



EHDEN

EUROPEAN HEALTH DATA & EVIDENCE NETWORK

806968 – EHDEN

European Health Data & Evidence Network

WP3 – Personalized Medicine

D3.5 First Report in educational and training material for the developed analytical tools

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	D3.5 – First report on educational and training material for the developed analytical tools		
	WP3 – Personalized Medicine		Version: v1.1 – Final
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TABLE OF CONTENTS


Table of contents	2
Document History	3
Definitions.....	4
Publishable Summary.....	5
1. Introduction	6
2. Onsite Training	6
3. Written Material	7
4. EHDEN Academy	8
5. Roadmap	10
5. Final Remarks	10

	D3.5 – First report on educational and training material for the developed analytical tools		
	WP3 – Personalized Medicine		Version: v1.1 – Final
	Author(s): Peter Rijnbeek, Nigel Hughes		Security: PU



DOCUMENT HISTORY

Version	Date	Description
V1.0	15-11-2020	Full Draft for internal review
V1.1	27-11-2020	Final Version

 EHDEN <small>EUROPEAN HEALTH DATA & EVIDENCE NETWORK</small>	D3.5 – First report on educational and training material for the developed analytical tools		
	WP3 – Personalized Medicine		Version: v1.1 – Final
	Author(s): Peter Rijnbeek, Nigel Hughes		Security: PU 4/11




DEFINITIONS

Participants of the EHDEN Consortium are referred to herein according to the following codes:

EMC	Erasmus Universitair Medisch Centrum Rotterdam- The Netherlands (Project Coordinator)
Synapse	Synapse Research Management Partners S.L. - Spain
UOXF	The Chancellor, Masters and Scholars of the University of Oxford - United Kingdom
UTARTU	Tartu Ulikool - Estonia
UAVR	Universidade de Aveiro – Portugal
The Hyve	The Hyve BV – the Netherlands
Odysseus	Odysseus Data Services SRO – Czech Republic
EPF	Forum Europeen des Patients (FPE) - Luxembourg
NICE	National Institute for Health and Care Excellence – United Kingdom
UMC	Stiftelsen WHO Collaborating Centre for International Drug Monitoring - Sweden
ICHOM	International Consortium for Health Outcomes measurement LTD - United Kingdom
Janssen	Janssen Pharmaceutica NV - Belgium (Project Lead)
Pfizer	Pfizer Limited – United Kingdom
Abbvie	AbbVie Inc - United States
IRIS	Institut De Recherches Internationales Servier - France
SARD	Sanofi Aventis Recherche & Developpement - France
Bayer	Bayer Aktiengesellschaft - Germany
Lilly	Eli Lilly and Company Limited – United Kingdom
AZ	AstraZeneca AB - Sweden
Novartis	Novartis Pharma AG - Switzerland
UCB	UCB Biopharma SPRL - Belgium
Celgene	Celgene Management SARL - Switzerland

Grant agreement	The agreement signed between the beneficiaries and the IMI JU for the undertaking of the EHDEN project (806968).
Project	The sum of all activities carried out in the framework of the Grant Agreement.
Consortium	The EHDEN Consortium, comprising the above-mentioned legal entities.
Consortium agreement	Agreement concluded amongst EHDEN participants for the implementation of the Grant Agreement. Such an agreement shall not affect the parties' obligations to the Community and/or to one another arising from the Grant Agreement.

	D3.5 – First report on educational and training material for the developed analytical tools		
	WP3 – Personalized Medicine		Version: v1.1 – Final
	Author(s): Peter Rijnbeek, Nigel Hughes		Security: PU




PUBLISHABLE SUMMARY

The goal of WP3 “Personalized Medicine” is to establish a standardized process to enable personalized decision-making that can be utilized for multiple outcomes of interest and can be applied to observational healthcare data from any patient subpopulation.

This short deliverable describes the approach and roadmap for the creation of educational and training materials for the analytical tools developed in WP3. In this first report on this topic, we focus on the progress made for the Patient-Level Prediction domain by discussing the material that has been made available in the Book of OHDSI and a course made available in the EHDEN Academy. This work demonstrates how the EHDEN project is acting as a catalyst for the adoption of the OMOP Common Data Model in Europe by providing an educational program for its stakeholders.

