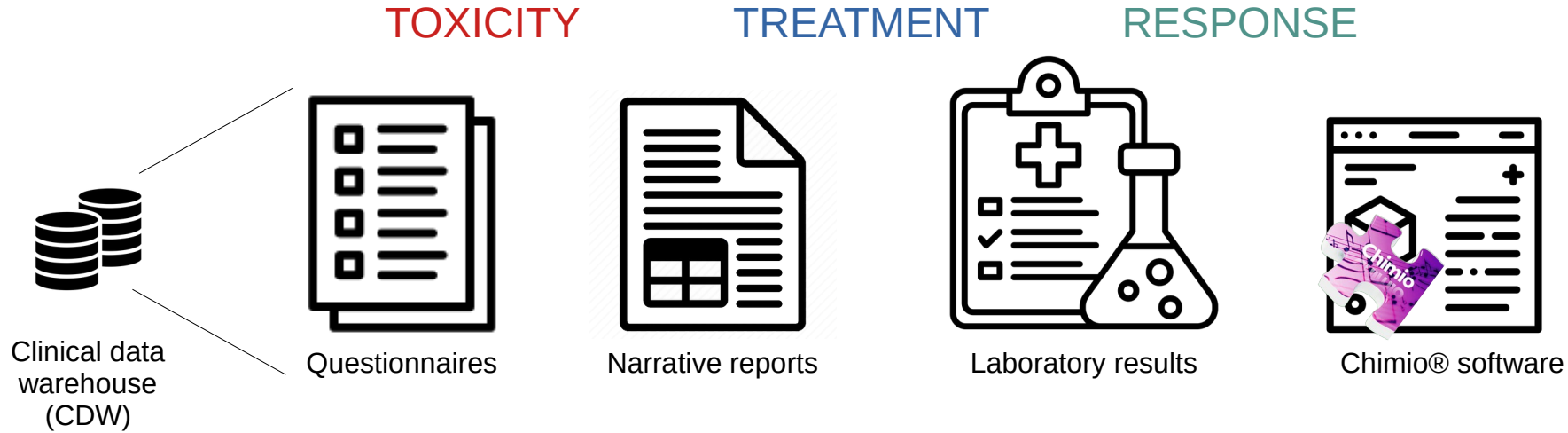
Laboratory results



Chimio® software

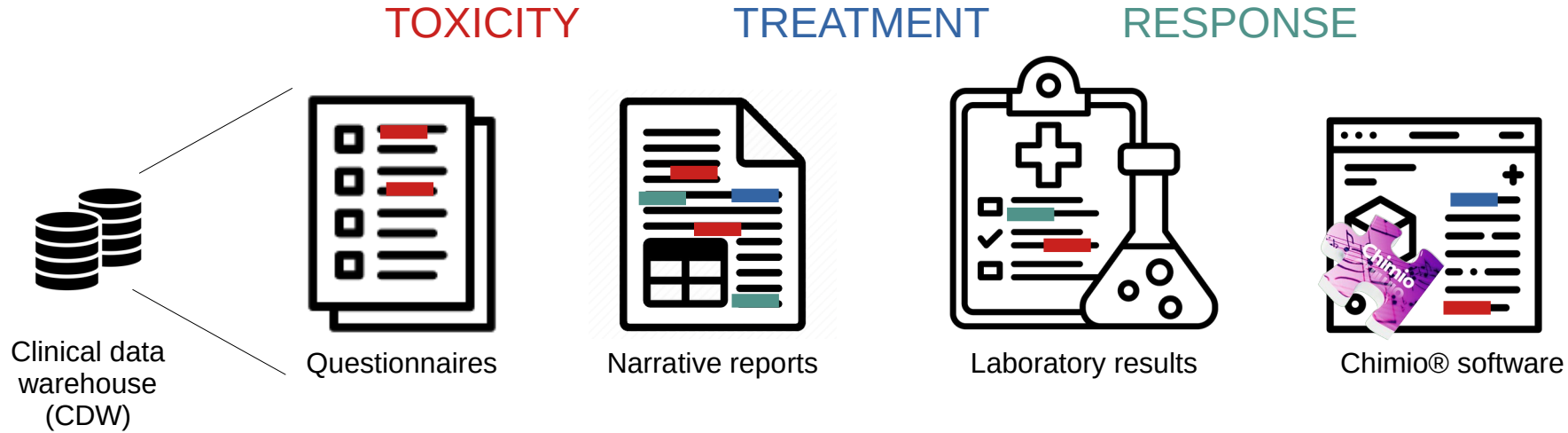
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Detection of chemotherapy toxicity and response from Electronic Health Records (EHRs)



