

INTRO TO i2b2

<https://i2b2.idr.ufhealth.org>



Clinical and Translational
Science Institute

Integrated Data Repository Research Services

UNIVERSITY of FLORIDA

Lei McDevitt, Kevin Hanson
Integrated Data Repository (IDR)

Outline

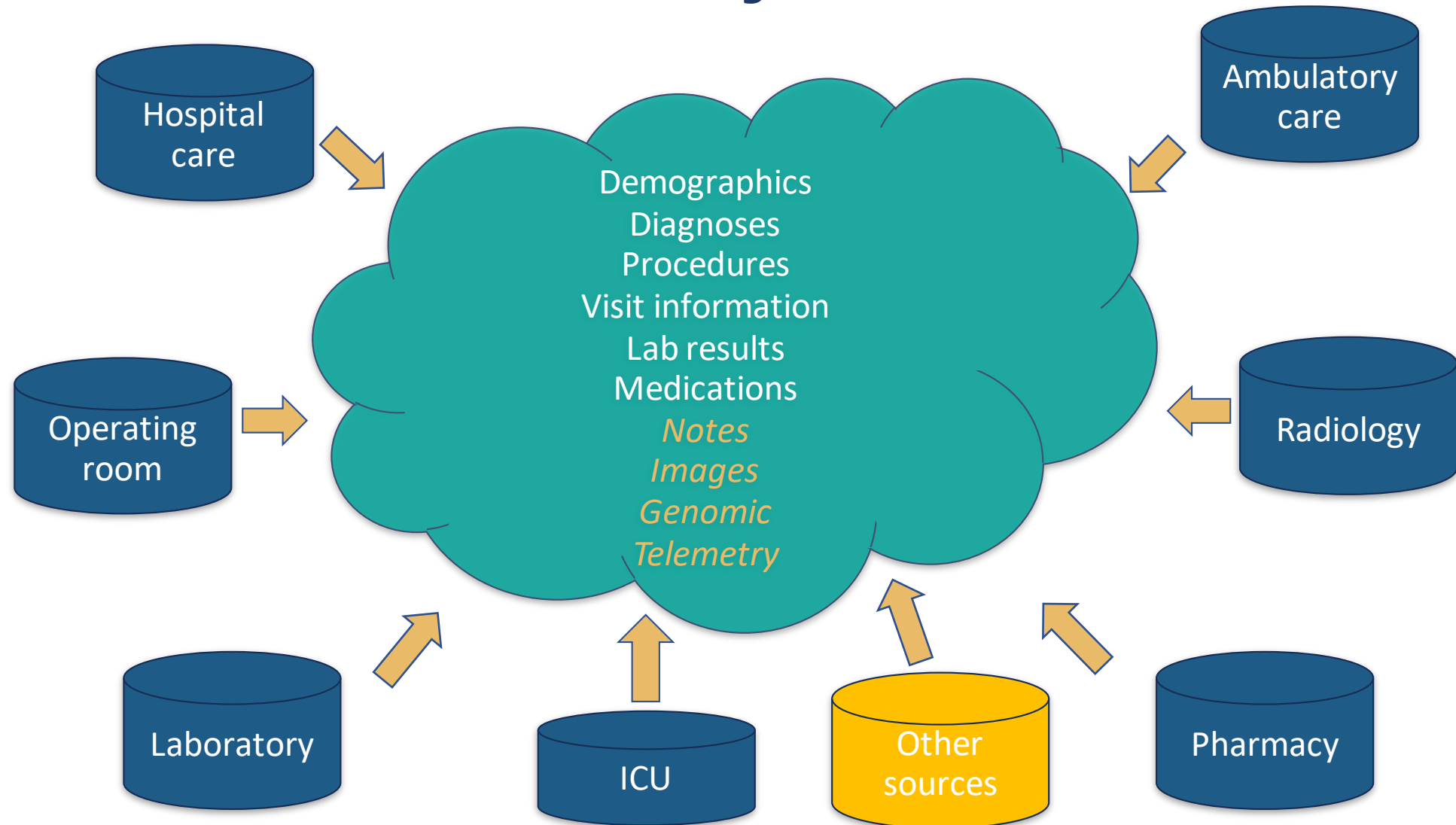
1. What is the IDR research service?
2. What is the I2B2 tool?
3. An example: how to use i2b2 to identify the cohort

