



Collaborator Showcase: Rapid Fire Presentations

Katia Verhamme, MD, PhD

Associate Professor of Use and Analysis of
Observational Data



TOOLS FOR THE COLLABORATIVE MAINTENANCE OF NATIONAL VOCABULARIES AND MAPPINGS

Speaker: Javier Gracia-Tabuenca

Poster 41

Tools for the collaborative maintenance of national vocabularies and mappings

FinOMOP Vocabulary WG

Javier Gracia-Tabuenca



FINNGEN



FinOMOP



OHDSI

How to get a new vocabulary in the CDM



OMOP-vocabs (<2B)



Accessible to every one



Peer-reviewed



C&CR



Update 6 months



GitHub



OMOP-vocabs (<2B)
FinOMOP-vocabs (>2B)



Accessible to a group



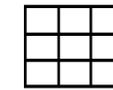
Peer-reviewed by group



C&CR or STCM



Update immediate



STCP table



Local
OMOP-CDM



No concept_ids



Accessible only locally



Local-review



STCM



Update immediate

FinOMOP way



OMOP-vocabs (<2B)



OMOP-vocabs (<2B)
FinOMOP-vocabs (<2B)

ETL

FinOMOP / FinOMOP_OMOP_vocabulary

VOCABULARIES

ICD8fi

ICD10fi

ICD10fi.info.csv

ICD10fi.usagi.csv

NEWS.md

LABfi

LABF_HUS

CODE_COUNTS

databases

FinnGenDF10.csv

HUS.csv

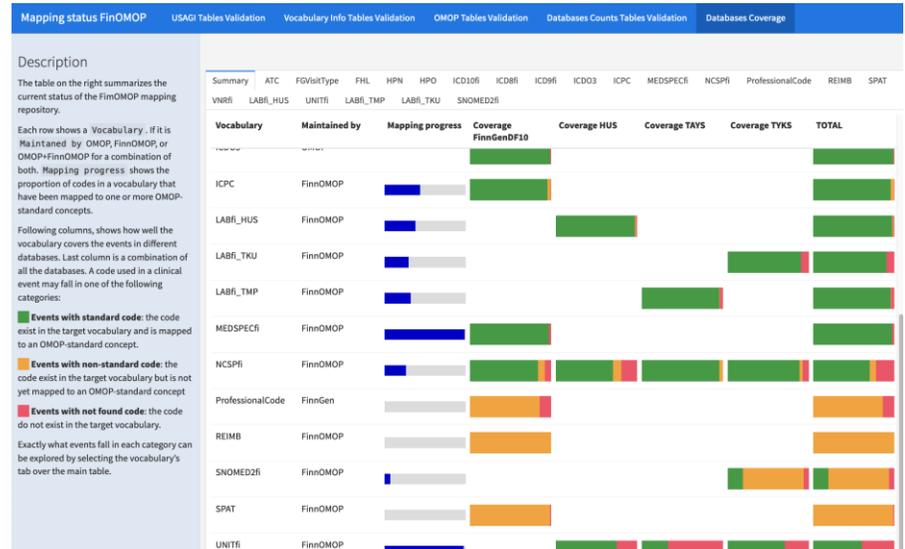
TAYS.csv



FinOMOP-vocabs (<2B)



Status dashboard



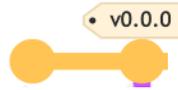
FinOMOP way



OMOP-vocabs (<2B)
FinOMOP-vocabs (>2B)



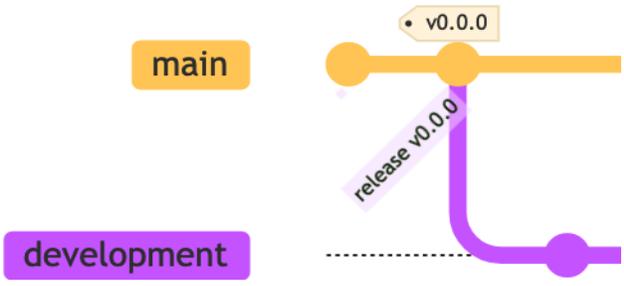
main



FinOMOP way



OMOP-vocabs (<2B)
FinOMOP-vocabs (>2B)



FinOMOP way

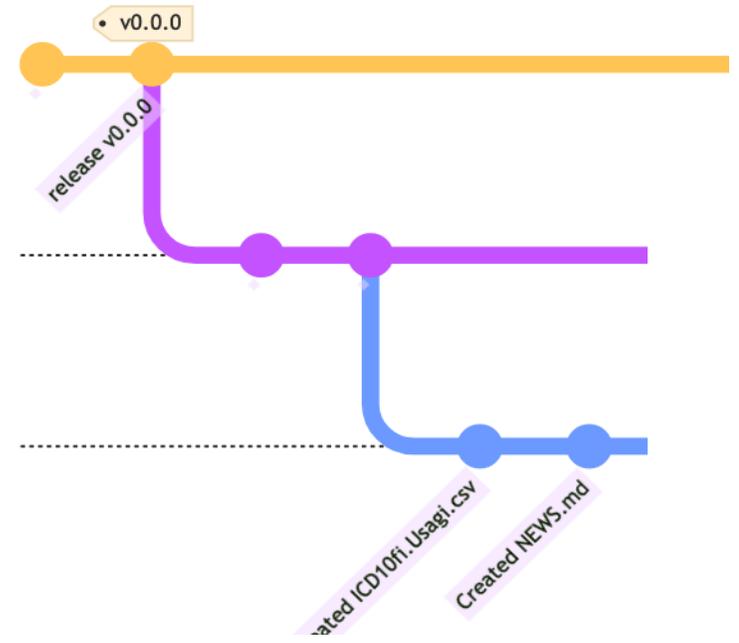


OMOP-vocabs (<2B)
FinOMOP-vocabs (>2B)

main

development

feature_add_ICD10fi_vocabulary



FinOMOP way



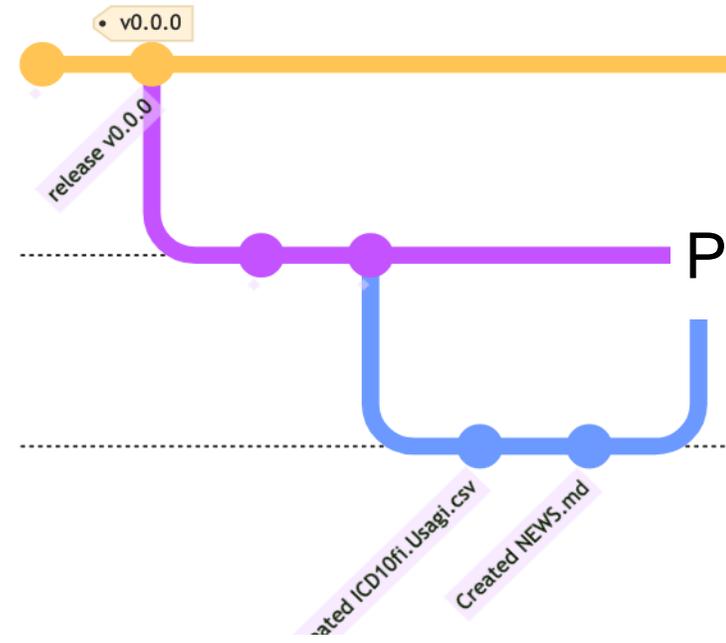
OMOP-vocabs (<2B)
FinOMOP-vocabs (>2B)



main

development

feature_add_ICD10fi_vocabulary



FinOMOP way

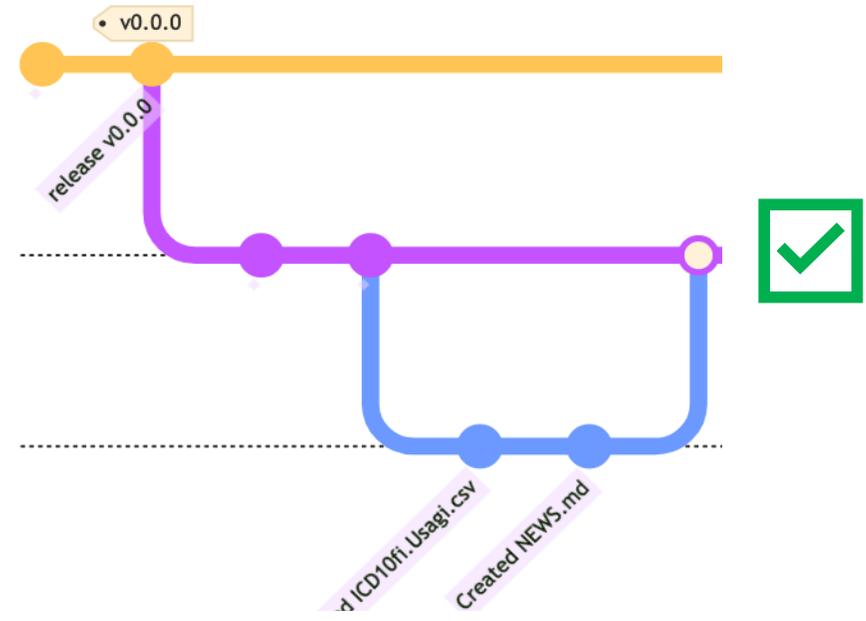


OMOP-vocabs (<2B)
FinOMOP-vocabs (>2B)

main

development

feature_add_ICD10fi_vocabulary



FinOMOP way



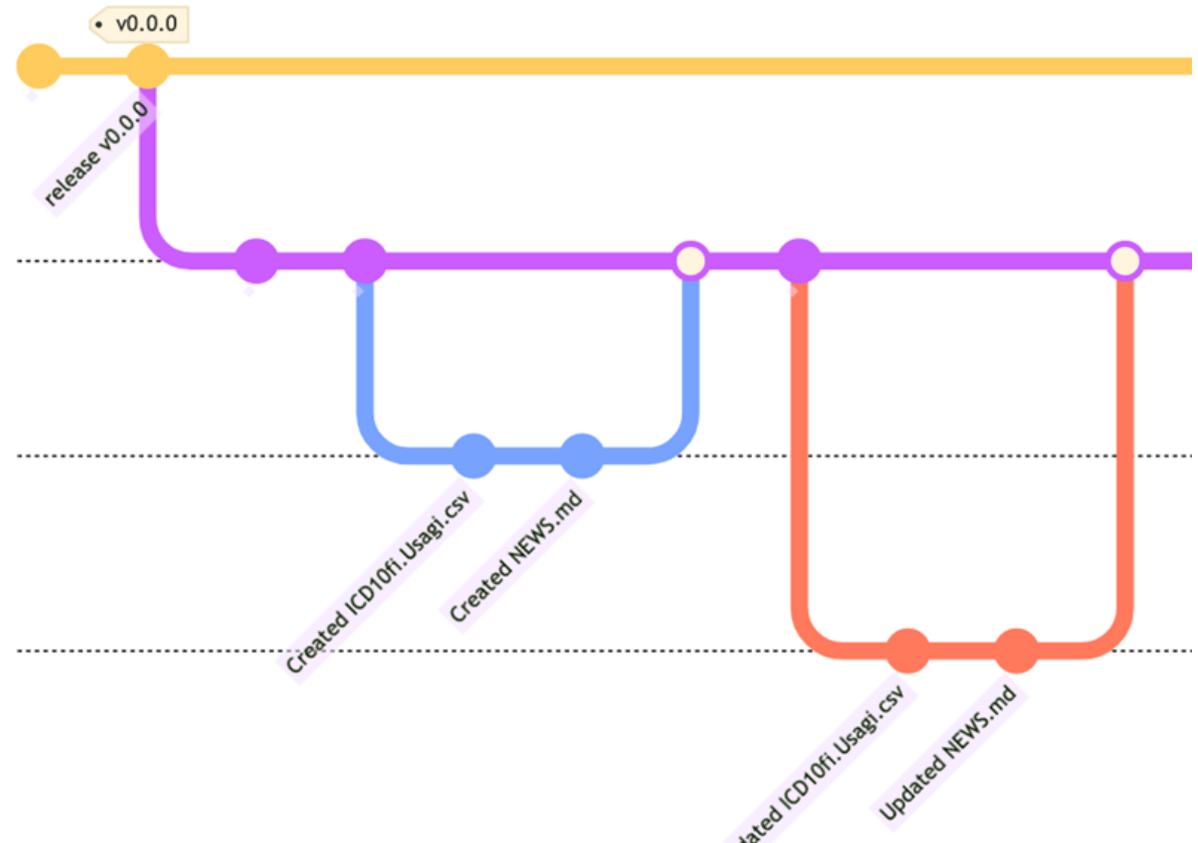
OMOP-vocabs (<2B)
FinOMOP-vocabs (>2B)

