Tapping into the World's Largest Observational Research Network with the OHDSI Community

Sarah Seager, Director of Data Science, OMOP

The OHDSI Network

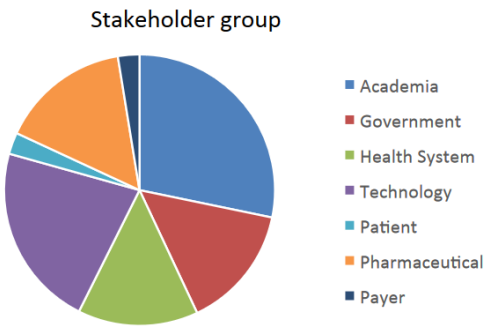
1

OHDSI

OBSERVATIONAL HEALTH DATA SCIENCES AND INFORMATICS

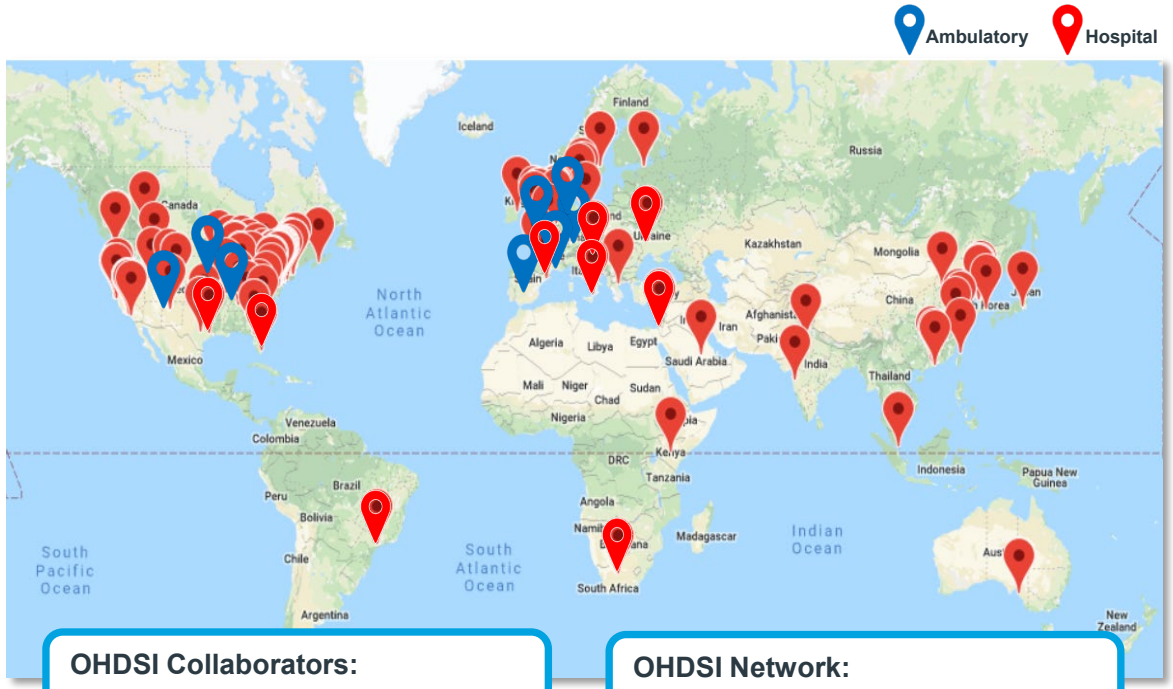
What OHDSI is:

- ✓ **Open Source**
- ✓ **Community**
- ✓ **Data**



Why Choose OHDSI/OMOP:

- ✓ **Fast, reliable** studies across a series of datasets and data types
- ✓ **Reduced cost of ownership** including understanding coding schemes, writing statistical programs across databases or developing software
- ✓ **Expanded data access** via the OHDSI network and remote multi-center database studies



OHDSI Collaborators:

- 2,770 users
- 25 workgroups
- 18,700 posts on 3,250 topics

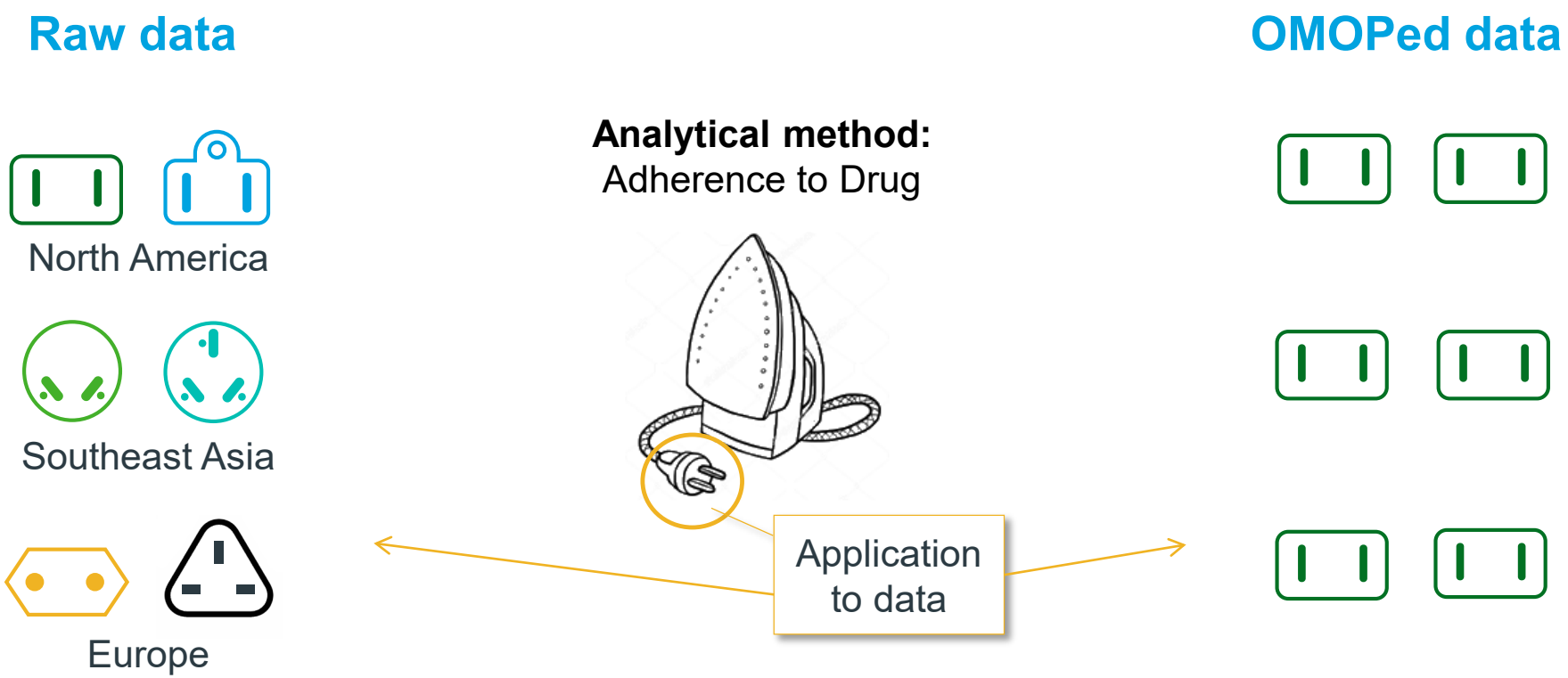
OHDSI Network:

