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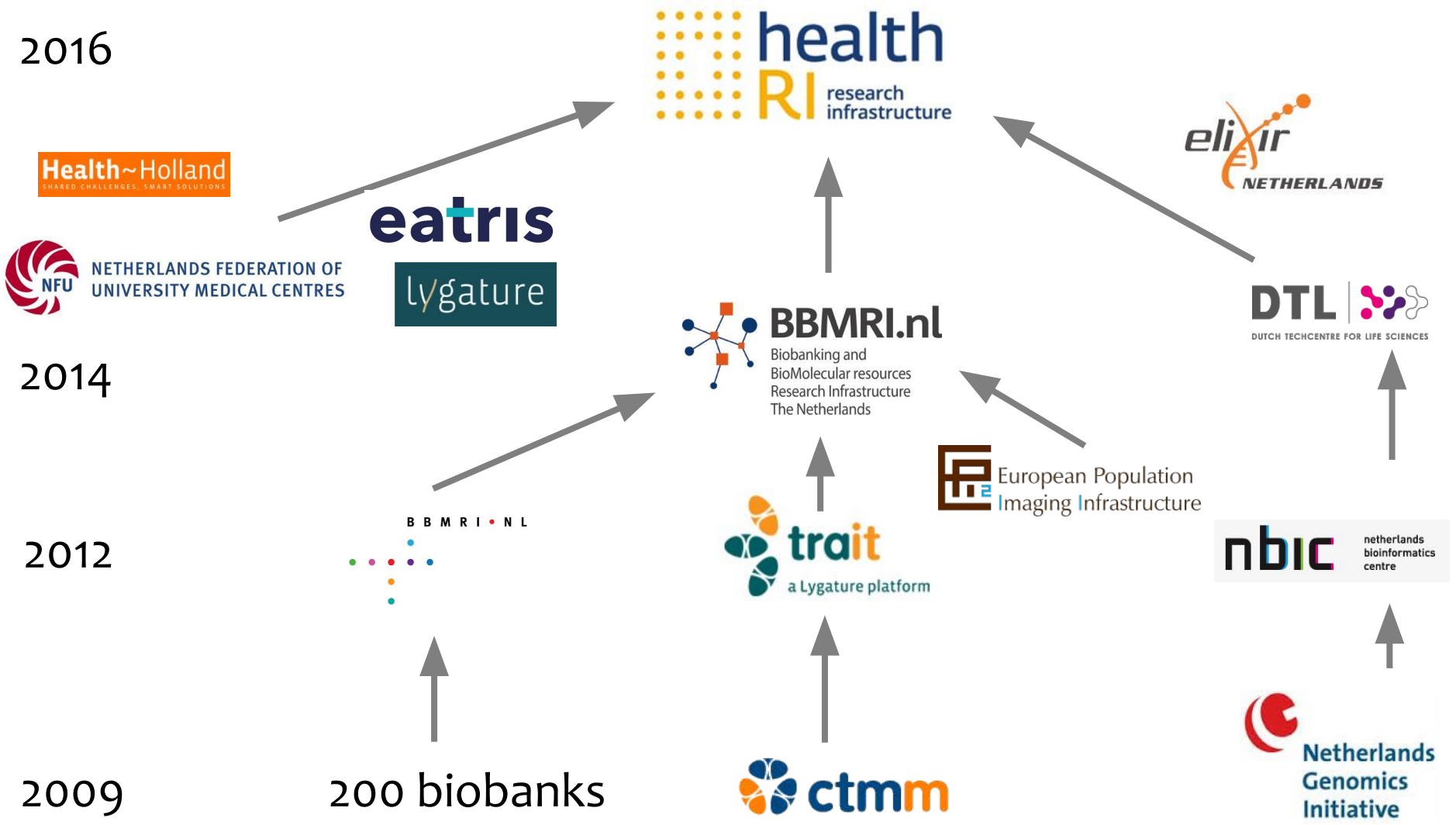
The latest in Glowing Bear
A modern open source interface for tranSMART, inspired by i2b2

i2b2 2017 European Meeting, Paris, Oct 6th 2017

@WardWeistra
@TheHyveNL
#GlowingBear

The Hyve - Open source solutions

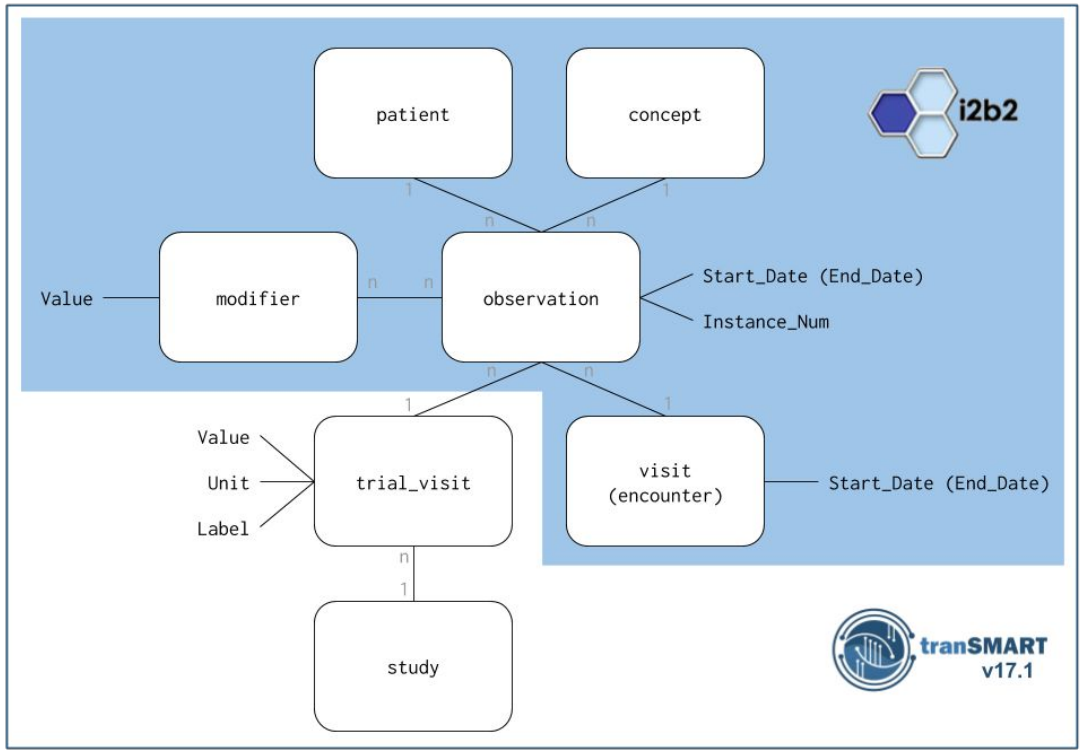
Towards one integrated infrastructure for personalised medicine & health research



What made the Glowing Bear cohort selector possible and necessary?

