OMOP on CQL on FHIR: The Intersection of Interoperability Standards and Digital Quality

OHDSI Community Call
Aug. 1, 2023 • 11 am ET
## August Community Calls

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug. 8</td>
<td>New Community Member Introductions</td>
</tr>
<tr>
<td>Aug. 15</td>
<td>Next Steps for HowOften</td>
</tr>
<tr>
<td>Aug. 22</td>
<td>OMOP Supporting Clinical Registries</td>
</tr>
<tr>
<td>Aug. 29</td>
<td>Vocabulary Release Update</td>
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</tbody>
</table>
Aug. 8: New Member Introductions

Next week’s community call will be our annual "Newcomer Introductions" session. If you are new to the community, please join this call to introduce yourself, tell us why you have joined the community, and how OHDSI can help your research interests.

bit.ly/OHDSI-Intros2023
Three Stages of The Journey

Where Have We Been?

Where Are We Now?

Where Are We Going?
Congratulations to the team of Yu Jeong Lee, Jinmi Kim, Youngmi Han, Kyuhyun Hwang, Byungkwan Choi, Tae Ryom Oh, Il Young Kim, and Harin Rhee on the publication of Risk of Hyponatremia after Tramadol/Acetaminophen Single-Pill Combination Therapy: A Real-World Study Based on the OMOP-CDM Database in Drugs in R&D.

Abstract

Background and Objective  Tramadol has been reported to cause hyponatremia but the evidence is conflicting. The risk of hyponatremia resulting from combination oral tramadol/acetaminophen (TA) therapy is thus unknown. This study examined whether, compared with acetaminophen (AA), TA use is associated with an increased risk of hyponatremia.

Methods  Hospital data compatible with the Observational Medical Outcomes Partnership–Common Data Model (OMOP–CDM; version 5.3) for 30,999 patients taking TA or AA from 2011 through 2020 were analyzed. New-onset hyponatremia was defined as a serum sodium level < 135 mEq/L within 10 days after drug initiation. The incidence rate ratio was calculated based on crude and 1:1 propensity-score-matched models. Subgroup analyses compared patients taking TA extended-release (TA-ER) and TA immediate-release (TA-IR) formulations.

Results  Among the 30,999 patients, 1,122 (3.6%) were aged > 65 years and 16,654 (53.7%) were male. Hyponatremia within 10 days developed in 1,613 (8.4%) of the 19,149 patients in the TA group; the incidence rate was higher than in the AA group (4.2%; 493 out of 11,850 cases). In the propensity-score-matched model, the incidence rate of hyponatremia in the TA group was 6.8 per 1000 person-days (PD), which was 1.57-fold (1.31, 1.80) higher than in the AA group (4.3 per 1000 PD). In both the crude and propensity-score-matched models, the incidence rate of hyponatremia was significantly higher in the TA-ER than TA-IR subgroup.

Conclusion  In this real-world study, hyponatremia was more frequently observed in the TA than AA group, and in the TA-ER than TA-IR subgroup. Therefore, it is imperative to prescribe tramadol cautiously and closely monitor electrolyte levels.
#OHDSISocialShowcase

[OHDSI Social Showcase Image]

ohdsi.org/europe2023-showcase
2023 Europe Symposium Collaborator Showcase

1. The EHREN Portal - Enhanced access to OMOP CDM databases
   Joho Rafael Almeida, Nigel Hughes, Peter Rijpkem, José Luís Oliveira

2. Privacy preserving usage analytics and identity in OMOP CDM databases
   Joho Rafael Almeida, José Luís Oliveira

3. The Dutch C4U Data Network: towards a standardized multi-center electronic health record database
   Arneet Jageswar, Marleen Otten, Tini van der Graaf, Laurens Bierhuizen, Willem Thol, Annette Grijzea, Harri-joe de Grooth, Paul Elleners

4. Community Contributions to the OHDSI Vocabulary, User Level 4 and a New Entity Matching System SSDSIN
   Greg Zhu, Anna Ostorapo, Nicholas Mentenopo, Melissa Reibetanz, Alexander Davydov, Christian Rach

