Making OMOP Happen: An Implementation Science Approach

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Background

This brief report aims to present the implementation science approach of the CURE Drug Repurposing Collaboratory (CDRC). The CDRC works to implement the Edge Tool Suite, a docker container deployment of the OHDSI stack which supports the use of these tools especially at sites with lower technical resources, at nearly two dozen healthcare systems, and share lessons learned about strategies to improve implementation of OHDSI projects.

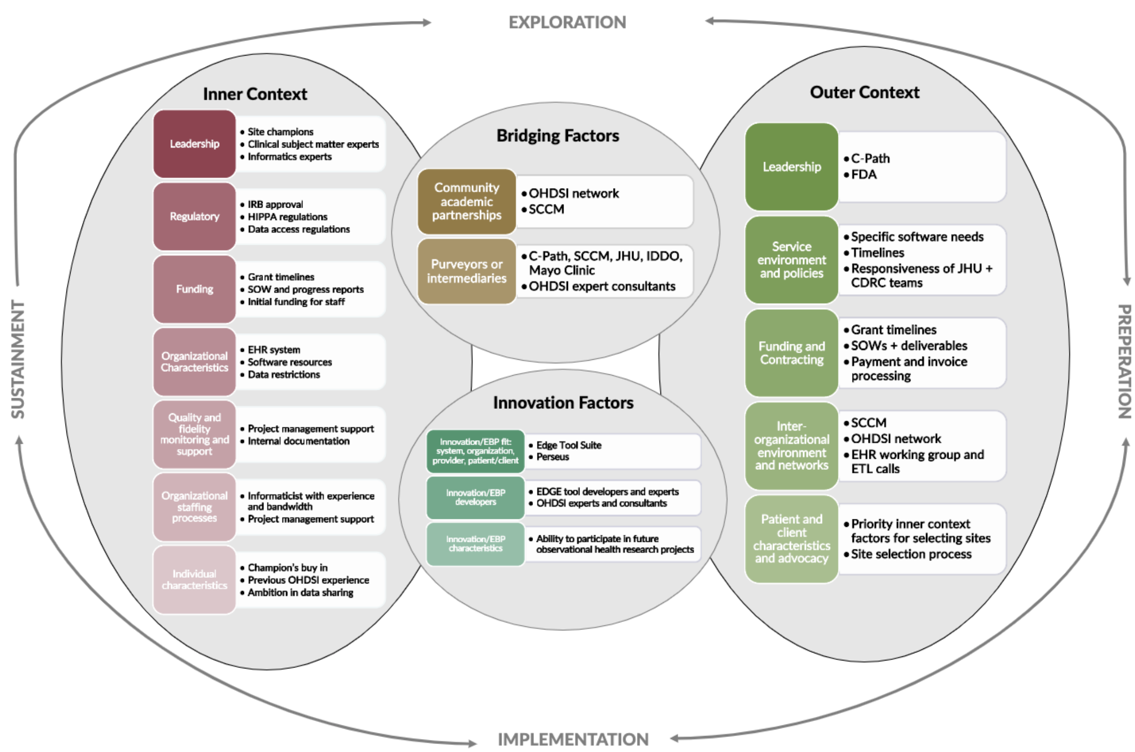
The CDRC is a public private partnership between the US Food and Drug Administration (FDA), the National Institutes of Health (NIH) National Center for Advancing Translational Sciences (NCATS) and the Critical Path Institute (C-Path). The CDRC also includes five primary institutional partners: the Society of Critical Care Medicine (SCCM), Johns Hopkins University, the Infectious Diseases Data Observatory (IDDO) at Oxford University, and Emory University. This collaborative received funding to implement the OHDSI Stack in healthcare systems to promote sharing of high-quality, de-identified data in a central repository. In order to participate in the registry, sites use OHDSI tools to define a cohort of COVID-19 inpatients who met prespecified inclusion criteria. Forty core variables are extracted and transferred to SCCM and to IDDO, where they become part of a multi-site registry, accessible via application to researchers. A cross-sectional subset of the data is also made available for public exploration in the FDA and NCATS hosted CURE ID platform. These data are intended to be updated on a regular basis, up to several times a year depending on the severity of the pandemic and number of patients, using a flush and fill method.

