Agenda

• Results of survey on support areas
• Plans for 2024 Q1
• APAC study updates
Overview on Survey Results

• 15 respondents
Survey Results – Uniform Data Representation

- Community is interested:
  - ETL, especially around ETL conventions
  - Vocab mapping: Usagi
  - Data Quality Dashboard
  - Extension Models
Survey Results – Data Analytics

- Community is interested in:
  - Operations: initiating network studies, finding partners, sharing outputs
  - Trend: Running R packages > Using ATLAS > Develop R packages
# Self-learning Topics

<table>
<thead>
<tr>
<th>Common themes observed in free-text responses</th>
<th>Suggested learning areas</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Book of OHDSI (Chinese):&lt;br&gt;<a href="https://www.ohdsi.org/wp-content/uploads/2021/02/OHDSI-B5-2020%E6%9C%80%E7%BB%88%E7%89%88.pdf">https://www.ohdsi.org/wp-content/uploads/2021/02/OHDSI-B5-2020%E6%9C%80%E7%BB%88%E7%89%88.pdf</a></td>
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<tr>
<td></td>
<td>Amazon (Paperback):&lt;br&gt;<a href="https://www.amazon.com/OHDSI-Observational-Health-Sciences-Informatics/dp/1088855199">https://www.amazon.com/OHDSI-Observational-Health-Sciences-Informatics/dp/1088855199</a></td>
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</table>
# Self-learning Topics

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<thead>
<tr>
<th>Common themes observed in free-text responses</th>
<th>Suggested learning areas</th>
</tr>
</thead>
</table>
| High level OMOP workflows and working examples of ATHENA, USGAI, ATLAS, R packages. | OHDSI YouTube Channel: [https://www.youtube.com/@OHDSI/videos](https://www.youtube.com/@OHDSI/videos)  
| Functional competencies - Writing R packages/running R packages, ETL steps in PostgreSQL. | DataCamp: [https://www.datacamp.com/](https://www.datacamp.com/)  
Udemy: [https://www.udemy.com/](https://www.udemy.com/) |
## Plans for 2024 Q1

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Speaker(s)</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 1</td>
<td>APAC Study Updates</td>
<td>Seng Chan You, Ivan Lam</td>
<td>Yonsei University, The University of Hong Kong</td>
</tr>
<tr>
<td>March 7</td>
<td>Perseus Intro &amp; Demo</td>
<td>Anton Ivanov, Anna Kovru</td>
<td>Software Country</td>
</tr>
<tr>
<td>April 4</td>
<td>Genomic Data Mapping</td>
<td>Erwin Tantoso</td>
<td>A*STAR</td>
</tr>
</tbody>
</table>
CHAPTER
Characterization of Health by OHDSI AP chapter to identify Temporal Effect of the Pandemic

- 2024.02.01
- Seng Chan You
<table>
<thead>
<tr>
<th>Contents</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction</td>
<td></td>
</tr>
<tr>
<td>2. Method</td>
<td></td>
</tr>
<tr>
<td>3. Result</td>
<td></td>
</tr>
<tr>
<td>4. Discussion</td>
<td></td>
</tr>
</tbody>
</table>
1. Introduction

2. Method

3. Result

4. Discussion
### Introduction

- Coronavirus disease 2019 (COVID-19) was declared as a pandemic by the WHO on March 11, 2020.

<table>
<thead>
<tr>
<th>Region</th>
<th>Date</th>
<th>Confirmed cases</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>World wide</td>
<td>By January, 2021</td>
<td>100 million</td>
<td>7 million</td>
</tr>
<tr>
<td></td>
<td>By December, 2023</td>
<td>770 million</td>
<td>2 million</td>
</tr>
<tr>
<td>Korea</td>
<td>By August, 2023</td>
<td>34 million</td>
<td>35 thousand</td>
</tr>
</tbody>
</table>

![Map of COVID-19 cases reported to WHO](https://data.who.int/dashboards/covid19/cases?n=c)

**World**

- **By January, 2021**: 100 million, 7 million
- **By December, 2023**: 770 million, 2 million