5. Extract, Transform, and Load of the Infectious Disease CDM for Harmonizing and Accessing Data to Real-time Infectious Disease Surveillance
   Byungjin Choi, Junhyung Chang, Sookmine Seo, Jeongyeon Lee, Bae Woong Park

6. Roadmap and Improvement of OMOP Vocabulary
   Christian Rach, Alexander Dorybf, Anna Ostorapo

7. Integrating the OMOP CDM into the I4B Surgeons of the German Health Data Label
   Ehsan Taghizadeh, Maxim Moiset

8. Thorough local evaluation of codelinked evidence artifacts and validation artifacts using the station automation
   Jano Houghtaling, Frederick Juici, Arthur Krishnan, Marc Pottery Contesto, Frank Lora, Laurene Moreau, Tom Possolo, Frode deLange

9. Capturing and consolidation of meta-specific concepts into a national OMOP dataset
   Jano Houghtaling, Jose Antonio Ramirez Garcia, Olmerona Le Corre, Luke Moreton, Rhys Neuss, Lara Holmren

10. Creation of a reusable OMOP transformation workflow for Danish electronic health record systems
    Jano Houghtaling, Lora Moreton, Louise Vandercruysse, Konrad Berner, Brecht Dekeyser, Frode deLange

11. Construction of a proof of concept warehouse solution for sampling source- and vocabulary-aggregated data across a multi-center cancer cancer registry
    Jano Houghtaling, Peter Piemse, Maaike van Swolten, Chanta Athrasia, Luis Hahnren

12. Development of the R-C4U ensemble to capture ensembles and features extracted from ensembles from MI and C4U ensembles
    Jutta Prinz, Jano Houghtaling, Frederick Juici, Steve de Borger, Jianxi Peng, and Dinh Smal

13. WADeS - a national cancer research database for rapid feedback within cancer care systems and external research institutions
    Julia Larroux, Kaspark Geyhmen, Naina Mohit, Sam Greenbury

14. OMOP CDM Data conversion for the Pan-European General Intervention Registry
    Arthur Cresen, Maria Ropalo, Pamela Nefserra

15. Development of a SPSS Beaver for structured Clinical Data Dictionary using the OMOP CDM
    Albana Lebarca, Sergio Aguiló

16. Quality Management Studies of the OHDSI Standardized Vocabularies
    Vlad Horacs, Arno Goulardis, Christian Rach, Alexander Dorybf
Development of a GA4GH Beacon for structured Clinical Data Discovery using the OMOP-CDM

(Sergi Aguiló-Castillo, Alberto Labarga, M.A. Mayer, J.M. Ramirez-Anguita, S. Capella-Gutierrez)

MONDAY
Creation of a reusable OMOP transformation workflow for Belgian electronic health record systems

(Jared Houghtaling, Lore Vermeylen, Louise Vandenbroucke, Korneel Bernaert, Brecht Dekeyser, Freija Descamps)
NNRD-AI: a national neonatal research database for rapid insights with machine learning and artificial intelligence

(Julia Lanoue, Kayleigh Ougham, Neena Modi, Sam Greenbury)

The NNRD-AI provides enhanced flexibility and accessibility for neonatal critical care admissions data

Background: The National Neonatal Research Database (NNRD) is a relational database that holds patient-level clinical admissions data drawn from Electronic Patient Records from all 181 NHS neonatal units in England, Wales, Scotland, and Isle of Man. Using the NNRD requires domain knowledge to correctly manipulate and interpret items. The NNRD-AI addresses these complexities by providing a curated dataset that is easy to use without prior domain knowledge and will advance the range of applications.

