

TriNetX Clinical Query Tool

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Scientific Computing and Data

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**Mount
Sinai**

Agenda

1. The Mount Sinai Data Warehouse
2. Introduction to TriNetX Cohort Query Tool
3. Building a Query in TriNetX
4. MSDW Custom Data Set Request

Mount Sinai Data Warehouse

Scientific Computing FAIR Principles for Data

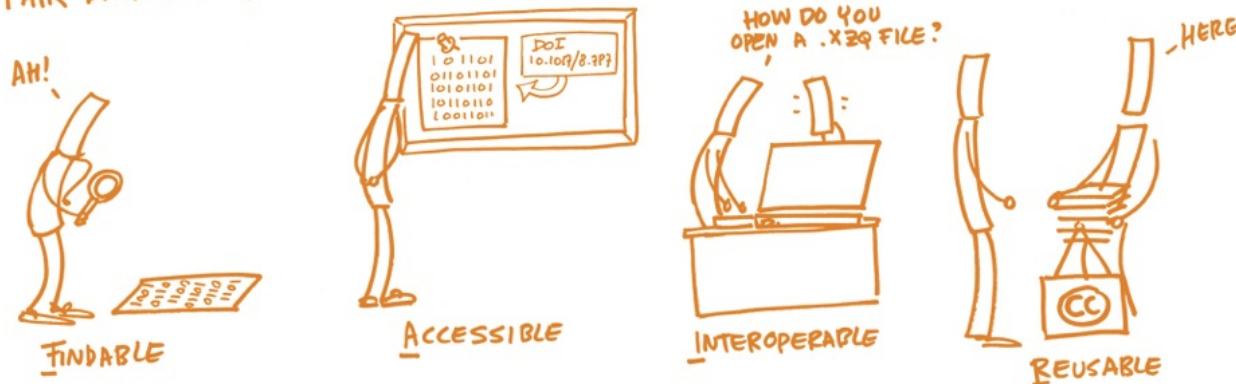
Findable

Accessible

Interoperable

Reusable /
Reproducible

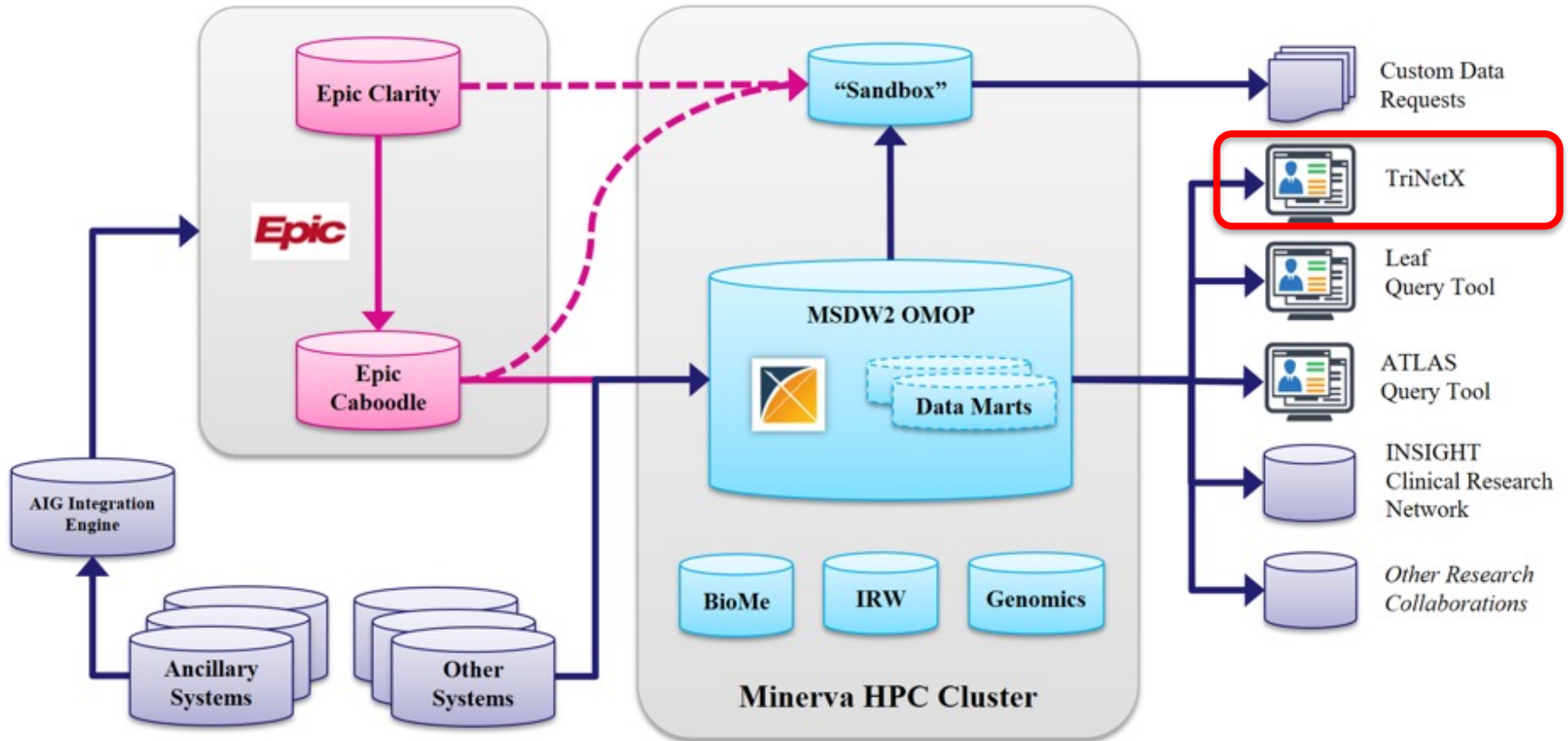
FAIR DATA PRINCIPLES



Source: NIH's Big Data to Knowledge (BD2K) Initiative (<https://commonfund.nih.gov/bd2k>)

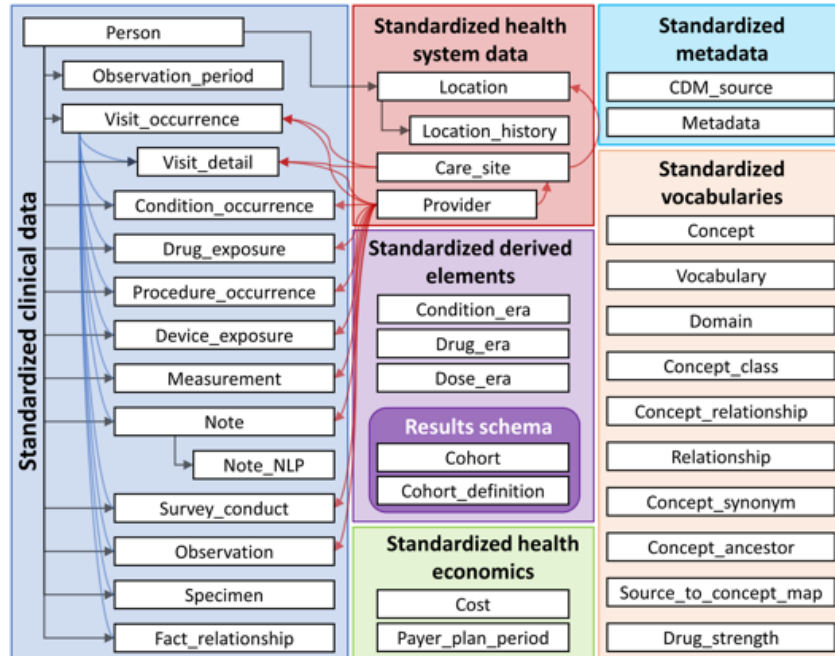
Image Source: <https://book.fosteropenscience.eu/>

Mount Sinai Data Warehouse Ecosystem



OMOP Common Data Model Requirements

1. Standardize **data structure** via common format



2. Standardize **data content** via mapping EHR codes to standard healthcare vocabularies

OMOP Domain	Standard Vocabularies	Non-standard Vocabularies
Condition	SNOMED-CT	ICD-10-CM, ICD-9-CM
Drug	RxNorm, CVX	ATC, NDC, Multum
Measurement	LOINC	SNOMED-CT, Nebraska Lexicon
Procedure	CPT4, HCPCS, ICD-10-PCS	ICD-9-Proc
Observation	SNOMED-CT, LOINC	ICD-10-CM, ICD-9-CM
Race, Ethnicity	OMOP Race, OMOP Ethnicity	SNOMED-CT, Nebraska Lexicon
Provider (Specialty)	NUCC, Medicare Specialty	SNOMED-CT, Nebraska Lexicon
Route	SNOMED-CT	Nebraska Lexicon
Unit	UCUM	SNOMED-CT, Nebraska Lexicon

MSDW Data Contents *(examples as of Nov 2023)*

OMOP Table	Record Type	Distinct Patients	Record Count
person	Patient Demographics	11,618,055	11,618,055
death	Patient Date of Death	48,349	48,349
visit_occurrence	Mobile Unit Encounter	77,079	126,565
visit_occurrence	Inpatient Hospitalization from ED Visit	293,832	560,477
visit_occurrence	Hospital Outpatient Visit	929,432	2,610,177
visit_occurrence	Urgent Care Visit	7,076	7,602
visit_occurrence	ED Visit	1,197,045	2,920,056
visit_occurrence	Inpatient Hospitalization	624,675	935,809
visit_occurrence	Chart Documentation Event	5,688,703	93,774,141
visit_occurrence	Outpatient Visit	4,264,078	78,712,464
visit_occurrence	Telehealth Visit	656,059	2,801,848
condition_occurrence	Hospital Problem	879,697	3,283,115
condition_occurrence	Encounter Diagnosis	4,039,195	110,395,725
condition_occurrence	Problem List	2,347,872	12,481,579
condition_occurrence	Billing Diagnosis	2,392,793	51,295,990
measurement	Vital Signs	3,592,852	607,783,616
measurement	Flowsheet Measurement	1,710,926	200,514,861
measurement	Lab Component Result	3,980,934	1,002,803,421

