



# European Medical Information Framework

Introduction  
29 April 2016



# Our Vision



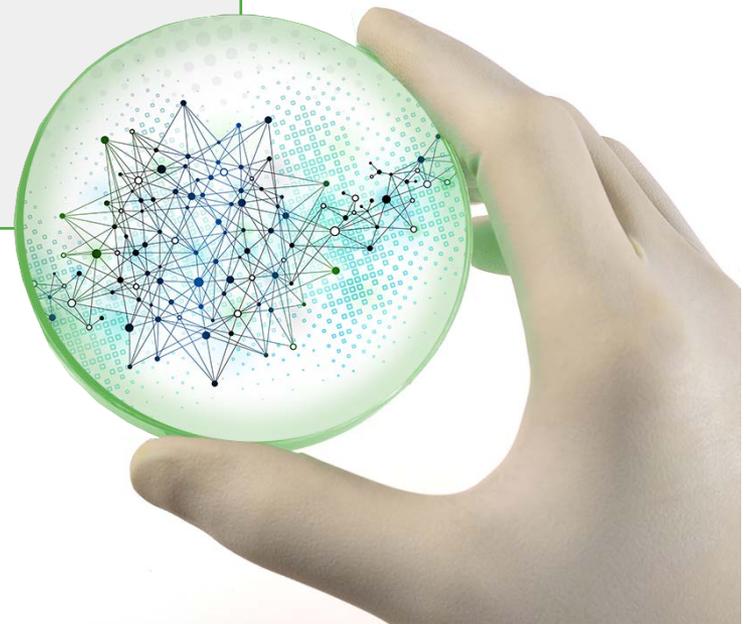
*To be the trusted European hub for health care data intelligence, enabling new insights into diseases and treatments*

EMIF supports flow from:

Data Discovery

↳ Data Assessment

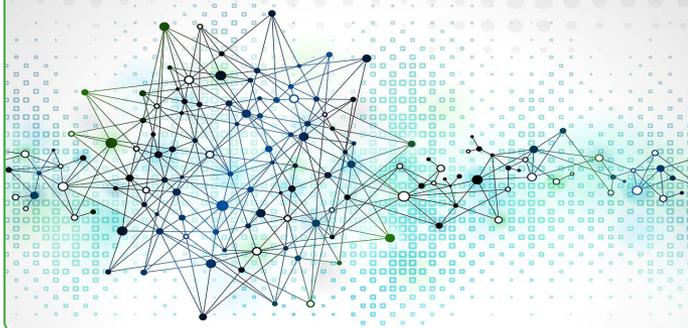
↳ Data Reuse



# Project objectives



## EMIF-Platform



Develop a framework for evaluating, enhancing and providing access to human health data across Europe, support EMIF-Metabolic and EMIF-AD (the specific topics below) as well as support research using human health data in general

