EUROPEAN OHDSI SYMPOSIUM

June 24th 2022 Rotterdam

EUROPE

"Welcome aboard!"

Organised by:

Erasmus MC
University Medical Center Rotterdam

Health Data Science

Welcome to the European OHDSI Journey

Prof. Dr. Ir. Peter R. Rijnbeek
Professor of Medical Informatics
Chair Department of Medical Informatics
Erasmus MC, The Netherlands

Thank you for your support!

Welcome on the SS Rotterdam

The SS Rotterdam – 'La Grande Dame'
Launched on 14 December 1956 here in Rotterdam
Originally served as a transatlantic line to connect Rotterdam with New York

Rotterdam, our biggest port...

Objectives of OHDSI Europe

- Enable the generation of reliable evidence from European health data: promote the adoption of the OMOP-CDM and analytics.

- Focus on European Challenges and Opportunities.

- Community building
  - Point of contact for all stakeholders
  - Training of stakeholders
  - Stimulate national and international collaborations in Europe
  - Organization of European OHDSI Symposia

First Annual OHDSI Symposium, March 23th 2018

- 200 participants
- 24 countries
- 40 posters
- 5 software demos
- 2 full day tutorials

Second Annual OHDSI Symposium, March 29th 2019

- 250 participant
- 27 countries
- 35 posters
- 8 software demos
- 5 full day tutorials

European OHDSI Symposium 2020 Cancelled

European OHDSI Symposium2020

27-29 March 2020 – Oxford, UK

Mathematical Institute,
University of Oxford

NDORMS
NUFFIELD DEPARTMENT OF ORTHOPAEDICS,
RHEUMATOLOGY AND MUSCULOSKELETAL SCIENCES

Prof. Daniel Prieto Alhambra

250 registered participants
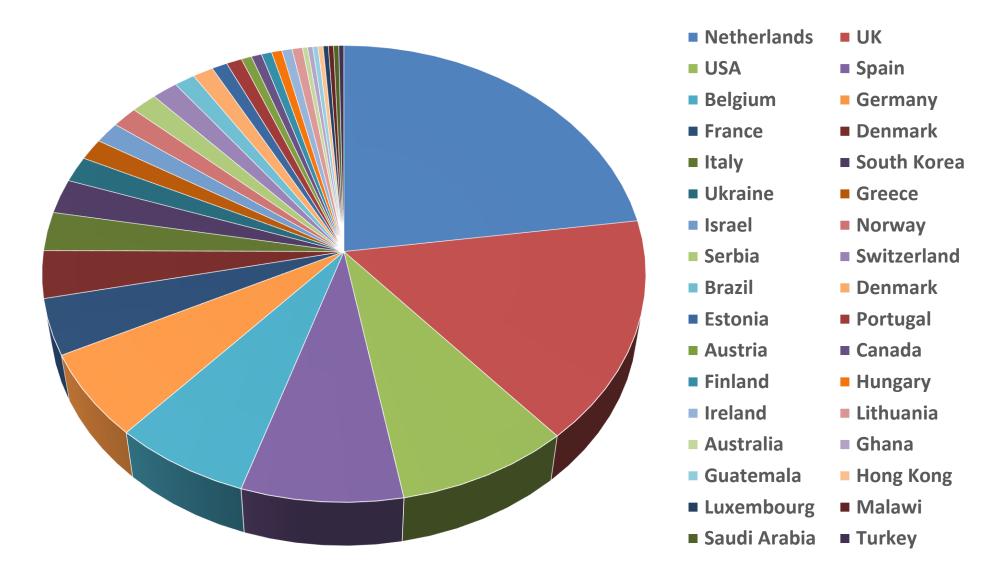
Meeting Goals Third OHDSI Symposium

- Provide a platform to stimulate community building
- Enable the community to share their plans and results
- Educate and train the community through a workshop (Saturday) and multiple Workgroup Meetings (Sunday)
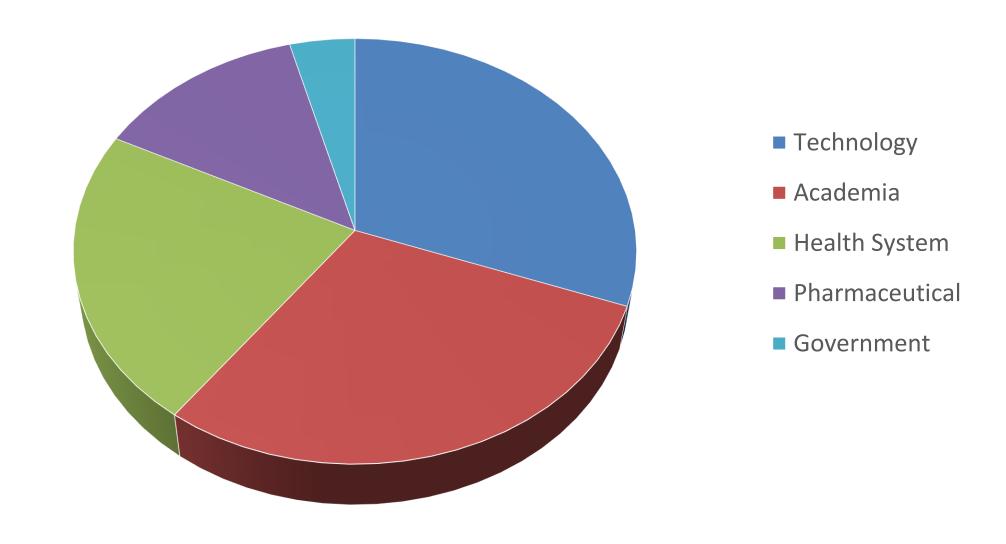
Breakdown of Participants: 34 Countries

Legend:
- Netherlands
- UK
- USA
- Spain
- Belgium
- Germany
- France
- Denmark
- Italy
- South Korea
- Ukraine
- Greece
- Israel
- Norway
- Serbia
- Switzerland
- Brazil
- Denmark
- Estonia
- Portugal
- Austria
- Canada
- Finland
- Hungary
- Ireland
- Lithuania
- Australia
- Ghana
- Guatemala
- Hong Kong
- Luxembourg
- Malawi
- Saudi Arabia
- Turkey

Breakdown of Participants: Stakeholders

Relationship with OHDSI

N=350

Category	Value
New to OHDSI	85
Participate OHDSI meetings	125
Database conversion	87
OMOP CDM instance	107
Use OHDSI tools & methods	136
Participate OHDSI Forum	53
Participate OHDSI studies	67
Visited OHDSI Europe Symp	62
Visited OHDSI Global Symp	105

Agenda

Time	Description	Location
9:10 – 9:40	Journey of OHDSI: Where have we been? Speaker: George Hripcsak, MD, MS, Vivian Beaumont Allen Professor and Chair, Biomedical Informatics, Columbia University Medical Center	Theatre
9:40 – 11:00	A Cruise around the OHDSI Europe Community Moderator: Nigel Hughes, Janssen Research and Development	Theatre
11:00 – 11:30	Coffee Break	Queen's Lounge
11:30 – 12:45	Rapid fire presentations of collaborators Moderator: Katia Verhamme, MD, Associate Professor of Use and Analysis of Observational Data, Department of Medical Informatics, Erasmus MC	Theatre
12:45 – 13:00	Findable, standardized data at scale through the EHDEN Database Catalogue Speaker: Julia Kurps, The Hyve	Theatre

Agenda (2)

Time	Description	Location
13:00 – 14:00	Lunch	La Fontaine & Odyssee Room
13:00 – 16:15	OHDSI Collaborator Showcase	La Fontaine & Odyssee Room
14:30 – 15:30	Early Investigators Mentor Meetings Lead: Ross Williams, Department of Medical Informatics, Erasmus MC	Queen's Lounge
16:15 – 16:45	Characterizing Adverse Events in COVID-19 infected patients across the OHDSI network Speaker: Erica Voss, MPH, Janssen Research and Development, Erasmus MC	Theatre
16:45 – 17:00	Data Analysis and Real World Interrogation Network (DARWIN EU®) Speaker: Peter Rijnbeek, PhD, Chair, Department of Medical Informatics, Erasmus MC	Theatre
17:00 – 17:45	Reaction panel with key stakeholders. Moderator: Dani Prieto-Alhambra, MD, PhD Professor of Pharmaco- and Device Epidemiology University of Oxford, Professor of Real World Evidence and Methods Research, Erasmus MC	Theatre
17:45 – 18:00	Closure	Theatre
18:00 – 19:30	Networking Reception	Queen's Lounge

Journey of OHDSI: Where have we been?

George Hripcsak, MD, MS

Vivian Beaumont Allen Professor and Chair, Biomedical Informatics, Columbia University Irving Medical Center

A lot has happened in the world since we were last together in Europe…
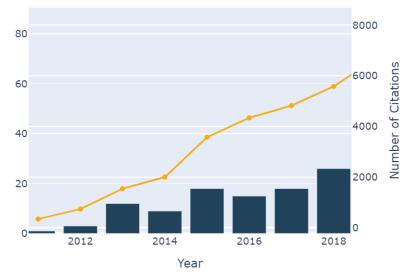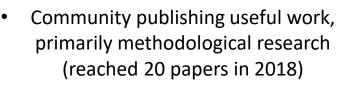
OHDSI progress at the last in-person European OHDSI Symposium Mar2019

OHDSI Publications & Cumulative Citations
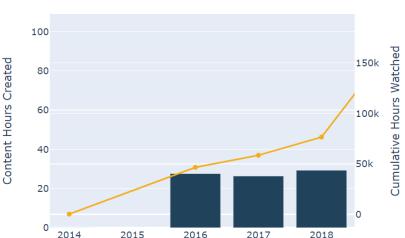
- Community education resources started to grow, with >25 hours of video content per year, which has now been cumulatively watched for >75,000 hours as of Jun2022

New and Cumulative OHDSI Researchers

YouTube Analysis
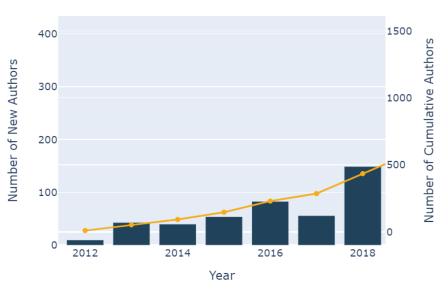
- Community publishing useful work, primarily methodological research (reached 20 papers in 2018)
- Those papers are now widely cited (>6,000 times as of Jun2022)

- Community was growing nicely, >500 different authors with work related to OHDSI research by end of 2018
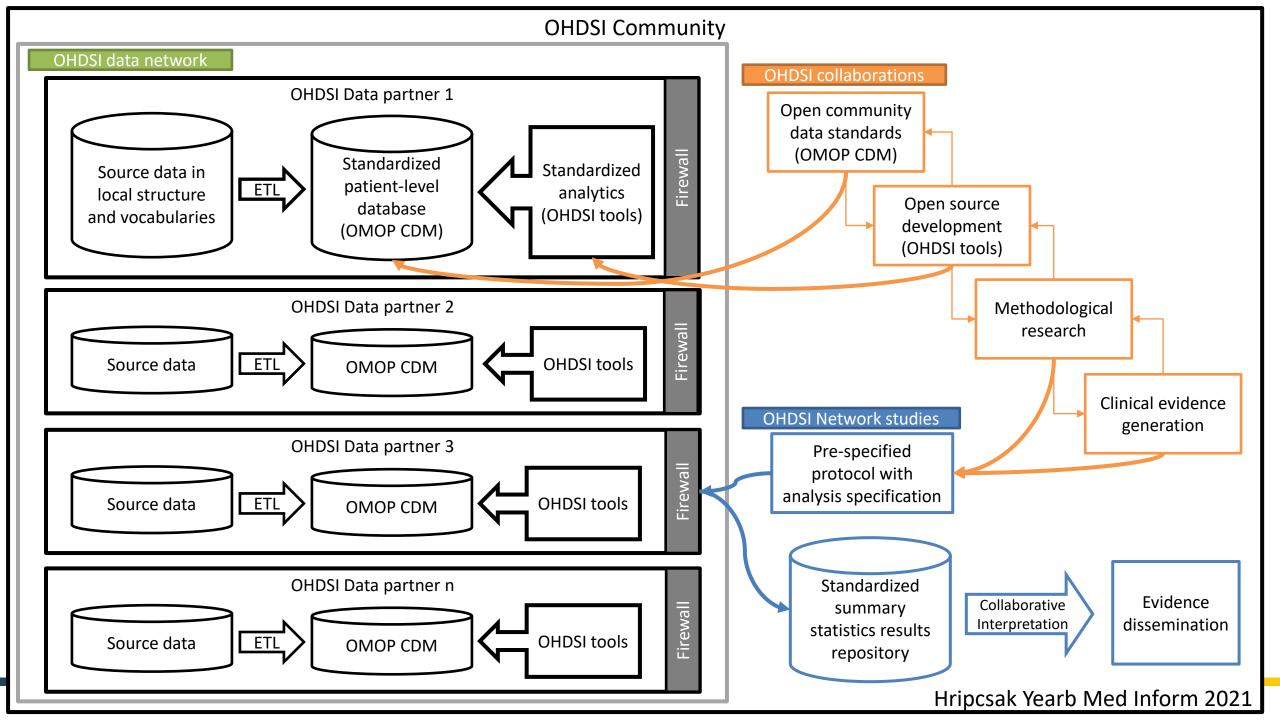
What hasn't changed since that last time we were all in-person in European OHDSI Symposium?
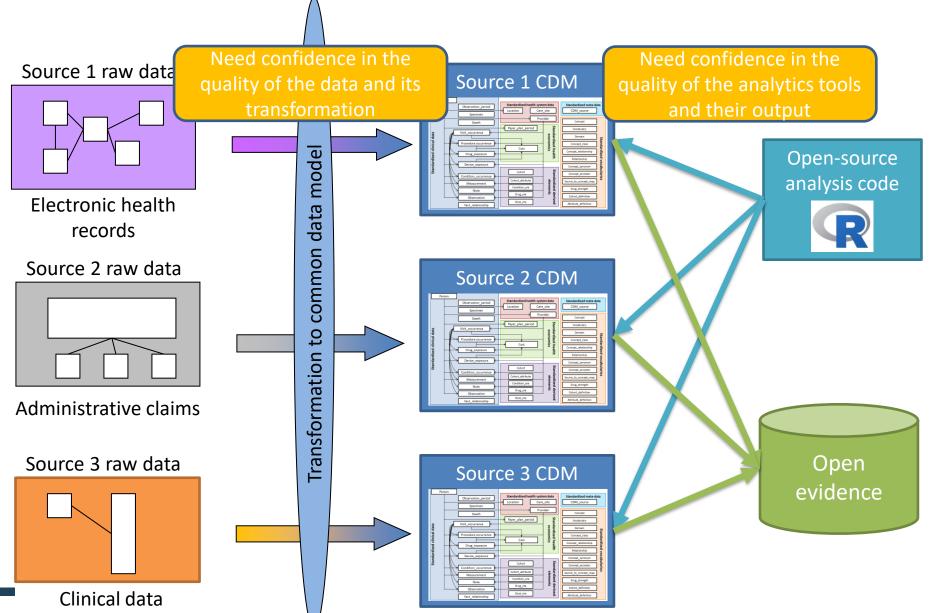
OHDSI's mission