See MSDW website for the complete list: <https://labs.ica hn.mssm.edu/msdw/data-sources/>

Introduction: TriNetX Cohort Query Tool

Clinical Query Tools - Overview

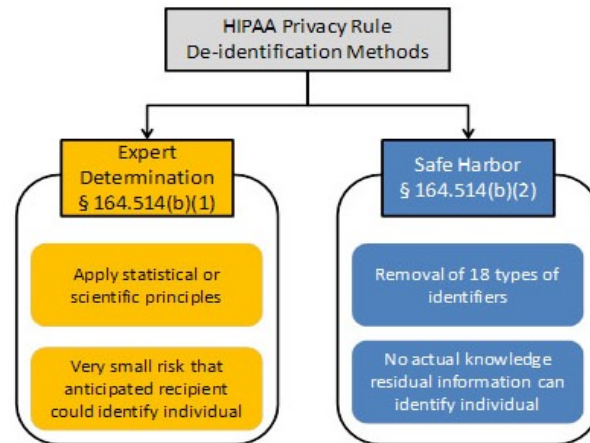
	Leaf	ATLAS	TriNetX
Description	Web-based, lightweight drag-and-drop cohort query tool that quickly analyzes population demographics	A web-based cohort query tool for database exploration, standardized vocabulary browsing, cohort definition, and patient cohort-level analysis	A web-based cohort query tool
Access	Use your Mount Sinai network username/password to login.	Use your Mount Sinai network username/password to login	Request access here . Log in to the TriNetX system using your email address and password.
Training	Written Tutorial ; PEAK Tutorial	Written Tutorial ; PEAK Tutorial ; Videos	PEAK Tutorial
Data Types	Patient demographics, diagnoses, procedures, medications, labs, orders, vitals, institutional patient cohorts (BioMe, IRW, etc.)	Patient demographics, diagnoses, procedures, medications, labs, orders, vitals	Patient demographics, diagnoses, procedures, medications, labs, orders, vitals
PHI	No	No	De-identified data only
Cost	No charge	No charge	No charge
Application Status	Leaf Status and Roadmap	ATLAS Status and Roadmap	
Advantages	Can visualize demographic details of cohorts, drag-and-drop query feature; download de-identified patient cohort list	Utilizes common data model and queries	Offers a polished, commercially developed user interface

See more details at <https://labs.icahn.mssm.edu/msdw/services/>

What is PHI? What is De-identification?

“**PHI** (Protected Health Information) is information (demographic, financial, social, clinical) relating to an individual’s past, present, or future health history, treatment, or payment for health care services that is held or transmitted by a CE or its BA that identifies the individual or ***for which there is a reason to believe it can be used to identify the individual.***”

De-identification is the process by which PHI is rendered not individually identifiable. The HIPAA Privacy Rule establishes two methods to de-identify PHI:



Types of Identifiers

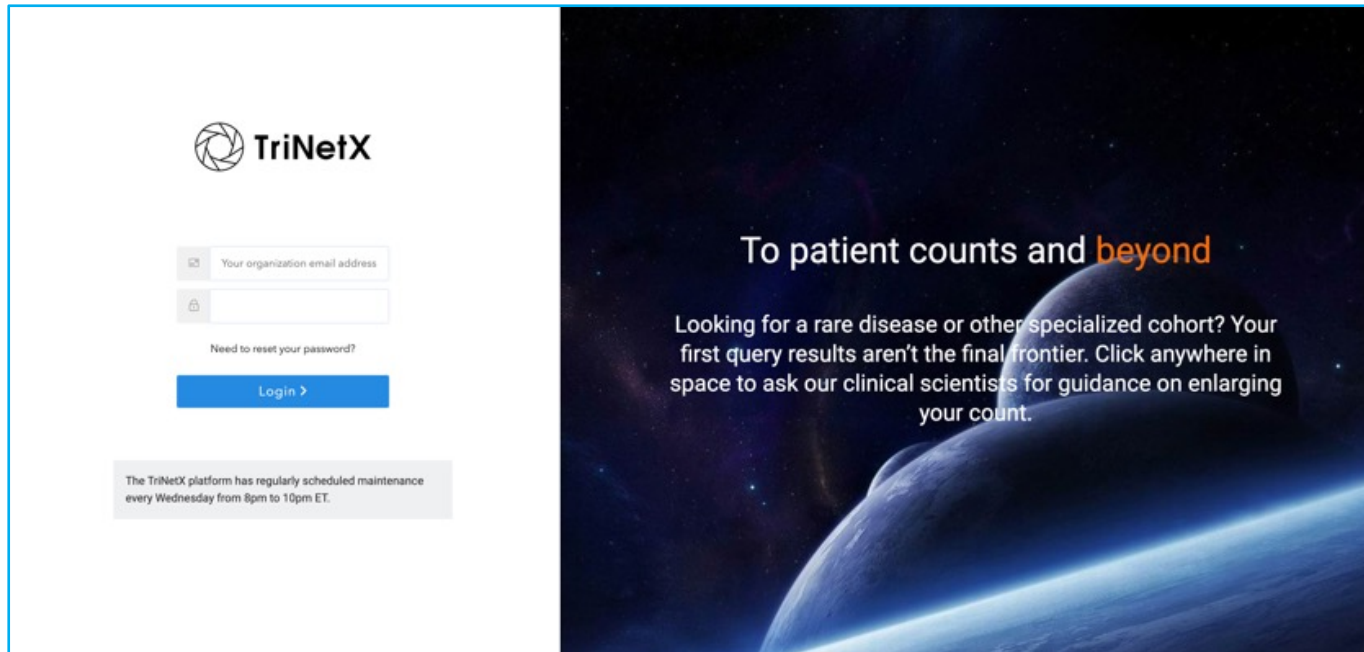
- Name
- Street Address, city, county, zip code (the first three digits of the zip code may be used if there are more than 20,000 people in the zip code)
- All element of dates (except year), including dates of birth, admission, discharge or death
- All ages over 89
- All telephone/fax numbers
- Fax number
- E-mail addresses
- Social Security Number (SSN)
- Medical Record Number (MRN)
- Health plan beneficiary number
- Account numbers (health plan IDs, credit card, bank, invoice #s)
- Certificate/License numbers
- Vehicle identifiers, including license plate numbers
- Device identification and/or serial number
- Uniform Resource Locator (URL)
- Internet Protocol (IP) address
- Biometric identifiers (finger, voiceprints, etc)
- Full face photographic images and other comparable images
- Any other unique identifying number, characteristic, or code

TriNetX Query Tool

- TriNetx can be used to query the MSDW for QI and Research purposes
- Access **De-identified** data across the following domains:
 - Diagnoses using ICD-10-CM
 - Encounters
 - Lab results using LOINC
 - Medications using ATC, RxNorm Ingredient
 - Procedures using CPT4
 - Demographics
 - Vitals
- Additional Features:
 - Simulate patient populations based on inclusion and exclusion criteria
 - Explore patient cohort to learn about any comorbid conditions, etc.
 - Predict number of newly eligible patients for your study
- Maintained by a third-party private company

Accessing TriNetX

- All Mount Sinai faculty, staff or student can access TriNetX at <https://live.trinetx.com>
- Google Chrome is the preferred browser
- Requires VPN access and use of your Mount Sinai Login credentials



The image shows a screenshot of the TriNetX login interface on the left and a promotional banner on the right. The login page features the TriNetX logo at the top, followed by two input fields for email and password, a 'Need to reset your password?' link, and a blue 'Login >' button. A maintenance notice is displayed at the bottom of the login area. The banner on the right has a space-themed background with the text: 'To patient counts and beyond', 'Looking for a rare disease or other specialized cohort? Your first query results aren't the final frontier. Click anywhere in space to ask our clinical scientists for guidance on enlarging your count.'

TriNetX Interface

The screenshot displays the TriNetX web interface at the URL `live.trinetx.com/tnx/studies`. The page features a dark navigation bar with the TriNetX logo and menu items: **Studies**, **Connect**, **Trial Connect**, **LEGACY**, **Browse Network**, and **Discover**. Below the navigation bar, there are tabs for **All studies**, **Favorites**, **Created by me**, **Shared with me**, **Template studies**, and **Oncology template studies**. A search bar and a "Sort by" dropdown (set to "Last Updated") are also present. A red arrow points to the **All studies** tab. On the right side of the interface, a blue button labeled **Create new study** is highlighted with a red rectangular box, and a red arrow points to it. The main content area is divided into **Open studies** (showing "COPD NS test 2") and **Other studies**. A sidebar on the right contains a placeholder text: "Please select a study".