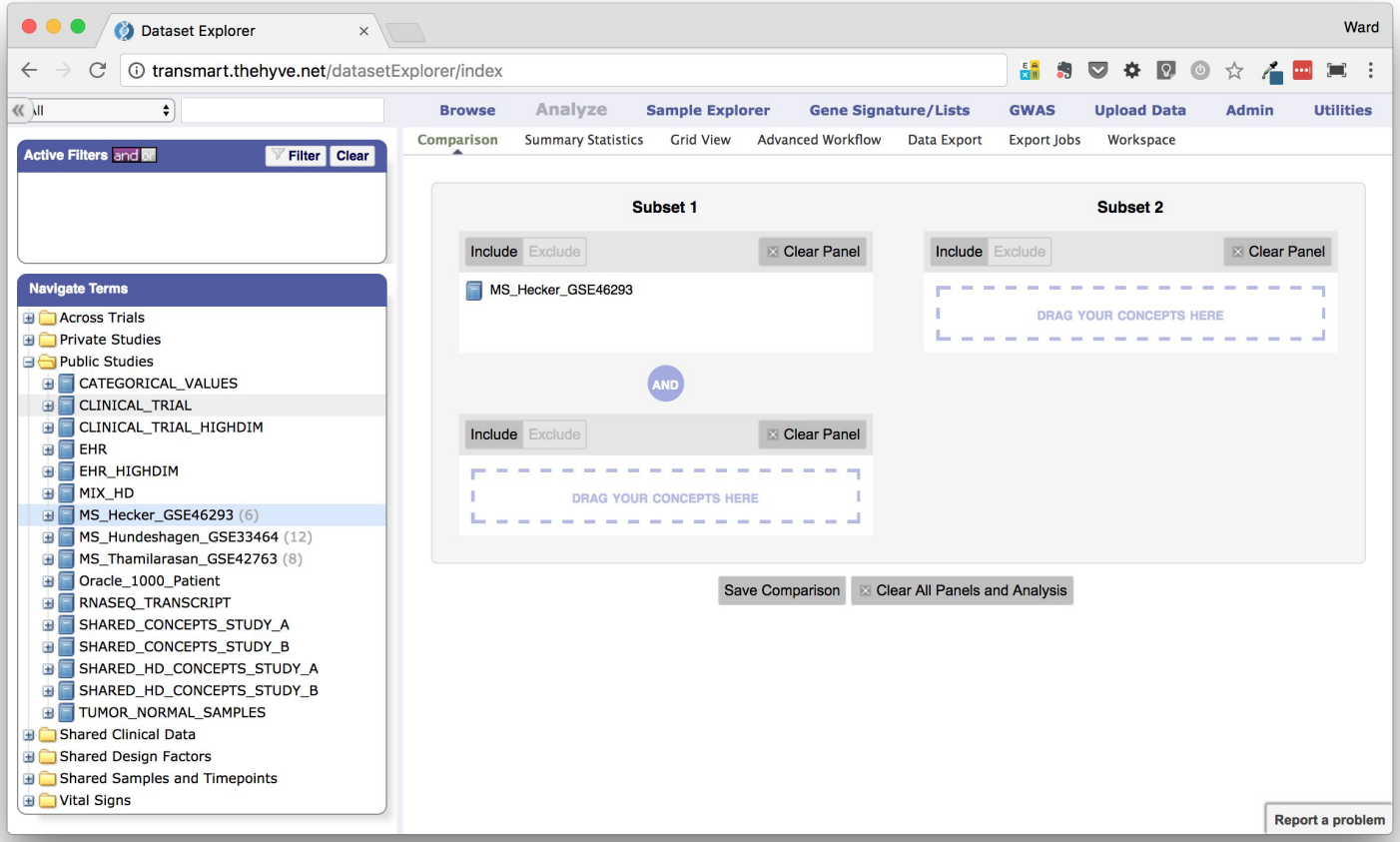
tranSMART 17.1

- Supports:
  - absolute and relative time series
  - samples and replicates
  - cross-study concepts and ontologies
- Achieved by restoring the i2b2 database



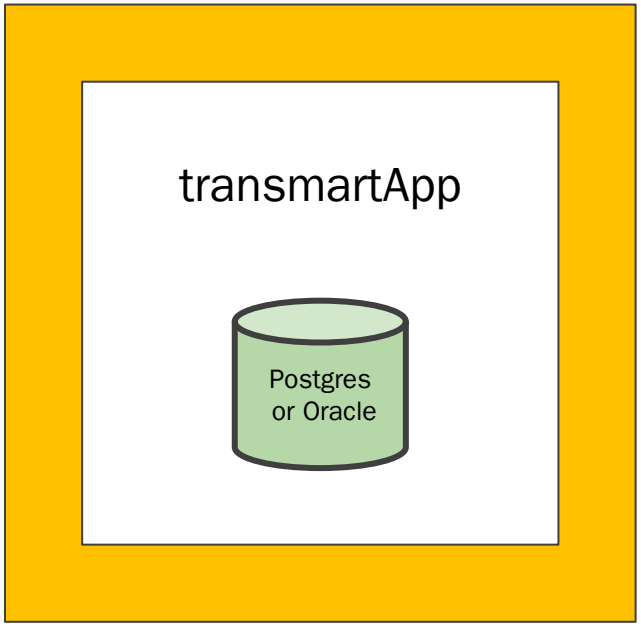
- Server version is released as beta on Github
  - https://github.com/tranSMART-Foundation/transmart-core
  - Production version expected in Oct 2017

