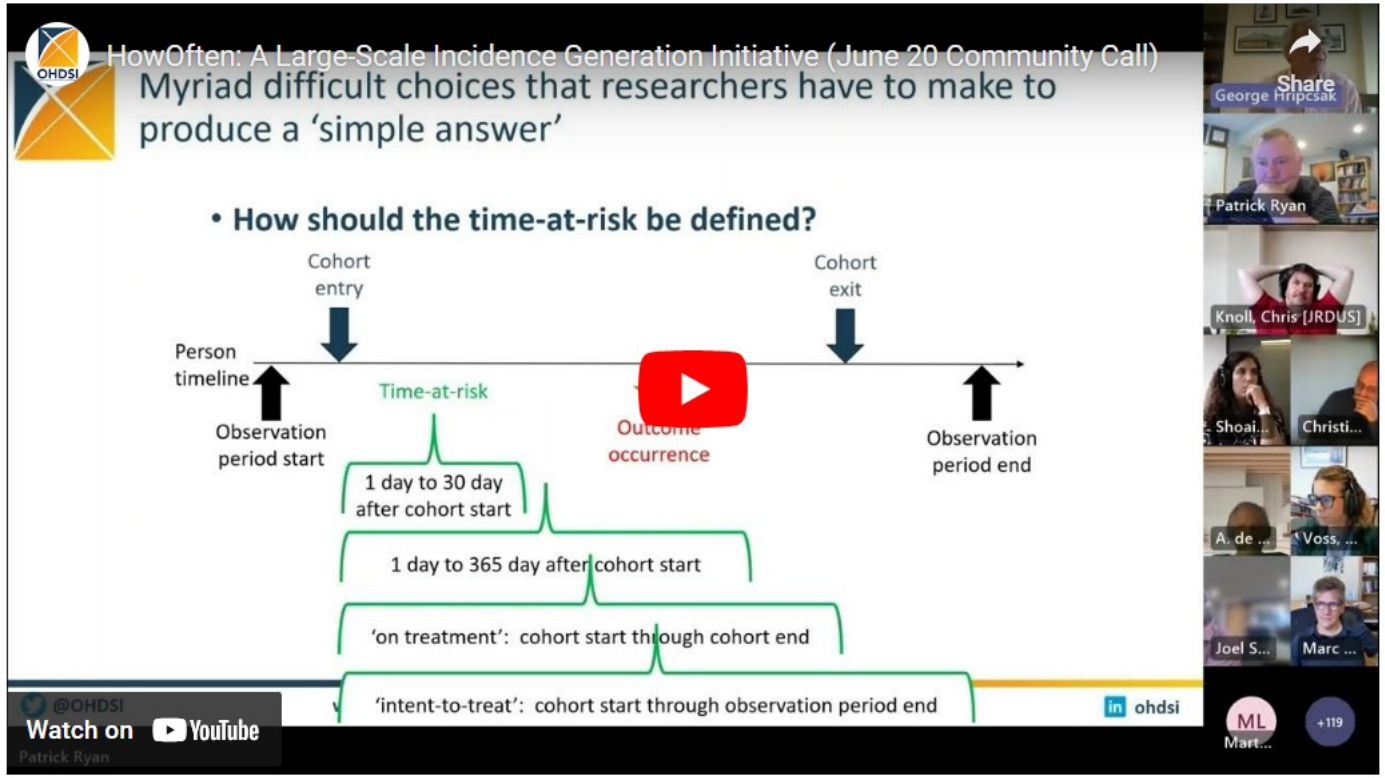
Next steps for HowOften: A Large-Scale Incidence Generation Initiative