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

Hripcsak Yearb Med Inform 2021
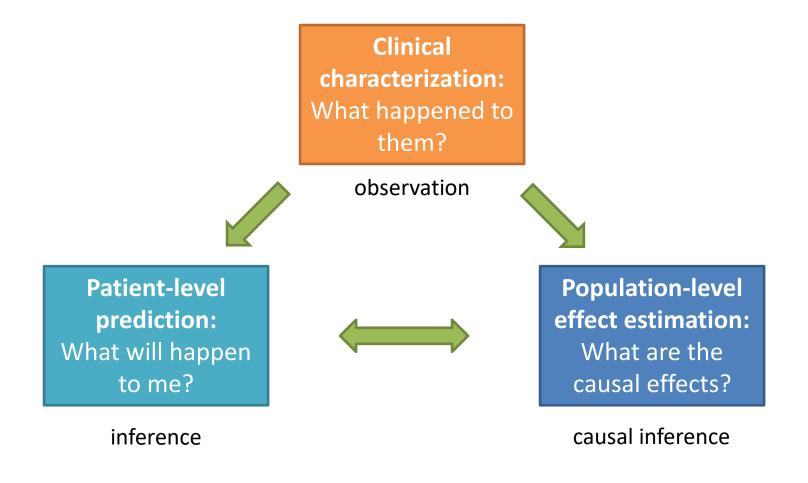
Common data model can enable standardized analytics across a distributed data network

Complementary evidence to inform the patient journey

Clinical characterization: What happened to them?

observation

Patient-level prediction: What will happen to me?

inference

Population-level effect estimation: What are the causal effects?

causal inference
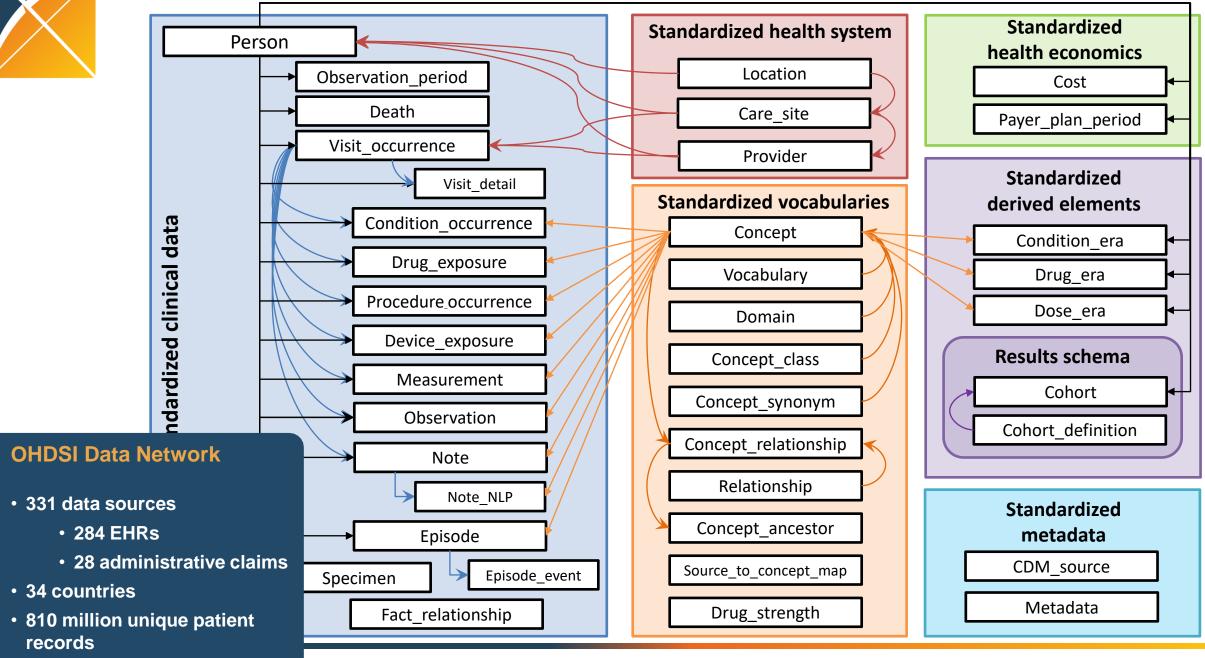
What has happened since last time we were all in-person in European OHDSI Symposium?

OHDSI community has grown

OHDSI Collaborators

- **3,194 collaborators**
- **74 countries**
- **21 time zones**
- **6 continents**
- **1 community**

OMOP Common Data Model v5.4 has been widely adopted

Standardized clinical data

- Person
- Observation_period
- Death
- Visit_occurrence
- Visit_detail
- Condition_occurrence
- Drug_exposure
- Procedure_occurrence
- Device_exposure
- Measurement
- Observation
- Note
- Note_NLP
- Episode
- Episode_event
- Specimen
- Fact_relationship

Standardized health system

- Location
- Care_site
- Provider

Standardized vocabularies

- Concept
- Vocabulary
- Domain
- Concept_class
- Concept_synonym
- Concept_relationship
- Relationship
- Concept_ancestor
- Source_to_concept_map
- Drug_strength

Standardized health economics

- Cost
- Payer_plan_period

Standardized derived elements

- Condition_era
- Drug_era
- Dose_era

Results schema

- Cohort
- Cohort_definition

Standardized metadata

- CDM_source
- Metadata

OHDSI Data Network

- 331 data sources
  - 284 EHRs
  - 28 administrative claims
- 34 countries
- 810 million unique patient records

OHDSI Standardized vocabularies have expanded

- **10,088,289 concepts**
  - 3,533,508 standard concepts
  - 752,175 classification concepts
- **134 vocabularies**
- **40 domains**

- **76,192,476 concept relationships**
- **84,898,314 ancestral relationships**
- **3,016,130 concept synonyms**

Open-source software development: HADES

OHDSI HADES packages downloads on CRAN: 373k times as of Jun2022

CohortMethod
New-user cohort studies using large-scale regression for propensity and outcome models.
Learn more…

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

Cyclops
Highly efficient implementation regularized logistic, Poisson and regression.
Learn more…

SelfControlledCohort
A self-controlled cohort design, where time preceding exposure is used as control.
Learn more…

EvidenceSynthesis
Routines for combining causal effect estimates and study diagnostics across multiple data sites in a distributed study.
Learn more…

ParallelLogger
Support for parallel computation with logging to console, disk, or mail.
Learn more…

PatientLevelPrediction
Build and evaluate predictive models for user-specified outcomes, using a wide array of machine learning algorithms.
Learn more…

EmpiricalCalibration
Use negative control exposure-outcome pairs to profile and calibrate a particular analysis design.
Learn more…

BigKnn
A large scale k-nearest neighbor classifier using the Lucene search engine.
Learn more…

services.
Learn more…

between OHDSI collaborators.
Learn more…

MethodEvaluation
Use real data and established reference sets as well as simulations injected in real data to evaluate the performance of methods.
Learn more…

CohortDiagnostics
Generate a wide set of diagnostics to evaluate cohort definitions against databases in the CDM.
Learn more…

Hydra
Hydrating package skeletons into executable R study packages based on specifications in JSON format.
Learn more…

Eunomia
A standard CDM dataset for testing and demonstration purposes that runs on an embedded SQLite database.
Learn more…

CirceR
An R wrapper for Circe, a library for creating cohort definitions, expressing them as JSON, SQL, or Markdown.
Learn more…

LEGEND – principles and practice

AMIA
OXFORD

Perspective

Principles of Large-scale Evidence Generation and Evaluation across a Network of Databases (LEGEND)

Martijn J. Schuemie [1,2], Patrick B. Ryan[1,3], Nicole Pratt[4], RuiJun Chen [3,5], Seng Chan You[6], Harlan M. Krumholz[7], David Madigan[8], George Hripcsak[3,9], and Marc A. Suchard[2,10]

AMIA
OXFORD

Research and Applications

Large-scale evidence generation and evaluation across a network of databases (LEGEND): assessing validity using hypertension as a case study

Martijn J Schuemie [1,2] Patrick B Ryan,[1,3] Nicole Pratt,[4] RuiJun Chen [3,5] Seng Chan You,[6] Harlan M Krumholz,[7] David Madigan,[8] George Hripcsak,[3,9] and Marc A Suchard[2,10]
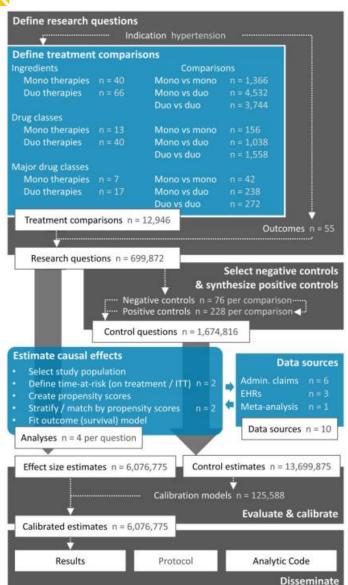
LEGEND principles

1. LEGEND will generate evidence at a large scale.

2. Dissemination of the evidence will not depend on the estimated effects.

3. LEGEND will generate evidence using a prespecified analysis design.

4. LEGEND will generate evidence by consistently applying a systematic process across all research questions.

5 LEGEND will generate evidence using best practices.

6. LEGEND will include empirical evaluation through the use of control questions.

7. LEGEND will generate evidence using open-source software that is freely available to all.

8. LEGEND will not be used to evaluate new methods.

9. LEGEND will generate evidence across a network of multiple databases.

10. LEGEND will maintain data confidentiality; patient-level data will not be shared between sites in the network.

LEGEND in practice
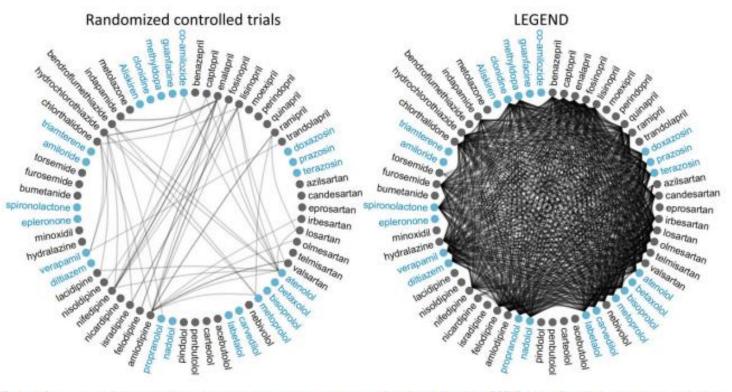
Figure 3. Comparisons of single-drug hypertension treatments in randomized controlled trials (left) and in LEGEND (right). Each circle represents an ingredient. Color groupings indicate drug classes. A line between circles indicates the 2 drugs are compared in at least 1 study.