- >150+ databases
- 21 countries
- 2.1B patient records, 369M ex-US

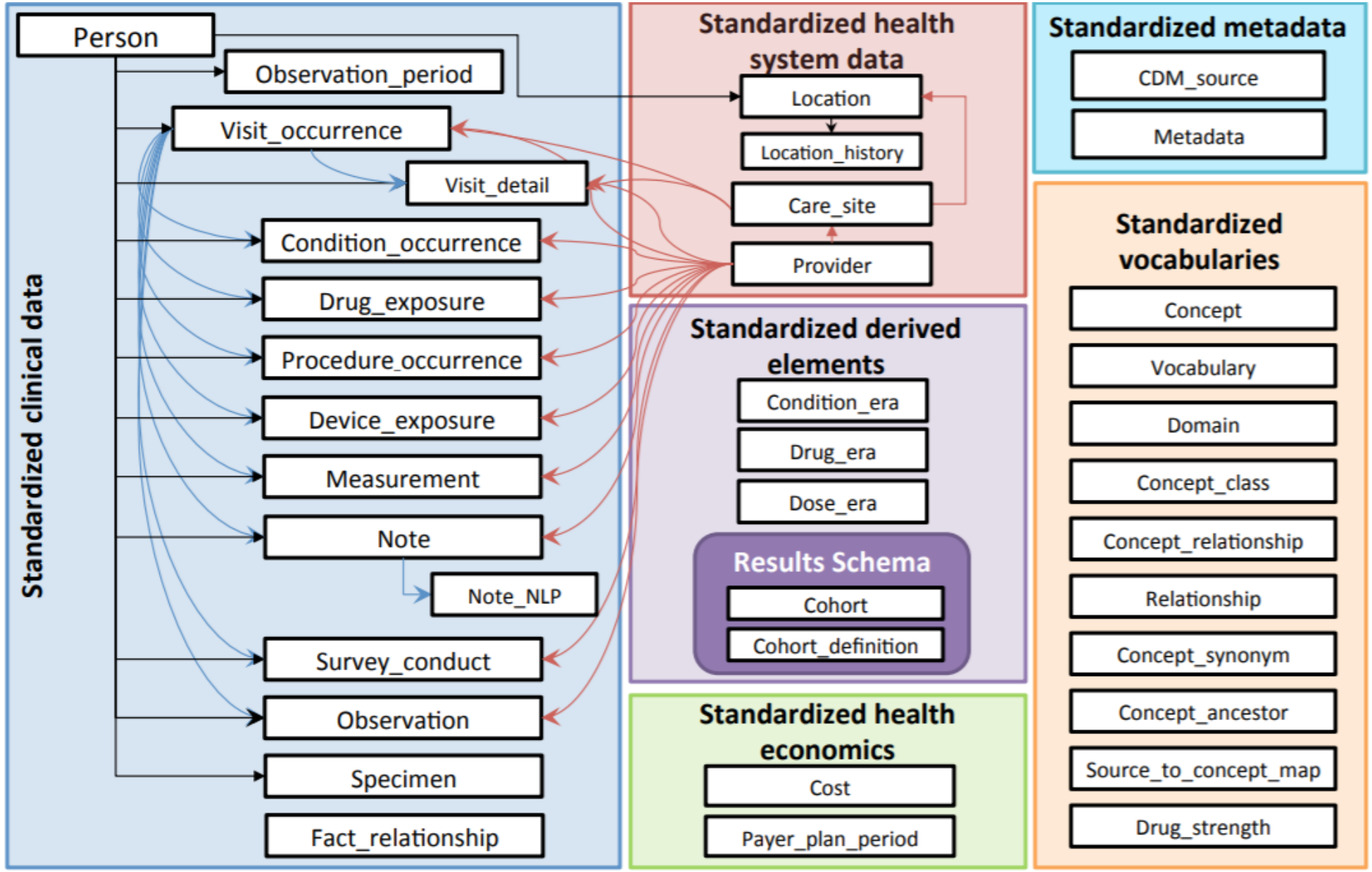
The OHDSI Network

How OMOP Works

Data Standardization to OMOP

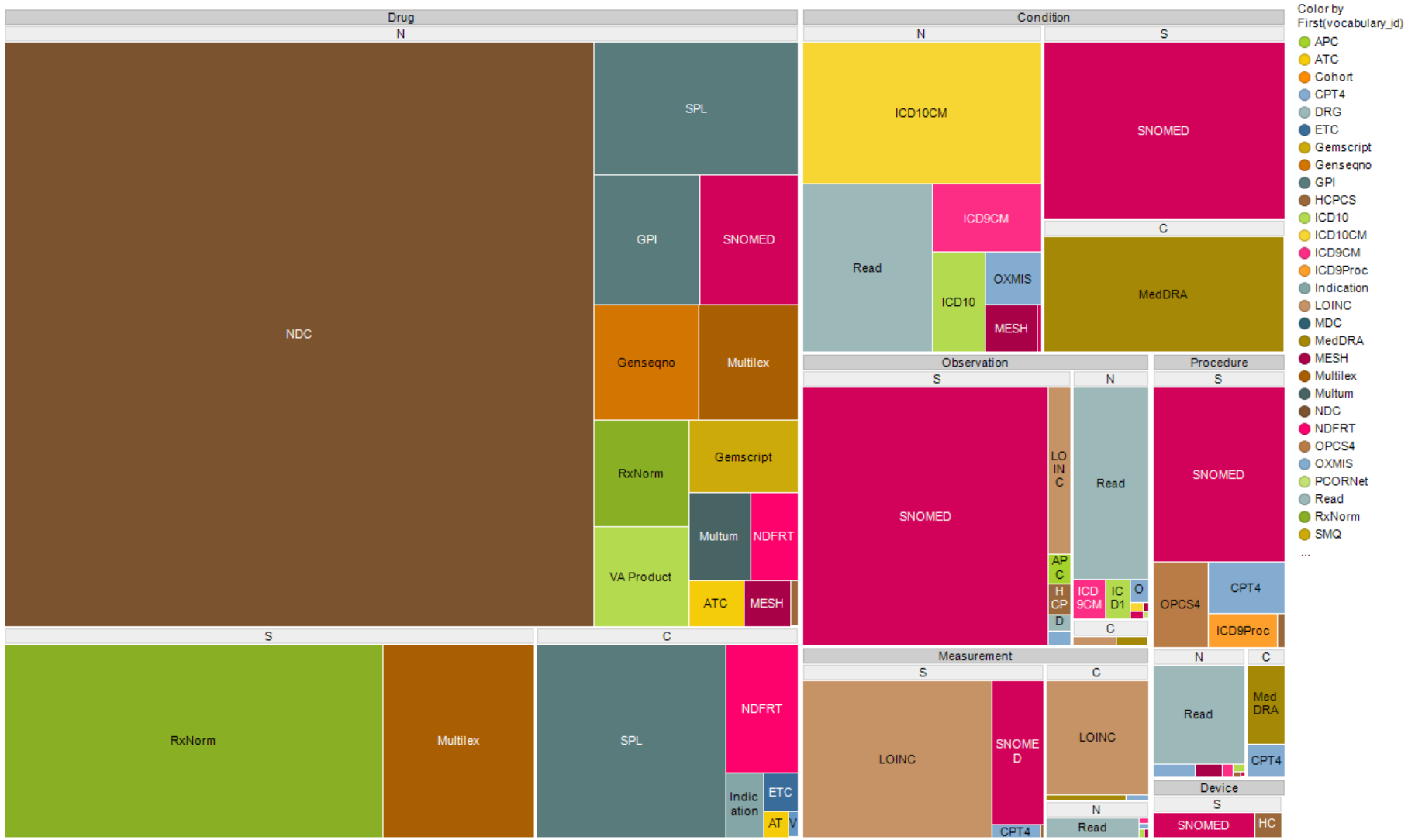


Standard content: OMOP Common Data Model Version 6



Standard content: OMOP Vocabularies

Breakdown of OHDSI concepts by domain, standard class, and vocabulary



HADES: Standard Method Library

Estimation methods

Cohort Method
New-user cohort studies using large-scale regression for propensity and outcome models

Self-Controlled Case Series
Self-Controlled Case Series analysis using few or many predictors, includes splines for age and seasonality.

Self-Controlled Cohort
A self-controlled cohort design, where time preceding exposure is used as control.

Patient Level Prediction
Build and evaluate predictive models for user-specified outcomes, using a wide array of machine learning algorithms

Case-control
Case-control studies, matching controls on age, gender, provider, and visit date. Allows nesting of the study in another cohort.

Case-crossover
Case-crossover design including the options to adjust for time-trends in exposures (so-called-case-time-control).

Method characterization

Empirical Calibration
Use negative control exposure-outcome pairs to profile and calibrate a particular analysis design.

Method Evaluation
Use real data and established reference sets as well as simulations injected in real data to evaluate the performance of methods.

Evidence Synthesis
Combining study diagnostics and results across multiple sites.

Supporting packages

Database Connector
Connect directly to a wide range of database platforms, including SQL Server, Oracle, and PostgreSQL.

Sql Render
Generate SQL on the fly for the various SQL dialects.