OHDSI Community Call
August 15, 2023 • 11 am ET

20 June 2023 community call

Video Presentation



Global Symposium

Global Symposium

Oct. 20-22 • East Brunswick, NJ, USA

ohdsi.org/OHDSI2023

OHDSI 2023 Global Symposium

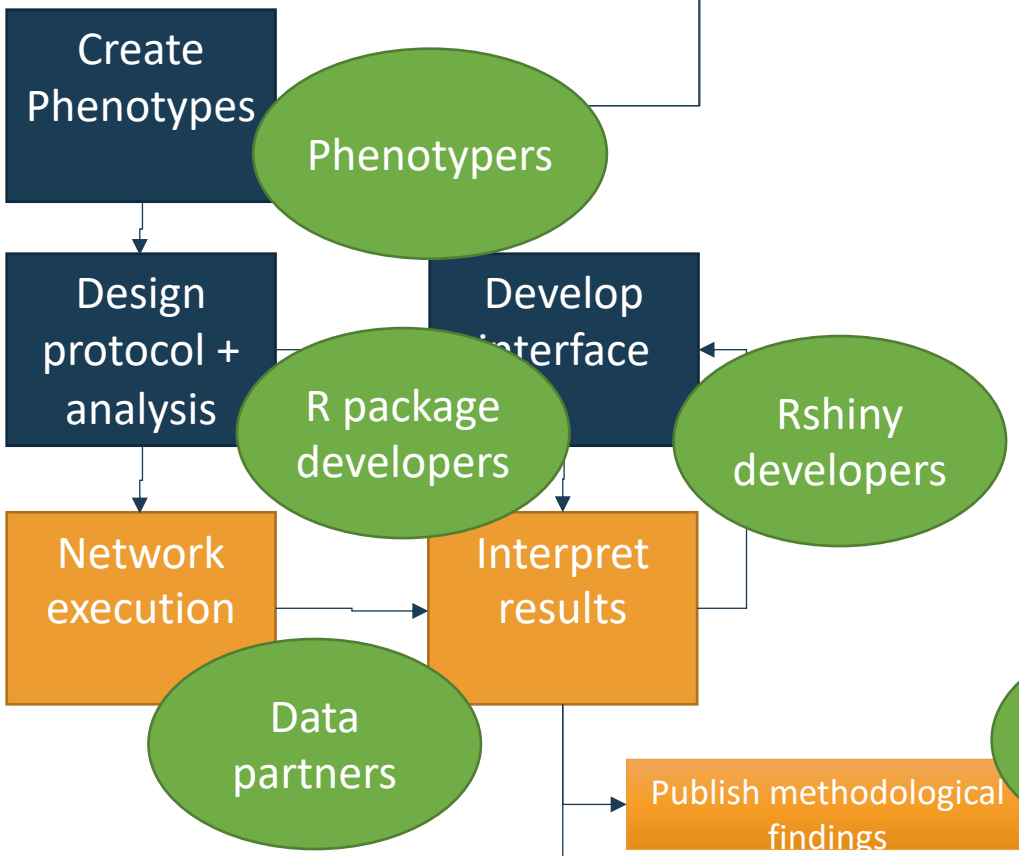
October 20-22 • East Brunswick, NJ, USA

** This agenda is tentative and subject to change*

	Friday, Oct 20	Saturday, Oct 21	Sunday, Oct 22
8:00am	Welcome to OHDSI2023!	Intro to OHDSI Tutorial & OHDSI workgroup activities	OHDSI collaborative workshop: HowOften
9:00am	State of the Community		
10:00am	Community networking		
11:00am	Plenary session		
12:00pm	Lunch	**Collaborator Showcase: posters & demos**	**Collaborator Showcase: posters & demos**
1:00pm	Panel: Network studies	OHDSI collaborative workshop: HowOften	HDSI workgroup activities
2:00pm	**Collaborator Showcase: posters & demos**		
3:00pm	**Collaborator Showcase: Lightning talks**		
4:00pm	**Collaborator Showcase: posters & demos**		
5:00pm	Closing talk	ree time ☺	Time to go home ☹
6:00pm	OHDSI Got Talent!		

HowOften community effort

We need you!



Target cohorts:

1. 'general population'
   1Jan2018, 1Jan2022, 1st visit 2018, 1st visit 2022….
2. 'important indications'
   Diabetes, Hypertension, Renal impairment, hepatic impairment, cardiac impairment, cancers (breast, lung, prostate), mental health (depression, bipolar, hizophrenia), infectious e (Covid, HIV), eye linding diseases), nen's health (pregnancy, endometriosis), ….
   rug classes'
   ACE inhibitors, SSRI, EGF, ….

Outcome cohorts:

1. Adverse events of special interest (AESI)
   Guillain-Barre Syndrome, Thrombocytopenia, Ischemic stroke, Transverse myelitis, …
2. Designated medical events (DME)
   Stevens-Johnson Syndrome, pancreatitis, rhabdomyolysis acute kidney injury, …
3. Indication outcomes
   End-stage renal disease, acute myocardial infarction, hepatic failure, …
4. Side effects of drugs
   Headache, diarrhea, anaphylaxis, …

Stratification factors:
1. Database, 2. Age, 3. Sex, 4. Calendar year

HowOften next steps

- Pre-Symposium:
  - Draft protocol to allow data partners to get approval to participate
  - Develop and evaluate all phenotypes for targets and outcomes
    - All outcomes to be used in HowOften must be included in OHDSI Phenotype Library
  - Release analysis package that includes all phenotypes and analysis to instantiate cohorts and characterize incidence of all target-outcome pairs
- During Symposium:
  - Execute HowOften analysis package across OHDSI network
  - Deploy viewer to allow exploration of all results
  - Collaborate on appropriate use of evidence
    - Methodological questions: how to ensure results are reliable?
    - Development questions: how to improve user interface to disseminate results?
    - Clinical questions: what have we learned that can fill evidence gaps and improve decision-making?