The UF Integrated data repository research service

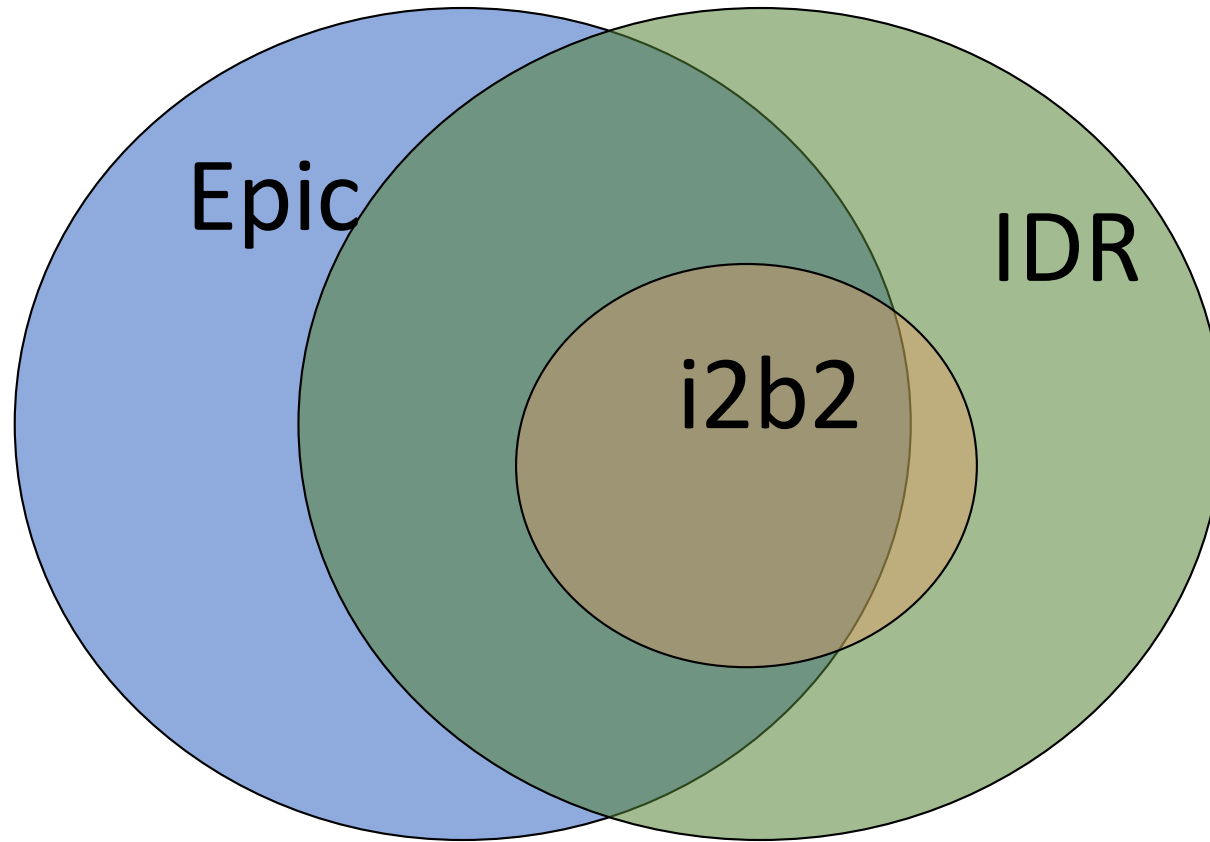
- IDR was developed over 10 years by UF Health and CTSI
- A large-scale clinical data warehouse (CDW)
- Supports clinical, education, and research missions



Data sources: EPIC and beyond



UF Health Data



~2.5 million patients
billions of facts in i2b2

i2b2

- **Informatics for Integrating Biology & the Bedside (i2b2)**
- An NIH-funded tool built at Harvard
- Feasibility and cohort discovery tool
- Provides HIPAA-compliant, limited data
 - Returns an obfuscated number of unique patients that meet query criteria
- Self-serve tool!