Mid Term Review meeting 15/04/2016 7

## EMIF-Metabolic



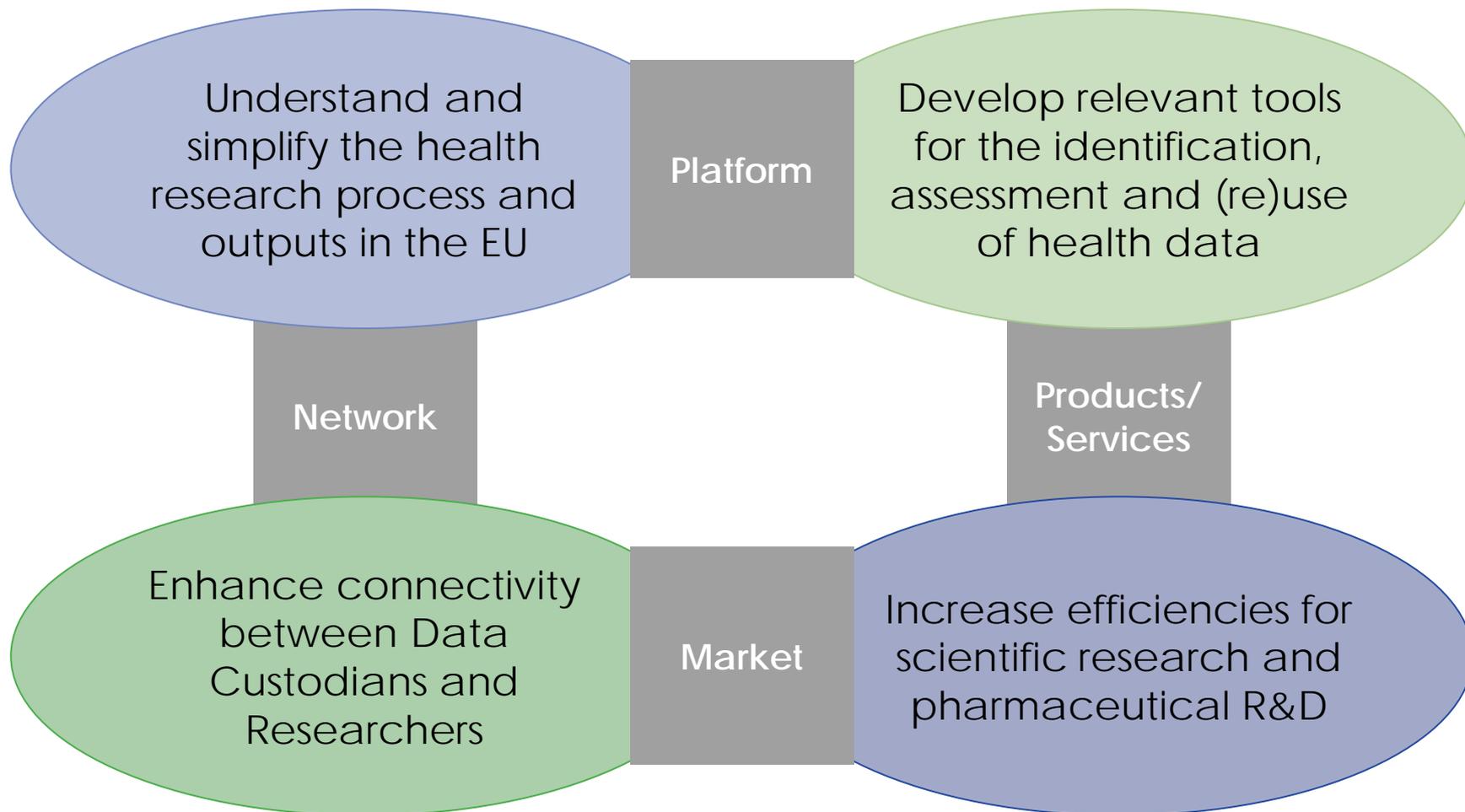
Identify predictors of metabolic complications in obesity