Duplicate a Study from My Studies

The screenshot shows the TriNetX interface. At the top, there are navigation tabs: 'Studies', 'Connect', 'Trial Connect', 'LEGACY', 'Browse Network', and 'Discover'. Below this, there are filters for 'All studies', 'Favorites', 'Created by me', 'Shared with me', 'Template studies', and 'Oncology template studies'. A search bar and a 'Sort by' dropdown (set to 'Last Updated') are visible. The main content area is divided into 'Open studies' and 'Other studies'. Under 'Open studies', there is a card for 'COPD NS test 2'. Under 'Other studies', there are cards for 'Multiple Myeloma Test', 'Multiple Myeloma', and 'COPD NS'. On the right side, a detailed view for 'COPD NS test 2' is shown, including 'Created By' (Naomi So), 'Created' (Dec 28, 2023), and 'Links' (Team (2), Documents (0)). At the bottom of this view, there are 'Delete' and 'Duplicate' buttons. A red box highlights the 'Duplicate' button, and a red arrow points from a box containing the word 'Duplicate' to this button.

The 'Duplicate Study' form is displayed. It has a title 'Duplicate Study' and a 'Study Name*' field. Below this, it says 'Enter a descriptive name for the study.' and 'Study Name*' with a text input field containing 'Duplicate Study Name]'. There is a section 'Copy the following to new study' with two columns of checkboxes: 'Current Study' (checked), 'Query History', 'Results History', 'Attached Documents', 'Analytics inputs', and 'Lucid inputs'. Below that is a 'Research Purpose*' field with a help icon. At the bottom, it says 'Please select at least one option below.*' and has two sections: 'Clinical Trial Research' (with 'Design clinical trial' and 'Assess feasibility of clinical trial' checked) and 'Other Scientific Research' (with 'Conduct health economics and outcomes research (HEOR)', 'Explore patient populations', and 'Conduct other secondary research' unchecked). A pink arrow points from the 'Duplicate' button in the previous screenshot to the 'Study Name' field.

Sample Study:

How many adult patients with a diagnosis of COPD and on triple therapy (fluticasone + umeclidinium + vilanterol), had an ED or inpatient visit at least once in the last year?

TriNetX – Create New Study

The screenshot displays the TriNetX web application interface. The browser address bar shows the URL `live.trinetx.com/tnx/studies`. The navigation bar includes the TriNetX logo and menu items: **Studies**, **Connect**, **Trial Connect**, **UBACF**, **Browse Network**, and **Discover**. Below the navigation bar, there are filter tabs: **All studies**, **Favorites**, **Created by me**, **Shared with me**, **Template studies**, and **Oncology template studies**. A search bar and a "Sort by" dropdown menu (set to "Last Updated") are visible. On the right side of the interface, a blue button labeled "Create new study" is highlighted with a red rectangular box, and a red arrow points to it from the left. Below the navigation and filter sections, there are two main content areas: "Open studies" and "Other studies". The "Open studies" section contains a single entry, "COPD NS test 2". The "Other studies" section is currently empty. On the right side of the main content area, there is a white box with the text "Please select a study".

TriNetX – Create New Study

The screenshot shows the 'Create New Study' form in the TriNetX interface. A pink arrow points to the 'Create New Study' header. Three red callout boxes with arrows point to specific fields: 'Study Name*', 'Research Purpose*', and 'Target Population*'. The form includes a search bar, navigation tabs, and various input fields for study details.

Study Name* (Callout: Study Name)

Enter a descriptive name for the study.

Research Purpose* (Callout: Research Purpose)

Please select at least one option below.*

Clinical Trial Research

- Design clinical trial
- Assess feasibility of clinical trial
- Identify clinical trial sites
- Recruit trial subjects

Other Scientific Research

- Conduct health economics and outcomes research (HEOR)
- Explore patient populations
- Conduct other secondary research

Study Identifying Information

Summary

Sponsor Name

Study Identifier

NCT Number

EuroCT Number

Study Status

Primary Therapeutic Area*

Secondary Therapeutic Area

Target Population* (Callout: Target Population)

Create New Study – Query Builder

The screenshot displays the TriNetX Query Builder interface. The left sidebar contains navigation options: Query Builder, Healthcare Organizations (HCOs), Explore Cohort, Analyze Criteria, Rate of Arrival, Analytics, Trial Connect (LEGACY), Connect (NEW), Study Management, and Design Assistance. The main area shows a query builder for Mount Sinai Health System. It features two search boxes: 'MUST HAVE Inclusion Criteria' and 'CANNOT HAVE Exclusion Criteria', both with search input fields. A 'Hierarchy Tree' button is located between these boxes. On the right, there is an 'Age/Sex' dropdown menu showing 'Any age / Any sex' and '4,433,940 patients on network'. Below the search boxes is a 'Build a new query' section with instructions and an 'Import Query' button. A pink arrow points to the 'Query Builder' sidebar item. A blue arrow points from the 'Hierarchy Tree' label to the 'MUST HAVE' search box. A red arrow points from the 'Age/Sex' label to the dropdown menu. A red arrow points from the 'Import Query' label to the 'Import Query' button.

TriNetX

Studies Connect Trial Connect LEGACY Browse Network Discover

My Studies > COPD Outcomes - NS > Query Builder

Mount Sinai Health System
1 of 1 HCOs online

There was an error loading available countries

Any age / Any sex
4,433,940 patients on network

MUST HAVE Inclusion Criteria

Q Search Term...

CANNOT HAVE Exclusion Criteria

Q Search Term...

Hierarchy Tree

Age/Sex

Import Query

Build a new query

Use the search boxes above to add new terms, or the button below to import a query

Import Query

Hierarchy Tree – Search from Clinical Domains

Mount Sinai Health System
1 of 1 HCOs online

Any country
1 country in the network

Any age / Any sex
4,716,660 patients on network

MUST HAVE

CANNOT HAVE

Diagnoses: ICD-10

Search Term...

All D Demographics **Dx Diagnoses** Oncology P Procedures M Medications L Labs G Genomics V Visits

Organized by ICD-10 Show ICD-9 terms ?

ICD-10-CM	Diagnoses: ICD-10	Patients
<input type="checkbox"/> ICD-10-CM	A00-B99 Certain infectious and parasitic diseases	3,567,720
<input type="checkbox"/> ICD-10-CM	C00-D49 Neoplasms	486,160
<input type="checkbox"/> ICD-10-CM	C00-D49 Neoplasms	455,240
<input type="checkbox"/> ICD-10-CM	D50-D89 Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	266,300
<input type="checkbox"/> ICD-10-CM	E00-E89 Endocrine, nutritional and metabolic diseases	945,110
<input type="checkbox"/> ICD-10-CM	F01-F99 Mental, Behavioral and Neurodevelopmental disorders	500,050
<input type="checkbox"/> ICD-10-CM	G00-G99 Diseases of the nervous system	525,950
<input type="checkbox"/> ICD-10-CM	H00-H59 Diseases of the eye and adnexa	309,570

Show Terms with Zero Patients Show Deprecated

Add To Query Cancel

Adding a term to the Query Builder:

Search for terms using the search box. For a given search result, click on the hierarchy tree to view parent and child terms

The screenshot displays the Mount Sinai Health System Query Builder interface. At the top, filters for 'Mount Sinai Health System' (1 of 1 HCOs online), 'Any country' (1 country in the network), and 'Any age / Any sex' (4,716,660 patients on network) are visible. The search bar contains 'COPD', highlighted by a red box and a red arrow labeled 'Search "COPD"'. Below the search bar, tabs for 'All', 'D Demographics', 'Dx Diagnoses', 'Oncology', 'P Procedures', 'M Medications', 'L Labs', 'G Genomics', and 'V Visits' are shown. The 'Dx Diagnoses' tab is active. The results table has columns for 'Code', 'Term Description', and 'Patients'. The first row is selected, with a pink arrow pointing to the 'J44' code. A red box labeled 'Patient Count' points to the number '38,590' in the 'Patients' column. A red box labeled 'Hierarchy Tree' points to the tree icon next to the patient count. At the bottom right, a red box labeled 'Add to Query' points to the 'Add To Query' button. The interface also includes checkboxes for 'Show Terms with Zero Patients' and 'Show Deprecated'.

Code	Term Description	Patients
<input checked="" type="checkbox"/> ICD-10-CM J44	Dx Other chronic obstructive pulmonary disease <i>Copd</i>	38,590
<input type="checkbox"/> ICD-10-CM J44.1	Dx Chronic obstructive pulmonary disease with (acute) exacerbation <i>Copd w acute exacerbation</i>	17,360
<input type="checkbox"/> ICD-10-CM J44.0	Dx Chronic obstructive pulmonary disease with (acute) lower respiratory infection <i>Copd w acute bronchitis</i>	970

Adding Additional Terms

Next search for medications under **MUST HAVE** and add all three meds to Query

Mount Sinai Health System
1 of 1 HCOs online

Any country
1 country in the network

Any age / Any sex
4,716,660 patients on network

MUST HAVE

CANNOT HAVE

Q Fluticasone

Q Search Term...