What typical questions can i2b2 answer?

- How many men with hypertension diagnoses had at least one inpatient encounter between January and December 2018?
- How many women ages 45-65 had successful breast cancer surgery?
- How many children were diagnosed with diabetes and had Hemoglobin A1c greater than 7% in the same financial encounter?

Data availability in i2b2

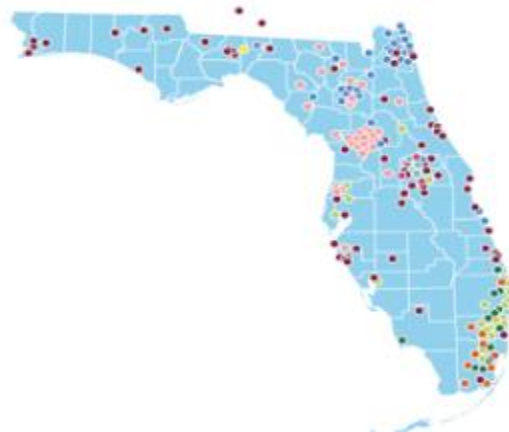
- Data guide
 - <https://idr.ufhealth.org/research-services/feasibility-cohort-discovery/uf-health-i2b2-training-tools/>
 - Click on 'The i2b2 Data Guide'
- Date range: 6/1/2011 - ?
 - Data refreshed quarterly
- Data is represented as closely as possible to the original source

i2b2 instances available at UF

ACT
The ACT Network
Powered by NCATS CTSA Program

 **OneFlorida**
Clinical Research Consortium

 **UFHealth**
UNIVERSITY OF FLORIDA HEALTH



i2b2 instance	Geography
UFHealth	Gainesville, Jacksonville
OneFlorida	Florida
ACT Network	Nationwide

Access i2b2

- Request access:
 - <https://idr.ufhealth.org/research-services/data-request-form/>
 - Select 'i2b2 Registration'
- View training material:
 - <https://idr.ufhealth.org/research-services/feasibility-cohort-discovery/uf-health-i2b2-training-tools/>
- Access:
 - <https://i2b2.idr.ufhealth.org/>

i2b2 support

i2b2support@ahc.ufl.edu

IRBDataRequest@ahc.ufl.edu

i2b2 Live Demo

How many children were diagnosed with diabetes and had Hemoglobin A1c greater than 7% in the same financial encounter?

<https://i2b2.idr.ufhealth.org/>

I2B2 Interface

i2b2 Query & Analysis Tool

Project: Cohort GNV (06/2011-06/2022)

User: Lei McDevitt

Find Patients | Analysis Tools | Message Log | Help | Logout

TermsFind TrmInfoWorkplaceQueriesFind Qry

Assessment Scales

COVID-19

Demographics

Diagnoses

Findings

Immunizations

Lab Results

Medications

Patient-Reported Outcomes

Personalized Medicine

Procedures

Research

Visit Details

Query Tool

Query Name:

Query Timing: Treat all groups independently

Group 1			Group 2			Group 3		
Dates	Occurs > 0x	Exclude	Dates	Occurs > 0x	Exclude	Dates	Occurs > 0x	Exclude
Treat Independently			Treat Independently			Treat Independently		
<div>Query build Tool</div>								

