Observational Health Data Sciences and Informatics: 2019 state of the collaborative

OHDSI's mission

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

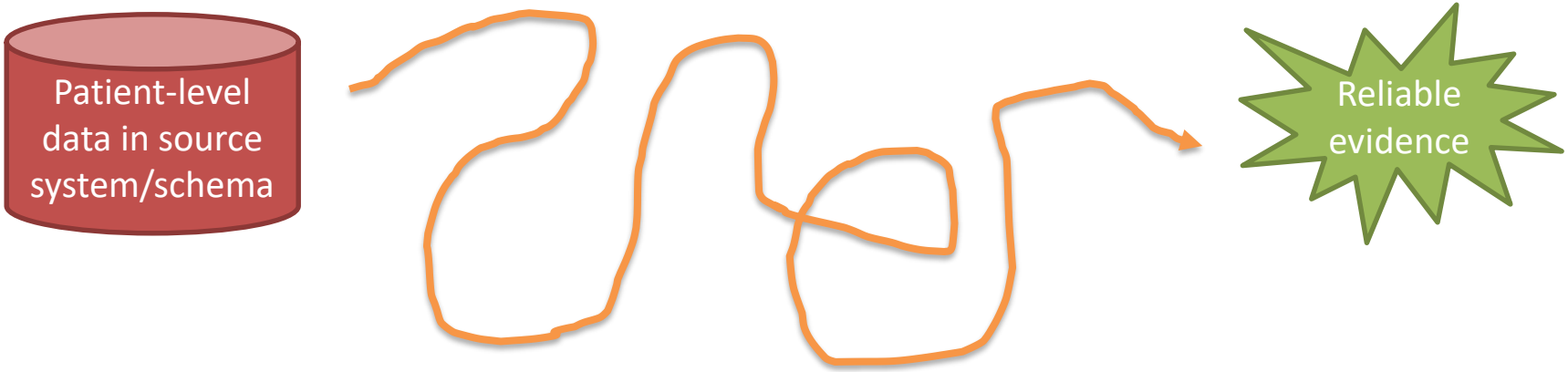
OHDSI's values

- **Innovation**: Observational research is a field which will benefit greatly from disruptive thinking. We actively seek and encourage fresh methodological approaches in our work.
- **Reproducibility**: Accurate, reproducible, and well-calibrated evidence is necessary for health improvement.
- **Community**: Everyone is welcome to actively participate in OHDSI, whether you are a patient, a health professional, a researcher, or someone who simply believes in our cause.
- **Collaboration**: We work collectively to prioritize and address the real world needs of our community's participants.
- **Openness**: We strive to make all our community's proceeds open and publicly accessible, including the methods, tools and the evidence that we generate.
- **Beneficence**: We seek to protect the rights of individuals and organizations within our community at all times.

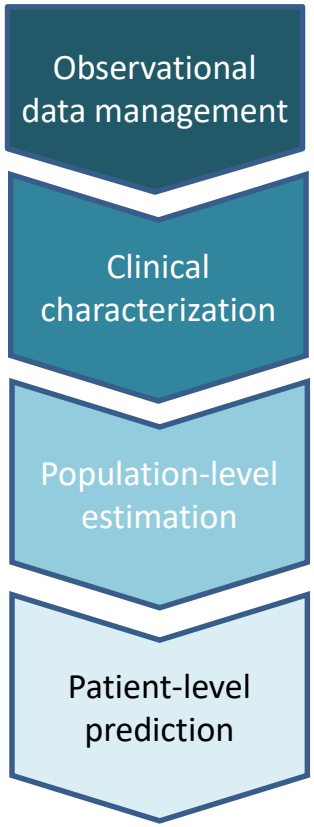
OHDSI community

We're all in this journey together…

The journey to real-world evidence



OHDSI's areas of focus: Continuing our journey in 2018…



- Maintain and evolve open community data and vocabulary standards
- Develop and improve tools to enable large-scale analysis
- Establish and promote community best practices
- Strengthen and expand collaborations across OHDSI research network
- Advance scholarship in observational data science through publication, presentations, and education
- **Generate and disseminate more clinical evidence**

