Phenotyping for Cardiovascular Disease

Seng Chan You

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Standard phenotype library

- Sentinel's efforts for this

Diagnostic Accuracy Study

Medicine®

OPEN

Chart validation of inpatient ICD-9-CM administrative diagnosis codes for ischemic stroke among IGIV users in the Sentinel Distributed Database

Eric M. Ammann, PhD[a,*], Enrique C. Leira, MD MS[a,b], Scott K. Winiecki, MD[c], Nandakumar Nagaraja, MD[b], Sudeepta Dandapat, MD[b], Ryan M. Carnahan, PharmD, MS[a], Marin L. Schweizer, PhD[b,d], James C. Torner, PhD[a], Candace C. Fuller, PhD[e], Charles E. Leonard, PharmD, MSCE[f], Crystal Garcia, MPH[e], Madelyn Pimentel, MSN[e], Elizabeth A. Chrischilles, PhD[a]

Standard phenotype library

- Sentinel's efforts for this

ORIGINAL REPORT

WILEY

Chart validation of inpatient ICD-9-CM administrative diagnosis codes for acute myocardial infarction (AMI) among intravenous immune globulin (IGIV) users in the Sentinel Distributed Database

Eric M. Ammann[1] | Marin L. Schweizer[2,3] | Jennifer G. Robinson[1,3,4] | Jayasheel O. Eschol[3] | Rami Kafa[3] | Saket Girotra[3,4] | Scott K. Winiecki[5] | Candace C. Fuller[6] | Ryan M. Carnahan[1] | Charles E. Leonard[7] | Cole Haskins[1,4,8] | Crystal Garcia[6] | Elizabeth A. Chrischilles[1]

Standard Phenotype Library for Cardiovascular Disease

Requirements Development for the OHDSI Gold Standard Phenotype Library

Researchers

apotvien Aaron Potvien — Aug 18

Greetings all,

Here at Georgia Tech, we've put together an initial requirements development document to help envision how an OHDSI Gold Standard Phenotype Library would function. To make the requirements more tangible, we put together a series of potential **personas** (representing different types of OHDSI stakeholders and collaborators), as well as **use cases** that capture the essence of what these users are trying to accomplish. The phenotype library is intended to be a home for validated, high-quality cohort phenotypes that can be generated using the OMOP CDM.

The full document can be found here on Google Docs 11. We would greatly appreciate your input on additional personas and/or use cases that typify other characteristics you believe should be represented in order to make the OHDSI Gold Standard Phenotype Library a valuable new resource for the entire community.

Best,
Aaron

http://forums.ohdsi.org/t/requirements-development-for-the-ohdsi-gold-standard-phenotype-library/4876

JAMA | Original Investigation

Association of Ticagrelor vs Clopidogrel With Net Adverse Clinical Events in Patients With Acute Coronary Syndrome Undergoing Percutaneous Coronary Intervention

Seng Chan You, MD, MS; Yeunsook Rho, PhD; Behnood Bikdeli, MD, MS; Jiwoo Kim, MS; Anastasios Siapos, MSc; James Weaver, MSc; Ajit Londhe, MPH; Jaehyeong Cho, BS; Jimyung Park, BS; Martijn Schuemie, PhD; Marc A. Suchard, MD, PhD; David Madigan, PhD; George Hripcsak, MD, MS; Aakriti Gupta, MD, MS; Christian G. Reich, MD; Patrick B. Ryan, PhD; Rae Woong Park, MD, PhD; Harlan M. Krumholz, MD, SM

IMPORTANCE Current guidelines recommend ticagrelor as the preferred P2Y12 platelet inhibitor for patients with acute coronary syndrome (ACS), primarily based on a single large randomized clinical trial. The benefits and risks associated with ticagrelor vs clopidogrel in routine practice merits attention.

OBJECTIVE To determine the association of ticagrelor vs clopidogrel with ischemic and hemorrhagic events in patients undergoing percutaneous coronary intervention (PCI) for ACS in clinical practice.

Editorial page 1

JAMA Patient Page page 1

Audio and Supplemental content

CME Quiz at jamacmelookup.com and CME Questions page 0

Seng Chan You[1]; Yeunsook Rho[2]; Jiwoo Kim2; Anastasios Siapos[3]; Ajit Londhe[4]; Jaehyeong Cho[5]; Jimyung Park[5]; Martijn Schuemie[4]; Marc A Suchard, MD, PhD[6,7]; David Madigan PhD8; George Hripcsak MD[9]; Christian G. Reich3; Patrick B. Ryan[4]; Rae Woong Park, MD, PhD[1,5]; Harlan M. Krumholz, MD[10]

[1]Department of Biomedical Informatics, Ajou University School of Medicine, Suwon, Korea; [2]Health Insurance Review and Assessment Service, Wonju, Korea; [3]IQVIA, Durham, USA; [4]Janssen Research and Development, Titusville, USA; [5]Department of Biomedical Sciences, Ajou University Graduate School of Medicine, Suwon, Korea; [6]Department of Biostatistics, Fielding School of Public Health, University of California, Los Angeles, CA, USA; [7]Department of Biomathematics, David Geffen School of Medicine at UCLA, University of California, Los Angeles, CA, USA; [8]Department of Statistics, Columbia University, New York, NY, USA; [9]Medical Informatics Services, New York-Presbyterian Hospital, New York, NY, USA; [10]Yale University School of Medicine, USA

Methods for phenotyping

- Rule-based phenotype
  - Human curated SNOMED-CT code
  - Leverage legacy of ICD-code system
    - ICD-9; ICD-10 (CM; K)
    - Read code
- Computational phenotype
  - APHRODITE
  - Others

Standard Phenotype Library for Cardiovascular Disease

- Why CVD? : Many OHDSI studies have been focused on CVD outcome
  - LEGEND (Lancet)
  - Ticagrelor vs Clopidogrel (JAMA)
  - Many more studies

- Targets
  - Acute myocardial infarction
  - Cerebrovascular accident (stroke)
    - Ischemic stroke
    - Hemorrhagic stroke
  - Heart failure
  - Sudden cardiac death
  - Major bleeding (hemorrhagic stroke + GI bleeding)

Why stroke?

- It is not easy to define stroke in SNOMED-CT system

Concept Set Expression | Included Concepts 51 | Included Source Codes | Export | Import

Name:

Non-hemorrhagic ischemic stroke

Show 25 entries

Showing 1 to 7 of 7 entries

	Concept Id	Concept Code	Concept Name
	4046089	230285003	Vascular dementia of acute onset
	4319146	95830009	Pituitary infarction
	379778	56267009	Multi-infarct dementia
	4046090	230287006	Mixed cortical and subcortical vascular dementia
	4046362	230706003	Hemorrhagic cerebral infarction
	4045741	230703006	Dysarthria-clumsy hand syndrome
	443454	432504007	Cerebral infarction

http://www.ohdsi.org/web/atlas/#/cohortdefinition/1768950

Why stroke?

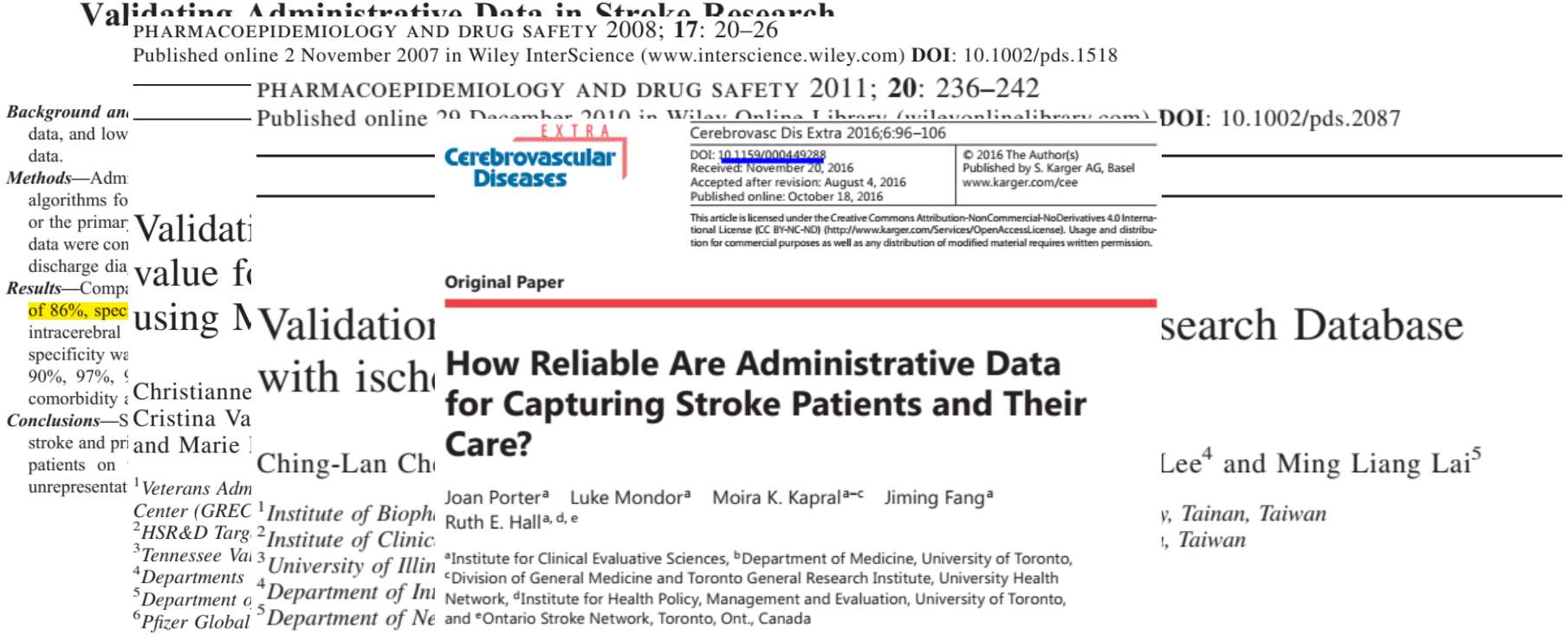
Risk Prediction for Ischemic Stroke and Transient Ischemic Attack in Patients Without Atrial Fibrillation: A Retrospective Cohort Study

Zhong Yuan, MD, PhD,* Erica A. Voss, MPH,† Frank J. DeFalco, BA,† Guohua Pan, PhD,† Patrick B. Ryan, PhD,* Daniel Yannicelli, MD,‡,[1] and Christopher Nes[illegible]

Main Outcomes Measure

The composite of ischemic stroke or TIA (at 1-year or 3-year observable time window, respectively) was the main outcome of interest because the current study is intended to assess the performance of the existing risk schemes (i.e., $CHADS_2$ and CHA_2DS_2-VASc) for its prediction. The outcome postindex date was identified using the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) codes present in any diagnosis field in the database (ischemic stroke: 433.x1, 434.1, 434.x1; TIA: 435.x). We used all diagnosis fields to as-

Previous papers validating stroke in ICD code system



Validating Administrative Data in Stroke Research

PHARMACOEPIDEMIOLOGY AND DRUG SAFETY 2008; **17**: 20–26
Published online 2 November 2007 in Wiley InterScience (www.interscience.wiley.com) **DOI**: 10.1002/pds.1518

PHARMACOEPIDEMIOLOGY AND DRUG SAFETY 2011; **20**: 236–242
Published online 29 December 2010 in Wiley Online Library (wileyonlinelibrary.com) **DOI**: 10.1002/pds.2087

Background an
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data.
Methods—Adm
algorithms fo
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data were con
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Results—Compa
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specificity wa
90%, 97%, 9
comorbidity a
Conclusions—S
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Christianne
Cristina Va
and Marie

[1]*Veterans Adm*
Center (GREC
[2]*HSR&D Targ*
[3]*Tennessee Va*
[4]*Departments*
[5]*Department o*
[6]*Pfizer Global*

EXTRA
Cerebrovascular Diseases

Cerebrovasc Dis Extra 2016;6:96–106
DOI: 10.1159/000449288
Received: November 20, 2016
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Validation
with isch

Ching-Lan Ch

[1]*Institute of Biophi*
[2]*Institute of Clinic*
[3]*University of Illin*
[4]*Department of Int*
[5]*Department of Ne*

Original Paper

How Reliable Are Administrative Data for Capturing Stroke Patients and Their Care?