Analytic use case	Type	Structure	Example
Clinical characterization	**Disease Natural History**	Amongst patients who are diagnosed with <insert your favorite disease>, what are the patient's characteristics from their medical history?	Amongst patients with rheumatoid arthritis, what are their demographics (age, gender), prior conditions, medications, and health service utilization behaviors?
	Treatment utilization	Amongst patients who have <insert your favorite disease>, which treatments were patients exposed to amongst <list of treatments for disease> and in which sequence?	Amongst patients with depression, which treatments were patients exposed to SSRI, SNRI, TCA, bupropion, esketamine and in which sequence?
	Outcome incidence	Amongst patients who are new users of <insert your favorite drug>, how many patients experienced <insert your favorite known adverse event from the drug profile> within <time horizon following exposure start>?	Amongst patients who are new users of methylphenidate, how many patients experienced psychosis within 1 year of initiating treatment?
Patient level prediction	**Disease onset and progression**	For a given patient who is diagnosed with <insert your favorite disease>, what is the probability that they will go on to have <another disease or related complication> within <time horizon from diagnosis>?	For a given patient who is newly diagnosed with atrial fibrillation, what is the probability that they will go onto to have ischemic stroke in next 3 years?
	Treatment response	For a given patient who is a new user of <insert your favorite chronically-used drug>, what is the probability that they will <insert desired effect> in <time window>?	For a given patient with T2DM who start on metformin , what is the probability that they will maintain HbA1C<6.5% after 3 years?
	Treatment safety	For a given patient who is a new user of <insert your favorite drug>, what is the probability that they will experience <insert adverse event > within <time horizon following exposure>?	For a given patients who is a new user of warfarin, what is the probability that they will have GI bleed in 1 year?
Population-level effect estimation	**Safety surveillance**	Does exposure to <insert your favorite drug> increase the risk of experiencing <insert an adverse event> within <time horizon following exposure start>?	Does exposure to ACE inhibitor increase the risk of experiencing Angioedema within 1 month after exposure start?
	Comparative effectiveness	Does exposure to <insert your favorite drug> have a different risk of experiencing <insert any outcome (safety or benefit) > within <time horizon following exposure start>, relative to <insert your comparator treatment>?	Does exposure to ACE inhibitor have a different risk of experiencing acute myocardial infarction while on treatment, relative to thiazide diuretic?

OHDSI's journey generating background incidence rates

thebmj

RESEARCH: SPECIAL PAPER

OPEN ACCESS

Check for updates

FAST TRACK

Characterising the background incidence rates of adverse events of special interest for covid-19 vaccines in eight countries: multinational network cohort study

Xintong Li,[1] Anna Ostropolets,[2] Rupa Makadia,[3] Azza Shoaibi,[3] Gowtham Rao,[3] Anthony G Sena,[3,6] Eugenia Martinez-Hernandez,[4] Antonella Delmestri,[1] Katia Verhamme,[6,7] Peter R Rijnbeek,[6] Talita Duarte-Salles,[5] Marc A Suchard,[8,9] Patrick B Ryan,[2,3] George Hripcsak,[2]

frontiers | Frontiers in Pharmacology

ORIGINAL RESEARCH
published: 26 April 2022
doi: 10.3389/fphar.2022.814198

Check for updates

eClinicalMedicine
Part of THE LANCET *Discovery Science*

Articles

Contextualising adverse events of special interest to characterise the baseline incidence rates in 24 million patients with COVID-19 across 26 databases: a multinational retrospective cohort study

