

d-wise

Empowering innovation for a healthier world



STRATEGY



DATA



CLOUD



PRIVACY



ANALYTICS

Moving Towards a Round World: Linking Multi-dimensional Clinical Metadata Across the CDISC Standards

Scott Bahlavooni, Chris Decker

WHAT IS THE PROBLEM?

In our personal life...

What if...?

How would you...?



Google

alzheimer's disease

All

News

Images

Videos

Books

More

Settings

Tools

About 29,000,000 results (1.08 seconds)

Alzheimer's Disease & Dementia | Alzheimer's Association

www.alz.org/alzheimers_disease_what_is_alzheimers.asp

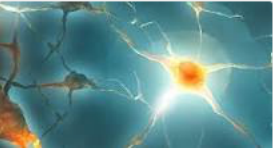
Alzheimer's is a type of dementia that causes problems with memory, thinking and behavior. ... Alzheimer's disease accounts for 60 to 80 percent of dementia cases. ... Approximately 200,000 Americans under the age of 65 have younger-onset Alzheimer's disease (also known as early-onset ... The basics · Symptoms · Changes in the brain · Plaques & tangles

Alzheimer's Disease Fact Sheet | National Institute on Aging

<https://www.nia.nih.gov/alzheimers/publication/alzheimers-disease-fact-sheet>

Alzheimer's disease is an irreversible, progressive brain disorder that slowly destroys memory and thinking skills, and eventually the ability to carry out the ... Changes in the Brain · Signs and Symptoms · What Causes Alzheimer's

Top stories



Scientists Have Uncovered The Atomic Structure of a Key Alzheimer's Protein F...
[ScienceAlert](#) · 1 day ago



Can poor sleep lead to Alzheimer's?
[CNN.com](#) · 1 day ago



Your Insomnia Could Actually Lead To Alzheimer's, Study Says
[Huffington Post](#) · 12 hours ...

[More for alzheimer's disease](#)

People also ask

What are the symptoms of Alzheimer's disease?

10 Early Signs and Symptoms of Alzheimer's. Memory loss that disrupts daily life may be a symptom of Alzheimer's or another dementia. Alzheimer's is a brain disease that causes a slow decline in memory, thinking and reasoning skills. There are 10 **warning signs** and symptoms.

[Know the 10 Signs of Alzheimer's Disease - Alzheimer's Association](http://www.alz.org/10-signs-symptoms-alzheimers-dementia.asp)
www.alz.org/10-signs-symptoms-alzheimers-dementia.asp

Alzheimer's disease

Also called: senile dementia

ABOUT

SYMPTOMS

TREATMENTS

Requires a medical diagnosis

Memory loss and confusion are the main symptoms.

People may experience:

Cognitive: mental decline, difficulty thinking and understanding, confusion in the evening hours, delusion, disorientation, forgetfulness, making things up, mental confusion, difficulty concentrating, inability to create new memories, inability to do simple math, or inability to recognize common things

Behavioral: aggression, agitation, difficulty with self care, irritability, meaningless repetition of own words, personality changes, lack of restraint, or wandering and getting lost

Mood: anger, apathy, general discontent, loneliness, or mood swings

Psychological: depression, hallucination, or paranoia

Whole body: loss of appetite or restlessness

Also common: inability to combine muscle movements or jumbled speech

Consult a doctor for medical advice

Sources: Mayo Clinic and others. [Learn more](#)

Download PDF

Related conditions

Dementia

A group of thinking and social symptoms that interferes with daily functioning.

Very common

Psychosis

A mental disorder characterized by a disconnection from reality.

Common

Feedback

In our work life...

pr.xpt

Row	STUDYID	DOMAIN	USUBJID	SPDEVID	PRSEQ	PRLNKID	PRTRT	PRLOC	PRFAST	PRSTDTC
1	ABC123	PR	AD01-101	22	1	02	PET/CT	HEAD	Y	2012-05-22T09:30:00
2	ABC123	PR	AD01-102	22	1	04	PET/CT	HEAD	Y	2012-05-22T08:00:00
3	ABC123	PR	AD01-103	44	1	05	PET	HEAD	Y	2012-05-22T09:00:00