Pipeline Structure

<table>
<thead>
<tr>
<th>NNRD</th>
<th>Intermediary Processing</th>
<th>NNRD-AI</th>
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<tbody>
<tr>
<td>Episodes</td>
<td>Daily Data</td>
<td>Abdominal X-Rays</td>
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<td></td>
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<td>Retinopathy of Prematurity Screening</td>
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<td>Septis Screening</td>
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<td></td>
<td></td>
<td>Brain Imaging</td>
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<td>Reference Data</td>
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Methods:
- The NNRD data is fed into the Python pipeline
- Curation includes:
  - Removal of improbable values
  - Outlier management
  - Type conversion
  - Growth standard deviation score calculation
  - Simplification of categorical variables
  - Conversion of nominal data to binary

Results:
- There are over 1.3 million babies from 181 units included in the NNRD-AI
- The three main outputs are:
  - nrrd_ai_stat: baby-level table with static and clinical outcomes
  - nrrd_ai_daily: curated daily summary table
  - nrrd_ai_agg: baby-level table with daily summary items aggregated at different points across stay

Example Application

Network graph showing transfer movements between operational delivery networks

One of the NNRD-AI intermediaries is a curated transfers table. This table includes information on admission and discharge times, discharge and receiving unit designation, and columns to indicate if the transfer occurred within the first 24-, 48- or 72-hours following delivery.

All clinical definitions and variables are validated against existing standard operating procedures used for the NNRD.
THURSDAY

OMOP-CDM Data conversion for the Papageorgiou General Hospital in Greece

(Pantelis Natsiavas, Grigoris Papapostolou)
Application of the R-CDM extension to capture metadata and features extracted from quantitative brain MRI and CT data

(Jelle Praet, Jared Houghtaling, Frederic Jung, Steve De Backer, Jeroen Pinxten and Dirk Smeets)
OHDSI Shoutouts!

Any shoutouts from the community? Please share and help promote and celebrate OHDSI work!

Do you have anything you want to share? Please send to sachson@ohdsi.org so we can highlight during this call and on our social channels. Let’s work together to promote the collaborative work happening in OHDSI!
Three Stages of The Journey

Where Have We Been?
Where Are We Now?
Where Are We Going?
# Upcoming Workgroup Calls

<table>
<thead>
<tr>
<th>Date</th>
<th>Time (ET)</th>
<th>Meeting</th>
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<tbody>
<tr>
<td>Wednesday</td>
<td>2 am</td>
<td>Methods Research</td>
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<td>Wednesday</td>
<td>8 am</td>
<td>Psychiatry</td>
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<td>Wednesday</td>
<td>12 pm</td>
<td>Health Equity</td>
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<td>Thursday</td>
<td>9:30 am</td>
<td>Themis</td>
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<tr>
<td>Thursday</td>
<td>12 pm</td>
<td>Methods Research</td>
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<td>Thursday</td>
<td>1 pm</td>
<td>OMOP CDM Oncology Vocabulary/Development Subgroup</td>
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<tr>
<td>Thursday</td>
<td>7 pm</td>
<td>Dentistry</td>
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<tr>
<td>Friday</td>
<td>9 am</td>
<td>GIS – Geographic Information Systems Development</td>
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<td>Friday</td>
<td>1 pm</td>
<td>Clinical Trials</td>
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<tr>
<td>Monday</td>
<td>9 am</td>
<td>Vaccine Vocabulary</td>
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<td>Monday</td>
<td>10 am</td>
<td>Africa Chapter</td>
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<tr>
<td>Monday</td>
<td>6 pm</td>
<td>OMOP &amp; FHIR</td>
</tr>
<tr>
<td>Tuesday</td>
<td>9 am</td>
<td>OMOP CDM Oncology Genomic Subgroup</td>
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</tbody>
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Collaborator Spotlight: Davera Gabriel

Davera Gabriel, the Director for Terminology Management at the Johns Hopkins University School of Medicine, has had a distinguished career as a nurse informatician supporting local, regional, and national multi-site implementations of information technology, terminologies, and data standards in human and population health research. She has worked with numerous teams with various clinical and/or technical backgrounds and helped them achieve new heights in informatics.

As an inaugural chair of the HL7 Terminology Services Management Group, co-lead the OMOP + FHIt Working Group, and early participant in the National COVID Cohort Collaborative (N3C), Davera is focused on ways to strengthen the partnership between OHDSI and HL7/FHIt, including through a full-day event at the 2023 Global Symposium.

In the latest edition of the Collaborator Spotlight, Davera talks about her career journey, why OMOP is an ideal partner for the FHIt community, lessons learned as part of the N3C community, the HL7 FHIt-OMOP Connection, and plenty more.

