

The Mayo Clinic, data mapping and building a successful advanced data analytics program

In 2010, the Mayo Clinic's Medical Director for Quality, Dr. Stephen Swensen, and Administrator for Quality, Mr. James Dilling, realized that for the Mayo Clinic to successfully apply data analytics to better manage risk and facilitate positive patient outcomes, they would first need to have a better understanding of its data, and the disparate collection sources used to collect and analyze it.

Quality measurement, a key component to improve healthcare, has traditionally relied on administrative data and time-consuming manual chart abstraction. This was no exception to Mayo Clinic. With the greatly increasing number of externally reported measures and internal quality initiatives, Mayo's quality organization was challenged with easing the manual work effort burden placed on staff. The Quality Management Services (QMS) department had more than doubled its chart abstraction staff to focus primarily on manual metric creation. For the effort to be successful, Mayo's leadership agreed that automating quality measures would provide the only viable way to free up staff time, allowing their focus to remain more on important quality improvement and analytic work rather than wasting precious time on manual measure creation.



Mark W. Stevens, Principal, ARRAHealth Consulting, President-Elect, [Central PA HIMSS](#)

The project

Assessing the data and collection sources across Mayo Clinic is no small task. This project involved capturing and assessing the data quality of 500 unique data elements used in 275 quality measures collected across 40 source systems across Mayo's three clinics located in Rochester MN, Scottsdale AZ and Jacksonville FL. The outcome: Mayo was able to successfully develop a quality measure assessment methodology and centralized measure metadata repository that today continues to serve as the foundation to their current e-Measure and data analytics programs.

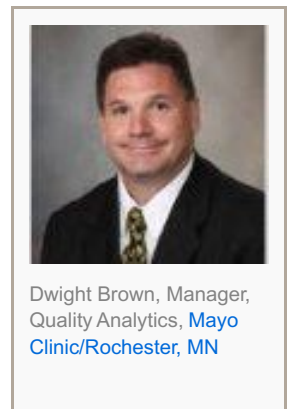
The organization

Mayo Clinic is a nonprofit organization committed to medical research and education, and providing expert, whole-person care to everyone who needs healing. Mayo Clinic has major campuses in Rochester, MN; Scottsdale and Phoenix, AZ; and Jacksonville, FL. The Mayo Clinic Health System has dozens of locations in several states.

The team

Dwight Brown is the Manager of Quality Analytics at Mayo Clinic in Rochester, Minnesota. He has 18 years of broad-based healthcare experience gained through management and internal consultation roles at Mayo. In addition to Finance and Human Resources, he has spent the past 15 years in Quality and Accreditation. For the past 8 years he has managed Quality measurement operations, providing strategic direction to a 30-person unit of nurse and non-nurse personnel accountable for abstraction, analysis, and reporting of internal and external Quality data. He has expertise in the application of a variety of quality improvement methodologies and serves as an institutional expert on Meaningful Use and eMeasurement.

To assist with solving with this problem, Mayo's Enterprise Information Management Leadership turned to their trusted partner, Avatar Enterprise Business Solutions. Avatar is a consulting firm that focuses on helping clients implement business-driven information management and analytics solutions aimed at improving the quality of healthcare while reducing costs, and creating a more agile enterprise that is better able to respond to new business opportunities in today's changing healthcare environment. Sanjay Pudupakkam, President & Founder has been committed to helping healthcare clients with information management and analytics needs for over 20 years.



Project Q&A with Mayo's Dwight Brown and Avatar's Sanjay Pudupakkam

Stevens: In looking at how and from what sources Mayo collects data, what were your biggest challenges? Any surprises?

Brown: We were challenged with having multiple, often disparate, data sources. Data elements were difficult to find and there was often no single source of truth. In addition, much of our data was contained in text fields, making automated data extraction nearly impossible.

Pudupakkam: The sheer number of source systems, measures and data elements identified and walking through the abstraction process at each of the Mayo Clinic campuses was the biggest challenge at hand during this work. While performing this work, we also identified and recommended any needed chart abstraction standardization and consistencies.

Stevens: How has data collection – and its relative value and types of uses – changed since you first began the project?

Brown: The original automation effort, combined with the application of the tools in our Meaningful Use effort has raised the awareness of the need to document in discrete fields where appropriate. Many key stakeholders have come to the table to develop ways which balance discrete documentation with minimizing provider documentation burden. This has truly shifted to becoming a full team effort.

Pudupakkam: This is a foundational initiative that lays the groundwork for future IT application and analytic projects.

It is quite common to find IT projects planning the reporting and analytics activities in the latter part of the project and sometimes completely overlooking this area. These activities often should occur at the beginning of the project. Organizations are in need of tangible information management methods and tools to ensure they are well positioned to capitalize on the knowledge gained from their information insights.

Stevens: How has the Business Case for this project evolved? Has this project lead Mayo into any new lines of endeavor?

Brown: The primary purpose of the original effort was to decrease the resources abstracting records, and shift to more advanced analytics. While this has continued, Meaningful Use pushed the understanding that getting to effective eCQM processes would have a direct impact on the true display of the level of care we were providing. It is now broadly understood that eCQMs are the methodology that will be used by regulatory bodies and if we want to provide an accurate display of our performance, our documentation practices need to support this.

Pudupakkam: The business case evolved in line with my client's desire. The driver for the initial work was resource cost savings based as the organization had seen a sudden and almost exponential growth in the number of quality measures requiring internal and external reporting. As quality measures became partially and fully automated and data element capture improved, the business case evolved to better patient outcomes and facilitate in managing risk



with the use of knowledge gained from analytics.

Stevens: How was Mayo able to define and achieve success on this project?

Brown: We were successful in this overall initiative because the Avatar team was able to:

- Provide knowledge and expertise to help us understand our available data and where gaps existed, which needed to be filled to get to electronic measurement.
- Provide effective project management of a very complex initiative.
- Provide an overall assessment of current state, recommendations for how to achieve our goals, and communication at multiple levels.
- Provide an analysis framework and centralized metadata repository which serves as the backbone of our eCQM and data analytic efforts.

Conclusion

Brown: At the time Avatar was hired, Mayo lacked a clear idea of its ability to automate measures. We knew we were expending significant resources in manually abstracting measures. Mayo also knew there had to be a better way, but we didn't know how to get there. Avatar came in with an iterative methodology centering around first understanding our data. Through conversations with their Subject Matter Experts and their understanding of data systems Avatar cataloged every data element for named Quality measures. Through this analysis we were able to get a clearer picture of discrete data elements, data found in text notes, and data existing in multiple field types. From there Avatar made recommendations on measures, which could be partially or fully automated.

Avatar's analysis indicated 76 percent of the needed data elements were in non-discrete or "mixed" fields (same data element was documented in both discrete fields and text notes). About the time the analysis was provided, Meaningful Use efforts were beginning. The information they had gathered gave us a jump start in understanding our gaps in the Meaningful Use eCQMs. From there we formulated a structure consisting of members from Quality Measurement, IT, the Practice, and other key groups working with the EMR. Utilizing the analysis and operational frameworks we actively worked to close the data gaps so as to demonstrate our truest performance with eCQMs.

Through work on these and other measures the proportion of non-discrete and mixed fields has decreased to 50 percent. As Mayo has moved forward into subsequent stages of Meaningful Use and, more recently, prepared for eCQMs for other government programs we have continued to use these frameworks given their effectiveness. It should be noted these efforts were undertaken in Mayo Clinic Rochester first, but will be used across all Mayo sites as we move into the future.

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