OHDSI APAC Symposium
Thank you for joining the Journey!

Patrick Ryan, PhD

Vice President, Observational Health Data Analytics, Janssen Research and Development

Assistant Professor, Adjunct, Department of Biomedical Informatics, Columbia University Irving Medical Center

OHDSI APAC 2020 Symposium Agenda

Korean Time	OHDSI APAC 2020 Session and Title - Dec 5th
10:00 - 10:30	OHDSI Welcome Session
10:30 - 11:30	Panel – OHDSI Community in Action – COVID19 Global effort
11:30 - 12:30	Network Session
12:30 - 13:30	APAC Study - Comprehensive comparative effectiveness and safety of second line antihypertensive agents; utilising the LEGEND principles to mobilize collaboration across the OHDSI APAC network
13:30 - 14:00	DOAC Study - Comparative effectiveness and safety of direct ORal Anticoagulants in patients with atrial fibrillation: a standardiZed Observational data Network study (CORAZON)
Korean Time	**OHDSI APAC 2020 Session and Title - Dec 6th**
10:00 - 10:30	OHDSI APAC State of the Community
10:30 - 13:00	OHDSI Chapter Breakout – China/Hong Kong, Australia, Singapore, Korea, Taiwan, Japan
13:00 - 13:30	Fun with the Community
13:30 - 14:00	Closing Ceremony

COLLABORATOR SHOWCASE - POSTERS

Name	Affiliation	Poster
Zachary Monge	Covance	A Hybrid Statistical-Machine Learning Approach to Anomaly Detection in Clinical Trial Data
Ty Stanford	University of South Australia	Mapping to standardised vocabularies: a process for drug codes in Australia
Guy Tsafnat	Evidentli	AI-powered data mapping
Jason C. Hsu	Taipei Medical University	Taipei Medical University Clinical Research Database (TMUCRD): A New Application Platform that Integrates Multi-center Electronic Medical Record Systems in Taiwan
Gang Wang	Beijing Anding Hospital affiliated to Capital Medical University	Treatment Patterns and Risk of Switch to Mania in Bipolar Depressive Patients Treated with Antidepressants: A real world study using the OHDSI Network
Gang Wang	Beijing Anding Hospital affiliated to Capital Medical University	Transforming the Psychiatric Hospital Database to the OMOP Common Data Model in China
Preetham Kadappu	School of Medical Sciences, University of New South Wales	Statin Prescribing Patterns and Residual CRP Risk on Hospitalisation in a South-Western Sydney Population

https://www.ohdsi.org/2020-asia-pacific-symposium-collaborator-showcase/

OHDSI

OBSERVATIONAL HEALTH DATA SCIENCES AND INFORMATICS

Who We Are | OHDSI Updates & News | Standards | Software Tools | OHDSI Studies | Book of OHDSI | Resources | New To OHDSI?

EHDEN Academy | 2020 Global Symposium | 2020 APAC Symposium | Past Events | OHDSI in MSTeams | Social Media/Newsletter

Home › 2020 OHDSI Global Symposium

2020 OHDSI Global Symposium

The 2020 OHDSI Global Symposium brought together a global research community for 18 hours of open science, international collaboration and community fun on Oct. 19. The day included presentations from community members, panels that brought together leaders from a variety of major healthcare organizations, as well as network sessions, the annual collaborator showcase, and plenty more. Please check out this page for complete updates from the day, and follow the OHDSI Twitter and LinkedIn feeds for the #OHDSISocialShowcase, which will highlight all presentations from the 2020 Collaborator Showcase.

The four-day event also included five virtual tutorials on Oct. 18, and a two-day study-a-thon (Oct. 20-21) that focused on two cardiovascular clinical prediction models (CPM) routinely used in clinical practice: the Revised Cardiac Risk Index (RCRI) and the Pooled Cohort Equations. That collaborative effort set the foundation for multiple network studies on these important healthcare issues.