This work falls under Task 3.7 “Develop educational and training material for the developed tools (M1-M60)” and is performed in close collaboration with WP4 and specifically Task 4.9 “Integration of material for education and training (M12-M36)”

	D3.5 – First report on educational and training material for the developed analytical tools		
	WP3 – Personalized Medicine		Version: v1.1 – Final
	Author(s): Peter Rijnbeek, Nigel Hughes		Security: PU 6/11

1. INTRODUCTION

In WP3 many tools and approaches are developed de novo or extended based on implementations made by the Observational Health Data Sciences and Informatics (OHDSI) initiative. All tools are made open source for the community to use these in epidemiological studies or method research. However, open source software without proper documentation and educational material is still not very useful for users beyond those in the expert inner circle. In EHDEN we therefore invest heavily in the creation of online training material to support our stakeholders. This works as a catalyst for the adoption of the OMOP-CDM in Europe.

In this first deliverable on educational and training material for the developed analytical tools we describe the work done in the first two years and discuss the roadmap for the next period.

2. ONSITE TRAINING

In OHDSI multiple full day training courses have been developed in which EHDEN consortium members have made major contributions. The courses have been given mainly around the OHDSI symposia in the USA, Europe, and ASIA. In the 2019 European Symposium organized by our partner EMC with the title “the Journey from Data to Evidence”. More than 250 participants from all over the world joined. There were 35 posters and 8 software demos, covering methods, skills and tools.



Figure 1. European OHDSI Symposium

During the European OHDSI Symposium multiple full day tutorials were given, including the following relevant to WP3:

- Population-Level Effect Estimation**
 This tutorial was for researchers who want to design estimation studies for safety surveillance and comparative effectiveness using the OHDI tools, and programmers who want to implement and execute estimation studies using the OHDSI methods library.
- Patient-Level Prediction**
 This tutorial was for researchers who want to design prediction studies for precision medicine and disease interception using the OHDSI tools and programmers who want to implement and execute prediction studies using the OHDSI methods library.

More detailed information about these topics can be found in D3.2 and D3.4.


	D3.5 – First report on educational and training material for the developed analytical tools		
	WP3 – Personalized Medicine		Version: v1.1 – Final
	Author(s): Peter Rijnbeek, Nigel Hughes		Security: PU 7/11



Figure 2. Training sessions during the European OHDSI Symposium at the Erasmus MC.

EHDEN consortium members have provided courses at the OHDSI symposium in Washington in the USA, at the South Korean Symposium and at Real-world Epidemiology Summer Course at Oxford University in this reporting period.

These onsite course are recorded and were made available on the OHDSI websites (www.ohdsi.org, www.ohdsi-europe.org) and [YouTube](https://www.youtube.com).

3. WRITTEN MATERIAL

The team has worked on a large amount of written material to train the community:

- **Software documentation**

Many manuals have been written in the form of R package vignettes, e.g., for the patient-level prediction package a website is available with all this information:

<https://ohdsi.github.io/PatientLevelPrediction/>

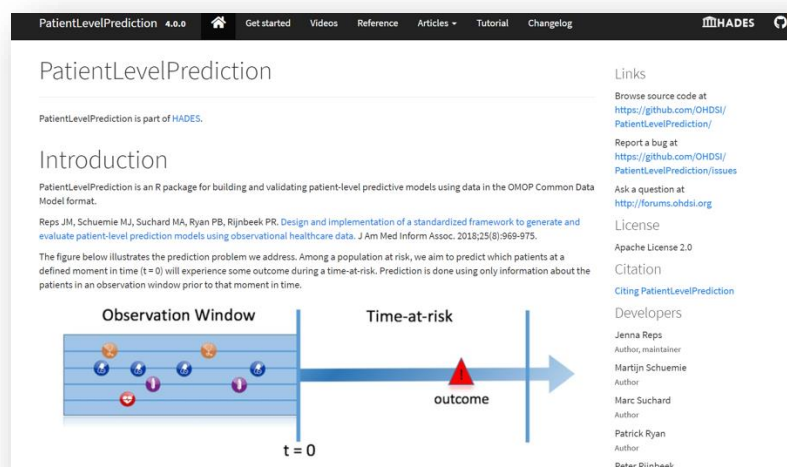



Figure 2: Patient-level Prediction package online manual

	D3.5 – First report on educational and training material for the developed analytical tools		
	WP3 – Personalized Medicine		Version: v1.1 – Final
	Author(s): Peter Rijnbeek, Nigel Hughes		Security: PU 8/11

- **The Book of OHDSI**

EHDEN participated in a large effort of the OHDSI community to write a book that describes the full eco-system, this included chapters on [Patient-Level Prediction](#) and [Population-Level Effect Estimation](#). The book is available free online: <https://ohdsi.github.io/TheBookOfOhdsi/> and in print at Amazon.