Can you discuss your career path around informatics and technology, and what your role is at Johns Hopkins University?

Looking back, I did not imagine how far my career path would go. I started as a Registered Nurse in critical care before making a transition into Health IT. My first position in information systems was working on a large-scale Department of Defense deployment that sought clinical professionals to support end-users. I discovered an affinity for the work, so I quickly moved to a development team where I learned a little MUMPS. A short time after, I was recruited to work as a Product Manager for the Cerner Corporation, where I was the company’s second Nurse hire.

Over the course of my career, I’ve had the great fortune to participate in many firsts in informatics: the first conversion of VT terminal functionality over to a GUI for DoD physicians, the first implementation of the first commercial integrated data repository, the first deployment of SNOMED CT by a major EMR vendor, and I developed the first terminology model for patient assessment scales using SNOMED CT. I led the first data standards group supporting the first CTBs, participated in the first federated implementation of i2b2, and helped build the first system linking all 5 University of California health systems’ EMR data for translational research. More recently, I helped develop the first data transformation pipeline harmonizing observational data from 4+ common data models onto OMOP. Notable other contributions include foundations for much derivative work: co-author of the first HL7 Continuity of Care Document specification; co-author of the first Common Terminology Services 2 FSHM contributor to chapters in Rethinking Clinical Trials: A Living Textbook of Pragmatic Clinical Trials; and participant in the Data Ingestion and Harmonization team for the largest HIPAA-compliant research repository in history: The National COVID Cohort Collaborative (N3C). I’ve consistently been able to find teams that were achieving cutting-edge advances in informatics. I’ve also been fortunate in that these talented people brought our timely visions to fruition.
Latest OHDSI Newsletter is Available

The Journey Newsletter (August 2023)

July Presentations


Europe Symposium Highlights Community Growth with 90+ Research Posters/Demos, Reports On Darwin/European Initiatives Progress

The 2023 Europe Symposium, held July 1-3 in Rotterdam, featured the widest breadth of research ever shared at the European event, and it also hosted several plenary talks and national updates to show how strong the community continues to grow.

The main conference included several talks, including sessions focused on European initiatives using the OMOP CDM and Data Analysis and Risk World Information Network (DARWIN) (EUIW) as well as 16 lighting talks focused on OHDSI Community Endorsees. Videos of all talks will be posted on the Europe Symposium homepage when available.

mailchi.mp/ohdsi/august2023

Collaborator Spotlight: Davera Gabriel

Davera Gabriel was Director for System Management at the Johns Hopkins University School of Medicine. She has extensive experience as a data scientist supporting local, regional and national health initiatives, primarily in implementation of informatics technologies, and data standardization in hospital and population health settings. She was the second Co-Chair of the National Cancer Institute's Cancer Biomedical Informatics Research Network (cBIRN) and was a founding member of the eScience Working Group on Biomedical Informatics.

Can you describe your career path and how you got here?

Sure. I’ve been interested in biology and data science since I was a child. When I was 13, I started volunteering as a research assistant in a biotechnology lab, and I continued to work in labs throughout college. After college, I worked for several years in the private sector, before deciding to pursue a career in academia.

What is your current role and what do you enjoy most about it?

I am currently a Professor of Management at the Johns Hopkins University School of Medicine, which is part of the National Institutes of Health. My role is to lead the research team and manage the projects.

Over the course of my career, I’ve had the great fortune to participate in many important initiatives over the last few years, and these initiatives continue to shape the field.

Where Have We Been?

- The 2023 Europe Symposium was held July 1-3 in Rotterdam, Neth., and included a main conference and three days of workshops and exhibits. The event welcomed 380 attendees, featured 5 plenary sessions, 10 rapid-fire presentation slots, highlighted seven national research and included 60+ collaborative showcase presentations.

- The 2023 APAC Symposium was held July 13-15 in Sydney, Aust., and included a main conference and a stall at Sydney Health 2023. South Korea was the focus of several talks during the conference, and a full day of teaching around running a network study.

- Talks from both the Europe and APAC Symposiums were recorded and will be posted to the symposium’s homepages when available.