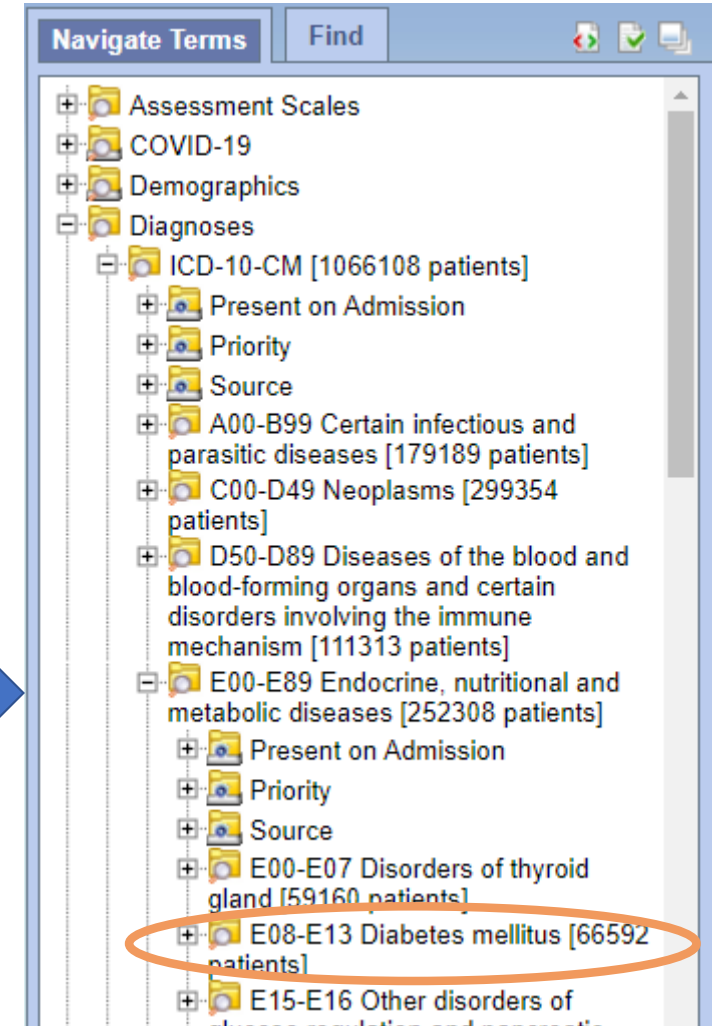
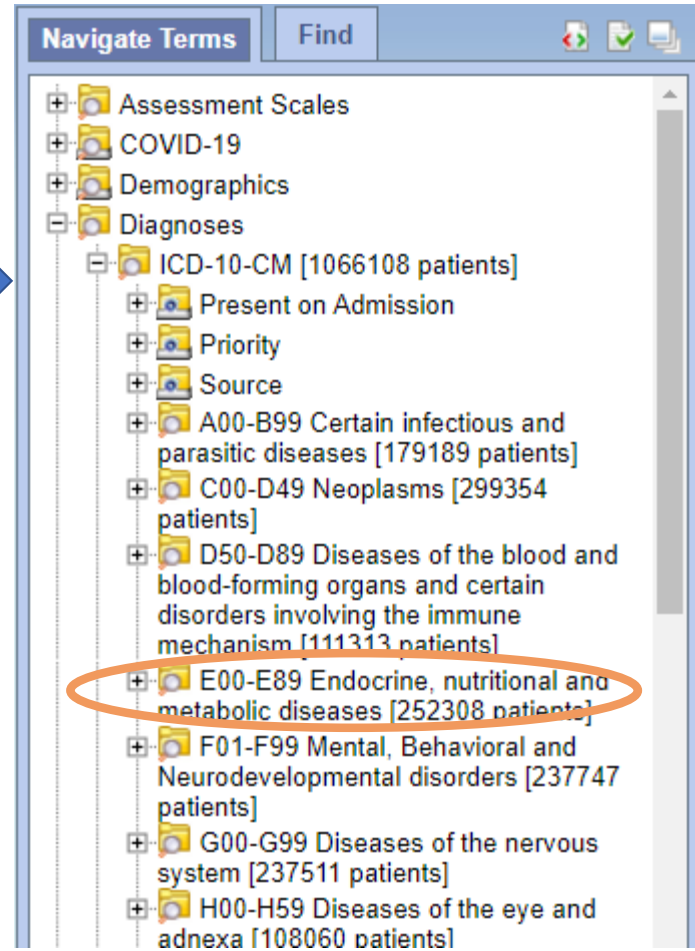
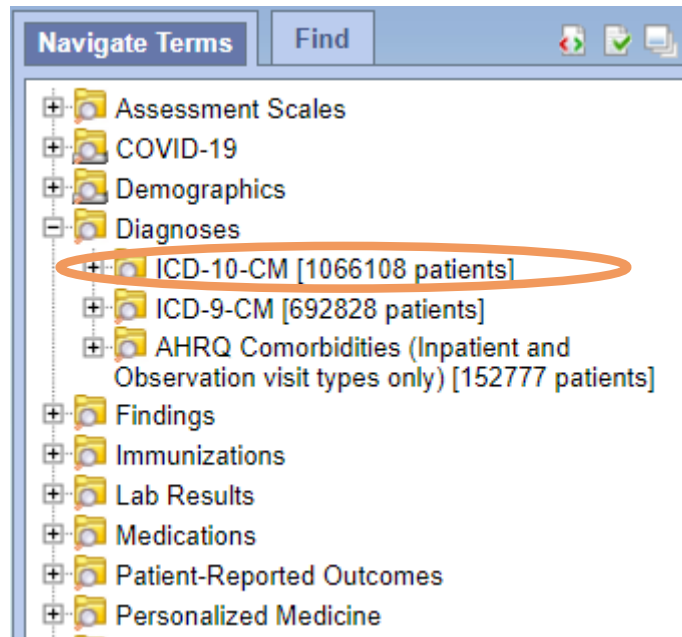
drop a term on here