main

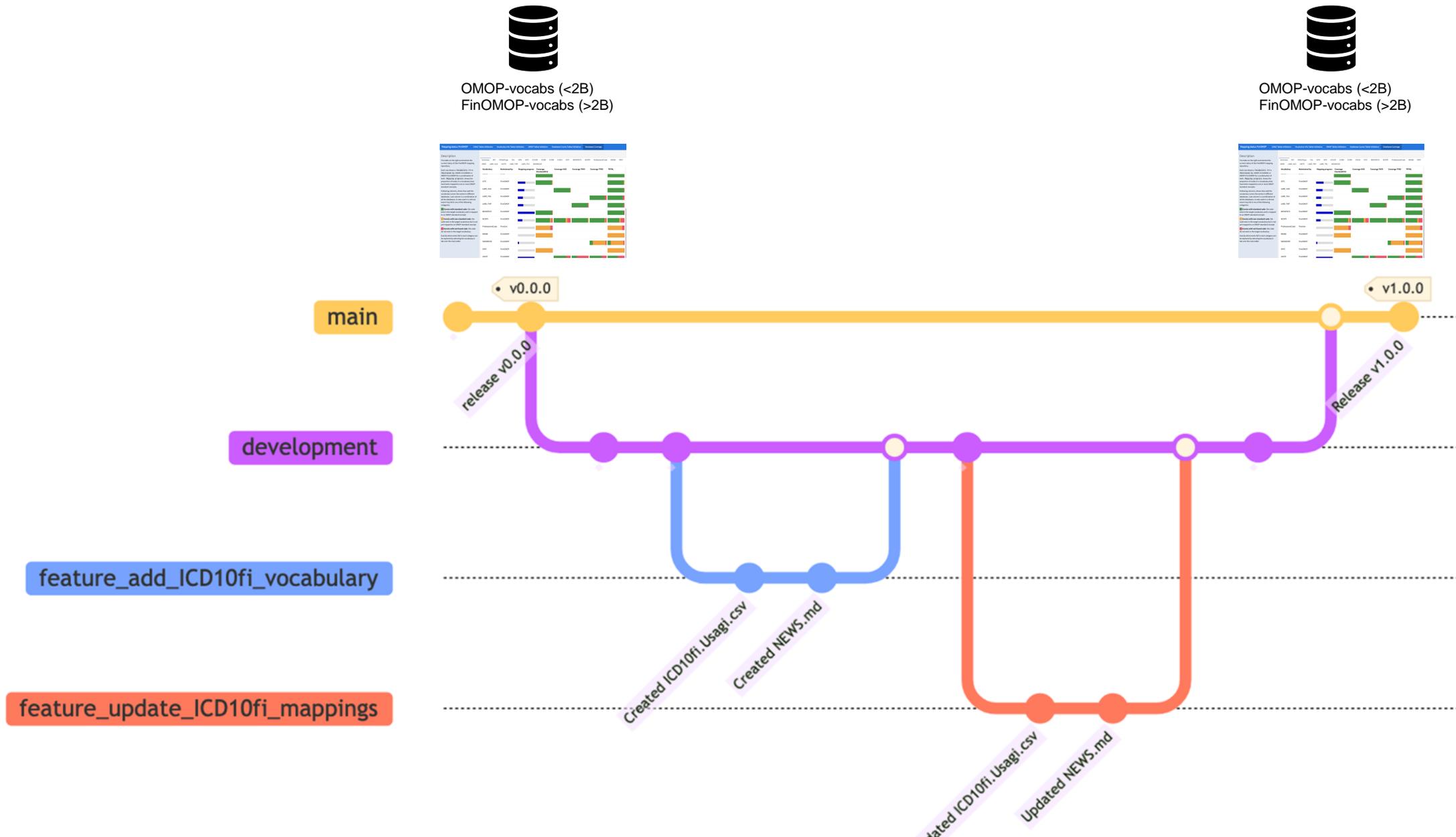
development

feature_add_ICD10fi_vocabulary

feature_update_ICD10fi_mappings



FinOMOP way





IMPLEMENTATION OF THE ARES APPLICATION
TO MONITOR NETWORK-WIDE DATA QUALITY
AND MAPPING COVERAGE FOR 16 UNIQUE
OMOP SOURCES ACROSS RWANDA

Speaker: Jared Houghtaling

Poster 16

Implementation of the ARES application to monitor network-wide data quality and mapping coverage for 16 unique OMOP sources across Rwanda

*Jared Houghtaling^a, Emma Gesquiere^a, Lars Halvorsen^a,
Marc Twagirumukiza^b, and Charles Ruranga^c*

^a edenceHealth NV (Kontich, Belgium)

^b University of Gent (Ghent, Belgium)

^c University of Rwanda (Kigali, Rwanda)

OHDSI Europe 2023 Symposium – Lightning Talk

3 July 2023

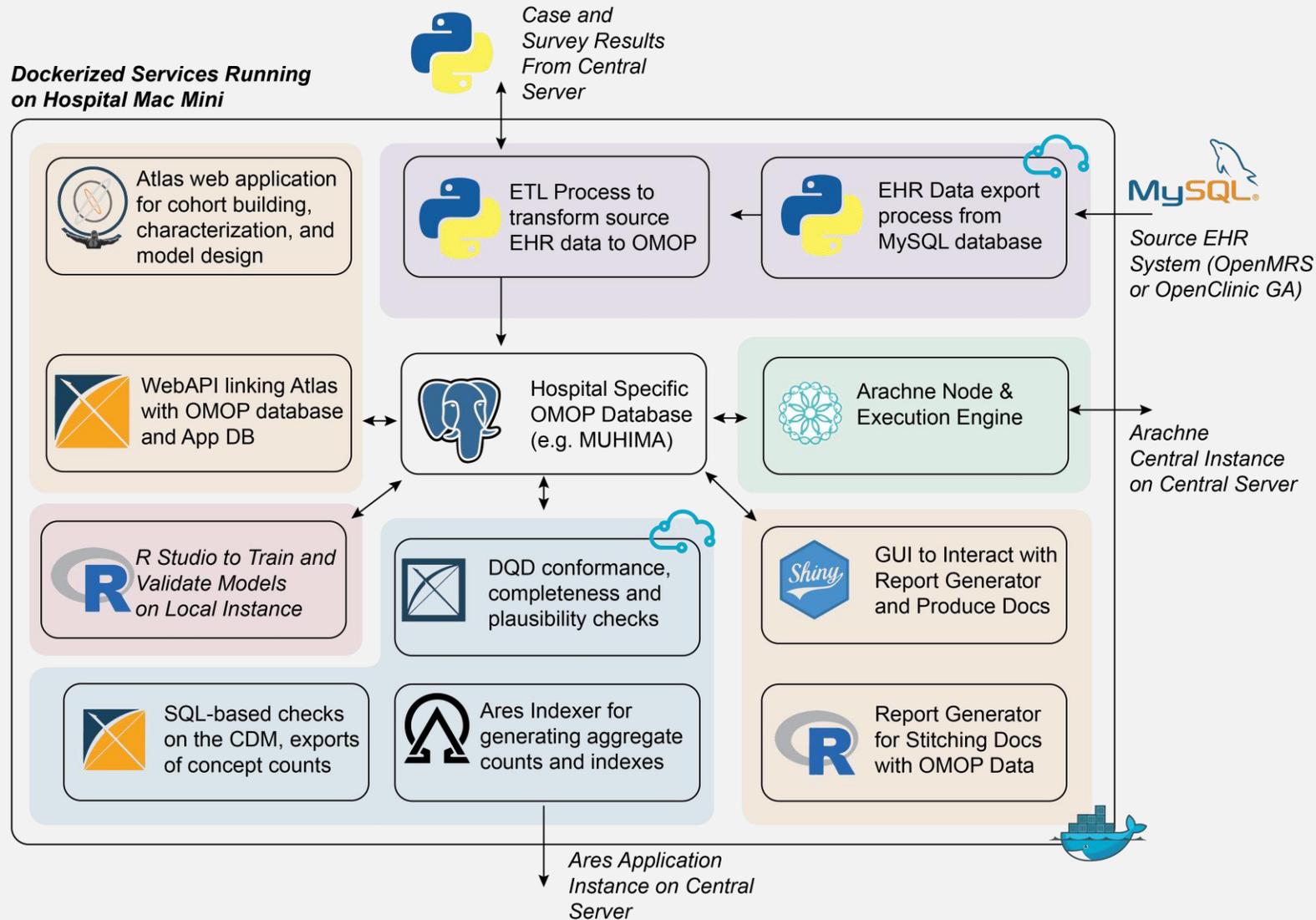


Background

- Project underway in 2021
- Collaboration between:
 - Univ. Ghent (BE)
 - Univ. Rwanda
 - Rwanda Biomed. Centre
 - Rwanda MOH
 - edenceHealth (BE)
- Initially aimed at tracking public health response to COVID, has since expanded

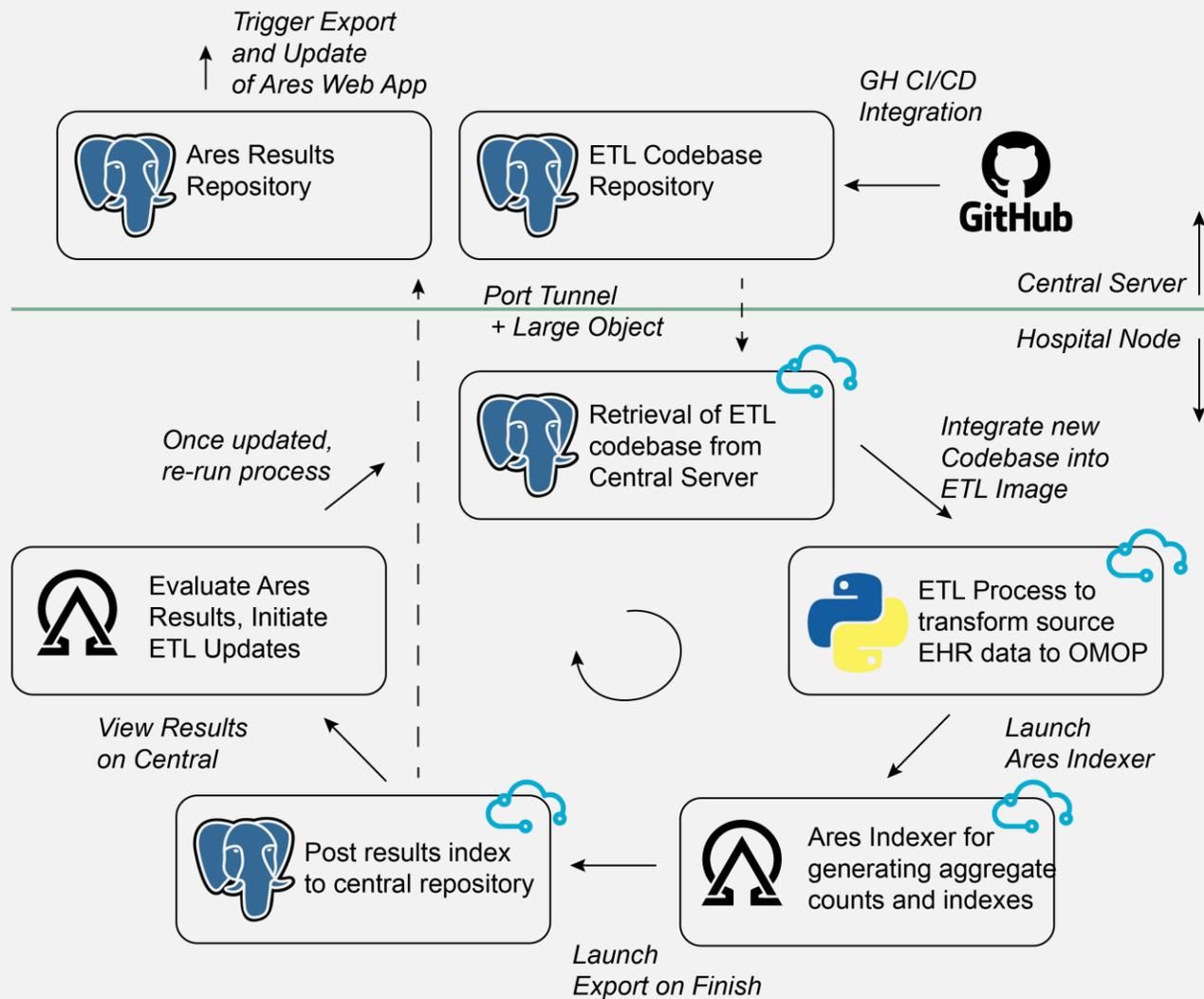


Node Installation



- 14 Sites with MacMini configured
- 2 additional national sources (COVID Survey + Case) to augment data sets
- Deployment via Docker
- Automation via SimpleMDM

QC Feedback Loop



- Unorthodox CI/CD structure addresses following constraints:
 - Poor network quality
 - < 50 kbps
 - Instability
 - Issues with GH at sites
 - Existing central server config
 - SimpleMDM Features
- Note that source EHR export process not yet fully automated