**Korea**

- **By August, 2023**: 34 million, 35 thousand

**Number of COVID-19 cases reported to WHO (cumulative total)**

- **773,819,856**
- **Reported COVID-19 cases**
  - 31 December 2023

**Number of COVID-19 cases reported to WHO (cumulative total)**

- **United States of America**: 103.4m
- **China**: 99.3m
- **India**: 45m

[Show 228 more](https://ncov.kdca.go.)
Introduction

- Governments all over the world introduced unprecedented restrictions

---

**Table 1:** Policy distribution by category and month. Distribution of policies globally.

**Figure 2:** Healthcare policy of coronavirus disease 2019 (COVID-19) in Korea. Source: https://ncov.kdca.go.kr/, MOHW (Ministry of Health and Welfare), 2023.
Introduction

- By the impact of COVID-19, many non-COVID-19 diseases’ health care utilization were affected.

Trends in the monthly number of patients with an office visit (blue line) or a telemedicine visit (orange line) per 10 000 persons.

Frequency of non-communicable diseases services during the COVID-19 pandemic compared to the same period prior to the pandemic.

Changes in Health Services Use Among Commercially Insured US Populations During the COVID-19 Pandemic

https://jamanetwork.com/journals/jamanetworkopen/article-abstract/2772537

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9997416/
Introduction

But, there was no study that assesses the impact of COVID-19 for long term follow up

- To manage non-COVID-19 health conditions after the pandemic
- To help mitigate adverse knock-on healthcare impacts of the pandemic

Objective

- Analysis of the incidence and prevalence of diseases before and after the COVID-19 outbreak and changes in the patterns of healthcare use
- Understand the impact of the spread of COVID-19 on the incidence and prevalence of major diseases and changes in medical use patterns
1. Introduction

2. Method

3. Result

4. Discussion
Methodological Challenge – Monthly Values

- Monthly incidence rate (per $10^{11}$ person-year)

\[
\frac{\text{No. of new cases of a disease occurring in the population during a certain month}}{\text{Sum of Person – Year in a certain month}} \times 10^{11}
\]

- Monthly prevalence rate

\[
\frac{\text{No. of cases of a disease present in the population during a certain month}}{\text{No. of persons in the population during a certain month}} \times 100
\]

- Monthly hospital visit (+ 3 types of epidemiology index)

\[
\frac{\text{No. of visits of a disease present in the population during a certain month}}{\text{Sum of days during a certain month}}
\]

<table>
<thead>
<tr>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inpatient hospitalization</td>
</tr>
<tr>
<td>Emergency room visits</td>
</tr>
<tr>
<td>All cause mortality</td>
</tr>
</tbody>
</table>
Methodological Challenge – Monthly Values

2 years: Look back period for Outcome

1 year: Min Observation Period

Risk Period

- 2018-03-01
- 2019-03-01
- 2020-03-01
- 2020-03-31
Methodological Challenge – Monthly Values

- 2 years: Look back period for Outcome
- 1 year: Min Observation Period
- 1 month

Risk Period

Incidence count
- 2020-03-01
- 2020-03-31

Base count
- 2020-03-01

Observation Period
- 2018-03-01
- 2019-03-01
- 2020-03-01
Methodological Challenge – Monthly Values

2 years: Look back period for Outcome
1 year: Min Observation Period
1 month
Risk Period

Incidence count
Base count

2018-03-01
2019-03-01
2020-03-01
2020-03-31
Methodological Challenge – Monthly Values

- Incidence count
- Base count

1 month

1 year: Min Observation Period

2 years: Look back period for Outcome

Risk Period

2018-03-01 to 2019-03-01
2019-03-01 to 2020-03-01
2020-03-01 to 2020-03-31

- Incidence count
- Base count
Methodological Challenge – Monthly Values

- **2 years: Look back period for Outcome**
- **1 year: Min Observation Period**
- **1 month**

---

**Risk Period**

- **Incidence count**
- **Base count**

- **2018-03-01**
- **2019-03-01**
- **2020-03-01**
- **2020-03-31**

- **2020-03-01**
- **2020-03-31**

- **2019-03-01**
- **2019-03-31**

- **2018-03-01**
- **2018-03-31**
Methodological Challenge – Monthly Values

- **1 month**
  - Incidence count
- **1 year: Min Observation Period**
- **2 years: Look back period for Outcome**
- **Risk Period**