Estimation
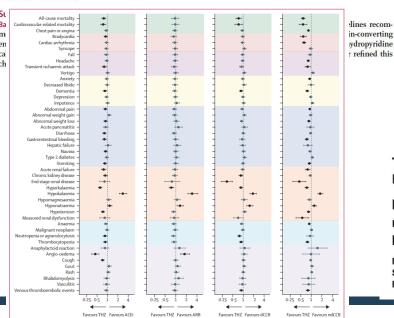
LEGEND has produced a new model for generating reliable evidence and new opportunities for collaborative research

Large-scale evidence through large-scale collaboration

March 2022

June 2022

Original Investigation | Cardiology

Analysis of Dual Combination Therapies Used in Treatment of Hypertension in a Multinational Cohort

Yuan Lu, ScD; Mui Van Zandt, BS; Yun Liu, PhD; Jing Li, MS; Xialin Wang, MS; Yong Chen, PhD; Zhengfeng Chen, MBBS, MMed; Jaehyeong Cho, PhD; Sreemanee Raaj Dorajoo, PhD; Mengling Feng, PhD; Min-Huei Hsu, MD, PhD; Jason C. Hsu, PhD; Usman Iqbal, PharmD, MBA, PhD; Jitendra Jonnagaddala, PhD; Yu-Chuan Li, MD, PhD; Siaw-Teng Liaw, MBBS, PhD; Hong-Seok Lim, MD, PhD; Kee Yuan Ngiam, MBBS, MMed; Phung-Anh Nguyen, PhD; Rae Woong Park, MD, PhD; Nicole Pratt, PhD; Christian Reich, MD, PhD; Sang Youl Rhee, MD; Selva Muthu Kumaran Sathappan, MSc; Seo Jeong Shin, PhD; Hui Xing Tan, MTech; Seng Chan You, MD, PhD; Xin Zhang, MS; Harlan M. Krumholz, MD, SM; Marc A. Suchard, MD, PhD; Hua Xu, PhD

Abstract

IMPORTANCE More than 1 billion adults have hypertension globally, of whom 70% cannot achieve their hypertension control goal with monotherapy alone. Data are lacking on clinical use patterns of dual combination therapies prescribed to patients who escalate from monotherapy.

OBJECTIVE To investigate the most common dual combinations prescribed for treatment escalation in different countries and how treatment use varies by age, sex, and history of cardiovascular disease.

DESIGN, SETTING, AND PARTICIPANTS This cohort study used data from 11 electronic health record databases that cover 118 million patients across 8 countries and regions between January 2000 and December 2019. Included participants were adult patients (ages ≥18 years) who newly initiated antihypertensive dual combination therapy after escalating from monotherapy. There were 2 databases included for 3 countries: the Iqvia Longitudinal Patient Database (LPD) Australia and

Key Points

Question What are the most common antihypertensive dual combinations prescribed to patients who escalate from monotherapy in clinical practice, and how do the combinations differ by country and patient demographic subgroup?

Findings In this cohort study of 970 335 individuals from 11 large databases, 12 dual combinations of antihypertensive drug classes were commonly used, with large variation

BMJ Open

Large-scale evidence generation and evaluation across a network of databases for type 2 diabetes mellitus (LEGEND-T2DM): a protocol for a series of multinational, real-world comparative cardiovascular effectiveness and safety studies

Rohan Khera [1,2], Martijn J Schuemie [3,4], Yuan Lu [1,2], Anna Ostropolets [5], RuiJun Chen [6], George Hripcsak [5,7], Patrick B Ryan [3,5], Harlan M Krumholz [1,2], Marc A Suchard [4,8,9,10]
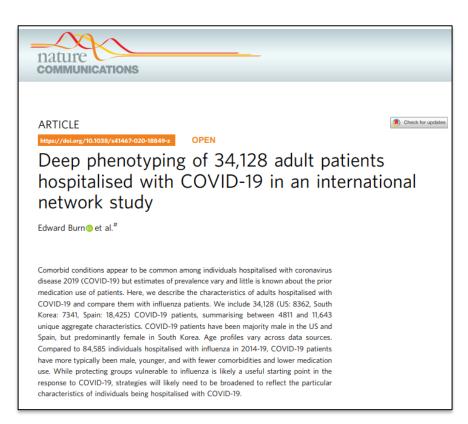
OHDSI COVID-19 Study-a-Thon (Mar2020)

Disease Natural History of COVID-19

- Describe baseline characteristics for those hospitalized for COVID-19 as compared to those hospitalized for influenza

Findings:

- Patients hospitalized with COVID are systematically different from those hospitalized with flu
- COVID hospitalized patients, when compared those hospitalized for influenza:
  - Greater proportion are male and slightly younger
  - Fewer comorbidities and lower medication use

- Utilized claims and electronic medical records from 10 databases across 3 different countries

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.

Large-scale characterization of COVID-19 disease natural history

Together, OHDSI has studied:

- **>17.2m** patients tested for SAR-COV-2

- **>4.5m** patients diagnosed or tested positive for COVID-19
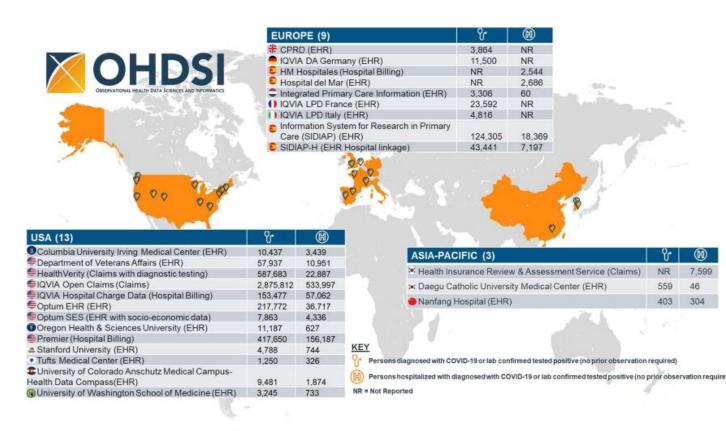
- **>890k** patients hospitalized with COVID-19

Large-scale characterization of COVID-19 disease natural history

Characterization

BMJ Open

Characteristics and outcomes of patients with COVID-19 with and without prevalent hypertension: a multinational cohort study

Carlen Reyes [1] Andrea Pisti[llo]
Elena Roel,[1,2] Diana Puente,[1,2]
Thamir M Alshammari,[6] Wahee[d]
Heba Alghoul [10] Carlos Arei[a]
Neus Valveny,[15] Gabriel de Mae
Jordi Martinez Roldan,[19] Inmac[u]
Asieh Golozar,[21,22] Christian Rei[]
Seng Chan You,[25] Kristine E Ly[n]
Fredrik Nyberg,[28] Anna Ostrop[o]
Marc A Suchard[31] Patrick Rya[n]

International Journal of Obesity

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

Martina Recalde,[1,2,36] Elena Roel [1,2,36] Andrea Pistillo,[1] Anthony G. Sena [3,4] Albert Prats-Uribe [5]
Waheed-Ul-Rahman Ahmed,[6,7] Heba Alghoul,[8] Thamir M. Alshammari [9] Osaid Alser,[10] Carlos Areia [11] Edward Burn,[1,5]
Paula Casajust,[12] Dalia Dawoud,[13] Scott L. DuVall,[14,15] Thomas Falconer,[16] Sergio Fernández-Bertolín,[1] Asieh Golozar,[17,18]
Mengchun Gong,[19] Lana Yin Hui Lai,[20] Jennifer C. E. Lane,[6] Kristine E. Lynch,[14,15] Michael E. Matheny,[21,22] Paras P. Mehta,[23]
Daniel R. Morales,[24] Karthik Natarjan,[16,25] Fredrik Nyberg,[26] Jose D. Posada,[27] Christian G. Reich,[28] Peter R. Rijnbeek,[] Lisa M. Schilling,[29]
Karishma Shah,[6] Nigam H. Shah,[27] Vignesh Subbian,[30] Lin Zhang,[31,32] Hong Zhu,[33,34] Patrick Ryan,[3,16] Daniel Prieto-Alhambra,[4,5]
Kristin Kostka,[28,35,37] and Talita Duarte-Salles [1,37]

PEDIATRICS

Thirty-Day Outcomes of Children and Adolescents With COVID-19: An International Experience

Talita Duarte-Salles, PhD,[a] David Vizcaya, PhD,[b] Andrea Pistillo, MSc,[a] Paula Casajust, MSc,[c] Anthony G. Sena[]
Lana Yin Hui Lai, PhD,[f] Albert Prats-Uribe, MD,[g] Waheed-Ul-Rahman Ahmed, PhD,[g,h] Thamir M. Alshammari, [P]
Heba Alghoul, PhD,[j] Osaid Alser, PhD,[k] Edward Burn, PhD,[a,g] Seng Chan You, PhD,[l] Carlos Areia, PhD,[m]
Clair Blacketer, MPH,[d,e] Scott DuVall, PhD,[n,o] Thomas Falconer, MSc,[p] Sergio Fernandez-Bertolin, BSc,[a] Steph[]
Asieh Golozar, PhD,[q,r] Mengchun Gong, PhD,[s] Eng Hooi Tan, PhD,[g] Vojtech Huser, PhD,[t] Pablo Iveli, PhD,[u]
Daniel R. Morales, PhD,[v] Fredrik Nyberg, PhD,[w] Jose D. Posada, PhD,[x] Martina Recalde, MPH,[a,y] Elena Roel, [M]
Lisa M. Schilling, PhD,[z] Nigam H. Shah, PhD,[x] Karishma Shah, PhD,[g] Marc A. Suchard, PhD,[aa] Lin Zhang, PhD,[]
Ying Zhang, PhD,[s] Andrew E. Williams, PhD,[dd] Christian G. Reich, PhD,[ee] George Hripcsak, PhD,[p] Peter Rijnbe[]
Patrick Ryan, PhD,[d,p] Kristin Kostka, MPH,[ee] Daniel Prieto-Alhambra, PhD[g]

Characteristics and Outcomes of Over 300,000 Patients with COVID-19 and History of Cancer in the United States and Spain

Elena Roel[1,2], Andrea Pistillo[1], Martina Recalde[1,2], Anthony G. Sena[3,4], Sergio Fernández-Bertolín[1],
Maria Aragón[1], Diana Puente[1,2], Waheed-Ul-Rahman Ahmed[5,6], Heba Alghoul[7], Osaid Alser[8],
[c]keter[3], William Carter[11], Paula Casajust[12],
[F]alco[3], Scott L. DuVall[16,17], Thomas Falconer[18,19],

RHEUMATOLOGY

Original article

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

Eng Hooi Tan[1], Anthony G. Sena [2,3], Albert Prats-Uribe [1],
Seng Chan You[4], Waheed-Ul-Rahman Ahmed[5,6], Kristin Kostka[7],
Christian Reich[7], Scott L. DuVall[8,9], Kristine E. Lynch[8,9],
Michael E. Matheny[10,11], Talita Duarte-Salles[12], Sergio Fernandez Bertolin[12],
George Hripcsak[13,14], Karthik Natarajan[13,14], Thomas Falconer[13],
Matthew Spotnitz[13], Anna Ostropolets[13], Clair Blacketer[2,3],
Thamir M. Alshammari[15], Heba Alghoul[16], Osaid Alser[17], Jennifer C. E. Lane[1],
Dalia M. Dawoud[18], Karishma Shah[5], Yue Yang[19], Lin Zhang[20,21],
Carlos Areia[22], Asieh Golozar[23,24], Martina Recalde[12,25], Paula Casajust[26],
Jitendra Jonnagaddala [27], Vignesh Subbian[28], David Vizcaya[29],
Lana Y. H. Lai[30], Fredrik Nyberg[31], Daniel R. Morales[32], Jose D. Posada[33],
Nigam H. Shah[33], Mengchun Gong[34], Arani Vivekanantham[5], Aaron Abend[35],
Evan P. Minty[36], Marc Suchard[37], Peter Rijnbeek[3], Patrick B. Ryan[2,13] and
Daniel Prieto-Alhambra[1]

Safety of hydroxychloroquine

- Evidence was needed around the use of hydroxychloroquine (HCQ) alone and in combination with azithromycin (AZ). We examined the use of these drugs in rheumatoid arthritis (RA) patients.