Results

Data Network Overview

Data Sources

14 

People

3.04M 

Data Quality Issues

353 

Data Source Releases

22 

Data Sources

Data Source	Person Count	Start Observed	End Observed	Latest Release	Data Quality Issues	Data Source Releases	Vocabulary Version	Average Update Frequency (days)
LAISDAR_CHUB	136,920	2019-07	2023-01	2023-02-13	21	1	v5.0 31-OCT-22	n/a
LAISDAR_CHUK	668,127	2005-02	2023-01	2023-03-24	44	1	v5.0 31-OCT-22	n/a
LAISDAR_GIHUNDWE	183,409	2010-07	2023-01	2023-05-12	29	2	v5.0 31-OCT-22	87
LAISDAR_GISENYI	198,000	2014-02	2022-07	2023-05-11	14	2	v5.0 31-OCT-22	72
LAISDAR_KIBAGABAGA	292,793	203-02	2022-12	2023-03-24	25	1	v5.0 31-OCT-22	n/a
LAISDAR_KIBUNGO	203,995	2019-09	2020-08	2023-02-21	34	1	v5.0 31-OCT-22	n/a
LAISDAR_KIGEME	91,145	2005-09	2023-02	2023-04-19	18	2	v5.0 31-OCT-22	50
LAISDAR_MUHIMA	235,157	2016-06	2023-01	2023-03-27	17	2	v5.0 31-OCT-22	3
LAISDAR_NTARAMA	220	2014-06	2018-01	2023-03-27	13	3	v5.0 31-OCT-22	28
LAISDAR_NYAGATARE	210,359	2013-12	2022-04	2023-06-07	23	2	v5.0 31-OCT-22	113
LAISDAR_NYAMATA	280,545		2023-01	2023-01-30	38	1	v5.0 31-OCT-22	n/a
LAISDAR_RUHENGERI	302,289	2014-04	2023-01	2023-04-19	28	2	v5.0 31-OCT-22	57
LAISDAR_RWAMAGANA	230,907	2012-11	2023-01	2023-02-14	39	1	v5.0 31-OCT-22	n/a
LAISDAR_SURVEY	10,975	2021-12	2022-02	2023-04-13	10	1	v5.0 31-OCT-22	n/a

Acknowledgements

- The many others who have contributed to this work:
 - **Ben Burke**
 - Lore Vermeylen
 - Frederic Jung
 - Ivo Mbi Kubam
 - Anne Li
 - IT/Data managers at all sites in Rwanda
 - Team at the Rwanda Biomedical Centre
 - Muhammed Semakula
 - Gilbert Rukundo
 - Viviane Akili
 - Laurence Twizeyimana
- Funding Agencies:
 - Canada's International Development Research Centre (IDRC)
 - Swedish International Development Cooperation Agency (Sida) under the Global South AI4COVID Program





MULTI-SITE COST-EFFECTIVENESS AND MARKOV CHAIN ANALYSIS OF HEART FAILURE

Speaker: Markus Haug

Poster 88



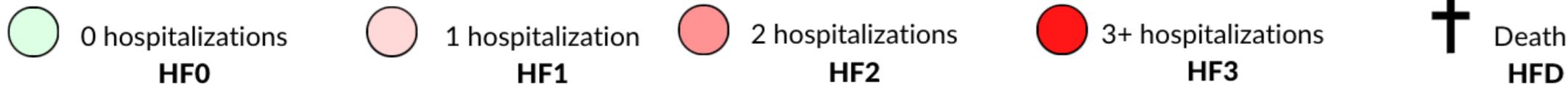
UNIVERSITY OF TARTU



Multi-site Cost-effectiveness and Markov Chain analysis of heart failure

Markus Haug MSc
University of Tartu

Cost-effectiveness analysis

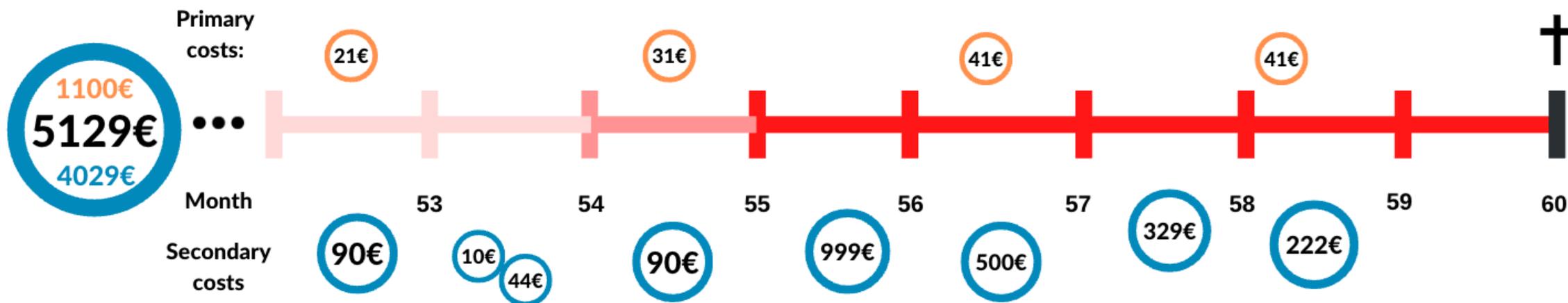


Total:

Alternative care
(Telemonitoring)



Traditional care



Components for analysis

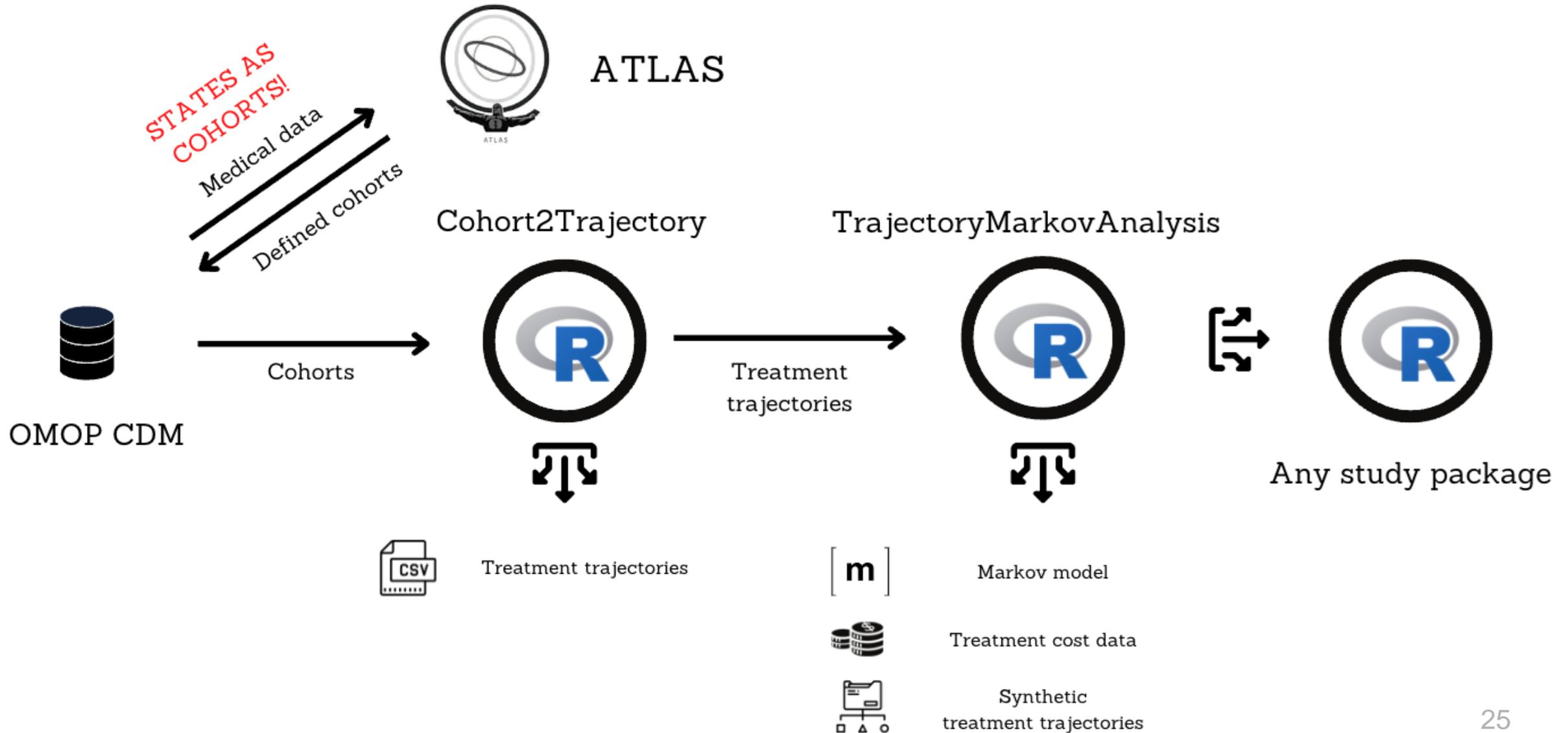
Markov Chain used for simulation

	HF0	HF1	HF2	HF3	HFD
HF0	0.95	0.03	0.00	0.00	0.02
HF1	0.02	0.88	0.03	0.01	0.06
HF2	0.01	0.02	0.86	0.05	0.06
HF3	0.00	0.01	0.01	0.91	0.07
HFD	0.00	0.00	0.00	0.00	1.00