Joan Porter[a] Luke Mondor[a] Moira K. Kapral[a–c] Jiming Fang[a]
Ruth E. Hall[a, d, e]

[a]Institute for Clinical Evaluative Sciences, [b]Department of Medicine, University of Toronto, [c]Division of General Medicine and Toronto General Research Institute, University Health Network, [d]Institute for Health Policy, Management and Evaluation, University of Toronto, and [e]Ontario Stroke Network, Toronto, Ont., Canada

search Database

Lee[4] and Ming Liang Lai[5]

y, Tainan, Taiwan
, Taiwan

Systematic review for validation of stroke in ICD code system

PHARMACOEPIDEMIOLOGY AND DRUG SAFETY 2012; **21**(S1): 100–128
Published online in Wiley Online Library (wileyonlinelibrary.com) **DOI**: 10.1002/pds.2312

ORIGINAL REPORT

A systematic review of validated methods for identifying cerebrovascular accident or transient ischemic attack using administrative data

Susan E. Andrade*, Leslie R. Harrold, Jennifer Tjia, Sarah L. Cutrona, Jane S. Saczynski, Katherine S. Dodd, Robert J. Goldberg and Jerry H. Gurwitz

Meyers Primary Care Institute (Reliant Medical Group, Fallon Community Health Plan, and University of Massachusetts Medical School), Worcester, MA, USA

ABSTRACT

Purpose To perform a systematic review of the validity of algorithms for identifying cerebrovascular accidents (CVAs) or transient ischemic attacks (TIAs) using administrative and claims data.

Methods PubMed and Iowa Drug Information Service searches of the English language literature were performed to identify studies published between 1990 and 2010 that evaluated the validity of algorithms for identifying CVAs (ischemic and hemorrhagic strokes, intracranial hemorrhage, and subarachnoid hemorrhage) and/or TIAs in administrative data. Two study investigators independently reviewed the abstracts and articles to determine relevant studies according to pre-specified criteria.

Results A total of 35 articles met the criteria for evaluation. Of these, 26 articles provided data to evaluate the validity of stroke, seven reported the validity of TIA, five reported the validity of intracranial bleeds (intracerebral hemorrhage and subarachnoid hemorrhage), and 10 studies reported the validity of algorithms to identify the composite endpoints of stroke/TIA or cerebrovascular disease. Positive predictive values (PPVs) varied depending on the specific outcomes and algorithms evaluated. Specific algorithms to evaluate the presence of stroke and intracranial bleeds were found to have high PPVs (80% or greater). Algorithms to evaluate TIAs in adult populations were generally found to have PPVs of 70% or greater.

Conclusions The algorithms and definitions to identify CVAs and TIAs using administrative and claims data differ greatly in the published literature. The choice of the algorithm employed should be determined by the stroke subtype of interest. Copyright © 2012 John Wiley & Sons, Ltd.

Andrade et al., *Pharmacoepidemiology and Drug Safety* (2012)

RESEARCH ARTICLE

Validity of Diagnostic Codes for Acute Stroke in Administrative Databases: A Systematic Review

Natalie McCormick[1,2], Vidula Bhole[2], Diane Lacaille[2,3,4], J. Antonio Avina-Zubieta[2,3,4]*

1 Faculty of Pharmaceutical Sciences, University of British Columbia, Vancouver, British Columbia, Canada, **2** Arthritis Research Canada, Richmond, British Columbia, Canada, **3** Division of Rheumatology, Department of Medicine. University of British Columbia, Vancouver, British Columbia, Canada, **4** Cardiovascular Committee of the CANRAD Network, Richmond, British Columbia, Canada

* azubieta@arthritisresearch.ca

McCormick et al., *PLoS ONE* (2015)

Diverse accuracy across the ICD codes

Jones[23], 2014	ICD-9-CM 433, any position	any stroke, definite or probable			10 (8-12)
	ICD-9-CM 433, primary position				15.82 (13-19)
	ICD-9-CM 434, any position				77 (74-79)
	ICD-9-CM 434, primary position				83.22 (81-86)
	ICD-9-CM 433 and 434, any position				41.56 (39.53-43.62)
	ICD-9-CM 433 and 434, primary position				54.86 (52.30-57.39)
	ICD-9-CM 436, any position				72 (66-77)
	ICD-9-CM 436, primary position				82.14 (76-87)
	ICD-9-CM 434 and 436, any position				75.60 (73.22-77.83)
	ICD-9-CM, 434 and 436, primary position				83.00 (80.61-85.15)
	ICD-9-CM 433/434/436, any position				44.94 (43.01-46.89)
	ICD-9-CM 433/434/436, primary position				58.40 (56.03-60.73)
	ICD-9-CM 433.01, 433.11, 433.21, 433.31, 433.81, 433.91, 434.01, 434.11, 434.91 (AHA/ASA code group), any position	ischaemic stroke			76 (74-79)

McCormick et al., *PLoS ONE* (2015)

Diverse accuracy across the ICD codes

Benesch *et al.*[14]	Hospitalizations at 5 academic medical centers identified using the Academic Medical Center Consortium database, 1992	Hospitalizations (stroke)	Inpatient ICD-9 codes 433 to 436	Medical record review was conducted (N = 649). Stroke was confirmed based upon the Wor Health Organization (WHO) definitions. Primary and secondary diagnoses: Code 433: PPV = 6.1% Code 434: PPV = 85.0% Code 435: PPV = 9.1% Code 436: PPV = 82.6% Primary diagnosis: Code 433: PPV = 9.1% Code 434: PPV = 90.3% Code 435: PPV = 6.3% Code 436: PPV = 88.9%

Andrade et al., *Pharmacoepidemiology and Drug Safety* (2012)

Diverse accuracy across the ICD codes

Table 5. Positive predictive values of International Classification of Diseases codes to identify cerebrovascular accident and transient ischemic attacks in adult populations*

ICD-9/ICD-10 code	Number of studies reporting PPV estimate	Median PPV estimate	Range of PPV estimates (minimum, maximum)	Number of studies reporting PPV estimate	Median PPV estimate	Range of PPV estimates (minimum, maximum)
			Studies evaluating acute stroke events			
	Using principal or most responsible diagnosis only			Using all discharge diagnoses		
430	3	87	33, 100	4	84	74, 100
431	3	88	80, 100	4	86	83, 93
432	3	21	17, 29	4	20	0, 32
432.9	0			1	60	
433	3	17	9, 46	4	15	6, 15
433.x0	1	13		0		
433.x1	1	71		0		
434	3	90	84, 92	4	85	77, 85
434.x0	1	33		0		
434.x1	1	72		0		
434.0	1	85		1	82	
434.1	1	80		1	58	
435	4	17	3, 29	4	14	9, 26
436	4	80	48, 89	5	81	70, 86
437	3	50	45, 69	3	22	2, 31
438	2	20	8, 33	3	1	0, 7
			Studies evaluating ischemic stroke events			
	Using principal or most responsible diagnosis only			Using all discharge diagnoses		
433	1	4		1	14	
434	2	87	82, 92	1	77	
434.11	1	85		0		
434.91	1	82		0		
435	0			1	12	
436	1	79		1	68	
437	0			1	2	
438	0			1	0	

Andrade et al., *Pharmacoepidemiology and Drug Safety* (2012)

My conclusion for stroke

- Diagnosis code
  - **ICD-9-CM: 433.x1, 434.x1**
  - **ICD10: I63x**
- Should be considered
  - Specifiers
    - Inpatient or ED visit only?
    - Primary or secondary diagnosis only?
    - Brain CT or MRI?

Diverse accuracy across the ICD codes

Table 5. Positive predictive values of International Classification of Diseases codes to identify cerebrovascular accident and transient ischemic attacks in adult populations*

ICD-9/ICD-10 code	Number of studies reporting PPV estimate	Median PPV estimate	Range of PPV estimates (minimum, maximum)	Number of studies reporting PPV estimate	Median PPV estimate	Range of PPV estimates (minimum, maximum)
Studies evaluating acute stroke events						
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434.x0	1	33		0		
434.x1	1	72		0		
434.0	1	85		1	82	
434.1	1	80		1	58	
435	4	17	3, 29	4	14	9, 26
436	4	80	48, 89	5	81	70, 86
437	3	50	45, 69	3	22	2, 31
438	2	20	8, 33	3	1	0, 7
Studies evaluating ischemic stroke events						
	Using principal or most responsible diagnosis only			Using all discharge diagnoses		
433	1	4		1	14	
434	2	87	82, 92	1	77	
434.11	1	85		0		
434.91	1	82		0		
435	0			1	12	
436	1	79		1	68	
437	0			1	2	
438	0			1	0	

Andrade et al., *Pharmacoepidemiology and Drug Safety* (2012)

ICD-9-CM (**433** & **434**)

- 433 Occlusion and stenosis of precerebral arteries
  - 433.0 Occlusion and stenosis of basilar artery
    - 433.00 Occlusion and stenosis of basilar artery without mention of cerebral infarction convert 433.00 to ICD-10-CM
    - 433.01 Occlusion and stenosis of basilar artery with cerebral infarction convert 433.01 to ICD-10-CM
  - 433.1 Occlusion and stenosis of carotid artery
    - 433.10 Occlusion and stenosis of carotid artery without mention of cerebral infarction convert 433.10 to ICD-10-CM
    - 433.11 Occlusion and stenosis of carotid artery with cerebral infarction convert 433.11 to ICD-10-CM
  - 433.2 Occlusion and stenosis of vertebral artery
    - 433.20 Occlusion and stenosis of vertebral artery without mention of cerebral infarction convert 433.20 to ICD-10-CM
    - 433.21 Occlusion and stenosis of vertebral artery with cerebral infarction convert 433.21 to ICD-10-CM
  - 433.3 Occlusion and stenosis of multiple and bilateral precerebral arteries
    - 433.30 Occlusion and stenosis of multiple and bilateral precerebral arteries without mention of cerebral infarction convert 433.30 to ICD-10-CM
    - 433.31 Occlusion and stenosis of multiple and bilateral precerebral arteries with cerebral infarction convert 433.31 to ICD-10-CM
  - 433.8 Occlusion and stenosis of other specified precerebral artery
    - 433.80 Occlusion and stenosis of other specified precerebral artery without mention of cerebral infarction convert 433.80 to ICD-10-CM
    - 433.81 Occlusion and stenosis of other specified precerebral artery with cerebral infarction convert 433.81 to ICD-10-CM
  - 433.9 Occlusion and stenosis of unspecified precerebral artery
    - 433.90 Occlusion and stenosis of unspecified precerebral artery without mention of cerebral infarction convert 433.90 to ICD-10-CM
    - 433.91 Occlusion and stenosis of unspecified precerebral artery with cerebral infarction convert 433.91 to ICD-10-CM
- 434 Occlusion of cerebral arteries
  - 434.0 Cerebral thrombosis
    - 434.00 Cerebral thrombosis without mention of cerebral infarction convert 434.00 to ICD-10-CM
    - 434.01 Cerebral thrombosis with cerebral infarction convert 434.01 to ICD-10-CM
  - 434.1 Cerebral embolism
    - 434.10 Cerebral embolism without mention of cerebral infarction convert 434.10 to ICD-10-CM
    - 434.11 Cerebral embolism with cerebral infarction convert 434.11 to ICD-10-CM
  - 434.9 Cerebral artery occlusion unspecified
    - 434.90 Cerebral artery occlusion, unspecified without mention of cerebral infarction convert 434.90 to ICD-10-CM
    - 434.91 Cerebral artery occlusion, unspecified with cerebral infarction convert 434.91 to ICD-10-CM

ICD-10 (**I63**, I64)

I63	**Cerebral infarction**
	Incl.: occlusion and stenosis of cerebral and precerebral arteries, resulting in cerebral infarction
	Excl.: sequelae of cerebral infarction (I69.3)
I63.0	**Cerebral infarction due to thrombosis of precerebral arteries**
I63.1	**Cerebral infarction due to embolism of precerebral arteries**
I63.2	**Cerebral infarction due to unspecified occlusion or stenosis of precerebral arteries**
I63.3	**Cerebral infarction due to thrombosis of cerebral arteries**
I63.4	**Cerebral infarction due to embolism of cerebral arteries**
I63.5	**Cerebral infarction due to unspecified occlusion or stenosis of cerebral arteries**
I63.6	**Cerebral infarction due to cerebral venous thrombosis, nonpyogenic**
I63.8	**Other cerebral infarction**
I63.9	**Cerebral infarction, unspecified**

I64	**Stroke, not specified as haemorrhage or infarction**
	Incl.: Cerebrovascular accident NOS
	Excl.: sequelae of stroke (I69.4)

SNOMED-CT code

- These two ancestor concept_ids can be used to include ‘maps to’ SNOMED-CT OMOP concept_id for ICD-codes(433.x1, 434.x1, I63x)

concept_id	concept_name	domain_id	vocabulary_id	concept_class_id	standard_concept	concept_code
443454	Cerebral infarction	Condition	SNOMED	Clinical Finding	S	432504007
4043731	Infarction - precerebral	Condition	SNOMED	Clinical Finding	S	230692004

