

**Oxford Summer School on Real World Evidence using OMOP  
Lady Margaret Hall, 19<sup>th</sup> to 23<sup>rd</sup> of June 2023**

**PRELIMINARY PROGRAMME**

**Brief Description:**

Our Oxford Summer School on Real World Evidence using OMOP (2023) will provide participants with the tools and concepts necessary to plan and execute Real World Evidence studies, with a focus on the use of the OMOP common data model.

The course will have morning lectures followed by afternoon practical sessions where concepts discussed in the morning will be put in practice with hands-on sessions. Practical sessions will have two tracks, to enable targeted learning for participants with different training/background and ambitions (see Overview below).

**Learning goals**

The overarching goal is to provide all participants training on general real world evidence (RWE) concepts related to study design, implementation, and analytics, with a focus on hands on practice using the OMOP common data model (CDM)

**Specific learning goals:**

1. **DATA DISCOVERY:** Gain an understanding of the existing sources of routinely collected data for epidemiological research
2. **THE OMOP COMMON DATA MODEL:** Become capable to explain the principles underpinning this common data model, and to provide examples of existing real world data mapped to this CDM.
3. **RWE STUDY DESIGN/S:** Be able to discuss common types of real world evidence study designs, including cohort, case-control, and case only studies.
4. **PHARMACO- AND DEVICE EPIDEMIOLOGY:** Be aware of the applications of real world data in both pharmaco and device epidemiological studies, including drug/device utilisation and safety research.
5. **PREDICTION MODELLING:** Learn basic concepts on the design and evaluation of prognostic/prediction models developed using real world data; and the use of such methods for treatment heterogeneity/personalised medicine research.



Nuffield Department of Orthopaedics,  
Rheumatology and Musculoskeletal Sciences  
University of Oxford, Nuffield Orthopaedic Centre,  
Windmill Road OXFORD, OX3 7HE

6. **REAL WORLD EVIDENCE METHODS:** Be familiar with the basics of RWE methods, including a) machine learning, b) principles of network/federated multi-database studies, c) methods to minimise confounding (e.g. propensity scores), and d) the target trial framework.
  
7. **PRACTICAL SKILLS IN RWE STUDY DESIGN AND ANALYSIS:** Acquire hands-on experience and skills designing and implementing RWE analysis plans, and/or programmatic skills.

## Overview

The course will contain morning lectures followed by interactive sessions in the afternoon.

Interactive sessions will include two differential tracks that will be related to the morning lectures:

- a) **Analyst/Epidemiologist track: practical sessions using existing user-friendly software (e.g. ATLAS)** to consolidate study design and conceptualisation, and improve phenotyping practices;
- b) **Programmer track: hands-on data analyses using synthetic data in the OMOP CDM using RStudio**, for developers or programmers interested in improving their skills in the analyses of real world data

## Requirements

All course attendees should bring a laptop with the necessary specs to connect to a public wi-fi network. Those opting for the Programmer track should be familiar with R programming, and have a working version of R and RStudio installed before the training takes place. You will receive specific instructions before the training to make sure this is installed and tested.



Nuffield Department of Orthopaedics,  
Rheumatology and Musculoskeletal Sciences  
University of Oxford, Nuffield Orthopaedic Centre,  
Windmill Road OXFORD, OX3 7HE

## **PRELIMINARY PROGRAMME**

### DAY 1 (Monday, 19<sup>th</sup> June 2023)

#### MORNING (9.00h am to 12.30h)

- Introductions and Registration
- Data Discovery
  - o Introduction to the OMOP CDM
  - o Types of real world data, data domains, dashboards
  - o Recent examples of diverse OMOP-mapped data sources
    - Primary care data: CPRD GOLD and AURUM; others
    - Hospital data: Queen Mary University London
    - Data from the Global South
- *COFFEE BREAK (10.30h to 11.00h)*
- Study Design and Considerations
  - o Study designs: cohort, case-control, sccs
  - o Exposure/outcome definitions
  - o Index date specification, time-at-risk, immortal time bias