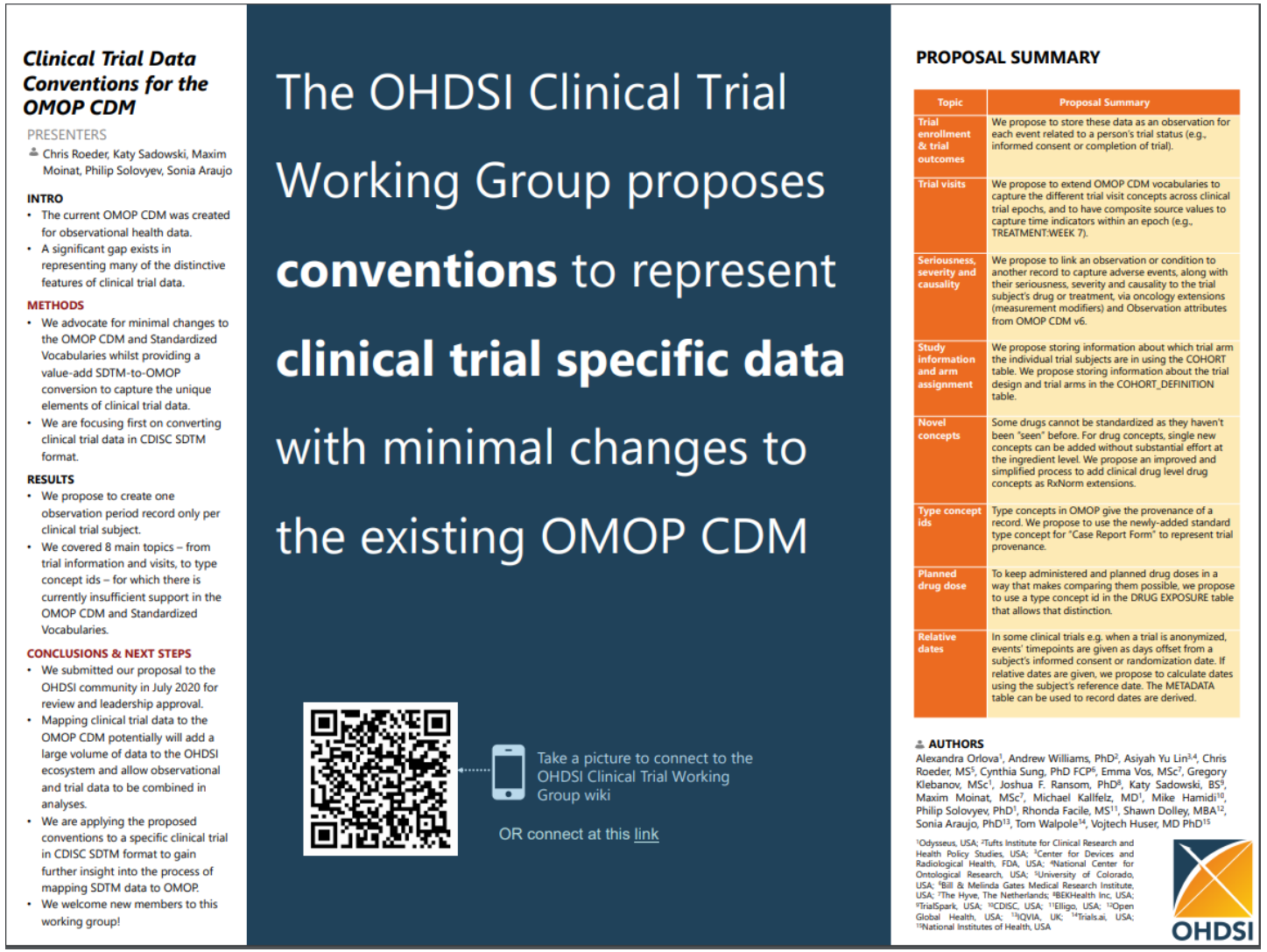
Symposium artwork courtesy of OHDSI collaborator Sarah Seager.

Global Symposium Sessions

https://www.ohdsi.org/2020-ohdsi-global-symposium/

Collaborator Showcase:

- 85 posters
- 10 software demos
- 12 lightning talks



Clinical Trial Data Conventions for the OMOP CDM

PRESENTERS

Chris Roeder, Katy Sadowski, Maxim Moinat, Philip Solovyev, Sonia Araujo

INTRO

- The current OMOP CDM was created for observational health data.
- A significant gap exists in representing many of the distinctive features of clinical trial data.

METHODS

- We advocate for minimal changes to the OMOP CDM and Standardized Vocabularies whilst providing a value-add SDTM-to-OMOP conversion to capture the unique elements of clinical trial data.
- We are focusing first on converting clinical trial data in CDISC SDTM format.

RESULTS

- We propose to create one observation period record only per clinical trial subject.
- We covered 8 main topics – from trial information and visits, to type concept ids – for which there is currently insufficient support in the OMOP CDM and Standardized Vocabularies.

