Using a Continuous Quality Improvement (CQI) Approach for Gap Analysis of OHDSI/ATLAS as An Enterprise Self-Service Analytics Platform by Academic Medical Centers

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Background

Informatics departments at large academic medical centers generally have two approaches to supplying observational health research data to investigators: custom queries developed manually by expert data engineers and data analysts or providing self-service analytic tools.[1] These tools ideally should engage users in systematic cohort identification and computable phenotyping activity in order to formulate a query based on the combination of clinical events and their temporal relationships, inclusion and exclusion criteria and other patient or population level characteristics.[2]

Custom queries require intimate understanding of the underlying data ecosystems by trained data experts, intensive communication between investigators and analysts, expose confidentiality and security of protected health information in unnecessarily, and are difficult to audit, trace, or reproduce. Self-service tools on the other hand require deep understanding of biomedical informatics standards and terminology systems, computable phenotyping, and training and onboarding process that is usually a barrier to general investigators.[3]

This project outlines a systematic research-question intake process that allows front-line researchers and clinical investigators to work directly with OHDSI Atlas system in collaboration with informatics analysts that support cohort studies and analytics while collecting direct user feedback about usability, user experience, challenges and short comings, and important feature requests from a non-informatics researchers' perspective. The current institutional perception is that Atlas' self-service capabilities, while powerful, are meant for advanced users with a formal informatics and data science background. Subsequently, this makes it difficult or impractical to use for general researchers who are interested in prep-for research or simple cohort-based studies in a local setting.

We aim to systematically guide users and provide just-in-time training in the context of user-requested projects, building their research question and guiding them to their analysis and providing applied hands-on experience to the researcher on how Atlas can help serve their real-world data research needs, while collecting direct feedback on usability, user experience, roadblocks to completion of self-service projects, potential novel optimizations to enable local users in a self-service mode to drive their projects to completion independently in a low-touch training environment. An issue tracker system is developed to log, classify, prioritize issues, and track resolution status of all projects to ensure that over time ATLAS becomes seen internally as a powerful analytics tool for all real-world data users and projects within across collaborating institutions.

Methods

We created a new intake process for the research data request process at Albert Einstein's College of Medicine that utilizes a formal ITSM methodology and tool. This process includes the following steps:

1. Create an inventory of requested projects and feasibility of completing using Atlas

We looked at all channels of incoming data requests and consolidated them into our request management software, Atlassian's Jira Service Manager. The informatics team assessed each project's feasibility using the OHDSI/Atlas tool with respect to available data and cohort requirements. Each project was then tagged with pertinent information about the research question and design methodologies. Any specific gaps in our OHDSI/Atlas technology or availability of data in the OMOP-CDM was noted as items to clarify with researchers or to resolve before meetings.

2. Logistics regarding scheduling meeting with researcher

For projects that have been evaluated and identified as good candidates for OHDSI/Atlas implementation, informatics analysts reached out to the requestor with an initial analysis and request to meet. Meeting requests are coordinated using an online appointment manager linked to the team's and researcher's calendar availability to speed up scheduling the initial project review session.

3. Preparatory work in advance of meetings

Prior to the initial meeting, an informatics analyst created a draft cohort definition based on the observational research question. During the initial project review session, the researcher and the informatics analyst reviewed the creation of the cohort definition together to clarify any details, examine potential alternatives, and review differences on the cohorts and research questions. Once the cohort definition was created and generated, subsequent characterization and/or data extraction requirements are completed using the extended cohort extraction tools.

4. Issues discovered and follow-up

Any issues that were discovered, including missing data in OMOP-CDM, or limitations of the Atlas cohort workflow, usability issues, complaints, errors due to misinterpretation or misunderstanding of the tools and interfaces were all noted as build fixes. These were prioritized and entered into a custom developed issue tracker application to be shared with the product teams which were reviewed and resolved. Many issues related to data availability could be resolved using our mapping and data management workflows, since the requesting researcher is usually a subject matter expert for the requested data domains. We follow a bi-weekly release cycle to resolve and update usability issues, add new features, and improve data availability. The newly available data and build fixes were communicated to the institution's OHDSI/Atlas user community using a home page dedicated and dedicated content management system.

Results

As of May 2023, there were 28 data-request projects in review, including data needed for grant submissions, clinical trial site feasibility questionnaires, and quality improvement projects. The current project statuses include triage, evaluation, in progress, PI review, and completed. We have identified more than 37 high priority issues preventing from a truly self-service utilization of OHDSI/ATLAS by general users. However, most issues found with the inability to complete a data request in a self-service mode can be attributed to the following 4 categories: 1) source data not available yet in our OMOP-CDM instance, 2) the Atlas user interface is not intuitive and understandable to design the cohort, 3) user has trouble finding specific concepts using OMOP as terminology system and existing search and navigation process, and 4) projects require information available in non-discrete sources such as clinical text.

The informatics team is addressing these issues by working with the product teams to facilitate the data availability in OMOP and by improving the Atlas user interface to make it more intuitive. Additionally, bi-weekly summaries of data requests and their statuses are communicated to key institutional stakeholders via emailed report. This ensures transparency and accountability in the data-request process.

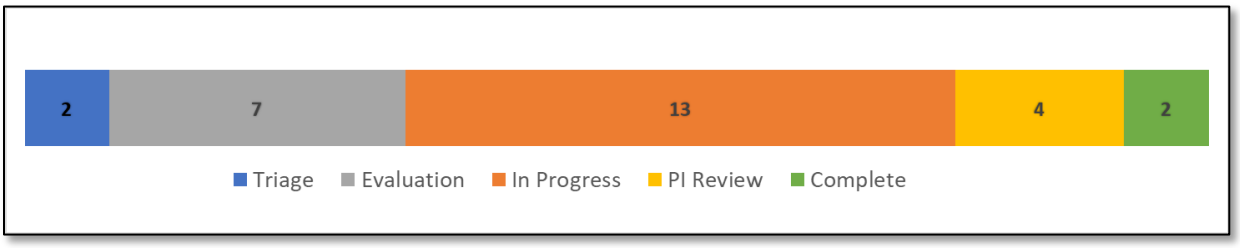

Figure 1: Summary of active requests by status

Status Name	Description
Triage	Requests identified as projects which can be fulfilled using Atlas
Evaluation	Waiting on researcher to clarify request, further investigation is needed to understand the underlying research question or problem before completing the build.
In Progress	Engaged with researchers, scoped out initial requirements, negotiated a plan and timeline, and started the build in Atlas
PI Review	Review results with investigators
Complete	Data results provided to investigator

Figure 2: Status descriptions

Conclusion

The new data-request review process has been well-received by researchers and the institution leadership. It has increased efficiency and collaboration between researchers and informatics analysts. However, there are still some manual steps involved, which will be automated as Atlas services are scaled up. The goal is to provide Atlas as an end-to-end self-service research data tool for researchers.

The Informatics team is committed to continuously improving the process and ensuring that researchers have the data they need to conduct high-quality research.

References

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