All D Demographics Dx Diagnoses Oncology P Procedures M Medications L Labs G Genomics V Visits

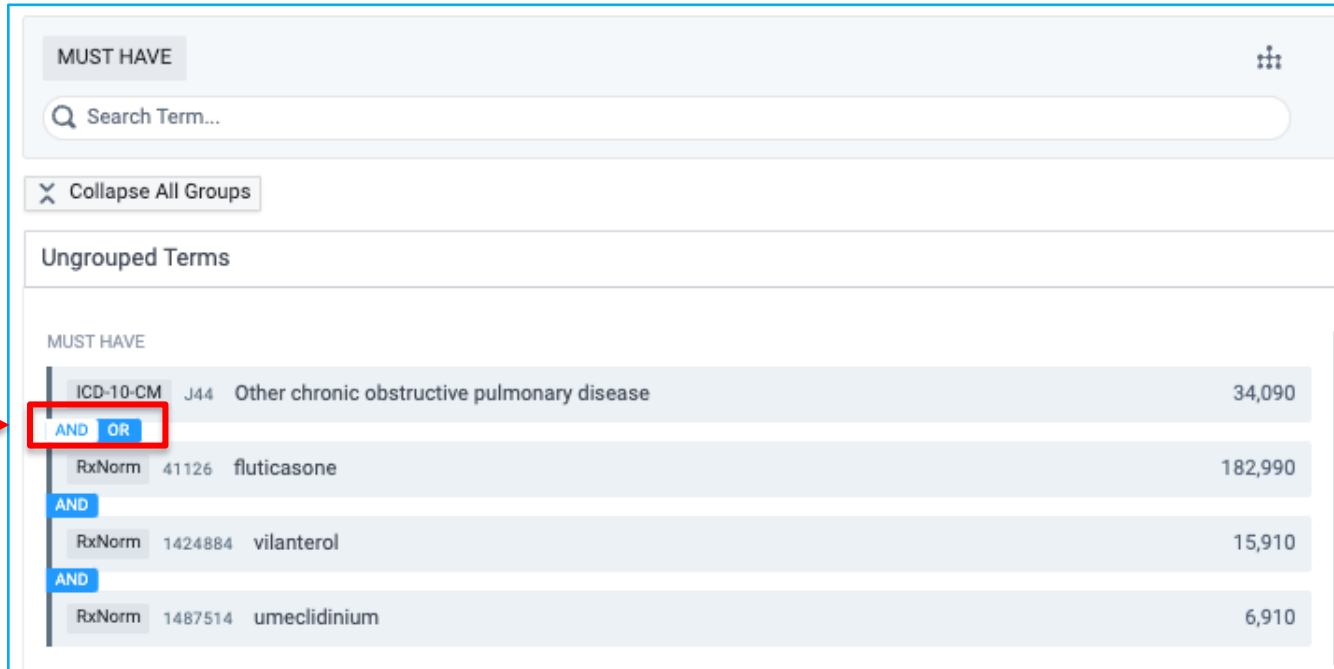
Code	Term Description	Patients
<input checked="" type="checkbox"/> RxNorm 41126	M Fluticasone	205,280
<input type="checkbox"/> ICD-10-CM T36.0X5A	Dx Adverse effect of penicillins, initial encounter Fluticasone adverse reaction	670
<input type="checkbox"/> ICD-10-CM T50.995A	Dx Adverse effect of other drugs, medicaments and biological substances, initial encounter Fluticasone allergy	230

Show Terms with Zero Patients Show Deprecated

Add to Query Add To Query Cancel

Adding Additional Terms

Click on the operator to switch between 'AND' & 'OR'

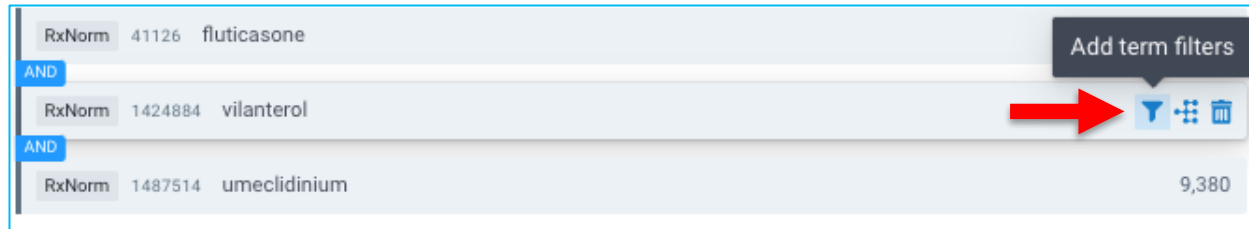


The screenshot shows a search interface with a search bar at the top containing the text "Search Term...". Below the search bar is a button labeled "Collapse All Groups". The main content area is titled "Ungrouped Terms" and contains a list of search results. The first result is "MUST HAVE" with "ICD-10-CM J44 Other chronic obstructive pulmonary disease" and a count of 34,090. Below this result is a selection menu with "AND" and "OR" options. A red arrow points to this menu. The second result is "RxNorm 41126 fluticasone" with a count of 182,990. The third result is "RxNorm 1424884 vilanterol" with a count of 15,910. The fourth result is "RxNorm 1487514 umeclidinium" with a count of 6,910.

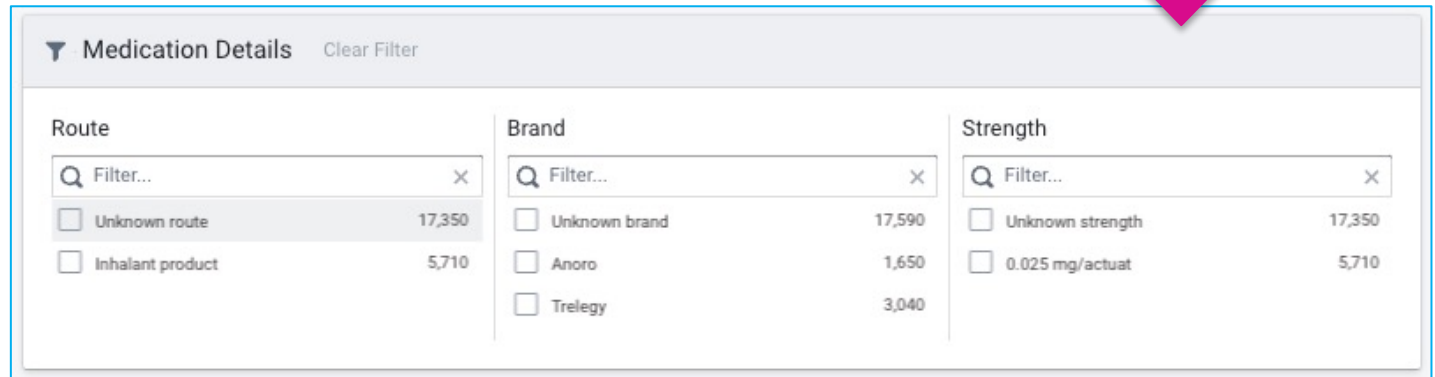
ICD-10-CM	J44	Other chronic obstructive pulmonary disease	34,090
RxNorm	41126	fluticasone	182,990
RxNorm	1424884	vilanterol	15,910
RxNorm	1487514	umeclidinium	6,910

Term Filters

Hover over a term and click on the blue funnel to add details (i.e. Route, Brand, Strength for a medication)



A screenshot of a search results interface. It shows three search results, each with a blue 'AND' label on the left. The first result is 'RxNorm 41126 fluticasone'. The second is 'RxNorm 1424884 vilanterol'. The third is 'RxNorm 1487514 umeclidinium' with a count of '9,380' on the right. A dark grey tooltip with the text 'Add term filters' is positioned over the second result. A red arrow points from the tooltip to a blue funnel icon in the right-hand corner of the second result's row. A large pink arrow points from the tooltip area down towards the 'Medication Details' panel below.



A screenshot of the 'Medication Details' panel. The title is 'Medication Details' with a 'Clear Filter' link. The panel is divided into three columns: 'Route', 'Brand', and 'Strength'. Each column has a search input field and a list of filter options with counts.

Route	Brand	Strength
<input type="checkbox"/> Unknown route 17,350	<input type="checkbox"/> Unknown brand 17,590	<input type="checkbox"/> Unknown strength 17,350
<input type="checkbox"/> Inhalant product 5,710	<input type="checkbox"/> Anoro 1,650	<input type="checkbox"/> 0.025 mg/actuat 5,710
	<input type="checkbox"/> Trelegy 3,040	

Visits

Add the terms for Emergency (ED) and Inpatient visit under MUST HAVE

The screenshot shows a query builder interface with two main sections: 'MUST HAVE' and 'CANNOT HAVE'. The 'MUST HAVE' section has a search bar containing 'Visits'. Below this, a row of category tabs includes 'All', 'D Demographics', 'Dx Diagnoses', 'Oncology', 'P Procedures', 'M Medications', 'L Labs', 'G Genomics', and 'V Visits'. The 'V Visits' tab is highlighted with a red box. Under the 'Visits' category, a list of visit types is shown with checkboxes: 'Visit' (checked), 'Visit: Ambulatory', 'Visit: Emergency' (checked), 'Visit: Inpatient Encounter' (checked), 'Visit: Unknown', and 'Visit: Virtual'. A red box highlights the 'Visit: Emergency' and 'Visit: Inpatient Encounter' rows. At the bottom right, a red arrow points to an 'Add To Query' button, with a 'Cancel' button next to it. A checkbox for 'Show Terms with Zero Patients' is located at the bottom left.

Visits	Patients
<input checked="" type="checkbox"/> Visit	4,716,440
<input type="checkbox"/> Visit: Ambulatory	3,347,120
<input checked="" type="checkbox"/> Visit: Emergency	1,020,870
<input checked="" type="checkbox"/> Visit: Inpatient Encounter	566,200
<input type="checkbox"/> Visit: Unknown	4,713,640
<input type="checkbox"/> Visit: Virtual	512,390

Create Groups of Terms

Once terms of interest have been added, click **Create a New Group** to group terms of interest

- Example: Group medications: *fluticasone*, *vilanterol*, *umeclidinium*

The screenshot shows a search interface with two main sections: 'MUST HAVE' and 'CANNOT HAVE'. Each section has a search bar. Below the search bars, there is a list of terms under the heading 'Ungrouped Terms'. The 'MUST HAVE' section contains a list of terms with their counts:

Term	Count
ICD-10-CM J44 Other chronic obstructive pulmonary disease	38,590
AND RxNorm 41126 fluticasone	205,280
AND RxNorm 1424884 vilanterol	19,450
AND RxNorm 1487514 umeclidinium	9,380
AND Visit: Emergency	1,020,870
AND Visit: Inpatient Encounter	566,200

A pink arrow points to the '+ Create a New Group' button at the bottom left. A pink box highlights the text '1. Added MUST HAVE terms' on the right side of the interface.

