

**Mapping Gravity value sets to OMOP CDM:
The case of the food insecurity screening
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The Office of the National Coordinator for Health IT (ONC) launched the USCDI and USCDI+ initiatives to establish domain and program-specific datasets. [1] As part of these initiatives, the ONC has developed data element lists for the following subdomains supporting Public Health programs: Case-Based Surveillance, Laboratory Data Exchange, Multi-Directional Exchange with Healthcare and Other Partners, Resource Reporting and Situational Awareness, and Risk Behaviors and Drivers of Inequity Data elements.[2] Supporting the ONC aims, the HL7 Gravity Accelerator developed Social Determinants of Health (SDOH) Value Sets in response. However, only a handful of studies have been published to-date on the standards-based representation of SDOH screening tools. Further, these have yet to demonstrate that the SDOH standards could be used with real-world data or for data exchange between sites using different Common Data Models, with a few exceptions.[3]

Methods

In this project, we focus on identifying the assessment tools related to the SDOH developed by the Gravity project. [4] Using the Athena software, we manually mapped food insecurity values set as a use case to OMOP CDM. We also computed a similarity index between assessment tools, for which value sets were mapped to Athena, and other screening tools that were not mapped to assess the level of substitutability between different assessment tools (Figure. 1-2).

Results

The Gravity project identified 23 programs that aimed to reduce food insecurity (Table. 1). The project also identified 24 screening tools with 98 related questions to assess food insecurity (Table. 2). We were able to map two screening tools to the LOINC Code and OMOP CDM with four unique questions. Nine screen tools' answers' choices were mapped to LOINC codes. However, these questions themselves were not mapped to LOINC or any other vocabulary. The BERT sentence embedding allows substituting most of the questions by using the three questions mapped to the LOINC code (Figure. 3).

Conclusion

Few screen tools have been mapped to both FHIR and OMOP CDM. Further work is needed to identify which questions from these tools should be standardized and mapped and create corresponding resources within FHIR and the OMOP CDM. We found that text similarity can be used to streamline the task of standardization and consolidation across different screen tools and questions. Large Language Models (LLMs) such as BERT can compute semantic similarity in various Social Determinants of Health (SDOH) constructs. Doing so may encourage more effective utilization of SDOH constructs by Electronic Health Record (EHR) vendors and healthcare providers. LLM's may also provide the OHDSI community with the means to identify missing SDOH questions and answers. In turn, this could support prioritized SDOH content development in the OMOP CDM,

Appendix

Figures:

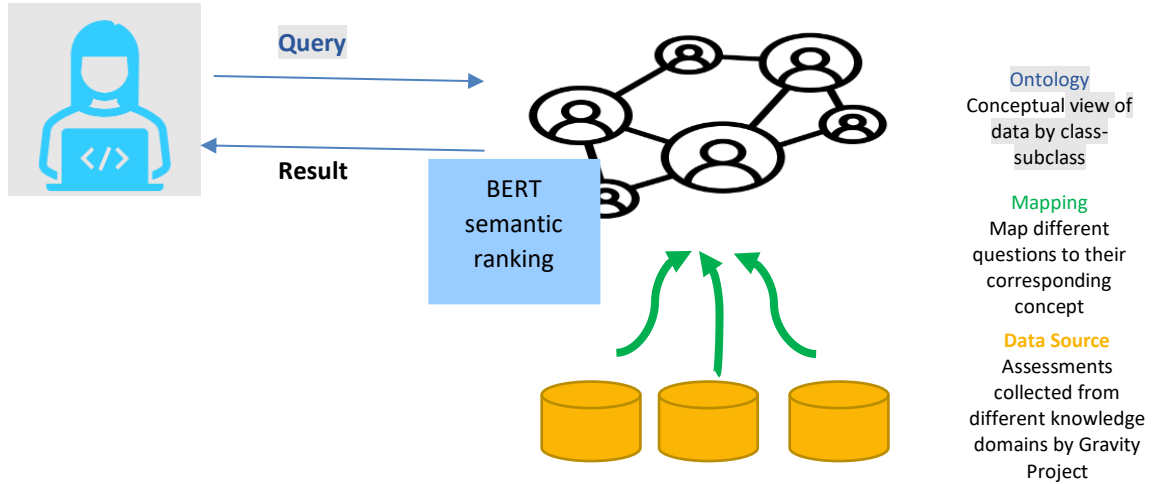


Figure 1: Representation of the decision support system for querying food insecurity assessment tools and identifying their similarities using BERT.