OHDSI workgroup updates

- CDM/Vocabulary – Christian Reich
- Natural Language Processing – Hua Xu
- OHDSI China – Hua Xu
- THEMIS - Mui Van Zandt
- EHR – Melanie Philofsky
- Metadata and Annotation – Ajit Londhe
- Pharmacovigilance Evidence Investigation – Erica Voss
- ATLAS/WebAPI – Anthony Sena
- Population-level Effect Estimation – Martijn Schuemie
- Patient-level Prediction – Peter Rijnbeek
- Book of OHDSI – David Madigan

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CDM & Vocabulary Working Group

2019 Update

Christian Reich & Clair Blacketer

2018 Accomplishments

Closed Issues: **43**

Ratified Proposals: **11**

Notable Releases:

- **Version 5.3.0**
  - Added the VISIT_DETAIL table
  - Added the METADATA table
- **Version 6.0.0**
  - Added the SURVEY_CONDUCT table
  - Added the LOCATION_HISTORY table

2019 Goals

- As the developers work to incorporate the recent v6.0.0 changes into the tools we would like to take the time to address the issues that have been identified as collaborators adopt the new version.
- In addition we would like to create a better testing and proposal ratification process with a focus on supporting vocabulary

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NLP Working Group

2019 Update

Hua Xu

OHDSI NLP Updates

- 2018 Summary
  - Delivered NLP Tools (https://github.com/OHDSI/NLPTools)
    - Wrappers for converting existing NLP systems (MetaMap, cTAKES, CLAMP) outputs to CDM NLP tables
    - Mapping of CUIs to standard terminology in CDM
  - Other ongoing projects
    - Mapping of Note Types to LOINC/standard vocabulary
    - Landscape Analysis of section identifier systems and proposal of a standard terminology for use
    - Extension and standardization of concept-modifiers from NLP systems
- 2019 Aims
  - Establish ETL for processing textual data into CDM
  - Develop tools (within Atlas) to facilitate uses of NLP data for cohort building/phenotyping
  - Conduct cross-site studies that use textual data
  - Continue developing other NLP resources

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China Working Group

2019 Update

Hua Xu

OHDSI China WG Updates

- 2018 Summary
  - Meetings: F2F meeting (Guangzhou), two hackathon (Shanghai and Beijing), monthly online meetings
  - Activities: CDM and vocabulary – version 1.0 limited release; NLP toolkit; studies in China
  - Publications: NCCD (Normalized Chinese Clinical Drug) – JAMIA, Chinese vocabulary – OHDSI abstract
- 2019 Aims
  - Continue 2019 F2F meeting and hold two Hackathon (Christian and Mui)
  - Develop Chinese Vocabulary 2.0, Chinese version of Atlas
  - Promote OHDSI data instances and conduct cross-site studies

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THEMIS Working Group

2019 Update

Mui Van Zandt

THEMIS Roadmap

THEMIS Roadmap

Q1-Q2 2018

Developed 1st set of conventions and documentation

Q3-Q4 2018

Release 1.0 Announcement at OHDSI Symposium

Q1-Q2 2019

Release 2.0

Q1-Q3 2019

- Develop QA/QC to incorporate THEMIS conventions including revisions to Achilles, WhiteRabbit etc..
- Kickoff Certification Process
- Invite 2-3 ETL partners & companies for pilot
- Release certification process

Q3-Q4 2019

- Announce pilot success story and value proposition of consistent/single ETL process for CDM
- Role out at OHDSI Symposia (Europe, China, US)

Q1-Q4 2020

- Drive adoption
- Dedicated web page under ohdsi.org
- Develop tutorial in CDM advanced model
- Submit abstracts to relevant conventions

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EHR Working Group

2019 Update

Melanie Philofsky

EHR WG

January 11, 2019 @ 10am EST

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Metadata and Annotations Working Group