Groups of Terms

3. Click **Add terms** of interest → 4. Select terms (i.e. fluticasone, vilanterol, umeclidinium) for newly created Group 1

The top part of the screenshot shows a table of search results:

ICD-10-CM J44 Other chronic obstructive pulmonary disease	38,590
RxNorm 41126 fluticasone	205,280
RxNorm 1424884 vilanterol	19,450
RxNorm 1487514 umeclidinium	9,380
Visit: Emergency	1,020,870
Visit: Inpatient Encounter	566,200

The bottom part shows a group configuration interface for "Group 1". A red box highlights the group name. Below it, a dashed box contains the text "3. Add terms" with a red arrow pointing to a blue "+ Add terms" button. The interface also shows options for "+ Related Group", "+ Number of Instances", "+ Terms", and "+ Time Constraint".

This screenshot shows the "Group 1" configuration interface with terms selected. A pink arrow from the previous slide points to this interface. A pink box with the text "4. Select terms for Group 1" has a pink arrow pointing to the selected terms. The terms "fluticasone", "vilanterol", and "umeclidinium" are checked under the "ADD TO MUST HAVE" section. The "Visit: Emergency" and "Visit: Inpatient Encounter" terms are unchecked. A pink arrow at the bottom right points to the "Save" button.

Terms not included in the group

ADD TO MUST HAVE

- ICD-10-CM J44 Other chronic obstructive pulmonary disease
- RxNorm 41126 fluticasone
- RxNorm 1424884 vilanterol
- RxNorm 1487514 umeclidinium
- Visit: Emergency
- Visit: Inpatient Encounter

ADD TO CANNOT HAVE

Save Cancel

Define Temporal Relationship between two Clinical Events

Related Group - Can indicate that Group B occurred before, on or after Group A

- Example: Patient must be on medications before ED or Inpatient Visit
- 1. Click **Related Group** from Group 1 (Meds) → 2. Click **Add terms** to Group B

AND

Group 1

Meds / **Group 1**

+ Terms + Time Constraint

MUST HAVE

RxNorm: 41126	fluticasone	205,280
AND		
RxNorm: 1424884	vilanterol	19,450
AND		
RxNorm: 1487514	umeclidinium	9,380

CANNOT HAVE

AND

Group 1

1A Meds / **Group 1A**

+ Number of Instances + Terms + Time Constraint

MUST HAVE

RxNorm: 41126	fluticasone	205,280
AND		
RxNorm: 1424884	vilanterol	19,450
AND		
RxNorm: 1487514	umeclidinium	9,380

CANNOT HAVE

Set a relationship between groups before running the query Set Relationship

1B Unnamed Group / **Group 1B**

+ Terms + Time Constraint

+ Add terms

2. Add terms

Define Temporal Relationship between two Clinical Events

3. Click **Set Relationship** between Group A and Group B

The screenshot displays a query builder interface with two groups, Group 1 and Group 2, and a central 'Set Relationship' button. Group 1 is titled '1A Meds' and contains a 'MUST HAVE' section with three items: 'RxCNorm: 41126 fluticasone 205,280', 'RxCNorm: 1424884 vilanterol 19,450', and 'RxCNorm: 1487514 umeclidinium 5,380'. Group 2 is titled '1B Unnamed Group' and contains a 'Terms not included in the group' section with three items: 'ICD-10-CM: J44 Other chronic obstructive pulmonary disease', 'Visit: Emergency', and 'Visit: Inpatient Encounter'. The 'Set Relationship' button is highlighted with a red box and a red arrow pointing to it from a larger red box containing the text '3. Set Relationship'. The interface also includes a 'Number of Instances' field, 'Terms' and 'Time Constraint' buttons, and 'Save' and 'Cancel' buttons at the bottom right.

AND

Group 1

+ Number of Instances ↑ ↓

1A Meds

+ Terms + Time Constraint

MUST HAVE

CANNOT HAVE

RxCNorm: 41126 fluticasone 205,280

RxCNorm: 1424884 vilanterol 19,450

RxCNorm: 1487514 umeclidinium 5,380

Set a relationship between groups before running the query

Set Relationship

3. Set Relationship

1B Unnamed Group

+ Terms

Terms not included in the group

ADD TO MUST HAVE

ADD TO CANNOT HAVE

ICD-10-CM: J44 Other chronic obstructive pulmonary disease

Visit: Emergency

Visit: Inpatient Encounter

Save Cancel

Define Temporal Relationship between two Clinical Events

4. Define temporal relationship between Group A and Group B.

The screenshot shows a configuration window for defining a temporal relationship between two groups of clinical events. The window is titled "AND" and contains two main sections: "1A Meds" and "1B ED or Inpatient Visit".

1A Meds

MUST HAVE		CANNOT HAVE	
RxNorm	41126 folicosone	205,280	
AND	RxNorm	1424884 vilanterol	19,450
AND	RxNorm	1487514 umeclidinium	9,380

Set a Relationship between 1A (Meds) and 1B (ED or Inpatient Visit)

Any instance of ED or Inpatient Visit occurred at least 1 day after any instance of Meds

Group 1A: Any instance | Most recent instance | First instance

Timeline: Anytime Before | 5yr | 3yr | 1yr | 6mo | 3mo | 1mo | 1day | Same Day | 1day | 1mo | 3mo | 6mo | 1yr | 3yr | 5yr | Anytime After

From: 1 Days After To: = Years After

Group 1B: Any instance | Most recent instance | First instance

1B ED or Inpatient Visit

MUST HAVE		CANNOT HAVE	
Visit: Emergency		1,020,870	
Visit: Inpatient Encounter		566,200	

The interface includes a red arrow pointing to the "Same Day" option on the timeline, indicating the selected relationship. The "From" field is set to "1" and the "To" field is set to "=", both with "Days" and "Years" units respectively. The "After" dropdown is also visible.

Copy a Group and Paste

1. Copy Group1B, and click **Paste Logic** to create **Group 2** (Example: COPD patients on meds who had an ED or Inpatient visit in the [past year](#))
2. Click **Time Constraint** for Group 2

Group 1

1A Meds

SubItem	Count
SubItem: 41126 Butoraxone	205,290
SubItem: 1424894 vildanterol	19,450
SubItem: 1487514 uraciladronum	9,380

Relationship: Any instance of ED or Inpatient Visit occurred at least 1 day after any instance of Meds.

1B ED or Inpatient Visit **Group 1B**

Visit	Count
Visit: Emergency	1,020,870
Visit: Inpatient Encounter	566,200

+ Create a New Group or **Paste Logic**

AND

Group 2 **Group 2**

ED or Inpatient Visit

Visit	Count
Visit: Emergency	1,020,870
Visit: Inpatient Encounter	566,200

Time Constraint

Adding Time Constraints

- Set time constraint for Group 2

AND

Group 2

ED or Inpatient Visit

Time Constraint for Group 2

Relative Time | Specific Dates

Anytime | 5yr | 3yr | 1yr | 6mo | 3mo | 1mo | 1day | Today

From 1 Years To 0 Months

Save Cancel

MUST HAVE

Visit: Emergency	1,000,870
Visit: Inpatient Encounter	566,200

CANNOT HAVE

Adding Number of Instances

Example: COPD patients on meds who had an ED or Inpatient visit at least once in the past year

AND

Group 2

ED or Inpatient Visit *This group occurred since 1 year ago*

MUST HAVE

Visit: Emergency	1,020,870
Visit: Inpatient Encounter	566,200

CANNOT HAVE

+ Number of Instances

Number of Instances



AND

Group 2

Number of Instances for Group 2

Group 2 (ED or Inpatient Visit) must happen...

Greater than or equal to a 1

Save Cancel

ED or Inpatient Visit *This group occurred since 1 year ago*

Restrict by Current Age

Example: COPD **adult** patients on meds who had an ED or inpatient visit at least once in the past year

Mount Sinai Health System
1 of 1 HCDs online

Any country
1 country in the network

Any age / Any sex
4,314,654 patients on network

MUST HAVE

CANNOT HAVE

Search Term...

Search Term...

