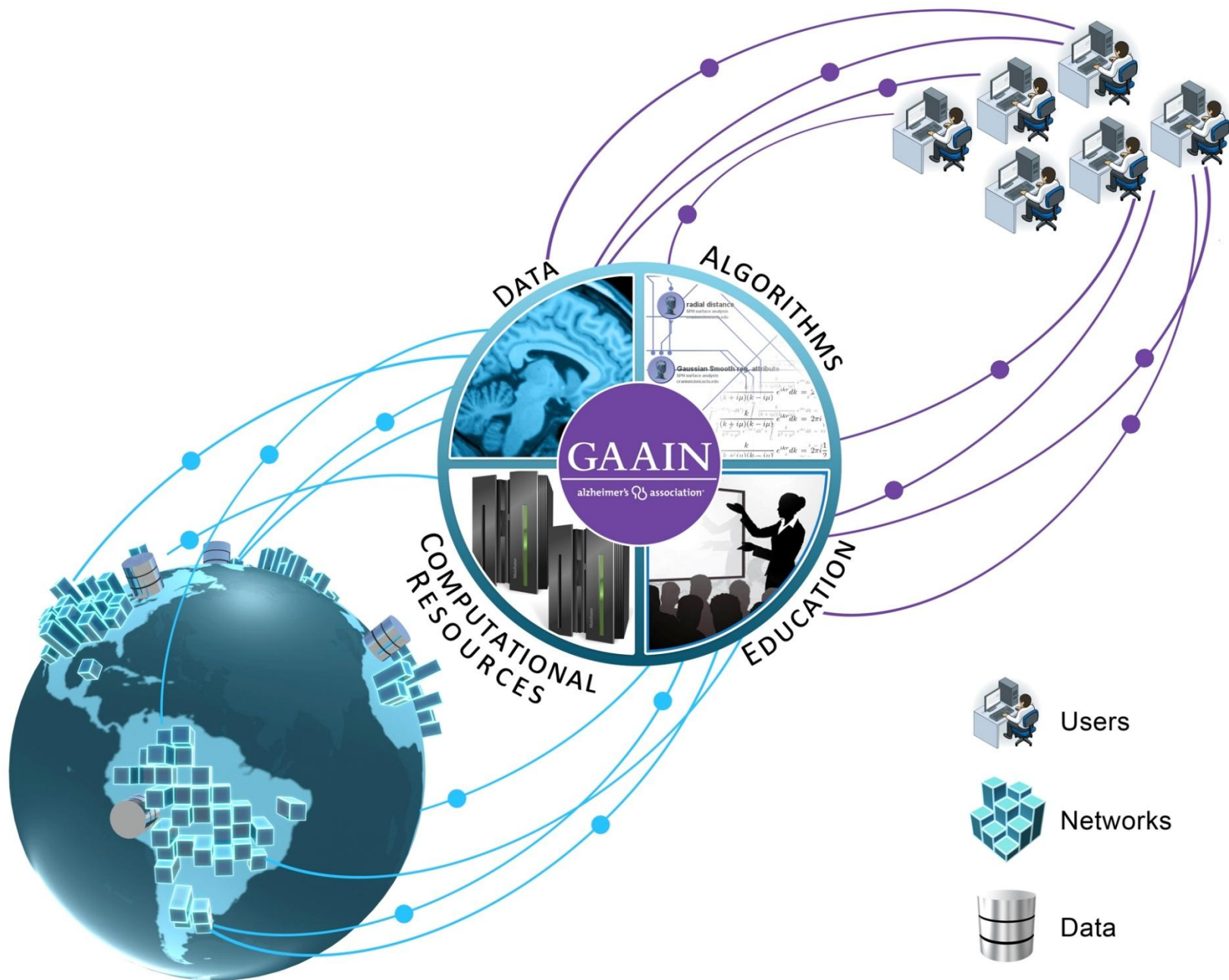


# GAAIN

Global Alzheimer's Association Interactive Network

Arthur W. Toga





# What is GAAIN?

A global cooperative of sharing, investigation and discovery for Alzheimer's Disease Research

- Data federation
- Cloud-enabled infrastructure
- Global network of analysis and workflow tools



# SAB Members

- Paul Aisen, UCSD
- Neil Buckholtz, National Institutes of Health
- William Klunk, University of Pittsburgh
- Enrique Castro deLeon, Intel
- Alon Halevy, Google
- Harry Johns, Alzheimer's Association
- William Thies, Alzheimer's Association