2019 Update

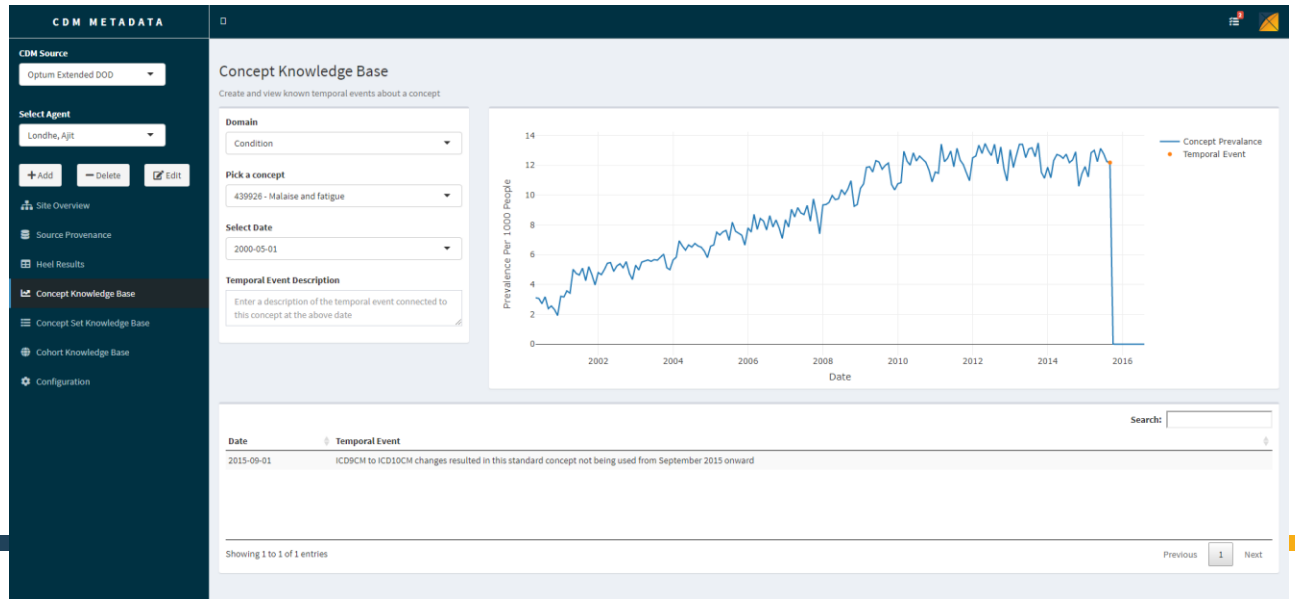
Ajit Londhe

2018 Accomplishments

- Defined terminology of “metadata” and “annotation” in the context of OHDSI
- Collected 30 real-world use cases from CHOP, NIH, Janssen, Tufts
- Developed concept hierarchy to help in standardizing metadata values
- Developed flexible table structure to add to the results schema to store metadata and annotations

Next Steps: Pilot, Test, Propose

- Challenges in proving value of metadata tables: no easy way to manage and consume metadata
- R Shiny Application ("CdmMetadata") will be used as a pilot of the metadata tables to help us gain adoption and build a stronger proposal to the CDM WG



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Pharmacovigilance Evidence Investigation WG

Working on the Common Evidence Model, (formerly LAERTES)

2019 Update

Erica Voss & Rich Boyce

2018 Accomplishments

- Common Evidence Model V1.0.0 Release
  - All sources updated and the process standardized
  - Processing of CEM standardized
  - Web API Updated
  - All code released in GitHub
- Integrated pulling negative controls from CEM into ATLAS
  - Tool used at OHDSI F2F
- Regular WG meetings, a few new members

2019 Goals

(to be discussed still in WG)

- Improve our parsing of product labels
- Integrate clinical trial data into CEM
- Develop process that allows users to use CEM to go from source code to source code if they are not using the OMOP Vocabulary

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ATLAS & WebAPI Working Group