CONCLUSIONS & NEXT STEPS

- We submitted our proposal to the OHDSI community in July 2020 for review and leadership approval.
- Mapping clinical trial data to the OMOP CDM potentially will add a large volume of data to the OHDSI ecosystem and allow observational and trial data to be combined in analyses.
- We are applying the proposed conventions to a specific clinical trial in CDISC SDTM format to gain further insight into the process of mapping SDTM data to OMOP.
- We welcome new members to this working group!

The OHDSI Clinical Trial Working Group proposes **conventions** to represent **clinical trial specific data** with minimal changes to the existing OMOP CDM

Take a picture to connect to the OHDSI Clinical Trial Working Group wiki

OR connect at this link

PROPOSAL SUMMARY

Topic	Proposal Summary
Trial enrollment & trial outcomes	We propose to store these data as an observation for each event related to a person's trial status (e.g., informed consent or completion of trial).
Trial visits	We propose to extend OMOP CDM vocabularies to capture the different trial visit concepts across clinical trial epochs, and to have composite source values to capture time indicators within an epoch (e.g., TREATMENT:WEEK 7).
Seriousness, severity and causality	We propose to link an observation or condition to another record to capture adverse events, along with their seriousness, severity and causality to the trial subject's drug or treatment, via oncology extensions (measurement modifiers) and Observation attributes from OMOP CDM v6.
Study information and arm assignment	We propose storing information about which trial arm the individual trial subjects are in using the COHORT table. We propose storing information about the trial design and trial arms in the COHORT_DEFINITION table.
Novel concepts	Some drugs cannot be standardized as they haven't been "seen" before. For drug concepts, single new concepts can be added without substantial effort at the ingredient level. We propose an improved and simplified process to add clinical drug level drug concepts as RxNorm extensions.
Type concept ids	Type concepts in OMOP give the provenance of a record. We propose to use the newly-added standard type concept for "Case Report Form" to represent trial provenance.
Planned drug dose	To keep administered and planned drug doses in a way that makes comparing them possible, we propose to use a type concept id in the DRUG EXPOSURE table that allows that distinction.
Relative dates	In some clinical trials e.g. when a trial is anonymized, events' timepoints are given as days offset from a subject's informed consent or randomization date. If relative dates are given, we propose to calculate dates using the subject's reference date. The METADATA table can be used to record dates are derived.

AUTHORS

Alexandra Orlova[1], Andrew Williams, PhD[2], Asiyah Yu Lin[3,4], Chris Roeder, MS[5], Cynthia Sung, PhD FCP[6], Emma Vos, MSc[7], Gregory Klebanov, MSc[1], Joshua F. Ransom, PhD[8], Katy Sadowski, BS[9], Maxim Moinat, MSc[7], Michael Kallfelz, MD[1], Mike Hamidi[10], Philip Solovyev, PhD[1], Rhonda Facile, MS[11], Shawn Dolley, MBA[12], Sonia Araujo, PhD[13], Tom Walpole[14], Vojtech Huser, MD PhD[15]

[1]Odysseus, USA; [2]Tufts Institute for Clinical Research and Health Policy Studies, USA; [3]Center for Devices and Radiological Health, FDA, USA; [4]National Center for Ontological Research, USA; [5]University of Colorado, USA; [6]Bill & Melinda Gates Medical Research Institute, USA; [7]The Hyve, The Netherlands; [8]BEKHealth Inc, USA; [9]TrialSpark, USA; [10]CDISC, USA; [11]Elligo, USA; [12]Open Global Health, USA; [13]IQVIA, UK; [14]Trials.ai, USA; [15]National Institutes of Health, USA

OHDSI

2020 Best Contribution in Observational Data Standards

Clinical trial data conventions for the OMOP Common Data Model

Chris Roeder, Katy Sadowski, Maxim Moinat, Philip Solovyev, Sonia Araujo, et al.

Noisy-Or Risk Allocation: A Probabilistic Model for Attributable Risk Estimation

Amelia J. Averitt, MPH MA PhD[1,2]; Adler Perotte, MD MA[1]

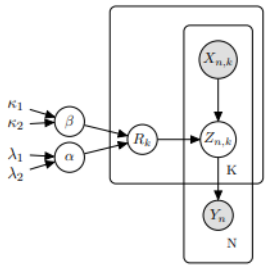
[1] Columbia University, Department of Biomedical Informatics. New York, NY. [2] Regeneron Genetics Center. Tarrytown, NY.