‘The tranSMART UI’ transmartApp

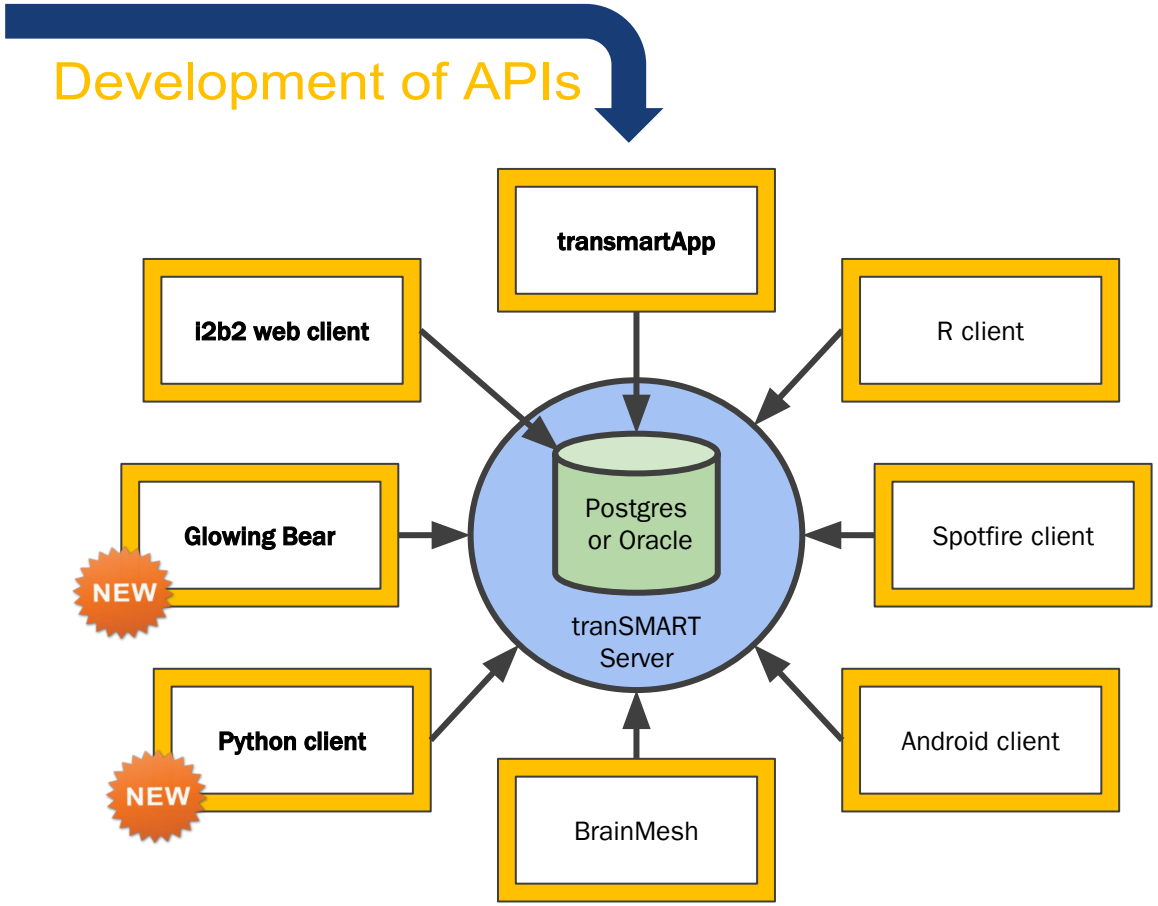


- Works with all data, without the new dimensions/features.
- No support for time series, samples and cross-study concepts

TranSMART REST API (V2)