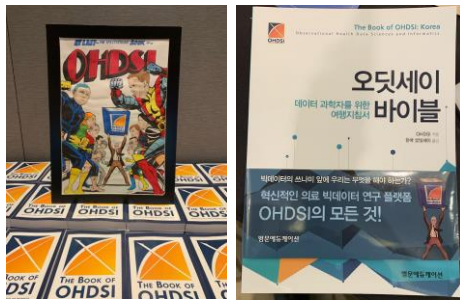


Figure 4. The Book of OHDSI

The Book has also been translated by the South Korean Team, no other translations are foreseen.

4. EHDEN ACADEMY

The EHDEN Project aspires to educate, via the EHDEN Academy, project colleagues and all relevant external stakeholders within Europe (and beyond), in particular the wider OHDSI global network as a key collaboration community supporting this. It is noteworthy that such bodies as the European Medicines Agency, and the European Commission itself highlight the need for upskilling in this domain and the opportunity for educational resources.

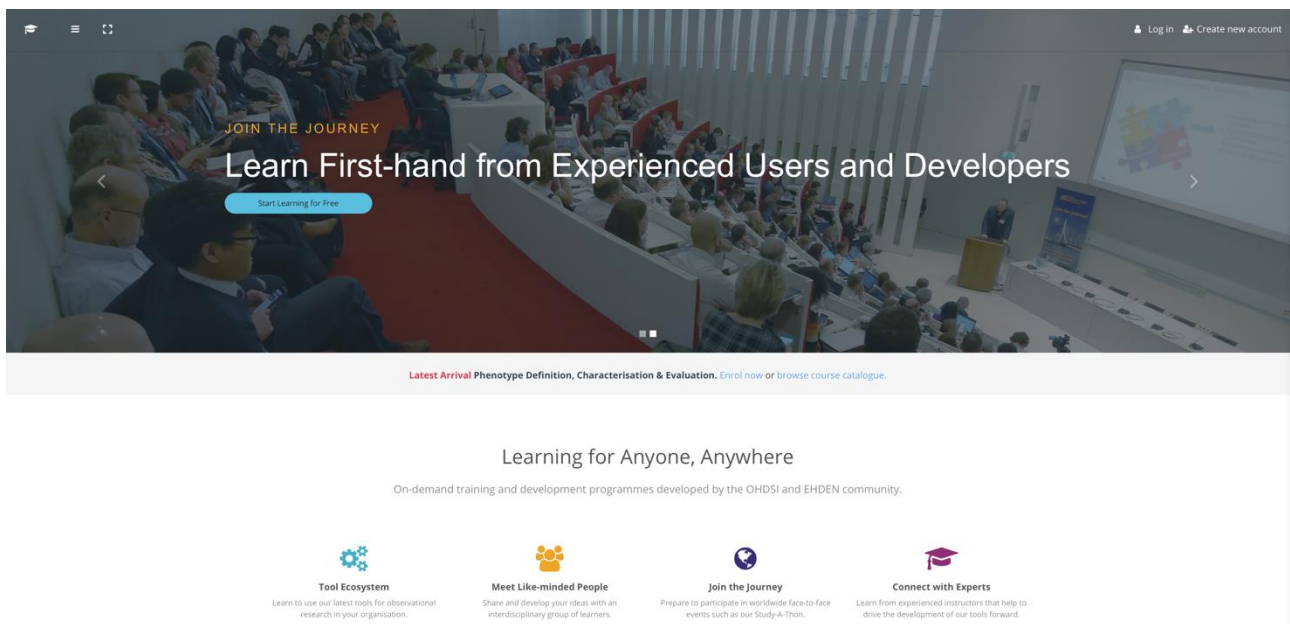



Figure 5. Landing page of the EHDEN Academy (<https://academy.ehden.eu>)

	D3.5 – First report on educational and training material for the developed analytical tools		
	WP3 – Personalized Medicine	Version: v1.1 – Final	
	Author(s): Peter Rijnbeek, Nigel Hughes	Security: PU	9/11

Initially, the aim was to train selected Small and Medium-Sized Enterprises (SMEs) selected through our open call process to ensure a consistent methodology for the mapping (ETL) of Data Partner source data to the OMOP common data model. This has led to the establishment of the EHDEN Academy, a Moodle-based, open-source platform. Six modules were created in 2019 as a basis for the initial curriculum and learning path, focused on SMEs. However, these courses are also of great value for others in the community.

The EHDEN Academy has been successfully used in training the 26 SMEs in the first two open calls, and more will be trained in further calls over the duration of the EHDEN project.

To enhance the project’s offering, the educational content was launched publicly on 23rd April 2020 with a plan to expand the courses and material for a wider audience, inclusive of Data Partners, researchers, regulators, HTA bodies, and anyone conducting observational research. Additional courses are being produced and content expanded.