<table>
<thead>
<tr>
<th>Year</th>
<th>Incidence count</th>
<th>Base count</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018-03-01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019-03-01</td>
<td>✧</td>
<td></td>
</tr>
<tr>
<td>2020-03-01</td>
<td>✧</td>
<td>✧</td>
</tr>
<tr>
<td>2020-03-31</td>
<td>✧</td>
<td>✧</td>
</tr>
</tbody>
</table>
Methodological Challenge – Monthly Values

- **1 month**: Incidence count
- **1 year**: Min Observation Period
- **2 years**: Look back period for Outcome

### Incidence count
- 2018-03-01
- 2019-03-01
- 2020-03-01
- 2020-03-31

### Base count
- 2020-03-01
- 2020-03-31
Methodological Challenge – Monthly Values

- **Incidence count**
- **Base count**

- **2 years: Look back period for Outcome**
- **1 year: Min Observation Period**
- **1 month**

- **Risk Period**

- **2018-03-01**
- **2019-03-01**
- **2020-03-01**
- **2020-03-31**

- **2020-03-01** to **2020-03-31**
Methodological Challenge – Monthly Values

- Incidence count
- Base count

<table>
<thead>
<tr>
<th>Date</th>
<th>Incidence count</th>
<th>Base count</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018-04-01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019-04-01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020-04-01</td>
<td><img src="2020-04-01" alt="Incidence" /></td>
<td><img src="2020-04-01" alt="Base" /></td>
</tr>
<tr>
<td>2020-04-30</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 2 years: Look back period for Outcome
- 1 year: Min Observation Period
- 1 month

Risk Period:
- 2020-04-01: Incidence
- 2020-04-01: Base
Methodological Challenge – Calculating monthly incidence/prevalence based on PLP
**ARGOS: Automated Report of Global Observation and Surveillance**

Argos

An R package for assessing the trends in incidence and outcome of the user-defined condition based on EHR-CED

Under-development

Do not use

Poster

createDenominatorSettings <- function(washoutPeriod = 0, # in days
sampleSize = 0, # It would be highly unusual to set sample size in denominator
useObservationPeriod = FALSE,
cohortId = NULL,
startDate = "", # character
dateEnd = "", # character
firstExposureOnly = F,
requireDenominatorPeriod = T,
minDenominatorPeriod = 0, # in days
denominatorDescription = "" # optional

Github.com/OHDSI/ARGOS

Drawn by DALL-E
Interrupted time series analysis

- Definition: A Valuable study design for **evaluating the effectiveness** of population-Level health **interventions** that have been implemented at a clearly defined **point in time**
- Evaluating the effectiveness of interventions by **comparing potential outcome** that will be observed when the **interventions were not implemented**
Method – Data source

- Data source
  - Electronical medical records (EMR) from Severance hospital in Yonsei University Health System, Republic of Korea
  - EMR is converted to OMOP CDM between January 2017 and July 2023
Method – Study design

- Study design
  - Cross-sectional study

- Intervention point
  - Immediately after the start of the first COVID-19 pandemic (2020.03) in Republic of Korea
Method – Study population

- Patients who visited Severance hospital with an observation period of more than 1 year
- The following 11 non-communicable diseases are selected as study population
  - Acute myocardial infarction with inpatient admission
  - Asthma or Chronic obstructive pulmonary disease (COPD)
  - Atrial fibrillation
  - COPD without asthma
  - Hypertension
  - Kawasaki’s disease
  - Major depressive disorder
  - Stroke with inpatient admission
  - Tuberculosis
  - Type 2 diabetes mellitus (T2DM) or history of diabetes

https://ohdsi.github.io/PhenotypeLibrary/articles/CohortDefinitionsInOhdsiPhenotypeLibrary.html
1. Introduction

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### Results – Incidence rate

<table>
<thead>
<tr>
<th>Category</th>
<th>Level (95% CI)</th>
<th>Slope (95% CI)</th>
<th>Up/Down/-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kawasaki’s disease</td>
<td>-2.00 (-3.10 to -0.80)</td>
<td>0.10 (0.04 to 0.17)</td>
<td>Level down Slope Up</td>
</tr>
</tbody>
</table>

![Graph showing incidence rate over time](image)

**IR per 10000 P-Y**

- **17-01**
- **17-07**
- **18-01**
- **18-07**
- **19-01**
- **19-07**
- **20-01**
- **20-07**
- **21-01**
- **21-07**
- **22-01**
- **22-07**
- **23-01**
Results – Incidence rate