Introduction

Attributable risk (AR) is the proportion of an outcome in a population that could be prevented by elimination of a causal exposure from the population.[1] In the high-dimensional setting, typical methods of AR estimation include the (i) calculation of excess risk [2]; (ii) approximation using disproportionality methods, such as risk ratios (RR) and Gamma Poisson Shrinker (GPS); and (iii) regression-based methods. However, none of these methods are able to estimate global ARs, predict outcomes, and estimate ARs of exposures at the individual-level.

This research proposes the Noisy-Or Risk Allocation (NORA) model for high-dimensional AR estimation from observational data. NORA is a multivariate, latent-variable model with a likelihood that captures the notion of causal independence. Unlike comparator methods, NORA supports both global inferences of risks and local inferences of risks and outcomes.

The Model



$$K = \text{The number of exposures} \quad (1)$$

$$N = \text{The number of subjects} \quad (2)$$

$$Z_{n,k}|X_{n,k}, R_k \sim Bernoulli(X_{n,k}R_k) \quad (3)$$

$$R_k|\alpha, \beta \sim Beta(\alpha, \beta) \quad (4)$$

$$p(Y_n|Z_{1:K}) \sim Bernoulli(1 - \prod_{k=1}^{K}(1 - Z_{n,k})) \quad (5)$$

Key Takeaways

- NORA infers ARs of causal exposures for a single binary outcome.
- Simulations suggest that NORA may be more robust to confounding than logistic regression.
- NORA may support causal reasoning at the patient-level with outcome predictions and causal estimation and at the population-level informing public-health with estimates of risks across the entire population.

[1] Leviton, A. *Definitions of Attributable Risk. Am J Epidemiol Sep 1;98(3):231–231. (1973).*

[2] Levin, M.L. *The Occurrence of Lung Cancer In Man. AUICC, 9, 531-541. (1953).*

[3] Liu Z, et al. *The world-wide incidence of ... HIV Med, 19(5):355–64. (2018).*

Simulation

To assess correctness the extent to which NORA is robust to bias, we simulated a confounded causal system for Myocardial Infarction (see file in MS Teams) in which the true risk (highest) is High Cholesterol (HC). NORA and L1 logistic regression (L1) were applied to learn ARs in the presence of observed and unobserved confounders.

Table 1: Estimated Risk of High Cholesterol by Model (True=0.30)

	Unobserved Confounders	Observed Confounders	% Bias
NORA	0.18	0.30	37.1%
L1	0.46	0.82	78.9%

Experimentation

We additionally applied NORA to 10 outcome-exposure cohorts from the NewYork-Presbyterian EHR (see Table 2 for outcomes). ARs were estimated for these causal systems using (i) NORA; (ii) L1; (iii) excess risk by Levin 1953; (iv) RR; and (v) GPS. We conducted a 3-part evaluation.

(1) Local inference of the outcome was evaluated through the predictive performance of a held-out dataset (NORA and L1 only.) The results (Table 2) indicate that NORA has competitive predictive ability to L1.

Table 2: Area Under the Receiver Operating Curve for NORA and L1

	DIC	Glaucoma	Hearing Loss	Heart Failure	Kaposi sarc.	Mucositis (v drug)	Renal Imp.	D/O Spleen	Hypothyroidism	Mucositis (v proc)
NORA	**0.89**	**0.70**	0.51	**0.80**	**0.80**	0.53	**0.82**	**0.65**	0.56	0.59
L1	0.78	0.70	**0.63**	0.80	0.56	**0.66**	0.80	0.50	**0.64**	**0.61**

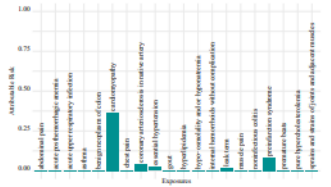
(2) Global inference of the exposures was evaluated by comparing the gold-standard, real-world AR of HIV for the outcome of Kaposi sarcoma [3] with the model-based AR estimates from NORA and comparators. Only NORA yielded an AR estimate in the correct order of magnitude (Table 3).

Table 3: AR Estimates of HIV for Kaposi sarcoma

	Gold-Standard	NORA	L1	Levin 1953	RR	GPS
HIV	0.0048	0.0070	0.7872	0.2022	0.9566	0.9603

(3) Local inference of the exposures was evaluated with an inspection of ARs & exposures for one individual with heart failure (HF). The posterior distribution over Z_n determines the probability that an exposure is a cause of the outcome given the remaining latent variables. The NORA-estimated high-AR exposures are known risk-factors of HF and are biologically sensible.