Uptake of the Academy has been positive, and the curriculum will be widened with learning paths and modules through the remainder of 2020 and beyond to support observational health research on a wider scale. An Executive Board, Project Management Team and Faculty have been established to operate the Academy, with representation from Academic and EFPIA partners, as well as OHDSI colleagues.

A sustainability plan for the Academy is being developed, focusing on scenarios for community expansion and financial scenarios for independent continuance alongside the EHDEN project.

Specifically linked to WP3, a module on patient-level prediction methodology is being launched via the Academy at the time of writing, and was developed via the Analysis, Design, Development, Implementation and Evaluation (ADDIE) model at the core of the Academy’s content development.

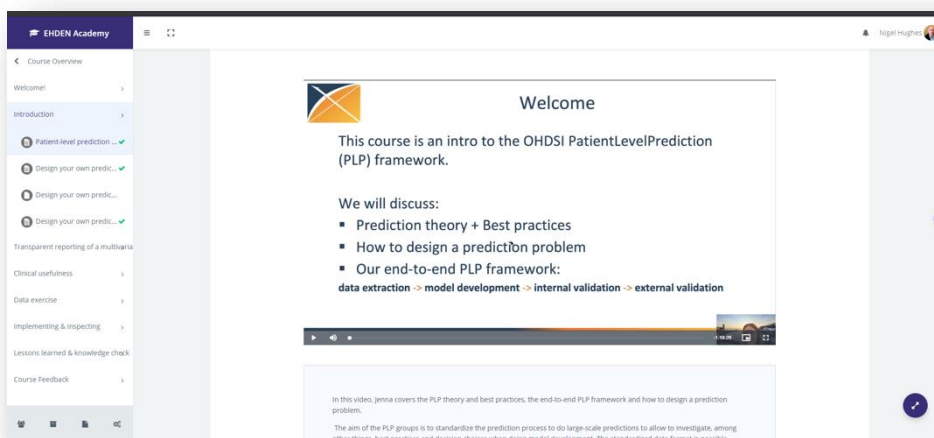



Figure 6: Screenshot from EHDEN Academy Patient-level Prediction course

In this module participants gain deeper insights into patient prediction modelling using OHDSI tools, in particular ATLAS, and focusing on:

- Defining prediction questions
- Identifying useful prediction questions of most relevance to prediction modelling
- Developing prediction models
- Evaluating prediction models
- Presenting prediction models

	D3.5 – First report on educational and training material for the developed analytical tools		
	WP3 – Personalized Medicine	Version: v1.1 – Final	
	Author(s): Peter Rijnbeek, Nigel Hughes	Security: PU	10/11

This course was originally delivered in a group setting but has been adapted for individual study. The aim of the Patient-level Prediction work in OHDSI is to standardise the prediction process to do large-scale predictions to allow to investigate, among other things, best practices and decision choices when doing model development. The standardised data format is possible thanks to the OMOP CDM.

5. ROADMAP

The Patient-level Prediction module is the start of a learning pathway for working in this domain with development of additional modules, supporting colleagues to move from novice to intermediate and expert understanding of prediction work within the OHDSI framework. This is part of a larger effort for course development as shown in figure 5 and described in detail in D4.4 “Report on educational and training material for the developed analytical tools”.

Further incorporation of current and future methodological development will drive education, as well as application in e.g. study-a-thons and standalone studies, all of which are educational opportunities.

The sustainability of the Academy is also being worked on as a whole (and referred to in D4.4). Continued development of the prediction learning pathway will be promoted within the OHDSI community and to a wider community of those working with observational data and prediction modelling.


Evaluation of such education, the impact on the discipline of prediction modelling will be further evaluated in the application work of WP3, as well as in study-a-thons and standalone studies performed during the remainder of the EHDEN project.



Figure 7: Learning Pathways and Module Content

5. FINAL REMARKS

We believe that the development of educational material is extremely important for the sustainability of the EHDEN eco-system. Since we are fundamentally changing the way to perform observational research at scale, good training resources are required to assure quality research. We are pleased that the OHDSI leadership has recognized this and is supporting and promoting the EHDEN Academy as a global resource. Especially, in the research field of personalized medicine and data science there is a need for in depth courses including training on the use of our state-of-art analytical tools.

	D3.5 – First report on educational and training material for the developed analytical tools		
	WP3 – Personalized Medicine		Version: v1.1 – Final
	Author(s): Peter Rijnbeek, Nigel Hughes		Security: PU



In the upcoming period we will further extend the personalized medicine learning path. Furthermore, we will collaborate with WP4 to incorporate in the educational track newly developed analytical pipelines and tools such as Arachne for federated study execution.