# Primary Components

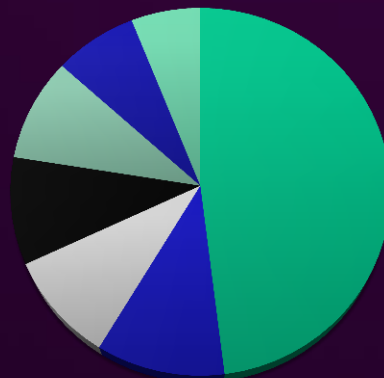
- Alzheimer's Disease Research Registry
  - Catalog of AD research conducted in the US and internationally
  - Interactive Search and Exploration Tools
- GAAIN Research Data Repository
  - Federated Database
  - Analysis/Workflow Tools
  - Compute Resources



# GAAIN Registry Features

- Publicly accessible website for:
  - Search
  - Research portfolio analysis
  - Analyzing trends & gaps in AD research

## Top Molecular Pathogenesis and Physiology Topics



- Amyloid
- Synaptic Dysfunction
- Genetics
- Immunity and Inflammation
- Tau
- Cell death
- Brain circuits and Synapses



# Gaain.org | Homepage

The screenshot shows a web browser window with the address bar displaying "www.gaain.org". The browser's address bar includes navigation buttons (back, forward, refresh) and search engines (Google, Wikipedia). The website header features the GAAIN logo (Alzheimer's Association) and a navigation menu with links for PARTNERS, CADRO, ABOUT, DATA & TOOLS, and NEWS. A search bar is located in the top right of the header.

**Global Alzheimer's Association Interactive Network**

GAAIN  
alzheimer's association

Enter search keyword

PARTNERS CADRO ABOUT DATA & TOOLS NEWS

**A Global Cooperative of Sharing, Investigation, & Discovery**

The Global Alzheimer's Association Interactive Network (GAAIN) is a collaborative project that will provide researchers around the globe with access to a vast repository of Alzheimer's disease research data and the sophisticated analytical tools and computational power needed to work with that data. Our goal is to transform the way scientists work together to answer key questions related to understanding the causes, diagnosis, treatment and prevention of Alzheimer's and other neurodegenerative diseases.

**STUDY REGISTRY**

Help us make better decisions and improve the overall governance of Alzheimer's research.

Register Today ▶

**BE A PARTNER**

Be at the forefront of advancing Alzheimer's research. We are currently seeking partners.

Apply Now ▶

**DATA & TOOLS**

GAAIN provides access to a vast repository of data, analytical tools, and computational power.

Learn More ▶

**News**

February 7th, 2012  
[Obama to increase Alzheimer's research funding – USA Today](#)  
"The Obama administration is set to announce a plan to spend more than half a billion dollars on Alzheimer's research next year, the Associated Press reports. "The plan is being unveiled as part of President Obama's 'We Can't Wait' initiative...."

January 17th, 2012  
[Finding a treatment for Alzheimer's by 2025 – CBS News](#)  
"The federal government set a goal Tuesday of finding an effective treatment for Alzheimer's by 2025. More than five million Americans were living with the disease in 2010. By 2050, it could be as many as 16 million. CBS News..."

November 7th, 2011  
[Partnering for Cures 2011 – Global Alzheimers Association Interactive Network](#)  
A video presentation from the Alzheimer's Association about GAAIN from November 7, 2011.

[More >](#)

**Events**

[Research & Standardization in Alzheimer's Disease Conference \(RASAD 2012\)](#)

[Alzheimer's Association International Conference](#)

[More >](#)

Study Registry  
Be a Partner

# Gaain.org | Partners

Google  
https://www.google.com

CNN.com | Huffington Post | YouTube | Dictionary.com | Wikipedia | TOI-Pedia | Facebook | Halo | WEB | 3D | Design | Art | Beatport | UESPWiki | Aimoan - Aimoonia... | Lightbox 2 | i2 Ref | Other bookmarks

Global Alzheimer's Association Interactive Network [Login](#)

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alzheimer's association

SEARCH

PARTNERS REGISTRY ABOUT DATA & TOOLS NEWS


Home > Partners


## PARTNERS

Network Partners in GAAIN will become part of a global effort to share and collaborate. GAAIN will link investigators, data, tools and infrastructure, creating a powerful and efficient environment for the study of Alzheimer's Disease.

**Benefits of GAAIN Network Partnership include:**

- Prestigious membership in a global network of investigators committed to advancing a sustainable and federated Alzheimer's Disease research infrastructure
- Access to a vast network of data and computer resources
- Access to a growing set of analytic tools spanning clinical, biologic, imaging and genetic data
- Data federation tools that support ontologies and metadata standards
- Online analytic tools allowing you to compare your data and analysis results with others.