- From the 2023 Europe Symposium is now available on OHDSI.org.

Where Are We Now?

- Registration is open for the OHDSI Global Symposium, which will be held Oct. 20–22 at the New Orleans Hilton East Riverfront Hotel & Executive Meeting Center in East Brunswick, N.J. This year’s conference will include a main conference and three days of workshops, stalls and exhibits.

- The Awards nominations are now open. To recognize OHDSI collaborators for their contributions towards OHDSI mission, the OHDSI Titan Awards were introduced at the 2023 Symposium and have been handed out at the OHDSI Summit in 2023.

- You can nominate a community member for a 2023 Titan Award. The deadline is Sep. 15, 2023.
OHDSI Got Talent!

Please join us for the first **OHDSI Got Talent!** competition at our 2023 Global Symposium.

We are looking for anybody with a special talent – singing, dancing, playing an instrument, comedy, magic, etc. – to join us for this fun event in October. Please use the link below to share your interest in participation!

Titan Award Nominations Are Open!

To recognize OHDSI collaborators (or collaborating institutions) for their contributions towards OHDSI’s mission, the OHDSI Titan Awards were introduced at the 2018 Symposium and have been handed out at the Global Symposium each year since.

bit.ly/2023TitanNominations
Global Symposium

Oct. 20-22 • East Brunswick, NJ, USA
Hilton East Brunswick Hotel & Executive Meeting Center

ohdsi.org/OHDSI2023
## Global Symposium Weekend Agenda

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<thead>
<tr>
<th>Time</th>
<th>Friday, Oct. 20</th>
<th>Saturday, Oct. 21</th>
<th>Sunday, Oct. 22</th>
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<tbody>
<tr>
<td>7:00 am</td>
<td>Registration/Lite Breakfast</td>
<td>Lite Breakfast</td>
<td>Lite Breakfast</td>
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<tr>
<td>8:00 am</td>
<td>Welcome to OHDSI2023!</td>
<td>Intro to OHDSI Tutorial &amp; OHDSI Workgroup Activities</td>
<td>OHDSI collaborative workshop: HowOften (part 2)</td>
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<tr>
<td>9:00 am</td>
<td>State of the Community</td>
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<tr>
<td>10:00 am</td>
<td>Community Networking</td>
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<tr>
<td>11:00</td>
<td>Plenary Session</td>
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<tr>
<td>12:00 pm</td>
<td>Buffet Lunch</td>
<td>Buffet Lunch + Collaborator Showcase: Posters &amp; Demos</td>
<td>Buffet Lunch + Collaborator Showcase: Posters &amp; Demos</td>
</tr>
<tr>
<td>1:00 pm</td>
<td>Panel: Network Studies</td>
<td>OHDSI collaborative workshop: HowOften (part 1)</td>
<td>OHDSI workgroup activities</td>
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<tr>
<td>2:00 pm</td>
<td>Collaborator Showcase: Posters &amp; Demos</td>
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<tr>
<td>3:00 pm</td>
<td>Collaborator Showcase: Lightning Talks</td>
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<td>4:00 pm</td>
<td>Collaborator Showcase: Posters &amp; Demos</td>
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<tr>
<td>5:00 pm</td>
<td>Closing Talk &amp; Titan Awards</td>
<td>Free time</td>
<td>We’ll see you again in 2024!</td>
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<tr>
<td>6:00 pm</td>
<td>Networking Reception</td>
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<tr>
<td>7:00 pm</td>
<td>OHDSI Got Talent!</td>
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*This agenda is tentative and subject to change.*
OHDSI HADES releases: DataQualityDashboard 2.4.0

DataQualityDashboard

DataQualityDashboard is part of HADES.
The goal of the Data Quality Dashboard (DQD) project is to design and develop an open-source tool to expose and evaluate observational data quality.

Introduction

This package will run a series of data quality checks against an OMOP CDM instance (currently supports v5.4, v5.3 and v5.2). It systematically runs the checks, evaluates the checks against some pre-specified threshold, and then communicates what was done in a transparent and easily understandable way.