ag.xpt

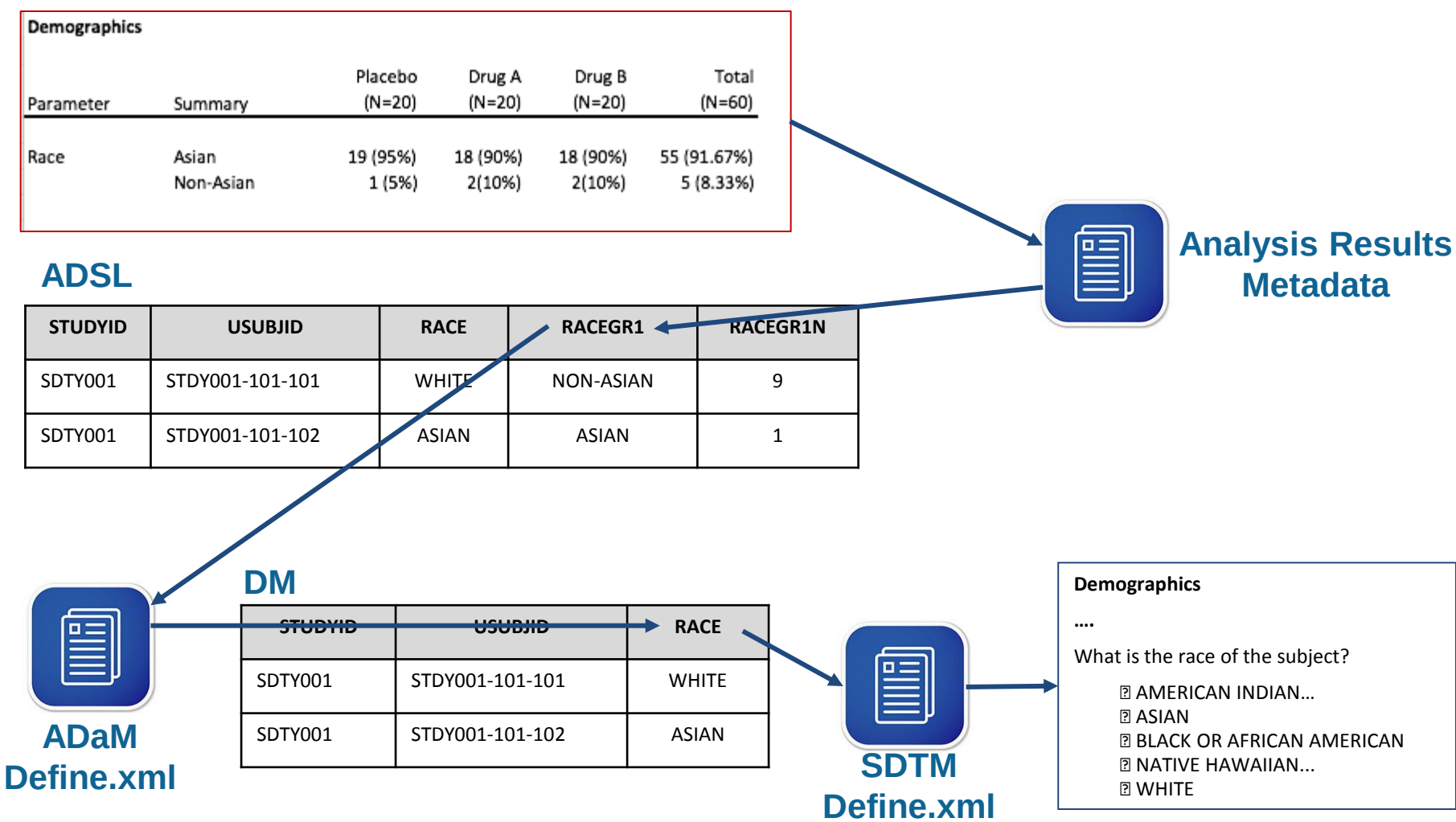
Row	STUDYID	DOMAIN	USUBJID	AGSEQ	AGLNKID	AGTRT	AGCAT	AGDOSE	AGDOSEU	AGSTDTC
1	ABC123	AG	AD01-101	1	02	18F-Florbetapir	AMYLOID TRACER	370	MBq	2012-05-22T08:40:00
2	ABC123	AG	AD01-102	1	04	11C-PiB	AMYLOID TRACER	370	MBq	2012-05-22T07:20:00
3	ABC123	AG	AD01-103	1	05	FDG	GLUCOSE TRACER	400	MBq	2012-05-22T08:30:00

mo.xpt

Row	STUDYID	DOMAIN	USUBJID	SPDEVID	MOSEQ	MOLNKID	MOREFID	MOTESTCD	MOTEST	MOORRES	MOORRESU
1	ABC123	MO	AD01-101	16	1	02	1234	VOLUME	Volume	1.8	mL
2	ABC123	MO	AD01-101	16	2	02	1234	VOLUME	Volume	1.9	mL
3	ABC123	MO	AD01-101	16	3	02	1234	VOLUME	Volume	3.7	mL
4	ABC123	MO	AD01-101	16	4	02	1234	THICK	Thickness	3	mm
5	ABC123	MO	AD01-101	16	5	02	1235	VOLUME	Volume	864	mL