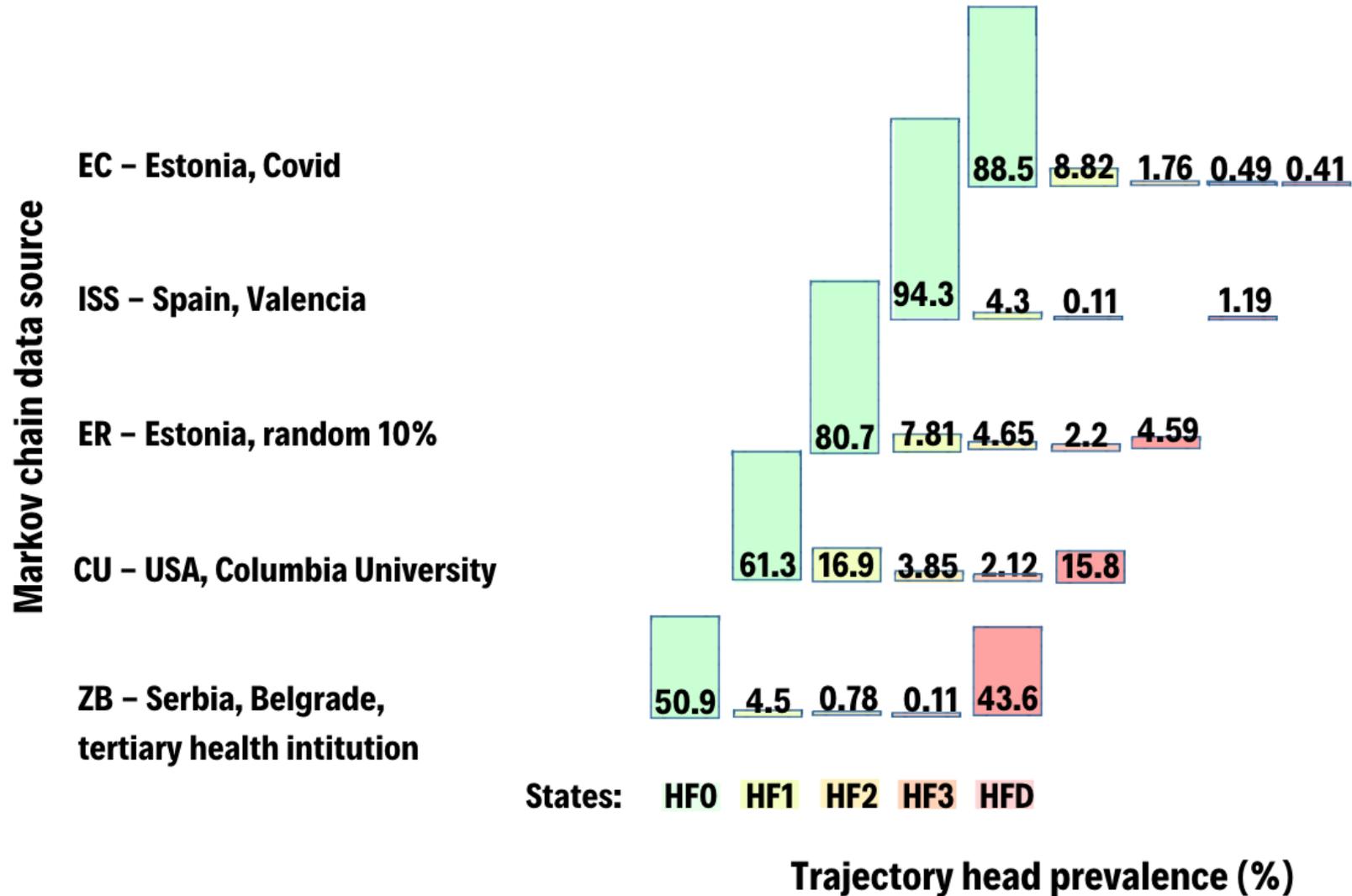
State costs and initial distribution

STATE	INITIAL DIST.	COST
HF0	88%	275 €
HF1	4%	458 €
HF2	4%	282 €
HF3	2%	294 €
HFD	2%	0 €

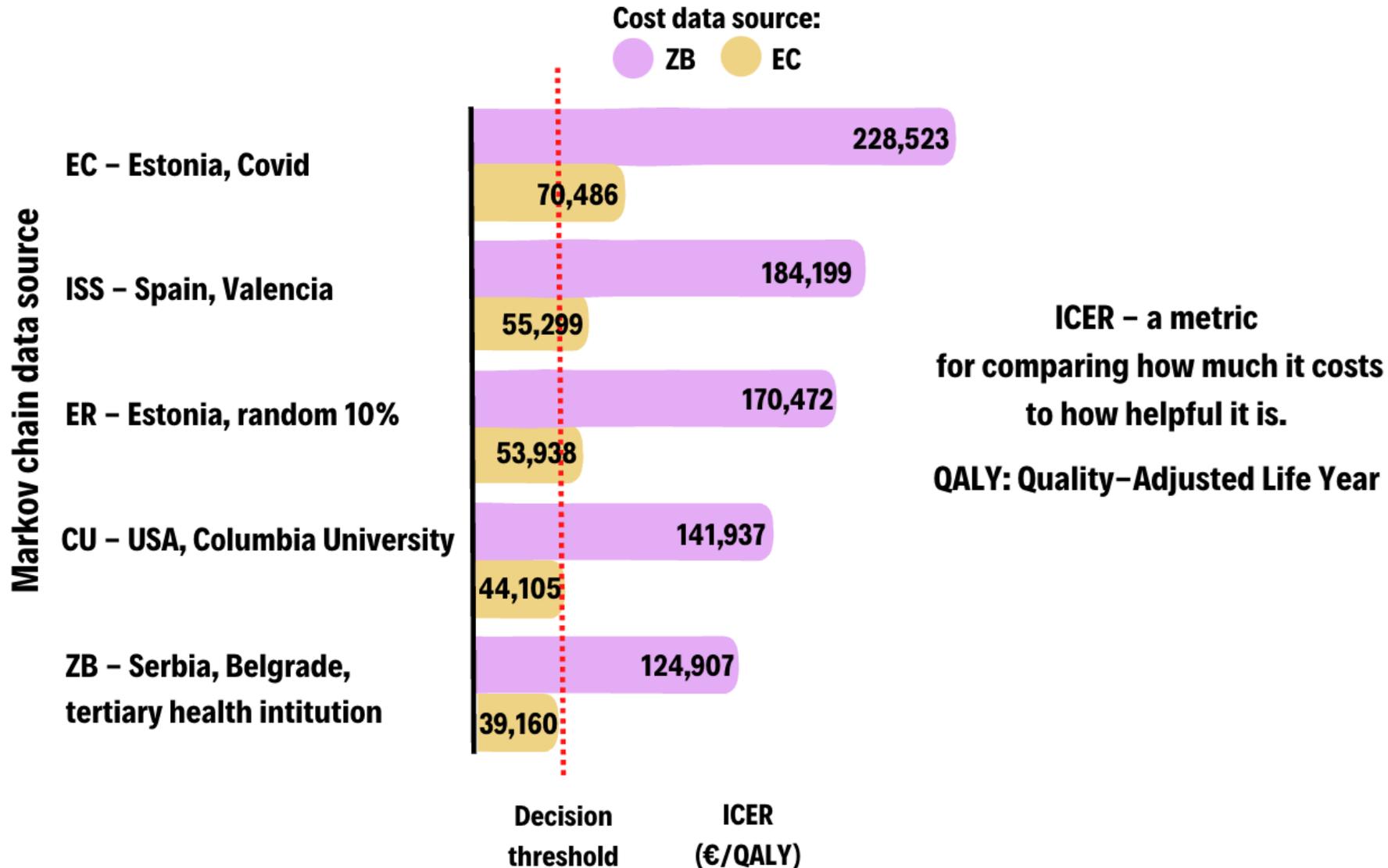
Proposed workflow



Initial state distributions in data sources



Effect of cost data source



Acknowledgements

- Team:



- Data partners: **Antonio Fernandez** (IIS INCLIVA, Spain, Valencia),
Thomas Falconer (The Columbia University Irving Medical Center, USA),
Ana Danilović, Filip Maljkovic (CHC Zvezdara, Belgrade, Serbia)

JOIN THE STUDY!



DEEP LEARNING COMPARISON

Speaker: Henrik John

Poster 87



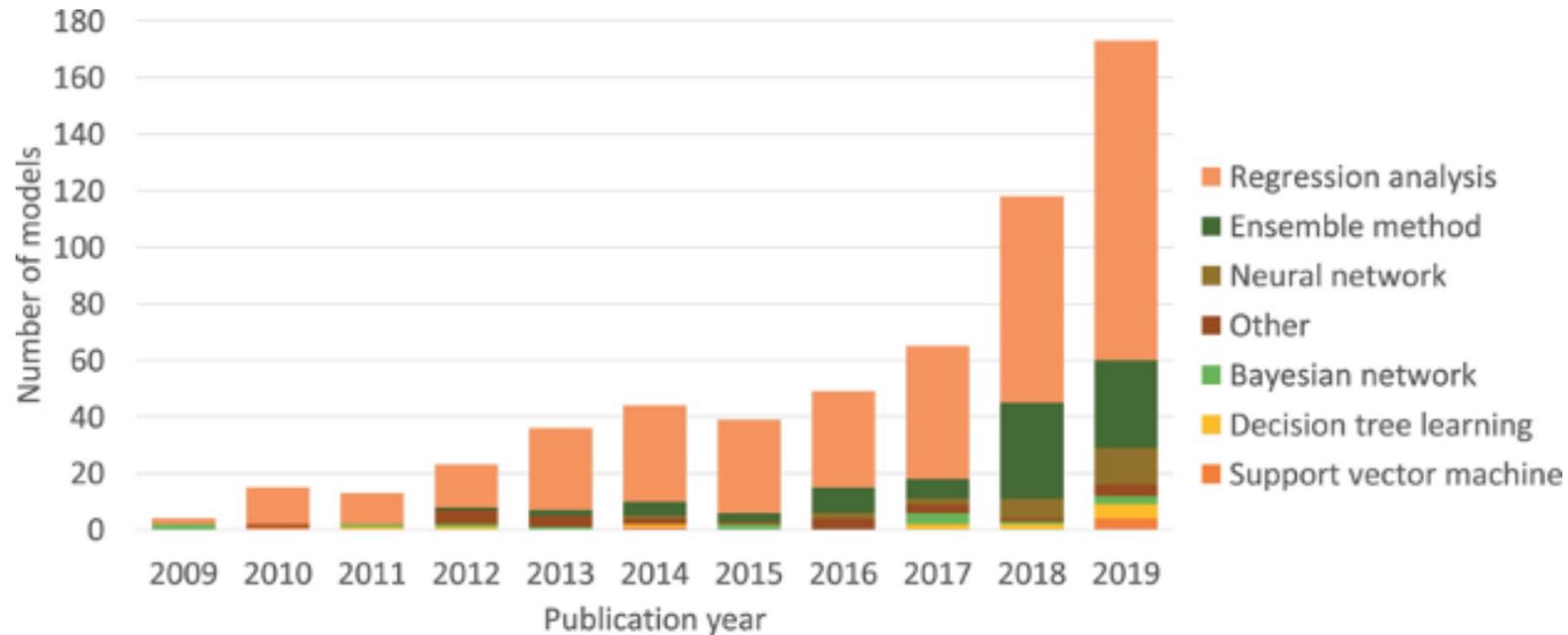
Deep Learning Comparison

An OHDSI Network Study

LH John, C Kim, JM Reps, EA Fridgeirsson



Background



Observational healthcare data limit efficacy of deep learning:

- highly sparse
- high-dimensional
- heterogenous

Yang 2022 - Figure 1 - J Am Med Inform Assoc, Volume 29, Issue 5, May 2022, Pages 983–989, <https://doi.org/10.1093/jamia/ocac002>



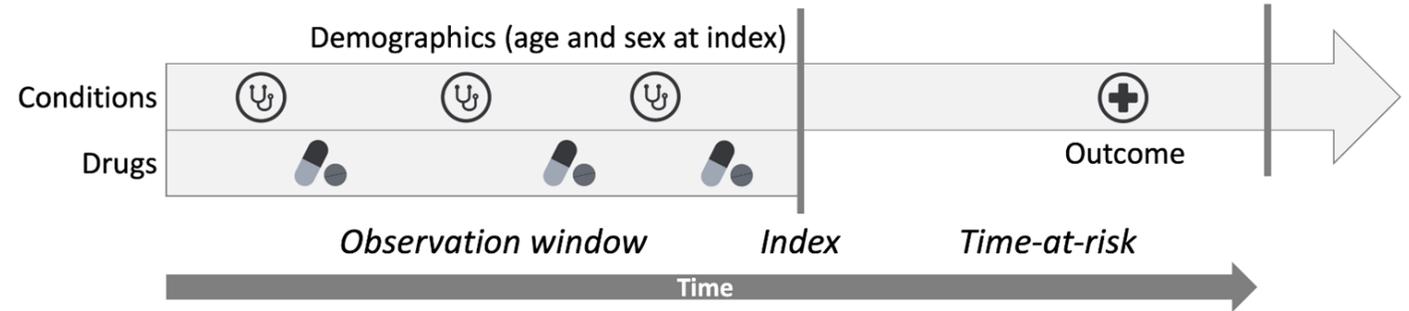
Study design

Aims

- Assess the added value of massive observational healthcare data for the development of deep learning models

Prediction methods

- Logistic regression L1
- Gradient Boosting
- ResNet (Gorishniy, 2021)
- FT-Transformer (Gorishniy, 2021)



Prediction problems

- Dementia in persons aged 55 and above
- Lung cancer in persons aged 45 and above
- Bipolar in persons diagnosed with major depressive disorder

Confirmed databases

- Optum SES
- Optum EHR
- IPCI
- AUSOM



Results

Cohort	Database	Method	AUROC
Dementia	IPCI	Logistic Regression	83.28
		Gradient Boosting	82.86
		ResNet	82.83
		Transformer	82.36
	AUSOM	Logistic Regression	71.04
		Gradient Boosting	70.84
		ResNet	67.26
		Transformer	TBD

Cohort	Database	Method	AUROC
Lung cancer	IPCI	Logistic Regression	71.04
		Gradient Boosting	70.84
		ResNet	67.3
		Transformer	69.99
	AUSOM	Logistic Regression	74.31
		Gradient Boosting	TBD
		ResNet	68.08
		Transformer	TBD



Join The Network Study!

Help us assess the added value of observational data for the development of deep learning models.

Head over to <https://github.com/ohdsi-studies/DeepLearningComparison> or use the QR code.





THE ASSOCIATION OF SHORT-, MEDIUM
AND LONG-TERM CARDIOVASCULAR
SEQUELAE WITH COVID-19 INFECTION: A
MULTINATIONAL PILOT STUDY

Speaker: Ian Wong

Poster 73



D²4H

Laboratory of Data
Discovery for Health

醫衛大數據深析實驗室 ®



HKU
Med

LKS Faculty of Medicine
The University of Hong Kong
香港大學李嘉誠醫學院

The association of short-, medium and long-term cardiovascular sequelae with COVID-19 infection: a multinational pilot study

Ian Chi Kei Wong, BSc (Hons) Pharmacy, MSc, PhD

Lo Shiu Kwan Kan Po Ling Professor in Pharmacy

Head, Department of Pharmacology and Pharmacy, LKS Faculty of Medicine, The University of Hong Kong

Lead Scientist, The Laboratory of Data Discovery for Health (D²4H)

wongick@hku.hk



Background

- COVID-19 infection is associated with a range of cardiovascular (CV) sequelae and associated mortality.^{1,2}
- The risk of CV sequelae remained unclear owing to the large variability in risk estimates from existing studies which differs in study design, population and selection of controls.³
- This study aimed to evaluate the risk of short-, medium-, and long-term CV sequelae following COVID-19 using multi-national healthcare data





Methods



Study design

- Retrospective cohort study
- Propensity score matching



Study population

- Individuals with COVID-19 between December 1st 2019-20 and non-COVID-19 controls



Study outcome

- Incident of nine cardiovascular sequelae



Follow-up

- **Short-** (Up to 6 months),
- **Medium-** (6 months to 1 year),
- **Long-term** (1 to 3 years)



Data source

- Multi-national healthcare databases
- We are calling for your collaborations!