- Findings:
  - In history use in RA population, HCQ alone is generally safe but in combination with AZ it shows a doubling of risk of 30-day cardiovascular mortality.
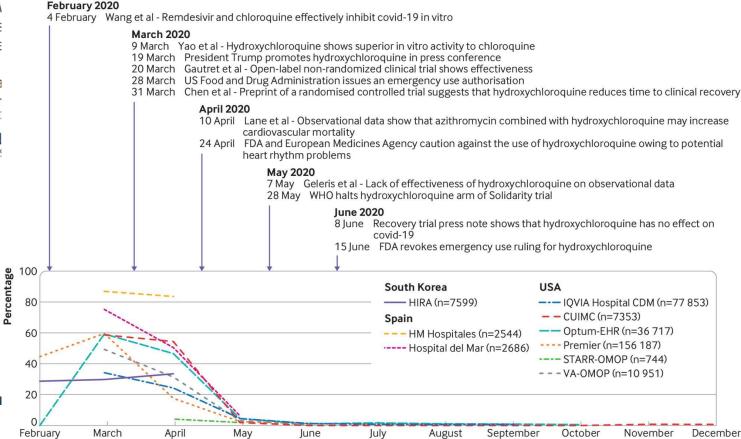
Showing impact: Characterization of drug utilization

RESEARCH

Use of repurposed and adjuvant drugs in hospital patients with covid-19: multinational network cohort study

Albert Prats-Uribe,[1] Anthony G Sena,[2,3] Lana Yin Hui Lai,[4] W
Heba Alghoul,[7] Osaid Alser,[8] Thamir M Alshammari,[9] Carlos
Paula Casajust,[12] Dalia Dawoud,[13,14] Asieh Golozar,[15,16] Jite
Paras P Mehta,[18] Mengchun Gong,[19] Daniel R Morales,[20,21]
Martina Recalde,[24,25] Elena Roel,[24,25] Karishma Shah,[5] Niga
Vignesh Subbian,[26] David Vizcaya,[27] Lin Zhang,[28,29] Ying Zh
Jaehyeong Cho,[31] Kristine E Lynch,[32] Michael E Matheny,[33,:
Peter R Rijnbeek,[3] George Hripcsak,[36] Jennifer CE Lane,[5] Ed
Marc A Suchard,[38] Talita Duarte-Salles,[24] Kristin Kostka,[37,39]
Daniel Prieto-Alhambra[1]

February 2020
4 February   Wang et al - Remdesivir and chloroquine effectively inhibit covid-19 in vitro

March 2020
9 March   Yao et al - Hydroxychloroquine shows superior in vitro activity to chloroquine
19 March   President Trump promotes hydroxychloroquine in press conference
20 March   Gautret et al - Open-label non-randomized clinical trial shows effectiveness
28 March   US Food and Drug Administration issues an emergency use authorisation
31 March   Chen et al - Preprint of a randomised controlled trial suggests that hydroxychloroquine reduces time to clinical recovery

April 2020
10 April   Lane et al - Observational data show that azithromycin combined with hydroxychloroquine may increase cardiovascular mortality
24 April   FDA and European Medicines Agency caution against the use of hydroxychloroquine owing to potential heart rhythm problems

May 2020
7 May   Geleris et al - Lack of effectiveness of hydroxychloroquine on observational data
28 May   WHO halts hydroxychloroquine arm of Solidarity trial

June 2020
8 June   Recovery trial press note shows that hydroxychloroquine has no effect on covid-19
15 June   FDA revokes emergency use ruling for hydroxychloroquine

South Korea
HIRA (n=7599)
Spain
HM Hospitales (n=2544)
Hospital del Mar (n=2686)

USA
IQVIA Hospital CDM (n=77 853)
CUIMC (n=7353)
Optum-EHR (n=36 717)
Premier (n=156 187)
STARR-OMOP (n=744)
VA-OMOP (n=10 951)

ACE Inhibitors and susceptibility to COVID-19

- Patients with cardiovascular diseases and hypertension treated with angiotensin converting enzyme inhibitors (ACEs) angiotensin-II receptor blockers (ARBs) may influence susceptibility to COVID-19 and worsen its severity.
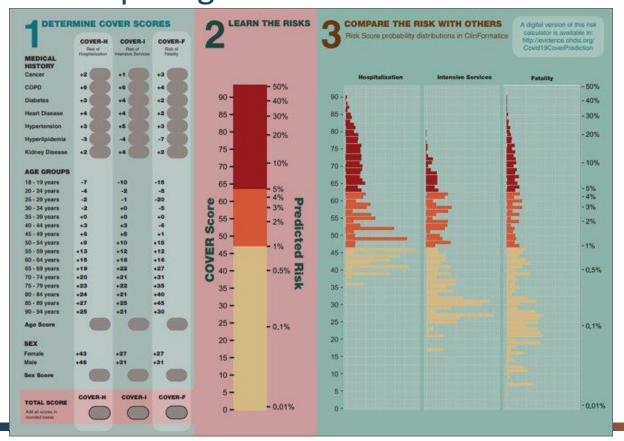
As stated by Watson et al. in relation to one of the published studies, lack of transparency and uncertainties about research standards applied raise doubts about published results. Morales et al. supported the reproducibility of their study by publishing the study protocol in the EU PAS Register ahead of time, providing a start-to-finish executable code, facilitating the sharing and exploration of the complete result set with an interactive web application and asking clinicians and epidemiologists to perform a blinded evaluation of propensity score diagnostics for the treatment comparisons.

COVER: COVID risk prediction

Objective: develop and externally validate **COV**ID-19 **E**stimated **R**isk scores that quantify a patient's risk of hospital admission, hospitalization requiring intensive services or fatality.

RESEARCH   **Open Access**

Seek COVER: using a disease proxy to rapidly develop and validate a personalized risk calculator for COVID-19 outcomes in an international network
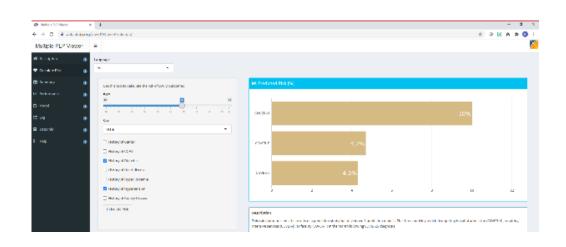
Ross D. Williams[1†], Aniek F. Markus[1†], Cynthia Yang[1], Talita Duarte-Salles[2], Scott L. DuVall[3], Thomas Falconer[4], Jitendra Jonnagaddala[5], Chungsoo Kim[6], Yeunsook Rho[7], Andrew E. Williams[8], Amanda Alberga Machado[9], Min Ho An[10], María Aragón[2], Carlos Areia[11], Edward Burn[2,12], Young Hwa Choi[13], Iannis Drakos[14], Maria Tereza Fernandes Abrahão[15], Sergio Fernández-Bertolín[2], George Hripcsak[4], Benjamin Skov Kaas-Hansen[16,17], Prasanna L. Kandukuri[18], Jan A. Kors[1], Kristin Kostka[19], Siaw-Teng Liaw[5], Kristine E. Lynch[3], Gerardo Machnicki[20], Michael E. Matheny[21,22], Daniel Morales[23], Fredrik Nyberg[24], Rae Woong Park[25], Albert Prats-Uribe[12], Nicole Pratt[26], Gowtham Rao[27], Christian G. Reich[19], Marcela Rivera[28], Tom Seinen[1], Azza Shoaibi[27], Matthew E. Spotnitz[4], Ewout W. Steyerberg[29,30], Marc A. Suchard[31], Seng Chan You[25], Lin Zhang[32,33], Lili Zhou[18], Patrick B. Ryan[27], Daniel Prieto-Alhambra[12], Jenna M. Reps[27†] and Peter R. Rijnbeek[1*†]

COVER: COVID risk prediction

- COVER interactive website to provide live risk scores

- Impact: Health minister of Catalonia Spain explicitly mentions the COVER index as one of the indicators they will use to measure the impact of a given outbreak.

COVER: COVID risk prediction

Interactive application for exploring prediction:

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

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

Prediction

Learning and establishing Patient-Level Prediction best practices

Contents lists available at ScienceDirect

Computer Methods and Programs in Biomedicine

ELSEVIER

A standardized analytics pipeline for reliable and rapid development and validation of prediction models using observational health data

Contents lists available at ScienceDirect

International Journal of Medical Informatics

ELSEVIER

Logistic regression models for patient-level prediction based on massive observational data: Do we need all data?

BMC Medical Informatics and Decision Making

Open access   Original research

BMJ Open Investigating the impact of development and internal validation design when training prognostic models using a retrospective cohort in big US observational healthcare data

RESEARCH   Open Access

Learning patient-level prediction models across multiple healthcare databases: evaluation of ensembles for increasing model transportability
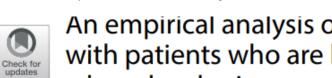
Jenna M Reps [1,2] Patrick Ryan,[1,2] P R Rijnbeek [1,3]

Jenna Marie Reps[1*†], Ross D. Williams[2†], Martijn J. Schuemie[1], Patrick B. Ryan[1] and Peter R. Rijnbeek[2]

Informatics and Decision Making

Evaluating the impact of covariate lookback times on performance of patient-level prediction models

Open Access

An empirical analysis of dealing with patients who are lost to follow-up when developing prognostic models using a cohort design

Jill Hardin[1,2*] and Jenna M. Reps[1,2]

Jenna M. Reps[1*], Peter Rijnbeek[2], Alana Cuthbert[3], Patrick B. Ryan[1], Nicole Pratt[4] and Martijn Schuemie[1]

Characterization

COVID-19 Vaccine Adverse Events of Special Interest

June 2021
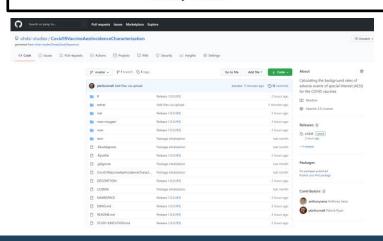
COVID AESI motivated further phenotype development and incidence research
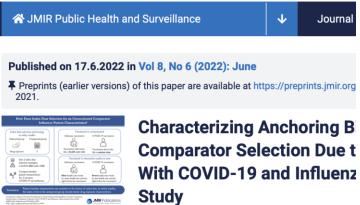
April 2022

May 2022
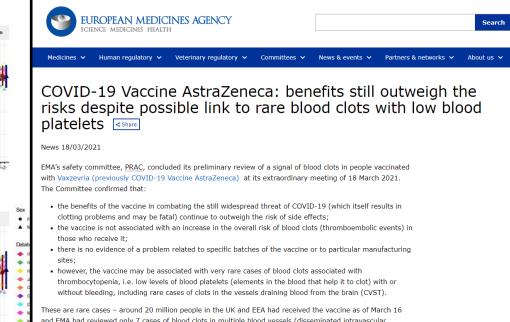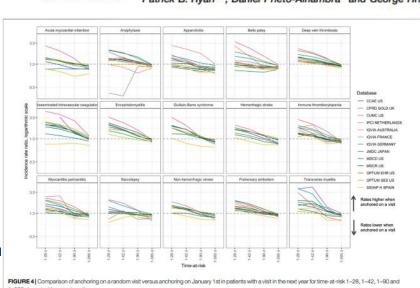
Factors Influencing Background Incidence Rate Calculation: Systematic Empirical Evaluation Across an International Network of Observational Databases
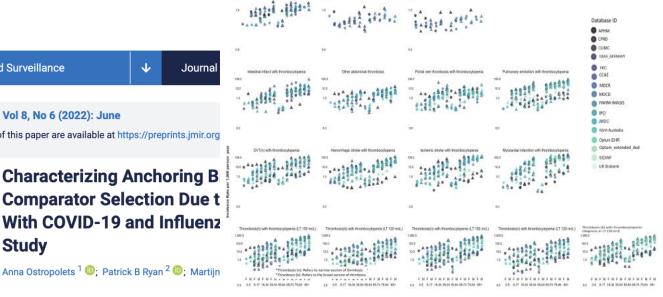
Phenotype Algorithms for the Identification and Characterization of Vaccine-Induced Thrombotic Thrombocytopenia in Real World Data: A Multinational Network Cohort Study

Characterizing Anchoring B[...] Comparator Selection Due t[...] With COVID-19 and Influenz[...] Study

OHDSI2020 Symposium (virtual)
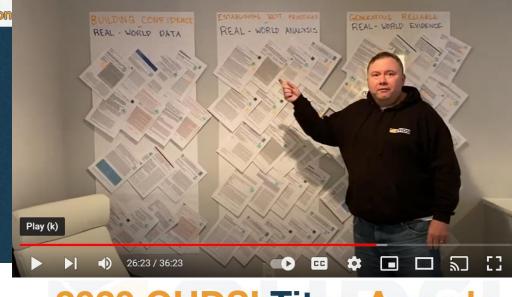
https://www.ohdsi.org/2020-ohdsi-global-symposium/

OHDSI2021 Symposium (virtual)

Phenotype Phebrurary Feb 2022

Phenotype Phebruary • Daily Threads & What We Learned

"Phenotype Phebruary" was a community-wide initiative to both develop and evaluate phenotypes for health outcomes that could be investigated by the community. Patrick Ryan introduced this initiative in both a video presentation and a forum post, and each of the conversations around the "28 phenotypes for 28 days" are being held within the OHDSI forums.

This page will provide direct links to each forum post, which is where conversations around each specific phenotype should be held. The video on the right includes "phun phacts" shared about each phenotype during our weekly community calls.