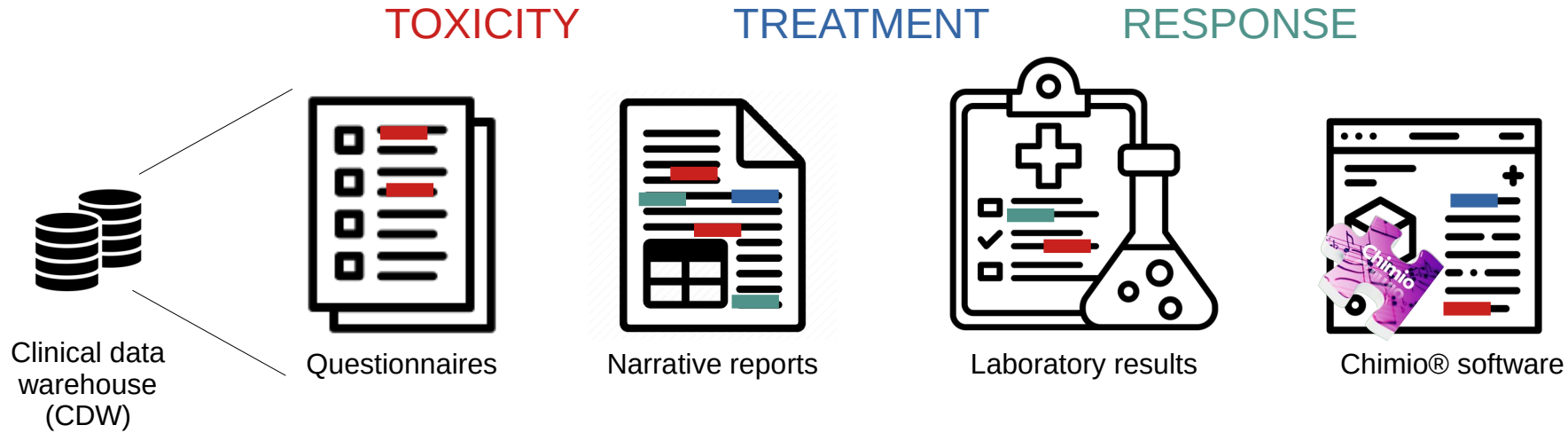
Thesis subject

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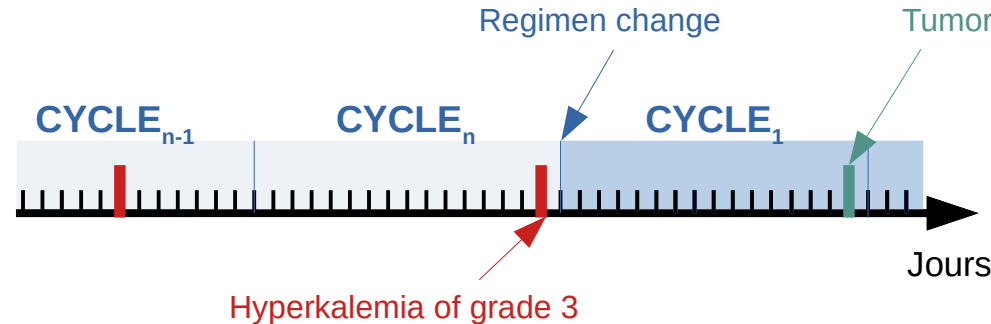


Thesis subject

Detection of chemotherapy toxicity and response from Electronic Health Records (EHRs)



Reconstruct the sequence of events that occurred during chemotherapy treatment...