 [Download Application Form \(PDF\)](#)



### Are you a GAAIN Partner?

Our expectations for new GAAIN partners include:

- Extensive, accessible and well organized set of Alzheimer's Disease research data from imaging, behavior or genetics (300+ research subjects)
- Experience and interest in collaborative efforts
- Ability to share de-identified data\*
- Reliable computer resources and high speed internet access to support data federation
- Technical expertise sufficient to test and implement data federation tools
- Willingness to beta test new tools
- Proponent of ethical data sharing\*

\* Only data collected in a manner that allows sharing in de-identified form may be part of the GAAIN effort. Strong and responsive support from your institution's ethics review committee is a plus.

Be a Partner Study Registry



# GAAIN Federated Data Repository

- Global network of committed investigators
- Vast network of data and compute resources
- Data federation tools
- Ontologies and metadata standards provide semantic framework
- Analytic tools for comparison of data across studies

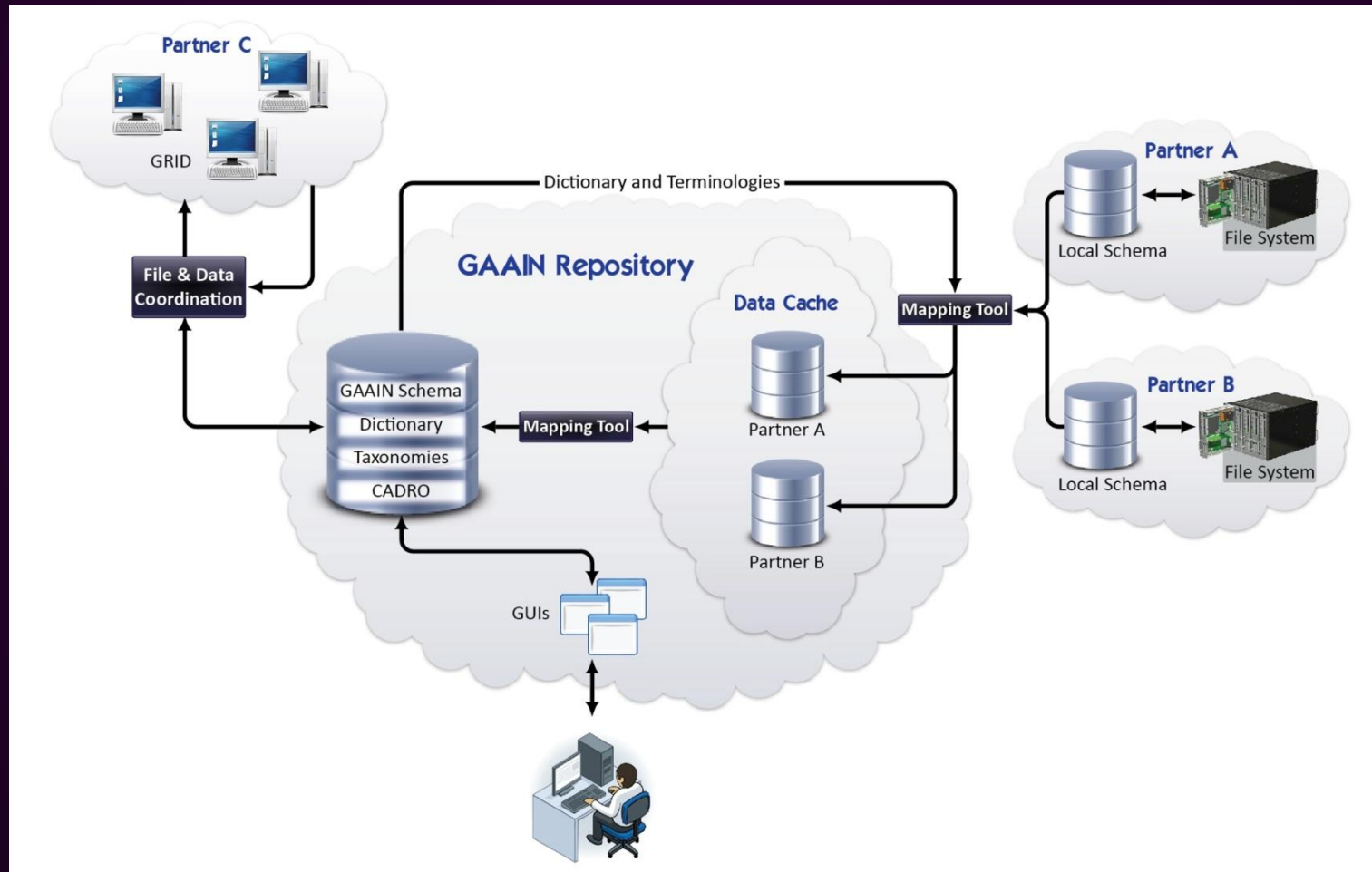


# GAAIN Challenges

- Subject privacy protection across international boundaries
- Complexity from cross-disciplinary data collection and analysis
- Creating robust and compelling tools for searching, visualizing, sharing and analyzing the federated data
- Semantics, ontologies, etc.