Figure 1: The Average AR of Exposures for a Single HF Patient



Funding acknowledgement: R01LM009886-10 and T15LM007079

2020 Best Contribution in Methodological Research

Noisy-Or Risk Allocation: A Probabilistic Model for Attributable Risk Estimation
Amelia Averitt, Adler Perotte

Large-scale evaluation of treatment effect heterogeneity in hypertension

Alexandros Rekkas[1], David van Klaveren[1], Peter R. Rijnbeek[1]
Erasmus University Medical Center, Rotterdam, The Netherlands

2020 Best Contribution in Open-source analytics development

Background

- Overall treatment effect estimates derived from the LEGEND-Hypertension study may not apply similarly to all individual patients
- As conventional subgroup analyses fail to capture the multivariate nature of heterogeneity of treatment effect (HTE), we opt for a risk modeling approach
- Outcome risk is a summary score that determines treatment effect—unlike individual variables that may or may not modify treatment effect
- We have developed a standardized easily scalable framework that enables risk-based assessment of HTE within the OHDSI paradigm
- Our work builds upon existing tools in the OHDSI Methods Library and previous work carried out during the LEGEND-Hypertension study

Methods

Databases
- IBM MarketScan® Medicare Supplemental Database (MDCR)
- IBM MarketScan® Commercial Database (CCAE)

Cohorts
Cohort definitions of the LEGEND-Hypertension study were used for both treatments and outcomes. We focus on the comparison of new users of ACE inhibitors to 4 other major classes of antihypertensive treatments:
- Angiotensin receptor blockers (ARB)
- Beta blockers
- Calcium channel blockers (CCB)
- Diuretics

We evaluated treatments regarding 55 outcome cohorts, including both main hypertension outcomes and safety outcomes.

Framework
The framework consists of six distinct steps:
- Definition of the problem, i.e. the population the treatment, the comparator and the outcome(s)
- Selection of the databases and the patient population
- Development of prediction models for the outcome(s) of interest
- Estimation of propensity scores within strata of predicted risk
- Estimation of relative and absolute treatment effects within strata of predicted risk
- Evaluation and presentation of the results

We have implemented the suggested framework in a publicly available R-package (https://github.com/OHDSI/RiskStratifiedEstimation).

Results

Table: Treatment cohort sizes in which our framework was applied

Treatment	MDCR	CCAE
ACE inhibitors	102,840	883,610
ARBs	32,275	274,368
Beta blockers	74,056	449,396
CCBs	50,088	311,032

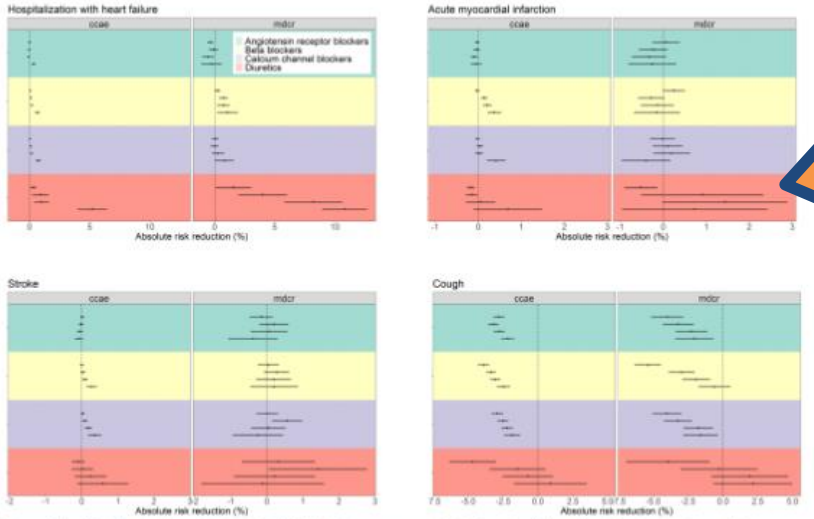


Figure: Absolute risk reduction of treatment with ACE inhibitors compared to treatment with the other 4 treatment classes. The comparisons were made in strata of predicted risk for hospitalization with heart failure. Positive values favor ACE inhibitors.

When comparing ACE inhibitors to calcium channel blockers LEGEND-Hypertension study found a calibrated hazard ratio of 0.85 (95% CI = [0.72, 1.03]) in CCAE database. However, the absolute benefit is concentrated in the highest risk group (top left graph), while the rest of the population receives no absolute benefit. This trend, can be seen in MDCR as well. Similar, conclusions can be drawn in the case of beta blockers (top left, top right and bottom left graphs). ACE inhibitors may be unattractive for patients at lower risk of hospitalization with heart failure, because cough risk substantially increases with ACE inhibitors (bottom right graph). At the same time, heart failure rates are similar for both beta blockers and calcium channel blockers compared to ACE inhibitors.