## EMIF-AD

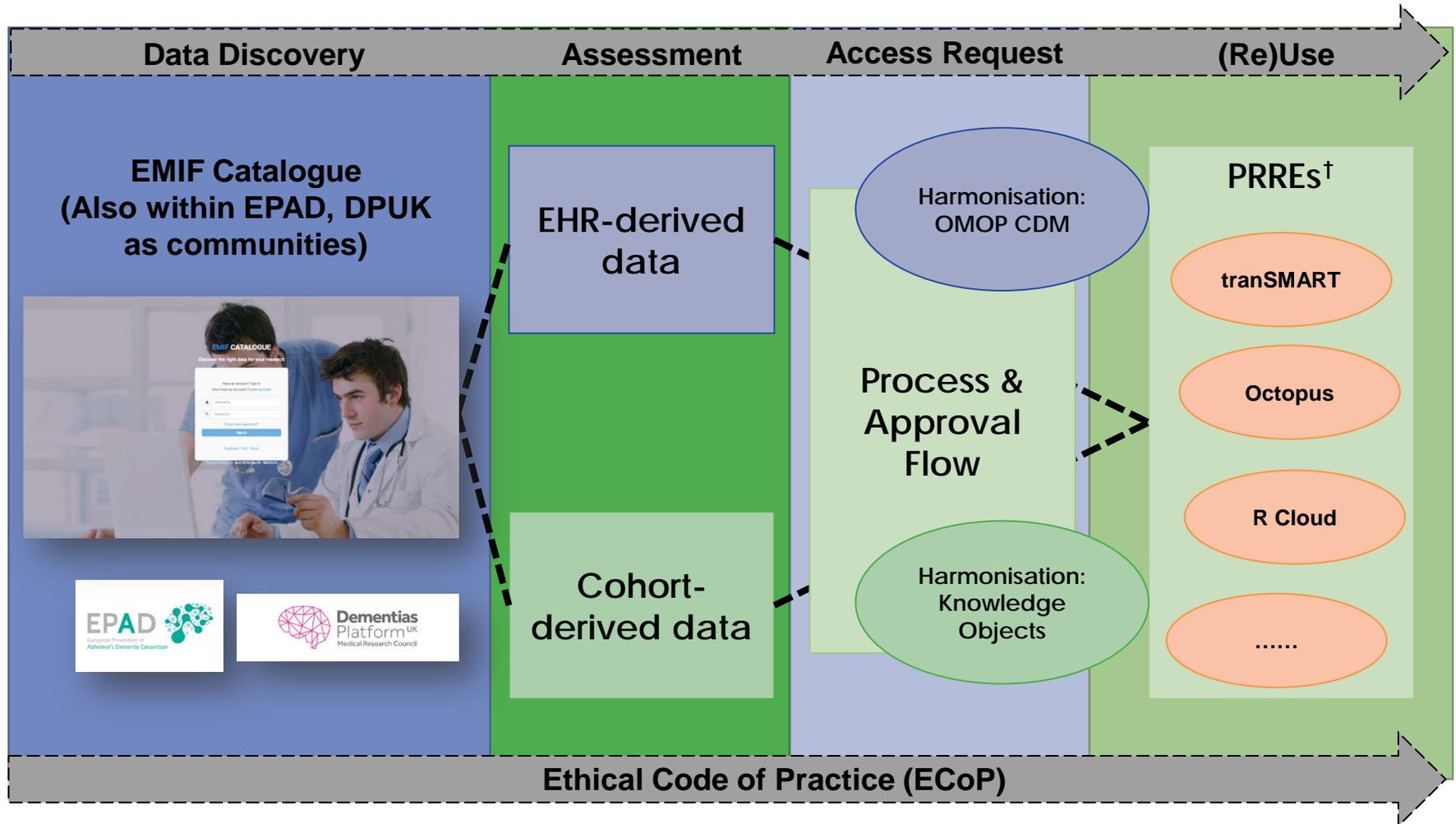


Identify predictors of Alzheimer's Disease (AD) in the pre-clinical and prodromal phase

# What is EMIF trying to achieve?



# EMIF; enabling the data to information to knowledge flow



† Private Remote Research Environment



innovative medicines initiative

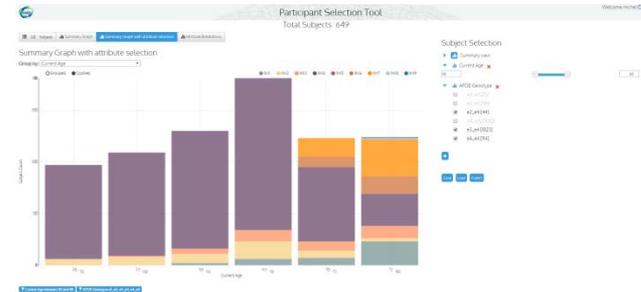
# Infrastructure implemented

- discovery, assessment and analysis

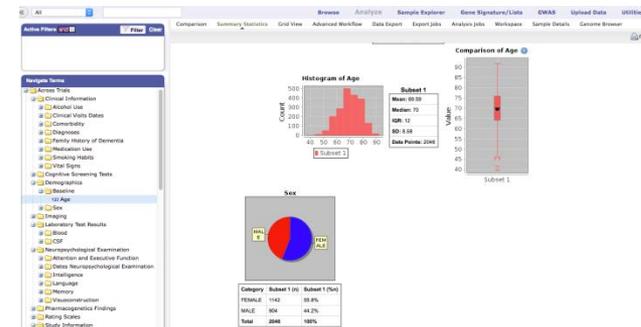


- ❖ Catalogue Tool
  - Identify study variables, size, characteristics
  - E.g. 45 cohorts for AD; ~60,000 research study participants

- ❖ Participant/ Variable Selection Tool
  - Generation of virtual cohorts
  - Value proposition for clinical trials



- ❖ Data analysis tool / TranSMART
  - Pooled analysis of harmonised data



# Closer detail on the EMIF Service Framework



## Public access

Catalogue descriptors

## On registration

Publicly accessible dashboards

## Verified users and organisations

Suitability (data item profiles)

## Verified teams and organisations

Research analysis (data sharing: centralised or federated models)

## Sign up

EMIF online communities

## Verified organisations

Customised dashboards

## Verified users and organisations

Feasibility (aggregated results)

# Catalogue - Communities



The screenshot shows the EMIF Catalogue website interface. At the top, there is a search bar labeled 'Free text search' and a navigation menu on the left with options like HOME, ABOUT, HELP, and CONTACT. The main content area is titled 'Welcome to the EMIF Catalogue' and lists several communities:

- ELECTRONIC HEALTH RECORD DATA**: total 14. Description: EMIF-EHR intends to explore how the massive data available in pan-European EHR systems can improve biomedical research. Buttons: Leave, More, OPEN.
- ALZHEIMER'S DISEASE COHORTS**: total 45. Description: The overall aim of EMIF-AD is to build an IF for studies on neurodegeneration in order to discover and validate AD biomarkers. Buttons: Leave, More, OPEN.
- EPAD**: total 18. Description: EPAD aims to develop an infrastructure to undertake adaptive studies for early and accurate decisions on the development of drug candidates or combinations. Button: + JOIN.
- ADVANCE**: total 2. Description: Accelerated development of vaccine benefit-risk collaboration in Europe.
- DEMO**: total 3. Description: This community is only used for Catalogue experiences.