Reduction in Kawasaki Disease After Nonpharmaceutical Interventions in the COVID-19 Era

A Nationwide Observational Study in Korea

Ji-Man Kang, MD; Young-Eun Kim, PhD; Kyungmin Huh, MD; Jinwook Min Young Kim, RN; Se Yong Jung, MD; Jong-Hun Kim, MD; Jaehun Jung

Disease - significant
## Results – Healthcare utilization

<table>
<thead>
<tr>
<th>Category</th>
<th>Level (95% CI)</th>
<th>Slope (95% CI)</th>
<th>Up/Down/-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inpatient hospitalization</td>
<td>-32.62 (-61.50 to -3.73)</td>
<td>2.38 (1.05 to 3.71)</td>
<td>Level Down</td>
</tr>
</tbody>
</table>

**Epidemiology index - significant COVID**
## Results – Healthcare utilization

<table>
<thead>
<tr>
<th>Category</th>
<th>Level (95% CI)</th>
<th>Slope (95% CI)</th>
<th>Up/Down/–</th>
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<td>Inpatient hospitalization</td>
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<td>2.38 (1.05 to 3.71)</td>
<td>Level Down</td>
</tr>
</tbody>
</table>

In July and August of 2020, South Korea experienced a significant strike by medical doctors. This industrial action was primarily in response to government policies which the medical community opposed. Key issues included the government’s plan to increase the number of medical students, establish public medical schools, and expand the role of non-physician medical workers. The doctors argued that these measures would not effectively address the underlying problems in the healthcare system, such as uneven distribution of doctors in various specialties and regions, and could potentially lower the quality of medical education and healthcare services. The strike led to the temporary closure of numerous clinics and hospitals, significantly impacting healthcare services across the country. This event highlighted the challenges and complexities of healthcare policy and workforce management in South Korea. (Written by ChatGPT)
Results – Healthcare utilization

<table>
<thead>
<tr>
<th>Category</th>
<th>Level (95% CI)</th>
<th>Slope (95% CI)</th>
<th>Up/Down/-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency room visits</td>
<td>-71.30 (-102.70 to -39.90)</td>
<td>1.74 (1.24 to 4.72)</td>
<td>Level Down Slope Up</td>
</tr>
</tbody>
</table>

Epidemiology index - significant
Further discussion

• Add the results for prevalence

• Resilience
  – How to set definition of resilience
  – How to measure the degree of resilience
  – How to sort out the result of the degree of resilience
OHDSI APAC Study 2 – Comparison of mortality, morbidities & healthcare resources utilisation between patients with and without a diagnosis of COVID-19

OHDSI APAC Scientific Forum
1st February 2024
Background

• COVID-19 infection is associated with a range of clinical sequelae and associated mortality.¹

• The risk of clinical sequelae remained unclear owing to the large variability in risk estimates from existing studies which differs in study design, population and selection of controls.²

• The persistent in risk of clinical sequelae associated with COVID-19 also remains unclear.

• This study aimed to evaluate the risk of short-, medium-, and long-term clinical 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 over 90 clinical 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
COVID-19 (Target) Cohort:
• Have a record of a first positive test or diagnosis for COVID-19 or during the inclusion period
• Index date will be defined the date of positive test or diagnosis of COVID-19

Non COVID-19 (Comparator) Cohort:
• Do not have a record of a COVID-19 test or a positive test for COVID-19 during the inclusion period
• Matched to subjects from the COVID-19 cohort

Follow-up period:
Follow-up until the outcome event, mortality, censoring for lost to follow-up and end of study period. For non COVID-19 group, people will be censored if they got COVID-19 infection.
Updates since pilot study

1. Period of time at risk
2. Cohort definition for COVID-19 (Target) Cohort
   • Included further concepts and values as concept
Updates since pilot study

3. Obtained results from **France**, **Italy**, **Germany** and **UK** databases

4. Meta-analysis to pool study results from individual databases
Study Population

Patients with COVID-19 (targets)
Patients without COVID-19 (comparators)

Exclude Individuals with:
• A history of outcome of interest
• Less than one day at risk

1:10 Propensity-score matching

Study population for separate clinical sequelae

Table 1. Number of patients included for analysis of cardiovascular disorder from separate databases and observation windows