A subset of our analyses can be explored by following the QR code.

SCAN ME

Conclusions

Our framework for risk-based assessment of HTE is highly scalable and can be used to generate large amounts of evidence in a standardized and timely manner.

We aim to expand our analyses in both the direction of treatments compared, and databases considered, thus generating a vast amount of evidence that can better inform medical decision-making in hypertension.

Limitations: (1) Our method does not provide individualized estimates of treatment benefit, as we are still relying on subgroups; (2) Residual confounding is not evaluated within risk subgroups.

This project has received funding from the Innovative Medicines Initiative 2 Joint Undertaking (JU) under grant agreement No 806968. The JU receives support from the European Union's Horizon 2020 research and innovation programme and EFPIA.

Contact: a.rekkas@erasmusmc.nl

Large-scale evaluation of treatment effect heterogeneity in hypertension
Alexandros Rekkas, David Van Klaveren, Peter Rijnbeek

2020 Best Contribution in Clinical Applications

Lightning Talk: OHDSI Alexa Skill for a Personalized COVID-19 Outcomes Risk Calculator

Lisa K. Evans, Baldwin School

https://www.youtube.com/watch?v=jlErWf0h2KU

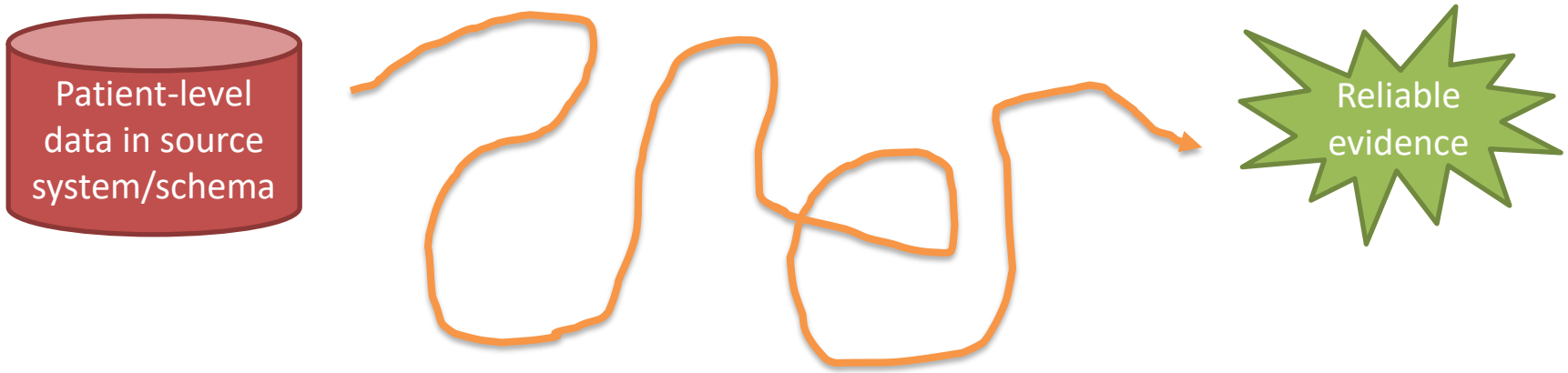
OHDSI is

an open science community

OHDSI's mission

To improve health by empowering a community to collaboratively generate the evidence that promotes better health decisions and better care

The journey to real-world evidence



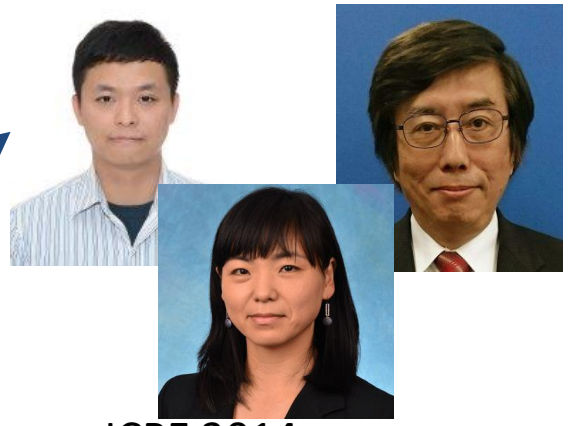
Odyssey (*noun*): \oh-d-si\

1. A long journey full of adventures
2. A series of experiences that give knowledge or understanding to someone

http://www.merriam-webster.com/dictionary/odyssey

My ongoing journey across the Asia-Pacific region

ICPE 2013
Montreal Canada



ICPE 2014
Taiwan

OHDSI Fudan 2019
Shanghai, China

OHDSI APAC 2020
EVERYWHERE!