On the right side, there is a 'Related publications' section with a vertical timeline of entries:

- 2016/Jun: Tolerability and pharmacokinetics of oxaloacetate 100 mg capsules in Alzheimer's subjects. has been published on BBA clinical 5 (120-3) **EMIF AD**
- 2016/Mar: The association between PGC-1 $\alpha$  and Alzheimer's disease. has been published on Anatomy & cell biology 49 (1-6) **EMIF AD**
- 2015 Oct-Dec: A New Look at Glaucoma. has been published on Journal of ophthalmic & vision research 10 (502-3) **EMIF AD**
- 2016/Apr/5: Evidence that electronic health records can promote physician counseling for healthy behaviors. has been published

# Catalogue – AD cohorts



EMIF Catalogue - Google Chrome  
EMIF Catalogue

https://emif-catalogue.eu/c/adcohort

EMIF CATALOGUE / EMIF AD

Free text search EMIF AD

EMIF AD / All

Compare Print  
Selected databases: 0

Acronym	Name	Institution name	Location	S...	P...	Last update	Select
Filter	Filter	Filter	Filter	Filter	Filter	Filter	?
AddNeuroMed	AddNeuroMed, Innovative Medicines for Europe (Innomed)	Institute of Psychiatry, King's College London	City of London, Greater London, England, United Kingdom			2016-04-04	<input type="checkbox"/>
ADGEN	Kuopio-ADGEN	University of Eastern Finland	Kuopio, Kuopio, Pohjois-Savo, Finland			2015-11-06	<input type="checkbox"/>
ADNI-1	Alzheimer's Disease Neuroimaging Initiative	University of California	San Francisco County, California, United States			2015-11-06	<input type="checkbox"/>
ADNI 2	Alzheimer's Disease Neuroimaging Initiative	University of California	San Francisco County, California, United States			2015-11-06	<input type="checkbox"/>
ADNI-GO	Alzheimer's Disease Neuroimaging Initiative	University of California	San Diego County, California, United States			2015-11-05	<input type="checkbox"/>

# Cohort information



Fingerprint

Literature

Documents

Discussion

Extra Information

Hits: 434 Unique Views: 239 Filled: 78.8 %

Summary Collapse Filters

## 6.01. Number of subjects with at least one assessment



### 6.01.01. Number of subjects

Normal

266

Subjective complaints

MCI

247

Probable/possible AD (NINCDS-ADRDA)

258

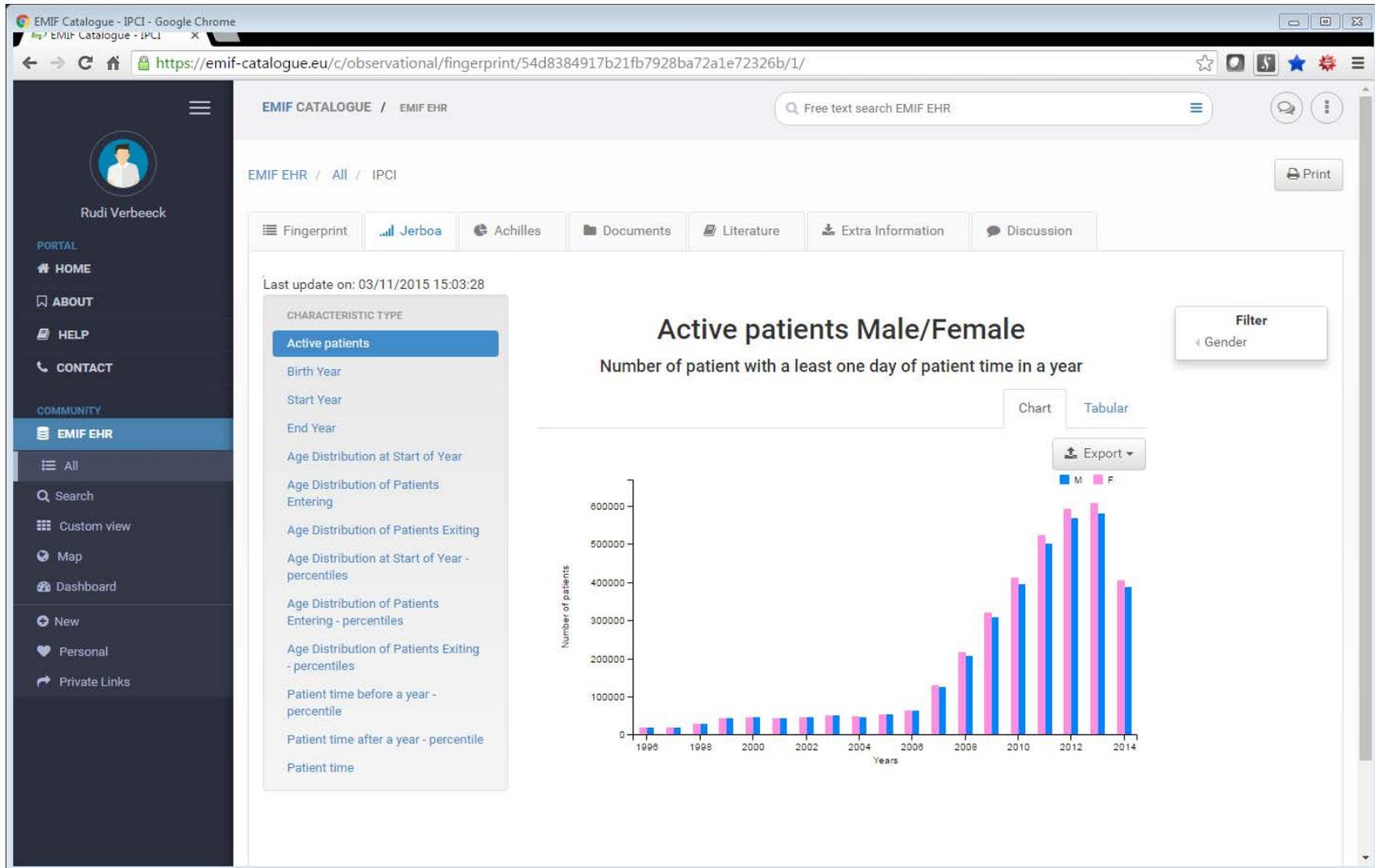
AD- preclinical stage (IWG/NIA)