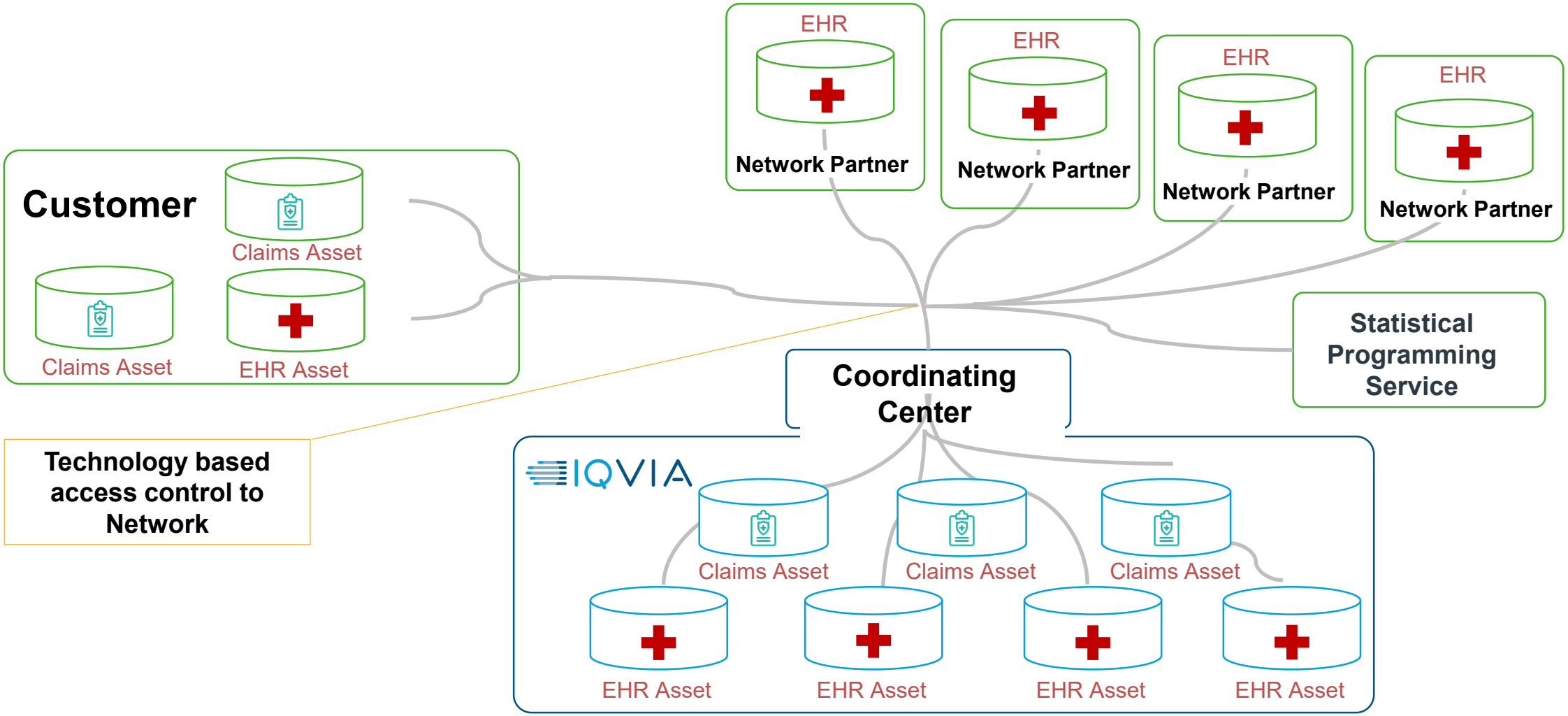
Cyclops
Highly efficient implementation of regularized logistic, Poisson and Cox regression.

ParallelLogger
Support for parallel computation with logging to console, disk, or e-mail

Feature Extraction
Automatically extract large sets of features for user-specified cohorts using data in the CDM.

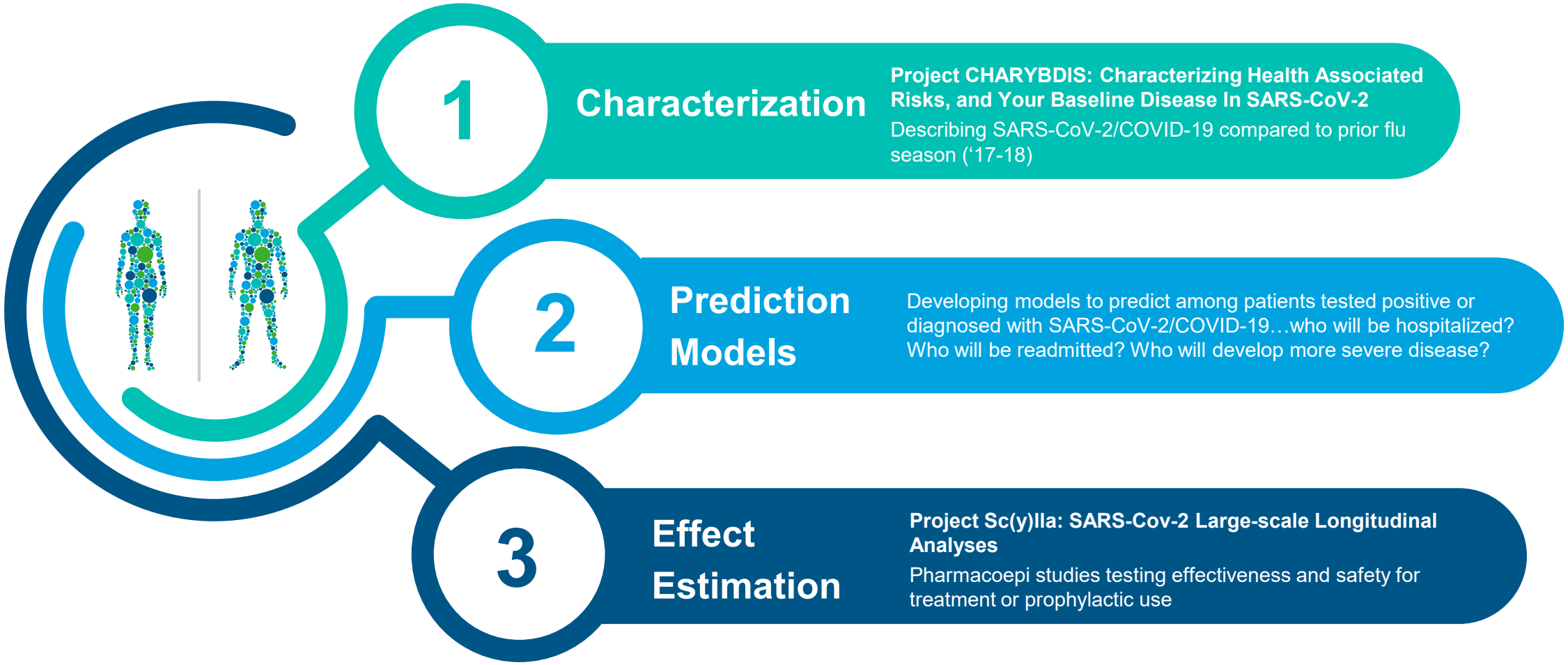
Research Network

Structure and participants



COVID Study-a-thon

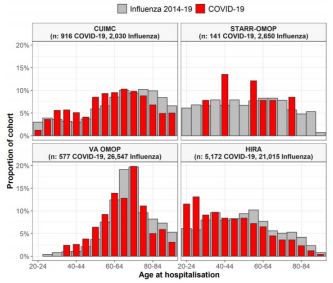
OHDSI COVID-19 Study-a-thon: Research Focus

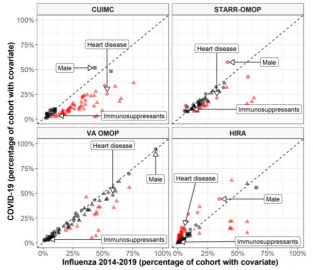


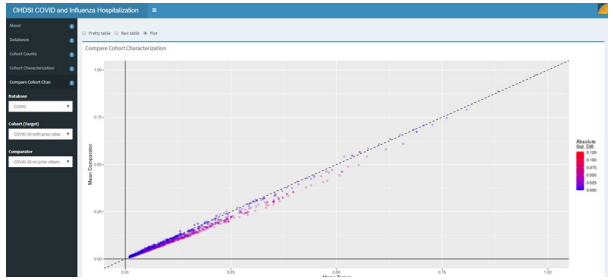
OHDSI COVID-19 Study-a-thon Highlights

1 Characterizations

An international characterisation of patients hospitalised with COVID-19 and a comparison with those previously hospitalised with influenza





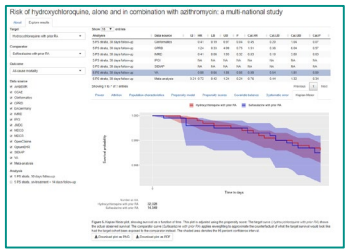


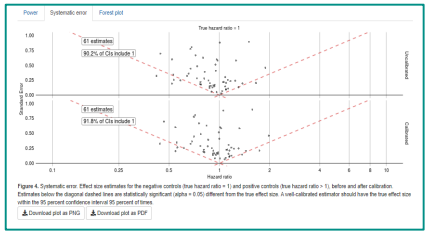
Interactive Shiny Application available at: http://evidence.ohdsi.org/Covid19CharacterizationHospitalization/

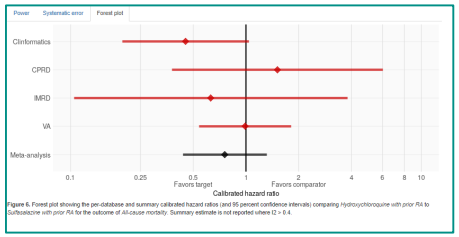
Highlight: *Compared to individuals hospitalized with influenza, patients admitted with COVID-19 were more likely male, younger, and, in the US, had fewer comorbidities and lower medication use.*

3 Effect Estimations

Safety of hydroxychloroquine, alone and in combination with azithromycin, in light of rapid wide-spread use for COVID-19: a multinational, network cohort and self-controlled case series study







Interactive Shiny Application available at: https://data.ohdsi.org/Covid19EstimationHydroxychloroquine/

Highlight: *Short-term hydroxychloroquine treatment is safe, but addition of azithromycin may induce heart failure and cardiovascular mortality, potentially due to synergistic effects on QT length. We call for caution if such combination is to be used in the management of COVID-19.*

Study-a-thon

/ˈstədē-a-thän / – (n.)
a detailed investigation and analysis conducted in a matter of days using the OHDSI standardized analytics and tools

In only **88** hours:

- Convened **351** participants from **30** countries
- Held **12** Global Huddles, **>100** collaborator calls, **>13,000** chat messages
- Reviewed **>10,000** publications
- Published **9** protocols
- Released **13** study packages
- Designed **355** cohort definitions
- Assembled a distributed data network with **37** partners, including **8** sites with COVID-19 cases (US, South Korea, Spain, Netherlands), to execute study packages

IQVIA

Results

OHDSI COVID-19 – Project CHARYBDIS Results

CHARYBDIS: Characterizing Health Associated Risks, and Your Baseline Disease In SARS-CoV-2

medRχiv

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Cold Spring Harbor Laboratory BMJ Yale

Comment on this paper

Characteristics and outcomes of 627 044 COVID-19 patients with and without obesity in the United States, Spain, and the United Kingdom

Martina Recalde, Elena Roel, Andrea Pistillo, Anthony G Sena, Albert Prats-Uribe, Waheed Ul-Rahman Ahmed, Heba Alghoul, Thamir M Alshammari, Osaid Alser, Carlos Areia, Edward Burn, Paula Casajust, Dalia Dawoud, Scott L DuVall, Thomas Falconer, Sergio Fernandez-Bertolin, Asieh Golozar, Mengchun Gong, Lana Yin Hui Lai, Jennifer C.E Lane, Kristine E Lynch, Michael E Matheny, Paras P Mehta, Daniel R Morales, Karthik Natarjan, Fredrik Nyberg, Jose D Posada, Christian G Reich, Lisa M Schilling, Karishma Shah, Nigham H Shah, Vignesh Subbian, Lin Zhang, Hong Zhu, Patrick Ryan, Daniel Prieto-Alhambra, Kristin Kostka, Talita Duarte-Salles

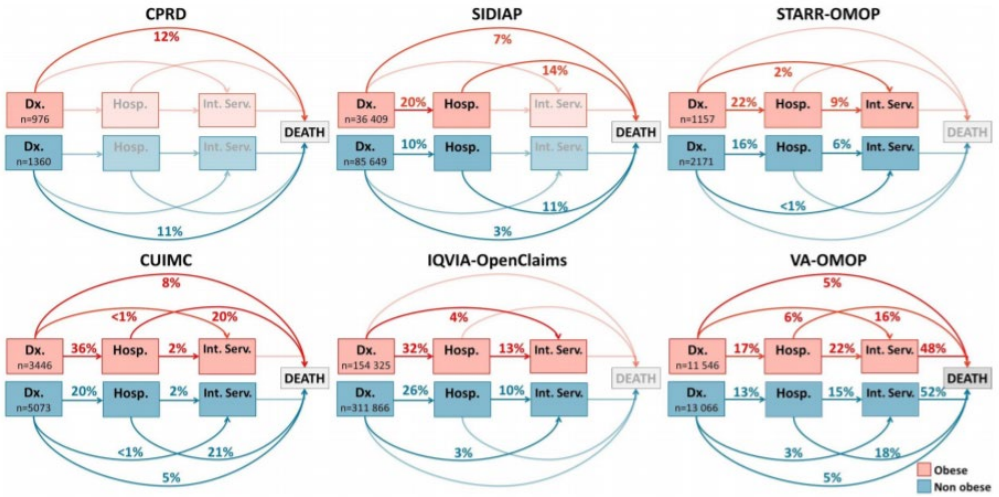
doi: https://doi.org/10.1101/2020.09.02.20185173

This article is a preprint and has not been peer-reviewed [what does this mean?]. It reports new medical research that has yet to be evaluated and so should *not* be used to guide clinical practice.

HIGHLIGHT: We show that obesity is more common amongst COVID-19 than influenza patients, and that obese patients present with more severe forms of COVID-19 with higher hospitalization, intensive services, and fatality than non-obese patients. These data are instrumental for guiding preventive strategies of COVID-19 infection and complications.

Figure 2: Main outcomes: a comparison between obese and non-obese patients with COVID-19 and obese influenza patients.

A. Obese and non-obese COVID-19 patients



Interactive Shiny Application available at: http://data.ohdsi.org/Covid19CharacterizationCharybdis/

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Comment on this paper

Heterogeneity and temporal variation in the management of COVID-19: a multinational drug utilization study including 71,921 hospitalized patients from China, South Korea, Spain, and the United States of America

Albert Prats-Uribe, Anthony G. Sena, Lana Yin Hui Lai, Waheed-Ul-Rahman Ahmed, Heba Alghoul, Osaid Alser, Thamir M Alshammari, Carlos Areia, William Carter, Paula Casajust, Dalia Dawoud, Asieh Golozar, Jitendra Jonnagaddala, Paras Mehta, Gong Menchung, Daniel R Morales, Fredrik Nyberg, Jose D Posada, Martina Recalde, Elena Roel, Karishma Shah, Nigam Shah, Lisa M Schilling, Vignesh Subbian, David Vizcaya, Andrew Williams, Lin Zhang, Ying Zhang, Hong Zhu, Li Liu, Peter Rijnbeek, George Hripcsak, Jennifer C.E Lane, Edward Burn, Christian Reich, Marc A Suchard, Talita Duarte-Salles, Kristin Kostka, Patrick B Ryan, DANIEL PRIETO-ALHAMBRA

doi: https://doi.org/10.1101/2020.09.15.20195545

This article is a preprint and has not been peer-reviewed [what does this mean?]. It reports new medical research that has yet to be evaluated and so should *not* be used to guide clinical practice.

HIGHLIGHT: Multiple medicines were used in the first months of COVID-19 pandemic, with substantial geographic and temporal variation. Hydroxychloroquine, azithromycin, lopinavir-ritonavir, and umifenovir (in China only) were the most prescribed repurposed medicines. Antithrombotics, antibiotics, H2 receptor antagonists and corticosteroids were often used as adjunctive treatments. Research is needed on the comparative risk and benefit of these treatments in the management of COVID-19.

Figure 1.- Percentage (%) of 30-day use of all medicines (rainbow plot) in hospitalized patients.

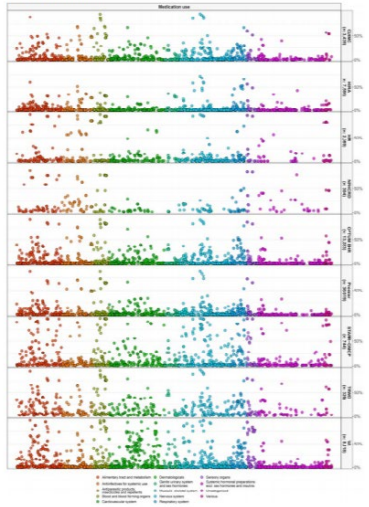

Figure 3.- Lollipop plot showing proportion of patients receiving "shortlisted" adjunctive therapies in hospitalized or intensive services settings.

Interactive Shiny Application available at: http://data.ohdsi.org/Covid19CharacterizationCharybdis/

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Comment on this paper

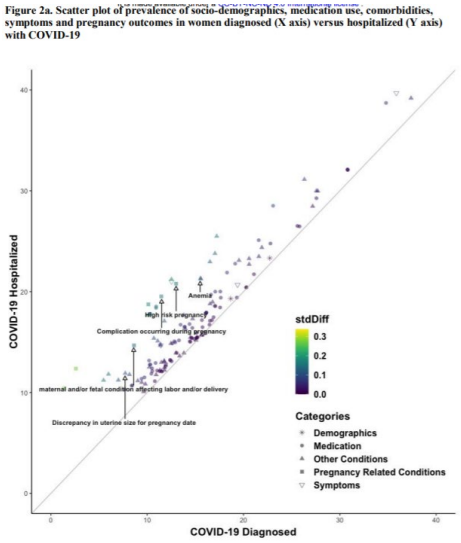
"Clinical characteristics, symptoms, management and health outcomes in 8,598 pregnant women diagnosed with COVID-19 compared to 27,510 with seasonal influenza in France, Spain and the US: a network cohort analysis"

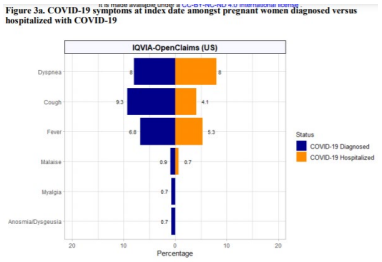
Lana Yin Hui Lai, Asieh Golozar, Anthony Sena, Andrea V. Margulis, Nuria Haro, Paula Casajust, Neus Valveny, Albert Prats-Uribe, Evan P. Minty, Waheed-Ul-Rahman Ahmed, Thamir M Alshammari, Daniel R. Morales, Heba Alghoul, Osaid Alser, Dalia Dawoud, Lin Zhang, Jose D. Posada, Nigam H. Shah, Clair Blacketer, Carlos Areia, Vignesh Subbian, Fredrik Nyberg, Jennifer C E Lane, Marc A Suchard, Mengchun Gong, Martina Recalde, Jitendra Jonnagaddala, Karishma Shah, Elena Roel, David Vizcaya, Stephen Fortin, Ru-fong Joanne Cheng, Christian Reich, George Hripcsak, Peter Rijnbeek, Patrick Ryan, Kristin Kostka, Talita Duarte-Salles, Daniel Prieto-Alhambra

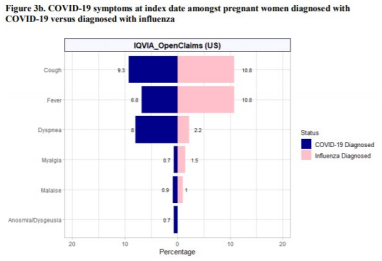
doi: https://doi.org/10.1101/2020.10.13.20211821

This article is a preprint and has not been peer-reviewed [what does this mean?]. It reports new medical research that has yet to be evaluated and so should *not* be used to guide clinical practice.