To develop predictive models of these events

Using an ontological representation of chemotherapy toxicities for guiding information extraction and integration from Electronics Health Records (EHRs)

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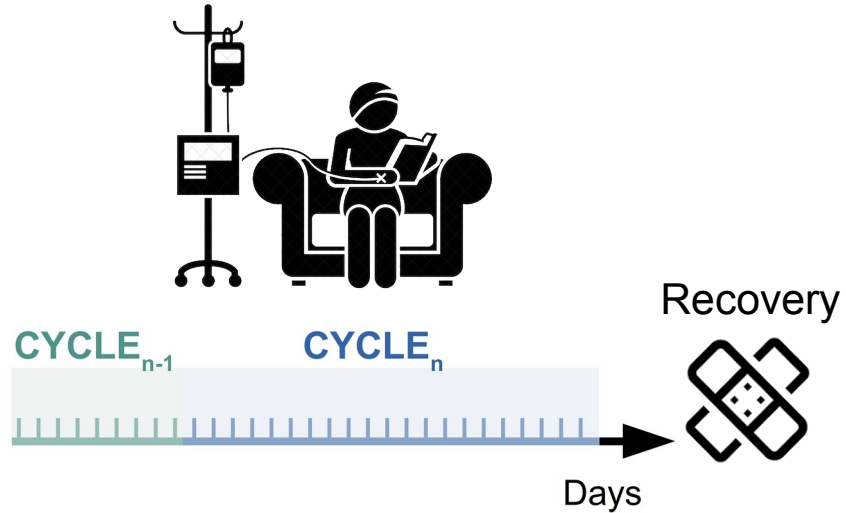
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Context (1/2)