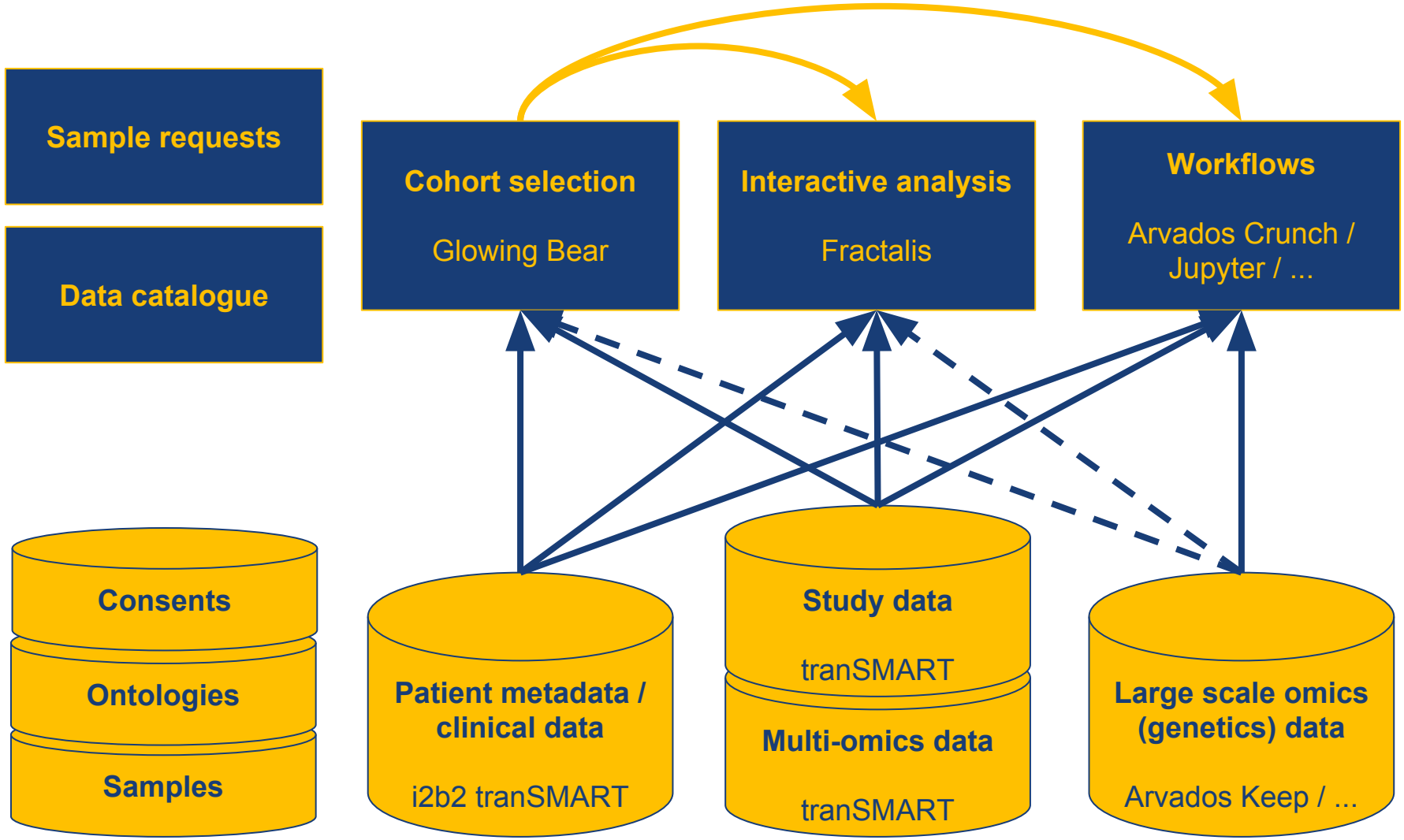


TranSMART 1.0



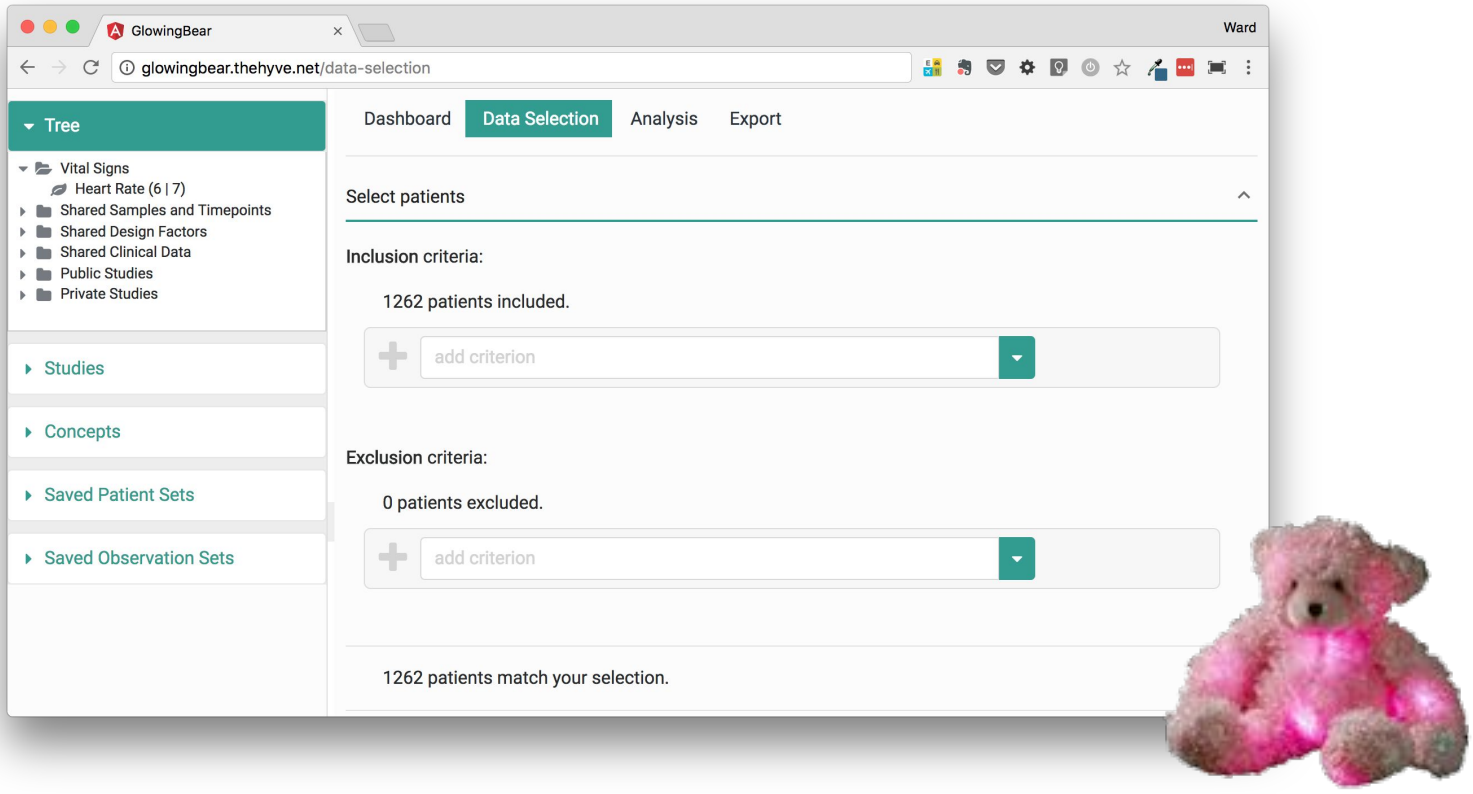
TranSMART 17.1

Microservices architecture



Glowing Bear cohort selector

The **Glowing Bear** cohort selector



A modern user interface supporting the full tranSMART 17.1, via the tranSMART REST API V2