Daily Phenotype Phebruary Links

(future dates are subject to change)

Feb. 1 · Type 2 Diabetes Mellitus
Feb. 2 · Type 1 Diabetes Mellitus
Feb. 3 · Atrial Fibrillation
Feb. 4 · Multiple Myeloma
Feb. 5 · Alzheimer's Disease
Feb. 6 · Hemorrhagic Events
Feb. 7 · Neutropenia
Feb. 8 · Kidney Stones
Feb. 9 · Delirium
Feb. 10 · Systemic Lupus Erythematosus
Feb. 11 · Suicide Attempts
Feb. 12 · Parkinson's Disease and Parkinsonism
Feb. 13 · Attention Deficit Hyperactivity Disorder
Feb. 14 · Hypertension *(Video Description)*
Feb. 15 · Acute Myocardial Infarction
Feb. 16 · Heart Failure
Feb. 17 · Cardiomyopathy
Feb. 18 · Multiple Sclerosis
Feb. 19 · Triple Negative Breast Cancer
Feb. 20 · Pulmonary Hypertension
Feb. 21 · Prostate Cancer
Feb. 22 · HIV
Feb. 23 · Hidradenitis Suppurativa
Feb. 24 · Anaphylaxis
Feb. 25 · Depression
Feb. 26 · Non-Small-Cell Lung Cancer
Feb. 27 · Drug-Induced Liver Injury
Feb. 28 · Severe Visual Impairment And Blindness
Bonus · Acute Kidney Injury

https://www.ohdsi.org/phenotype-phebruary/

OHDSI DevCon April 2022

OHDSI Workgroups have expanded

ATLAS
Current Participants: 56
Lead: Anthony Sena

Clinical Trials
Current Participants: 107
Leads: Mike Hamidi, Lin Zhen

Common Data Model
Current Participants: 241
Lead: Clair Blacketer

OHDSI Steering Committee
Current Participants: 24
Lead: Patrick Ryan

Oncology
Current Participants: 123
Lead: Shilpa Ratwani

Patient-Generated Health Data
Current Participants: 76
Lead: Seng Chan You

Data Quality Dashboard Development
Current Participants: 90
Lead: Clair Blacketer

Early-Stage Researchers
Current Participants: 44
Leads: Faaizah Arshad, Ross Williams

Education
Current Participants: 21
Lead: Nigel Hughes

Pharmacovigilance Evidence Investigation
Current Participants: 48
Leads: Rich Boyce, Erica Voss

Phenotype Development & Evaluation
Current Participants: 88
Leads: Gowtham Rao

Population-Level Effect Estimation
Current Participants: 152
Lead: Martijn Schuemie, Marc Suchard

Electronic Health Record (EHR) ETL
Current Participants: 148
Lead: Melanie Philofsky

Geographic Information System (GIS)
Current Participants: 51
Leads: Robert Miller, Andrew Williams

HADES (Health Analytics Data-to-Evidence Suite)
Current Participants: 112
Lead: Martijn Schuemie

Patient-Level Prediction
Current Participants: 152
Lead: Jenna Reps, Peter Rijnbeek

Psychiatry
Current Participants: 64
Lead: Shilpa Ratwani

Registry (formerly UK Biobank)
Current Participants: 55
Lead: Maxim Moinat

Health Equity
Current Participants: 43
Lead: Jake Gillberg

Latin America
Current Participants: 14
Lead: Jose Posada

Medical Devices
Current Participants: 50
Leads: Vojtech Huser, Asiyah Lin

Vaccine Safety
Current Participants: 26
Lead: Patrick Ryan

Vaccine Vocabulary
Current Participants: 35
Lead: Adam Black

Women of OHDSI
Current Participants: 97
Lead: Maura Beaton

Natural Language Processing
Current Participants: 228
Lead: Hua Xu

OHDSI Asia-Pacific (APAC)
Current Participants: 38
Lead: Mui Van Zandt

OHDSI APAC Steering Committee
Current Participants: 29
Lead: Mui Van Zandt

https://www.ohdsi.org/ohdsi-workgroups/

Regional chapters and centers

Africa
New Chapter
Lead: Nega Gebreyesus

Australia
Current Participants: 36
Lead: Nicole Pratt

China
Current Participants: 163
Lead: Hua Xu

Europe
Current Participants: 135
Lead: Peter Rijnbeek

Japan
Current Participants: 19
Lead: Tatsuo Hiramatsu

Korea
Current Participants: 26
Lead: Seng Chan You

Singapore
Current Participants: 30
Lead: Mengling Feng
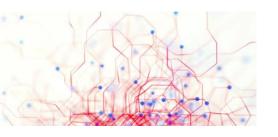
Taiwan
Current Participants: 48
Lead: Jason Hsu

EHDEN
EUROPEAN HEALTH DATA & EVIDENCE NETWORK

OHDSI Center at
Northeastern's
Roux Institute

Community calls offer weekly collaboration

https://ohdsi.org/ohdsi-community-calls/
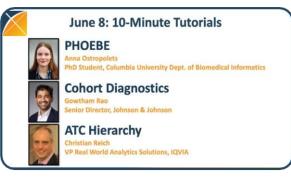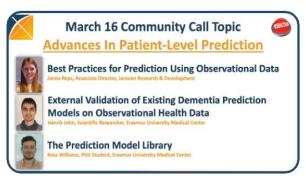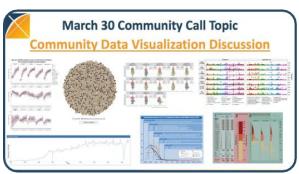
Collaborating to establish international data standards

HL7 International and OHDSI Announce Collaboration to Provide Single Common Data Model for Sharing Information in Clinical Care and Observational Research

Health Level Seven International (HL7®) and the Observational Health Data Sciences and Informatics (OHDSI) network today announced a collaboration to address the sharing and tracking of data in the healthcare and research industries by creating a single common data model. The organizations will integrate HL7 Fast Healthcare Interoperability Resources (FHIR®) and OHDSI's Observational Medical Outcomes Partnership (OMOP) common data model to achieve this goal.

HL7 International CEO Dr. Charles Jaffe, M.D., Ph.D., underscored the significance of this partnership. "The Covid-19 pandemic has emphasized the need to share global health and research data." He continued, "Collaboration with OHDSI is critical to solving this challenge and will help our mutual vision of a world in which everyone can securely access and use the right data when and where they need it."

"We are excited to have the OHDSI community join this partnership with HL7 to evolve community standards around observational research and clinical care. These standards set the foundation for our mission of global, open-science research, and this partnership will accelerate the development of effective and safe treatments for diseases facing today's global population." - George Hripcsak

The organizations will align their standards to capture data in a clearly defined way into a single common data model. This will allow clinicians as well as researchers to pull data from multiple sources and compile it in the same structure without degradation of the information. This endeavor has global implications with the potential to permit the clinical community to define the elements they need, package and share them in a consistent single structure.
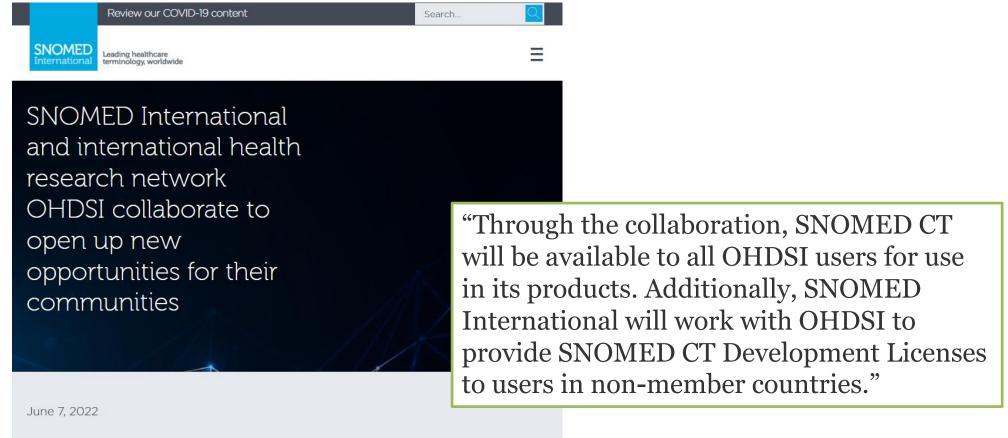
"We are excited to have the OHDSI community join this partnership with HL7 to evolve community standards around observational research and clinical care," said George Hripcsak, MD, MS, OHDSI's coordinating center director. "These standards set the foundation for our mission of global, open-science research, and this partnership will accelerate the development of effective and safe treatments for diseases facing today's global population."

About Health Level Seven International (HL7)

Founded in 1987, Health Level Seven International is the global authority for healthcare information interoperability and standards with affiliates established in more than 30 countries. HL7 is a non-profit, ANSI accredited standards development organization dedicated to providing a comprehensive framework and related standards for the exchange, integration, sharing, and retrieval of electronic health information that supports clinical practice and the management, delivery and evaluation of health services. HL7's members represent approximately 500 corporate members, which include more than 90 percent of the information systems vendors serving healthcare. HL7 collaborates with other standards developers and provider, payer, philanthropic and government agencies at the highest levels to ensure the development of comprehensive and reliable standards and successful interoperability efforts.

https://www.ohdsi.org/ohdsi-hl7-collaboration/
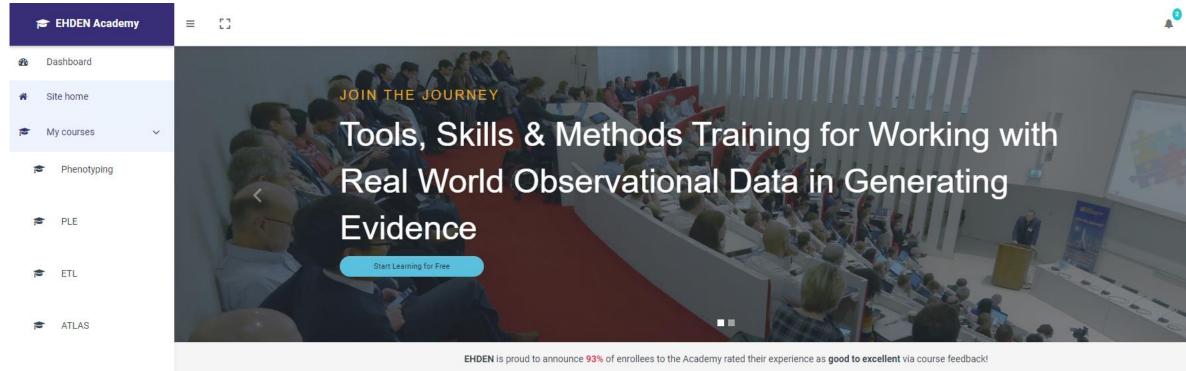
Establishing agreements to enable community to apply open data standards and content

Review our COVID-19 content

SNOMED International — Leading healthcare terminology, worldwide

SNOMED International and international health research network OHDSI collaborate to open up new opportunities for their communities

June 7, 2022

"Through the collaboration, SNOMED CT will be available to all OHDSI users for use in its products. Additionally, SNOMED International will work with OHDSI to provide SNOMED CT Development Licenses to users in non-member countries."

The Observational Health Data Sciences and Informatics (OHDSI) community and SNOMED International have formalized their long-time relationship with a five-year collaborative agreement that will benefit both of their user communities.

https://www.snomed.org/news-and-events/articles/SNOMED-OHDSI-2022-collaboration

EHDEN Academy provides robust educational content to OHDSI community and beyond

- 18 courses
- >1,800 users from >60 countries
- >790 completions of 'Getting Started'

https://academy.ehden.eu/

OHDSI partners collaborating to support EMA through DARWIN-EU

European Medicines Agency website screenshot:

Initiation of DARWIN EU® Coordination Centre advances integration of real-world evidence into assessment of medicines in the EU < Share

News 09/02/2022

EMA is initiating today the establishment of the Coordination Centre for the Data Analysis and Real World Interrogation Network (DARWIN EU®).

The role of the Coordination Centre is to develop and manage a network of real-world healthcare data sources across the EU and to conduct scientific studies requested by medicines regulators and, at a later stage, requested by other stakeholders.

The vision of DARWIN EU® is to give EMA and national competent authorities in EU Member States access to valid and trustworthy real-world evidence, for example on diseases, patient populations, and the use, safety and effectiveness of medicines, including vaccines, throughout the lifecycle of a medicinal product.

By supporting decision-making on the development, authorisation and surveillance of medicines, a wide range of stakeholders will benefit, from patients and healthcare professionals to health technology assessment bodies and the pharmaceutical industry. Additionally, DARWIN EU® will provide an invaluable resource to prepare for and respond to future healthcare crises and pandemics.

For example, the availability of timely and reliable real-world evidence can lead to innovative medicines becoming more quickly available to patients. Better evidence also supports more informed regulatory decision-making on the safe and effective use by patients of medicines on the market.

EMA will be working with Erasmus University Medical Center Rotterdam to establish the DARWIN EU® Coordination Centre. The contract was awarded to Erasmus University Medical Center Rotterdam following a call for tender for a service provider published in June 2021. The contractor will set up the necessary
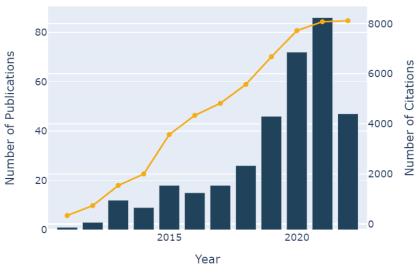
Where are we today at the 2022 in-person European OHDSI Symposium?
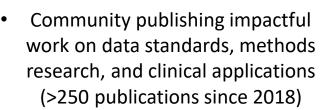
Where we are today:
European OHDSI Symposium June2022

Thank you Paul Nagy for developing the OHDSI community dashboard!