Adverse Drug Reaction (ADR) due to chemotherapy treatment

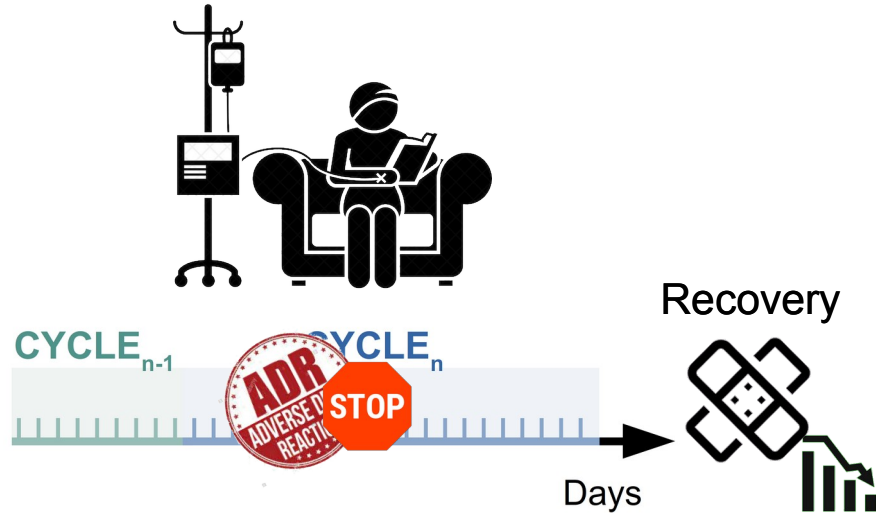
Chemotherapy treatment



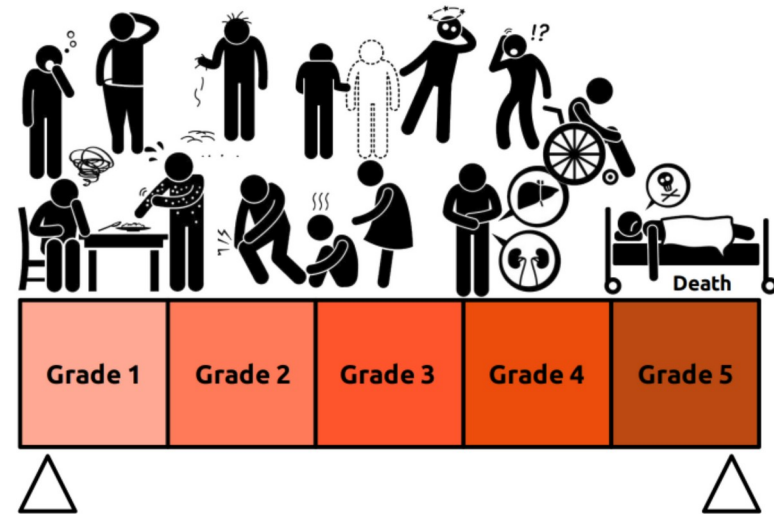
Context (1/2)

Adverse Drug Reaction (ADR) due to chemotherapy treatment

Chemotherapy treatment



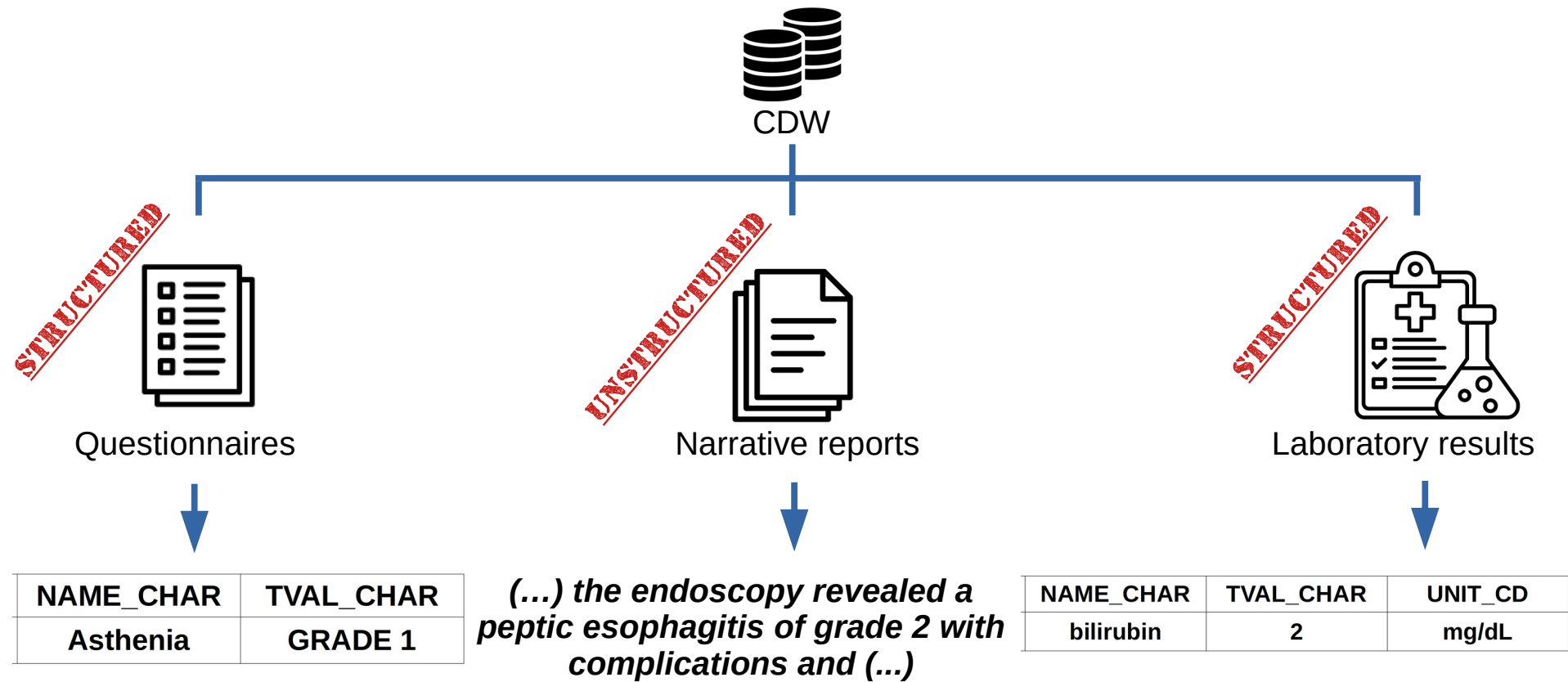
Adverse Drug Reaction (ADR)