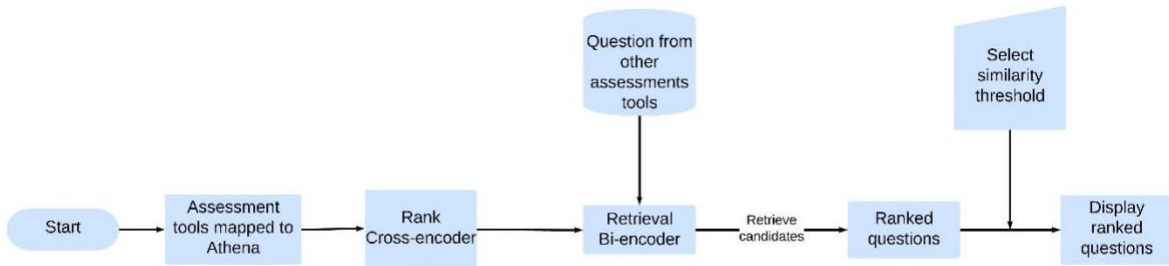
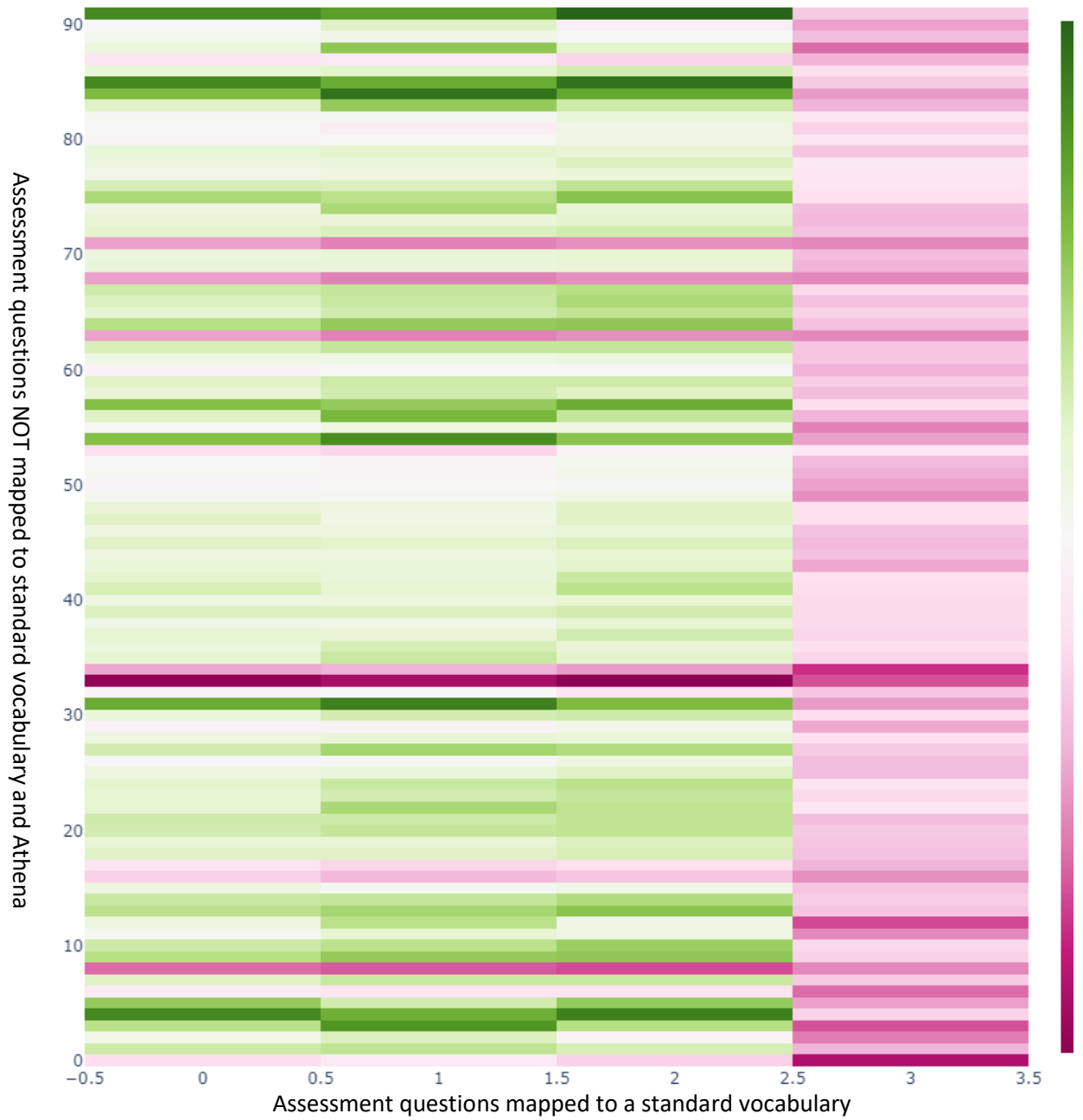