Unwanted ‘maps from’ ICD codes

	concept_code	vocabulary_id	source_name
1	G43.6	ICD10CM	Persistent migraine aura with cerebral infarction
2	G43.60	ICD10CM	Persistent migraine aura with cerebral infarction, not intractable
3	G43.601	ICD10CM	Persistent migraine aura with cerebral infarction, not intractable, with status migrainosus
4	G43.609	ICD10CM	Persistent migraine aura with cerebral infarction, not intractable, without status migrainosus
5	G43.61	ICD10CM	Persistent migraine aura with cerebral infarction, intractable
6	G43.611	ICD10CM	Persistent migraine aura with cerebral infarction, intractable, with status migrainosus
7	G43.619	ICD10CM	Persistent migraine aura with cerebral infarction, intractable, without status migrainosus
8	G46.5	ICD10CM	Pure motor lacunar syndrome
9	G46.6	ICD10CM	Pure sensory lacunar syndrome
10	G46.7	ICD10CM	Other lacunar syndromes
11	I97.81	ICD10CM	Intraoperative cerebrovascular infarction
12	I97.810	ICD10CM	Intraoperative cerebrovascular infarction during cardiac surgery
13	I97.811	ICD10CM	Intraoperative cerebrovascular infarction during other surgery
14	I97.82	ICD10CM	Postprocedural cerebrovascular infarction
15	I97.820	ICD10CM	Postprocedural cerebrovascular infarction following cardiac surgery
16	I97.821	ICD10CM	Postprocedural cerebrovascular infarction following other surgery
17	346.6	ICD9CM	Persistent migraine aura with cerebral infarction
18	346.60	ICD9CM	Persistent migraine aura with cerebral infarction, without mention of intractable migraine without mention of status migrainosus
19	346.61	ICD9CM	Persistent migraine aura with cerebral infarction, with intractable migraine, so stated, without mention of status migrainosus
20	346.62	ICD9CM	Persistent migraine aura with cerebral infarction, without mention of intractable migraine with status migrainosus
21	346.63	ICD9CM	Persistent migraine aura with cerebral infarction, with intractable migraine, so stated, with status migrainosus
22	997.02	ICD9CM	Iatrogenic cerebrovascular infarction or hemorrhage

Unwanted ‘maps from’ ICD codes

	concept_code	vocabulary_id	source_name
1	G43.6	ICD10CM	Persistent migraine aura with cerebral infarction
2	G43.60	ICD10CM	Persistent migraine aura with cerebral infarction, not intractable
3	G43.601	ICD10CM	Persistent migraine aura with cerebral infarction, not intractable, with status migrainosus
4	G43.609	ICD10CM	Persistent migraine aura with cerebral infarction, not intractable, without status migrainosus
5	G43.61	ICD10CM	Persistent migraine aura with cerebral infarction, intractable
6	G43.611	ICD10CM	Persistent migraine aura with cerebral infarction, intractable, with status migrainosus
7	G43.619	ICD10CM	Persistent migraine aura with cerebral infarction, intractable, without status migrainosus
8	G46.5	ICD10CM	Pure motor lacunar syndrome
9	G46.6	ICD10CM	Pure sensory lacunar syndrome
10	G46.7	ICD10CM	Other lacunar syndromes
11	I97.81	ICD10CM	Intraoperative cerebrovascular infarction
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20	346.62	ICD9CM	Persistent migraine aura with cerebral infarction, without mention of intractable migraine with status migrainosus
21	346.63	ICD9CM	Persistent migraine aura with cerebral infarction, with intractable migraine, so stated, with status migrainosus
22	997.02	ICD9CM	Iatrogenic cerebrovascular infarction or hemorrhage

SELECT COUNT(DISTINCT PERSON_ID) FROM CONDITION_OCCURRENCE WHERE condition_source_value LIKE 'G436%’

➔ 0 (No one has this diagnosis code in Korea, NHIS-NSC)

Three options

1. We can validate concept id of **443454**, **4043731** in OHDSI – The best option
2. We can make a stroke cohort definition with excluding terms for same-day migraine
3. We can count how many people actually have these diagnoses in multiple databases. If no database has this condition, then I would be relieved

concept_id	concept_name	domain_id	vocabulary_id	concept_class_id	standard_concept	concept_code
443454	Cerebral infarction	Condition	SNOMED	Clinical Finding	S	432504007
4043731	Infarction - precerebral	Condition	SNOMED	Clinical Finding	S	230692004

JAMA | Original Investigation

Association of Ticagrelor vs Clopidogrel With Net Adverse Clinical Events in Patients With Acute Coronary Syndrome Undergoing Percutaneous Coronary Intervention

Seng Chan You, MD, MS; Yeunsook Rho, PhD; Behnood Bikdeli, MD, MS; Jiwoo Kim, MS; Anastasios Siapos, MSc; James Weaver, MSc; Ajit Londhe, MPH; Jaehyeong Cho, BS; Jimyung Park, BS; Martijn Schuemie, PhD; Marc A. Suchard, MD, PhD; David Madigan, PhD; George Hripcsak, MD, MS; Aakriti Gupta, MD, MS; Christian G. Reich, MD; Patrick B. Ryan, PhD; Rae Woong Park, MD, PhD; Harlan M. Krumholz, MD, SM

IMPORTANCE Current guidelines recommend ticagrelor as the preferred P2Y12 platelet inhibitor for patients with acute coronary syndrome (ACS), primarily based on a single large randomized clinical trial. The benefits and risks associated with ticagrelor vs clopidogrel in routine practice merits attention.

OBJECTIVE To determine the association of ticagrelor vs clopidogrel with ischemic and hemorrhagic events in patients undergoing percutaneous coronary intervention (PCI) for ACS in clinical practice.

Editorial page 1

JAMA Patient Page page 1

Audio and Supplemental content

CME Quiz at jamacmelookup.com and CME Questions page 0

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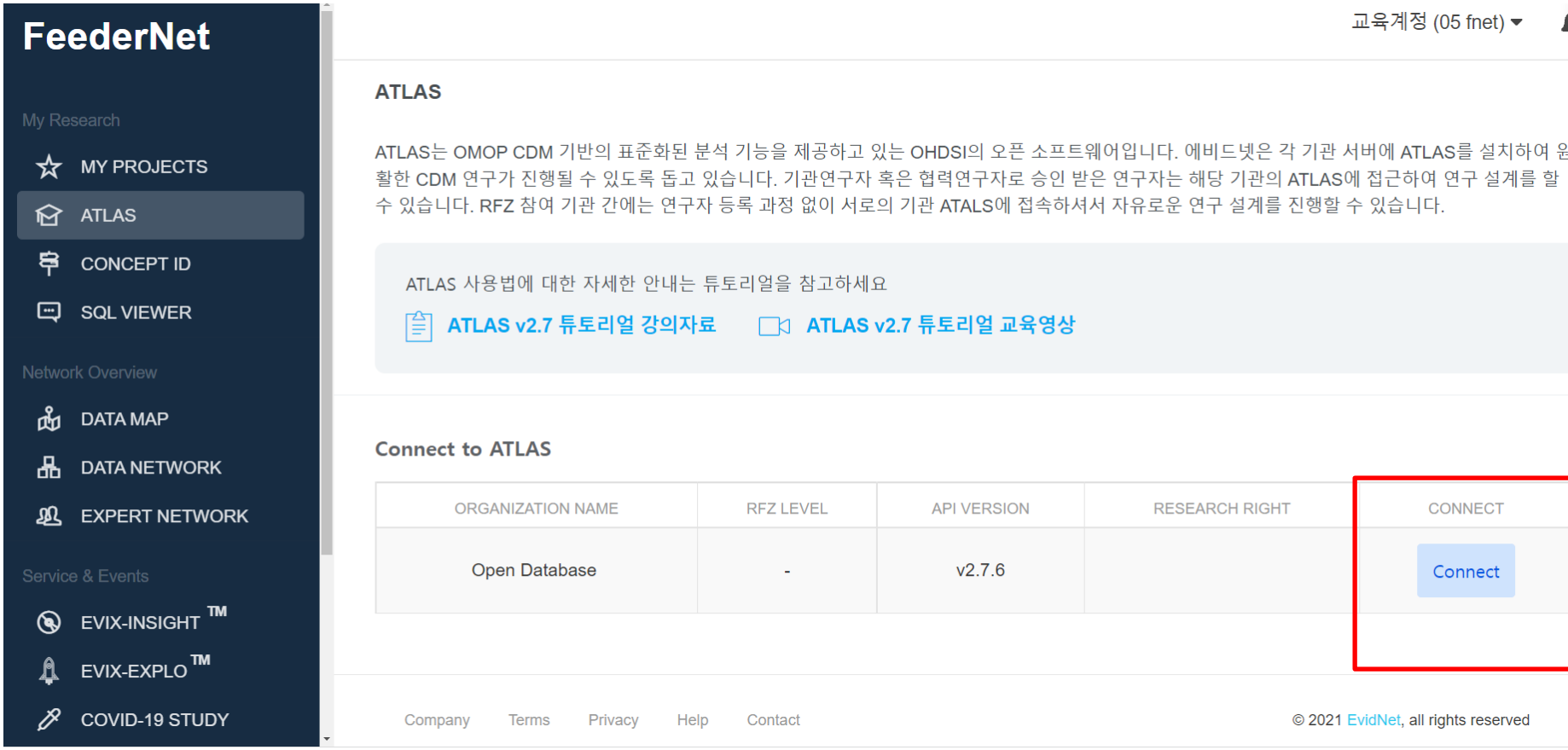
FeederNet
My Research
MY PROJECTS
ATLAS
CONCEPT ID
SQL VIEWER
Network Overview
DATA MAP
DATA NETWORK
EXPERT NETWORK
Service & Events
EVIX-INSIGHT ™
EVIX-EXPLO ™
COVID-19 STUDY
교육계정 (05 fnet)
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ATLAS
ATLAS는 OMOP CDM 기반의 표준화된 분석 기능을 제공하고 있는 OHDSI의 오픈 소프트웨어입니다. 에비드넷은 각 기관 서버에 ATLAS를 설치하여 원활한 CDM 연구가 진행될 수 있도록 돕고 있습니다. 기관연구자 혹은 협력연구자로 승인 받은 연구자는 해당 기관의 ATLAS에 접근하여 연구 설계를 할 수 있습니다. RFZ 참여 기관 간에는 연구자 등록 과정 없이 서로의 기관 ATALS에 접속하셔서 자유로운 연구 설계를 진행할 수 있습니다.
ATLAS 사용법에 대한 자세한 안내는 튜토리얼을 참고하세요
ATLAS v2.7 튜토리얼 강의자료
ATLAS v2.7 튜토리얼 교육영상
Connect to ATLAS
ORGANIZATION NAME
RFZ LEVEL
API VERSION
RESEARCH RIGHT
CONNECT
Open Database
-
v2.7.6
Connect
Company
Terms
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Help
Contact
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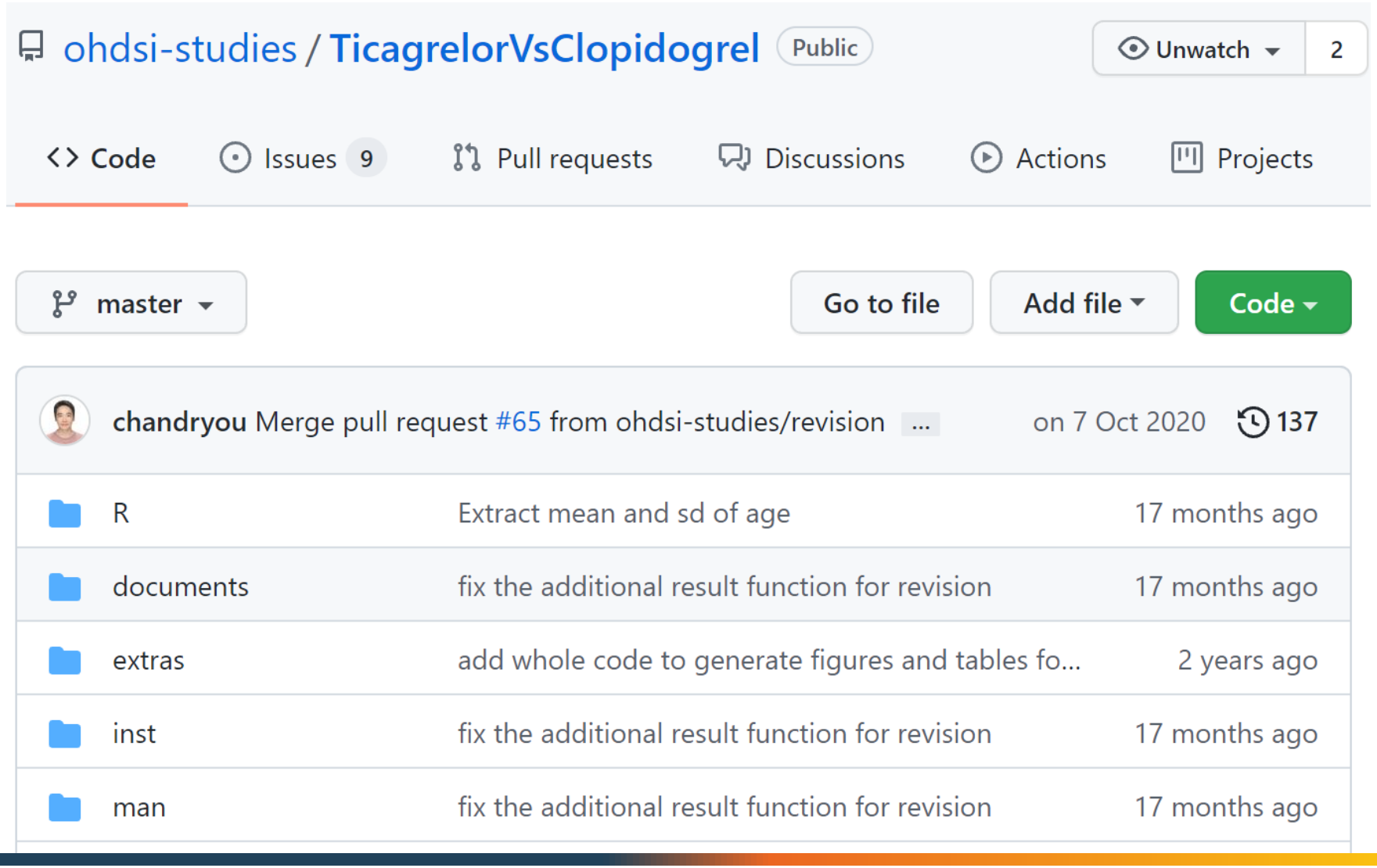
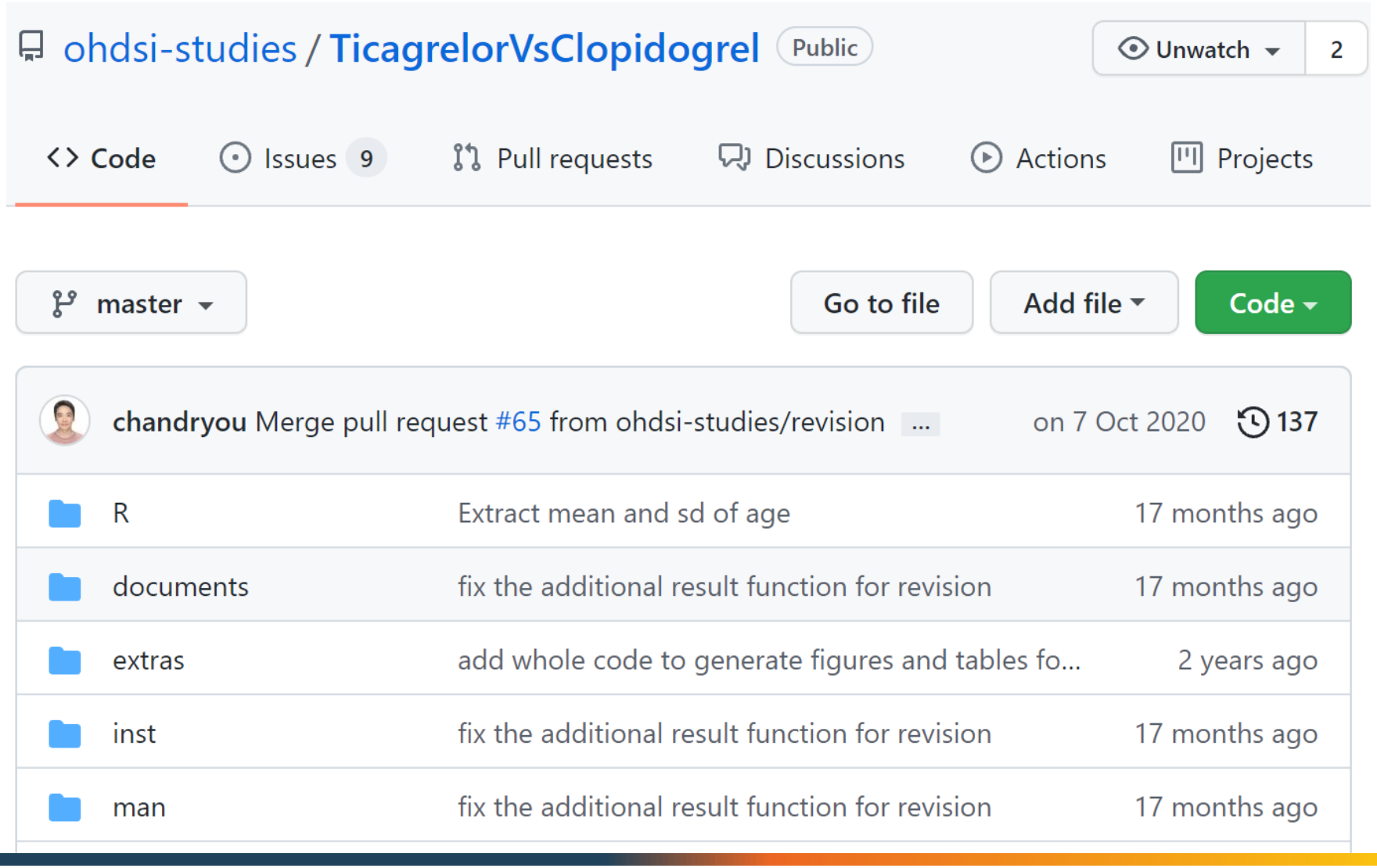
Study Package Repository