<table>
<thead>
<tr>
<th>Country</th>
<th>Short</th>
<th>Medium</th>
<th>Long</th>
</tr>
</thead>
<tbody>
<tr>
<td>France LPD</td>
<td>Target</td>
<td>45,500</td>
<td>37,671</td>
</tr>
<tr>
<td></td>
<td>Comparator</td>
<td>306,653</td>
<td>256,600</td>
</tr>
<tr>
<td>Italy LPD</td>
<td>Target</td>
<td>5,959</td>
<td>4,723</td>
</tr>
<tr>
<td></td>
<td>Comparator</td>
<td>34,414</td>
<td>27,387</td>
</tr>
<tr>
<td>Germany DA</td>
<td>Target</td>
<td>16,338</td>
<td>13,972</td>
</tr>
<tr>
<td></td>
<td>Comparator</td>
<td>110,892</td>
<td>91,546</td>
</tr>
<tr>
<td>UK IMRD</td>
<td>Target</td>
<td>34,977</td>
<td>29,783</td>
</tr>
<tr>
<td></td>
<td>Comparator</td>
<td>304,707</td>
<td>256,973</td>
</tr>
<tr>
<td>Total</td>
<td>Target</td>
<td>102,774</td>
<td>86,149</td>
</tr>
<tr>
<td></td>
<td>Comparator</td>
<td>756,666</td>
<td>632,506</td>
</tr>
</tbody>
</table>

Figure 1. Flow diagram on the selection of study population
Hazard ratio

France LPD

Cardiovascular disorder
Dermatological diseases
Endocrine disease
Gastrointestinal disorder
Hematological disorder
Immunological disorder
Malignant disease
Neurological disorder
Psychiatric disorder
Renal and Hepatic disorder
Respiratory disorder

Italy LPD

Hazard Ratio (95% Confidence Interval)
Hazard ratio

Germany DA

UK IMRD

Cardiovascular disorder
Dermatological diseases
Endocrine disease
Gastrointestinal disorder
Hematological disorder
Immunological disorder
Malignant disease
Neurological disorder
Psychiatric disorder
Renal and Hepatic disorder
Respiratory disorder

Hazard Ratio (95% Confidence Interval)
## Hazard ratio

### Meta-analysis

<table>
<thead>
<tr>
<th>Condition</th>
<th>Hazard Ratio (95% Confidence Interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiovascular disorder</td>
<td></td>
</tr>
<tr>
<td>Dermatological diseases</td>
<td></td>
</tr>
<tr>
<td>Endocrine disease</td>
<td></td>
</tr>
<tr>
<td>Gastrointestinal disorder</td>
<td></td>
</tr>
<tr>
<td>Hematological disorder</td>
<td></td>
</tr>
<tr>
<td>Immunological disorder</td>
<td></td>
</tr>
<tr>
<td>Malignant disease</td>
<td></td>
</tr>
<tr>
<td>Neurological disorder</td>
<td></td>
</tr>
<tr>
<td>Psychiatric disorder</td>
<td></td>
</tr>
<tr>
<td>Renal and Hepatic disorder</td>
<td></td>
</tr>
<tr>
<td>Respiratory disorder</td>
<td></td>
</tr>
</tbody>
</table>

- Long-term (Red)
- Medium-term (Green)
- Short-term (Blue)
Hazard ratio of CS by age
Hazard ratio of CS by sex

Male

Female

- Cardiovascular disorder
- Dermatological diseases
- Endocrine disease
- Gastrointestinal disorder
- Hematological disorder
- Immunological disorder
- Malignant disease
- Neurological disorder
- Psychiatric disorder
- Renal and Hepatic disorder
- Respiratory disorder

Hazard Ratio (95% Confidence Interval)
Summary

- Consistent with existing literatures, evidence supported an increased risk of clinical sequelae in the short-term.
- A reduction in risk of clinical sequelae was observed in the medium and long term.
- Meta-analysis of results from individual databases will allow for more reliable evidence and clearer representation of research findings.
Going Forward

• Obtain results from the US database
• Summarise findings and prepare the manuscript
Acknowledgement

• IQVIA
  – Xiaoyu Lin, Yin Can, Jing Li

• HKU
  – Yi Chai
Thank you!