Run QueryClear0 GroupsNew Group

Show Query StatusGraph ResultsQuery Report

Query Status/Results/Reports

i2b2 – Navigate Terms



i2b2 – Navigate Terms

Query Name: diabete@12:34:49

Query Timing: Treat all groups independently

Group 1

Dates

Occurs > 0x

Exclude

Treat Independently

E08-E13 Diabetes mellitus [86376 patients]

250 Diabetes mellitus [44912 patients]

Group 2

Dates

Occurs > 0x

Exclude

Treat Independently

Group 3

Dates

Occurs > 0x

Exclude

Treat Independently

one or more of these

AND

drop a term on here

Run Query

Clear

1 Group

New Group

Show Query Status

Graph Results

Query Report

Number of patients

107963±3

For Query diabete@12:34:49"

i2b2 – Navigate Terms

Navigate Terms

Find

Search by Names Search by Codes

Containing hemoglobin a1c

Find Any Category

- Hemoglobin A1c (LOINC: LP16413-4) [152825 patients]
- Hemoglobin A1c/Hemoglobin.total (LOINC: LP286151-8) [152825 patients]
- Hemoglobin A1c/Hemoglobin.total | Blood | Hematology and Cell counts (LOINC: LP393563-4) [152825 patients]
- Hemoglobin A1c/Hemoglobin.total in Blood (LOINC: 4548-4) [150908 patients]**
- Hemoglobin A1c/Hemoglobin.total in Blood by calculation (LOINC: 17855-8) [5910 patients]

Choose value of - (Test:Hgb A1c MFr Bld)

Searches by Lab values can be constrained by the high/low flag set by the performing laboratory, or by the values themselves.