Context (2/2)

Toxicity sources in Clinical Data Warehouses (CDW)

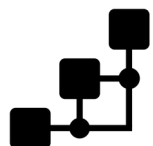
Information about toxicities is available in CDW, but in heterogeneous forms



Objective

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

Our contributions :



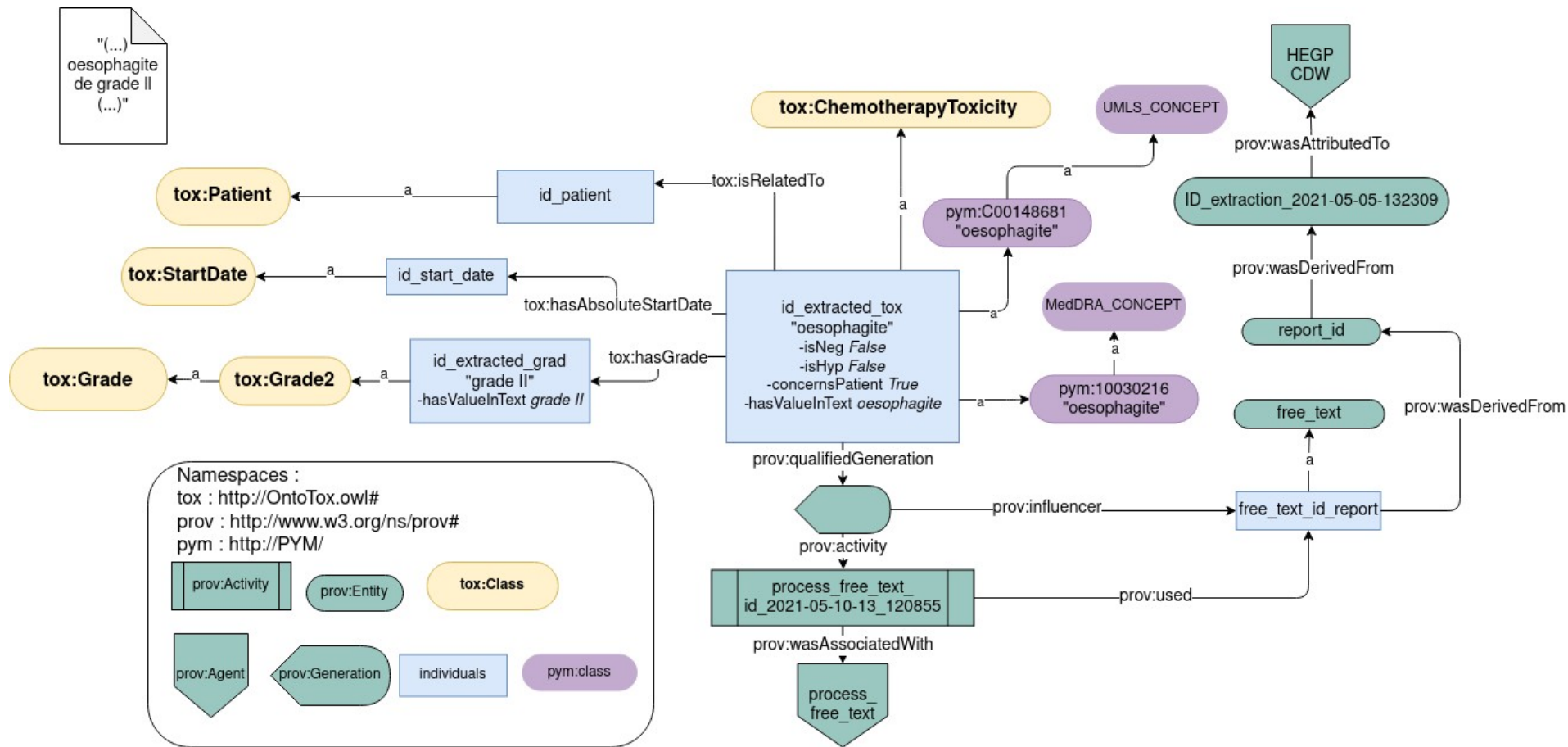
Creation of OntoTox, an **ontology** for chemotherapy toxicities guided by data