Metadata in Clinical Research

Metadata Across the Clinical Trial Lifecycle





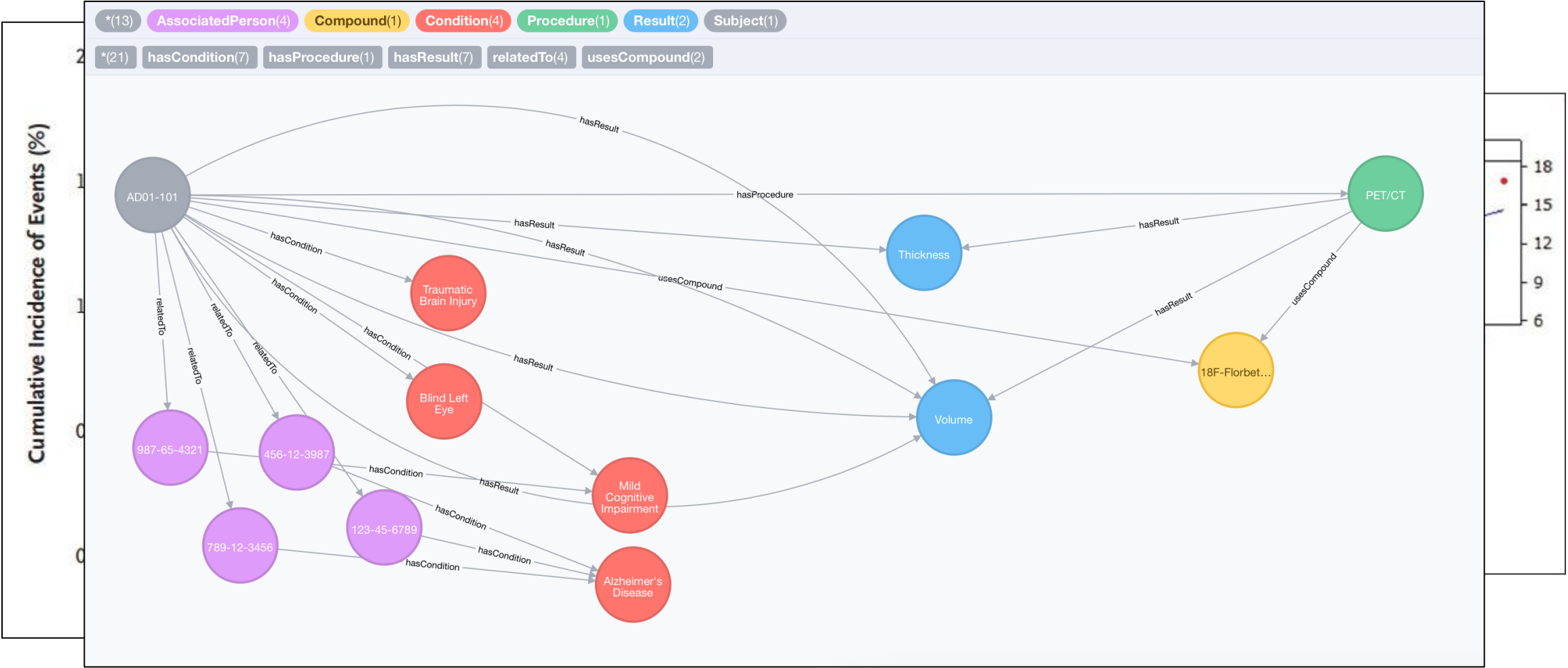
Metadata Repository Storage & management location

Metadata is not...



CONNECTING THE DOTS

What is a graph?



Graphs and Graph Databases

■ What is a graph (model)?

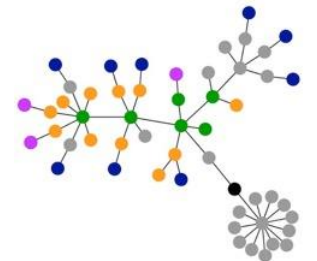
- Graphs contain nodes and relationships
- Nodes are entities (e.g. subject, visit, glucose test)
- Relationships are the associations between nodes (e.g. hasVisit, performsAssessment)

■ What is a graph database?

- A database optimized to store, manage, and query graph models with a focus on the relationship(s) between entities

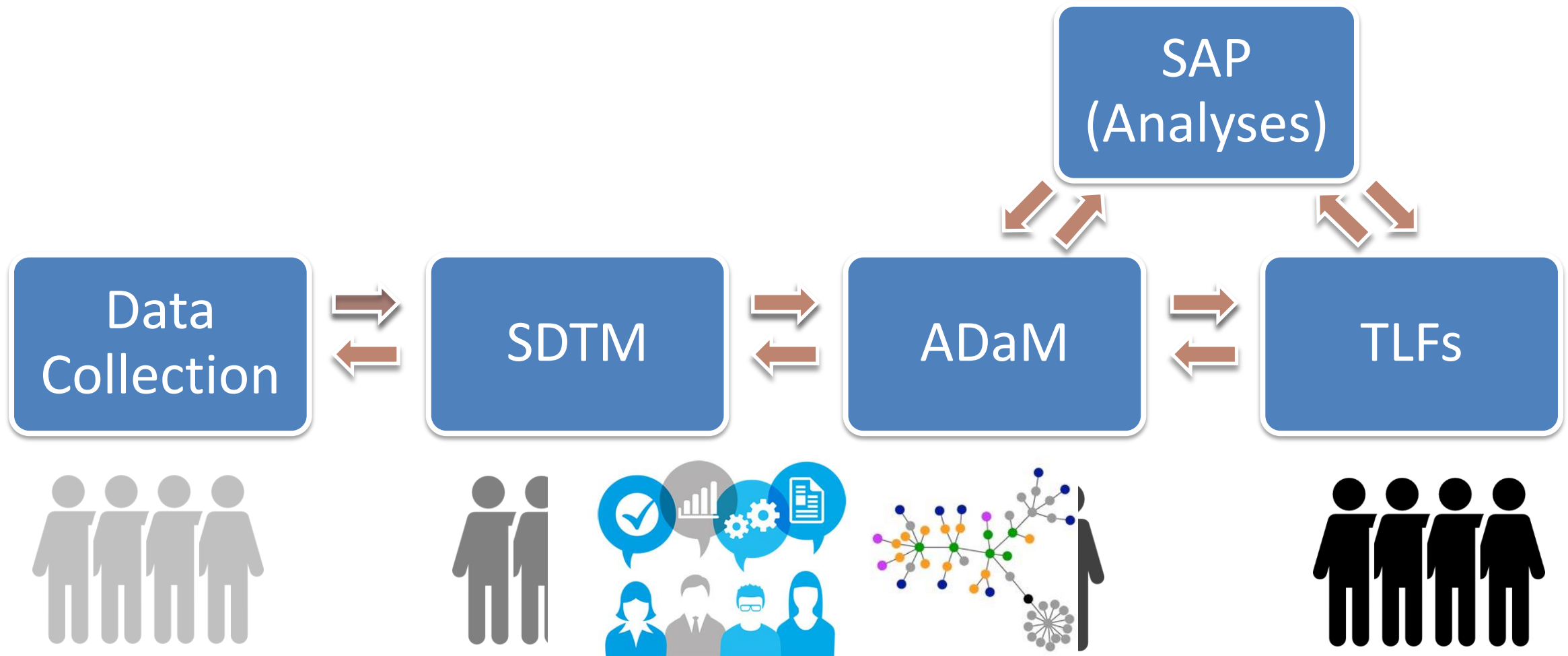
■ Why use a graph database?