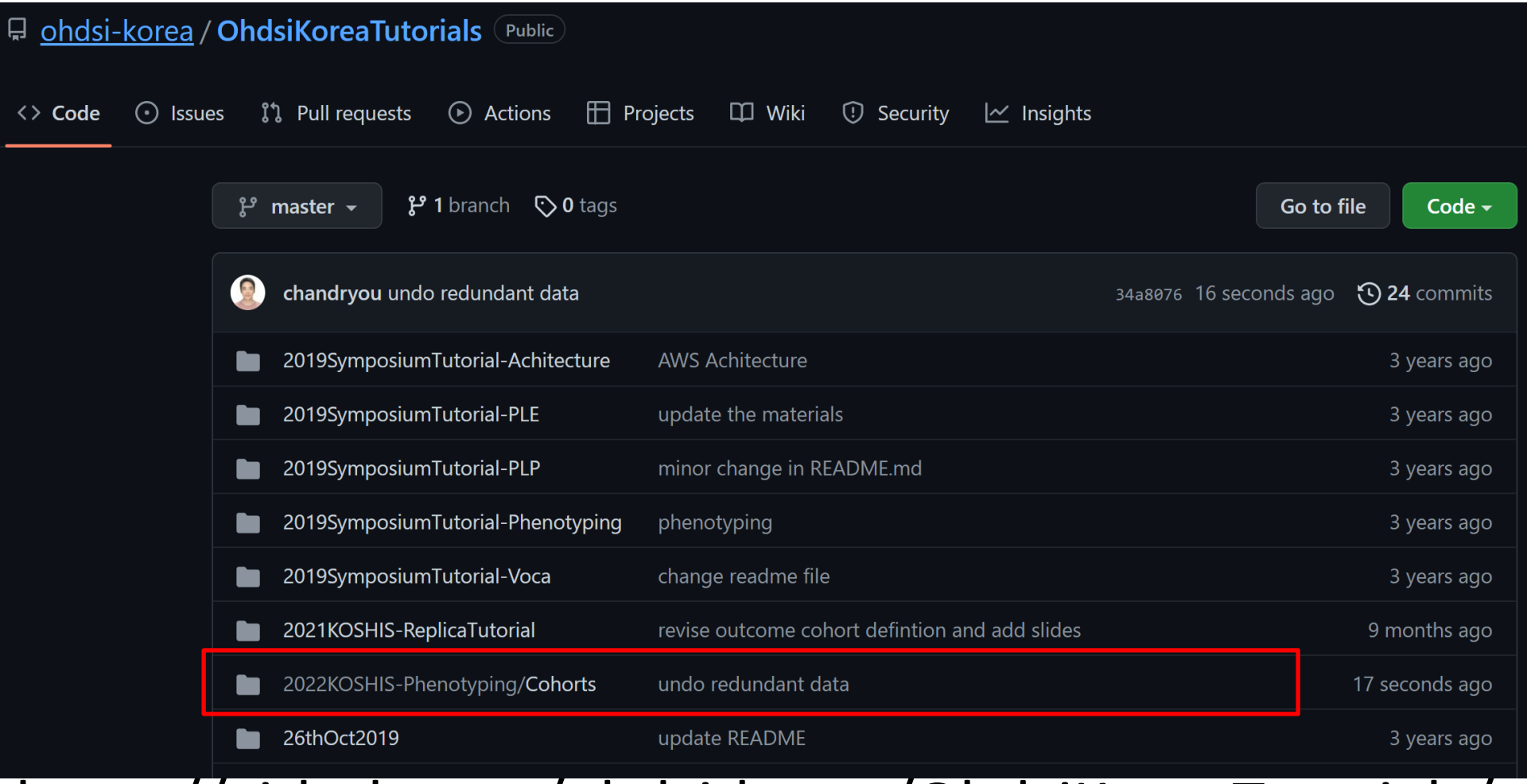
https://github.com/ohdsi-studies/TicagrelorVsClopidogrel

Study Package Repository



https://github.com/ohdsi-studies/TicagrelorVsClopidogrel

Study Package Repository
for this tutorial



https://github.com/ohdsi-korea/OhdsiKoreaTutorials/

Validation using Manual chart review

eMethod 3. Individual outcome definitions

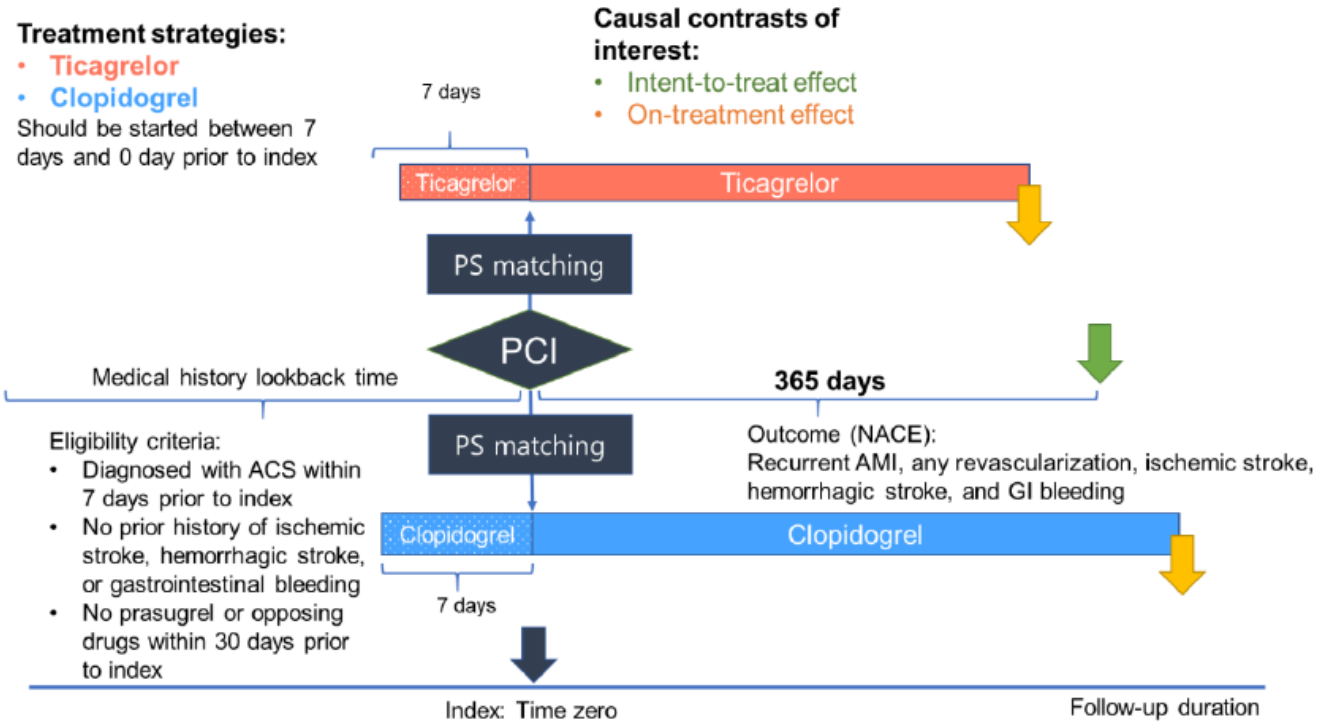
For each outcome, we developed an operational phenotype definition to determine if observational data could in fact support evaluation of the outcome. Where possible, concept sets originated with published code lists (eg ICD-9-CM and ICD-10). We developed definition of outcome cohorts and query to extract them using ATLAS, the OHDSI open-source platform (https://github.com/OHDSI/atlas). We executed these definitions on EHR data of Korean tertiary hospital to validate the definitions. Positive predictive values were estimated by a physician's manual chart review of discharge notes.