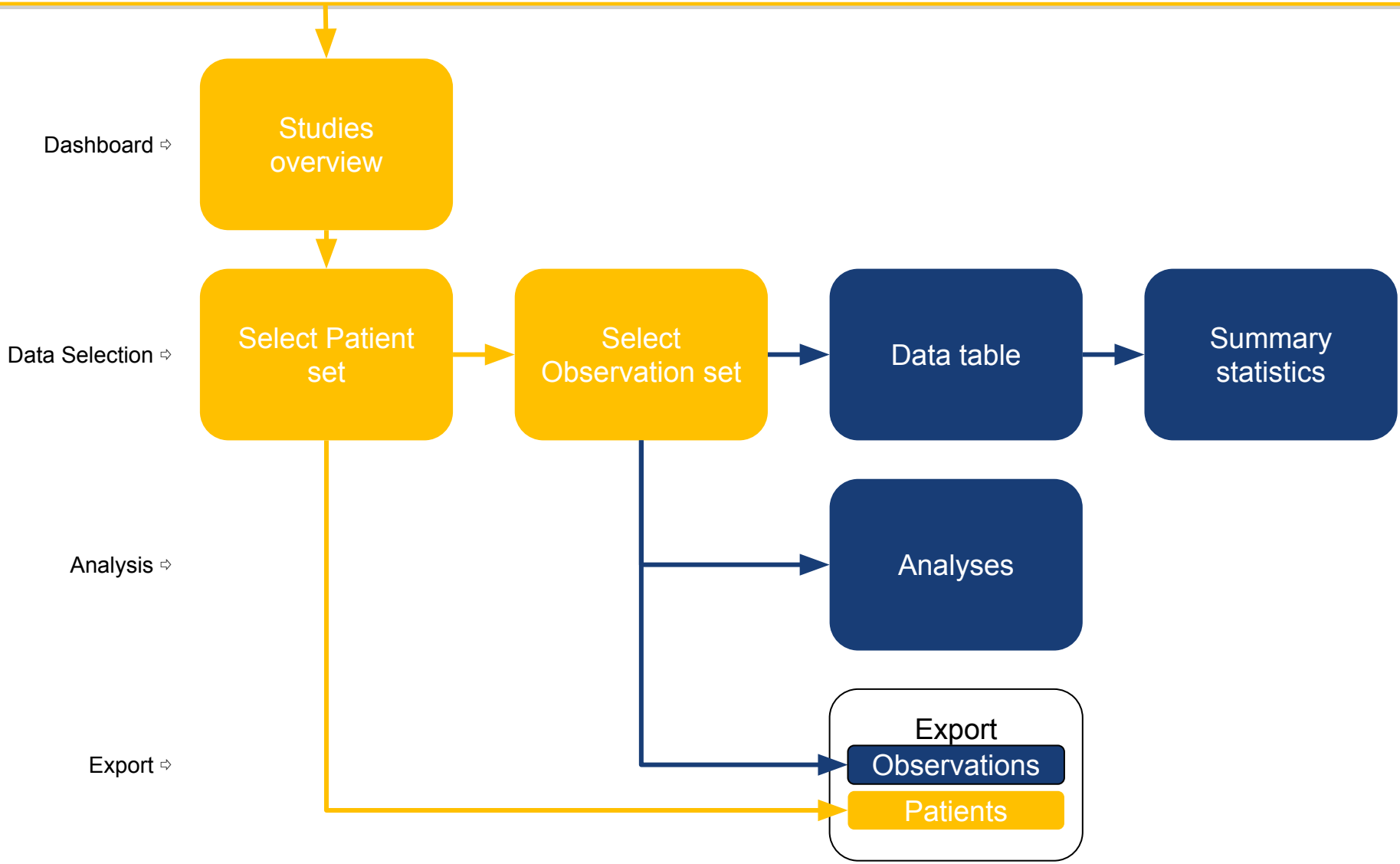
The **Glowing Bear** cohort selector

- Funded by
  - Health-RI (BBMRI)
  - Netherlands Twin Registry
- Being installed in production now

- Working on integrations with partners
  - Fractalis (SmartR successor) interactive analysis
  - HiDome: Cohort selection on omics data
  - Jupyter Hub / Notebook

- Supports time series, samples and cross-study queries
- Built on tranSMART REST API Version 2 with Angular 4
- Open source: https://github.com/thehyve/glowing-bear