Preliminary findings

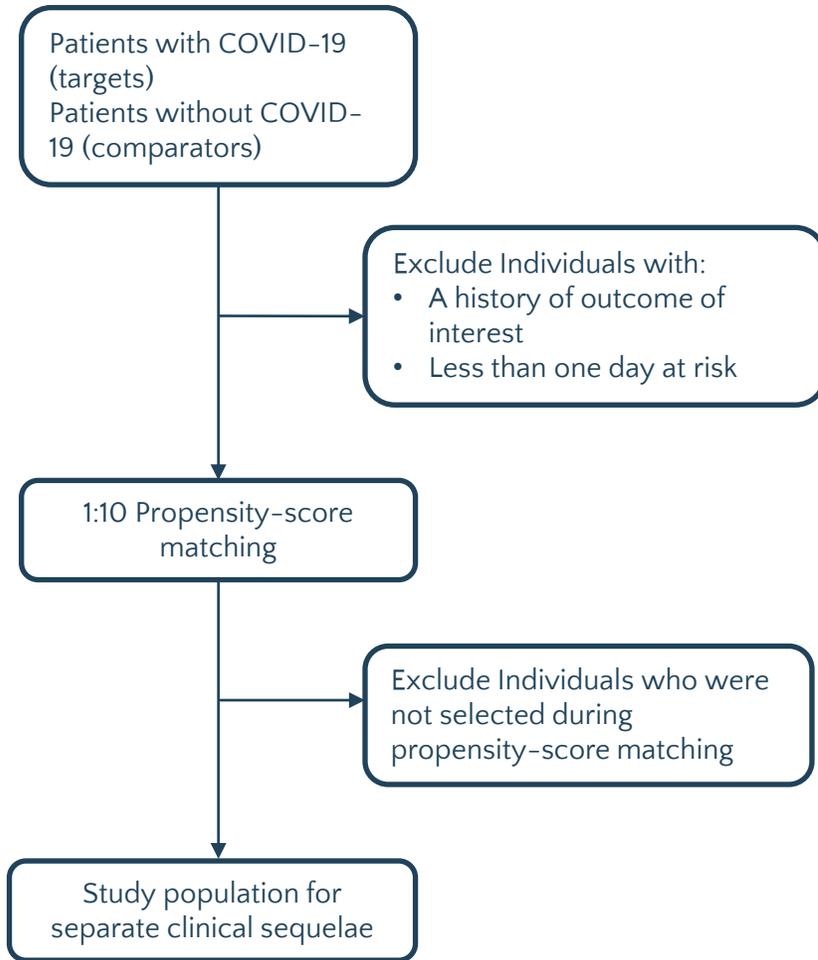


Figure 1. Flow diagram on the selection of study population

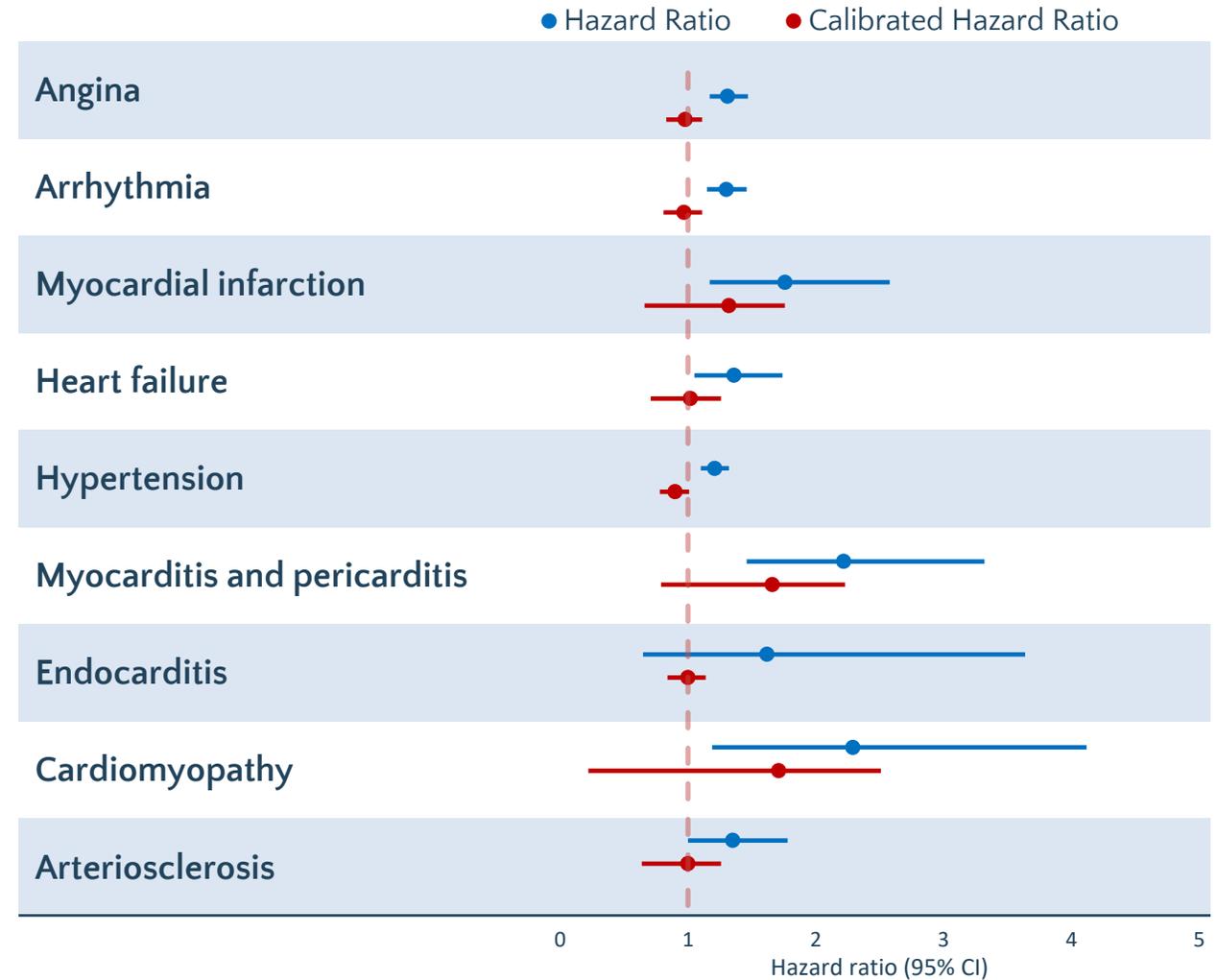


Figure 2. Hazard ratio and calibrated hazard ratio of cardiovascular sequelae between December 1st, 2019–2022 in Italy LPD IQVIA database



Future plans

1. Further analyses to evaluate the short, medium and long-term risk of cardiovascular sequelae
2. Perform study package in databases mapped to OMOP CDM

Database	Electronic health records
US Open-claim IQVIA	Pre-adjudicated health insurance claims collected from general practitioners and specialists
Germany DA IQVIA ^a , France LPD IQVIA ^b	Proprietary practice management software used by general practitioners and selected specialists
Italy LPD IQVIA ^b , UK IMRD IQVIA ^c	Patient records from general practitioners
Korea HIRA	Health Insurance Review & Assessment Service

^a DA = Disease Analyser, ^b LPD = Longitudinal Patient Database, ^c IMRD = IQVIA Medical Research Data



SUPPORTING PHARMACOVIGILANCE SIGNAL
VALIDATION AND PRIORITIZATION WITH
ANALYSES OF ROUTINELY COLLECTED HEALTH
DATA – LESSONS LEARNED FROM AN EHDEN
NETWORK STUDY

Speaker: Judith Brand

Poster 56

Supporting pharmacovigilance signal validation and prioritisation with analyses of routinely collected health data

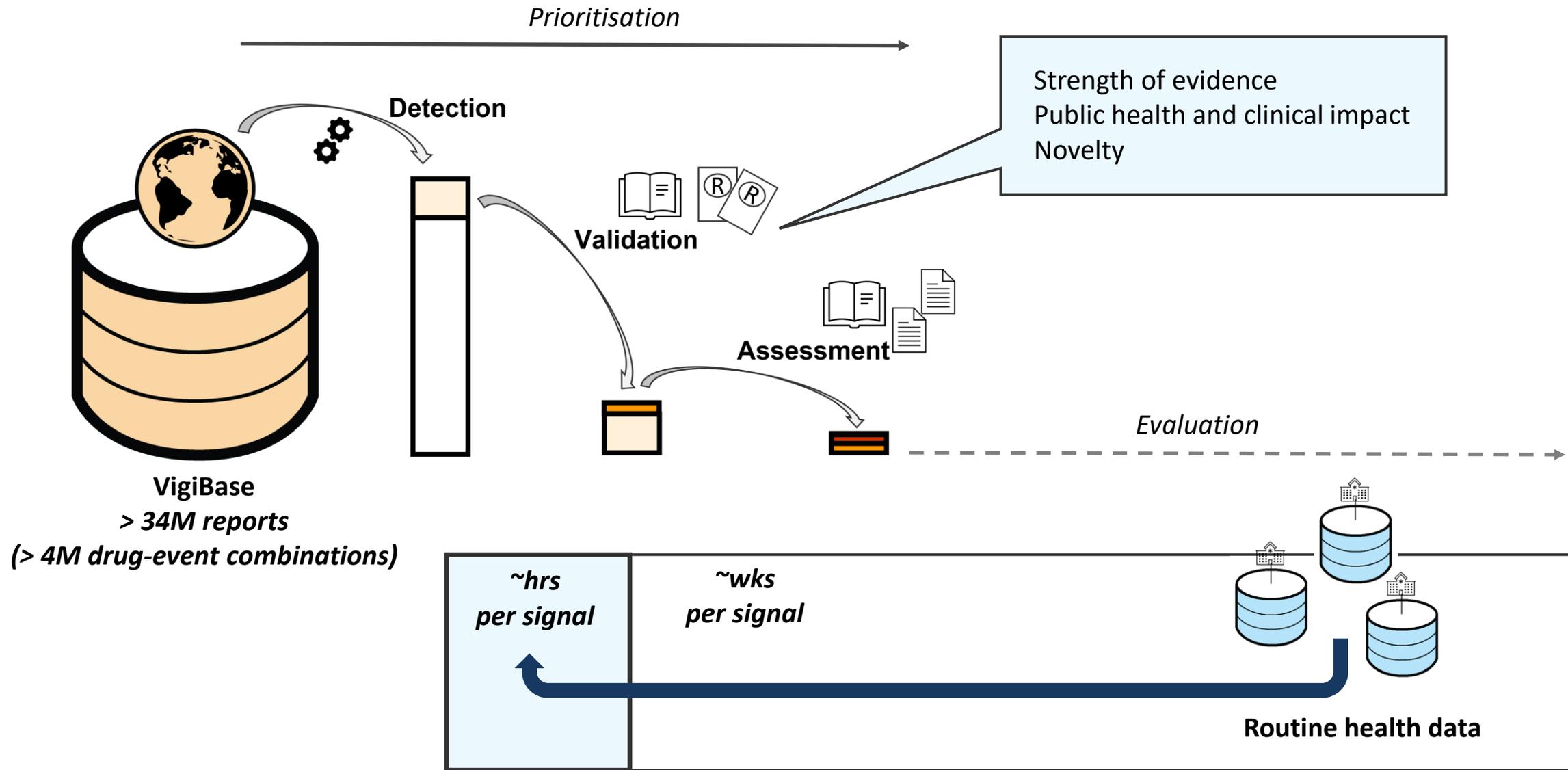
lessons learned from an EH DEN network study

Judith Brand



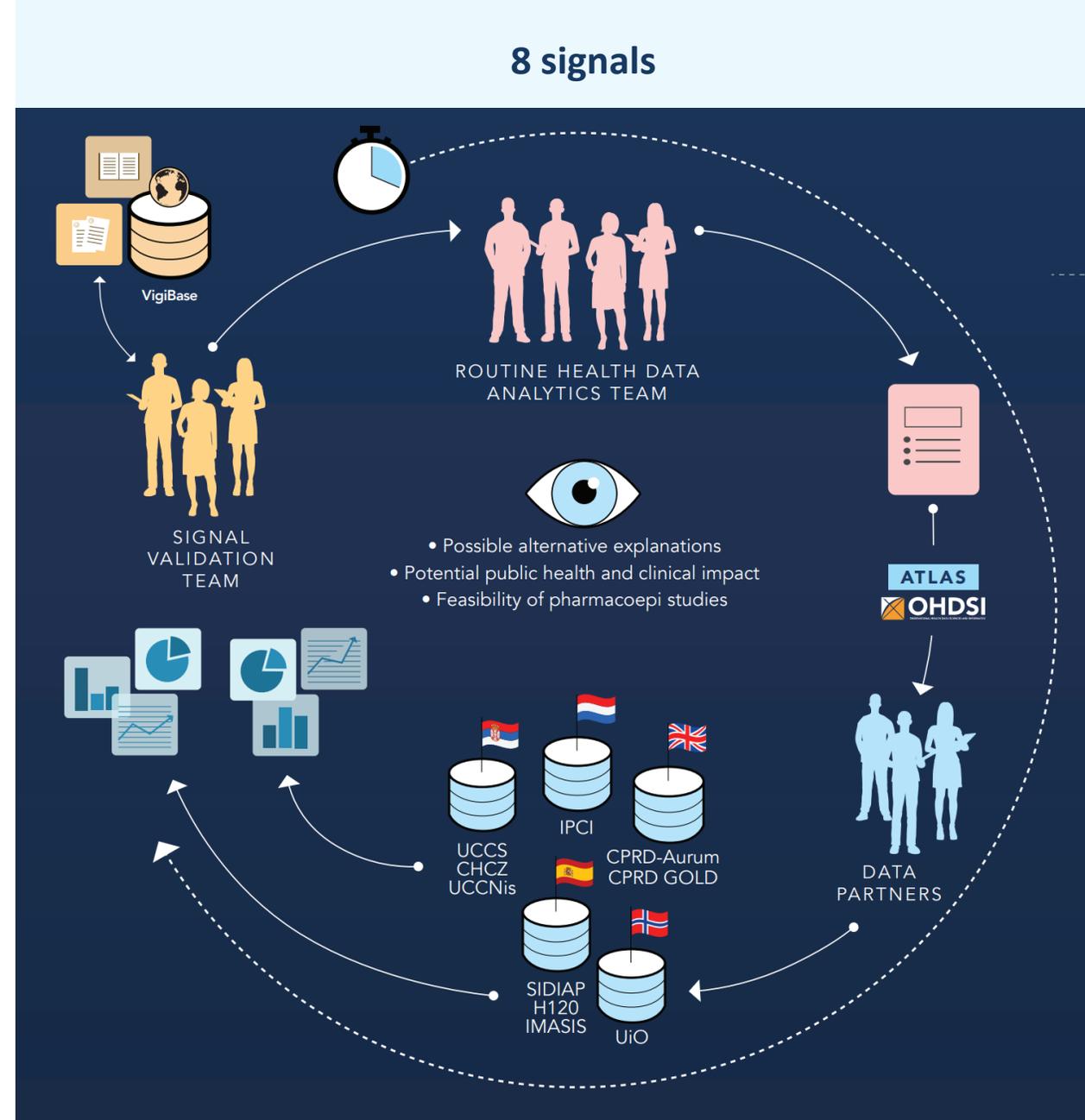
Pharmacovigilance study-a-thon
Uppsala, 5-9 September 2022

How do we identify signals?