# Data Federation



# Controlled Terminologies

- Controlled terminologies enable mapping of heterogeneous data into common terms
  - Supports searching across databases
  - Supports data integration
- **CDISC Terminologies** (Clinical Data Interchange Standards Consortium Terminology)
  - **STDM**: Study/Trial Design Model
  - **ADaM**: Basic Data Structure for Time-to-Event Analysis
  - **CDASH**: Basic recommended data collection fields for 18 domains
  - **SEND**: Standard for Exchange of Nonclinical Data



# Mapping Tool

The screenshot displays the GAAIN Mapping Tool interface. At the top, the header includes the GAAIN logo (Global Alzheimer's Association Interactive Network) and a search bar. The main navigation menu contains links for PARTNERS, CADRO, ABOUT, DATA & TOOLS, and NEWS.

The interface is divided into two main panels:

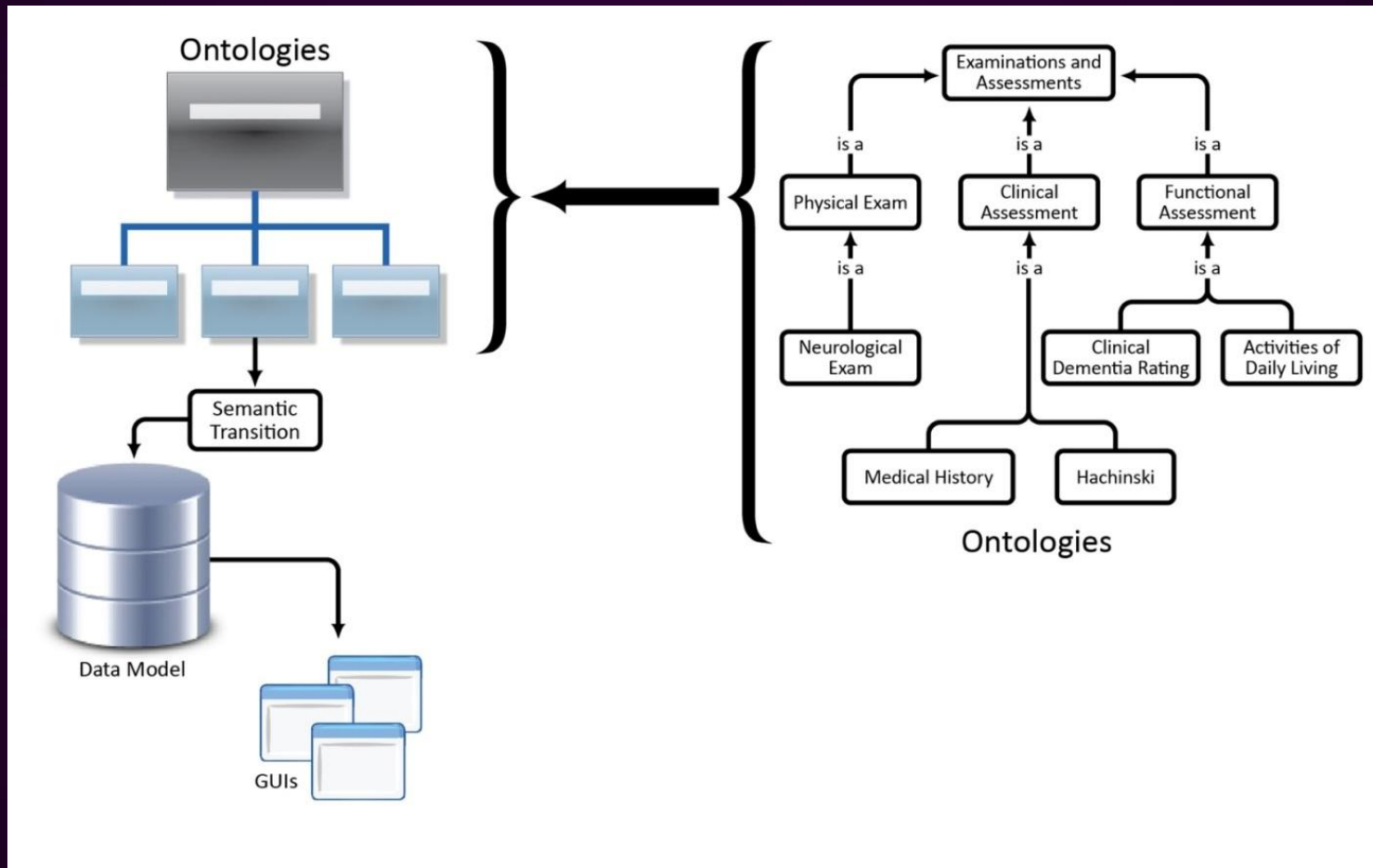
- Map to GAAIN:** This panel shows a mapping process between source data and a target schema. On the left, under 'DATA', the source is 'N4U socio\_demog\_mod'. It lists categories like 'Family History', 'Socio-demographics', and 'Something else'. Under 'GAAIN Target Map', it lists corresponding target fields such as 'ethnic\_origin', 'date', 'location', 'subject\_education', and 'primary\_occupation'. A 'VIEW BY CONNECTIONS' button is located at the bottom of this panel.
- Inspect:** This panel provides a detailed view of the data. It includes a 'Data Inspection' table and a 'Data Overview' section.