☐ No Value

☐ By Flag

☒ By Value

Please select operator:
GREATER THAN (>)

Please enter a value:
7

Units = %

OK Cancel

i2b2 – QueryTool

Project: Cohort GNV (06/2011-06/2022)

User: Lei McDevitt

Find Patients | Analysis Tools | Message Log | Help | Logout

TermsFind TrmInfoWorkplaceQueriesFind Qry

Assessment Scales

- Braden Scale [346620 patients]
- Morse Fall Risk Scale [418480 patients]
- REALM Adult Health Literacy [152683 patients]

COVID-19

Demographics

- Age
 - 0-9 years old [120859 patients]
 - 10-17 years old [114984 patients]
 - 18-34 years old [374174 patients]
 - 35-44 years old [180657 patients]
 - 45-54 years old [185280 patients]
 - 55-64 years old [268839 patients]
 - 65-74 years old [276623 patients]
 - 75-84 years old [188295 patients]
 - >= 65 years old [554480 patients]
 - >= 85 years old [89562 patients]
- Adult (>= 18 years old)
- Child (< 18 years old)
- Not Recorded

County

Death Date [50745 patients]

Ethnicity

Gender

History of Cancer Diagnosis

Language

Marital Status

MyChart Status

Payer

Race

Vital Status

Zip Codes

- Known axiUm Patient [108002 patients]
- Known Healthstreet Patient [3785 patients]
- Known Tumor Registry Patient [46023 patients]

Diagnoses

- ICD-10-CM [1405909 patients]
- Present on Admission

Query Tool

Query Name: E08-E-Hemog- Chil@13:34:30

Query Timing: Treat all groups independently

Group 1			Group 2			Group 3		
Dates	Occurs > 0x	Exclude	Dates	Occurs > 0x	Exclude	Dates	Occurs > 0x	Exclude
Treat Independently			Treat Independently			Treat Independently		
E08-E13 Diabetes mellitus [86376 patients]			Hemoglobin A1c/Hemoglobin.total in Blood (LOINC: 4548-4) [196785 patients] > 7 %			Child (< 18 years old) at visit		
250 Diabetes mellitus [44912 patients]								

one or more of these

AND

one or more of these

AND

one or more of these

Run QueryClear3 GroupsNew Group

Show Query StatusGraph ResultsQuery Report

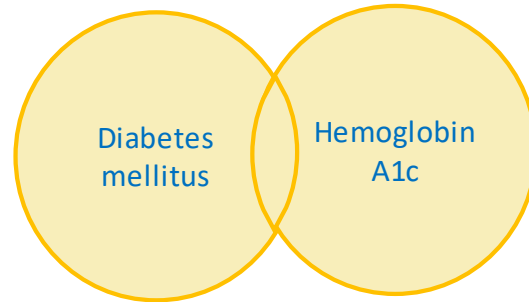
Number of patients

1791±3

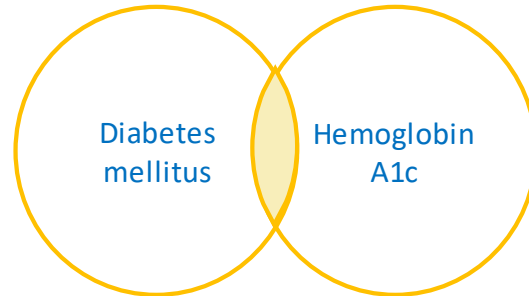
For Query E08-E-Hemog- Chil@13:34:30"

i2b2 – Query Logic

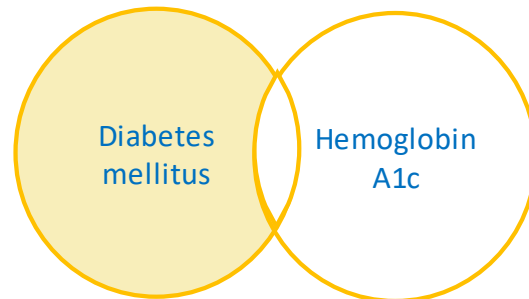
OR



AND



NOT



Group 1			Group 2		
Dates	Occurs > 0x	Exclude	Dates	Occurs > 0x	Exclude
Treat Independently ▾			Treat Independently ▾		
E08-E13 Diabetes mellitus [66592 patients]					
Hemoglobin A1c/Hemoglobin.total in Blood (LOINC: 4548-4) [150908 patients] > 7 %					