Erica A. Voss,[a,b,c,*] Azza Shoaibi,[a,c] Lana Yin Hui Lai,[a,d] Clair Blacketer,[a,b,c] Thamir Alshammari,[a,e] Rupa Makadia,[a,c] Kevin Haynes,[c] Anthony G. Sena,[a,b,c] Gowtham Rao,[a,c] Sebastiaan van Sandijk,[a,f] Clement Fraboulet,[g] Laurent Boyer,[g] Tanguy Le Carrour,[h] Scott Horban,[i] Daniel R. Morales,[j,k] Jordi Martínez Roldán,[l] Juan Manuel Ramírez-Anguita,[m,n] Miguel A. Mayer,[m,n] Marcel de Wilde,[a,b] Luis H. John,[a,b] Talita Duarte-Salles,[a,o] Elena Roel,[o] Andrea Pistillo,[o] Raivo Kolde,[p] Filip Maljković,[q] Spiros Denaxas,[r,s,t] Vaclav Papez,[r,s] Michael G. Kahn,[a,u] Karthik Natarajan,[a,v,w] Christian Reich,[a,x] Alex Secora,[x] Evan P. Minty,[a,y] Nigam H. Shah,[a,z] Jose D. Posada,[a,aa] Maria Teresa Garcia Morales,[ab] Diego Bosca,[ao] Honorio Cadenas Juanino,[ac] Antonio Diaz Holgado,[ac] Miguel Pedrera Jiménez,[ap] Pablo Serrano Balazote,[ap] Noelia García Barrio,[ap] Selçuk Şen,[ad] Ali Yağız Üresin,[ad] Baris Erdogan,[ae] Luc Belmans,[af] Geert Byttebier,[af] Manu L. N. G. Malbrain,[af,ag] Daniel J. Dedman,[ah] Zara Cuccu,[ah] Rohit Vashisht,[a,ai] Atul J. Butte,[a,ai,aj] Ayan Patel,[a,ai] Lisa Dahm,[a,aj] Cora Han,[a,aj] Fan Bu,[ak] Faaizah Arshad,[a,ak] Anna Ostropolets,[a,v] Fredrik Nyberg,[al] George Hripcsak,[a,v,w] Marc A. Suchard,[a,ak,am] Dani Prieto-Alhambra,[a,b,an] Peter R. Rijnbeek,[a,b] Martijn J. Schuemie,[a,c,ak] and Patrick B. Ryan[a,c,v]

Factors Influencing Background Incidence Rate Calculation: Systematic Empirical Evaluation Across an International Network of Observational Databases

*Anna Ostropolets[1†], Xintong Li[2†], Rupa Makadia[3], Gowtham Rao[3], Peter R. Rijnbeek[4], Talita Duarte-Salles[5], Anthony G. Sena[3,4], Azza Shaoibi[3], Marc A. Suchard[6,7], Patrick B. Ryan[1,3], Daniel Prieto-Alhambra[2] and George Hripcsak[1,8]**

