Harnessing OHDSI's Framework for a Global Real World Evidence Masters Degree Program

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Background

In January of 2021 Northeastern University founded the Observational Health Data Sciences and Informatics (OHDSI) Center at the Roux Institute, an innovative research center designed to collaborate with the broader OHDSI Community. The mission of the OHDSI Center is dedicated to the advancement of collaborative, open, and reproducible scientific research. A key component of vision of the OHDSI Center is the development of credentialed learning opportunities in generating reliable evidence from real-world data and the associated analytic methods. Shortly after the establishment of the OHDSI Center, a team with a background in industry, academia and government, as well as expertise in OMOP CDM, OHDSI tools, statistics, and pedagogy, was charged with the development of a master's degree program training the next generation of real-world evidence (RWE) analysts in open source and reproducible methods with an emphasis on the OMOP CDM and the OHDSI analytic framework.

Methods

A team of Northeastern University faculty and OHDSI collaborators united to create a graduate level curriculum rooted in the OHDSI philosophy of real world data (RWD) analytics. Starting from the Book of OHDSI[1] and the FDA definitions of real world data and evidence[2], a series of courses were developed to follow the journey from data to evidence and to address the following program level learning objectives: 1) Describe the value and process of the ethical use of observation health data to answer clinical questions. 2) Illustrate how different forms of observational health data are collected, organized, and standardized to generate accurate, reproducible, and well-calibrated evidence. 3) Use state-of-the-art statistical software and methods to combine and analyze large-scale federated health data from diverse sources while preserving privacy. 4) Construct and take part in a team to conceptualize, analyze, and communicate the results of a study using observational health data to answer a clinical question. 5) Evaluate the strengths and weaknesses of an observation health analysis.

The Observational Medical Outcomes Partnership (OMOP) Common Data Model (CDM) was selected as the common data model to run throughout the courses. Consistent with the OHDSI approach, content pertaining to statistics and analytics was structured into distinct sections encompassing characterization, patient level prediction, and population estimation.

Results

A comprehensive 31-credit Master's degree program entitled "Real World Evidence in Healthcare and Life Sciences" (MS in RWE) was developed and approved by the Northeastern University Board of Trustees in December 2021. The MS in RWE program was subsequently approved to be offered at the Roux Institute in Portland, Maine by the Maine Board of Education in October 2022. This program, which requires no prerequisites in statistics, epidemiology, or computer programming, is offered for full-time, part-time, and on-line learners.

The adherence to the OMOP CDM and OHDSI toolkits required us to develop 11 new courses, each

constructed to adhere to the principles of reproducibility, open science, and the use of best practices. These 11 new courses, along with 2 existing graduate level courses comprise the full masters degree program (Figure 1). By developing 11 new courses, we were able to adhere to modern methods, best practices, and the OHDSI framework closely, as we did not need to incorporate any legacy courses.

Conclusion

The OHDSI framework for moving from health data to clinical evidence generation and the OMOP CDM provided an excellent structure to adapt into a master's degree program. By forming a team of OHDSI contributors and faculty from the university, we were able to quickly and thoughtfully adapt these OHDSI principles into a structured curriculum that satisfied accreditation requirements and could be delivered to learners at scale. Future plans for this degree program include offering custom learning options for interested business clients and modularizing subsets of courses to create distinct badges or certificates providing credentialed learning in specific portions of journey from data to evidence.

References

1. Hripcsak, G., Duke, J., Shah, N., Reich, C., Huser, V., Schuemie, M., Suchard, M., & Ryan, P. (Eds.). (2021). The Book of OHDSI. Observational Health Data Sciences and Informatics. Retrieved from https://ohdsi.github.io/TheBookOfOhdsi/.
2. *Real-World Evidence*. 02/05/2023; Available from: https://www.fda.gov/science-research/science-and-research-special-topics/real-world-evidence.

	Required Core Courses	
Course Code	**Course Title**	**Credit Hours**
HSCI 5130	Introduction to Real World Evidence	2
HSCI 5140	Foundations of Data Models	2
HSCI 5150	Methods for Observational Research 1	3
HSCI 5160	Standardization of Real World Data	2
HSCI 5170	Data Model Transformation	2
HSCI 5151	Methods for Observational Research 2	3
PHSC 5212	Research Skills and Ethics	2
HSCI 6980	Capstone	3
	Selective Courses	
Course Code	**Course Title**	**Credit Hours**
HSCI 5180	Phenotyping	2
HSCI 5190	Cohort Building	2
HSCI 6110	Advanced Population Characterization	2
HSCI 6120	Advanced Population Estimation	3
HSCI 6130	Advanced Patient Prediction	3

Figure 1: The current Northeastern University MS in RWE curriculum