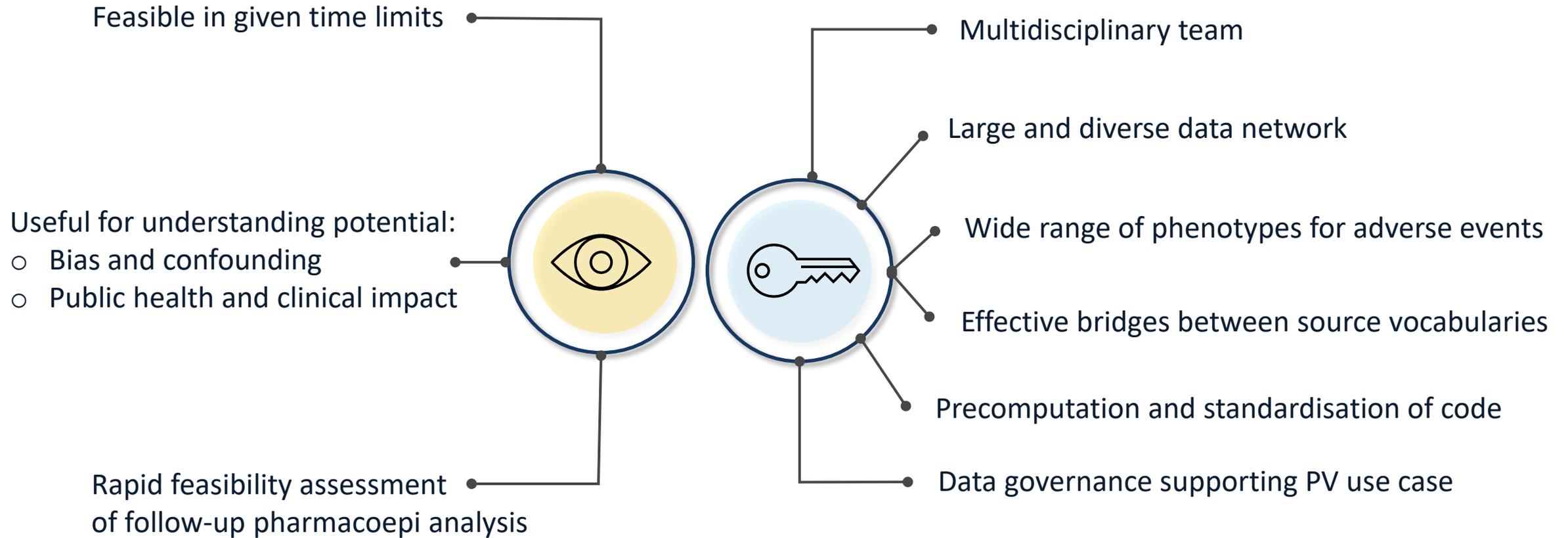


What we did...

- Routine signal validation and prioritisation of statistical signals involving:
 - 200 generic drugs
 - 16 adverse event phenotypes
- On request, characterization analyses with 10 EHDEN data partners to contextualise:
 - Drug
 - Indication(s)
 - Adverse event



What we learned...





PATTERN OF LONG COVID SYMPTOMS AND
CONDITIONS: CLUSTERING ANALYSIS BASED
ON LARGE MULTINATIONAL COHORTS AS
PART OF AN EHDEN STUDY-A-THON

Speaker: Marti Catala Sabate

Poster 77

Kim López-Güell, Martí Català, Daniel Dedman, Talita Duarte-Salles, Raivo Kolde, Raúl López-Blasco, Álvaro Martínez, Lourdes Mateu, Gregoire Mercier, Alicia Abellan, Johnmary T. Arinze, Theresa Burkard, Edward Burn, Zara Cuccu, Dominique Delseny, Chungsoo Kim, Ji-woo Kim, Kristin Kostka, Francesco Lapi, Cora Loste, Ettore Marconi, Miguel A. Mayer, Jaime Meléndez-Cardiel, Núria Mercadé-Besora, Mees Mosseveld, Jessie O Oyinlola, Roger Paredes, Juan Manuel Ramírez-Anguita, Anneli Uusküla, Bernardo Valdivieso, Junqing Xie, Annika M Jödicke, Daniel Prieto-Alhambra



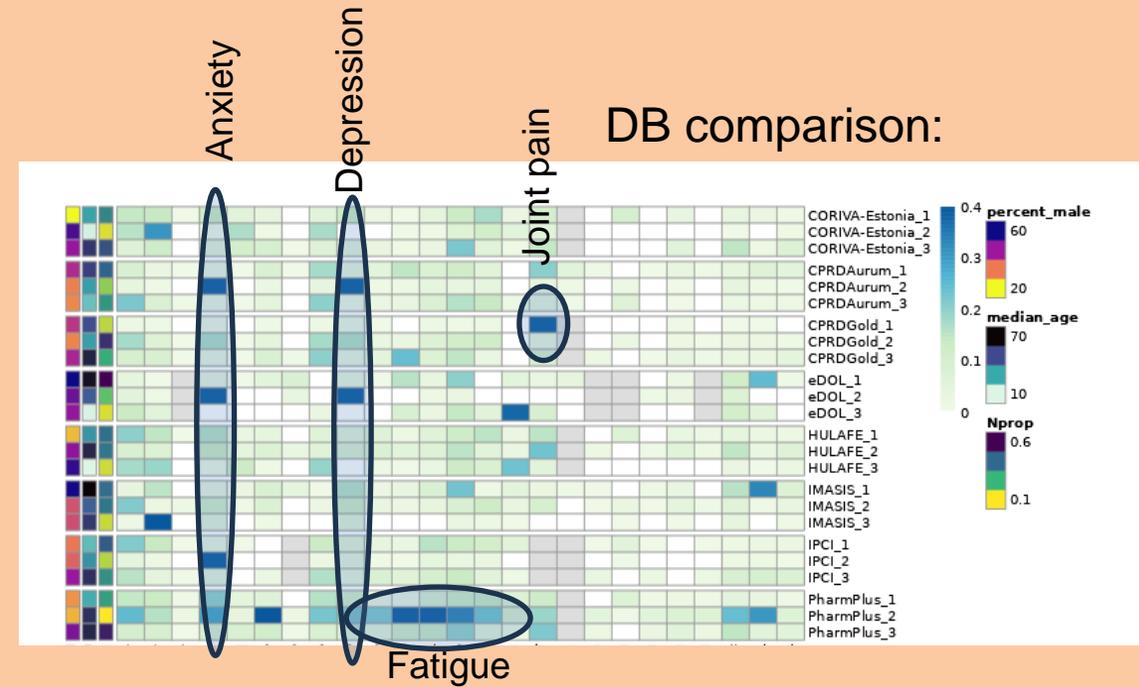
EHDEN

EUROPEAN HEALTH DATA & EVIDENCE NETWORK

RESULTS FOR OBJECTIVE 3

Latent Class Analysis: 4 subgroups, 1+ symptoms

CPRD GOLD:

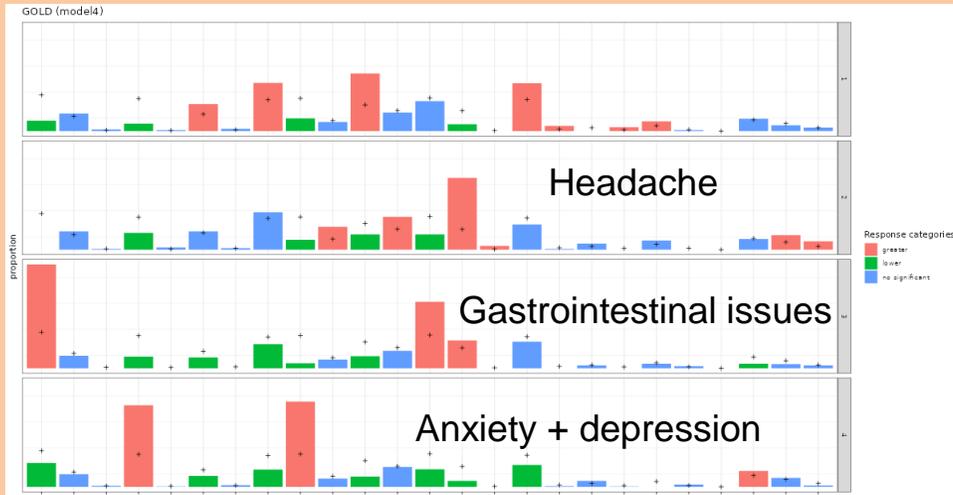


- (i) Mostly defined by one predominant symptom, which could also be common in the whole population
- (ii) A lot of heterogeneity in general across databases and healthcare settings

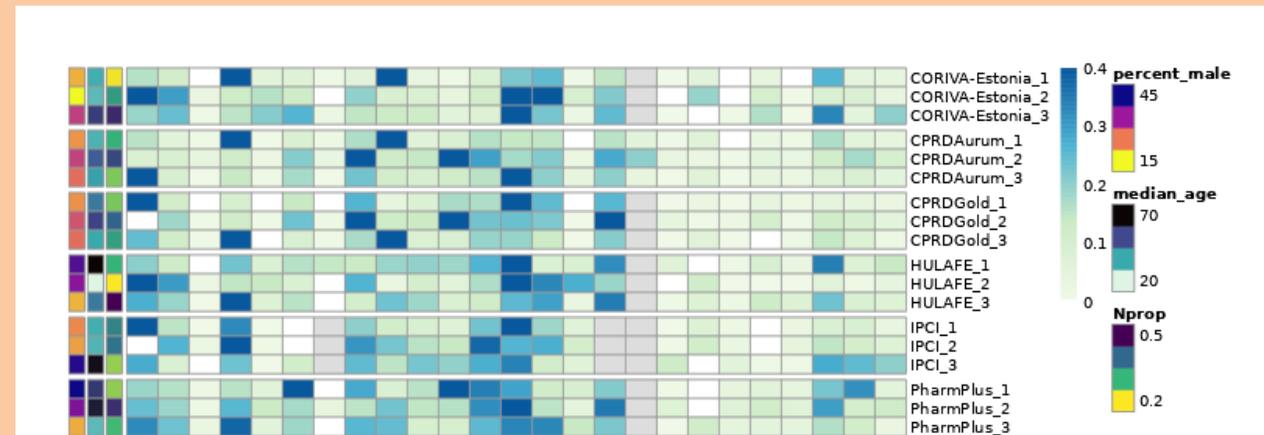
RESULTS FOR OBJECTIVE 3

Latent Class Analysis: 4 subgroups, 3+ symptoms

CPRD GOLD:



DB comparison:



- (i) More combinations of multiple predominant symptoms, potentially clinically more relevant
- (ii) Some clusters repeated across databases (for 2+, 3+ symptoms): anxiety-depression, dyspnea-cough, gastrointestinal-abdominal pain...
- (iii) A lot of heterogeneity in general across databases and healthcare settings