- If it's good enough for Google, Facebook, LinkedIn, etc.
- Contextual, flexible, agile

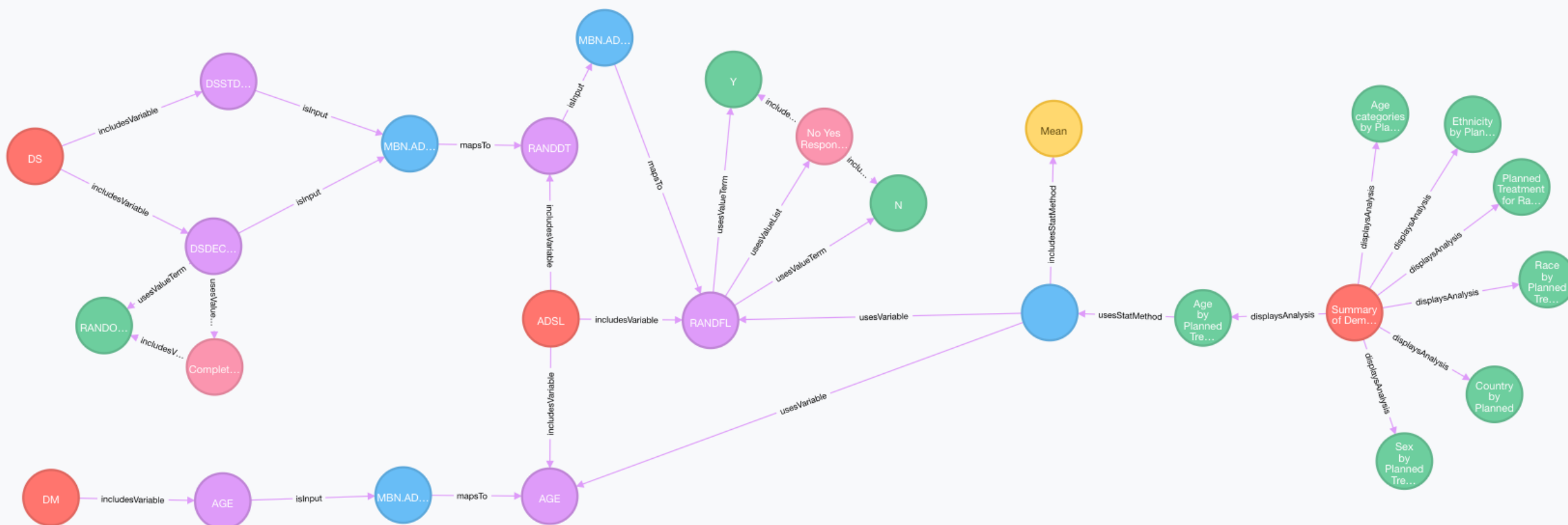


PROVING A CONCEPT

More “Pleasurable” Specifications

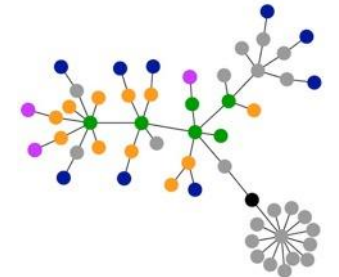


What did we do?