Supplementary Table. Outcome definition

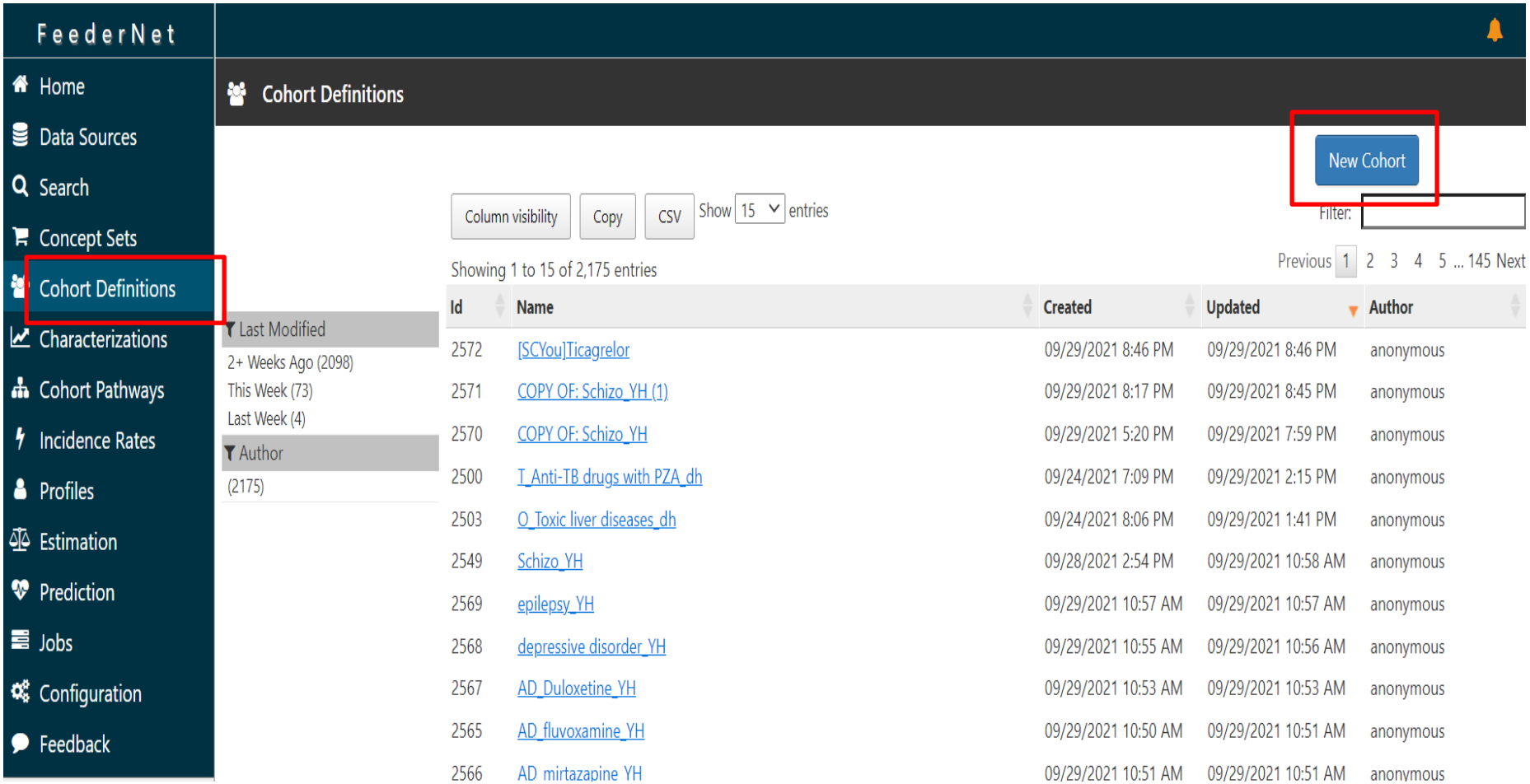
Outcome	Logical description	ICD-9-CM	ICD-10	CPT4	PPV, % (n)
Acute myocardial infarction	Record of acute myocardial infarction during an inpatient or ER visit	410;410.01;410.02;410.1;410.11;410.12;410.2;410.21;410.22;410.3;410.31;410.32;410.4;410.41;410.42;410.5;410.51;410.52;410.7;410.71;410.72;410.8;410.81;410.82;410.9;410.91;410.92	I21.0;I21.1;I21.2;I21.3;I21.4;I21.9		83.8 (83/99)
Revascularization	Record of PCI or CABG during an inpatient or ER visit			566;567;33510;33511;33512;33513;33514;33516;33517;33518;33519;33521;33522;33523;33533;33534;33535;33536;33542;33545;33548;33572;33621;35506;35694;92920;92921;92924;92925;92928;92929;92933;92934;92937;92938;92941;92943;92944;1006199;1006200;1006208;1006216;1006217	100.0 (30/30)
Ischemic stroke	Earliest record of ischemic stroke during an inpatient or ER visit	346.6;346.6;346.61;346.62;346.63;433.01;433.11;433.21;433.31;433.81;433.91;434.01;434.11;434.91;997.02	I63.9;I63.8;I63.6;I63.5;I63.4;I63.3;I63.2;I63.1;I63.0;I63;G46.7;G46.6;G46.5;F01.3;F01.1;F01.0		72.9 (70/96)
Hemorrhagic stroke	Earliest record of intracranial hemorrhage without concomitant ischemic stroke during an inpatient or ER visit	430;431;432;432;432.1;432.9	I60;I60.0;I60.5;I60.6;I60.7;I60.8;I60.9;I61.0;I61.1;I61.2;I61.3;I61.4;I61.5;I62;I62.0;I62.1;I62.9		100.0 (46/46)
Gastrointestinal bleeding	Gastrointestinal hemorrhage condition record during an inpatient or ER visit	530.21;530.7;530.82;531;531;531.01;531.2;531.2;531.21;531.4;531.4;531.41;531.6;531.6;531.61;532;532;532.01;532.2;532.2;532.21;532.4;532.4;532.41;532.6;532.6;532.61;533;533;533.01;533.2;533.2;533.21;533.4;533.4;533.41;533.6;533.6;533.61;534;534;534.01;534.2;534.2;534.21;534.4;534.4;534.41;534.6;534.6;534.61;535.01;535.11;535.21;535.31;535.41;535.51;535.61;535.71;537.83;537.84;562.02;562.03;562.12;562.13;569.3;569.85;578;578;578.1;578.9	K22.6;K25.0;K25.2;K25.4;K25.6;K26.0;K26.2;K26.4;K26.6;K27.0;K27.2;K27.4;K27.6;K28.0;K28.2;K28.4;K28.6;K62.5;K92.0;K92.1;K92.2		95.8 (68/71)
Dyspnea	Record of dyspnea	786.02;786.05	R06.0		94.7 (18/19)

Method: Study Population

- Inclusion Criteria
  - Adults (>=20 yrs) who initiated ticagrelor or clopidogrel due to acute coronary syndrome (ACS) and undertook percutaneous coronary intervention (PCI)
- Exclusion Criteria
  - Prior history of stroke or gastrointestinal bleeding
  - Use of prasugrel or opposing drug within previous 30 days from index date



https://github.com/ohdsi-studies/TicagrelorVsClopidogrel


FeederNet
Home
Data Sources
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Concept Sets
Cohort Definitions
Characterizations
Cohort Pathways
Incidence Rates
Profiles
Estimation
Prediction
Jobs
Configuration
Feedback
Cohort Definitions
New Cohort
Column visibility
Copy
CSV
Show 15 entries
Filter:
Showing 1 to 15 of 2,175 entries
Previous 1 2 3 4 5 ... 145 Next
Last Modified
2+ Weeks Ago (2098)
This Week (73)
Last Week (4)
Author
(2175)
Id
Name
Created
Updated
Author
2572 [SCYou]Ticagrelor 09/29/2021 8:46 PM 09/29/2021 8:46 PM anonymous
2571 COPY OF: Schizo_YH (1) 09/29/2021 8:17 PM 09/29/2021 8:45 PM anonymous
2570 COPY OF: Schizo_YH 09/29/2021 5:20 PM 09/29/2021 7:59 PM anonymous
2500 T_Anti-TB drugs with PZA_dh 09/24/2021 7:09 PM 09/29/2021 2:15 PM anonymous
2503 O_Toxic liver diseases_dh 09/24/2021 8:06 PM 09/29/2021 1:41 PM anonymous
2549 Schizo_YH 09/28/2021 2:54 PM 09/29/2021 10:58 AM anonymous
2569 epilepsy_YH 09/29/2021 10:57 AM 09/29/2021 10:57 AM anonymous
2568 depressive disorder_YH 09/29/2021 10:55 AM 09/29/2021 10:56 AM anonymous
2567 AD_Duloxetine_YH 09/29/2021 10:53 AM 09/29/2021 10:53 AM anonymous
2565 AD_fluvoxamine_YH 09/29/2021 10:50 AM 09/29/2021 10:51 AM anonymous
2566 AD_mirtazapine_YH 09/29/2021 10:51 AM 09/29/2021 10:51 AM anonymous

[MyName]Ticagrelor

Definition | Concept Sets | Generation | Reporting | Export | Messages 6

Text View | Graphical View | JSON | SQL


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    "STANDARD_CONCEPT": "S",
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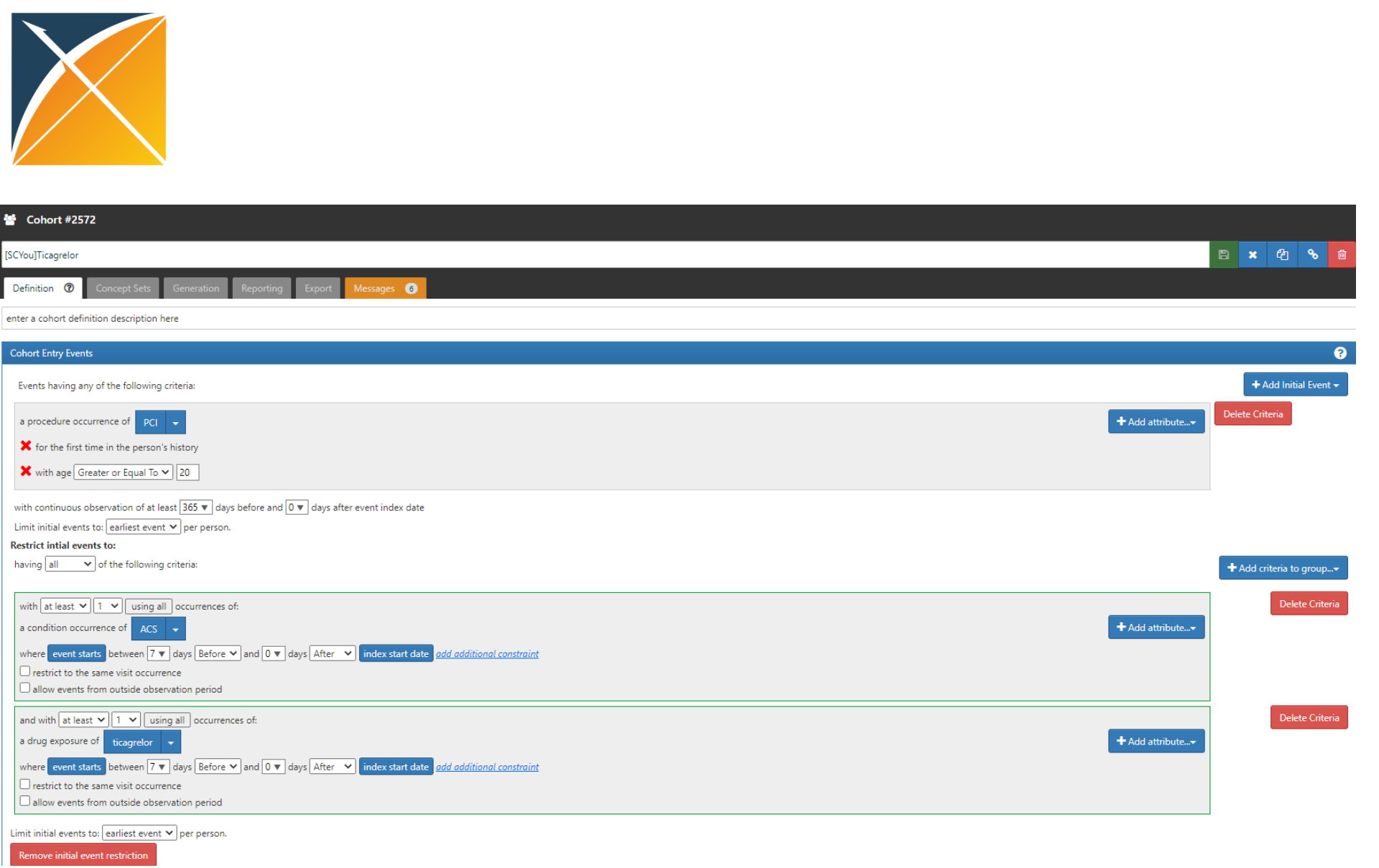
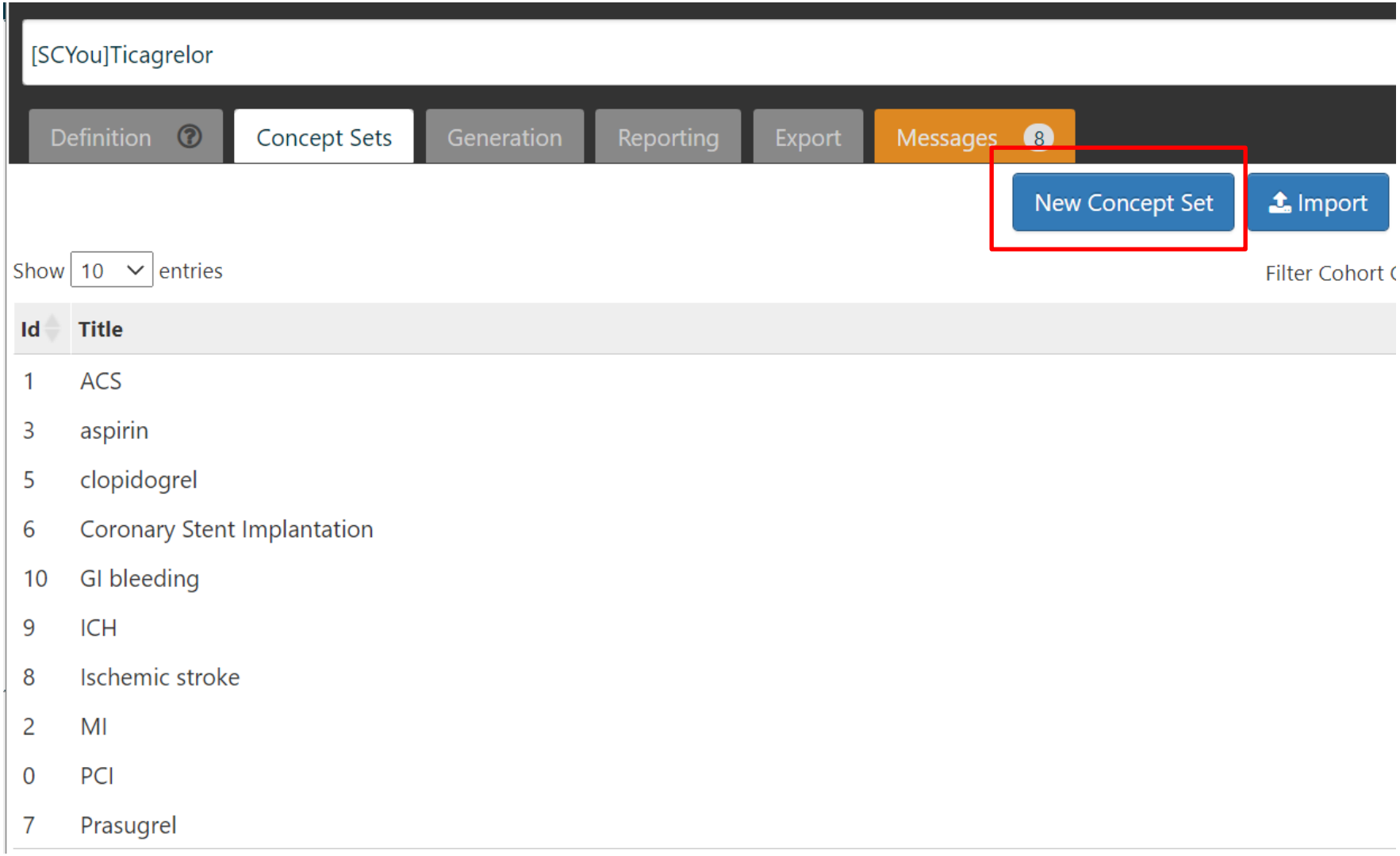
Copy and paste the cohort.json file