EVALUATION OF TREATMENT EFFECT
HETEROGENEITY IN THE LEGEND-
HYPERTENSION STUDY

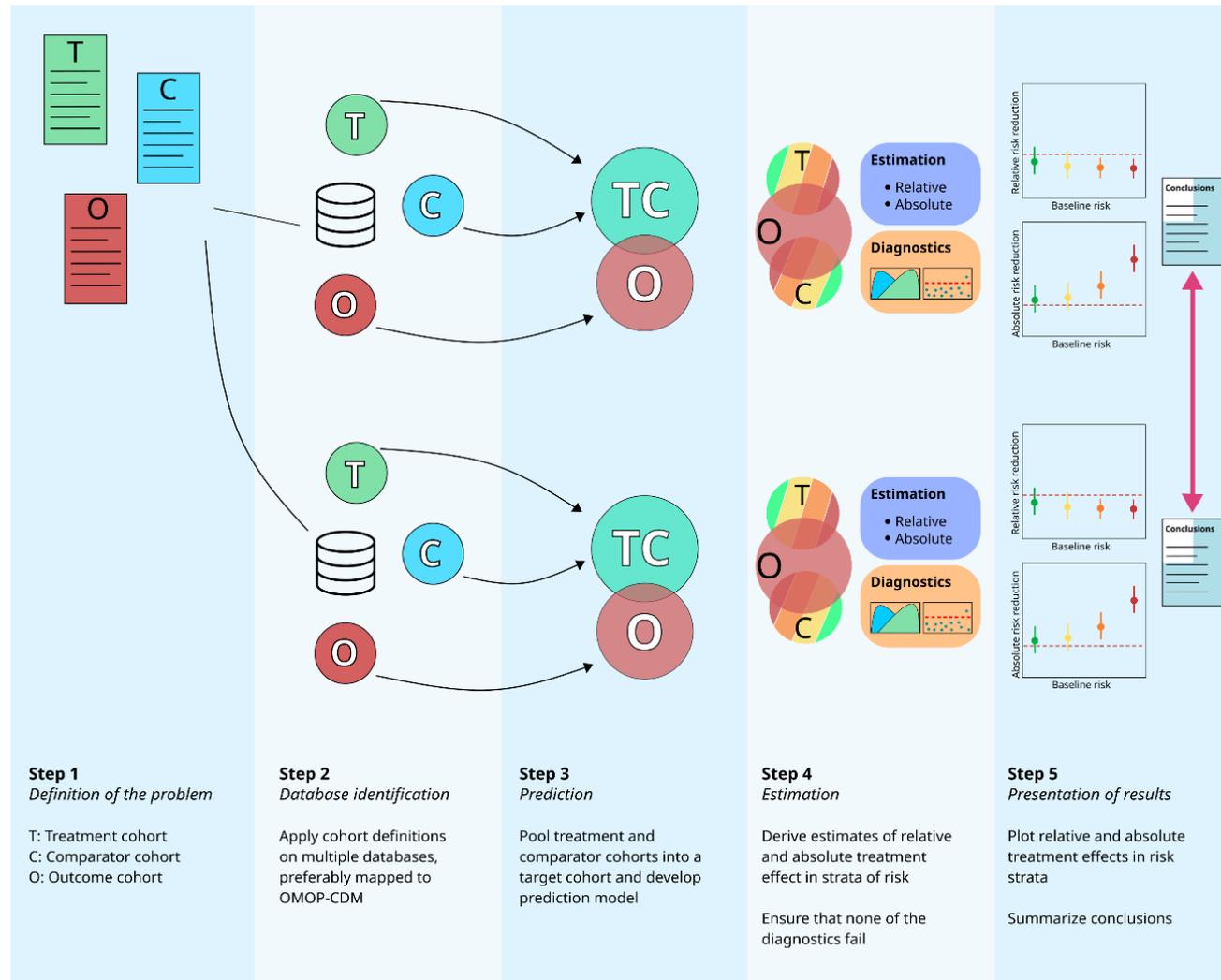
Speaker: Alexandros Rekkas

Poster 52

Evaluation of treatment effect heterogeneity in the LEGEND-Hypertension study

Alexandros Rekkas, Jenna M. Reps, Peter R. Rijnbeek, David van Klaveren

Background



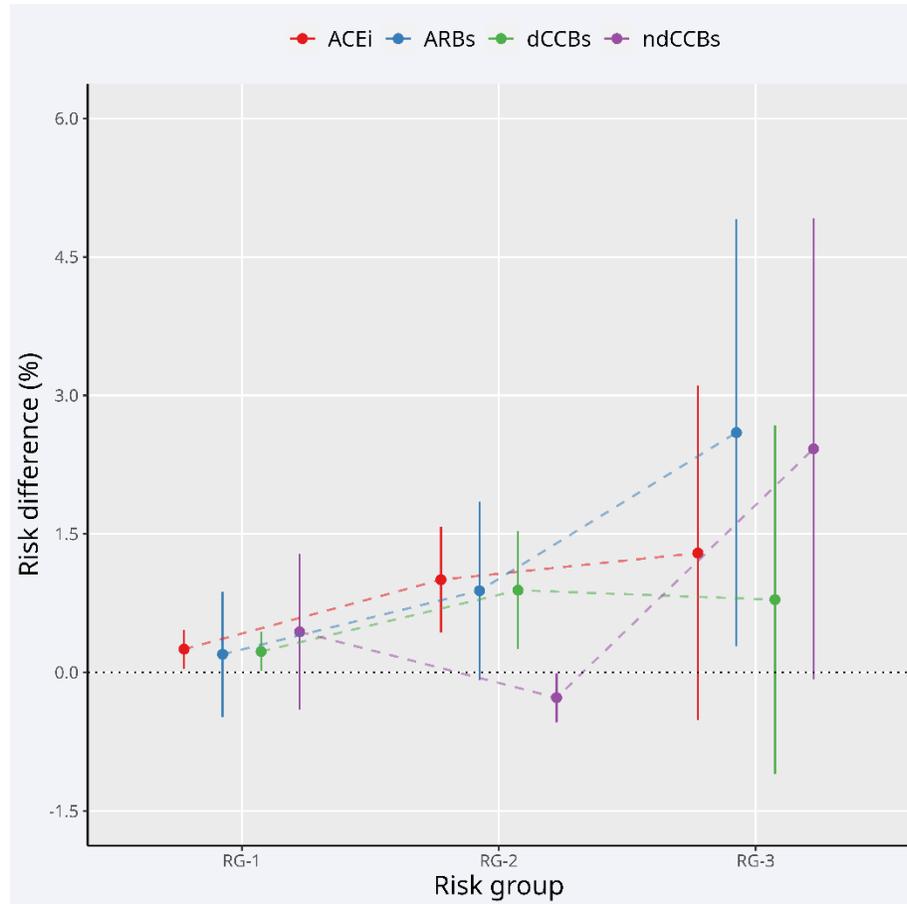
Rekkas, A., van Klaveren, D., Ryan, P.B. et al. A standardized framework for risk-based assessment of treatment effect heterogeneity in observational healthcare databases. *npj Digit. Med.* **6**, 58 (2023)

Methods

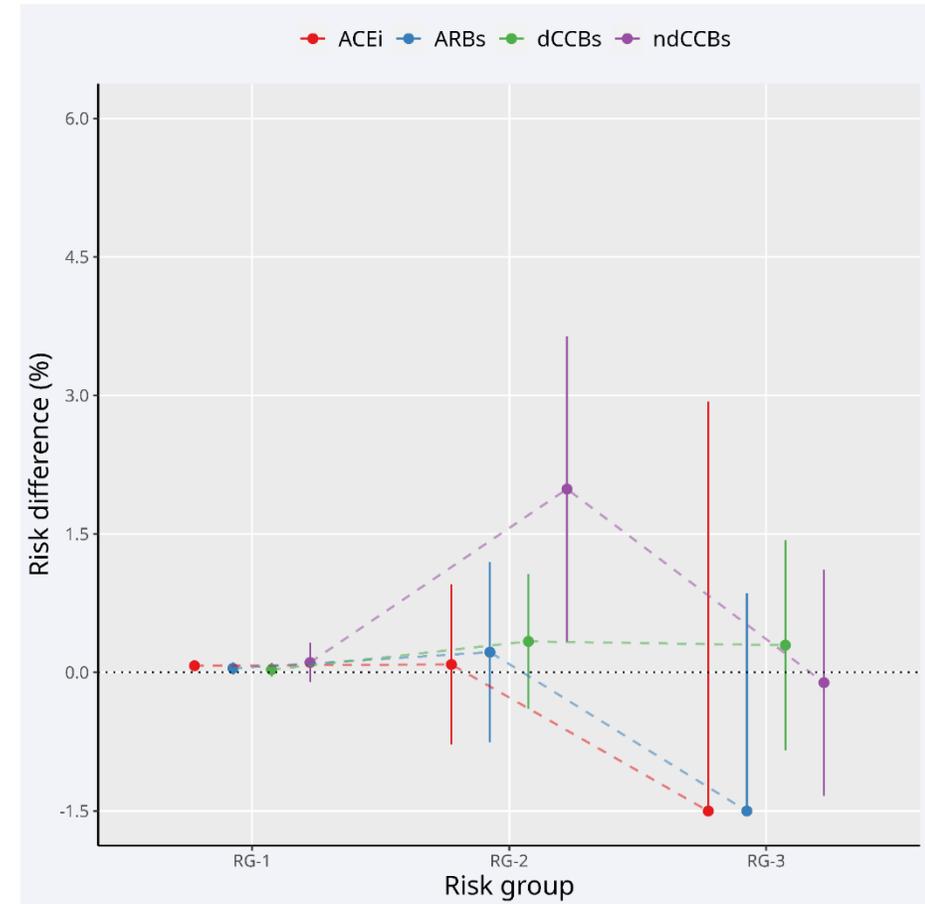
Database	ACEi	ARBs	dCCBs	ndCCBs	THZ
MDCD	116,531	20,383	83,130	6,524	58,712
CCAE	954,658	324,355	328,563	37,688	363,249

- Stratification on acute MI risk (below 1%, between 1% and 1.5%, above 1.5%)
- Evaluation of preference score distributions, covariate balance, and negative control outcomes
- Estimation of relative treatment effects within risk strata using Cox proportional hazards regression
- Estimation of absolute risk differences within risk strata from the differences between the Kaplan-Meier curves on day 730 from treatment initiation

Results



Risk differences of acute MI within risk groups of acute MI in MDCD



Risk differences of acute MI within risk groups of acute MI in CCAE

More results

Results can be explored here:

https://arekkas.shinyapps.io/legend_htn_hte





CHARACTERISTICS AND OUTCOMES OF OVER
A MILLION INFLAMMATORY BOWEL DISEASE
SUBJECTS IN SEVEN COUNTRIES: A
MULTINATIONAL COHORT STUDY

Speaker: Chen Yanover

Poster 69

Characteristics and Outcomes of >1M Inflammatory Bowel Disease Patients

Chen Yanover, KI Research Institute, Israel

- **KI Research Institute:** Tal El-Hay, Maytal Bivas-Benita, Pinchas Akiva
- **Janssen R&D, LLC:** Erica A Voss, Joel Swerdel, Anna Sheahan, Nathan Hall
- **Columbia University:** Jimyung Park, Thomas Falconer
- **Ajou University:** Rae Woong Park, Kwang Jae Lee, Sung Jae Shin
- **Kandong Sacred Heart Hospital:** Seung In Seo, Kyung-Joo Lee
- **Johns Hopkins:** Leonard Haas, Paul Nagy, Mary Bowring, Michael Cook, Steven Miller
- **Rambam Medical Center:** Ramit Magen-Rimon, Yehuda Chowers, Roni Weisshof



Background, Goal

- Crohn's disease (CD) and ulcerative colitis (UC) are chronic inflammatory bowel diseases (IBD) with consistently increasing incidence rates. These conditions significantly impact the quality of life of patients and families
- ⇒ Characterize IBD, CD, UC disease trajectory
- Risk factors, symptoms, associated comorbidities, treatment pathways, outcomes

Methods

- Study design: A multinational cohort study using routinely collected healthcare data from 16 OMOPed DBs
 - USA, France, Germany, the UK, Korea, Japan, Australia

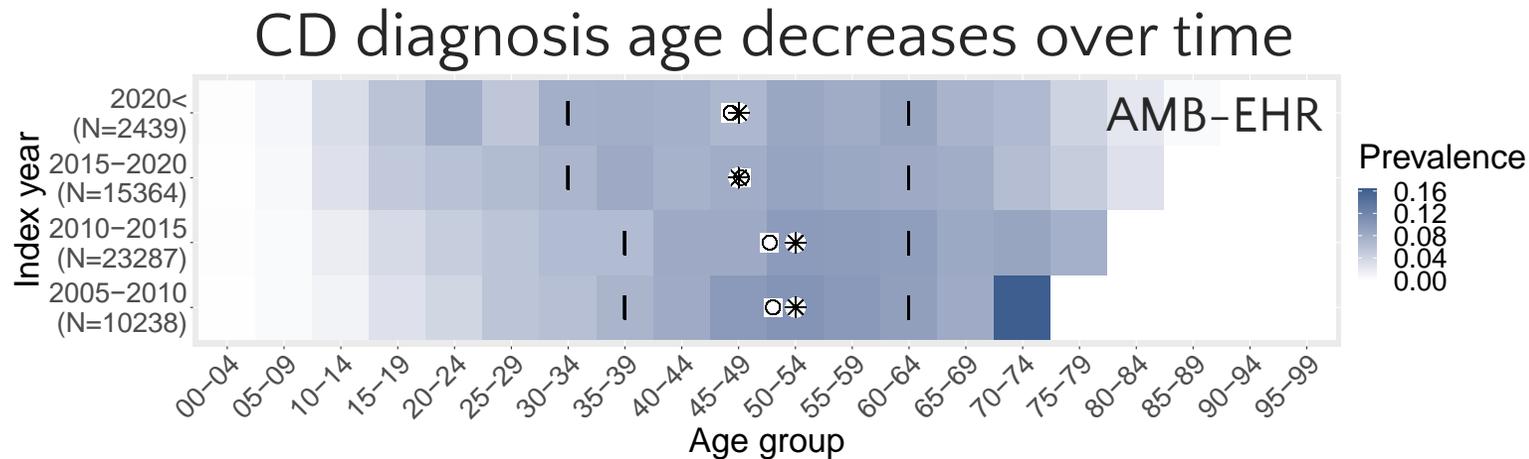
IBM® MarketScan® Commercial Claims DB	CCAE	■	🏠 ⊕	IQVIA™ Adjudicated Health Plan Claims Data	AMB-EHR	▣	🏠
IBM® MarketScan® Multi-State Medicaid DB	MDCD	■	🏠 ⊕	IQVIA™ Disease Analyzer – France	France	□	🏠
IBM® MarketScan® Medicare Supplemental DB	MDCR	■	🏠 ⊕	IQVIA™ Disease Analyzer – Germany	Germany	□	🏠
Optum’s Clinformatics® Data Mart – Date of Death	DOD	■	🏠 ⊕	IQVIA™ Medical Research Data – UK	IMRD-UK	□	🏠
IQVIA™ Adjudicated Health Plan Claims	PharMetrics+	■	🏠 ⊕	Insurance claims from Japan	JMDC	■	🏠 ⊕
Optum® Pan-Therapeutic Electronic Health Records	Optum EHR	□	🏠 ⊕ 🏠	Ajou University School of Medicine	AUSOM	□	🏠 ⊕ 🏠
Columbia University Irving Medical Center	CUIMC	□	🏠 ⊕ 🏠	Kangdong Sacred Heart Hospital	KDH	□	🏠 ⊕ 🏠
Johns Hopkins Medicine	JHM	□	🏠 ⊕ 🏠	IQVIA Australian Longitudinal Patient Data	Australia	□	🏠

Geography □ USA; □ Europe; □ Asia; □ Australia
Data type ■ Admin claims; □ EHRs; ▣ Claims + EHRs
Included visits 🏠 Outpatient; ⊕ Inpatient; 🏠 ER

- Disease cohorts defined using IBD, CD, UC Dx, Rx
- Characteristics, outcomes: Predefined features, +100 IBD-specific features during subjects’ entire history, 1Y, 1M before index date; 1M, 1, 3, 5, 10Y and all-time following index date.