POC Conclusions

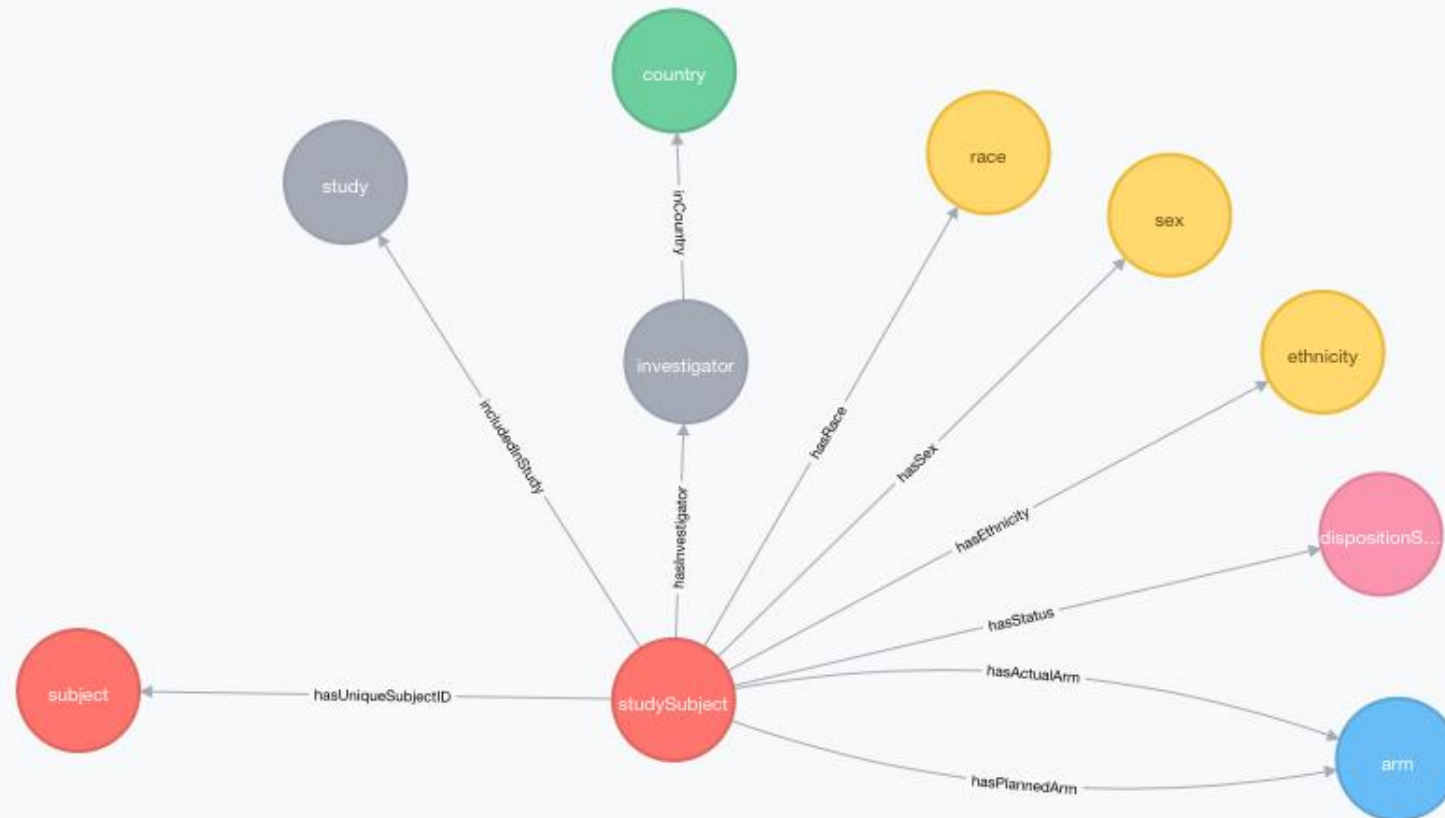
- Focusing on UX made spec development more pleasurable
- Graphs made spec development more meaningful
- Specialized silos are NOT required to create artifacts



2017 Computational Science Symposium Link-a-thon

WHY NOT DATA?

2017 PhUSE CSS Link-a-thon



Use Case 1: Extracting Data to SDTM

SDTM DM domain conformant to CDISC/PMDA rules

STUDYID	USUBJID	SUBJID	RFSTDT	RFENDTC	RFXSTDT	RFXENDTC	RFXPDTC	SITEID	AGE	AGEU	SEX	RACE	ETHNICITY	ARMCD	ARM	ACTARMCD	ACTARM	COUNTRY	DMDTC	DMDY
CDISCPLOT01	01-701-1015	1015	1/2/14	7/2/14	1/2/14	7/2/14	2014-07-02T11:45	701	63	YEARS	F	WHITE	HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	12/26/13	-7
CDISCPLOT01	01-701-1028	1028	7/19/13	1/14/14	7/19/13	1/14/14	2014-01-14T11:10	701	71	YEARS	M	WHITE	NOT HISPANIC OR LATINO	Xan_Hi	Xanomeline High Dose	Xan_Hi	Xanomeline High Dose	USA	7/11/13	-8
CDISCPLOT01	01-701-1047	1047	2/12/13	3/29/13	2/12/13	3/9/13	7/28/13	701	85	YEARS	F	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	1/22/13	-21
CDISCPLOT01	01-701-1118	1118	3/12/14	9/9/14	3/12/14	9/9/14	2014-09-09T13:28	701	52	YEARS	M	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	2/27/14	-13
CDISCPLOT01	01-701-1130	1130	2/15/14	8/16/14	2/15/14	8/16/14	2014-08-16T13:10	701	84	YEARS	M	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	2/9/14	-6
CDISCPLOT01	01-701-1133	1133	10/28/12	4/29/13	10/28/12	4/28/13	2013-04-29T10:13	701	81	YEARS	F	WHITE	NOT HISPANIC OR LATINO	Xan_Hi	Xanomeline High Dose	Xan_Hi	Xanomeline High Dose	USA	10/23/12	-5
CDISCPLOT01	01-701-1153	1153	9/23/13	4/1/14	9/23/13	3/16/14	2014-04-01T14:25	701	79	YEARS	F	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	9/6/13	-17
CDISCPLOT01	01-701-1180	1180	2/12/13	3/23/13	2/12/13	3/18/13	4/7/13	701	56	YEARS	M	WHITE	NOT HISPANIC OR LATINO	Xan_Hi	Xanomeline High Dose	Xan_Hi	Xanomeline High Dose	USA	1/28/13	-15
CDISCPLOT01	01-701-1181	1181	12/5/13	12/12/13	12/5/13	12/9/13	5/23/14	701	79	YEARS	F	WHITE	NOT HISPANIC OR LATINO	Xan_Hi	Xanomeline High Dose	Xan_Lo	Xanomeline Low Dose	USA	11/26/13	-9
CDISCPLOT01	01-701-1188	1188	2/15/13	3/25/13	2/15/13	3/24/13	8/4/13	701	71	YEARS	M	WHITE	NOT HISPANIC OR LATINO	Xan_Lo	Xanomeline Low Dose	Xan_Lo	Xanomeline Low Dose	USA	2/3/13	-12
CDISCPLOT01	01-701-1234	1234	3/30/13	9/22/13	3/30/13	9/22/13	2013-09-22T09:25	701	69	YEARS	M	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	3/20/13	-10
CDISCPLOT01	01-701-1239	1239	1/11/14	7/11/14	1/11/14	7/10/14	2014-07-11T15:40	701	56	YEARS	M	WHITE	HISPANIC OR LATINO	Xan_Hi	Xanomeline High Dose	Xan_Hi	Xanomeline High Dose	USA	12/28/13	-14
CDISCPLOT01	01-701-1275	1275	2/7/14	6/14/14	2/7/14	5/31/14	2014-06-14T12:35	701	61	YEARS	M	AMERICAN INDIAN OR ALASKA NATIVE	NOT HISPANIC OR LATINO	Xan_Hi	Xanomeline High Dose	Xan_Hi	Xanomeline High Dose	USA	1/25/14	-13
CDISCPLOT01	01-701-1345	1345	10/8/13	3/18/14	10/8/13	3/18/14	2014-03-18T14:12	701	63	YEARS	F	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	10/1/13	-7
CDISCPLOT01	01-701-1386	1386					1/7/14	701	71	YEARS	M	WHITE	NOT HISPANIC OR LATINO	SCRNFAIL	Screen Failure			USA	12/28/13	