2019 Update

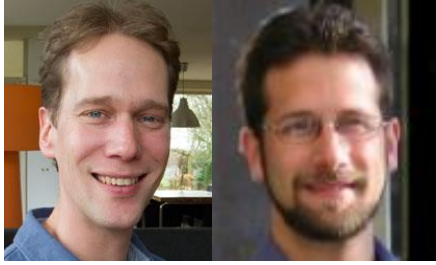
Anthony Sena

2018 Accomplishments

- 2018 Atlas/WebAPI Community Accomplishments, by the numbers:
  - **4:** Releases of Atlas/WebAPI
  - **19**: Community members contributing code
  - **355**: Issues Closed
  - **551**: Pull Requests Reviewed & Approved
- Atlas Feature Highlights:
  - Cohort Characterization revamp
  - Cohort Pathways
  - Multi-analysis PLE/PLP Designer
  - Security Improvements
- Sept 2018: Established Atlas/WebAPI Working Group
  - Raising awareness and planning of development activities around Atlas/WebAPI.
  - Provide guidance to those that wish to contribute to these tools.

2019 Goals

Release	Goals	Target Date
Atlas/WebAPI 2.7	Bug Fixes	March 2019
Atlas/WebAPI 2.8	Performance Optimizations	May 2019
Atlas/WebAPI 3.0	• CDM v6.x Support • User Interface revamp • Deeper integration with Arachne	US Symposium 2019

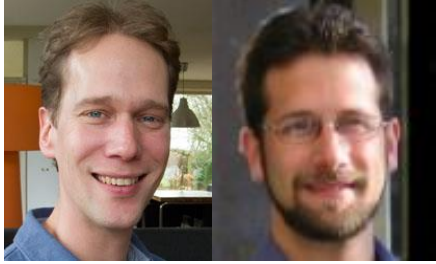


Population-Level Estimation Working Group

2019 Update

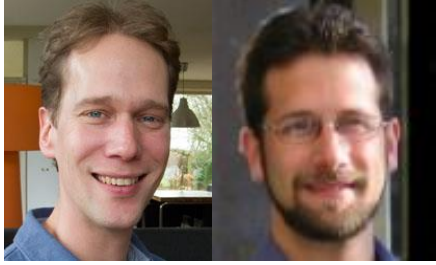
Martijn Schuemie & Marc Suchard

Achievements in 2018



- 19 workgroup meetings (western and eastern hemisphere)
- Further development of the Methods Library
  - CohortMethod V3.0
  - Methods Library documentation: https://ohdsi.github.io/MethodsLibrary
  - ATLAS Estimation Tool: Generation of full study code
- Publications
  - Evaluation of large-scale propensity scores (International Journal of Epi)
  - Some-by-some for depression (Philosophical Transactions)
  - Empirical confidence interval calibration (PNAS)
  - Methods evaluation (submitted to Harvard Data Science Review)
- Awards
  - Marc and Martijn received the Titan award for methods development!
- LEGEND (Large-Scale Evidence Generation and Evaluation in a Network of Databases)
  - Presented at the OHDSI 2018 Symposium
  - Several papers in preparation

Goals 2019



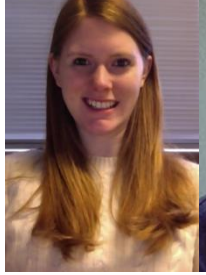
- Write one or more chapters for the Book of OHDSI
- Improve Methods Library
  - Usability
  - Documentation
  - Robustness
  - Validation
- Continue evidence generation in LEGEND

Patient-Level Prediction Working Group

2019 Update

Peter Rijnbeek & Jenna Reps

Patient-Level Prediction 2018




Exciting year for the PLP Working Group with a lot of progress!

- Accepted Publication on the PLP Framework in Jamia
- A lot of methodological work: Deep Learning, Learning Curves, Ensemble Training, Validation of existing models, Heterogeneity of Treatment Effect, Smooth Calibration
- Nice work of dissemination of results: Several Shiny Applications
- A lot of work to incorporate the framework in the OHDSI eco-system: ATLAS integration
- Improvements in documentation: multiple vignettes, short videos initiated

www.github.com/OHDSI/PatientLevelPrediction

Jenna M Reps, Martijn J Schuemie, Marc A Suchard, Patrick B Ryan, Peter R Rijnbeek; Design and implementation of a standardized framework to generate and evaluate patient-level prediction models using observational healthcare data, Journal of the American Medical Informatics Association, Volume 25, Issue 8, 1 August 2018, Pages 969–975, https://doi.org/10.1093/jamia/ocy032