Toxicity **extractions** from different data sources



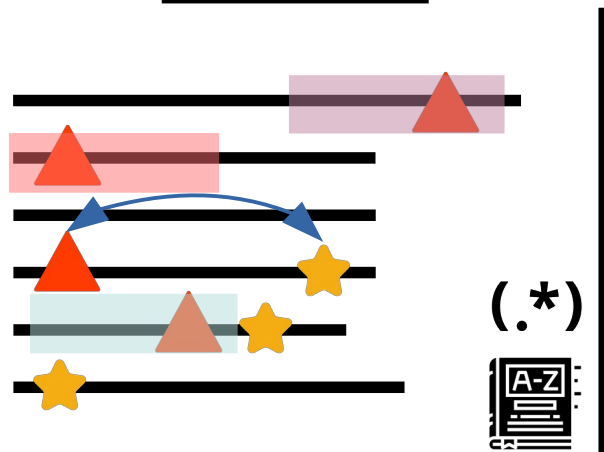
Demonstration of OntoTox interest with a **clinical use case**



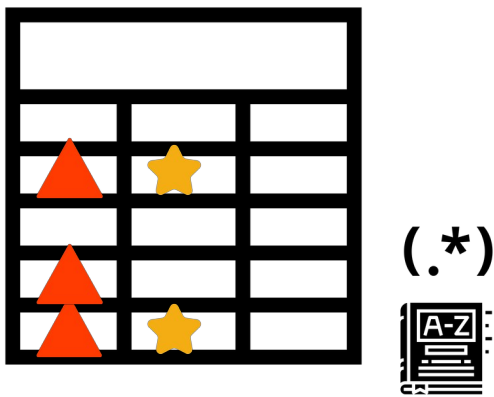


Toxicity extraction processes

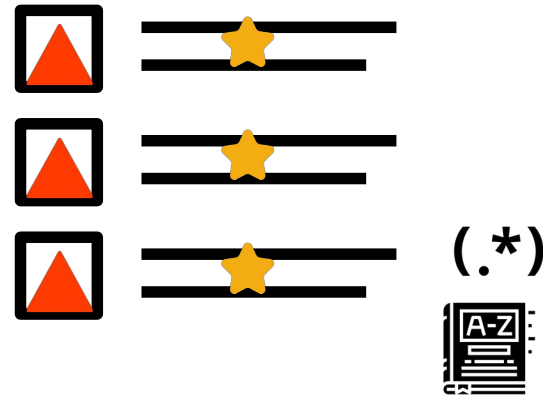
Free text



Table



Questionnaire



Entity recognition :

▲ : toxicity -----  : 4,038 toxicity term dictionary

★ : grade ----- (.*) : regular expression

Context detection:

negation

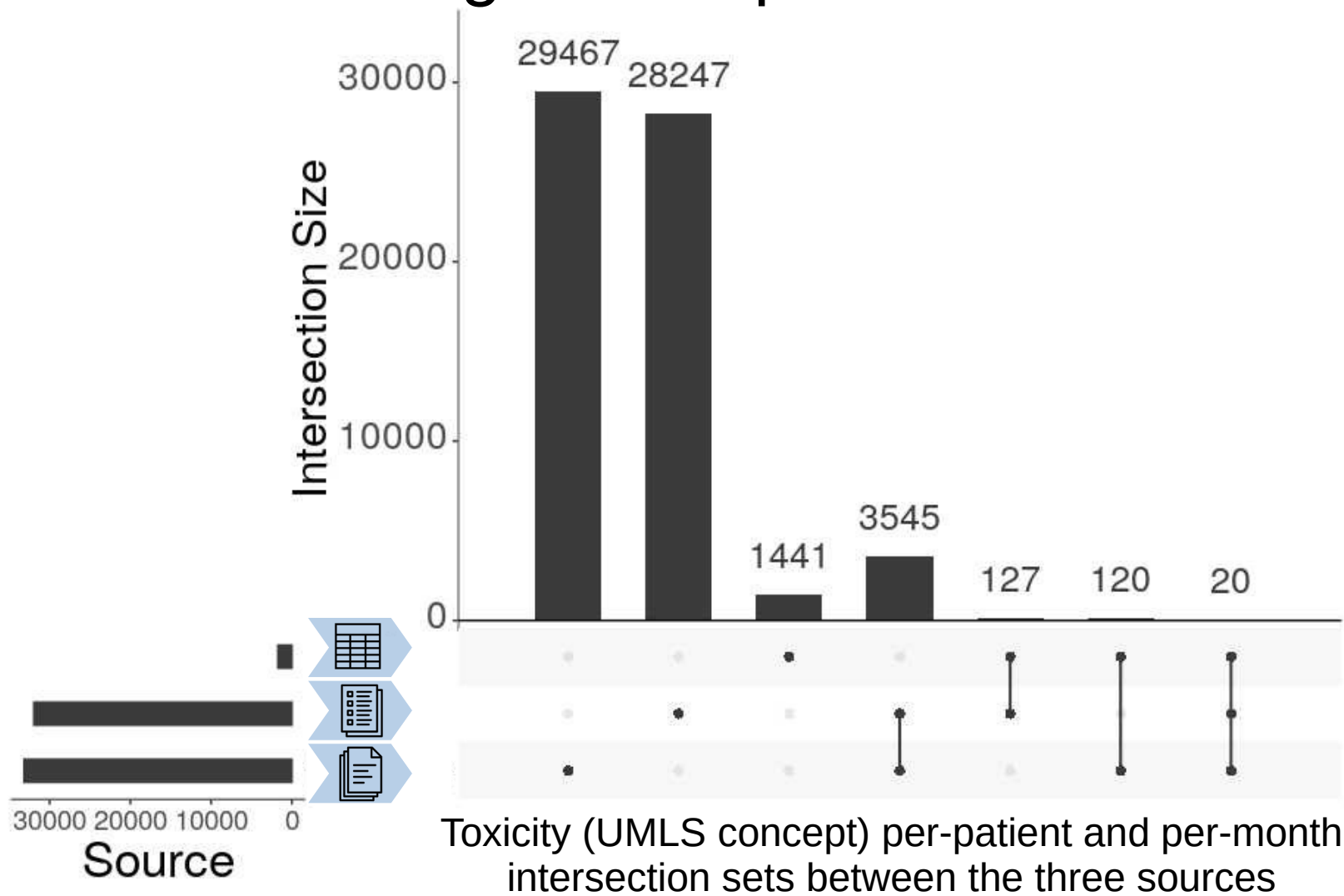
hypothesis

family

 : Link between entities with dependency parsing



Results for 330 lung cancer patients








Discussion

OntoTox an ontology

-  - link to other knowledge models (PROV-O, MedDRA, UMLS)
-  - further use of reasoner

Room for improvement






-  - evaluate the quality of the extraction
-  - use better extraction algorithms
-  - leveraging ontology hierarchy for granularity
-  - time representation
-  - treatment representation

Discussion

OntoTox an ontology

-  - link to other knowledge models (PROV-O, MedDRA, UMLS)
-  - further use of reasoner