#### NETWORKING LUNCH BREAK (12.30-13.30h)

#### AFTERNOON (13.30h-17.00h)

- o Practical session: **Creating and improving cohorts using the OMOP CDM**
  - Analyst/Epi track: Designing and creating condition and medication-based concept sets and cohorts using Athena and ATLAS; interpreting cohort diagnostics
  - Programmer track: Working with the OMOP CDM from R, creating candidate code lists, and building cohorts programmatically in R

## DAY 2 (Tuesday, 20<sup>th</sup> June 2023)

### MORNING (9.00h am to 12.30h)

- Basic RWE: population-level epi and phenotyping
  - o Descriptive epi (incidence, prevalence)
  - o Phenotyping
- *COFFEE BREAK (10.30h to 11.00h)*
- Minimising Bias in RWE studies
  - o Confounding and Bias
  - o Propensity Score methods
  - o Methods to minimise the impact of misclassification
  - o Survival Analyses

### NETWORKING LUNCH BREAK (12.30-13.30h)

### AFTERNOON (13.30h-17.00h)

- Analyst/Epi track:
  - o Defining a cohort study using ATLAS
  - o Interpreting results from a cohort analysis
- Programmer track:
  - o Writing bespoke code with OMOP
  - o Estimating population-level incidence and prevalence



Nuffield Department of Orthopaedics,  
Rheumatology and Musculoskeletal Sciences  
University of Oxford, Nuffield Orthopaedic Centre,  
Windmill Road OXFORD, OX3 7HE

## DAY 3 (Wednesday, 21<sup>st</sup> June 2023)

### MORNING (9.00h am to 12.30h)

- Survival Analyses and Patient-level Prediction
  - o Prediction and prognosis modelling
  - o Designing a prediction study in OMOP
  
- *COFFEE BREAK (10.30h to 11.00h)*
  
- Drug utilisation studies
  - o Population-level and Patient-level drug utilisation
  - o Treatment patterns
  - o Drug utilisation time trends [Sara]

### NETWORKING LUNCH BREAK (12.30-13.30h)

### AFTERNOON (13.30h-17.00h)

- Analyst/Epi track:
  - o Treatment Patterns
  - o Patient-level prediction in ATLAS and PLP
- Programmer track:
  - o Programming a cohort study in R



Nuffield Department of Orthopaedics,  
Rheumatology and Musculoskeletal Sciences  
University of Oxford, Nuffield Orthopaedic Centre,  
Windmill Road OXFORD, OX3 7HE

## DAY 4 (Thursday, 22<sup>nd</sup> June 2023)

### MORNING (9.00h am to 12.30h)

- Machine learning, clustering, longitudinal analyses
  - o Introduction to Machine Learning
  - o Cluster analyses
  - o Longitudinal clustering
- *COFFEE BREAK (10.30h to 11.00h)*
- Distributed analytics and Network Studies
  - o Designing network studies: EHDEN/OHDSI experiences
  - o Tools for the execution of network studies
  - o Preparing for a Study-a-Thon

### NETWORKING LUNCH BREAK (12.30-13.30h)

### AFTERNOON (13.30h-17.00h)

- Both tracks: Building a network study together



Nuffield Department of Orthopaedics,  
Rheumatology and Musculoskeletal Sciences  
University of Oxford, Nuffield Orthopaedic Centre,  
Windmill Road OXFORD, OX3 7HE

## DAY 5 (Friday, 23<sup>rd</sup> June 2023)

### MORNING (9.30h am to 12.30h)

- Target trial emulation methods
  - o Target trial emulation: the principles
  - o Can RWE replicate trials: DUPLICATE
  
- *COFFEE BREAK (10.30h to 11.00h)*
  
- RWE for regulatory purposes
  - o DARWIN EU
  
- NETWORKING LUNCH BREAK (12.30-13.30h) and closure



Nuffield Department of Orthopaedics,  
Rheumatology and Musculoskeletal Sciences  
University of Oxford, Nuffield Orthopaedic Centre,  
Windmill Road OXFORD, OX3 7HE