SDTM DM domain conformant to FDA rules

STUDYID	USUBJID	SUBJID	RFSTDT	RFENDTC	RFXSTDT	RFXENDTC	RFXPDTC	SITEID	AGE	AGEU	SEX	RACE	ETHNICITY	ARMCD	ARM	ACTARMCD	ACTARM	COUNTRY	DMDTC	DMDY
CDISCPLOT01	01-701-1015	1015	1/2/14	7/2/14	1/2/14	7/2/14	2014-07-02T11:45	701	63	YEARS	F	WHITE	HISPANIC OR LATINO	Pbo	Placebo		Placebo	USA	12/26/13	-7
CDISCPLOT01	01-701-1028	1028	7/19/13	1/14/14	7/19/13	1/14/14	2014-01-14T11:10	701	71	YEARS	M	WHITE	NOT HISPANIC OR LATINO	Xan_Hi	Xanomeline High Dose	Xan_Hi	Xanomeline High Dose	USA	7/11/13	-8
CDISCPLOT01	01-701-1047	1047	2/12/13	3/29/13	2/12/13	3/9/13	7/28/13	701	85	YEARS	F	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	1/22/13	-21
CDISCPLOT01	01-701-1118	1118	3/12/14	9/9/14	3/12/14	9/9/14	2014-09-09T13:28	701	52	YEARS	M	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	2/27/14	-13
CDISCPLOT01	01-701-1130	1130	2/15/14	8/16/14	2/15/14	8/16/14	2014-08-16T13:10	701	84	YEARS	M	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	2/9/14	-6
CDISCPLOT01	01-701-1133	1133	10/28/12	4/29/13	10/28/12	4/28/13	2013-04-29T10:13	701	81	YEARS	F	WHITE	NOT HISPANIC OR LATINO	Xan_Hi	Xanomeline High Dose	Xan_Hi	Xanomeline High Dose	USA	10/23/12	-5
CDISCPLOT01	01-701-1153	1153	9/23/13	4/1/14	9/23/13	3/16/14	2014-04-01T14:25	701	79	YEARS	F	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	9/6/13	-17
CDISCPLOT01	01-701-1180	1180	2/12/13	3/23/13	2/12/13	3/18/13	4/7/13	701	56	YEARS	M	WHITE	NOT HISPANIC OR LATINO	Xan_Hi	Xanomeline High Dose	Xan_Hi	Xanomeline High Dose	USA	1/28/13	-15
CDISCPLOT01	01-701-1181	1181	12/5/13	12/12/13	12/5/13	12/9/13	5/23/14	701	79	YEARS	F	WHITE	NOT HISPANIC OR LATINO	Xan_Hi	Xanomeline High Dose	Xan_Lo	Xanomeline Low Dose	USA	11/26/13	-9
CDISCPLOT01	01-701-1188	1188	2/15/13	3/25/13	2/15/13	3/24/13	8/4/13	701	71	YEARS	M	WHITE	NOT HISPANIC OR LATINO	Xan_Lo	Xanomeline Low Dose	Xan_Lo	Xanomeline Low Dose	USA	2/3/13	-12
CDISCPLOT01	01-701-1234	1234	3/30/13	9/22/13	3/30/13	9/22/13	2013-09-22T09:25	701	69	YEARS	M	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	3/20/13	-10
CDISCPLOT01	01-701-1239	1239	1/11/14	7/11/14	1/11/14	7/10/14	2014-07-11T15:40	701	56	YEARS	M	WHITE	HISPANIC OR LATINO	Xan_Hi	Xanomeline High Dose	Xan_Hi	Xanomeline High Dose	USA	12/28/13	-14
CDISCPLOT01	01-701-1275	1275	2/7/14	6/14/14	2/7/14	5/31/14	2014-06-14T12:35	701	61	YEARS	M	AMERICAN INDIAN OR ALASKA NATIVE	NOT HISPANIC OR LATINO	Xan_Hi	Xanomeline High Dose	Xan_Hi	Xanomeline High Dose	USA	1/25/14	-13
CDISCPLOT01	01-701-1345	1345	10/8/13	3/18/14	10/8/13	3/18/14	2014-03-18T14:12	701	63	YEARS	F	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	10/1/13	-7
CDISCPLOT01	01-701-1386	1386					1/7/14	701	71	YEARS	M	WHITE	NOT HISPANIC OR LATINO	SCRNFAIL				USA	12/28/13	

Use Case 2: Exploring Integrated Data

■ Which studies contain a placebo arm?