Patient-Level Prediction in Action

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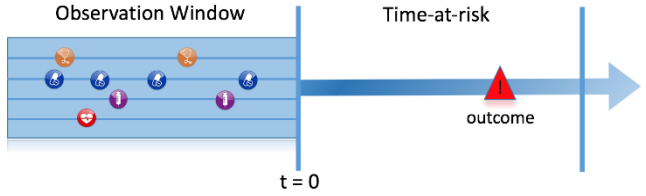
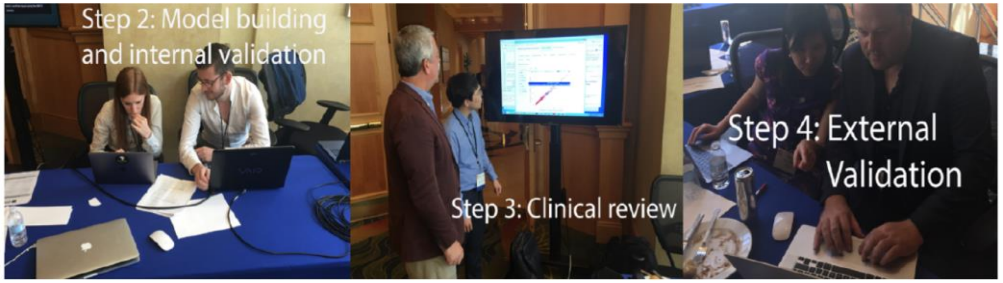
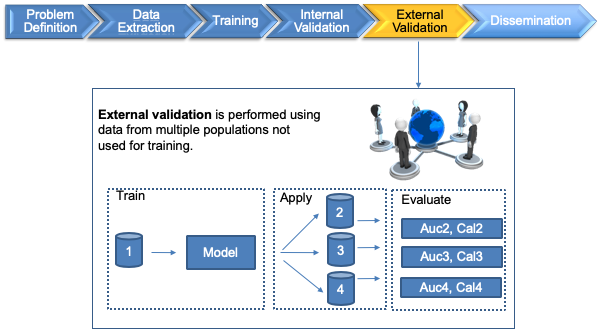
Patient-Level Prediction Team Work







Looking forward to 2019:

- More studies!
- Method research, e.g. use of temporal data, HTE
- Library of Prediction Models
- TRAINING!

Big thank you to all those involved in the exciting PLP Journey!

The Book of OHDSI

2019 Update

David Madigan

Book of OHDSI

Objective: To write a book that will serve as a central knowledge repository for all things OHDSI.

An electronic book written using the bookdown package. The source material is developed in TheBookOfOhdsi GitHub repository.

Start Date: November 27, 2018

Workgroup Leads: David Madigan, Martijn Schuemie

http://www.ohdsi.org/web/wiki/doku.php?id=projects:workgroups:the_book_of_ohdsi

Pilot Chapters and Leads

Patient-level prediction by **@Rijnbeek**

Common Data Model by **@mvanzandt** and **@clairblacketer**

Network Studies by **@gregk**

Observational Health Data Sciences and Informatics: Where are we going together in 2019?

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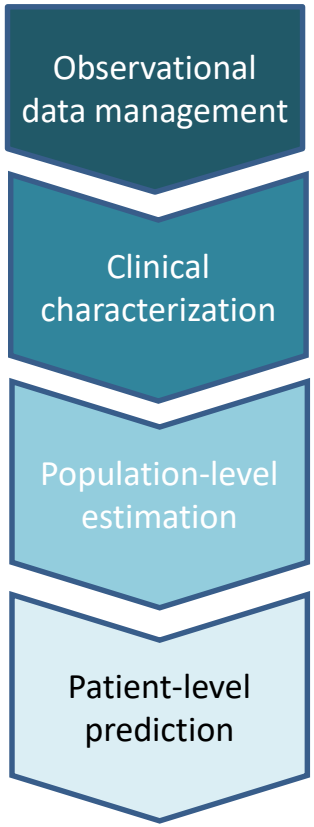
OHDSI's areas of focus: Continuing our journey in 2019…



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