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STOP-HCV-HCC Program: Privacy-Preserving Innovation for Remote Data Access and Analytics at Federally Qualified Health Centers in South Texas

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Abstract. STOP-HCV-HCC program to screen and treat hepatitis C, vaccinate for hepatitis B, and prevent hepatocellular carcinoma is implementing a cloud-based privacy-preserving platform to overcome electronic health record barriers to reporting, without data transfer, at four federally qualified health centers in South Texas, USA.

Keywords. Rural Health, Medically Underserved Areas, Hispanic or Latino, Electronic Health Records, Medical Informatics, Data Science

1. Introduction

UT Southwestern and UT Health Science Center San Antonio (UTHSA) have partnered with four U.S. federally qualified health centers (FQHC) in South Texas, which have 26 clinical sites across 14 counties, for the STOP-HCV- HCC clinical program to screen and treat hepatitis C (HCV) and prevent hepatocellular carcinoma (HCC), which occurs in higher than the national rate in the primarily Latino rural South Texas population. FQHCs are federally-funded clinics for medically underserved, low-income populations. Funded by Cancer Prevention and Research Institute of Texas (CPRIT), the program screened 9,128 eligible patients (born 1945-1965) during its first four years. However, extant native reporting functionalities of the disparate electronic health record systems (EHRs) were inaccurate at the FQHCs and nonfunctional at one, hindering analytics for required reporting and clinical program management. Remote, secure federated reporting across the FQHCs' data was impossible. In response, the UT team collaborated with TripleBlind, a Mayo Clinic-backed startup to leverage its privacy-preserving data-access and analytics platform [1] after meeting them at a conference and reviewing MITRE Corporation's independent evaluation of their platform. Together, we garnered next-

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round CPRIT funding via an innovation grant and expanded the program to include HCV screening for all adults (18-79), and hepatitis B (HBV) screening and vaccination. The innovation on which funding hinged is to implement the TripleBlind platform to access and analyze EHR data within and across decentralized FQHCs, without transferring data.

2. Methods

From November 2023 to March 2024, we remotely accessed the backup analytics server for the EHR at the FQHC Community Health Centers of South Texas (CHCST). From the table structure, we identified necessary data elements and wrote structured query language (SQL) queries for quarterly reporting on the following: screening and testing for HCV and HBV (13 and 14 measures, respectively), HBV vaccination (7 measures), and 20 more data elements, including proxy variables for visits, lab values, and HCC diagnosis, for ongoing HCV case management. Operations were carried out using secure, privacy-preserving methods, with a data governance agreement in which the FQHC is alerted, informed, and opens server access each time it's needed, and has access to tracking logs. We remotely installed the TripleBlind software in on-premises servers at CHCST and at UTHSA in a secure cloud instance; implementation, with formative and summative evaluation, is guided by the Systems Engineering Initiative for Patient Safety (SEIPS 2.0) framework. Using Secure Multi-Party Computation, TripleBlind's Blind Learning enables many operations from descriptive statistics, to training sophisticated neural networks on federated data [1]. Further technical details and architecture will be shared at the session. We connected the TripleBlind platform to the queries at CHCST, ran the first reports, and validated report data through extensive back-end querying and manual front-end EHR data checking. We've begun work at the second FQHC.

3. Results, Discussion and Conclusions

We can now run required quarterly reports at CHCST via the TripleBlind platform in less than 4 minutes by hitting a button as opposed to the many hours over multiple days that the CHCST team used to spend each quarter attempting to wrest accurate data from their EHR's built-in reporting functionality. Our now-accurate reporting showed that the program successfully screened ~four times more patients for HCV at CHCST in the prior reporting period than was previously reported before our implementation (210 vs. 52).

Significant work was required for data identification and query-building, but the approach we have developed is feasible, reproducible, and affordable. We expect much greater reporting accuracy and efficiency at the other FQHCs, too. EHR vendors could expedite the processes we have developed by aiding in data field identification. We look forward to completing implementation, and further exploring and reporting on secure, private methods and advanced federated querying and analysis across the FQHCs.

References

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