Where we were at Mar2019

OHDSI Publications & Cumulative Citations
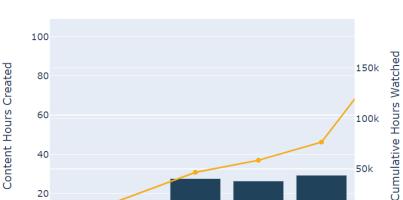
New and Cumulative OHDSI Researchers

- Community education resources started to grow, with >25 hours of video content per year, which has now been cumulatively watched for >75,000 hours as of Jun2022

YouTube Analysis

- Community publishing useful work, primarily methodological research (reached 20 papers in 2018)
- Those papers now widely cited (>6,000 times as of Jun2022)
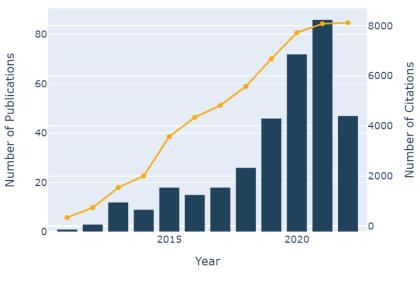
- Community was growing nicely, >500 different authors with work related to OHDSI research by end of 2018
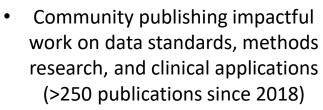
Where we are today: June2022

OHDSI Publications & Cumulative Citations
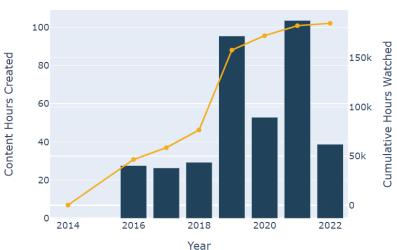
- Community education resources are actively used, with >370 hours of video content, which has now been cumulatively watched for >184,000 hours as of Jun2022

New and Cumulative OHDSI Researchers

YouTube Analysis
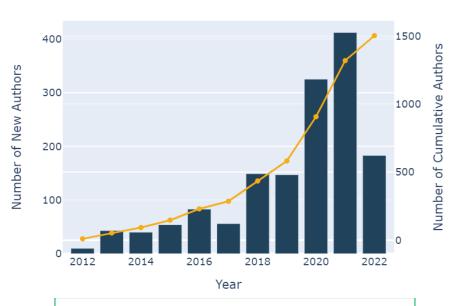
- Community publishing impactful work on data standards, methods research, and clinical applications (>250 publications since 2018)
- >8,000 citations of OHDSI research in other publications + EMA + UpToDate …

- Community continues to accelerate in its growth, now with >1,500 different co-authors contributing to OHDSI-related research

A Cruise Around the OHDSI Europe Community

Nigel Hughes

Janssen Research and Development

EHDEN

A Cruise Around the OHDSI Europe Community

1. **Estonia.** Conversion of Estonian health data into the OMOP CDM

2. **Finland.** The Finnish OMOP data network (FinOMOP)

3. **Denmark.** Transforming Danish Registries to the OMOP Common Data Model: use case on the Danish Colorectal Cancer Group (DCCG) Database

4. **Norway.** Norwegian registries onto OMOP Common Data Model: mapping challenges and opportunities for pregnancy studies

5. **Germany.** OHDSI Germany: A recap after one year

6. **Italy.** The Italian national node of OHDSI Europe

7. **Greece.** An update from the Greek National Node

8. **Ukraine.** Integration prospects of the Ukrainian healthcare system with OMOP CDM

9. **Israel.** The journey from isolated EHR's to unified CDM network

10. **France.** The Health Data Hub, the French national gateway for an easy, unified, transparent and secure access to health data

Conversion of Estonian health data into the OMOP CDM

Marek Oja

Institute of Computer Science, University of Tartu

Conversion of Estonian health data into the OMOP CDM

insurance claims, prescription data and electronic health records

Marek Oja PhD
University of Tartu
STACC

Estonia

Population
of 1.4 million

Digital health data for
most of the population
from national registries

Estonian healthcare system

Healthcare providers

~800 primary care providers

20 hospitals

~600 private care Providers (mostly dental care)

Mandatory reporting

National health databases

- **insurance claims**
- **digital prescriptions**
- **electronic health records**
- cancer registry
- death registry
- etc.

Three data sources

- **Electronic health records**
  - **Measurements** together with measurement values (LOINC, etc.)
  - **Cancer** specific measurements and clinical findings
  - **Pathology** findings
  - Diagnoses (ICD10)
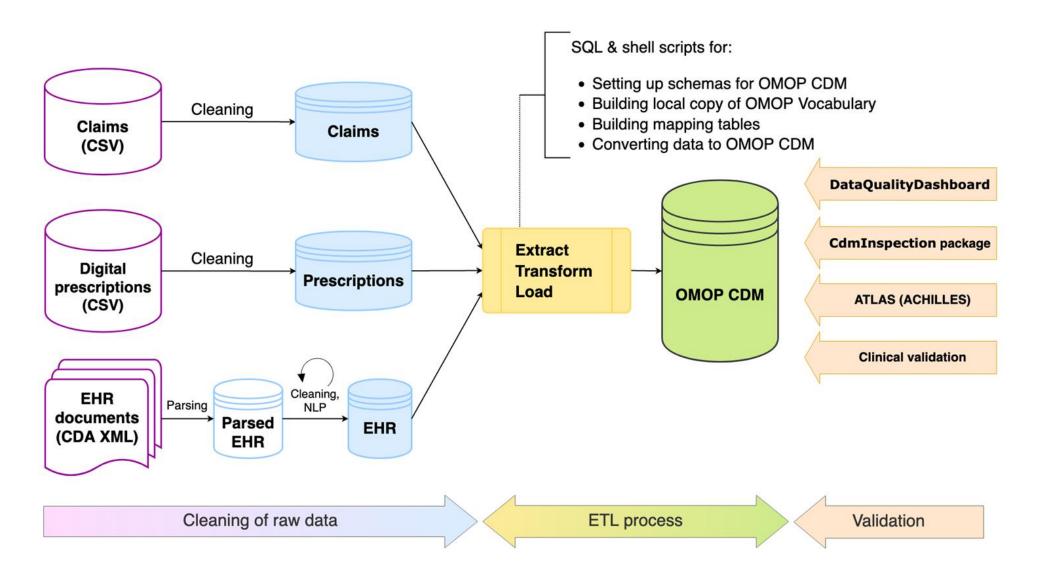
- **Digital Prescriptions**
  - Prescribed and dispensed **drugs** (ATC code, package code)
  - Diagnoses (ICD10)

- **Insurance claims**
  - **Services** and **treatments** performed (local codes and NCSP to SNOMED)
  - Diagnoses (ICD10)

Combining three data sources into one CDM - reusable ETL process

Applications

- Following datasets in OMOP format in University of Tartu:
  - 10% random population in Estonia (RITA-MAITT)
  - Asthma specific dataset
  - COVID specific dataset
  - Estonian Biobank health data
- Participated in network studies
  - Prostate cancer study (PIONEER)
  - Adverse Events of Special Interest within COVID-19 Subjects
  - EHDEN Asthma drug utilization study
- Local studies
  - HPV (human papillomavirus) prevalence in Estonia
  - Cardiovascular risk estimation
  - Many MSc and BSc theses

UNIVERSITY OF TARTU

Acknowledgements

Team:
Jaak Vilo
Sulev Reisberg
Sven Laur
Raivo Kolde
Marek Oja
Sirli Tamm

PhD students:
Ida Maria Orula
Maarja Pajusalu
Harry-Anton Talvik
Markus Haug
Hendrik Šuvalov

UNIVERSITY OF TARTU

Thank you!

unitartu

tartuuniversity

The Finnish OMOP data network (FinOMOP)

Javier Gracia-Tabuenca

FinnGen

Who we are

University Hospitals

Tays
Sampo Kukkurainen
Toni Mikkola
Tarja Laitinen
Leena Hakkarainen

TYKS Turun yliopistollinen keskussairaala
Anna Hammais
Pia Tajanen
Juha-Matti Varjonen
Otto Ettala

HUS Helsinki University Hospital
Perttu Koskenvesa
Kimmo Porkka
Annu Kaila
Otso Peippo
Ilona Siljander
Oscar Brück

KYS
Simo Ryhänen
Eric Le Tortorec
Arto Vesterbacka

SMEs

MediSapiens   **productivity leap**
Max Salmi   Juha Koski
Kalle Kollin   Pasi Rikala
                     Anna Virtanen

National health institute

Finnish institute for health and welfare
Persephone Doupi
Arto Vuori
Jan Magnusson

Research Projects

FINNGEN
Javier Gracia-Tabuenca
Sam Padmanabhuni

Where we are

17 Vocabularies to OMOP

Vocabulary	Mapping progress
FHL	
HPN	
ICD10fi	
ICD8fi	
ICD9fi	
LABfi	
LABfi_tampere	
LABfi_turku	
MICROBEfi_turku	
NCSPfi	
REIMB	
SNOMED2fi	
SPAT	
UNITfi	
MEDSPECfi	
MICROBEfi	
ProcedureModifier	

4 Databases to OMOP-CDM v5.3.1

	Person	Visit	Condition	Procedure	Drug	Measur.
Tampere Hospital EHDEN Pilot	114K	4M	9M	3.7M	2.6M	17M
Turku Hospital EHDEN 3th call	788K	21M	28M	13M	15M	146M
Helsinki Hospital EHDEN 4th call	2.8M	43M	54M	25M	33M	621M
FinnGen 392k DNA samples	392K	157M	87M	6M	104M	297K
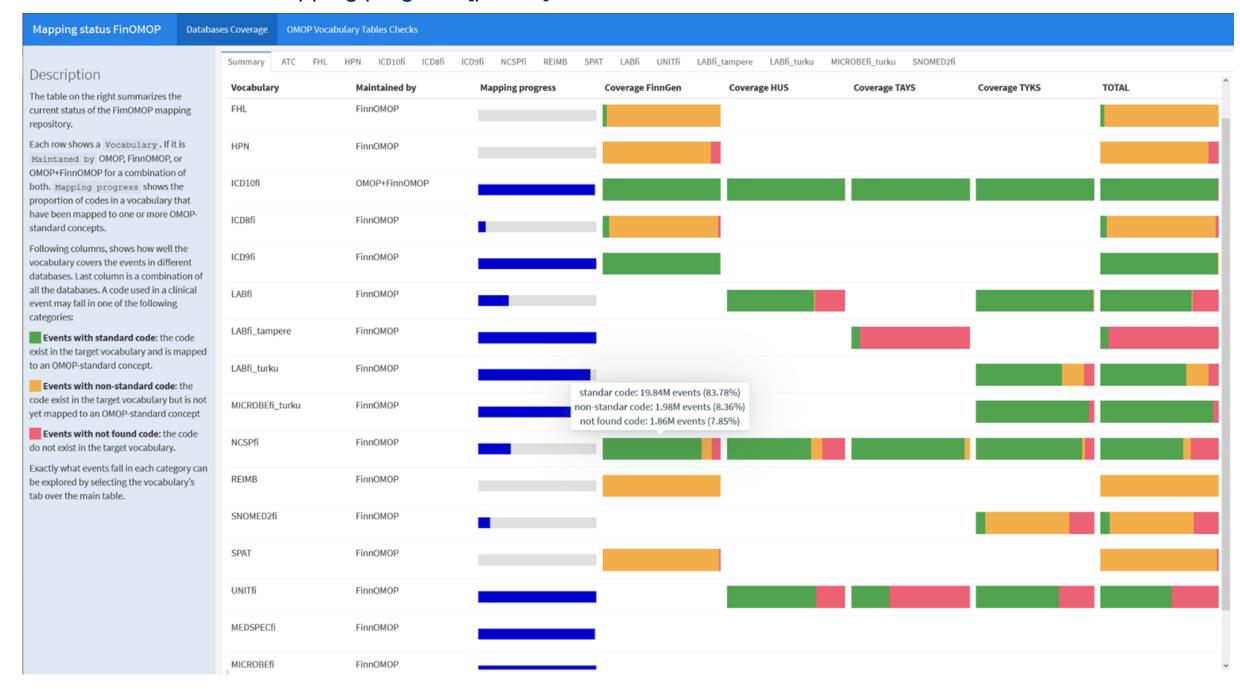
Use cases

- 1 national federated analyses: Acute leukemia

- Local use case: Atlas is regularly used to case-control cohorts for running genome wide association studies (GWAS), in Finngen.

Where we are going

- Participate in international federated analysis

- Vocabularies from STCM to C&CR [2]

- National federated analysis

- ETL 2 more databases:
    - Kuopio University Hospital,
    - Pilot in THL (National health institute) = all hospitals combined

- Building tools
    - Shiny app to visualize cohorts [1]
    - Shiny app quick analyses in local data
    - Dashboard to visualize mapping progress [poster]

[1] H. Siirtola et al. Glyph-based visualization of health trajectories. In *2022 26th International Conference Information Visualisation (IV),* July 2022, to appear.
[2] M. Philofsky. Mapping Custom Source Codes to Standard Concepts: A Comparison of Two Approaches. OHDSI symposium 2020

Dashboard to visualize mapping progress [poster]

Who we are

University Hospitals

Sampo Kukkurainen
Tarja Laitinen
Leena Hakkarainen

Anna Hammais
Pia Tajanen
Juha-Matti Varjonen
Otto Ettala

Perttu Koskenvesa
Kimmo Porkka
Annu Kaila
Ilona Siljander
Oscar Brück

Simo Ryhänen
Eric Le Tortorec

Contact Person

kimmo.porkka@helsinki.fi

SMEs

MediSapiens

productivity leap

Max Salmi
Kalle Kollin

Juha Koski
Pasi Rikala

National health institute

Finnish institute for health and welfare

Persephone Doupi
Arto Vuori
Jan Magnusson

Research Projects

FINNGEN

Javier Gracia- Tabuenca
Sam Padmanabhuni

OMOP CDM Results

TABLENAME	COUNT	PATIENTS
observation	5,124,260	76,849
condition_occurrence	1,169,054	76,849
measurement	1,079,371	76,847
condition_era	878,790	76,849
procedure_occurrence	750,378	74,557
visit_occurrence	308,406	76,849
specimen	139,465	40,479
observation_period	76,849	76,849
person	76,849	76,849
death	42,620	42,620
drug_era	8,784	4,953
drug_exposure	8,784	4,953
location	4,678	-
care_site	384	-
device_exposure	0	0
note	0	0
dose_era	0	0
cost	0	-
payer_plan_period	0	0
visit_detail	0	0
provider	0	-

Conclusion

- **De-identification protocols can add to the ones already provided by the OMOP CDM and facilitate data authority compliance.**