- match (s:study)-[*1..4]-(a:arm) where a.value contains "Placebo" return distinct s.studyNumber order by s.studyNumber

■ How many subjects are participating in multiples studies?

- match (s:subject)-[]-(ss:studySubject) with s, count(*) as nstudy where nstudy > 1 with s match (s)-[]-(ss:studySubject)-[]-(stdy:study) return s.uniqueSubjectID,stdy.studyNumber order by s.uniqueSubjectID,stdy.studyNumber ;

Use Case 3: Adding New Information to the Graph

- **I need to add a new indicator that a sites 701, 703, and 707 have violated best practices**
 - `match (n:investigator) where n.siteID in ['701', '703', '707'] set n.violation='Y' return n ;`



Use Case 3: Extracting to SDTM

■ SDTM DM domain with Site Deviation Flag

STUDYID	USUBJID	SUBJID	RFSTDTC	RFENDTC	RFXSTDTC	RFXENDTC	RFXPDTC	SITEID	SITEDV	AGE	AGEU	SEX	RACE	ETHNICITY	ARMCD	ARM	ACTARMCD	ACTARM	COUNTRY	DMDTC	DMDY
CDISCPIL01	01-701-1015	1015	1/2/14	7/2/14	1/2/14	7/2/14	2014-07-02T11:45	701	Y	63	YEARS	F	WHITE	HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	12/26/13	-7
CDISCPIL01	01-701-1028	1028	7/19/13	1/14/14	7/19/13	1/14/14	2014-01-14T11:10	701	Y	71	YEARS	M	WHITE	NOT HISPANIC OR LATINO	Xan_Hi	Xanomeline High Dose	Xan_Hi	Xanomeline High Dose	USA	7/11/13	-8
CDISCPIL01	01-701-1047	1047	2/12/13	3/29/13	2/12/13	3/9/13	7/28/13	701	Y	85	YEARS	F	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	1/22/13	-21
CDISCPIL01	01-701-1118	1118	3/12/14	9/9/14	3/12/14	9/9/14	2014-09-09T13:28	701	Y	52	YEARS	M	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	2/27/14	-13
CDISCPIL01	01-701-1130	1130	2/15/14	8/16/14	2/15/14	8/16/14	2014-08-16T13:10	701	Y	84	YEARS	M	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	2/9/14	-6
CDISCPIL01	01-701-1133	1133	10/28/12	4/29/13	10/28/12	4/28/13	2013-04-29T10:13	701	Y	81	YEARS	F	WHITE	NOT HISPANIC OR LATINO	Xan_Hi	Xanomeline High Dose	Xan_Hi	Xanomeline High Dose	USA	10/23/12	-5
CDISCPIL01	01-701-1153	1153	9/23/13	4/1/14	9/23/13	3/16/14	2014-04-01T14:25	701	Y	79	YEARS	F	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	9/6/13	-17
CDISCPIL01	01-701-1180	1180	2/12/13	3/23/13	2/12/13	3/18/13	4/7/13	701	Y	56	YEARS	M	WHITE	NOT HISPANIC OR LATINO	Xan_Hi	Xanomeline High Dose	Xan_Hi	Xanomeline High Dose	USA	1/28/13	-15
CDISCPIL01	01-701-1181	1181	12/5/13	12/12/13	12/5/13	12/9/13	5/23/14	701	Y	79	YEARS	F	WHITE	NOT HISPANIC OR LATINO	Xan_Hi	Xanomeline High Dose	Xan_Lo	Xanomeline Low Dose	USA	11/26/13	-9
CDISCPIL01	01-701-1188	1188	2/15/13	3/25/13	2/15/13	3/24/13	8/4/13	701	Y	71	YEARS	M	WHITE	NOT HISPANIC OR LATINO	Xan_Lo	Xanomeline Low Dose	Xan_Lo	Xanomeline Low Dose	USA	2/3/13	-12
CDISCPIL01	01-701-1234	1234	3/30/13	9/22/13	3/30/13	9/22/13	2013-09-22T09:25	701	Y	69	YEARS	M	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	3/20/13	-10
CDISCPIL01	01-701-1239	1239	1/11/14	7/11/14	1/11/14	7/10/14	2014-07-11T15:40	701	Y	56	YEARS	M	WHITE	HISPANIC OR LATINO	Xan_Hi	Xanomeline High Dose	Xan_Hi	Xanomeline High Dose	USA	12/28/13	-14
CDISCPIL01	01-701-1275	1275	2/7/14	6/14/14	2/7/14	5/31/14	2014-06-14T12:35	701	Y	61	YEARS	M	AMERICAN INDIAN OR ALASKA NATIVE	NOT HISPANIC OR LATINO	Xan_Hi	Xanomeline High Dose	Xan_Hi	Xanomeline High Dose	USA	1/25/14	-13
CDISCPIL01	01-701-1345	1345	10/8/13	3/18/14	10/8/13	3/18/14	2014-03-18T14:12	701	Y	63	YEARS	F	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	10/1/13	-7
CDISCPIL01	01-701-1386	1386					1/7/14	701	Y	71	YEARS	M	WHITE	NOT HISPANIC OR LATINO	SCRNFAL	Screen Failure			USA	12/28/13	