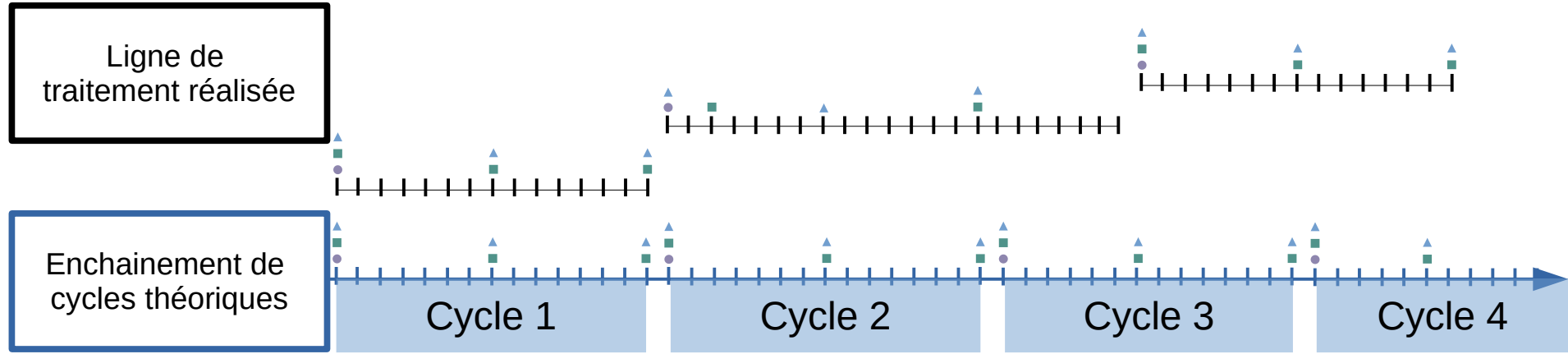
Room for improvement

-  - **evaluate the quality of the extraction**
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Travaux en cours :

Mesure de la dérive au traitement chimiothérapique



■ Cétuximab

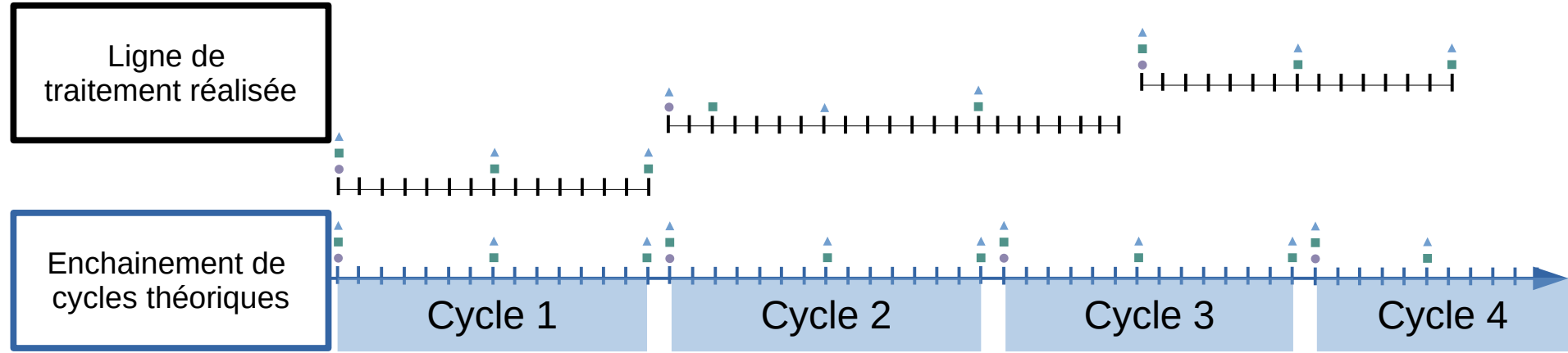
● Carboplatine

▲ Paclitaxel



Travaux en cours :

Mesure de la dérive au traitement chimiothérapique



Définition d'une dissimilarité inter-cycles

Thank you !



Alice ROGIER, Adrien COULET, Bastien RANCE



alice.rogier@inserm.fr



OntoTox GitHub:

<https://github.com/TeamHeka/OntoTox>



OntoTox BioPortal:

<https://bioportal.bioontology.org/ontologies/ONTOTOX>

Icons from Noun Project:

Fengquan Li
Eucalyp
Creative Stall
Adrien Coquet
Chanut is Industries
Prettycons
H Alberto Gongora
Smalllike
visual world
Pham Thi Dieu Linh
icons
alberto galindo
Justin Blake
Hrbon
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