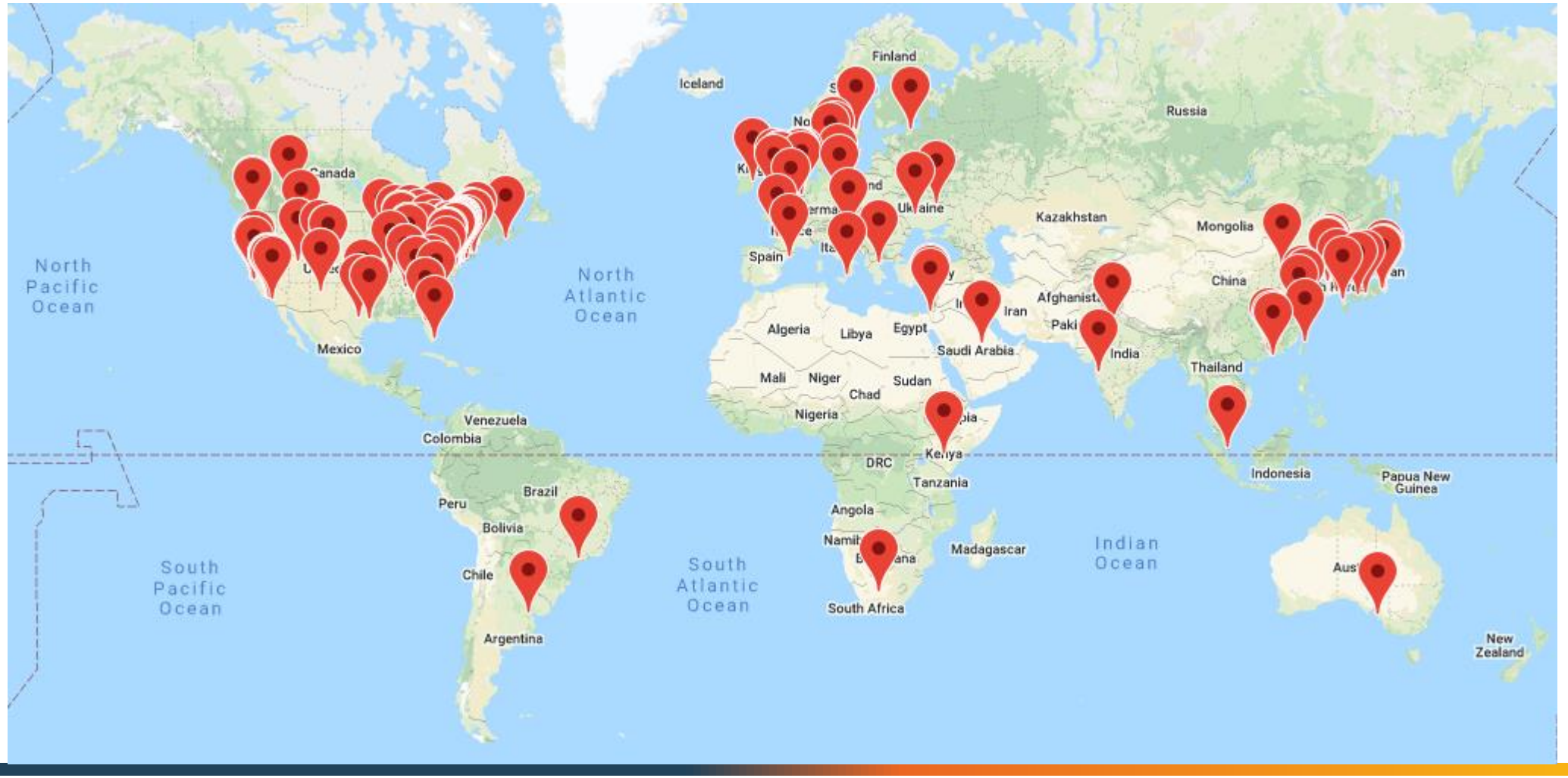
ACPE 2013
Hong Kong

OHDSI Korea 2017
Suwon, Korea

OHDSI Korea 2019
Gwangyu, Korea

OHDSI community

We're all in this journey together…



OHDSI COVID-19 Study-a-Thon (3/2020)