CDISCPIL01	01-701-1392	1392	10/28/12	4/28/13	10/28/12	4/28/13	2013-04-28T11:30	701	Y	78	YEARS	M	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	10/17/12	-11
CDISCPIL01	01-701-1440	1440	8/8/13	2/5/14	8/8/13	2/5/14	2014-02-05T11:25	701	Y	70	YEARS	M	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	7/24/13	-15
CDISCPIL01	01-703-1096	1096	1/25/13	3/29/13	1/25/13	3/16/13	3/29/13	703	Y	81	YEARS	F	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	12/19/12	-37
CDISCPIL01	01-703-1119	1119	2/20/13	6/13/13	2/20/13	6/13/13	8/24/13	703	Y	81	YEARS	F	WHITE	NOT HISPANIC OR LATINO	Xan_Lo	Xanomeline Low Dose	Xan_Lo	Xanomeline Low Dose	USA	2/2/13	-18
CDISCPIL01	01-703-1295	1295	11/21/13	5/19/14	11/21/13	4/19/14	2014-05-19T14:45	703	Y	88	YEARS	F	WHITE	NOT HISPANIC OR LATINO	Xan_Hi	Xanomeline High Dose	Xan_Hi	Xanomeline High Dose	USA	10/24/13	-28
CDISCPIL01	01-703-1299	1299	9/12/12	3/13/13	9/12/12	3/13/13	3/27/13	703	Y	81	YEARS	F	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	9/7/12	-5
CDISCPIL01	01-703-1335	1335	3/17/14	5/24/14	3/17/14	5/7/14	2014-05-24T12:15	703	Y	67	YEARS	F	BLACK OR AFRICAN AMERICAN	NOT HISPANIC OR LATINO	Xan_Hi	Xanomeline High Dose	Xan_Hi	Xanomeline High Dose	USA	2/28/14	-17
CDISCPIL01	01-704-1065	1065	10/24/13	12/24/13	10/24/13	12/22/13	2/17/14	704		75	YEARS	M	WHITE	NOT HISPANIC OR LATINO	Xan_Hi	Xanomeline High Dose	Xan_Hi	Xanomeline High Dose	USA	10/17/13	-7
CDISCPIL01	01-704-1074	1074	1/22/14	3/31/14	1/22/14	3/20/14	2014-03-31T10:30	704		80	YEARS	F	WHITE	NOT HISPANIC OR LATINO	Xan_Hi	Xanomeline High Dose	Xan_Hi	Xanomeline High Dose	USA	1/19/14	-3
CDISCPIL01	01-704-1114	1114	1/23/13	7/8/13	1/23/13	7/7/13	2013-07-08T09:56	704		77	YEARS	M	WHITE	NOT HISPANIC OR LATINO	Xan_Lo	Xanomeline Low Dose	Xan_Lo	Xanomeline Low Dose	USA	1/9/13	-14
CDISCPIL01	01-704-1127	1127	10/2/13	3/31/14	10/2/13	3/31/14	2014-03-31T11:30	704		84	YEARS	F	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	9/16/13	-16
CDISCPIL01	01-704-1164	1164	9/19/12	4/4/13	9/19/12	4/4/13	4/4/13	704		67	YEARS	F	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	9/11/12	-8
CDISCPIL01	01-704-1218	1218	11/19/12	5/27/13	11/19/12	5/27/13	2013-05-27T11:20	704		81	YEARS	F	WHITE	NOT HISPANIC OR LATINO	Xan_Lo	Xanomeline Low Dose	Xan_Lo	Xanomeline Low Dose	USA	11/11/12	-8
CDISCPIL01	01-704-1260	1260	8/30/12	1/18/13	8/30/12	11/4/12	1/18/13	704		71	YEARS	F	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	8/23/12	-7
CDISCPIL01	01-704-1323	1323	7/8/13	8/8/13	7/8/13	8/5/13	10/1/13	704		68	YEARS	F	WHITE	NOT HISPANIC OR LATINO	Xan_Lo	Xanomeline Low Dose	Xan_Lo	Xanomeline Low Dose	USA	6/13/13	-25
CDISCPIL01	01-704-1332	1332	12/9/13	2/16/14	12/9/13	2/14/14	2/24/14	704		80	YEARS	M	WHITE	NOT HISPANIC OR LATINO	Xan_Hi	Xanomeline High Dose	Xan_Hi	Xanomeline High Dose	USA	11/24/13	-15
CDISCPIL01	01-704-1351	1351	10/12/13	4/18/14	10/12/13	4/18/14	2014-04-18T10:30	704		70	YEARS	M	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	9/26/13	-16
CDISCPIL01	01-704-1435	1435	11/17/12	1/12/13	11/17/12	1/9/13	2013-01-12T12:00	704		74	YEARS	M	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	11/1/12	-16
CDISCPIL01	01-704-1445	1445	5/11/14	11/1/14	5/11/14	11/1/14	11/1/14	704		75	YEARS	M	WHITE	NOT HISPANIC OR LATINO	Pbo	Placebo	Pbo	Placebo	USA	5/1/14	-10

Food for thought...



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THANK YOU!