- **Conversion to OMOP depends on date completeness and content coverage by standardized vocabularies, but offers the opportunity to medical experts to use standardized tools for complex cohorts and ML algorithms.**

- **Standard CDM quality tools guarantee conformity with community standards, but custom QC steps are required to ensure minimum loss of information.**

- **Producing a clinical-grade CDM that can be used for better patient care and personalized medicine requires detailed quality control processes.**

UiO : Department of Pharmacy
University of Oslo
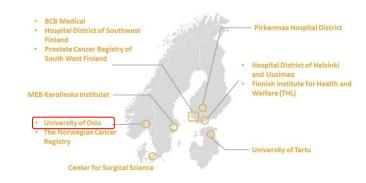
Norwegian registries onto OMOP Common Data Model
mapping challenges and opportunities for pregnancy studies

Nhung Trinh - UiO, Jared Houghtaling – Edence Health, Fabian LM Bernal - UiO, Eimir Hurley - UiO, Emma Gesquiere – Edence Health, Lars Halvorsen – Edence Health, Hedvig ME Nordeng - UiO

UiO OMOP tables – v5.3.1

OMOP Table	Row Counts
'drug_exposure'	373'510'250
'measurement'	40'761'350
'observation'	38'190'803
'condition_occurrence'	13'572'671
'visit_occurrence'	6'186'120
'person'	5'508'030
'observation_period'	5'508'030
'fact_relationship'	3'658'561
'procedure_occurrence'	391'629
'death'	83'298
'provider'	47'981

5 508 030 individuals (2018-2020)
- 720 765 pregnancies
- 452 831 mothers
- 440 731 fathers
- 695 569 children

Concept mapping

➤ ATC codes => mapped automatically

➤ ICD-10 codes => mapped automatically

➤ 237 non-standard codes to standard concepts

- 67 pregnancy related codes

- 48 speciality related codes

- 48 communicable disease related codes

- 46 vaccine related codes

- 17 drug related codes

- 3 procedure related codes

➤ 40 custom concepts

⇒ many are relevant for pregnancy studies

Creation of custom concepts (n=40)

Custom concepts: terminologies not supported by standard vocabularies

SPABORT_12	Previous miscarriages before 12 weeks of gestation	<INTEGER>
SPABORT_23	Previous miscarriages/stilbirths 12-23 weeks of gestation	<INTEGER>
PREEKLTIDL__1	Early preeclampsia	Yes
ROYK_FOER__2	Smoking before pregnancy	Sometimes
ROYK_FOER__3	Smoking before pregnancy	Daily
ROYK_BEG__1	Smoking at start of pregnancy	No
ROYK_BEG__2	Smoking at start of pregnancy	Sometimes
ROYK_BEG__3	Smoking at start of pregnancy	Daily
BLODNING_0500__1	Hemorrhage more than 500 ml during delivery	500-1500 mL
BLODNING_0500__2	Hemorrhage more than 500 ml during delivery	>1500 mL
BLODNING_0500__3	Hemorrhage more than 500 ml during delivery	>500 mL, unspecified
OVERFLYTTET__2	Child was transfered to neonatal ward	No

Lessons learnt from our mapping

✓ Norwegian registry data were successfully mapped onto OMOP CDM

using OHDSI tools with high level of concordance

⇒ One in very few data partners with pregnancy data

✓ Several important pregnancy related variables could not be mapped

with standard concepts

✓ A pregnancy extension table might be needed in future version of the

OMOP CDM to support pregnancies studies

OHDSI Germany
A recap after one year

Michele ZOCH, Elisa HENKE, Yuan PENG, Najia AHMADI, Joshua WIEDEKOPF, Mareike PRZYSUCHA, Josef SCHEPERS, Martin SEDLMAYR, Ines REINECKE

Where we started

MEDIZIN INFORMATIK INITIATIVE

miracum
Medical Informatics in Research and Care in University Medicine

@ Dresden

> Stud Health Technol Inform. 2020 Jun 16;270:158-162. doi: 10.3233/SHTI200142.

Design for a Modular Clinical Trial Recruitment Support System Based on FHIR and OMOP

Ines Reinecke [1], Christian Gulden [2], Michéle Kümmel [1], Azadeh Nassirian [1], Romina Blasini [3], Martin Sedlmayr [1]

Affiliations + expand
PMID: 32570366   DOI: 10.3233/SHTI200142

Development of an ETL Process for Bulk and Incremental Load of German Patient Data into OMOP CDM Using FHIR

Authors: Elisa Henke, Yuan Peng, Ines Reinecke, Michele Zoch, Martin Sedlmayr

FHIR®

Slide 100

Our Goals

Beginning　　　　**Today**　　　　**Future**

Where we are right now

- Medication data
- Rare diseases
- Pre- and post-coordination

OHDSI Germany – Join the Journey:
A Workshop

Ines REINECKE [a,1], Michele ZOCH [a], Christian REICH [b, d], Michael KALLFELZ [c],
Nikolai GREWE [d], Christian REICH [b, d], and Martin SEDLMAYR [a]
[a] Institute for Medical Informatics and Biometry, Carl Gustav Carus Faculty of Medicine,
Technische Universität, Dresden, Germany
[b] Observational Health Data Sciences and Informatics (OHDSI), New York, NY, USA
[c] Odysseus Data Services GmbH, Berlin, Germany
[d] IQVIA, Cambridge, MA, USA

Adapting

Networking

Collaborating

Sharing

Slide 103

Where we want to go

Beginning **Today** **Future**

Overcoming administrative hurdles

Onboarding of further participants in Germany

Participating at international projects like DARWIN

Collaborating in new projects

Intensify joint work

TECHNISCHE
UNIVERSITÄT
DRESDEN

OHDSI Germany – A recap after one year

Michele Zoch || 24.06.2022

DRESDEN
concept

Contact details

We look forward to exchange and collaboration.

Michele Zoch
zoch@ohdsi.org

Ines Reinecke
reinecke@ohdis.org

OHDSI Germany

The Italian national node of OHDSI Europe

Lucia Sacchi

University of Pavia

OHDSI Italia

Lucia Sacchi

Department of Electrical, Computer and Biomedical Engineering
University of Pavia, Italy
SIBIM (Italian Society for Biomedical Informatics)

UNIVERSITÀ
DI PAVIA

SIBIM SOCIETÀ SCIENTIFICA ITALIANA di INFORMATICA BIOMEDICA

Partners

30+ individuals
20 institutions
(**14** data partners)
…and it's just the beginning!

Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milano
Fondazione IRCCS Istituto Nazionale dei Tumori, Milano
IRCCS Policlinico San Donato, Milano
Fondazione IRCCS Istituto Neurologico Carlo Besta, Milano
Casa di Cura Privata del Policlinico, Milano
PGMD Consulting

IRCCS Centro di Riferimento Oncologico, Aviano

Università di Pavia
SIBIM (Italian Society for Biomedical Informatics)
BIOMERIS
Istituti Clinici Scientifici Maugeri IRCCS, Pavia
Fondazione IRCCS Policlinico San Matteo, Pavia

AUSL-IRCCS di Reggio Emilia
IRCCS Istituto Romagnolo per lo Studio dei Tumori (IRST) "Dino Amadori"
Azienda Ospedaliero-Universitaria di Parma
Policlinico S.Orsola-Malpighi, Bologna
DataRiver

Fondazione Toscana Gabriele Monasterio per la Ricerca Medica e di Sanità Pubblica

Università di Catanzaro

Istituto Mediterraneo per i Trapianti e Terapie ad Alta Specializzazione, Palermo

Aims and objectives
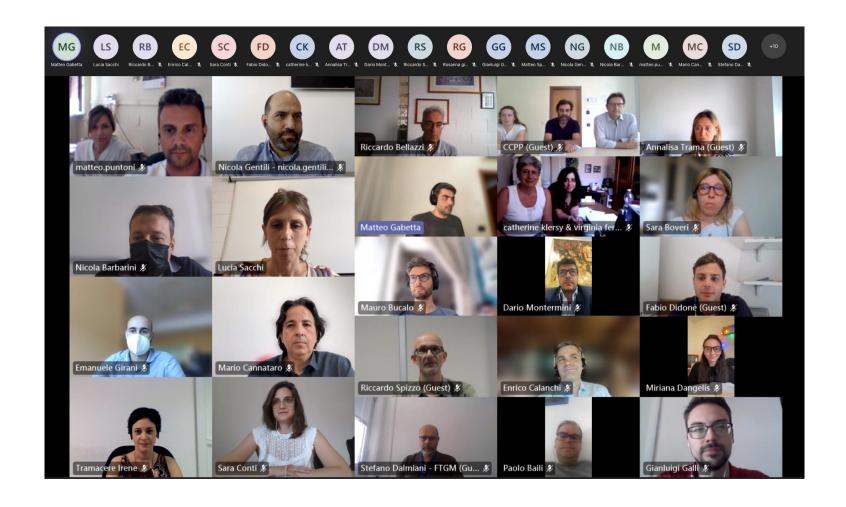
- Promote OMOP/OHDSI
  - by dissemination events
  - adding new members and data partners to the node
- Promote national projects
  - ICT
  - Observational studies
- Coordinate dialogue with
  - Local Regions
  - Ministry of research and Ministry of health
  - Existing projects

Aims and objectives

- Contribute to the OHDSI community

- Mapping Italian terminologies and codes on OMOP
  - National codes: e.g. AIC codes for drugs (Federfarma)
  - Regional codes

- Define common administrative procedures
  - DPO approval
  - EC approval
  - AGID guidelines (for public entities)
  - Internal SOP / IO
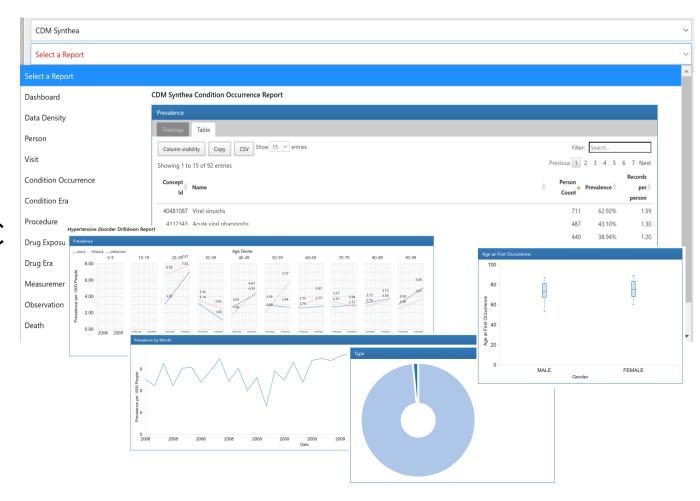
Kick-off meeting June 15th 2022

- 34 participants

First objective: the OHDSI Italia paper

- Aim
  - Run Achilles at each Data Partner involved
- Steps
  - Sep. 2022: DPIA
  - Dec. 2022: Protocol to the EC
  - Mar. 2023: Run Achilles
  - Jun. 2023:
    - merge results
    - prepare manuscript

An update from the Greek National Node

Pantelis Natsiavas

Centre for Research & Technology Hellas

An update for the Greek OHDSI|EHDEN node

Pantelis Natsiavas
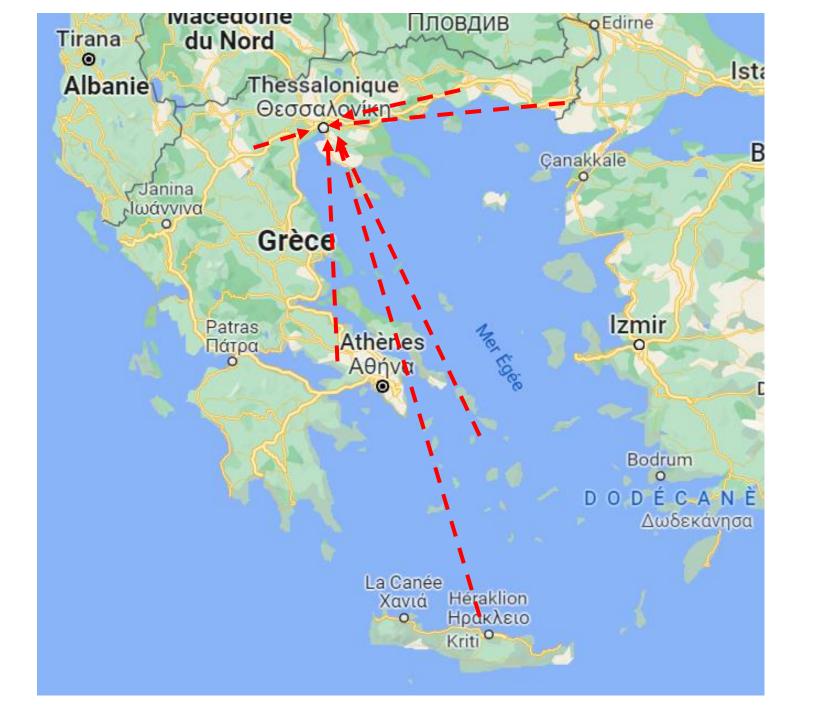
Vlassios Dimitriadis

Greek National Node - status

- Already joined EHDEN
    - 2 data partners
    - 2 SMEs

- Joining process
    - Data partners: 6+ (have just submitted application for funding via EHDEN)
    - SMEs: 3 (starting certification process)

Challenges

Everybody is positive!