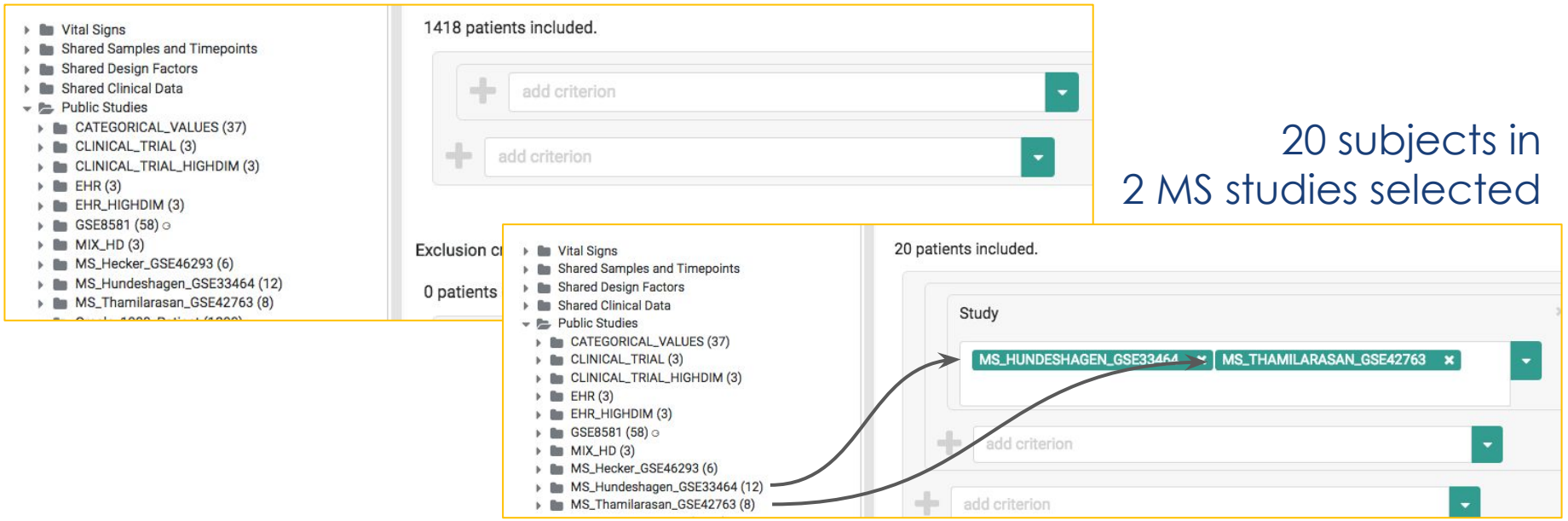
The **Glowing Bear** cohort selector



Cross-study

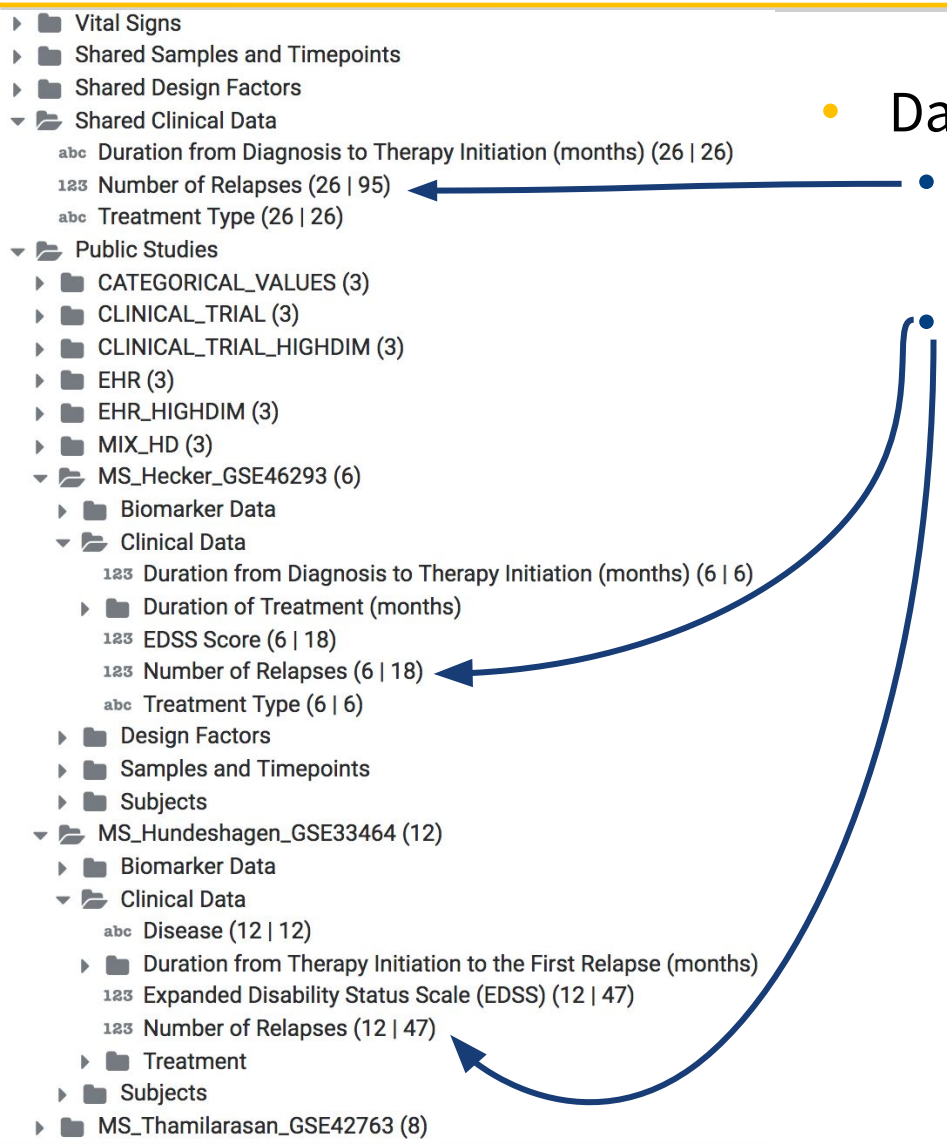
- Glowing Bear is cross-study by default.
- One or several studies can be dropped into filter box to limit subset to selected studies.

1418 subjects in total over all studies



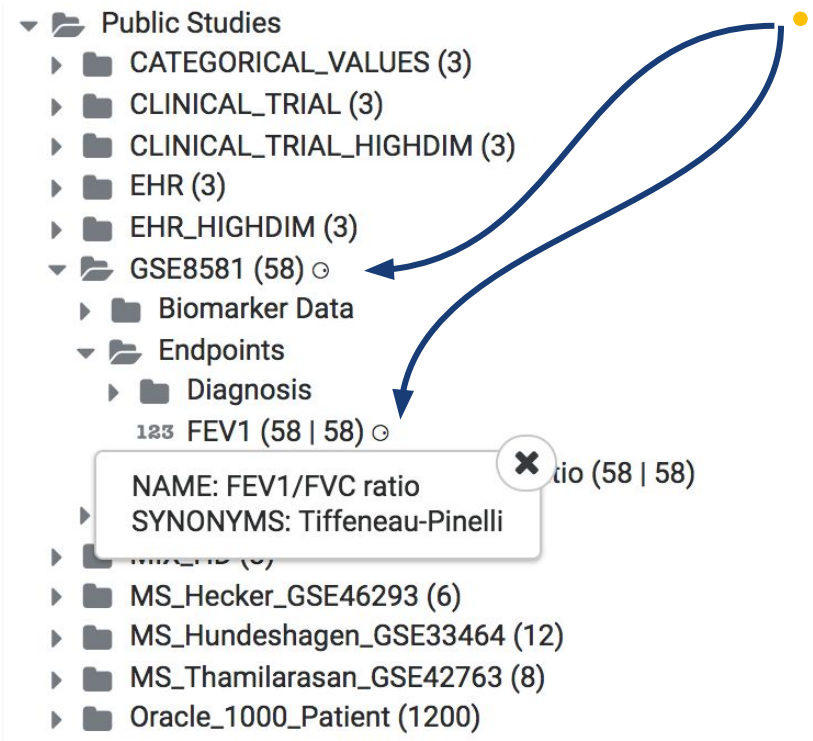
20 subjects in
2 MS studies selected

Ontologies



- Data can loaded at the same time as:
  - Shared concepts, mapped to standard ontologies
  - Study specific concepts, with study based hierarchy