Copy To Clipboard

Reload


Cohort #2572
[SCYou]Ticagrelor
Definition
Concept Sets
Generation
Reporting
Export
Messages 6
enter a cohort definition description here
Cohort Entry Events
Events having any of the following criteria:
+ Add Initial Event
a procedure occurrence of PCI
+ Add attribute...
Delete Criteria
for the first time in the person's history
with age Greater or Equal To 20
with continuous observation of at least 365 days before and 0 days after event index date
Limit initial events to: earliest event per person.
Restrict intial events to:
having all of the following criteria:
+ Add criteria to group...
with at least 1 using all occurrences of:
a condition occurrence of ACS
+ Add attribute...
Delete Criteria
where event starts between 7 days Before and 0 days After index start date add additional constraint
restrict to the same visit occurrence
allow events from outside observation period
and with at least 1 using all occurrences of:
a drug exposure of ticagrelor
+ Add attribute...
Delete Criteria
where event starts between 7 days Before and 0 days After index start date add additional constraint
restrict to the same visit occurrence
allow events from outside observation period
Limit initial events to: earliest event per person.
Remove initial event restriction

#1 Create Concept Set: Ticagrelor



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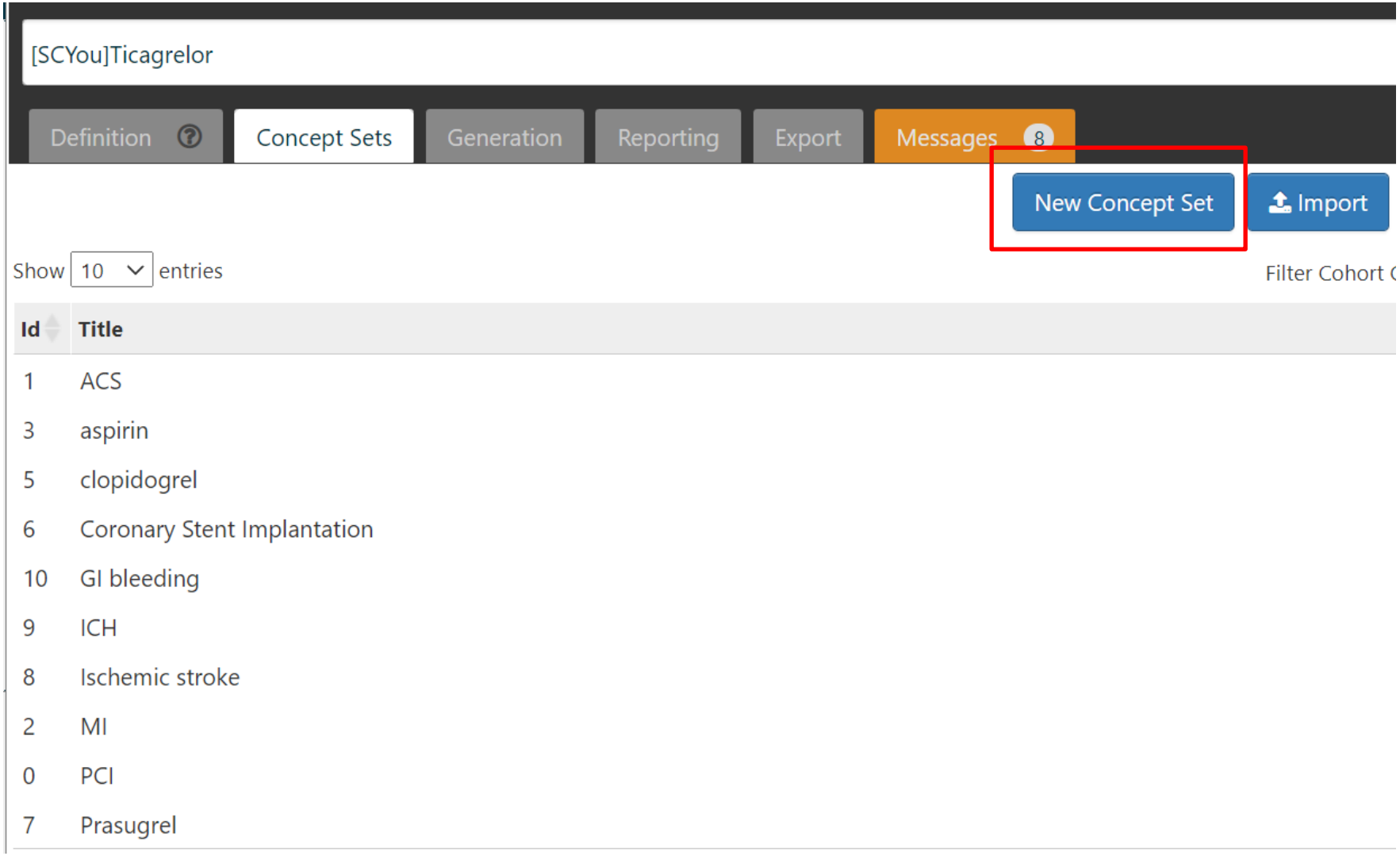
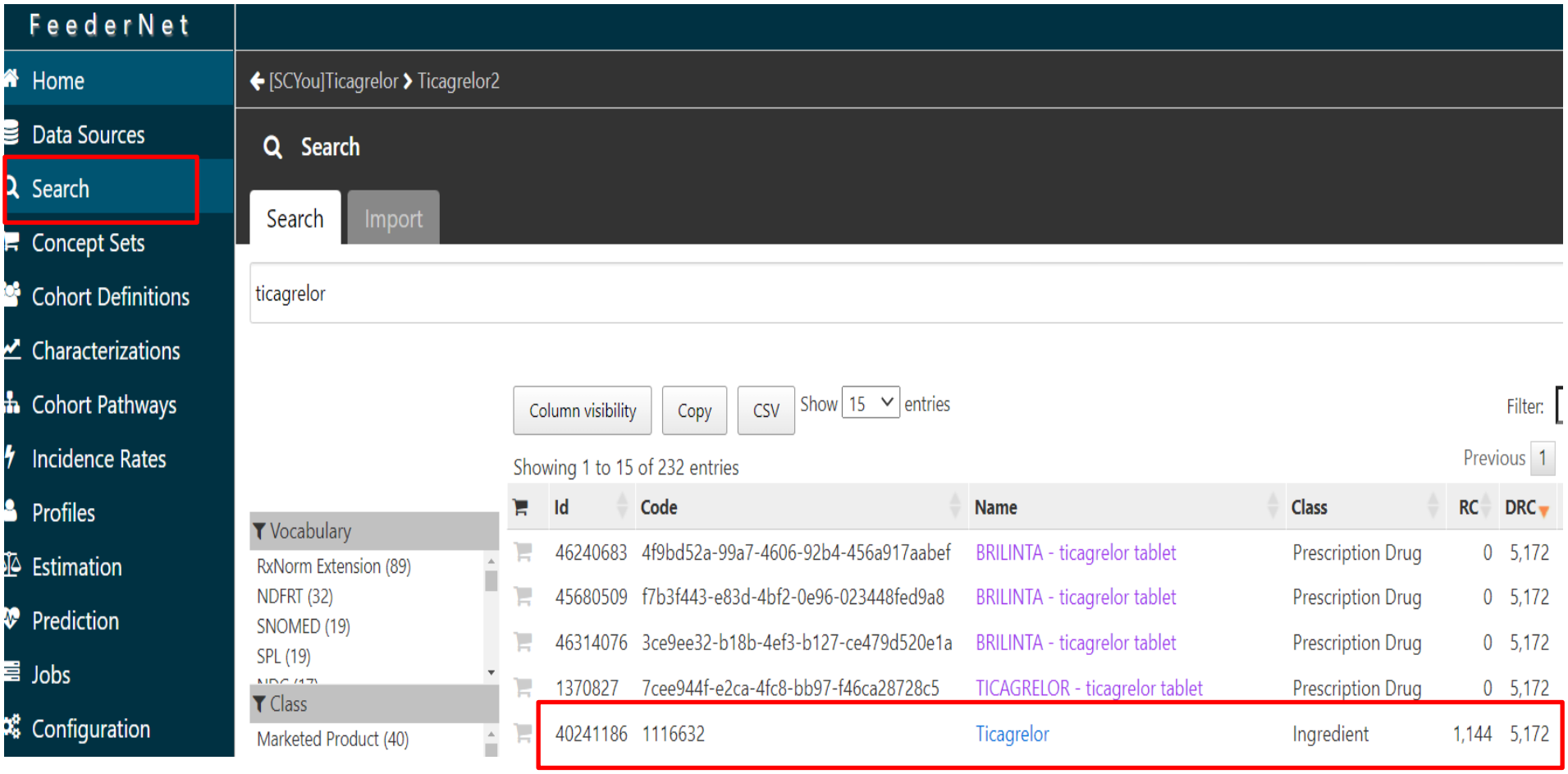
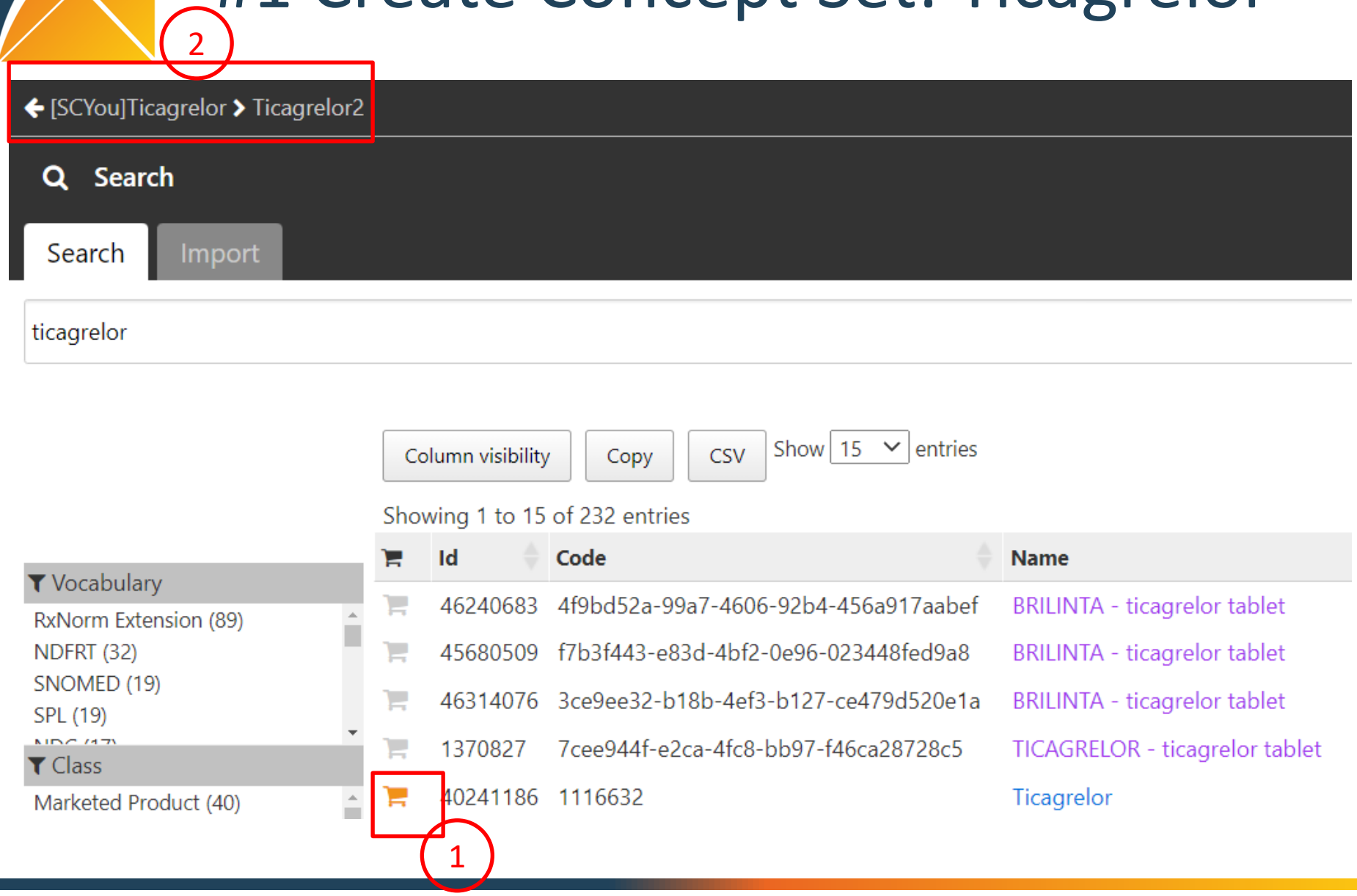