However…
- Lack of IT systems
- Lack of mentality
- Lack of central guidance in terms of policy

Communication plan

- Direct communication of the EHDEN|OHDSI rationale
  - Already communicated with more than 20 organizations (local pharma branches, research organizations, regional health authorities, hospitals, national data providers…).
  - More to come in the near future…

- Communication in organized events
  - Already communicated in 3 organized events (National event for ECRIN, ELEFI, association of clinical IT professionals etc.)
  - More to come in the near future… (conference organized in October from ELEFI etc.)

- Organize a dedicated half-day webinar

Action plan

- Organize pilot studies on Greek data nodes
  - Requires a critical mass of data providers, hopefully next year this will be in place
  - Perhaps based on already available protocol studies
- Organize Greek network meetings
- National research funding applications/proposals

#Join the Journey – in Greece (!!!)

Contact:

Pantelis Natsiavas, pnatsiavas@certh.gr

Vlassios Dimitriadis, blassid@certh.gr

INSTITUTE OF APPLIED BIOSCIENCES
ΙΝΣΤΙΤΟΥΤΟ ΕΦΑΡΜΟΣΜΕΝΩΝ ΒΙΟΕΠΙΣΤΗΜΩΝ
CENTRE for RESEARCH and TECHNOLOGY-HELLAS

INTEGRATION PROSPECTS OF THE UKRAINIAN HEALTHCARE SYSTEM WITH OMOP CDM

PRESENTER:
MARIIA KOLESNYK

TEAM:
TATIANA ALEKSANDROVA
POLINA TALAPOVA
DENYS KADUK
MAKSYM TROFYMENKO
INNA AGEEVA
MAX VED

The improvement of the Ukrainian electronic healthcare system (eHealth) and medical service quality includes the introduction of healthcare data standardization.

The Observational Medical Outcomes Partnership (OMOP) Common Data Model (CDM), managed by the Observational Health Data Sciences and Informatics (OHDSI) community, continues to be one of the leading CDMs for leveraging clinical and administrative health data for research purposes.
This model also is widely used by the European Health Data Evidence Network (EHDEN).
OMOP CDM covers 330 databases, including more than 800 million unique patient records from 34 countries.

CDM BENEFITS:

- SYNTACTIC AND SEMANTIC INTEROPERABILITY
- REUSABLE ANALYSIS
- COMPARABLE STUDIES
- REDUCED NEED TO REPROCESS SAME DATA MULTIPLE TIMES

In the context of Russia's armed aggression against Ukraine, the introduction of data standardization is an urgent issue aimed at optimizing the provision of medical care to the military personnel and civilians, as well as collecting, processing, and summarizing data on the nature of injuries, provided medical help, the number of victims, killed, and disabled persons.

UKRAINIAN EHEALTH STORES DATA IN THE FOLLOWING DATABASES (DB):

Authorization DB
Integration layer DB
Master Patient Index DB
Partner Relationship Management DB

mongoDB.
HL7 FHIR

Data related to the Medical Events Data Structure in the Fast Healthcare Interoperability Resources (FHIR) standard

INTEGRATION PROSPECTS OF THE UKRAINIAN HEALTHCARE SYSTEM WITH OMOP CDM:

CONNECTING AND USING UKRAINIAN OBSERVATIONAL DATA BY THE GLOBAL SCIENTIFIC COMMUNITY TO IMPROVE THE QUALITY OF MEDICAL SERVICES AND THE HEALTH OF ARMED FORCES PERSONNEL AND CIVILIANS DURING AND AFTER THE WAR IN UKRAINE

FULL INFORMATION IS AVAILABLE UNDER THE LINK
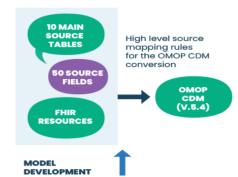
Scan QR to download the full paper

We developed a model for the potential ETL data conversion from the eHealth system to the OMOP CDM standard (v.5.4).
It describes the main source tables and FHIR resources from the Ukrainian medical information systems (MIS) to the central DB of eHealth and determines which of them can be used for the conversion to the OMOP CDM.

UKRAINIAN MEDICAL INFORMATION SYSTEMS

10 MAIN SOURCE TABLES

50 SOURCE FIELDS

FHIR RESOURCES

High level source mapping rules for the OMOP CDM conversion

OMOP CDM (V.5.4)

MODEL DEVELOPMENT

EHEALTH WEBSITE ANALYSIS
HTTPS://EHEALTH.GOV.UA/

TECHNICAL DOCUMENTATION

Conversion rules of each source table to OMOP CDM
Description of data concentration and domain coverage
General purification rules

IMPLEMENTATION OF THE UKRAINIAN EHEALTH INTO THE OHDSI AND EHDEN COMMUNITIES

Step 1: preparing and applying to become an EHDEN data partner by the National Health Service of Ukraine.

EHDEN
Національна служба здоров'я України

Step 2: full-cycle data harmonization made by local certified small and medium-sized enterprises to maintain the Ukrainian economy.

sciforce

OHDSI

Kineret
Israel hospitals data lake.
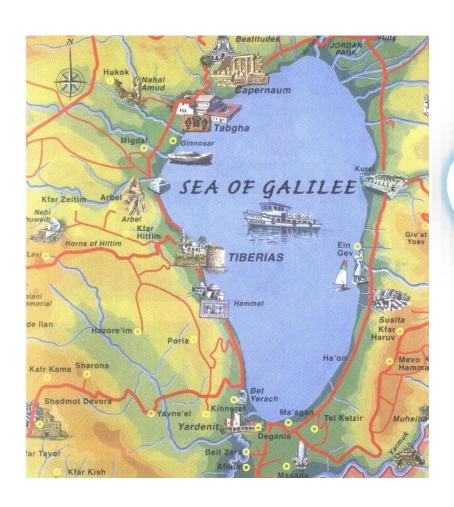
Medical Center data-lake
for research and innovation

The journey from isolated EHR's to unified CDM network

Third OHDSI Europe symposium – June 2022

Guy Livne

The nature of Kineret (Hebrew name for the Sea of Galilee)
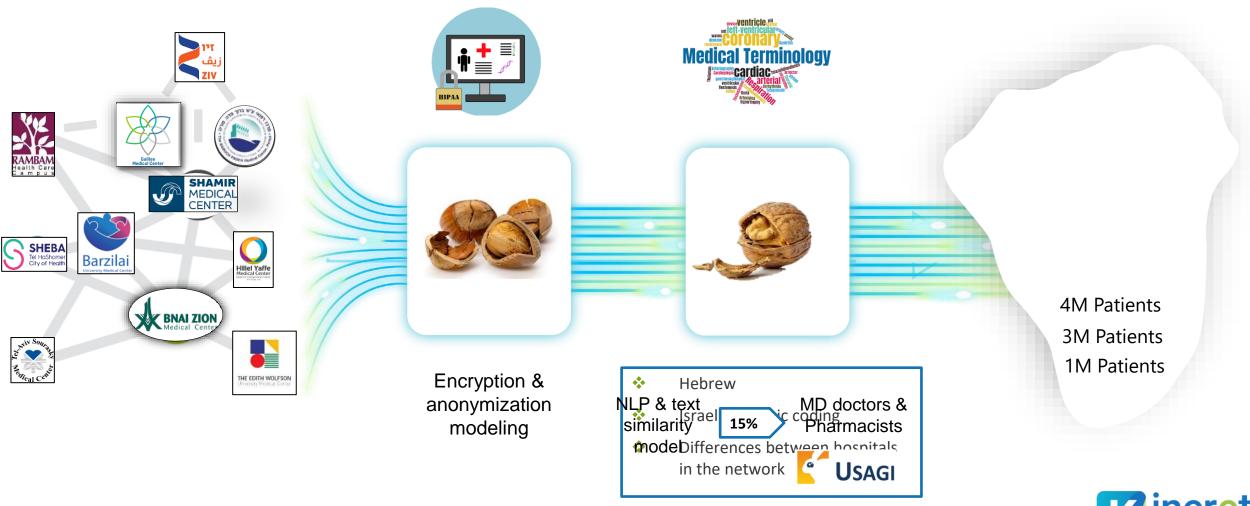
Promoting research and innovation in health
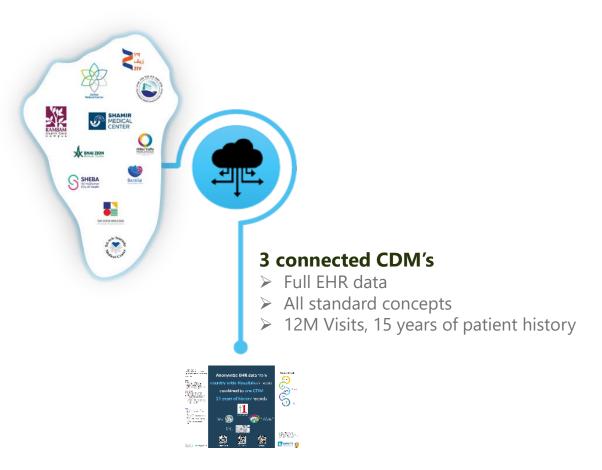
- 3 medical centers (9 by the end of 2023)
- All range of hospital treatment and medical data
- Diversity population
  - City & Rural area
  - All ages
  - Life-tyle

Oh, what a journey…

Encryption & anonymization modeling

NLP & text similarity model

❖ Hebrew
❖ Israeli automatic coding
❖ Differences between hospitals in the network

15%

MD doctors & Pharmacists

USAGI

Medical Terminology

4M Patients
3M Patients
1M Patients

Kineret
Israel hospitals data lake

Accomplished and continue...

3 connected CDM's
- ➢ Full EHR data
- ➢ All standard concepts
- ➢ 12M Visits, 15 years of patient history

Our team is in place and ready to go

Thank you

https://kineret.health.gov.il
Kineret@health.moh.gov.il

Guy.livne@moh.gov.il
Livne.guy@gmail.com

The Health Data Hub, the French national gateway for an easy, unified, transparent and secure access to health data

Lorien Benda

Health Data Hub

Health Data Hub

OHDSI congress

June 24th, 2022

The Health Data Hub's mission: a unique national french gateway for easy, unified, transparent and secure access to health data

The uses of health data are multiplying and access to data sources in the shortest possible time is essential. The Health Data Hub is a public structure created at the end of 2019 to facilitate access to health data for public interest projects in order to improve the quality of care for patients.

A **unique gateway** to health data in France

A **collection of databases**, including one of the largest medico-administrative database in the world

A **state-of-the-art** and **secure technological platform**

Several tools to **bring together key stakeholders** and to foster a health data culture

Health data sharing, a major priority for the European Commission and European health policy

Objective
remove obstacles to the smooth functioning of the data economy

Health data fragmentation

Multiple conditions for data use

Diversity of access governance models

Solutions
create an EU-wide governance framework for data access and use

2020 — **Data Governance Act**

2021 — **Joint Action TEHDAS** "Towards a European Health Data Space"

2021 — **Pilot version of European Health Data Space**: call for proposals financed up to 5m€
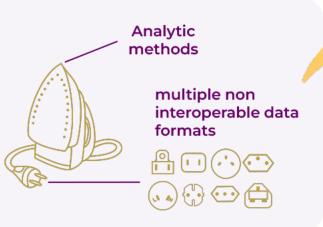
2022 — **European Health Data Space legislative proposal published May 3rd**

The Health Data Hub ensures data interoperability

Health data around the world, **the need of a common data model** for large scale data use

Analytic methods

multiple non interoperable data formats

OMOP-CMP
internationally renowned data model

Relational data model centred around a patient table

Standard vocabularies and terminologies allowing interoperability

Opensource program libraries
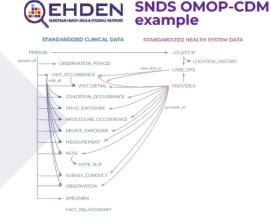
Omopisation
building interoperable databases

EHDEN
EUROPEAN HEALTH DATA & EVIDENCE NETWORKS

SNDS OMOP-CDM example

STANDARDIZED CLINICAL DATA   STANDARDIZED HEALTH SYSTEM DATA

PERSON
person_id
OBSERVATION_PERIOD
VISIT_OCCURRENCE
visit_id
VISIT_DETAIL
CONDITION_OCCURRENCE
DRUG_EXPOSURE
PROCEDURE_OCCURRENCE
DEVICE_EXPOSURE
MEASUREMENT
NOTE
NOTE_NLP
SURVEY_CONDUCT
OBSERVATION
SPECIMEN
FACT_RELATIONSHIP

LOCATION
LOCATION_HISTORY
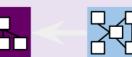care_site_id   CARE_SITE
PROVIDER
provider_id

Panel Discussion

1. **Estonia.** Marek Oja, Institute of Computer Science, University of Tartu

2. **Finland.** Javier Gracia-Tabuenca, FinnGen

3. **Denmark.** Andi Tsouchnika, Center for Surgical Science, Zealand University Hospital

4. **Norway.** Eimir Hurley, University of Oslo

5. **Germany.** Michele Zoch, Technische Universität Dresden

6. **Italy.** Lucia Sacchi, University of Pavia

7. **Greece.** Pantelis Natsiavas, Centre for Research & Technology Hellas

8. **Ukraine.** Mariia Kolesnyk, SciForce

9. **Israel.** Guy Livne, Israel Ministry of Health

10. **France.** Lorien Benda, Health Data Hub

Coffee Break