HIGHLIGHT: Comorbidities that were more prevalent with COVID-19 hospitalization (compared to COVID-19 diagnosed) in pregnancy included renal impairment and anemia. Multiple medications were used to treat pregnant women hospitalized with COVID-19, some with little evidence of benefit. Anosmia and dyspnea were indicative symptoms of COVID-19 in pregnancy compared to influenza, and may aid differential diagnosis. Despite low fatality, pregnancy and maternal outcomes were worse in COVID-19 than influenza.







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Comment on this paper

Baseline phenotype and 30-day outcomes of people tested for COVID-19: an international network cohort including >3.32 million people tested with real-time PCR and >219,000 tested positive for SARS-CoV-2 in South Korea, Spain and the United States

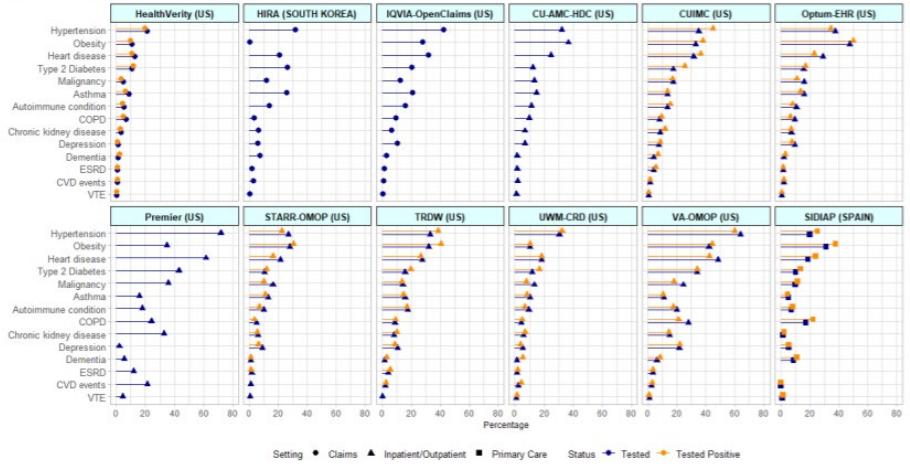
Asieh Golozar, Lana YH Lai, Anthony G. Sena, David Vizcaya, Lisa M. Schilling, Vojtech Huser, Fredrik Nyberg, Scott L. Duvall, Daniel R. Morales, Thamir M Alshammari, Hamed Abedtash, Waheed-Ul-Rahman Ahmed, Osaid Alser, Heba Alghoul, Ying Zhang, Mengchun Gong, Yin Guan, Carlos Areia, Jitendra Jonnagaddala, Karishma Shah, Jennifer C.E. Lane, Albert Prats-Uribe, Jose D. Posada, Nigam H. Shah, Vignesh Subbian, Lin Zhang, Maria Tereza Fernandes Abrahão, Peter R. Rijnbeek, Seng Chan You, Paula Casajust, Elena Roel, Martina Recalde, Sergio Fernández-Bertolín, Alan Andryc, Jason A. Thomas, Adam B. Wilcox, Stephen Fortin, Clair Blacketer, Frank DeFalco, Karthik Natarajan, Thomas Falconer, Matthew Spotnitz, Anna Ostropolets, George Hripcsak, Marc Suchard, Kristine E. Lynch, Michael E. Matheny, Andrew Williams, Christian Reich, Talita Duarte-Salles, Kristin Kostka, Patrick B. Ryan, Daniel Prieto-Alhambra

doi: https://doi.org/10.1101/2020.10.25.20218875

This article is a preprint and has not been peer-reviewed [what does this mean?]. It reports new medical research that has yet to be evaluated and so should *not* be used to guide clinical practice.

HIGHLIGHT: Observed disparity in testing practices led to variable baseline characteristics and outcomes, both nationally (US) and internationally. Our findings highlight the importance of large scale characterization of COVID-19 international cohorts to inform planning and resource allocation including testing as countries face a second wave.

Figure 1: Baseline comorbidities 30-days prior to index date among SARS-CoV-2 *tested* and *tested+* cohorts across databases of various setting



COPD = Chronic obstructive pulmonary disease; ESRD = End stage renal disease; CVD = Cardiovascular disease; VTE = Venous thromboembolism events; US= United States

Interactive Shiny Application available at: http://data.ohdsi.org/Covid19CharacterizationCharybdis/

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Cold Spring Harbor Laboratory BMJ Yale

Comment on this paper

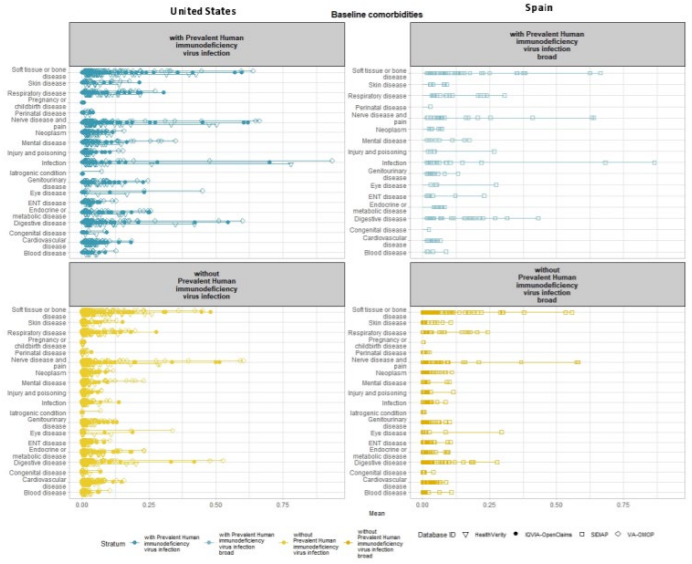
Using Real World Data to Understand HIV and COVID-19 in the U.S.A. and Spain: Characterizing Co-Infected Patients Across the Care Cascade

Julianna Kohler, Kristin Kostka, Rupa Makadia, Roger Paredes, Talita Duarte-Salles, Scott Duvall, Alison Cheng, Asieh Golozar, Jennifer C. E. Lane, Anthony G. Sena, Peter R. Rijnbeek, Daniel R. Morales, Patrick B. Ryan, Christian Reich, Michael E. Matheny, Kristine E. Lynch, George K. Siberry, Daniel Prieto-Alhambra

doi: https://doi.org/10.1101/2020.11.10.20229401

This article is a preprint and has not been peer-reviewed [what does this mean?]. It reports new medical research that has yet to be evaluated and so should *not* be used to guide clinical practice.

HIGHLIGHT: We found that HIV and COVID-19 coinfected patients have higher prevalence of underlying comorbidities such as cardiovascular and respiratory disease as compared to HIV-negative COVID-19 infected patients. We also found that, across the care cascade, co-infected patients who received intensive services were more likely to have more serious underlying disease or a history of more serious events as compared to PLHIV who were diagnosed with COVID-19.



Interactive Shiny Application available at: http://data.ohdsi.org/Covid19CharacterizationCharybdis/

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Cold Spring Harbor Laboratory BMJ Yale

Comment on this paper

Baseline characteristics, management, and outcomes of 55,270 children and adolescents diagnosed with COVID-19 and 1,952,693 with influenza in France, Germany, Spain, South Korea and the United States: an international network cohort study

Talita Duarte-Salles, David Vizcaya, Andrea Pistillo, Paula Casajust, Anthony G. Sena, Lana Yin Hui Lai, Albert Prats-Uribe, Waheed-Ul-Rahman Ahmed, Thamir M Alshammari, Heba Alghoul, Osaid Alser, Edward Burn, Seng Chan You, Carlos Areia, Clair Blacketer, Scott DuVall, Thomas Falconer, Sergio Fernandez-Bertolin, Stephen Fortin, Asieh Golozar, Mengchun Gong, Eng Hooi Tan, Vojtech Huser, Pablo Iveli, Daniel R. Morales, Fredrik Nyberg, Jose D. Posada, Martina Recalde, Elena Roel, Lisa M. Schilling, Nigam H. Shah, Karishma Shah, Marc A. Suchard, Lin Zhang, Ying Zhang, Andrew E. Williams, Christian G. Reich, George Hripcsak, Peter Rijnbeek, Patrick Ryan, Kristin Kostka, Daniel Prieto-Alhambra

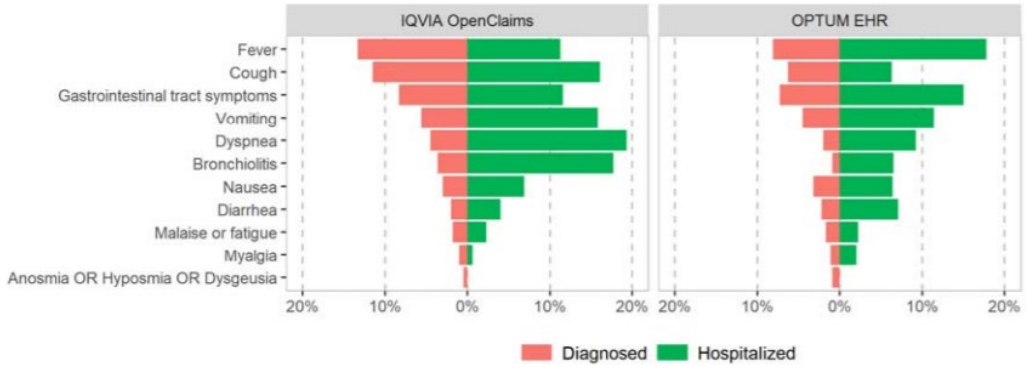
doi: https://doi.org/10.1101/2020.10.29.20222083

This article is a preprint and has not been peer-reviewed [what does this mean?]. It reports new medical research that has yet to be evaluated and so should *not* be used to guide clinical practice.