Metadata

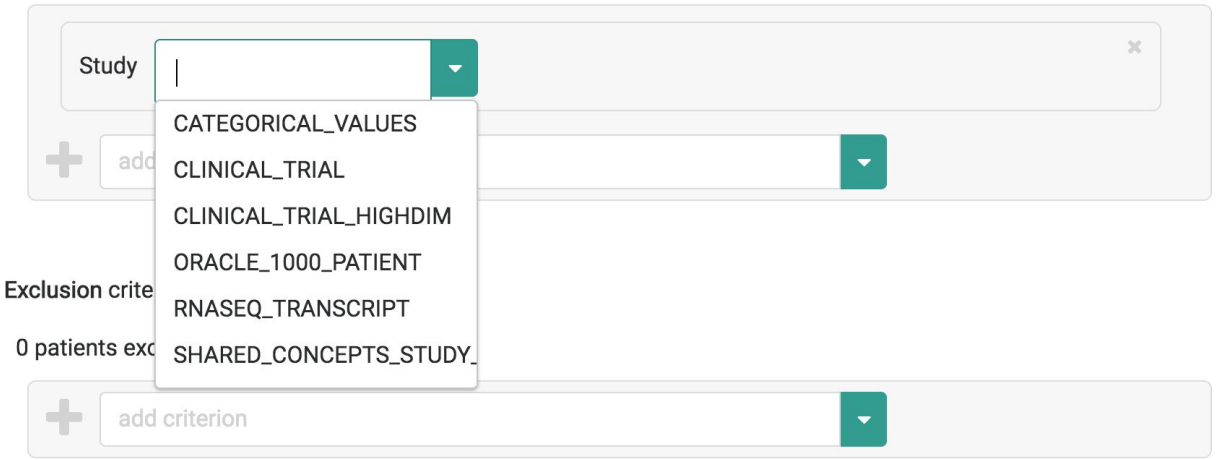


Icons indicate for which tree nodes metadata is available

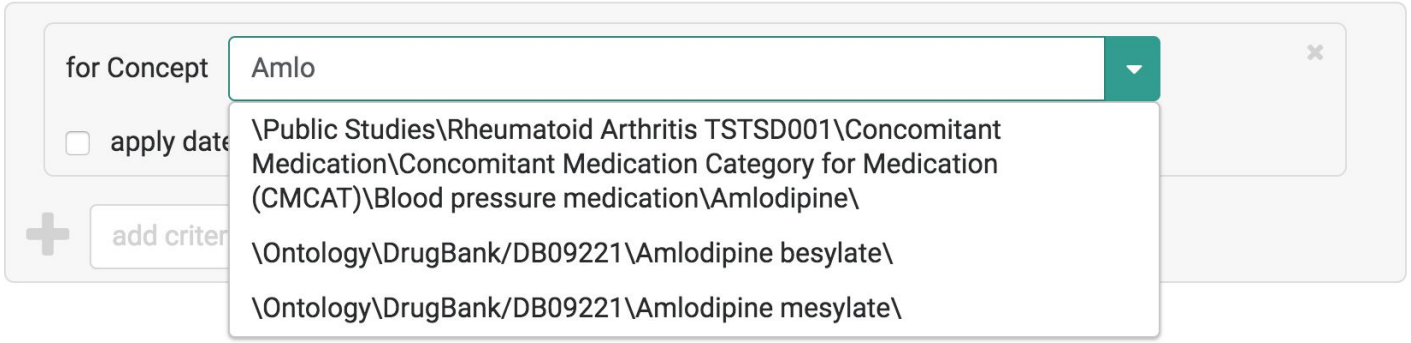
- Supported on both studies and variables

Search

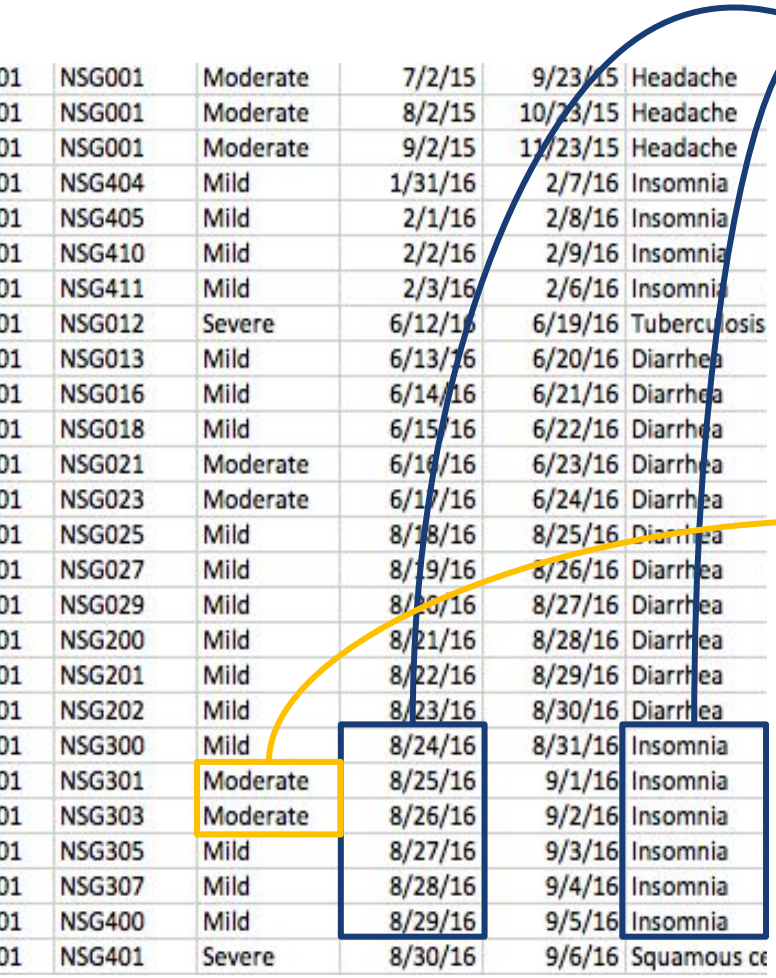
- On Studies



- On Concepts



Filtering on time series



01	NSG001	Moderate	7/2/15	9/23/15	Headache
01	NSG001	Moderate	8/2/15	10/23/15	Headache
01	NSG001	Moderate	9/2/15	11/23/15	Headache
01	NSG404	Mild	1/31/16	2/7/16	Insomnia
01	NSG405	Mild	2/1/16	2/8/16	Insomnia
01	NSG410	Mild	2/2/16	2/9/16	Insomnia
01	NSG411	Mild	2/3/16	2/6/16	Insomnia
01	NSG012	Severe	6/12/16	6/19/16	Tuberculosis
01	NSG013	Mild	6/13/16	6/20/16	Diarrhea
01	NSG016	Mild	6/14/16	6/21/16	Diarrhea
01	NSG018	Mild	6/15/16	6/22/16	Diarrhea
01	NSG021	Moderate	6/16/16	6/23/16	Diarrhea
01	NSG023	Moderate	6/17/16	6/24/16	Diarrhea
01	NSG025	Mild	8/18/16	8/25/16	Diarrhea
01	NSG027	Mild	8/19/16	8/26/16	Diarrhea
01	NSG029	Mild	8/20/16	8/27/16	Diarrhea
01	NSG200	Mild	8/21/16	8/28/16	Diarrhea
01	NSG201	Mild	8/22/16	8/29/16	Diarrhea
01	NSG202	Mild	8/23/16	8/30/16	Diarrhea
01	NSG300	Mild	8/24/16	8/31/16	Insomnia
01	NSG301	Moderate	8/25/16	9/1/16	Insomnia
01	NSG303	Moderate	8/26/16	9/2/16	Insomnia
01	NSG305	Mild	8/27/16	9/3/16	Insomnia
01	NSG307	Mild	8/28/16	9/4/16	Insomnia
01	NSG400	Mild	8/29/16	9/5/16	Insomnia
01	NSG401	Severe	8/30/16	9/6/16	Squamous ce

6 patients included.