< Previous

Next >

1. Database General In... 60%
2. Key Publications (1/1) 100%
3. Data Access (47/48) 97%
4. Study Characteristic... 94%
5. Inclusion / Exclusion ... 66%
6. Number of subjects (... 42%
7. Clinical Information (... 100%
8. Dementia rating scal... 76%
9. Subjective Cognitive ...100%
10. Neuropsychiatric S... 91%
11. Quality of Life (10/11) 90%
12. Caregiver (1/1) 100%
13. Health Resource Ut...100%
14. Other scales (2/2) 100%

# Catalogue – suitability



# Integration in the EMIF-Platform



EMIF CATALOGUE / DEMO

Free text search DEMO

DEMOS / All / IEETA Demo

Print

Fingerprint Jerboa Achilles Literature Documents Discussion Extra Information

Change Reports

Person

**Person Summary**

Source name: OHDSI Sample DB  
Number of 2.41M persons:

**Year of Birth**

**Population by Gender**

**Population by Race**

**Population by Ethnicity**

No Data

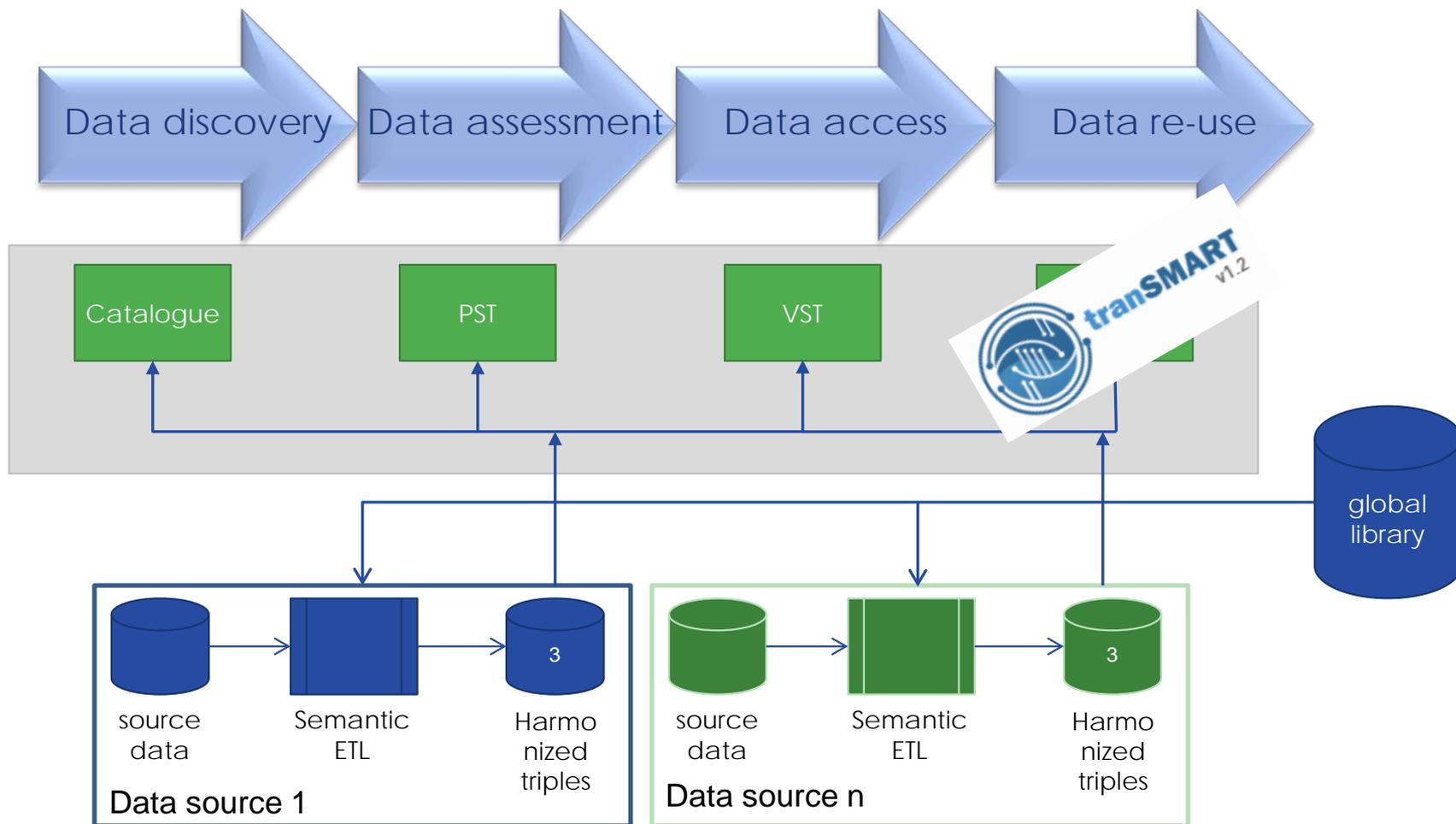
# Content EMIF-AD Catalogue



	Number of cohorts
Clinical	31
Population	7
Trial	1
Other	5

	Number of subjects
Normal cognition	31376
Subjective cognitive complaints	4369
Mild cognitive impairment	11287
Alzheimer's disease dementia	9754
Other dementia	2453
	<b>Total N=59239</b>

# Cohorts: From data discovery to re-use



# Participant selection tool



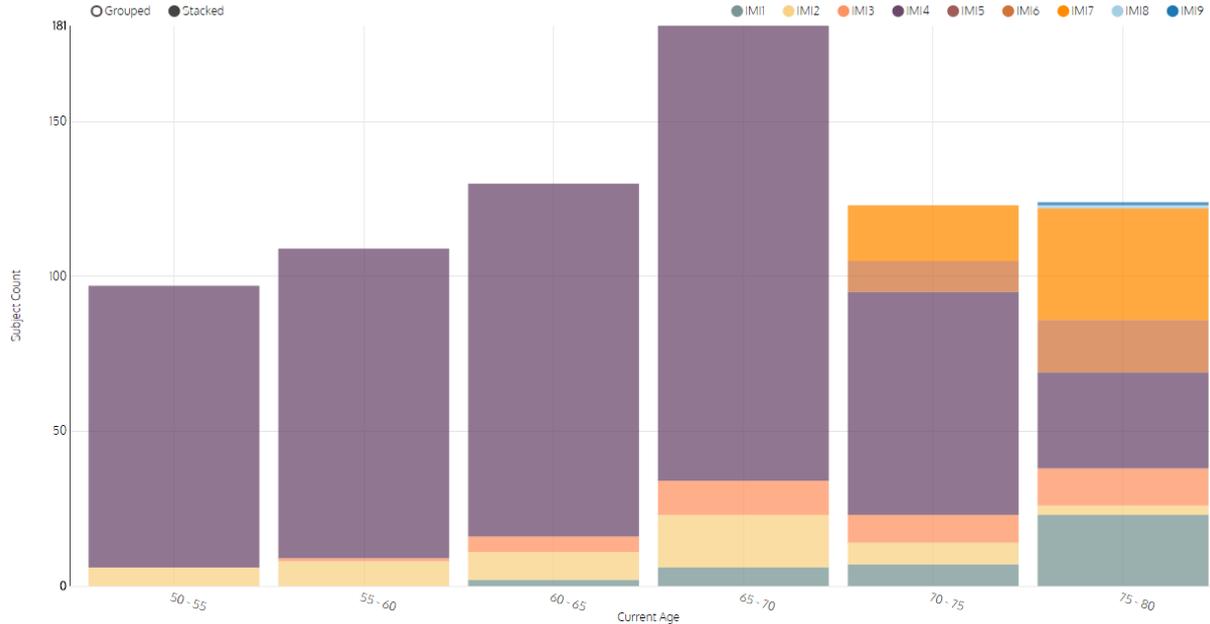
Participant Selection Tool  
Total Subjects: 649