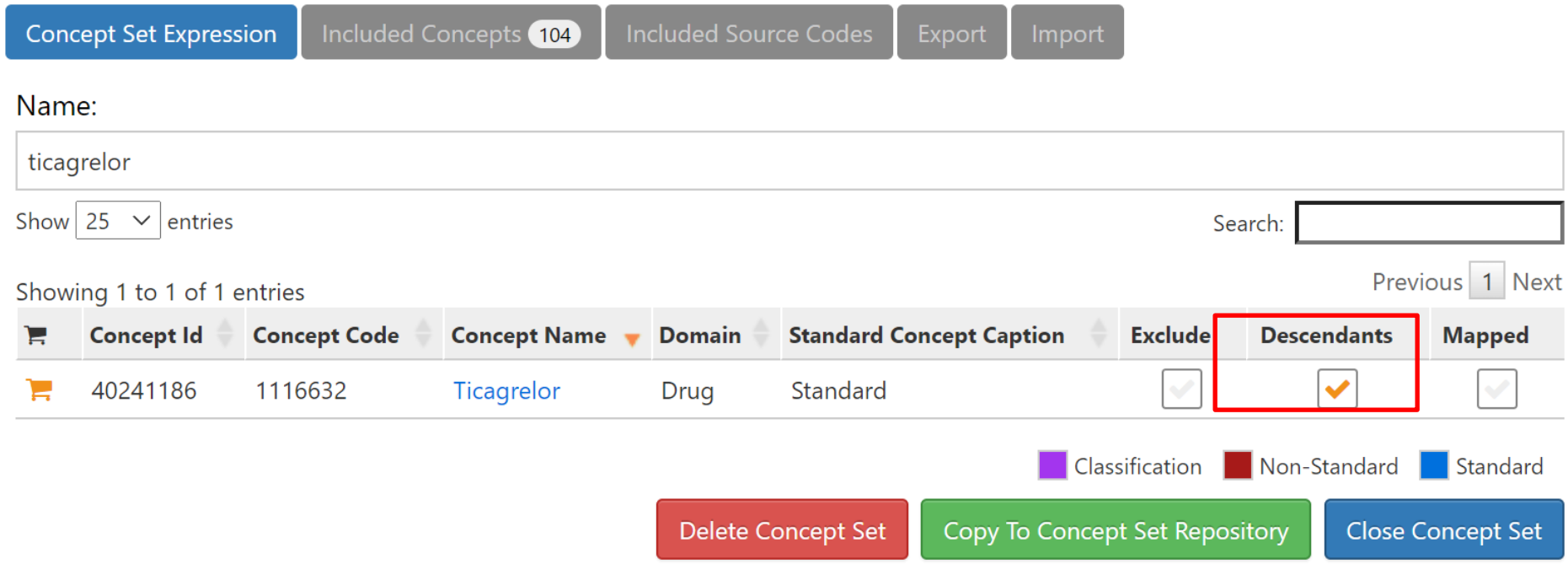
#1 Create Concept Set: Ticagrelor



#1 Create Concept Set: Ticagrelor



#1 Create Concept Set: Ticagrelor



#1 Create Concept Set: ACS

Name:

ACS

Show 25 entries

Search:

Showing 1 to 5 of 5 entries

Previ

Concept Id	Concept Code	Concept Name	Domain	Standard Concept Caption	Exclude	Descendants
315296	4557003	Preinfarction syndrome	Condition	Standard	☐	☑
444406	70422006	Acute subendocardial infarction	Condition	Standard	☐	☑
438170	73795002	Acute myocardial infarction of inferior wall	Condition	Standard	☐	☑
434376	54329005	Acute myocardial infarction of anterior wall	Condition	Standard	☐	☑
312327	57054005	Acute myocardial infarction	Condition	Standard	☐	☑

#2 Create Target Cohort:Ticagrelor

Cohort Entry Events

Events having any of the following criteria:

a procedure occurrence of PCI

✖ for the first time in the person's history

✖ with age Greater or Equal To 20

with continuous observation of at least 0 days before and 0 days after event index date

Limit initial events to: earliest event per person.

#2 Create Target Cohort:Ticagrelor

Restrict intial events to:

having all of the following criteria:

with at least 1 using all occurrences of:

a condition occurrence of ACS

where event starts between 7 days Before and 0 days After index start date

restrict to the same visit occurrence

allow events from outside observation period

and with at least 1 using all occurrences of:

a drug exposure of ticagrelor

where event starts between 7 days Before and 0 days After index start date

restrict to the same visit occurrence

allow events from outside observation period

#2 Create Target Cohort:Ticagrelor

New inclusion criteria

1. Without clopidogrel or prasugrel on the day of PCI
2. Without previous stroke
3. Without previous GI bleeding

Without clopidogrel or prasugrel on the day of PCI

enter an inclusion rule description

having all of the following criteria:

+ Add cri

with at most 0 using all occurrences of:

a drug exposure of clopidogrel

+ Add attribute...

where event starts between 30 days Before and 0 days After

index start date *add additional constraint*

☐ restrict to the same visit occurrence

☐ allow events from outside observation period

and with at most 0 using all occurrences of:

a drug exposure of Prasugrel

+ Add attribute...

where event starts between 30 days Before and 0 days After

index start date *add additional constraint*

☐ restrict to the same visit occurrence

☐ allow events from outside observation period

#2 Create Target Cohort:Ticagrelor

Inclusion Criteria

New inclusion criteria

1. Without clopidogrel or prasugrel on the day of PCI
2. Without previous stroke
3. Without previous GI bleeding

Without previous stroke

enter an inclusion rule description

having all of the following criteria: + Add cri

with at most 0 using all occurrences of:

a condition occurrence of Ischemic stroke + Add attribute...

where event starts between All days Before and 0 days After

index start date *add additional constraint*

restrict to the same visit occurrence

allow events from outside observation period

and with at most 0 using all occurrences of:

a condition occurrence of ICH + Add attribute...

where event starts between All days Before and 0 days After

index start date *add additional constraint*

restrict to the same visit occurrence

allow events from outside observation period

#2 Create Target Cohort:Ticagrelor

New inclusion criteria

1. Without clopidogrel or prasugrel on the day of PCI
2. Without previous stroke
3. Without previous GI bleeding

Without previous GI bleeding

enter an inclusion rule description

having all of the following criteria:

with at most 0 using all occurrences of:

a condition occurrence of GI bleeding

where event starts between All days Before and 0 days After

index start date *add additional constraint*

restrict to the same visit occurrence

allow events from outside observation period

#2 Create Target Cohort:Ticagrelor

Cohort Exit

Event Persistence:

Event will persist until: end of a continuous drug exposure

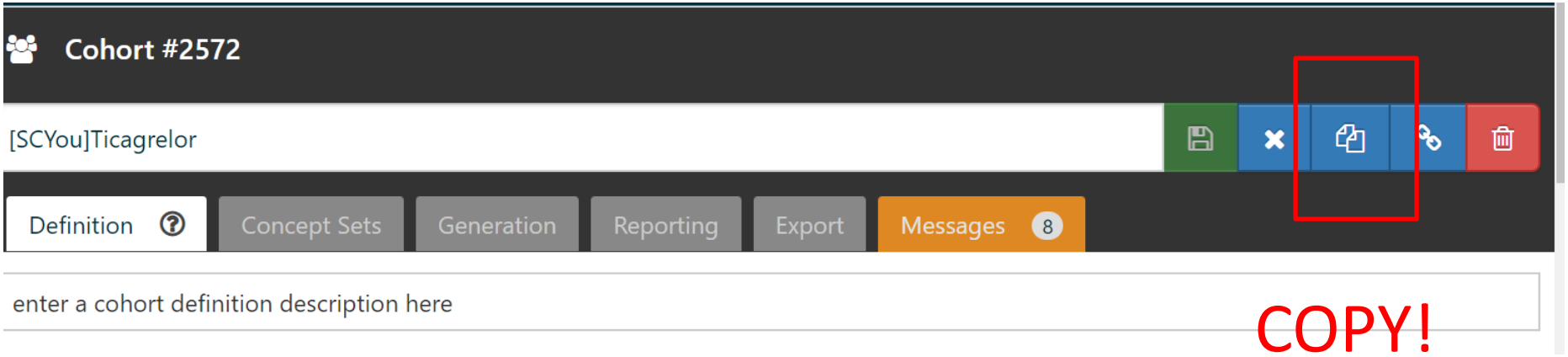
Continuous Exposure Persistence:

Specify a concept set that contains one or more drugs. A drug era will
the concept set, using the specified persistence window as a maximum
adding a specified surveillance window to the final exposure event. If
date is inferred to be event start date + days supply in cases when day
persistence assures that the cohort end date will be no greater than th