Snapshot of the OHDSI COVID-19 Data Network

USA (11)	EUROPE (8)	ASIA-PACIFIC (3)
Columbia University (NY – EHR)	CPRD (UK – EHR)	HIRA (South Korea – Administrative Claims)
Department of Veterans Affairs (National – EHR)	DA Germany (Germany – EHR)	DCMC (South Korea – EHR)
HealthVerity (Claims linked to diagnostic testing)	HM Hospitales (Spain – Hospital Billing)	Nanfang Hospital (China – EMR)
IQVIA Open Claims (National – Administrative Claims)	IPCI (Netherlands – EHR)	
Optum EHR (National – EHR)	LPD France (France – EHR)	
Optum SES (National – administrative claims)	LPD Italy (Italy – EHR)	
Premier (National – Hospital Billing)	SIDIAP (Spain – EHR)	
Stanford University (CA – EHR)	SIDIAP-H (Spain – EHR Hospital linkage)	
Tufts University (MA – EHR)		
University of Colorado Anschutz Medical Campus (CO – EHR)		
University of Washington Medicine COVID Research Dataset (WA – EHR)		

Together, OHDSI has studied:

- **>7.4m** patients tested for SAR-COV-2
- **>1.6m** patients diagnosed or tested positive for COVID-19
- **>300k** patients hospitalized with COVID-19

#OHDSICOVID19

EHR = Electronic Health Records, EMR = Electronic Medical Records

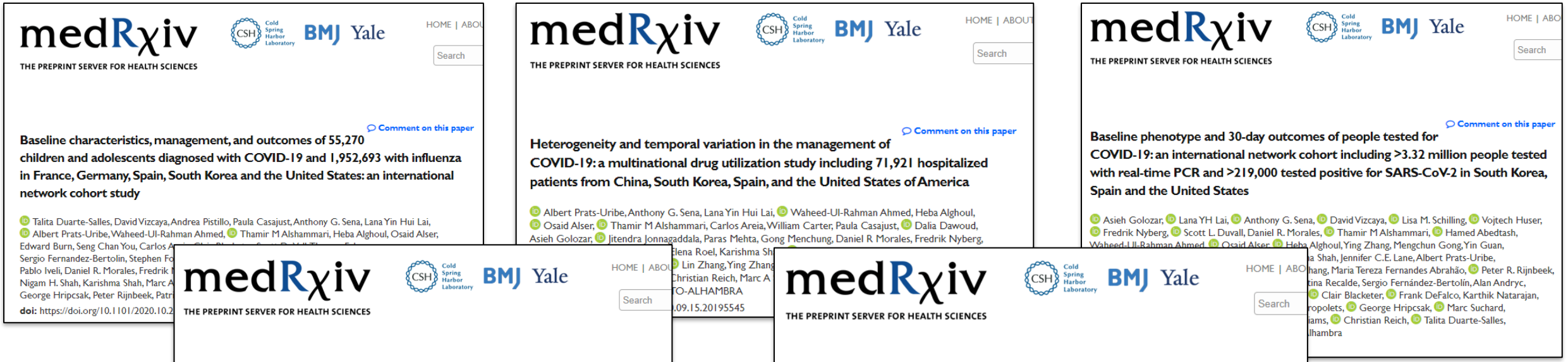
As of 12Oct2020

Characterization

CHARYBDIS Results Viewer

Interactive application for exploring disease natural history:

- https://data.ohdsi.org/Covid19CharacterizationCharybdis/



Prediction

COVER: COVID risk prediction

Interactive application for exploring prediction:

- https://data.ohdsi.org/Covid19CoverPrediction/

https://www.ohdsi.org/2020-ohdsi-global-symposium/

Estimation

Leadership role of APAC

Research

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.

DESIGN, SETTING, AND PARTICIPANTS A retrospective cohort study of patients with ACS who underwent PCI and received ticagrelor or clopidogrel was conducted using 2 United States electronic health record–based databases and 1 nationwide South Korean database from

Editorial page 1613

JAMA Patient Page page 1690

Audio and Supplemental content

CME Quiz at jamacmelookup.com and CME Questions page 1672

Bergabunglah dengan Journey!

여정에 참여하세요!

加入旅程！

เข้าร่วมการเดินทาง!

Join the Journey!

旅に参加しましょう！

Tham gia Hành trình!

加入旅程！

यात्रा में शामिल हों!

Sumali sa Paglalakbay!

Yolculuğa Katılın!

ਯਾਤਰਾ ਵਿਚ ਸ਼ਾਮਲ ਹੋਵੋ!