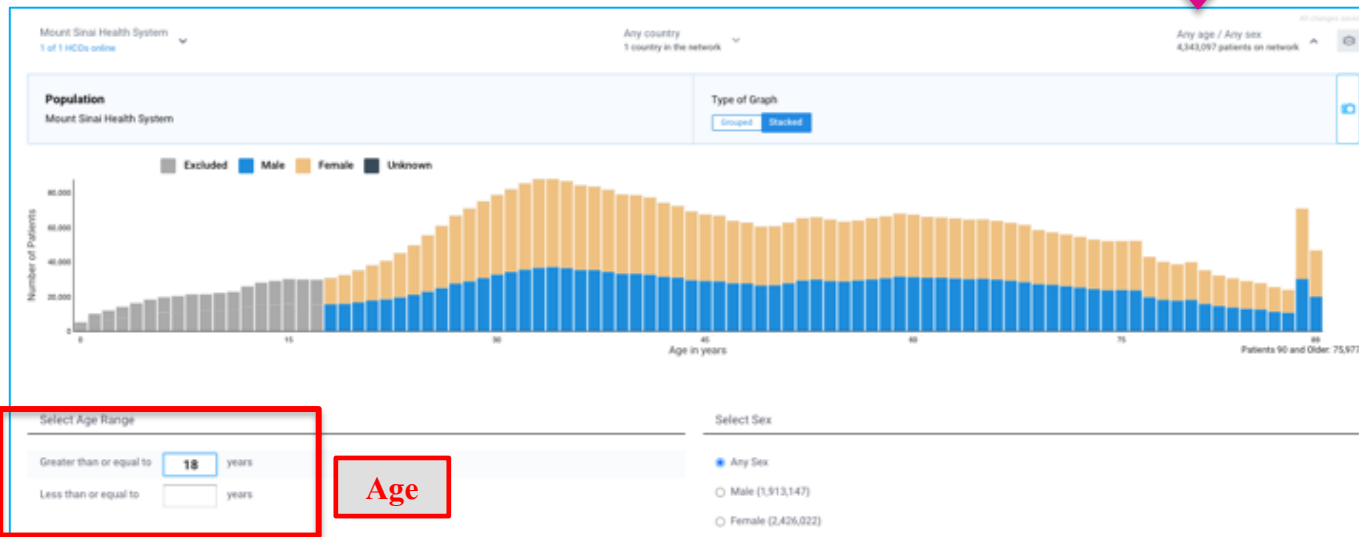
Collapse All Groups

Ungrouped Terms

MUST HAVE

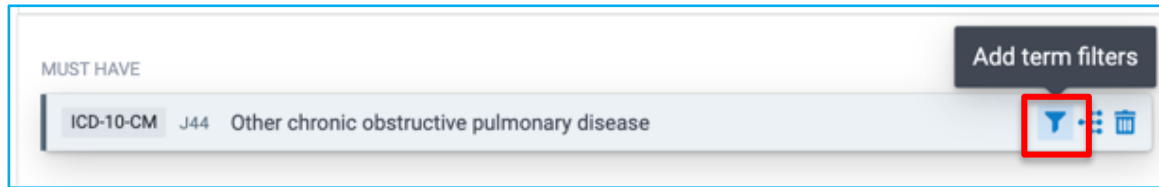
CANNOT HAVE

ICD-10-CM .244 Other chronic obstructive pulmonary disease 38,590

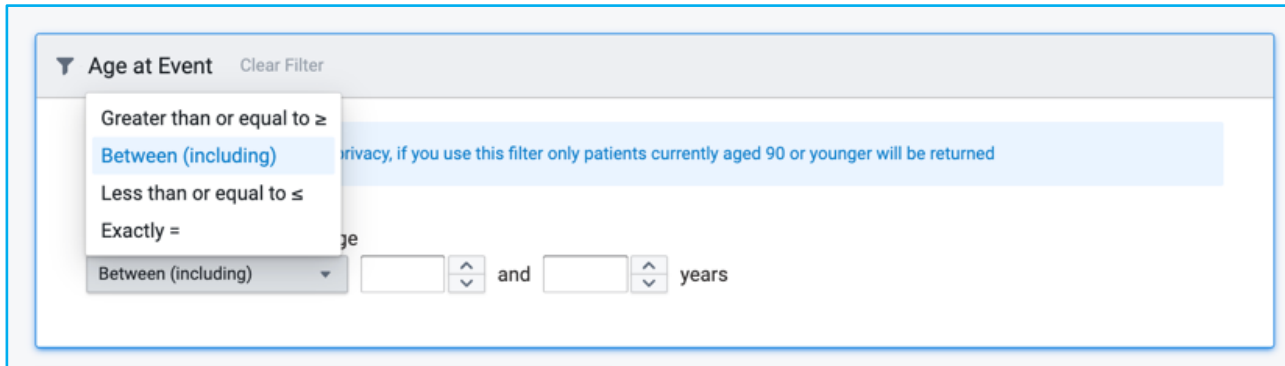


Restrict by Age at Event

Hover mouse over the term in Query Builder and click on **Blue Funnel**:



Indicate age or age range for when patient had the term documented:



Exclude Deceased Patients

Found under Demographics

The screenshot shows a search interface with two filter sections: 'MUST HAVE' and 'CANNOT HAVE'. The 'CANNOT HAVE' section is highlighted with a red box and contains the search term 'Deceased'. Below the filters, a navigation bar includes categories like 'All', 'Demographics', 'Diagnoses', 'Oncology', 'Procedures', 'Medications', 'Labs', 'Genomics', and 'Visits'. The 'Demographics' category is selected. The main area displays a table with columns for 'Code', 'Term Description', and 'Patients'. A single entry is visible: 'D Deceased' with 34,930 patients. At the bottom, there is a checkbox for 'Show Terms with Zero Patients' and buttons for 'Add To Query' and 'Cancel'.

Code	Term Description	Patients
D	Deceased	34,930

Count Patients

Once query has been built, click **Count Patients** to generate cohort

The screenshot displays a clinical data analysis tool interface. At the top right, there are two buttons: 'Patients' and 'Cohort'. The 'Patients' button is highlighted with a pink arrow and shows the number '790'. The 'Cohort' button is highlighted with a red box and shows the number '1'. Below these buttons, there is a search bar and a 'Count Patients' button. The main area of the interface shows a query builder with various filters and a table of results. The table has columns for 'MUST HAVE', 'DID NOT HAVE', and 'COUNT VALUE'. The results are grouped into 'Group 1' and 'Group 2'. The 'Group 1' section includes a table with columns for 'MUST HAVE', 'DID NOT HAVE', and 'COUNT VALUE'. The 'Group 2' section also includes a table with columns for 'MUST HAVE', 'DID NOT HAVE', and 'COUNT VALUE'. The interface is designed for building and analyzing clinical queries.

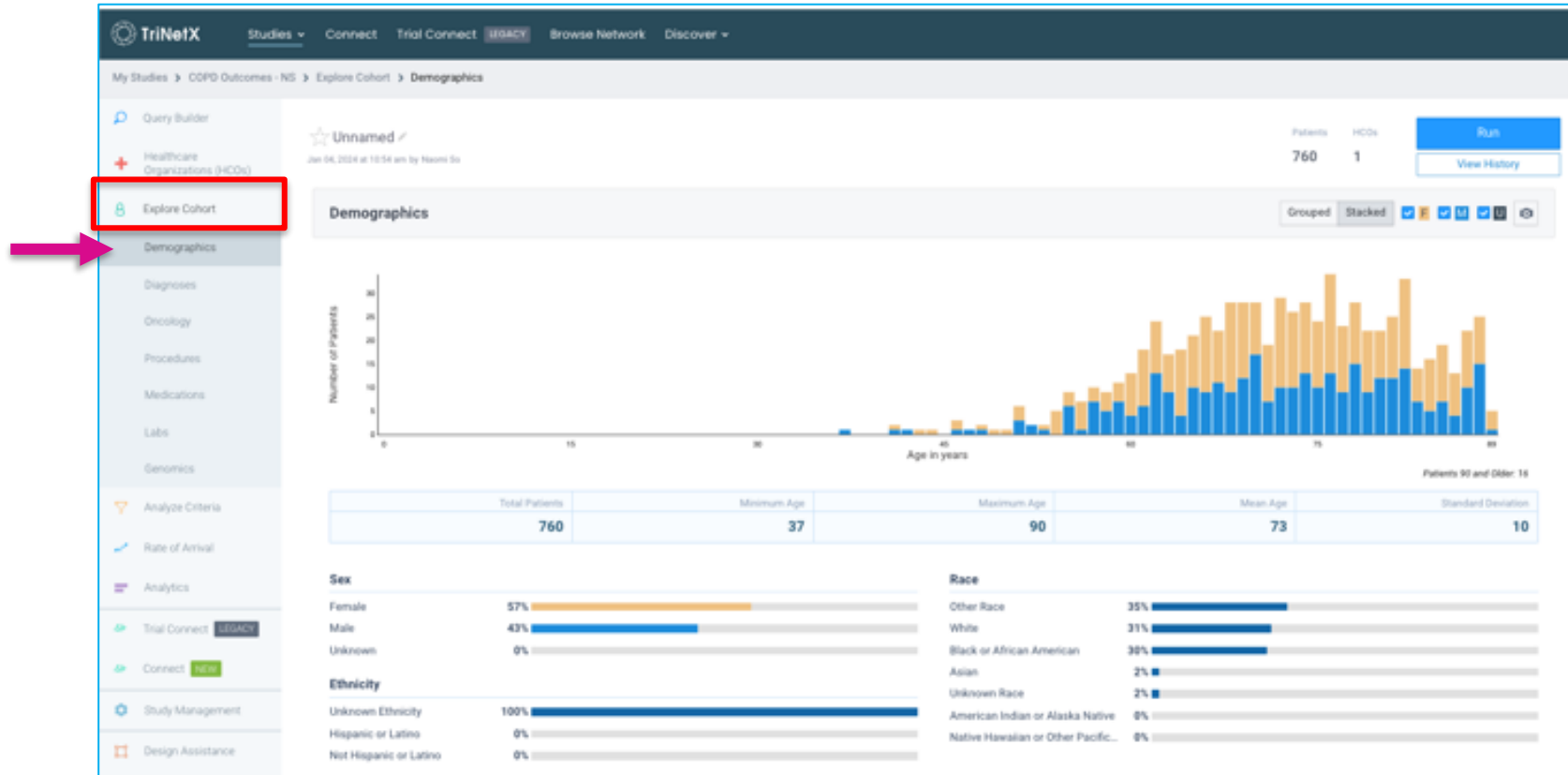
MUST HAVE	DID NOT HAVE	COUNT VALUE
Other chronic obstructive pulmonary disease		38,393

MUST HAVE	DID NOT HAVE	COUNT VALUE
Substance abuse		214,286
Alcohol use disorder		15,432
Amphetamine		1,365

MUST HAVE	DID NOT HAVE	COUNT VALUE
Emergency		1,028,876
Emergency Encounter		564,200

MUST HAVE	DID NOT HAVE	COUNT VALUE
Emergency		1,028,876
Emergency Encounter		564,200

Explore Cohort - Demographics



Explore Cohort - Diagnoses

The screenshot shows the 'Explore Cohort - Diagnoses' interface. A sidebar on the left contains navigation options: Query Builder, Healthcare Organizations (HCOs), Explore Cohort (highlighted with a red box and a pink arrow), Demographics, Diagnoses (highlighted with a pink arrow), Oncology, Procedures, Medications, Labs, Genomics, Analyze Criteria, Rate of Arrival, Analytics, Trial Connect (status: active), Connect (status: new), Study Management, and Design Assistance.