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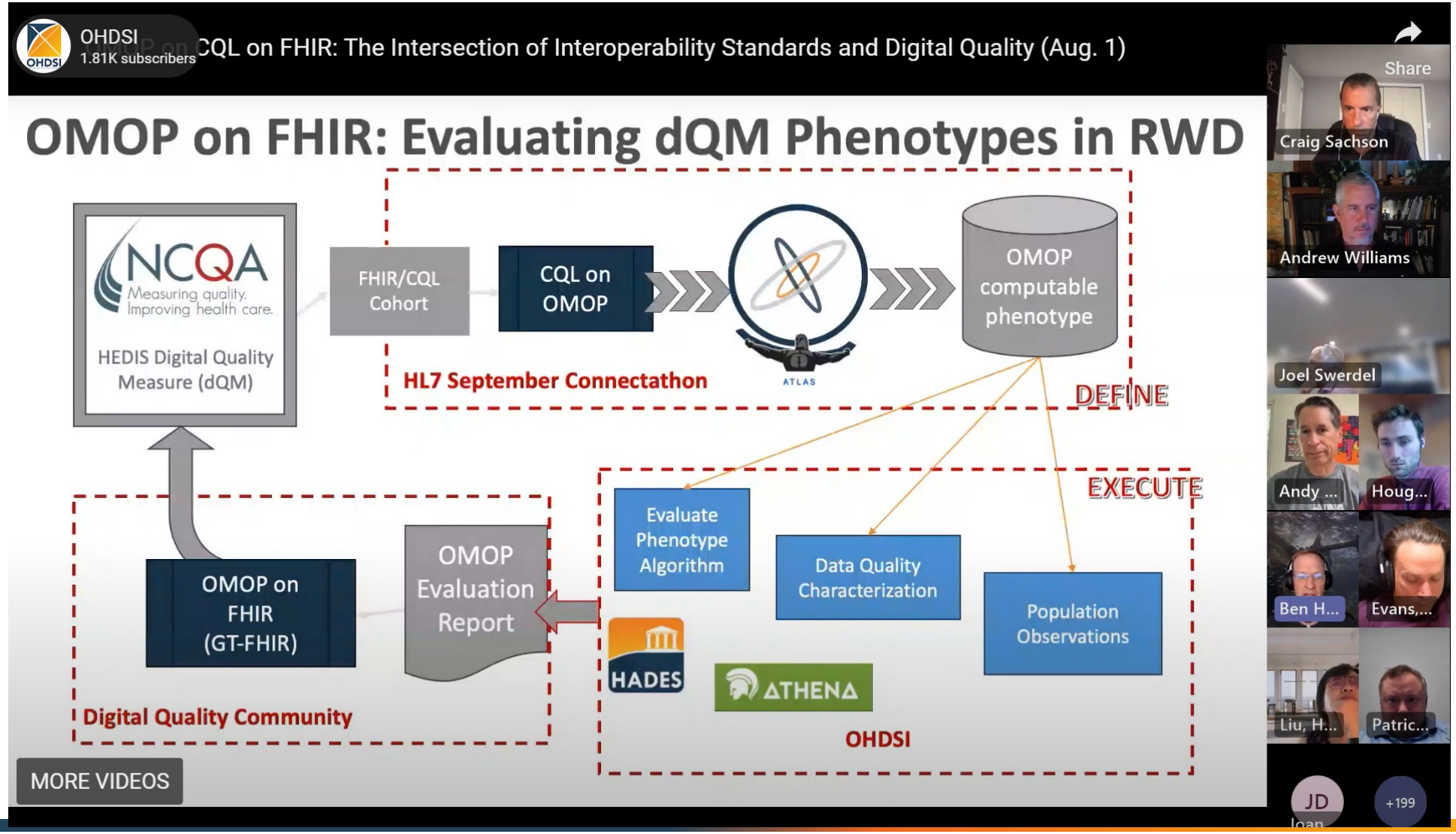
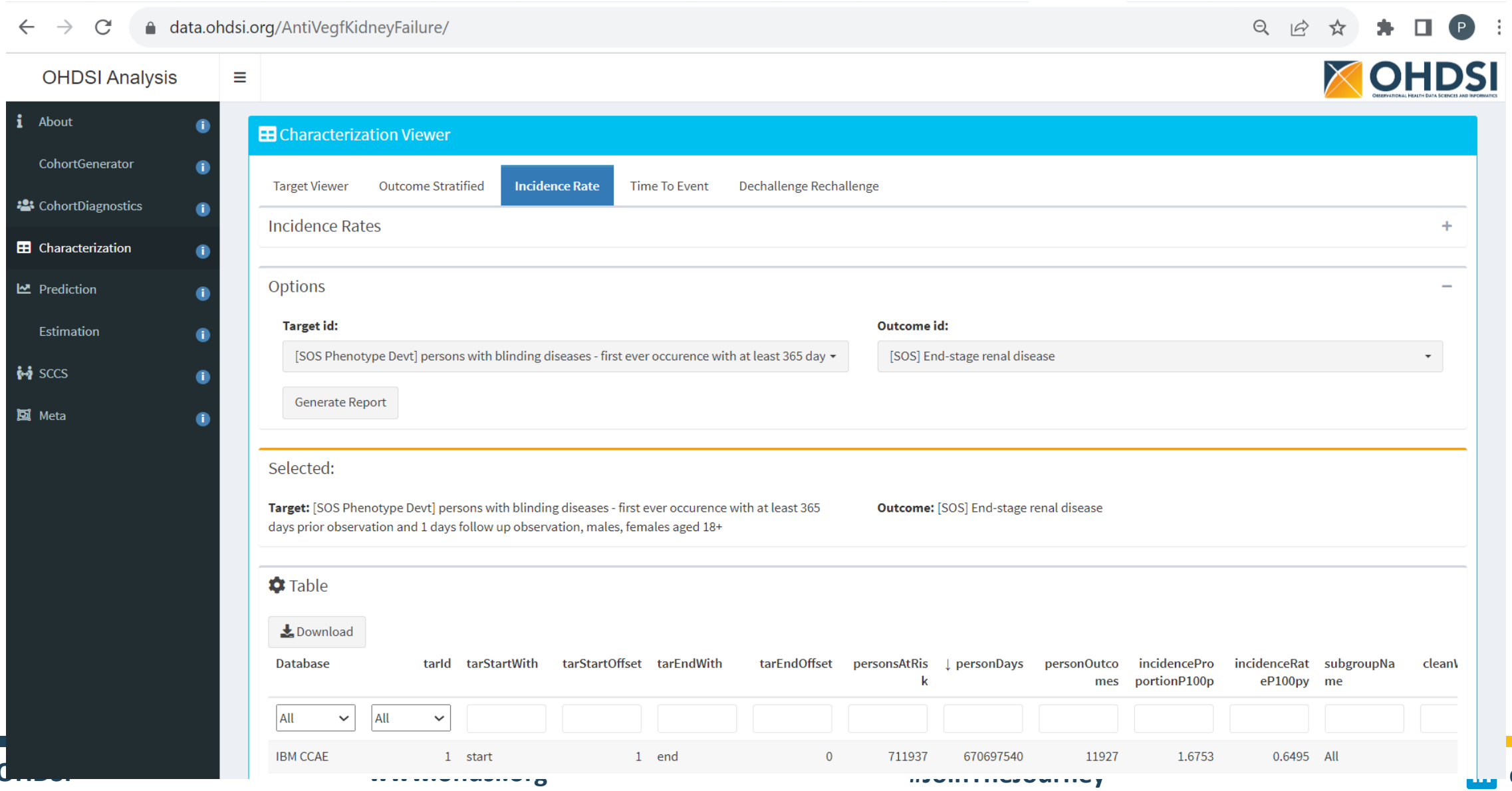
Aug 1: Quality measure = Incidence Proportion



