

## Day-to-Day Program for Molecular Pharmacoepidemiology Course

Course Director: Dr. Fariba Ahmadizar

### Monday, July 7, 2025: Introduction to Molecular Pharmacoepidemiology

Time Place (TBA)	Description	Lecturer
09:30 – 09:45	<b>Introduction:</b> Welcome and Introduction to the Course	Dr. Fariba Ahmadizar
09:45 – 12:30	<b>Lecture 1:</b> Introduction to Molecular Pharmacoepidemiology - Overview of molecular pharmacoepidemiology and the role of omics (genomics, metabolomics). - Introduction to multi-omics data and their application in drug safety and efficacy. - Study design for pharmacoepidemiological studies using multi-omics. - Strengths and limitations of omics data in epidemiological studies.	Dr. Fariba Ahmadizar
12:30 – 13:30	<b>Lunch Break</b>	
13:30 – 17:00	<b>Practical Work:</b> Hands-on analysis with a genetic study dataset (Assignment 1) - Introduction to the dataset and initial steps for analysis. - Statistical methods for analysis with support from a dedicated statistician. - Group assignment briefing and initial group work (Assignment 2).	Malede Sisay, MSc, Statistician

### Tuesday, July 8, 2025: Study Design in Pharmacogenetic Studies

Time Place (TBA)	Description	Lecturer
09:30 – 09:45	<b>Introduction to Day 2:</b> Overview of Study Design in Pharmacogenetics	Prof. Miriam Sturkenboom
09:45 – 12:30	<b>Lecture 2:</b> Study Design in Pharmacogenetic Studies - Overview of study designs in pharmacogenetics: cohort, case-control, and cross-sectional designs. - Challenges in pharmacogenetic study design: confounding, population stratification, and sample size considerations. - Analytical methods in pharmacogenetic studies: Introduction to Directed Acyclic Graphs (DAGs) for causal inference.	Prof. Miriam Sturkenboom
12:30 – 13:30	<b>Lunch Break</b>	
13:30 – 17:00	<b>Practical Work:</b> Analyzing Pharmacogenetic Study Design Challenges - Apply study design principles to the provided dataset with research questions, addressing confounding and sample size issues (Assignment 1). - Group work (Assignment 2).	Malede Sisay, MSc, Statistician

## Wednesday, July 9, 2025: Genetic and Genomic Approaches in Pharmacoepidemiology

Time Place (TBA)	Description	Lecturer
09:30 – 09:45	<b>Introduction to Day 3:</b> Overview of Genetic and Genomic Approaches in Pharmacoepidemiology	Dr. Behrooz Z. Alizadeh
09:45 – 12:30	<b>Lecture 3:</b> Genetic and Genomic Approaches in Pharmacoepidemiology <ul style="list-style-type: none"> <li>- Understanding pharmacogenomics: The role of genetic variability in drug response.</li> <li>- Introduction to causal inference in genetic studies.</li> <li>- Mendelian Randomization (MR): Concept, applications, and limitations in pharmacoepidemiology.</li> <li>- Case studies of pharmacogenomics and drug response (e.g., warfarin, statins).</li> </ul>	Dr. Behrooz Z. Alizadeh
12:30 – 13:30	<b>Lunch Break</b>	
13:30 – 17:00	<b>Practical Work:</b> Continue applying Genetic analyses to Genetic Data (Assignment 1). <ul style="list-style-type: none"> <li>- Group work (Assignment 2).</li> </ul>	Malede Sisay, MSc, Statistician

## Thursday, July 10, 2025: Translating Pharmacogenomics into Clinical Practice

Time Place (TBA)	Description	Lecturer
09:30 – 09:45	<b>Introduction to Day 4:</b> Overview of Translating Pharmacogenomics into Clinical Practice	Dr. Vera Deneer
09:45 – 12:30	<b>Lecture 4:</b> Translating Pharmacogenomics into Clinical Practice <ul style="list-style-type: none"> <li>- From bench to bedside: Translating pharmacogenomics into actionable clinical guidelines.</li> <li>- Clinical implementation of pharmacogenomic testing in healthcare systems.</li> <li>- Incorporating genotype information into electronic health records (EHRs).</li> <li>- Case studies of successful pharmacogenomic implementation in clinical practice (e.g., oncology, cardiology, psychiatry).</li> </ul>	Dr. Vera Deneer
12:30 – 13:30	<b>Lunch Break</b>	
13:30 – 17:00	<b>Practical Work:</b> Continue applying Genetic analyses to Genetic Data (Assignment 1). <ul style="list-style-type: none"> <li>- Group work (Assignment 2).</li> </ul>	Malede Sisay, MSc, Statistician

**Friday, July 11, 2025: Artificial Intelligence (AI) & Advanced Analytical Techniques in Pharmacoepidemiology**

<b>Time Place (TBA)</b>	<b>Description</b>	<b>Lecturer</b>
<b>09:30 – 09:45</b>	<b>Introduction to Day 5:</b> Overview of AI and Advanced Analytical Techniques in Pharmacoepidemiology	Dr. Said Bouhaddani
<b>09:45 – 12:30</b>	<b>Lecture 5:</b> Artificial Intelligence (AI) & Advanced Analytical Techniques in Pharmacoepidemiology - AI methods for analyzing multi-omics and pharmacoepidemiology data. - Applying machine learning techniques (clustering, neural networks, random forests) to predict drug responses. - Mediation analysis and instrumental variable regression using omics data.	Dr. Said Bouhaddani
<b>12:30 – 13:30</b>	<b>Lunch Break</b>	
<b>13:30 – 15:30</b>	<b>Group Presentations</b> - Each group presents their reading assignment on a pharmacogenomics paper, including a critique and key takeaways (Assignment 2).	Dr. Fariba Ahmadizar
<b>15:30 – 17:00</b>	<b>Q&amp;A</b>	Dr. Fariba Ahmadizar  Malede Sisay, MSc, Statistician