Group 1			Group 2		
Dates	Occurs > 0x	Exclude	Dates	Occurs > 0x	Exclude
Treat Independently ▾			Treat Independently ▾		
E08-E13 Diabetes mellitus [66592 patients]			Hemoglobin A1c/Hemoglobin.total in Blood (LOINC: 4548-4) [150908 patients] > 7 %		

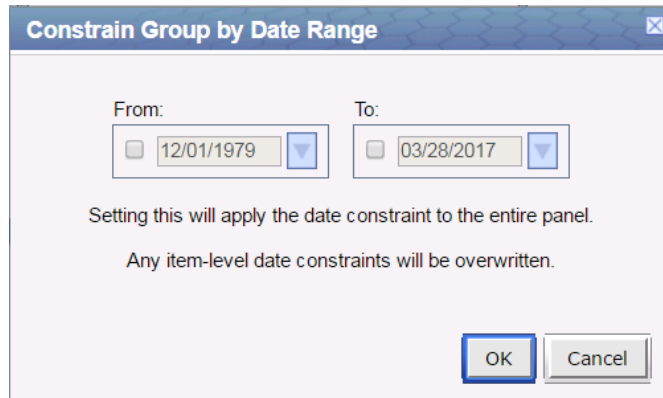
Group 1			Group 2		
Dates	Occurs > 0x	Exclude	Dates	Occurs > 0x	Exclude
Treat Independently ▾			Treat Independently ▾		
E08-E13 Diabetes mellitus [66592 patients]			NOT Hemoglobin A1c/Hemoglobin.total in Blood (LOINC: 4548-4) [150908 patients] > 7 %		

i2b2 – Results



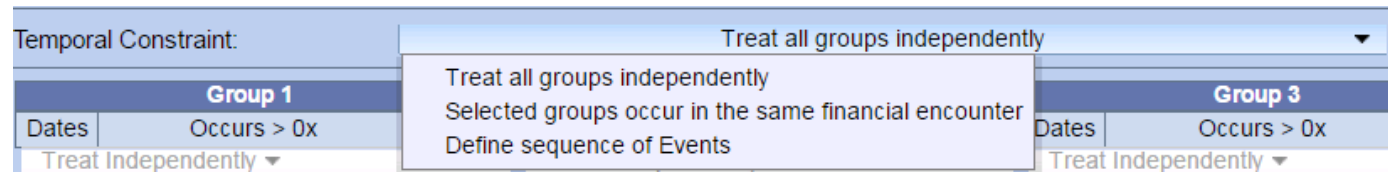
Additional filters

- Date range



The dialog box is titled "Constrain Group by Date Range". It contains two date pickers: "From:" with the date "12/01/1979" and "To:" with the date "03/28/2017". Below the pickers, there is a message: "Setting this will apply the date constraint to the entire panel. Any item-level date constraints will be overwritten." At the bottom right, there are "OK" and "Cancel" buttons.

- Temporal constraints:
 - Treat all groups independently
 - Groups occur in the same financial encounter
 - Sequence of events



The screenshot shows a dropdown menu for "Temporal Constraint:". The menu is open, showing three options: "Treat all groups independently", "Selected groups occur in the same financial encounter", and "Define sequence of Events". The background shows a table with columns "Dates" and "Occurs > 0x" for "Group 1" and "Group 3".

Accessing Patient Line Level Data



- Need an approved IRB
- Submit an online data request form <https://idr.ufhealth.org/services/analyst-data-support-services/idr-data-request-form/>
- Contact IDR Data Team IRBDataRequest@ahc.ufl.edu

- Need an approved IRB for OneFlorida
- Submit an online application form <https://onefloridaconsortium.org/front-door/research-infrastructure-utilization-application/>
- Contact OneFlorida Front Door Team OneFloridaOperations@health.ufl.edu

- Need an approved IRB at each participating institution
 - Need to find a collaborator at an institution of interest
- Submit an online data request form <https://idr.ufhealth.org/services/analyst-data-support-services/idr-data-request-form/> to get UF data
- Contact IDR Data Team IRBDataRequest@ahc.ufl.edu

Thank you

QUESTIONS