Welcome michel

All Subjects Summary Graph Summary Graph with attribute selection Attribute Breakdown

## Summary Graph with attribute selection

Group by: Current Age



## Subject Selection

Summary view

Current Age

50



80

APOE Genotype

e2\_e2 [25]

e2\_e3 [116]

e2\_e4 [44]

e3\_e3 [2532]

e3\_e4 [1023]

e4\_e4 [114]

+

Save

Load

Export

Current Age between 50 and 80 APOE Genotype e2\_e4, e3\_e4, e4\_e4

# Variable selection tool



## Variable Selection Tool

Welcome michel

Total Subjects: 7580

Participant Selection Tool

Variable Selection Tool

Request Form

Status Tracker

name	IMI1	IMI2	IMI3	IMI4	IMI5	IMI6	IMI7	IMI8	IMI9
APOE Genotype	244	119	161	2641	0	234	509	84	49
RAVLT	250	0	0	0	0	0	0	0	0
MMSE	250	119	163	0	3507	0	0	0	0
CERAD Word List Delayed Recall	0	0	0	0	3530	0	0	0	0
Amyloid Beta 42 in CSF	0	119	0	0	0	0	0	0	0
Logical Memory Delayed - Norm	0	0	0	2641	0	0	0	0	0
Logical Memory Immediate - Norm	0	0	0	2641	0	0	0	0	0
Gender	250	0	164	2641	3530	234	509	84	49

SELECTED:

MMSE

Gender

Amyloid Beta 42 in CSF



Only show selected variables

# tranSMART Homepage



Active Filters and Filter Clear

- Navigate Terms
- Across Trials
  - Private Studies
    - AddNeuroMed (786)
    - Antwerp (150)
      - Clinical Information (150)
      - Cognitive Screening Tests (150)
        - Mini Mental State Exam (150)
      - Demographics (149)
      - Imaging (58)
      - Laboratory Test Results (150)
        - Blood (150)
        - CSF (150)
      - Neuropsychological Examination (150)
        - Attention and Executive Function (14)
        - Dates Neuropsychological Examinatic
        - Language (145)
        - Memory (145)
        - Visuoconstruction (143)
      - Rating Scales (150)
      - Study Information (150)
      - Subject Characteristics (73)
    - Descrpa (881)
    - EDAR (332)
      - Clinical Information (332)
        - Alcohol (305)
        - Comorbidities (330)
        - Dates Follow-up Visits (162)
        - Diagnosis (323)
        - Family History of Dementia (253)
        - Medication Use (288)
        - Smoking (313)
        - Smoking Amount (31)

Subset 1	Subset 2
<input type="text"/>	<input type="text"/>
Exclude <input type="button" value="X"/>	Exclude <input type="button" value="X"/>
AND <input type="button" value="Exclude"/> <input type="button" value="X"/>	AND <input type="button" value="Exclude"/> <input type="button" value="X"/>
<input type="text"/>	<input type="text"/>
AND <input type="button" value="Exclude"/> <input type="button" value="X"/>	AND <input type="button" value="Exclude"/> <input type="button" value="X"/>
<input type="text"/>	<input type="text"/>

Save Subset  Clear



innovative medicines initiative

# Using tranSMART



## 1000 study (WP3)

Navigation: All | Browse | Analyze | Sample Explorer | Gene Signature/Lists | GWAS | Upload Data | Utilities

Comparison | Summary Statistics | Grid View | Advanced Workflow | Data Export | Export Jobs | Analysis Jobs | Workspace | Sample Details

622 | 0 | 0

Active Filters and on Filter Clear

Navigate Terms

- 1000 Study V02 (662)
  - Clinical Information (662)
    - Alcohol Use (327)
    - Clinical Visits Dates (586)
    - Comorbidity (514)
    - Diagnoses (655)
    - Family History of Dementia (242)
    - Medication Use (375)
    - Smoking Habits (331)
    - Vital Signs (213)
  - Cognitive Screening Tests (661)
    - Memory Alteration Test (116)
    - Mini Mental State Exam (659)
  - Demographics (661)
    - Baseline (657)
    - Sex (661)
      - Female (366)
      - Male (295)
  - Imaging (482)
  - Laboratory Test Results (662)
    - Blood (387)
    - CSF (662)
  - Neuropsychological Examination (661)
  - Pharmacogenetics Findings (482)
  - Rating Scales (639)
    - Dates Rating Scales (196)
    - Dementia Rating Scales (630)
    - Neuropsychiatric Scales (443)