HIGHLIGHT: Despite negligible fatality, complications including pneumonia, ARDS and MIS-C were more frequent in children/adolescents with COVID-19 than with influenza. Dyspnea, anosmia and gastrointestinal symptoms could help differential diagnosis. A wide range of medications were used for the inpatient management of pediatric COVID-19.

Figure 3. Symptoms recorded at index date among children/adolescents (<18 years of age)

A. Diagnosed compared to hospitalized with COVID-19



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RHEUMATOLOGY

British Society for Rheumatology

ACCEPTED MANUSCRIPT

COVID-19 in patients with autoimmune diseases: characteristics and outcomes in a multinational network of cohorts across three countries

Eng Hooi Tan, Anthony G Sena, Albert Prats-Uribe, Seng Chan You, Waheed-Ul-Rahman Ahmed, Kristin Kostka, Christian Reich, Scott L Duvall, Kristine E Lynch, Michael E Matheny ... Show more

Rheumatology, keab250, https://doi.org/10.1093/rheumatology/keab250

Published: 16 March 2021 **Article history** ▾

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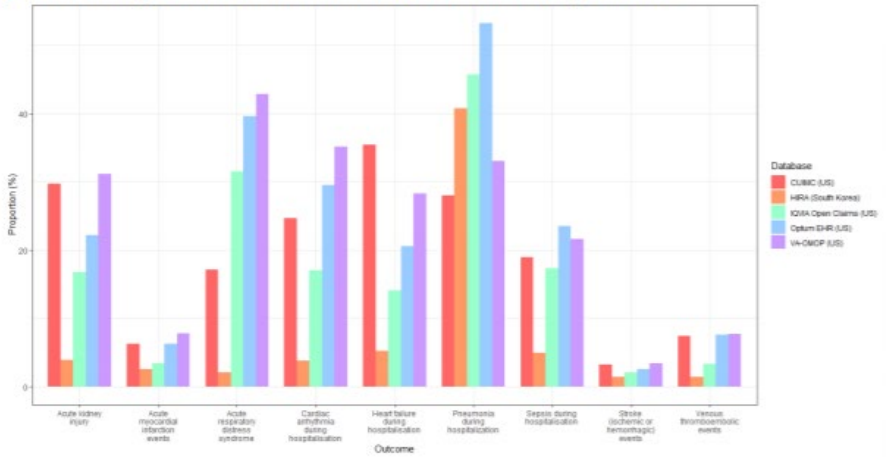
Abstract

Objective

Patients with autoimmune diseases were advised to shield to avoid COVID-19, but information on their prognosis is lacking. We characterised 30-day outcomes and mortality after hospitalisation with COVID-19 among patients with prevalent autoimmune diseases, and compared outcomes after hospital admissions among similar patients with seasonal influenza.

HIGHLIGHT: Most patients were female, aged ≥50 years with previous comorbidities. The prevalence of hypertension (45.5–93.2%), chronic kidney disease (14.0–52.7%) and heart disease (29.0–83.8%) was higher in hospitalised vs diagnosed patients with COVID-19. Compared with 70 660 hospitalised with influenza, those admitted with COVID-19 had more respiratory complications including pneumonia and acute respiratory distress syndrome, and higher 30-day mortality (2.2% to 4.3% vs 6.3% to 24.6%).

Figure 3a. Severe outcomes in 30 days post hospital admission with COVID-19 in patients with prevalent autoimmune diseases, stratified by database



Interactive Shiny Application available at: http://data.ohdsi.org/Covid19CharacterizationCharybdis/

OHDSI COVID-19 Study-a-thon Results

Characterization

nature COMMUNICATIONS

ARTICLE

https://doi.org/10.1038/s41467-020-18849-z OPEN

Check for updates

Deep phenotyping of 34,128 adult patients hospitalised with COVID-19 in an international network study

Edward Burn et al.#

Comorbid conditions appear to be common among individuals hospitalised with coronavirus disease 2019 (COVID-19) but estimates of prevalence vary and little is known about the prior medication use of patients. Here, we describe the characteristics of adults hospitalised with COVID-19 and compare them with influenza patients. We include 34,128 (US: 8362, South Korea: 7341, Spain: 18,425) COVID-19 patients, summarising between 4811 and 11,643 unique aggregate characteristics. COVID-19 patients have been majority male in the US and Spain, but predominantly female in South Korea. Age profiles vary across data sources. Compared to 84,585 individuals hospitalised with influenza in 2014-19, COVID-19 patients have more typically been male, younger, and with fewer comorbidities and lower medication use. While protecting groups vulnerable to influenza is likely a useful starting point in the response to COVID-19, strategies will likely need to be broadened to reflect the particular characteristics of individuals being hospitalised with COVID-19.

HIGHLIGHT: Compared to individuals hospitalized with influenza, patients admitted with COVID-19 were more likely male, younger, and, in the US, had fewer comorbidities and lower medication use.

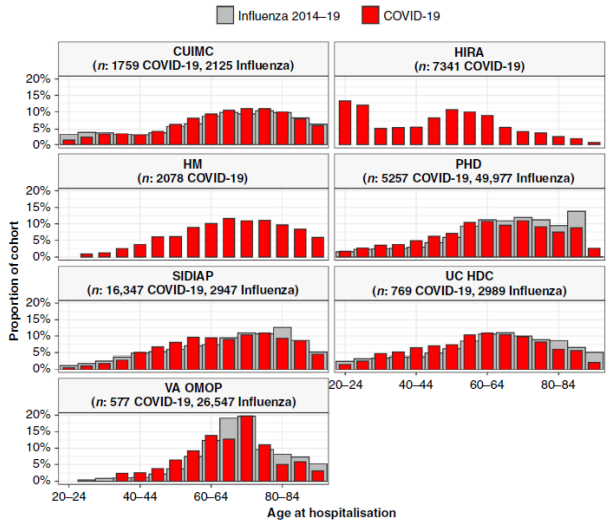


Fig. 1 Age of patients hospitalised with COVID-19 and of patients hospitalised with influenza. Individuals hospitalised with COVID-19 between December 2019 and April 2020 compared with those hospitalised with influenza between September 2014 to April 2019 (where available). Proportion of cohorts by 5-year age groups, with groups with counts of <10 omitted. CUIMC: Columbia University Irving Medical Center; HIRA: Health Insurance Review & Assessment; HM: HM Hospitales; PHD: Premier Healthcare Database; SIDIAP: The Information System for Research in Primary Care; UC HDC: University of Colorado Health Data Compass; VA OMOP: Department of Veterans Affairs. Influenza data for SIDIAP was only available from 2014 to 2017.

