

# Data Quality and Architecture Enrichment for Insights Visualization



## The Challenge

A radiopharmaceutical imaging company faced challenges in monitoring patient statistics and clinical trial logistics. A lack of visibility and awareness into this data hindered conversations with leadership regarding the status of active clinical trials, ultimately putting clinical trial results at risk. The company needed a trusted, single location to ask relevant business questions about their data and to see trends or anomalies across multiple clinical trials. They faced challenges, however, due to trial data being sent by various vendors in different formats (no standardized values across trials). To mitigate these issues, the company engaged Enterprise Knowledge (EK) to provide Semantic Data Management Advisory & Development as part of a data normalization and portfolio reporting program. The engagement's goal was to develop data visualization dashboards to answer critical business questions with cleaned, normalized, and trustworthy patient data from four clinical trials, depicted in an easy-to-understand and actionable manner.



## The Solution

To unlock data insights across trials in one accessible location, EK designed and developed a Power BI dashboard to visualize data from multiple trials in one centralized location. To begin developing dashboards, EK met with the client to confirm the business questions the dashboards would answer, ensuring the dashboards would visually display the patient and trial information needed to answer them. To remedy the varying data formats sent by vendors, EK mapped data values from trial reports to each other, normalizing and enriching the data with metadata and lineage. With structure and standardization added to the data, the dashboards could display robust data insights into patient status with filterable trial-specific information for the clinical imaging team.

EK also worked to transform the company's data management environment—developing a medallion architecture structure to handle historical files and enforcing data cleaning and standardization on raw data inputs—to ensure dashboard insights were accurate and scalable to the inclusion of future trials. Implementing these data quality pre-processing steps and architecture considerations prepared the company for future applications and uses of reliable data, including the development of data products or the creation of a single view into the company-wide data landscape.

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## The EK Difference

To support the usage, maintenance, and future expansion of the data environment and data visualization tooling, EK developed knowledge transfer materials. These proprietary materials included setting up a semantic modeling foundation via a data dictionary to explain and define dashboard fields and features, a proposed future medallion architecture, and materials to socialize and expand the usage of visualization tools to additional sections of the company that could benefit from them.

### *Dashboard Knowledge Transfer Framework*

To ensure the longevity of the dashboard, especially with the future inclusion of additional trial data, it was essential to develop materials for future dashboard users and developers. The knowledge transfer framework designed by EK outlined a repeatable process for dashboard development with enough detail and information that someone unfamiliar with the dashboards can understand the background, use cases, data inputs, visualization outputs, and the overall purpose of the dashboarding effort. Instructions for dashboard upkeep, including how to update and add data to the dashboard as business needs evolve, were also provided.

### *Semantic Model Foundations: Data Dictionary*

To semantically enhance the dashboards, all dashboard fields and features were cataloged and defined by EK experts in semantics and data analysis. In addition to definitions, the dictionary included purpose statements and calculation rules for each dashboard concept (where applicable). This data dictionary was created to prepare the client to process all trial information moving forward and serve as a reference for the data transformation process.

### *Proposed Future Architecture*

To optimize data storage in the future, EK proposed a medallion architecture strategy consisting of Bronze, Silver, and Gold layers to preserve historical data and pave the way for matured logging techniques. At the time EK engaged the client, there was no proper data storage. EK's architecture strategy detailed storage preparation considerations for each layer, including workspace creation, file retention policies, and options for ingesting and storing data. EK leveraged technical expertise and a rich background in architecture strategies to provide expert advisory on the client's future architecture.

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## *Roadshow Materials*

EK developed materials that summarized the mission and value of the clinical imaging dashboards. These materials included a high-level overview of the dashboard ecosystem so all audiences could comprehend the dashboard's purpose and execution. With a KM-angled focus, the overall purpose of the materials was to gain organizational buy-in for the dashboard and build awareness of the clinical imaging team and the importance of the work they do. The roadshow materials also sought to promote dashboard adoption and future expansion of dashboarding into other areas of the company.



## The Results

Before the dashboard, employees had to track down various spreadsheets for each trial sent from different sources and stored in at least four different locations. After the engagement, the company had a functional dashboard that displayed on-demand data visualizations across four clinical trials that pulled from a single data repository, creating a seamless way for the clinical imaging team to identify trial data and patient discrepancies early and often, preventing errors that could have resulted in unusable trial data. In all, having multiple trials' information available in one streamlined view through the dashboard dramatically reduced the time and effort employees had previously spent tracking down and manually analyzing raw, disparate data for insights, from as high as 1-2 hours every week to as low as 15 minutes. Clinical imaging managers are now able to quickly determine and share trusted trial insights with their leadership confidently, enabling informed decision-making with the resources to explain where those insights were derived from.

In addition to the creation of the dashboard, EK helped develop a knowledge transfer framework and future architecture and data cleaning considerations, providing the company with a clear path to expand and scale usage to more clinical trials, other business units, and new business needs. In fact, the clinical imaging team identified at least four additional trials that, as a result of EK's foundational work, can be immediately incorporated into the dashboard as the company sees fit.

Enterprise Knowledge (EK) is a services firm that integrates Knowledge Management, Information Management, Information Technology, and Agile Approaches to deliver comprehensive solutions. Our mission is to form true partnerships with our clients, listening and collaborating to create tailored, practical, and results-oriented solutions that enable them to thrive and adapt to changing needs.

Our core services include strategy, design, and development of Knowledge and Information Management systems, with proven approaches for Data and Information Management, Knowledge Graph Implementation in support of NLP, ML, and AI initiatives, Taxonomy Design, Project Strategy and Roadmapping, Brand and Content Strategy, Change Management and Communication, and Agile Transformation and Facilitation. At the heart of these services, we always focus on working alongside our clients to understand their needs, ensuring we can provide practical and achievable solutions on an iterative, ongoing basis.