The main content area is titled 'Diagnoses' and shows a list of diagnoses for a cohort of 760 patients. The interface includes a search bar with the text '1/12 emphysema' (highlighted with a red box and labeled 'Search for diagnosis') and a filter section for 'Diagnoses within' (3M, 6M, 12M, 24M, Anytime) and 'All', 'Acute', 'Chronic' (highlighted with a red box and labeled 'Set time parameters').

The diagnosis list includes the following entries:

ICD-10-CM	ICD-10-CM	Description	Patients	% of Cohort
J50-J99		Diseases of the respiratory system	760	100%
J40-J4A		Chronic lower respiratory diseases	760	100%
J44		Other chronic obstructive pulmonary disease	760	100%
J43		Emphysema	410	54%
J45		Asthma	400	53%
J41		Simple and mucopurulent chronic bronchitis	170	22%
J42		Unspecified chronic bronchitis	140	18%
J47		Bronchiectasis	90	12%
J48		Bronchitis, not specified as acute or chronic	80	11%
J94-J99		Other diseases of the respiratory system	440	58%
J09-J18		Influenza and pneumonia	380	50%
J00-J09		Other diseases of upper respiratory tract	290	38%
J00-J06		Acute upper respiratory infections	230	30%
J00-J22		Other acute lower respiratory infections	160	21%
J80-J84		Other respiratory diseases principally affecting the interstitium	150	20%
J90-J94		Other diseases of the pleura	110	14%
J60-J70		Lung diseases due to external agents	60	8%

Buttons for '+ Add to Must Have' and '+ Add to Cannot Have' are visible above the list (highlighted with a red box and labeled 'Option to add terms to query').

Analyze Criteria

View the impact each criteria has on the total patient count

1. Click **New Analysis**

My Studies > COPD Outcomes - NS > Analyze Criteria > Unnamed

Query Builder

Healthcare Organizations (ICDs)

Explore Cohort

Analyze Criteria

Rate of Annual

Unnamed

Criteria analysis has not yet been run on this query. Click New Analysis to analyze criteria.

New Analysis

Analyze Criteria

2. Select Baseline Criteria to define base population (i.e. patients with COPD)
3. Select Terms for Analysis
4. Click Run

The screenshot displays the 'New Criteria Analysis' workflow in a healthcare data platform. The interface is divided into several sections:

- Navigation:** The top breadcrumb shows 'My Studies > COPD Outcomes - NS > Analyze Criteria > Unnamed'.
- Left Sidebar:** Contains navigation options: 'Query Builder', 'Healthcare Organizations (HCOs)', 'Explore Cohort', 'Analyze Criteria' (highlighted), and 'Rate of Arrival'.
- Main Panel - Step 1:** Titled 'New Criteria Analysis', it shows 'Select baseline terms which correspond to the condition being studied'. A red box highlights the '1. Select Baseline Criteria' step. Below, under 'Ungrouped Terms', the 'MUST HAVE' section has a checked box next to 'ICD-10-CM J44 Other chronic obstructive pulmonary disease'. A red arrow points from a box labeled '2. Select Baseline Criteria' to this selection.
- Main Panel - Step 2:** Shows 'Select up to fifteen terms to analyze'. A red box highlights the '2. Select Terms for Analysis' step. Below, under 'Ungrouped Terms', the same term is selected. A red arrow points from a box labeled '3. Select Terms for Analysis' to this selection.
- Main Panel - Step 3:** Shows the configuration of analysis groups. Two groups are visible:
 - Group 1:** '1A. Meds'. It lists three ICD-10-CM codes: J31.010 Subacute, J44.010 Mild, and J44.011 Moderate. A relationship is defined: 'Any instance of ED or Inpatient Visit occurred at least 1 day after any instance of Meds'.
 - Group 2:** '2A. ED or Inpatient Visit'. It lists two visit types: 'Visit: Emergency' and 'Visit: Inpatient Encounter'. A relationship is defined: 'This group occurred since 1 year ago'.A red arrow points from a box labeled '4. Run' to the 'Run' button in the top right corner.
- Buttons:** At the top right, there are buttons for 'Select All', 'Back', 'Run', and 'Cancel'.

Analyze Criteria

- View the impact each criteria has on the total patient count
- The % decrease is from the criteria above

The screenshot displays the 'Analyze Criteria' interface for a study named 'Unnamed'. The breadcrumb trail is 'My Studies > COPD Outcomes - NS > Analyze Criteria > Unnamed'. The interface includes a sidebar with navigation options: Query Builder, Healthcare Organizations (HCOs), Explore Cohort, **Analyze Criteria** (highlighted with a red box), Rate of Arrival, Analytics, Trial Connect (LEGACY), Connect (NEW), Study Management, and Design Assistance. The main content area shows the study name 'Unnamed' with a star icon, a timestamp 'Jan 04, 2024 at 11:00 am by Naomi D...', and summary statistics: 760 Patients and 1 HCOs. There are buttons for 'New Analysis' and 'View History'. Below this is the 'Analyze Criteria' section with a 'View' button. A funnel chart visualizes the patient and HCO counts for various criteria:

Criteria	Patients	% Change	HCOs
Network	4,716,660		1
Base Population	38,590	(-99%)	1
Population ≥ 18 years, Any sex	38,560	(0%)	1
Group 1A: Meds The terms in this group occurred at any time. Must Have: [RxNorm] 41126 Fluticasone AND [RxNorm] 1424884 Vilanterol AND [RxNorm] 1487514 Umeclidinium. Group 1B: ED or Inpatie...	1,480	(-96%)	1
Group 2A: ED or Inpatient Visit This group occurred since 1 year ago (Greater than or equal to 1 instance). Must Have: Visit: emergency [DR] Visit: inpatient encounter	760	(-49%)	1
Total	760		1

Analyze Criteria

Option to **Hide** criteria to see how it impacts patient count

Unnamed
Jan 04, 2024 at 11:00 am by Naomi Se

Patients: 760 HCOs: 1

New Analysis
View History

Analyze Criteria

View

	Patients	HCOs
Network	4,716,660	1
Base Population		
Population ≥ 18 years, Any sex		
Group 1A: Meets The terms in this group occurred at any time Must Have: RxNorm: 41126 Fluticasone AND RxNorm: 1424884 Vilanterol AND RxNorm: 1487514 Umeclidinium Group 1B: ED or Inpatie...		
Group 2A: ED or Inpatient Visit This group occurred since 1 year ago (Greater than or equal to 1 instance) Must Have: Visit: emergency OR Visit: inpatient encounter		

HIDE

Unnamed
Jan 04, 2024 at 11:00 am by Naomi Se

Patients: 760 HCOs: 1

New Analysis
View History

Analyze Criteria

View

	Patients	HCOs
Network	4,716,660	1
Base Population	38,590	1 (-99%)
Population ≥ 18 years, Any sex	38,590	1 (0%)
Group 2A: ED or Inpatient Visit This group occurred since 1 year ago (Greater than or equal to 1 instance) Must Have: Visit: emergency OR Visit: inpatient encounter	5,430	1 (-96%)
Adjusting your criteria increases your cohort by 614% or 4,670 patients	5,430	1
Hidden Terms 1	Patients	HCOs

Group 1A: Meets The terms in this group occurred at any time Must Have: RxNorm: 41126 Fluticasone AND RxNorm: 1424884 Vilanterol AND RxNorm: 1487514 Umeclidinium Group 1B: ED or Inpatie...

Impact of hidden term

Rate of Arrival

View how many patients who meet query criteria enter patient cohort each month

The screenshot displays a software interface for analyzing patient arrival rates. The main header shows the study name 'Unnamed' and the date 'Jan 04, 2024 at 11:08 am by Naomi So'. It also displays the number of patients (760) and HCOs (1). A red box highlights the 'Run' button, and another red box highlights the 'View History' button. The 'Rate of Arrival' option in the sidebar is also highlighted with a red box and an arrow. The main content area shows a table titled 'Patient Arrival Rate' with columns for 'Historic Arrivals (Monthly Avg Over Past 3 Yrs.)' and 'Predicted Arrivals (Monthly Avg Over Next 1 Yr.)'. The data for 'Mount Sinai Health System' shows 23.5 historic arrivals and 33.9 predicted arrivals. A red box highlights the table data.