In this report, we use the Exploration, Preparation, Implementation, Sustainment (EPIS) framework to analyze the process of onboarding sites and facilitating successful completion of the project. EPIS is an implementation science approach to the implementation of evidence-based practices (EBPs) in a variety of settings. The framework is made up of four main phases (exploration, preparation, implementation, and sustainment) as well as four groups of factors that impact implementation (inner context, outer context, innovation factors, and bridging factors). This report uses these factors to analyze the project and understand the strengths and weaknesses of the CURE ID project's interactions with sites so far.

Methods

We reviewed recorded calls and email communications with sites to identify major successes and roadblocks in the implementation of the OHDSI stack and OMOP common data model. Through these sources, we were able to retroactively apply the EPIS implementation framework to understand and evaluate the applicable factors associated with the CDRC's project. This process included diagraming the inner and outer context and the bridging and innovation factors and looking at them within the EPIS visualization model.

Additionally, we performed member checking asking core team members to review the diagrams developed, feedback from sites, and personal experiences to understand barriers which emerged and delayed or prevented a project's implementation at different sites as well as key facilitators which promote successful implementation. Identified barriers and facilitators were used to inform areas of focus in considering potential changes for future sites.



Results

The team found that understanding the inner context of sites was particularly important for determining whether the project would be successful at any given site. Specifically, understanding the technological factors (e.g., EHR vendor, software resources, and staff experience) and the compliance factors (i.e., ethics review and data security processes) allowed our project to best adapt to the specific environment. In situations where the site's inner context was not well understood before attempting implementation the project was more likely to be delayed or unsuccessful due to constraints outside of the CDRC team's control. Additionally, understanding the leadership and staffing resources at a site best helped predict success of a site. In cases where project champions held higher positions of leadership within the institution (e.g., Chief Medical Informatics Officer), the project was more likely to move forward and continue to gain traction with the necessary stakeholders at the site. Conversely, in situations where sufficient staffing was not available, funding or other outer context factors were not able to overcome the barriers to success.

Bridging factors, such as professional networks and the OHDSI community also proved important in the site recruitment and engaging a first conversation with a potential new site. Beyond the first conversation, strong bridging factors also contributed to more efficient and effective follow through.

When bridging factors provided consistent and reliable tech support, sites were more likely to have long-term and lasting success with the project.

Finally, our analysis highlighted the importance of focusing time and effort on emphasizing and communicating the innovation factors to potential sites and their leadership. As the project progressed, we were able to better define what the project was providing to the site and the value add of implementation. This allowed for faster connection with the correct people at the institution and expedited the speed at which sites moved beyond initiation to the contracting phases.

Conclusion

Overall, successful implementation of OHDSI tools via the Edge Tool Suite and uptake of the OMOP common data model at healthcare system sites requires understanding individual site's technological, regulatory, and staffing contexts. Spending time to ask questions and understand these factors is worthwhile, as it leads to better customization and more efficient work processes as the project progresses. Additionally, connections and professional networks are important to connect the OHDSI community with sites. The OHDSI network is a valuable resource itself in identifying sites interested in this kind of work, however expanding to other professional networks, in this case SCCM, allows for more clinical interest in the research and broadens the network of institutions that could benefit from common data models. Finally, those seeking to partner with hospital sites should focus on clearly and concisely communicating the value-add and innovation factors associated with the significant resource commitment that converting data to OMOP can require. While some in informatics may inherently understand the value, refining the value proposition to appeal to more clinically focused physicians and staff can allow for expedited adoption of the project.

References

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