Figure 2: Similarity index algorithm using BERT.

Figure 3: Alignment of non-standardized the food insecurity assessment questions to the standardized assessment questions



Tables:

<i>Table 1: Program targeting food insecurity</i>
Benefits enrollment assistance program
Community Meal Program
Child and Adult Care Food Program
Community Action Agency Program
Community resource network program
Congregate Meal Program
Farmers' Market Nutrition Program for Women, Infants and Children
Food Distribution Program on Indian Reservations
Food pantry program
Food prescription program
Food program
Gus Schumacher Nutrition Incentive Program
Food program and nutrition program
Garden program
Home-Delivered Meals Program
Medically Tailored Meals Program
Nutrition program
School meal and snack program
Senior Farmers' Market Nutrition Program
Special Supplemental Nutrition Program for Women, Infants and Children
Summer Food Service Program
Supplemental Nutrition Assistance Program
Supplemental Nutrition Assistance Program

<i>Table 2: Identified food insecurity tools</i>
AAFP Social Needs Screening Tool
AHC
CHCW Internally developed the SDOH Tool
Community Connect Social Needs Screening Tool
FIES-SM
Health Information National Trends Survey
Health Leads
HFIAS
Household Food Security Survey Module
IHELP
Kaiser YCLS
Kleinman
Medicare THA
NC SDOH

SEEK
SWYC
Total Health Quick Check (CHC Sno)
US household food security 18 item
US household food security six-item, ten-item, and 18 items
US household food security ten items, and 18 items
USDA Youth
We Care

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References:

1. Centers for Medicare & Medicaid Services. Medicare and Medicaid Programs; Patient Protection and Affordable Care Act; Advancing Interoperability and Improving Prior Authorization Processes for Medicare Advantage Organizations, Medicaid Managed Care Plans, State Medicaid Agencies, Children’s Health Insurance Program (CHIP) Agencies and CHIP Managed Care Entities, Issuers of Qualified Health Plans on the Federally-Facilitated Exchanges, Merit-Based Incentive Payment System (MIPS) Eligible Clinicians, and Eligible Hospitals and Critical Access Hospitals in the Medicare Promoting Interoperability Program. Federal Register. 2022. pp. 76238–76371. Available: <https://www.federalregister.gov/d/2022-26479>
2. USCDI+. [cited 9 Oct 2023]. Available: <https://www.healthit.gov/topic/interoperability/uscdi-plus>
3. Phuong J, Hong S, Palchuk MB, Espinoza J, Meeker D, Dorr DA, et al. Advancing Interoperability of Patient-level Social Determinants of Health Data to Support COVID-19 Research. AMIA Jt Summits Transl Sci Proc. 2022;2022: 396–405. Available: <https://www.ncbi.nlm.nih.gov/pubmed/35854720>
4. OHDSI-Symposium-Submission: This repository includes the resources used for my conference submission. Github; Available: <https://github.com/adambouras/OHDSI-Symposium-Submission>