Interactive Shiny Application available at: http://evidence.ohdsi.org/Covid19CharacterizationHospitalization/

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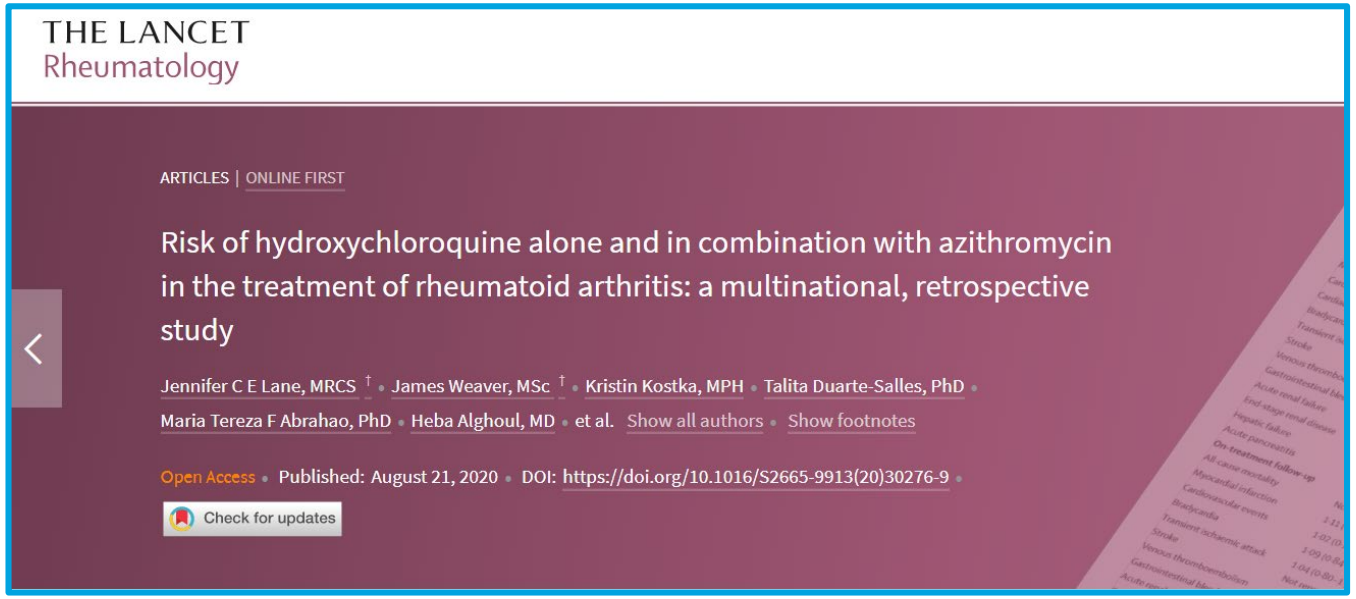
Population-Level Effect Estimation

HIGHLIGHT: Short-term hydroxychloroquine treatment is safe, but addition of azithromycin may induce heart failure and cardiovascular mortality, potentially due to synergistic effects on QT length.



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Risk of hydroxychloroquine alone and in combination with azithromycin in the treatment of rheumatoid arthritis: a multinational, retrospective study

Jennifer C E Lane, MRCS [†] • James Weaver, MSc [†] • Kristin Kostka, MPH • Talita Duarte-Salles, PhD • Maria Tereza F Abrahao, PhD • Heba Alghoul, MD • et al. Show all authors • Show footnotes

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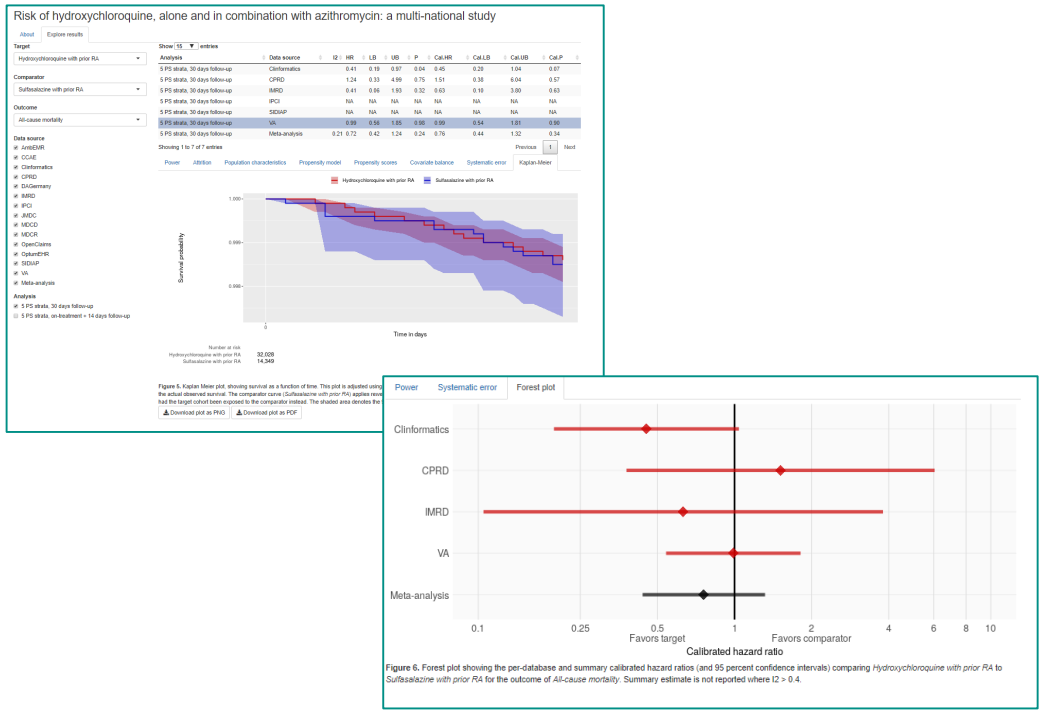

Interactive Shiny Application available at: https://data.ohdsi.org/Covid19EstimationHydroxychloroquine/

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Risk of depression, suicide and psychosis with hydroxychloroquine treatment for rheumatoid arthritis: a multinational network cohort study

Jennifer C E Lane, James Weaver, Kristin Kostka, Talita Duarte-Salles, Maria Tereza F Abrahao, Heba Alghoul, Osaid Alser, Thamir M Alshammari, Carlos Areia, Patricia Biedermann ... Show more

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Rheumatology, keaa771, https://doi.org/10.1093/rheumatology/keaa771

Published: 25 December 2020 **Article history** ▾

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Abstract

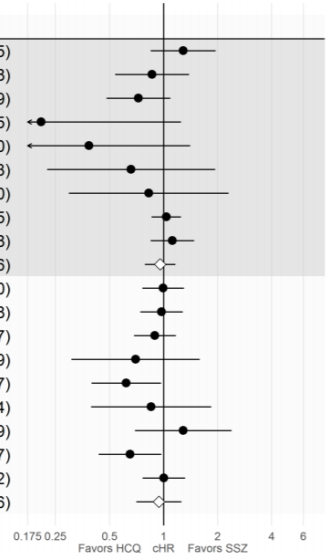
Objectives

Concern has been raised in the rheumatology community regarding recent regulatory warnings that HCQ used in the coronavirus disease 2019 pandemic could cause acute psychiatric events. We aimed to study whether there is risk of incident depression, suicidal ideation or psychosis associated with HCQ as used for RA.

HIGHLIGHT: Hydroxychloroquine does not appear to increase the risk of depression, suicide/suicidal ideation, or psychosis compared to sulfasalazine. No effects were seen in the short (first month of treatment) or in the long term. Use at higher dose or for different indications might have other effects and needs further investigation.

Figure 1. Forest plot of the association between short- (top) and long-term (bottom) use of Hydroxychloroquine versus Sulfasalazine and risk of depression, by database and in meta-analysis.

Time-at-risk	Database	cHR (95%)
30-day	AmbEMR	1.28 (0.85, 1.95)
	CCAE	0.86 (0.54, 1.38)
	Clinformatics	0.72 (0.48, 1.09)
	CPRD	0.21 (0.03, 1.25)
	DAGermany	0.38 (0.11, 1.40)
	MDCD	0.66 (0.22, 1.93)
	MDCR	0.83 (0.30, 2.30)
	OpenClaims	1.03 (0.86, 1.25)
	OptumEHR	1.12 (0.85, 1.48)
	Summary (I2=0.23)	0.96 (0.79, 1.16)
On-treatment	AmbEMR	0.99 (0.76, 1.30)
	CCAE	0.97 (0.74, 1.28)
	Clinformatics	0.89 (0.68, 1.17)
	CPRD	0.70 (0.31, 1.59)
	DAGermany	0.62 (0.40, 0.97)
	IMRD	0.85 (0.40, 1.84)
	MDCD	1.29 (0.69, 2.39)
	MDCR	0.65 (0.44, 0.97)
	OpenClaims	1.00 (0.76, 1.32)
	Summary (I2=0.21)	0.94 (0.71, 1.26)



cHR=calibrated hazard ratio; 95%=95% confidence interval; I2=estimate heterogeneity statistic.