Incidence characterization part of Sisyphus Challenge – context to understand causal effects

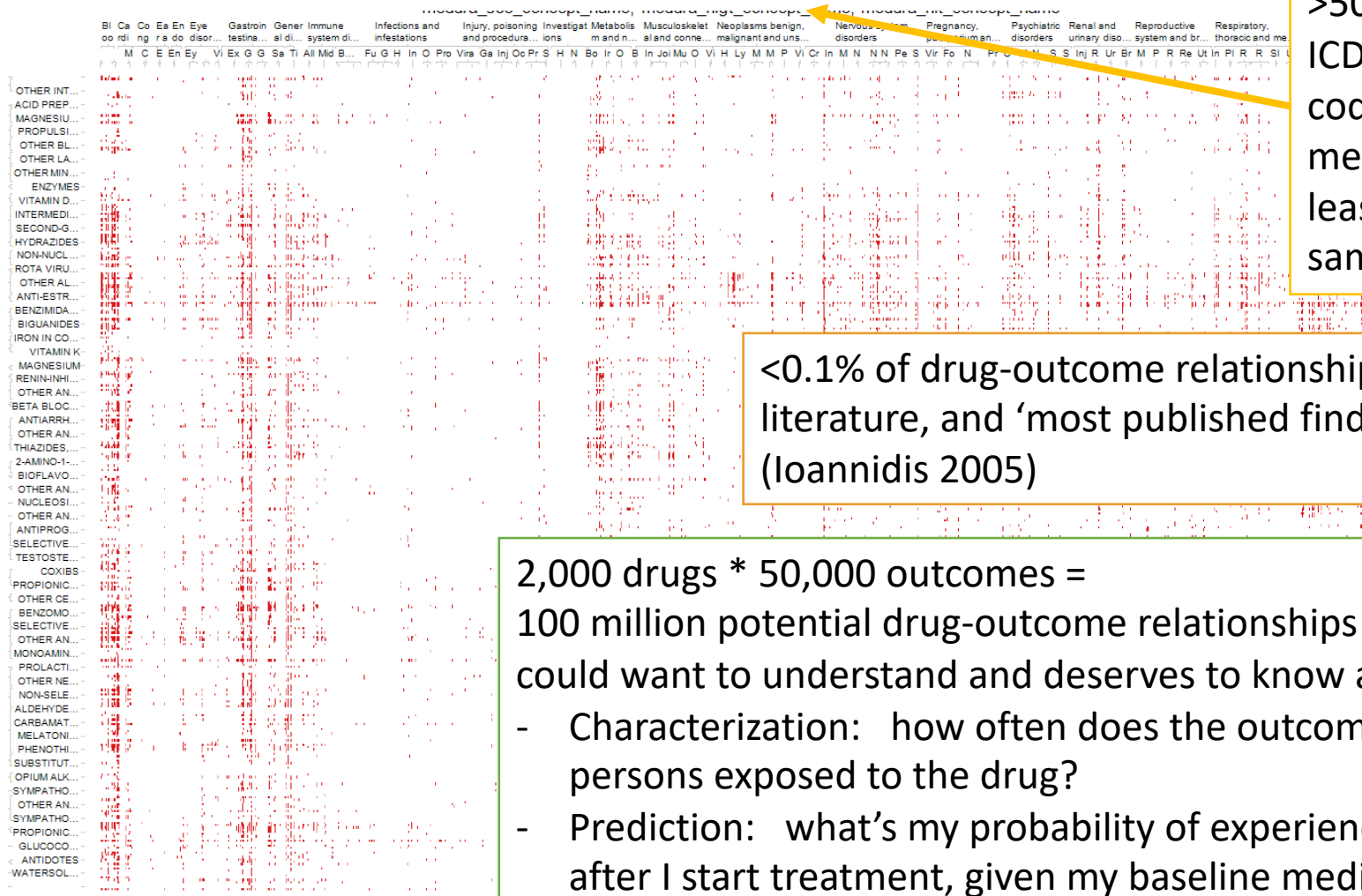


Why large-scale analysis is needed in healthcare

In 2022, there were >2,000 active ingredients approved by FDA which were prescribed to at least patient in 1 large US claims database