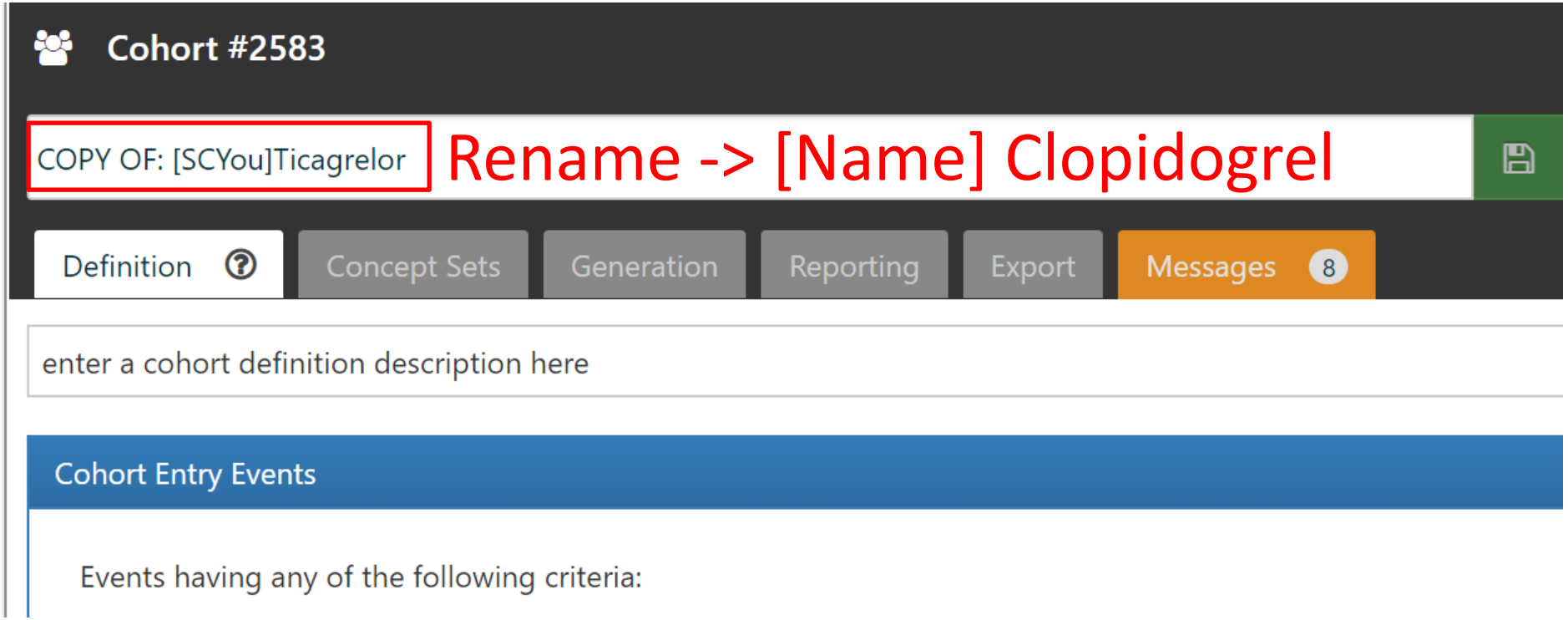
Concept set containing the drug(s) of interest: ticagrelor

- Persistence window: allow for a maximum of 7 days betwe
- Surveillance window: add 0 days to the end of the era of p
  cohort exit.

#3 Create Comparator Cohort: Clop



#3 Create Comparator Cohort: Clop



#3 Create Comparator Cohort: Clop

with at least 1 using all occurrences of:

a condition occurrence of ACS

Add attribute...

where event starts between 7 days Before and 0 days After index start date *add additional constraint*

☐ restrict to the same visit occurrence

☐ allow events from outside observation period

and with at least 1 using all occurrences of:

a drug exposure of clopidogrel

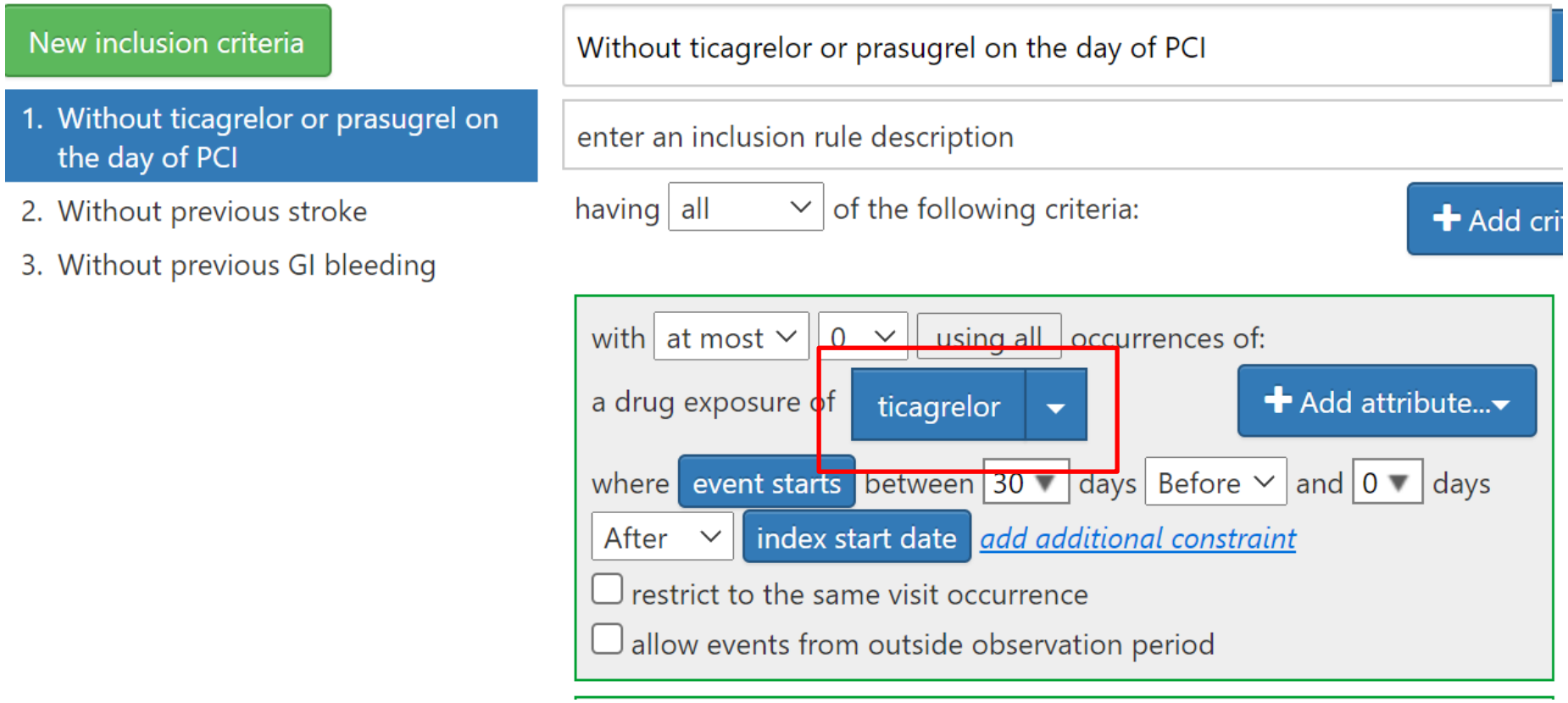
Add attribute...

where event starts between 7 days Before and 0 days After index start date *add additional constraint*

☐ restrict to the same visit occurrence

☐ allow events from outside observation period

#3 Create Comparator Cohort: Clop



#3 Create Comparator Cohort: Clop

Cohort Exit

Event Persistence:

Event will persist until: end of a continuous drug exposure

Continuous Exposure Persistence:

Specify a concept set that contains one or more drugs. A drug era will b
the concept set, using the specified persistence window as a maximum
adding a specified surveillance window to the final exposure event. If nc
date is inferred to be event start date + days supply in cases when days
persistence assures that the cohort end date will be no greater than the

Concept set containing the drug(s) of interest: clopidogrel

- Persistence window: allow for a maximum of 7 days betwee
- Surveillance window: add 0 days to the end of the era of pe
  cohort exit.

#4 Create Outcome Cohort:AMI

Name:

Acute MI

Show 25 entries

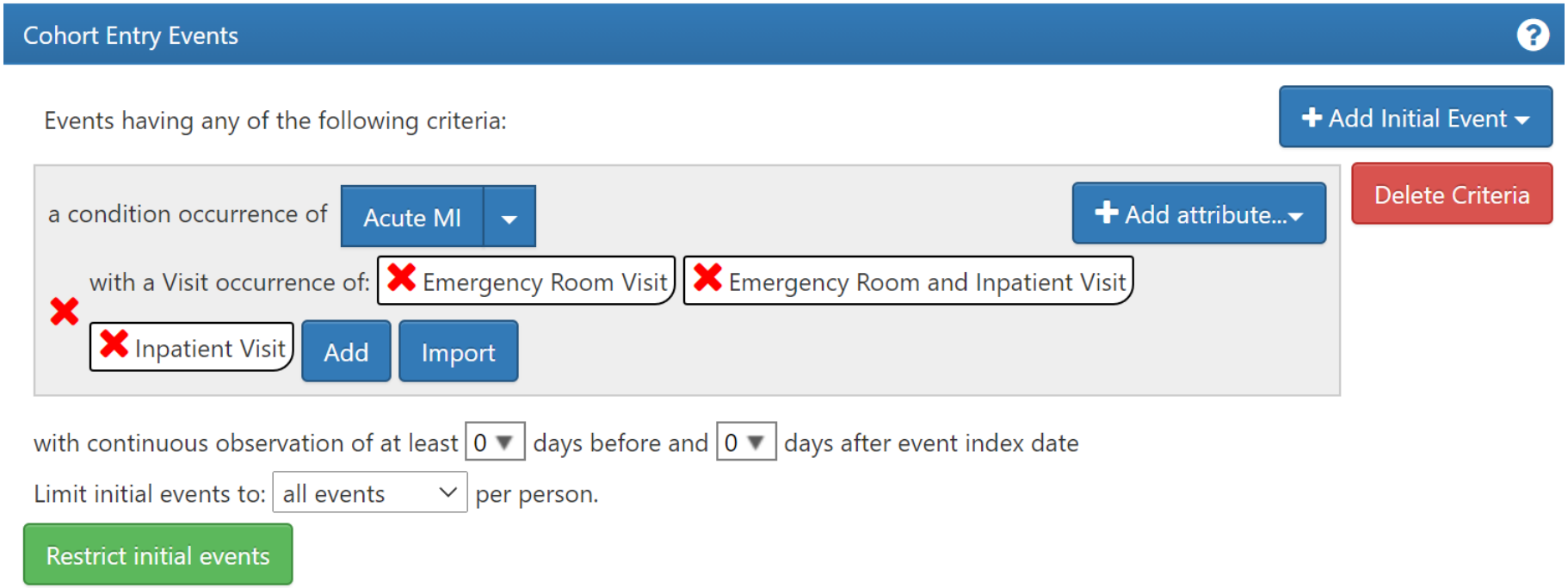
Search:

Showing 1 to 4 of 4 entries

Previous 1 Next

	Concept Id	Concept Code	Concept Name	Domain	Standard Concept Caption	Exclude	Descendants	Mapped
	444406	70422006	Acute subendocardial infarction	Condition	Standard	☐	☑	☐
	438170	73795002	Acute myocardial infarction of inferior wall	Condition	Standard	☐	☑	☐
	434376	54329005	Acute myocardial infarction of anterior wall	Condition	Standard	☐	☑	☐
	312327	57054005	Acute myocardial infarction	Condition	Standard	☐	☑	☐

#4 Create Outcome Cohort:AMI



#4 Create Outcome Cohort:AMI

emergency | Visit | Search

Show 10 entries | Filter records:

	Concept Id	Code	Concept Name	Standard Type	Vocabulary	Domain
✓	8870	23	Emergency Room - Hospital	S	CMS Place of Service	Visit
✓	38004220	261QE0002X	Ambulatory Emergency Care Clinic/Center	S	NUCC	Visit
✓	38004337	333300000X	Emergency Response System Supplier	S	NUCC	Visit
✓	38004362	343900000X	Non-emergency Medical Transport	S	NUCC	Visit
✓	9203	ER	Emergency Room Visit	S	Visit	Visit
✓	262	ERIP	Emergency Room and Inpatient Visit	S	Visit	Visit
✓	581381	OMOP4822040	Emergency Room Critical Care Facility	S	CMS Place of Service	Visit
✓	32583	7	Emergency Room	N	UB04 Point of Origin	Visit

#4 Create Outcome Cohort:AMI

Show 10 entries

Filter records: inpatient

	Concept Id	Code	Concept Name	Standard Type	Vocabulary	Domain
✓	8717	21	Inpatient Hospital	S	CMS Place of Service	Visit
✓	38004311	315D00000X	Inpatient Hospice	S	NUCC	Visit
✓	8971	51	Inpatient Psychiatric Facility	S	CMS Place of Service	Visit
✓	8920	61	Comprehensive Inpatient Rehabilitation Facility	S	CMS Place of Service	Visit
✓	262	ERIP	Emergency Room and Inpatient Visit	S	Visit	Visit
✓	9201	IP	Inpatient Visit	S	Visit	Visit
✓	581384	OMOP4822037	Inpatient Nursery	S	CMS Place of Service	Visit
✓	581383	OMOP4822038	Inpatient Cardiac Care Facility	S	CMS Place of Service	Visit
✓	581379	OMOP4822042	Inpatient Critical Care Facility	S	CMS Place of Service	Visit
✓	32211	02	Discharged/transferred to other short term general hospital for inpatient care.	N	UB04 Pt dis status	Visit

#4 Create Outcome Cohort:AMI

Cohort Exit

Event Persistence:

Event will persist until: fixed duration relative to initial event

Fixed Duration Persistence:

The event end date is derived from adding a number of days to the ev
all cohort episodes will have the same fixed duration (subject to furthe
the cohort may have varying cohort duration times due to the varying
length of stay). This event persistence assures that the cohort end date
offset.

- Event date to offset from: start date
- Number of days offset: 1 days

Censoring Events:

Exit Cohort based on the following criteria:

No censoring events selected.