for Concept \Public Studies\Rheumatoid Arthritis TSTSD001\Adverse Event\AE P

with values Insomnia × Select all Clear

and start date *between* 23-08-2016 00:00:00 and 30-08-2016 00:00:00

add criterion

2 patients included.

for Concept \Public Studies\Rheumatoid Arthritis TSTSD001\Adverse Event\AE P

with values Insomnia × Select all Clear

and start date *between* 23-08-2016 00:00:00 and 30-08-2016 00:00:00

and

for Concept \Public Studies\Rheumatoid Arthritis TSTSD001\Adverse Event\AE S

with values Moderate × Select all Clear

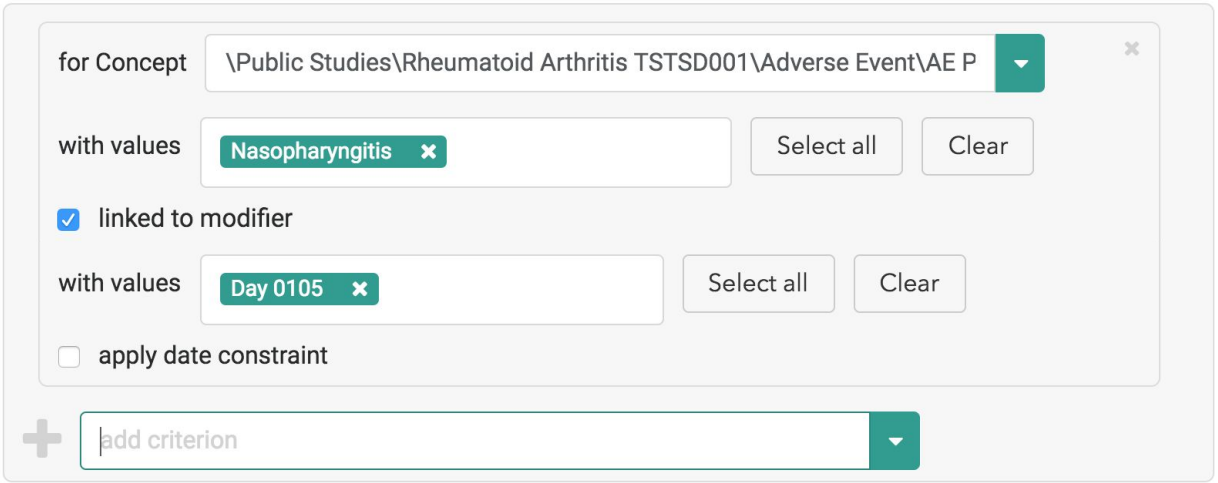
apply date constraint

add criterion

Filtering on modifiers (coming soon)

STUDY_ID	SUBJ_ID	AE Prefered Term (AE	Study Day of End of Event
TSTSD001	NSG001	Headache	Day 0105
TSTSD001	NSG001	Nasopharyngitis	Day 0105
TSTSD001	NSG003	Headache	Day 0105
TSTSD001	NSG003	Nasopharyngitis	Day 0105
TSTSD001	NSG004	Tuberculosis	Day 0096
TSTSD001	NSG006	Nasopharyngitis	Day 0096
TSTSD001	NSG010	Headache	Day 0096
TSTSD001	NSG027	Diarrhoea	Day 0105

2 patients included.



Glowing Bear

health RI research infrastructure

Modern cohort selector on the i2b2 tranSMART database

- New since the June Harvard i2b2 tranSMART meeting:
  - Data tree: Concept search, dynamic loading and interactive
  - Observation filtering on concepts
  - Data export
  - Query management

- Adopted by Health-RI, child cancer center Princess Maxima Center, Dutch twin registry (NTR), US Pharma

- Coming soon
  - Integration with Fractalis for interactive analytics
  - Integration of HiDome for cohort selection on Omics
  - Export to SPSS, filtering on family relations, strong test suite, ...

More information and demo server HERE

trait
a Lygature platform

BBMRI.nl
Biobanking and
BioMolecular resources
Research Infrastructure
The Netherlands

health RI research infrastructure

the hyve

We empower scientists by building on open source software

Our collaborators:
Sascha Herzinger - Université du Luxembourg
Denny Verbeeck - Johnson & Johnson
Matteo Gabetta, Mauro Bucalo - Biomeris

Our team, in particular:
Bo Gao, Wibo Pipping, Gijs Kant
Jochem Bijlard, Ruslan Forostianov

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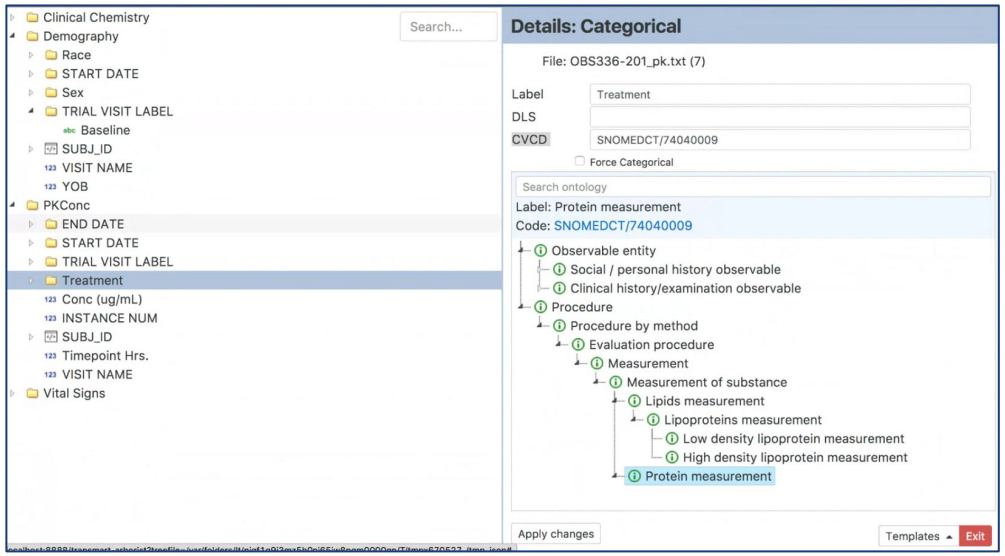
We're also making data loading easier

"The Arborist and *tmtk*:
A researcher friendly data loading toolkit for tranSMART"

- The Arborist: Demo / Github
- *tmtk*: Docs / PyPi / Github