Overview

The quality checks were organized according to the Kahn Framework\(^1\) which uses a system of categories and contexts that represent strategies for assessing data quality. For an introduction to the kahn framework please click here.

Using this framework, the Data Quality Dashboard takes a systematic-based approach to running data quality checks. Instead of writing thousands of individual checks, we use “data quality check types”. These “check types” are more general, parameterized data quality checks into which OMOP tables, fields, and concepts can be substituted to represent a singular data quality idea. For example, one check type might be written as

The number and percent of records with a value in the cdmFieldName field of the cdmTableName table less than plausibleValueLow.
OHDSI HADES releases: PheValuator 2.2.9

PheValuator

PheValuator is part of HADES.

Introduction

The goal of PheValuator is to produce a large cohort of subjects each with a predicted probability for a specified health outcome of interest (HOI). This is achieved by developing a diagnostic predictive model for the HOI using the PatientLevelPrediction (PLP) R package and applying the model to a large, randomly selected population. These subjects can be used to test one or more phenotype algorithms.

Process Steps

The first step in the process, developing the evaluation cohort, is shown below:

**Step 1: Develop Evaluation Cohort from Diagnostic Predictive Model**

![Diagram of process steps]
New Opening: Tufts Medicine

Project Manager - Informatics

Apply

II. PRINCIPAL DUTIES AND ESSENTIAL FUNCTIONS

- Demonstrates thorough knowledge of the project aims, scope, budget, and timeline. Creates and executes project plans with guidance from leadership, and revises as appropriate to meet changing needs and requirements. Ensures timely review and finalization of documents prepared by the team before submission.
- Contributes to new proposal development and writes/edits substantive sections.
- Manages day-to-day interaction with internal and external stakeholders, including managing expectations. Communicates effectively to identify needs and evaluate alternative business solutions.
- Facilitates internal and external meetings effectively. Holds regular status meetings with project team(s). Effectively communicates relevant project information to leadership, including task status and progress to milestones. Resolves and/or escalates issues in a timely fashion.
- Understands how to communicate difficult/sensitive information to varied stakeholders.
- Develops clear, actionable plans, coordinating completion of action items, setting deadlines, and tracking milestones.
- Convenes and aids committees or working groups to develop and sustain new and existing initiatives, including providing excellent written and verbal communications such as reports, proposals, and presentations to keep all stakeholders informed.
- Collects and analyzes data to track program/project progress and to inform continuous improvement, strategic decisions, and resource allocation.
- Manages events, meetings, including scheduling and logistical arrangements, serving as liaison to presenters/invitees, agenda preparation, materials distribution, minutes, follow-up, media, and audio-visual needs.
- Maintains collaborative team relationships with peers and colleagues to help foster a positive work environment.
- Performs other similar and related duties as required or directed.
Job Openings – This Week In OHDSI page

Tenure Track Faculty
#103752

Description
The Department of Biomedical Informatics (DBIM) of Columbia University seeks exceptional junior-level faculty members in the tenure track.

The positions are open to researchers interested in developing and applying informatics theory and achieving tangible benefits to health care and biology. Three particular foci are 1) machine learning for healthcare and health-related data science, 2) health information technology-based interventions to improve health care and the health of individuals and populations, and 3) translational bioinformatics.

Columbia University

Associate Professor, Observational Health Data Analytics – Global Epidemiology

Job Title: Associate Director, Observational Health Data Analytics – Global Epidemiology

FUNCTION: Epidemiology

LOCATION: New York, New Jersey, United States; Amsterdam, Netherlands; United States; Tokyo, Japan; United States

Application Deadline: May 20, 2023

COI Statements

Columbia University

www.ohdsi.org

JoinTheJourney
Where Are We Going?

Any other announcements of upcoming work, events, deadlines, etc?
Three Stages of The Journey

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Aug. 1 - OMOP on CQL on FHIR: The Intersection of Interoperability Standards and Digital Quality

Ben Hamlin
Senior Research Informaticist, Quality Measurement and Research Group
National Committee for Quality Assurance

Jared Houghtaling
Software Development Analyst
Tufts Clinical and Translational Science Institute

Clark Evans
Tufts Clinical and Translational Science Institute