subject_identifier	education_level	marital_status	primary_occupation
1008	8	married	housewife
1013	5	married	housewife
1016	8	married	employee
1020	18	divorced	teacher
1021	8	married	employee

The 'Data Overview' section features a pie chart and a query builder. The 'Inspect' field is set to 'marital\_status'. The 'Filter' is 'visit\_number = 0'. The query builder shows 'IF [ ] THEN [ ] ELSE [ ]'. The 'NULL' count is 0.

- View, inspect and transform source data
- View and inspect target schema and controlled terminologies

# Ontology-guided Search



Questions like, “How many subjects are there with functional assessments and imaging?” can be asked .

# Search: Distribution

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Search

PARTNERS CADRO ABOUT DATA & TOOLS NEWS

Display Results Clear Export

SUBJECT CHARACTERISTICS -

- Socio-demographics
- Family History

EXAMINATIONS AND ASSESSMENTS -

- Neuropsychological Assessments
- MMSE: Mini-mental State Examination
- BDI: Beck Depression Inventory
- ADAS: Alzheimer's Disease Assessment Scale
- Clinical Dementia Rating

Functional Assessments

BIOLOGICAL MARKERS +

PHYSICAL EXAMINATIONS +

NEUROIMAGING +

CADRO CATEGORY +

Socio-demographics

Available Subjects

STUDY	Coordinating Center	Subjects	Access
ADNI	Laboratory of Neuro Imaging, UCLA	815	Type 1
CARIPLLO	N4U	30	Type 1
DIAN	Alzheimer's Disease Cooperative Study	102	Type 2
Normative Archive	N4U	1600	Type 1

Review and Filter

Socio-demographic Distribution

Gender Distribution

- Female
- Male

Screening DX Distribution

- Normal
- MCI
- AD

Age Range Distributions

- 60-70
- 71-80
- 81+

Marital Status Distribution

- Divorced
- Never married
- Married
- Domestic Partner

Drag and drop individual items into work area to see distribution of values and number of subjects having data available. Study-level access levels shown.

# Search More

Global Alzheimer's Association Interactive Network [Login](#)

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PARTNERS CADRO ABOUT DATA & TOOLS NEWS

Display Results Clear Export

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- Functional Assessments

BIOLOGICAL MARKERS +

PHYSICAL EXAMINATIONS +

NEUROIMAGING +

CADRO CATEGORY +

Socio-demographics Functional Assessments Neuroimaging

Available Subjects

STUDY	Coordinating Center	Subjects	Access
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CARIPLO	NJU	30	Type 1
DIAN	Alzheimer's Disease Cooperative Study	102	Type 2
Normative Archive	NJU	800	Type 1

Review and Filter

Socio-demographic Distribution

Gender Distribution  
 Female  
 Male

Screening DX Distribution  
 Normal  
 MCI  
 AD

Age Range Distributions  
 60-70  
 71-80  
 81+

Marital Status Distribution  
 Divorced  
 Never married  
 Married  
 Domestic Partner

Functional Assessment Inventory

Neuroimaging Inventory

Drag and drop minor or major categories into work area to see inventory of information types available from each study.