All drugs

All health outcomes of interest



In 2022, there were >50,000 distinct ICD10CM diagnosis codes used to represent medical conditions in at least patient in that same database

<0.1% of drug-outcome relationships have published literature, and 'most published findings are false' (Ioannidis 2005)

2,000 drugs * 50,000 outcomes =
100 million potential drug-outcome relationships that some patient could want to understand and deserves to know about

- Characterization: how often does the outcome occur among persons exposed to the drug?
- Prediction: what's my probability of experiencing the outcome after I start treatment, given my baseline medical history?
- Estimation: Does the drug cause the outcome?

What's our large-scale matrix?

Outcome Cohorts:

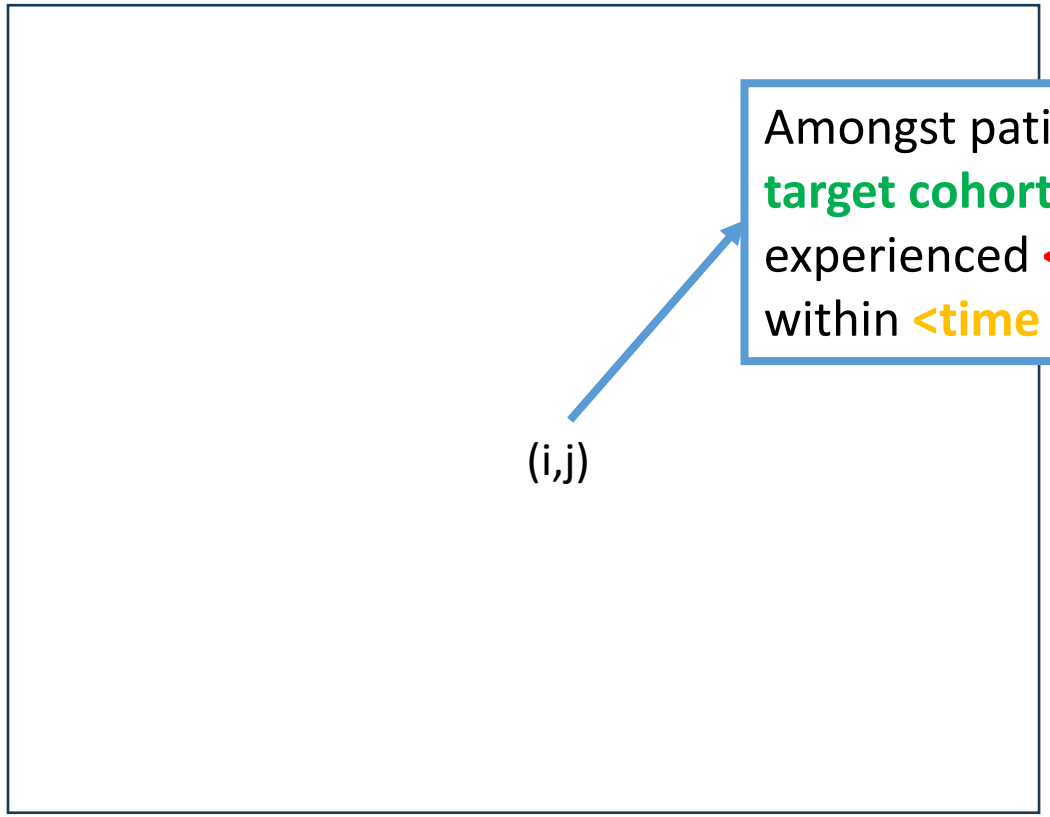
The events that occur within the population 'at risk'

1 2 3 … j … m

Target Cohorts:

The 'denominator' of the population 'at risk'

1
2
3
…
i
…
n



Amongst patients who are **<insert your favorite target cohort i>,** how many patients experienced **<insert your favorite outcome j>** within **<time horizon relative to target start>**?

How can you contribute now?

ohdsi.github.io/PhenotypeLibrary/index.html

PhenotypeLibrary 3.16.1 Reference Articles Changelog HADES

The OHDSI phenotype library

R-CMD-check passing codecov 100%

PhenotypeLibrary is part of HADES.