Interactive Shiny Application available at: https://data.ohdsi.org/Covid19EstimationHydroxychloroquine2/

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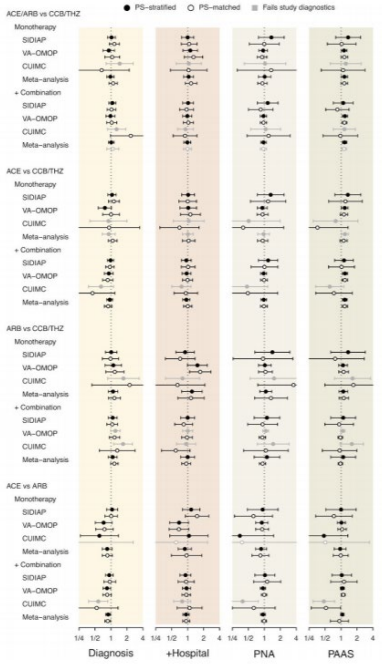
Renin-angiotensin system blockers and susceptibility to COVID-19: a multinational open science cohort study

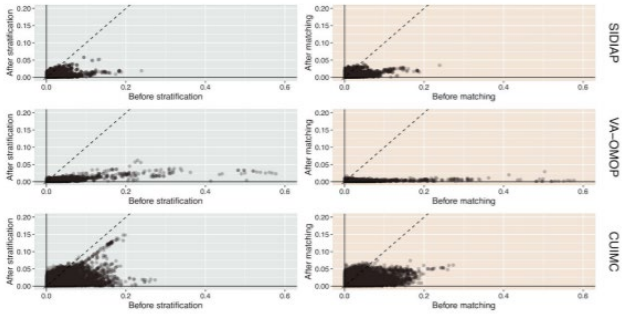
Daniel R Morales, Mitchell M Conover, Seng Chan You, Nicole Pratt, Kristin Kostka, Talita Duarte Salles, Sergio Fernandez Bertolin, Maria Aragon, Scott L. DuVall, Kristine Lynch, Thomas Falconer, Kees van Bochove, Cynthia Sung, Michael E. Matheny, Christophe G. Lambert, Fredrik Nyberg, Thamir M AlShammari, Andrew E. Williams, Rae Woong Park, James Weaver, Anthony G. Sena, Martijn J. Schuemie, Peter R. Rijnbeek, Ross D. Williams, Jennifer C.E Lane, Albert Prats Uribe, Lin Zhang, Carlos Areia, Harlan Krumholz, Daniel Prieto Alhambra, Patrick B Ryan, George Hripcsak, Marc A Suchard

doi: https://doi.org/10.1101/2020.06.11.20125849

This article is a preprint and has not been peer-reviewed [what does this mean?]. It reports new medical research that has yet to be evaluated and so should *not* be used to guide clinical practice.

HIGHLIGHT: We observed, however, no significant difference between drug- classes for COVID-19 hospitalization or pneumonia risk across all comparisons. Conclusion: There is no clinically significant increased risk of COVID-19 diagnosis or hospitalization with ACE or ARB use. Users should not discontinue or change their treatment to avoid COVID-19.





Interactive Shiny Application available at: https://data.ohdsi.org/IcariusSusceptibility/

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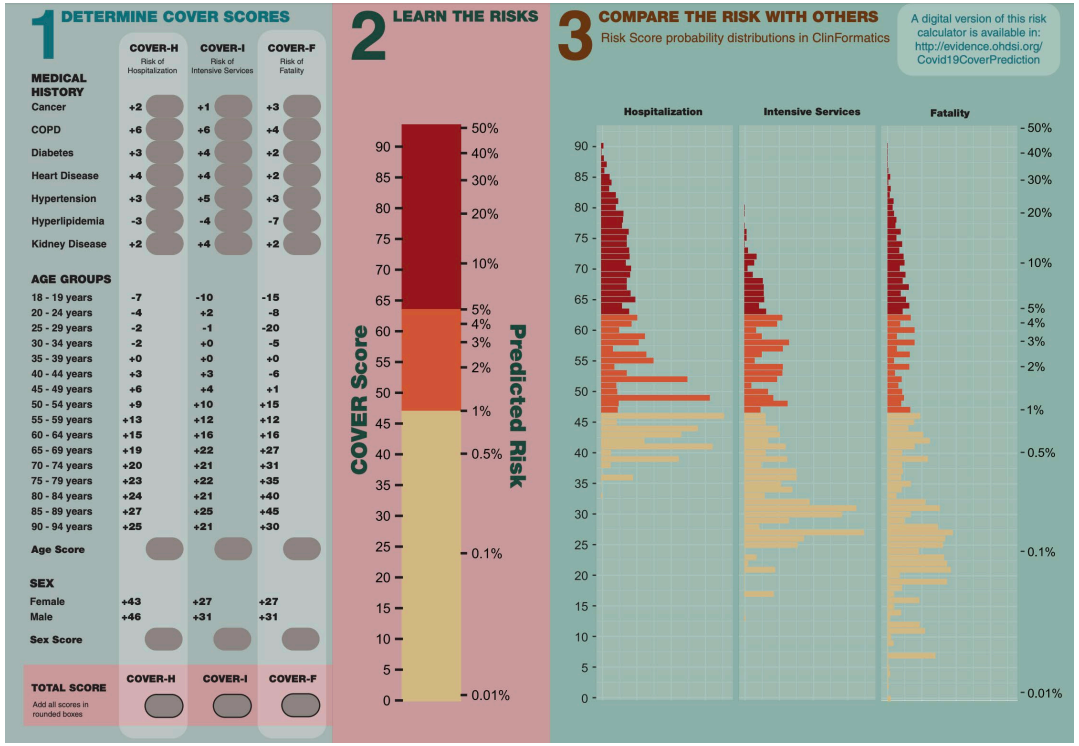
Seek COVER: Development and validation of a personalized risk calculator for COVID-19 outcomes in an international network

Ross D. Williams, Aniek F. Markus, Cynthia Yang, Talita Duarte Salles, Thomas Falconer, Jitendra Jonnagaddala, Chungsoo Kim, Yeunsook Rho, Andrew Williams, Min Ho An, María Aragón, Carlos Areia, Edward Burn, Young Choi, Iannis Drakos, Maria Fernandes Abrahão, Sergio Fernández-Bertolín, George Hripcsak, Benjamin Kaas-Hansen, Prasanna Kandukuri, Jan A. Kors, Kristin Kostka, Siaw-Teng Liaw, Gerardo Machnicki, Daniel Morales, Fredrik Nyberg, Rae Woong Park, Albert Prats-Uribe, Nicole Pratt, Gowtham Rao, Christian G. Reich, Marcela Rivera, Tom Seinen, Azza Shoaibi, Matthew E. Spotnitz, Ewout W. Steyerberg, Marc A Suchard, Seng Chan You, Lin Zhang, Lili Zhou, Patrick B. Ryan, Daniel Prieto-Alhambra, Jenna M. Reps, Peter R. Rijnbeek

doi: https://doi.org/10.1101/2020.05.26.20112649

This article is a preprint and has not been certified by peer review [what does this mean?]. It reports new medical research that has yet to be evaluated and so should *not* be used to guide clinical practice.

HIGHLIGHT: We identified 7 predictors (history of cancer, COPD, diabetes, heart disease, hypertension, hyperlipidemia, kidney disease) which combined with age and sex discriminated which patients would experience any of our outcomes (hospitalization and death).



Interactive Shiny Application available at: http://evidence.ohdsi.org/Covid19CoverPrediction

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Can we trust the prediction model? Demonstrating the importance of external validation by investigating the COVID-19 Vulnerability (C-19) Index across an international network of observational healthcare datasets

Jenna M Reps, Chungsoo Kim, Ross D. Williams, Aniek F Markus, Cynthia Yang, Talita Duarte Salles, Thomas Falconer, Jitendra Jonnagaddala, Andrew Williams, Sergio Fernandez-Bertolin, Scott L DuVall, Kristin Kostka, Gowtham Rao, Azza Shoaibi, Anna Ostropolets, Matthew E Spotnitz, Lin Zhang, Paula Casajust, Ewout Steyerberg, Fredrik Nyberg, Benjamin Skov Kaas-Hansen, Young Hwa Choi, Daniel Morales, Siaw-Teng Liaw, Maria Tereza Fernandes Abrahao, Carlos Areia, Michael E Matheny, Maria Aragon, Rae Woong Park, George Hripcsak, Christian G Reich, Marc A Suchard, Seng Chan You, Patrick B Ryan, Daniel Prieto-Alhambra, Peter R Rijnbeek

doi: https://doi.org/10.1101/2020.06.15.20130328

This article is a preprint and has not been peer-reviewed [what does this mean?]. It reports new medical research that has yet to be evaluated and so should *not* be used to guide clinical practice.

HIGHLIGHT: The results show that the discriminative performance of the C-19 model is low for influenza cohorts, and even worse amongst COVID-19 patients in the US, Spain and South Korea. These results suggest that C-19 should not be used to aid decision making during the COVID-19 pandemic.

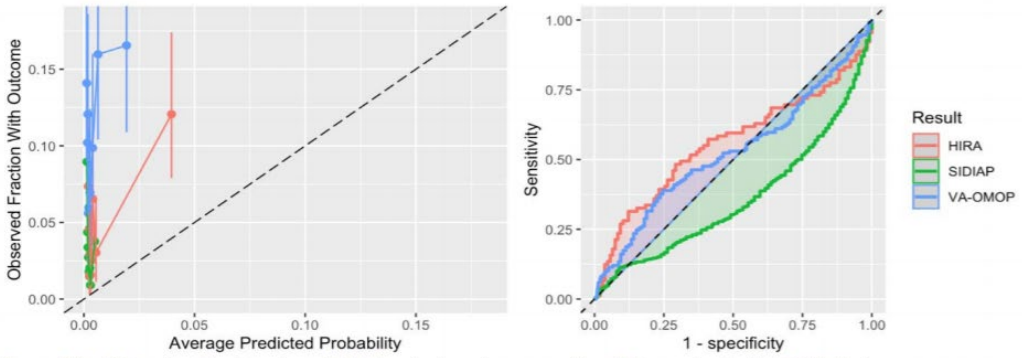

Figure 1 The ROC and calibration plots of C-19 for the three datasets with sufficient and suitable COVID-19 data

Interactive Shiny Application available at: http://evidence.ohdsi.org/C19Validation

Thank you

Sarah.seager@iqvia.com