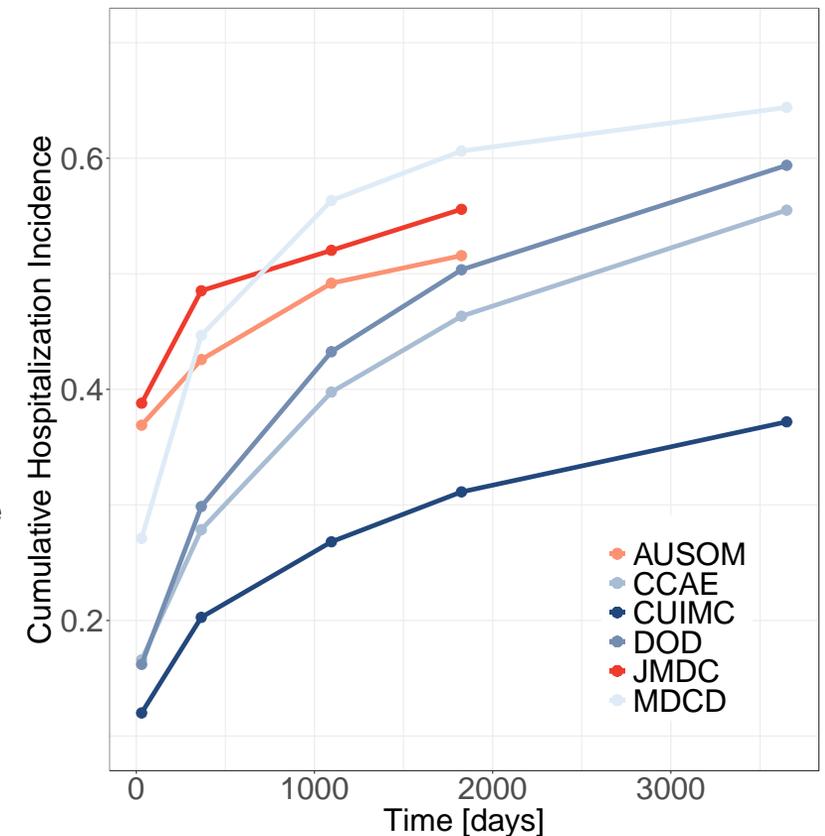
Result Teaser

- Age at diagnosis, by index year
- Hospitalization cumulative rate
- Treatment, by age group



* median age group; | interquartile range; O estimated average

Higher CD hospitalization rate in Asia



Challenges, Limitations

- Potential differences in coding, reporting across DBs
- Vocabulary updates render concept sets outdated
- HUGE amounts of data (>2G), challenging to view, handle
- Only binary attributes; no cross-strata info

THANK YOU!



PREDICTION OF 30-DAY, 90-DAY AND 1 YEAR
MORTALITY AFTER COLORECTAL CANCER
SURGERY USING A DATA-DRIVEN APPROACH

Speaker: Ismail Gögenur

Poster 70



Prediction of 30-day, 90-day and 1 year mortality after colorectal cancer surgery using a data-driven approach

Ismail Gögenur

Professor, DMSc, Consultant
Center for Surgical Science

Department of Surgery, Zealand University Hospital
Institute for Clinical Medicine, University of Copenhagen



**CENTER FOR
SURGICAL
SCIENCE**

REGION SJÆLLAND
SJÆLLANDS UNIVERSITETSHOSPITAL



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Clinical problem

Risk factors

Key outcomes

Risk factors

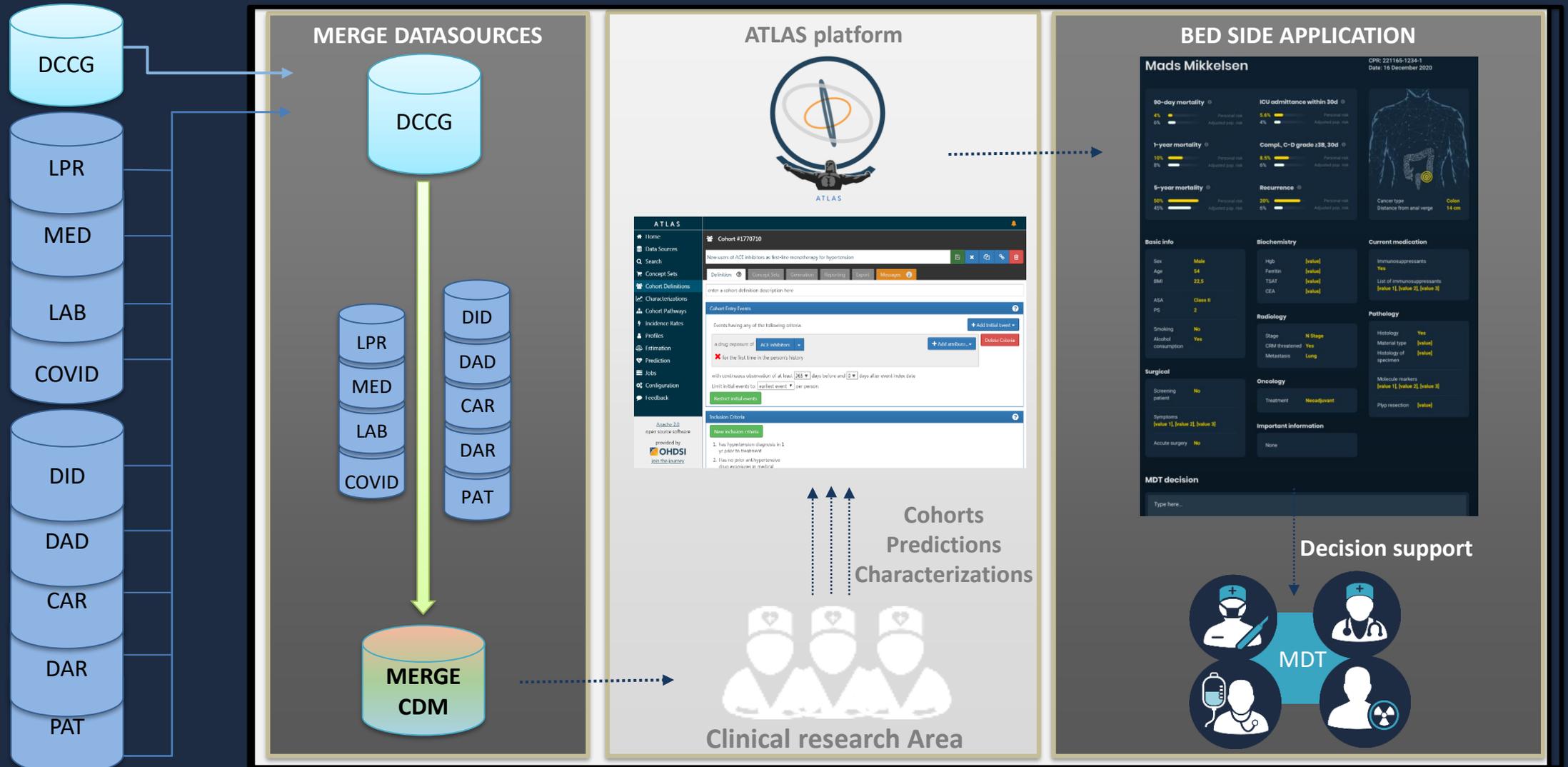
Key outcomes



Using an OMOP based big data platform to aid clinical decision support



Overview of the CDM creation at CSS



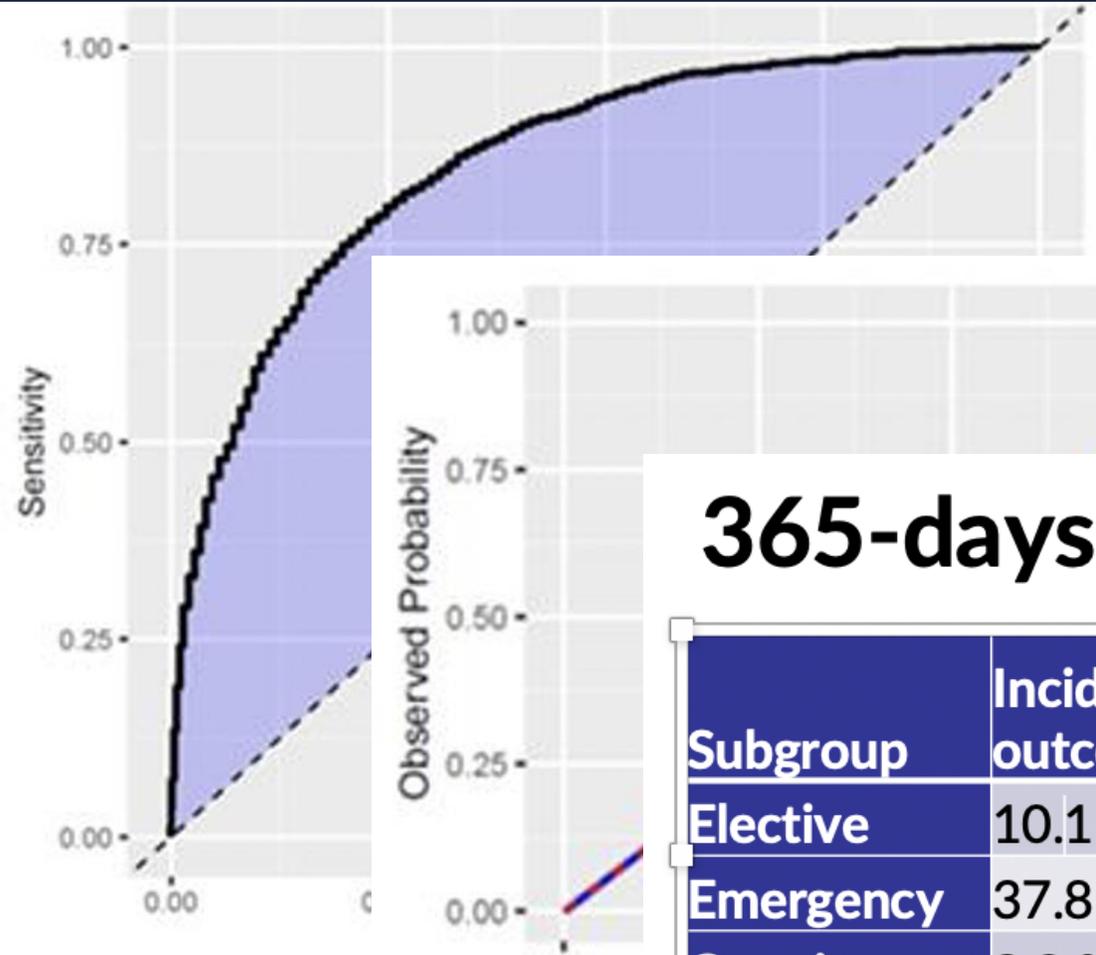
Results for the mortality models

Time-at-risk

30 days

90 days

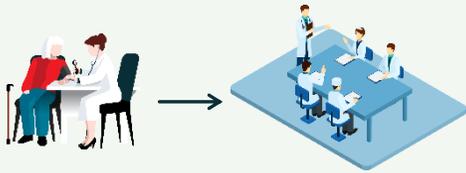
365 days



365-days mortality

Subgroup	Incidence of outcomes	AUROC	Calibration slope	Intercept
Elective	10.1 %	0.854	1.10	0.16
Emergency	37.8 %	0.852	1.13	0.05
Curative	9.0 %	0.850	1.07	0.11
Palliative	46.6 %	0.812	1.03	0.08

AI Based prediction model



expanded MDT

Specialty experts



1 YEAR MORTALITY

<1%

1-5%

5-15%

>15%

PATIENT-CATEGORY

LAV RISIKO

MIDDEL RISIKO

HØJT RISIKO

MEGET HØJT RISIKO

IMPROVED RECOVERY TRAJECTORIES

PRE-OP
Patientschool
Short fasting
Oral carbohydrate

OPERATION
Minimally invasive surgery
Multimodal analgesia

POST-OP
Ambulation day of surgery
Early oral nutrition

POST-DIS

PRE-OP	OPERATION	POST-OP	POST-DIS
+			
++		++	
++++		+++	+
++++ ++	++	++++	++

Improved patient care!

- ↓ Complications
- ↑ Empowerment
- ↑ Cure Rate
- ↓ Readmissions
- ↑ Quality of life
- ↑ Oncol treatment
- ↓ Mortality



Early results and conclusion

- **N=80**
- **Reduction in length of stay after surgery**
- **Reduction in morbidity**
- **Reduction in readmissions after surgery**

Early results indicate that decision support tools based on an OMOP based data infrastructure can be feasible in a clinical setting and improve clinical outcomes



Collaborator Showcase: Rapid Fire Presentations

THANK YOU!



Lunch, Collaborator Showcase, and Early Investigator meetings



The Collaborator Showcase is made possible with the help of MTG and IOMED



Early Investigators mentor meetings in the Queen's Lounge



Led by Ross Williams