

OHDSI CDM as a Data Translation Engine (DTE), A Use Case Example led by the Center for International Blood and Marrow Transplant Research (CIBMTR)

**Trent Peterson, MBA¹, Robinette Renner, PhD², Kristina Bloomquist, M.Ed², Kristin Kostka, MPH³,
Ben Smith¹, Christian Reich, MD, PhD³**

¹Principia Health Sciences, Cary, NC; ²CIBMTR, Minneapolis, MN; ³IQVIA, Cambridge, MA

Abstract

The CIBMTR has embarked on an initiative to transform how data are collected and transmitted from approximately 400 cellular therapy centers worldwide. The CIBMTR aims to reduce the transplant center administrative burden by deploying The Observational Medical Outcomes Partnership (OMOP) Common Data Model (CDM) as a centralized data translation hub to receive, store and export data. The novel deployment of the CDM centrally reduces the data mapping burden on centers and enables a flexible and scalable approach to data collection and data sharing.

Research Category (please highlight or circle which category best describes your research)

Observational data management, clinical characterization, population-level estimation, patient-level prediction, other (if other, please indicate)

Introduction

The Center for International Blood and Marrow Transplant Research® (CIBMTR) is a research collaboration between the National Marrow Donor Program® (NMDP)/Be The Match® and the Medical College of Wisconsin (MCW). The CIBMTR collaborates with the global scientific community to advance hematopoietic cell transplantation (HCT) and cellular therapy worldwide to increase survival and enrich the quality of life for transplant patients. The CIBMTR has embarked on an initiative to transform how data are collected and transmitted from approximately 400 cellular therapy centers worldwide. Outcomes data are collected for all allogeneic HCTs and 80% of autologous HCTs performed in the US¹. The CIBMTR currently offers a web-based submission process to collect data from a library of forms that are developed and updated with input from the CIBMTR network of scientific experts. The current manual data collection process introduces the potential for human error and creates an administrative burden for the centers to locate, collect and record data in the CIBMTR system. The CIBMTR aims to reduce the center administrative burden by deploying The Observational Medical Outcomes Partnership (OMOP) Common Data Model (CDM) as a centralized data translation hub to receive, store and export data enabling a flexible and scalable approach to data collection and data sharing.

Background

Since 2007, the CIBMTR has supported electronic data exchange from a transplant center's database to the CIBMTR through the AGNIS (A Growable Network Information System) application. Challenges experienced by centers in mapping their database to the data elements used by AGNIS has limited its

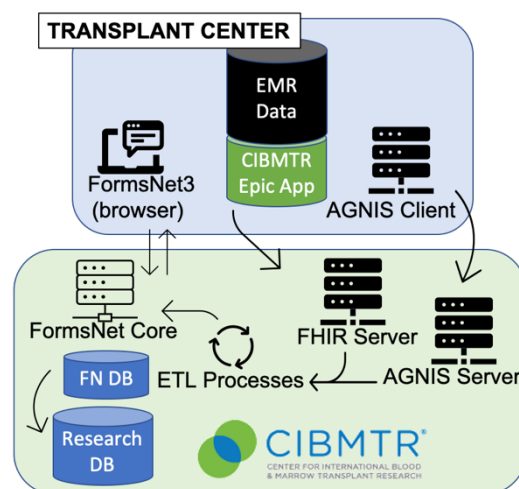


Figure 1. CIBMTR Current Data

widespread adoption by centers. To address these challenges, the CIBMTR deployed the CIBMTR Reporting App (CRA) in the Epic App Orchard®. The CIBMTR Reporting App leverages Fast Healthcare Interoperability Resources (FHIR)³ to allow centers to electronically exchange data with the CIBMTR (Figure 1). However, more than 50% of centers do not use the Epic EHR. Also, both AGNIS and the Epic App rely on a forms library to dictate data collection and ETL processes.

Methods

CIBMTR is now moving to expand the automated collection of cellular therapy data with a primary goal to further reduce the administrative burden on centers. Under the new model, data will pass through a central Observational Health Data Sciences and Informatics (OHDSI) hub hosted by CIBMTR to perform extraction transformation and loading (ETL) processes in a Data Translation Engine (DTE) and to normalize the disparate vocabulary and data models from the transplant centers (Figure 2).

The key processes within the DTE are ingesting data from centers, storing source data centrally, and exporting data in a data model and vocabulary appropriate for intake to other systems. The source data

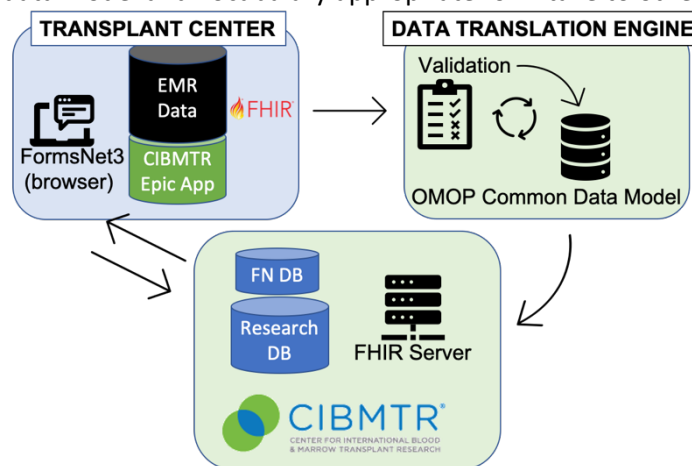


Figure 2. DTE Data Collection Process Model

are ingested through OMOP ETL processes and stored in the CDM using the standardized vocabulary. The data are then run through an export ETL process, converted to the target CIBMTR data model, and sent internally via FHIR to the CIBMTR FHIR server. Data are further processed and made available for external research through a research database. The centralized storage of source data enables a clear audit trail, improves metadata management, and facilitates analysis using either established research channels or future analytics that require source data.

Conclusion

This new model has begun to show a level of improvement at the basic levels for data latency and data quality. Furthermore, when data standards are present for structured data the model starts to introduce a reduction in administrative burden for data entry that can be realized. Initially, centers supporting standard FHIR or OMOP data models significantly decrease the mapping required. The novel deployment of the CDM as a centralized translation engine is expected to support additional data models as needed to further ease data sharing. The DTE ingestion of raw data sourced from the centers 'source of truth' offers improved data provenance and metadata management capabilities to the CIBMTR. The new model rewards centers that have employed data standards because less mapping is required. By choosing a model that relies on data standards and technical standards, the CIBMTR expects that this new model will improve the data acquisition process for its extensive and varied network.

References

1. What We Do. About Us 2020. <https://www.cibmtr.org/About/WhatWeDo/pages/index.aspx> (accessed July 14, 2020).
2. Integration of hematopoietic cell transplantation outcomes data. Renner R, Carlis J, Maiers M, Rizzo JD, O'Neill C, Horowitz M, et al. Proceedings of 2015 International Conference on Data Integration in the Life Sciences. 2015;9162:139–46.
3. FHIR®. FHIR v401 2019. <https://www.hl7.org/fhir/> (accessed July 14, 2020)