### Histogram of Age

Subset 1

**Subset 1**

Mean:	69.16
Median:	70
IQR:	13
SD:	10.6
Data Points:	622

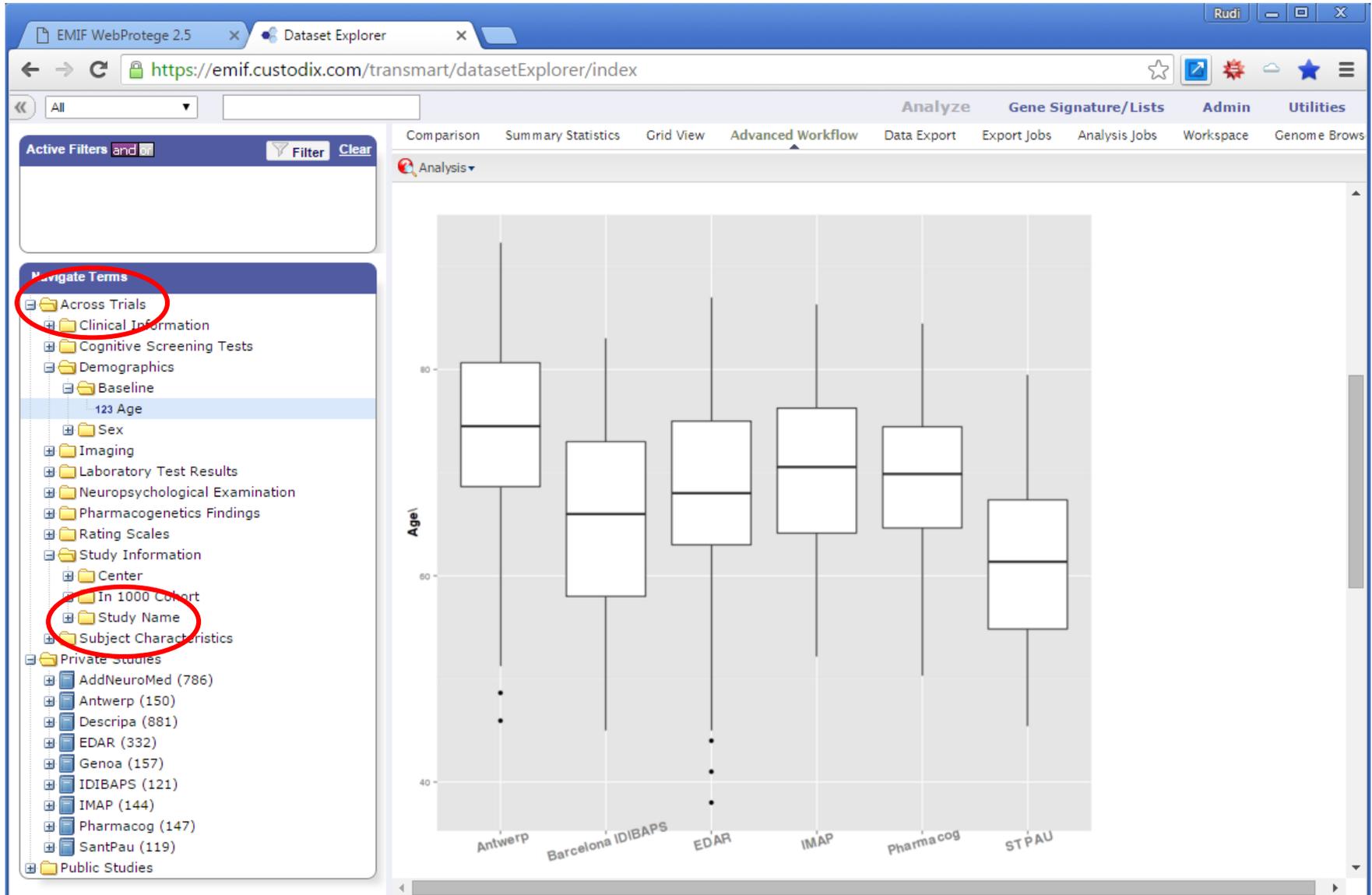
### Comparison of Age

Subset 1

### Sex

Category	Subset 1 (n)	Subset 1 (%n)
1		0.2%
FEMALE	311	51.2%
MALE	295	48.8%

# tranSMART cross-trial analysis



# AD cohorts in tranSMART



Cohorts	N
AddNeuroMed	786
Antwerp	150
DescripA	881
EDAR	332
Genoa	157
IDIBAPS	167
IMAP	144
Lausanne	40
Pharmacog	147
St Pau	119
	<b>Total N=2923</b>