Healthcare Organization (HCO)	Historic Arrivals (Monthly Avg Over Past 3 Yrs.)	Predicted Arrivals (Monthly Avg Over Next 1 Yr.)	Trend
Mount Sinai Health System	23.5	33.9	

Study Management

- **Properties** → Edit Study Properties
- **Team** → Share Study
- **Documents** → Upload relevant study documents

The screenshot shows the 'Study Properties' page for a study named 'COPD Outcomes - NS'. The breadcrumb trail at the top reads 'My Studies > COPD Outcomes - NS > Study Management > Properties'. On the left sidebar, the 'Properties' menu item is highlighted with a red box and a pink arrow pointing to it. In the main content area, the 'Study Name' field is populated with 'COPD Outcomes - NS'. Below this, the 'Research Purpose' field is highlighted with a red box and contains the text 'Clinical Trial Research' and 'Other Scientific Research Explore patient populations'. At the bottom of the page, there are sections for 'Study Identifying Information' and 'Summary'. In the top right corner, a red box highlights the text 'Edit Study Properties', with a red arrow pointing to a blue button labeled 'Edit Study Properties'.

Demo of Example Query in TriNetX

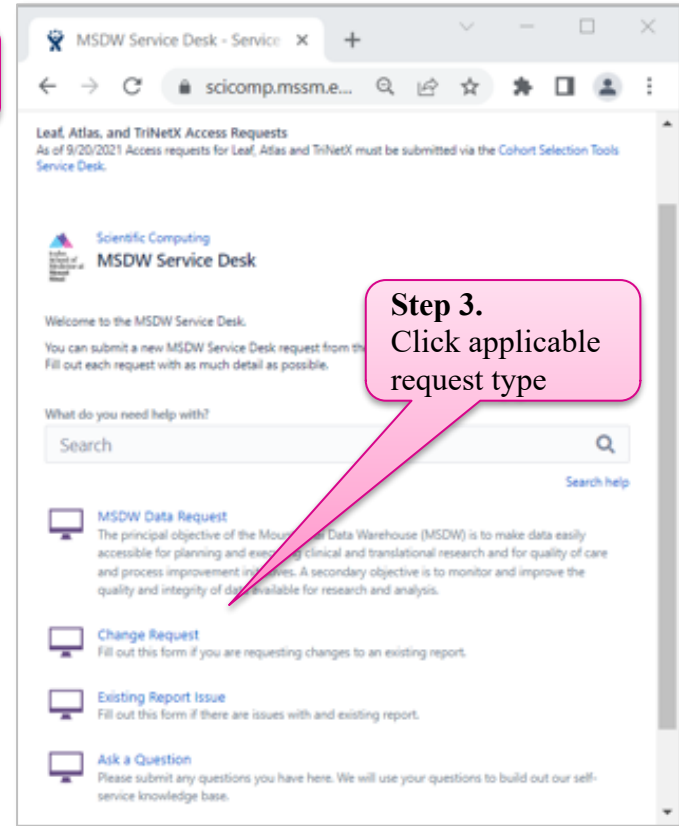
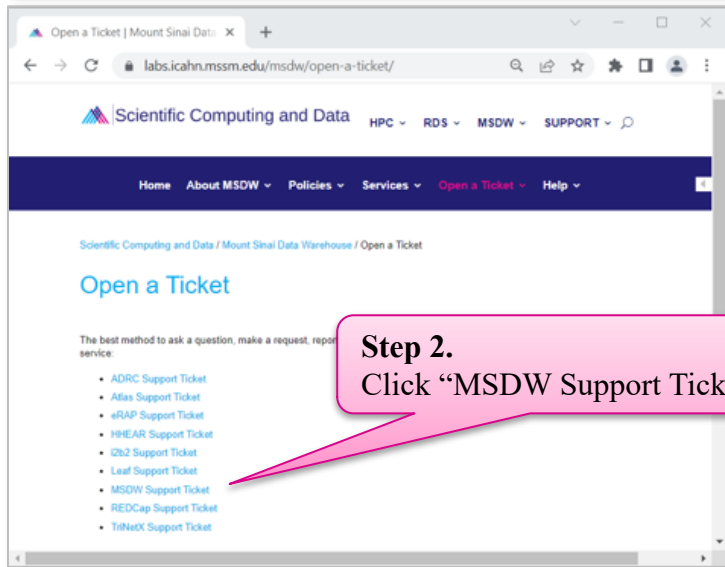
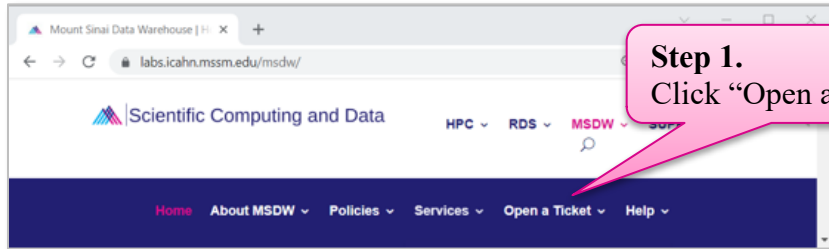
MSDW Custom Data Request

When You Need Custom Data

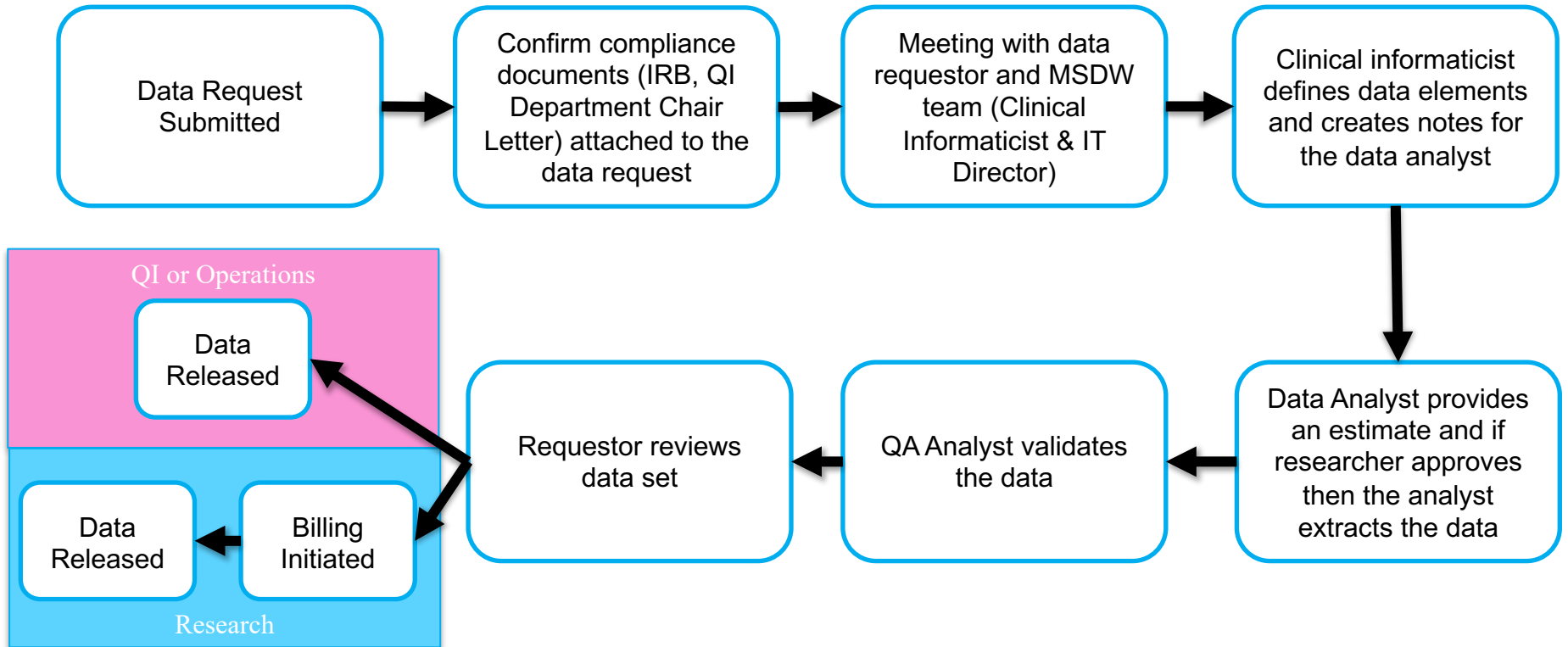
- ▶ Complex question that cannot be answered with one of the self-service query tools
- ▶ Need additional data that is not included in a de-identified data set
- ▶ Need PHI data for your analysis

<https://scicomp.mssm.edu/jira/servicedesk/customer/portal/4>

How to Open an MSDW Request Ticket



Workflow Once Data Request Submitted



JIRA ticketing system used to monitor the status of data requests

Acknowledgements

Encourage MSDW Users to Acknowledge CTSA

Mount Sinai Data Warehouse | S: x +

https://labs.icaohn.mssm.edu... A^h 🔍 ★ ☆ ⌚ ⬇️ 📄 🗑️ Sign in [Profile] ... [B]

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<https://redcap.mountsinai.org/redcap/surveys/?s=HPEMDCYLNTXF3E3E>

For 20 or more publications, email Maria at marajulia.castro@mssm.edu

Learn more about MSDW and Clinical Query tools from the links below:

<https://labs.icaahn.mssm.edu/msdw/>

<https://labs.icaahn.mssm.edu/msdw/services/>

<https://labs.icaahn.mssm.edu/msdw/data-sources/>

“Walk-in” Digital Concierge service hosted by the MSDW

- Every Wednesday from 3:30 PM to 4:30 PM



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Thank you!



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