Gowtham A Rao

Annoucements on OHDSI forums
Release notes
Definition catalog

The Observational Health Data Sciences and Informatics (OHDSI) community has developed a publicly accessible, version-controlled Phenotype Library to guide real-world evidence towards the FAIR principles: Findability, Accessibility, Reproducibility, and Interoperability.[1] This library aims to foster the submission and retrieval of high-quality cohort definitions, cataloging of metadata, attribution and promotion of discovery and reuse in scientific research.

Within the OHDSI Phenotype Library (OHDSI PL), each entry represents a unique cohort definition identifiable by a stable, externally referenceable ID. Comprehensive metadata about each cohort definition is cataloged and made searchable for researchers.[2] Content in the library is subject to version control, with each version is assigned a specific DOI.

The OHDSI PL employs a community engagement and contribution process, crediting contributors via ORCID when provided. Submitted cohort definitions are subject to a voluntary, open peer review process managed by the OHDSI Phenotype Development and Evaluation Workgroup. All cohort definitions are computable and portable and conform to the specifications of the Observational Medical Outcomes Partnership Common Data Model (OMOP CDM) promoting efficient implementation, standard terminology use, seamless conversions between computable and human-readable definitions, and consistent understanding of the logic.[3-6]

Links

Browse source code
Report a bug
Ask a question

License

Apache License

Citation

Citing PhenotypeLibrary

Developers

Gowtham Rao
Maintainer

What is OHDSI Phenotype Library

- Cohort Definition
  - Catalog of computable phenotype algorithms (called Cohort Definitions) that are compatible with the OHDSI standard software.
  - Unit of the library = 'Cohort Definition'
  - When executed yield a Cohort.
- OHDSI Phenotype Library is a OHDSI Github Repository, that is available as
  - Github API https://github.com/OHDSI/PhenotypeLibrary/tree/main/inst
  - Installable R package remotes::install_github("OHDSI/PhenotypeLibrary")
- Applications using the OHDSI
  - https://data.ohdsi.org/PhenotypeLibrary/
  - https://dash.ohdsi.org/phenotype-explorer

Principles of OHDSI Phenotype Library

- Publicly accessible
- Version-controlled
- Referenceable
- Towards FAIR principles: Findability, Accessibility, Reproducibility, and Interoperability.
- Cataloguing of metadata, attribution and promotion of discovery and reuse in scientific research.

What is NOT the OHDSI Phenotype Library

- NOT: ‘Gold Standard’. One clinical idea may have more than one cohort definition*

  *Exception: Logically identical cohort definitions or cohort definitions with identical performance characteristic

Submission* to OHDSI Phenotype Library

- Start an OHDSI Forum, tag librarian Gowtham_Rao .
- Title of the thread: start with ’Phenotype Submission - ’.
  - Examples of titles for the thread ‘Phenotype submission - Acute Hepatic Injury’
- Include the following metadata
  - Submitted Cohort Name : User submitted cohort name. Can be long and us special characters. Can clash with another user submitted cohort definition.
  - Logic Description : A simplified description of the logic used to build the cohort definition. What allows persons to enter and what allows to persons to exit.
  - Contributors : Name of the contributor;
  - Contributor OrcIds : optional e.g. '0000-0002-4949-7255';
  - Contributor Organizations : e.g. 'OHDSI'; Department of Veterans Affairs.
  - Clinical Description: A text based description of the clinical idea being model in the phenotype algorithm.

*Alternative options: Email Gowtham Rao at rao@ohdsi.org or come to the OHDSI Phenotype Development and evaluation workgroup.

HowOften phenotype deadline: 15Sept2023

- HowOften symposium activity will be based exclusively on phenotypes in the OHDSI Phenotype Library
- Contribute phenotypes to OHDSI Phenotype Library by 15Sept2023 to be considered for inclusion in the HowOften effort

Breakout activity

- 10 persons x 10 minutes
- Brainstorm:
  - Q1: How would you and others use the evidence from HowOften large-scale incidence characterization?
  - Q2: What phenotypes are still needed to be included in HowOften to generate the evidence you need?

Join by Web **PollEv.com/patrickryan800**

How would you and others use the evidence from HowOften large-scale incidence characterization?

Benchmark quality improvement: to understand the range of observed proportions across different databases for various HEDIS measures

1 0

To determine if I should be concerned about a potential future risk now that I've been diagnosed with a condition

Join by Web **PollEv.com/patrickryan800**

What phenotypes are still needed to be included in HowOften to generate the evidence you need?