

Key Features of a Healthcare Analytics Platform

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Introduction


In healthcare, practitioners struggle to implement data-driven decision making for several reasons. Complexity, the amount of clinical data, and the ability to collect it put tremendous financial and operational burdens on providers, taxing an already complex process of provider and patient interactions.

Segmentation of care across a variety of settings, each running its own system for data capture, and the lack of centralized ownership of health records make it difficult for organizations to exchange data and challenging for patients to access an aggregated, holistic view of the care received.

Even organizations with financial incentives to use data for optimal care are sometimes unable to access this holistic view. Payers (healthcare insurance providers) rely on comprehensive and accurate data for calculating risk, setting prices for premiums and reimbursement rates for providers, and for proactively managing members with specific diagnoses to ensure they get the right care to maintain or improve their condition.

In 2009, when Congress introduced the HITECH Act, it drove a major shift in the national healthcare industry. The act recognized that acquisition, exchange and meaningful use of data for decision making were integral to delivering quality care. Additionally, specific rules under the Meaningful Use Mandate and the funding it provided allowed for the digitization of healthcare data and set up an important framework for a more objective way to measure quality and outcomes of care. Decision makers understood old models of fee-for-service did not incentivize the reduction or optimization of services.





Using data for decision making and tying financial gains to better health outcomes paved the way for a shift toward value-based care. Providers started to amass an incredible amount of digital data, but the ability to exchange it remained a significant challenge for siloed organizations. More importantly, sharing data with users who could use that data for optimal care and services for their patients required all parties to invest in expensive, limited-scope solutions — which was not always a feasible option.

Even in 2009, acquiring and organizing data for optimal decision making were not new concepts. Many organizations across various industries — not only healthcare — wanted to use data more effectively and become data-driven. Digital transformation as a concept was taking off around the same time, although it was (and still is) an imprecise term companies use to identify a very wide range of activities and results.

Today, we still see the same themes highlighted in healthcare providers' strategic goals. HIMSS22 demonstrated vendors and buyers are focusing on personalized care delivery they can only enable with holistic views of member and patient health. The pandemic accelerated the shift toward virtual care and telehealth and showcased real challenges to health equity, requiring providers and payers to use and integrate a richer dataset. This dataset includes social determinants of health (SDOH), patient-generated data and expanded Artificial Intelligence (AI) capabilities that provide patients with a better match to the right services, treatment pathways and clinical interventions. Providers can use this data to identify service inefficiencies, bias and underrepresentation across all populations (race, gender, socioeconomic and more). Frontline workers who rely on this information demand customizable tools that can meet their specific clinical and business needs.

Comprehensive solutions do not depend on specific product implementation or even holistic integrations of disparate systems and datasets. Organizations need to work toward ensuring they can trust and use the data, along with developing analytics capabilities that define a path toward specific changes and outcomes. In this white paper, we will discuss key focus areas and solutions that enable data-driven organizations.





The Key Focus Areas for Using Data Effectively

AGGREGATING DATA YOU CAN TRUST

The prerequisites to leveraging data for effective decision making and positive outcomes directly relate to the ability to trust the data — with a clear understanding of what it represents. Cliché phrases about data quality like “Single source of truth” and “Garbage in, garbage out” point to the fundamental state of data that healthcare organizations strive toward. Data profiling, or assessing the quality of available data, can provide the clarity and visibility necessary to build that trust.

DATA AVAILABILITY

Data availability plays a major role in determining what types of use cases you enable. Simple questions like “What data is available to me?” and “How did these results come together?” don’t always have simple or straightforward answers. Any piece of data has metadata associated with it, which indicates:

- **Where** it came from
- **When** it was generated or added
- Whether it represents **change** from a previously stored value
- Whether it was further **transformed** based on any rules or conditions the receiving system defined.

This metadata is crucial for making sense of an aggregated dataset and for conducting actionable analytics reporting, especially when users receive the feeds at a varied cadence and schedule. For organizations that rely on multiple sources for business insights, clarity into this metadata is often elusive and challenging, especially for business users.

There’s frequently a significant time lag between:

- When the encounter occurs
- When a source system captures and stores the associated data
- When a source system transmits the data
- When a target system acquires, loads and processes the data
- When a target system refreshes the data in the reporting layer
- And when the user finally accesses and reviews it.

In certain cases, the time lag between the encounter and user access could be a **month or longer**. But even in the fastest scenarios for batch processing, one to two business days is a typical lag.

Data availability informs the appropriate orchestration of ingestions, loads and pipeline execution to maintain referential integrity. Certain pieces of data depend on each other and sometimes require sequence processing. For example, if membership and claims data come together from different sources at different times, users need controls and system capabilities in place to match and link that data in case a claim has a new member ID.

When master data management (MDM) merges multiple pieces of information into a single record, it's important to have visibility into:

- How the final record comes together
- What the contributing sources are for each piece
- When the system made these available
- And what criteria the system used to determine if these records all belong together.

This is especially important for an accurate, linear record that can enable better risk stratification and care management.

For effective data governance and vendor management processes, it is important to identify data issues and errors as they occur, but this again ties into an ability to have access to and evaluate metadata as it enters the ecosystem.

DATA QUALITY

The quality of data varies across sources. Even with the advent of EMR and other systems, which simplified input and data capture with most attributes predefined or structured (i.e., dropdowns, checkboxes, templates and so on), issues persist. Humans can make mistakes when entering data — data processing rules exist to address keyboard input errors. Different systems require different elements, so when aggregating a dataset from disparate sources, gaps in data can present challenges for certain use cases, even for linking data across sources and matching them to a specific individual. Besides completeness and data comprehensiveness, you could see mismatched data values for the same attributes across systems.

Payers need to link various data points together and associate them with an individual member to create an aggregated record. This is a prerequisite for all subsequent use cases, whether it's financial reporting, proactive management of members with critical conditions, or efforts to reduce the medical loss ratio.

The effectiveness of any data-mastering solution in creating a unique entity and then matching and linking various attributes to that entity depends on being able to reliably identify which attributes you need for that task. You can only establish this reliability through data profiling of a dataset across all data elements. Profiling provides visibility into the quality of a given dataset. The information gained from profiling determines:

- What you can do with the data
- If you can use it downstream
- What specific actions you can take
- What areas of focus in which you need to improve quality and address issues.

A common use case is member address standardization and cleansing. How systems capture addresses for members and providers varies so much that the only way to rely on this data for any downstream use and manipulation is to standardize it through a common and trusted database. Several options are available on the market for that.

A much bigger challenge for provider data is standardization. Providers need accurate data for patient access, billing, credentialing, contracting and other use cases that are routine for insurance providers and other organizations. This data changes frequently, but many organizations have a significant time lag in updating their systems and directories. They may also be missing key information. NPPES, PECOS and other NPI databases are not always up to date or don't contain comprehensive information about providers. Tying together organization affiliation, place of service and billing details can also present significant challenges due to the complexity of the practice across various care settings and the associated metadata.

Monitoring incoming data and continuously assessing its quality is essential to establishing effective vendor management, data governance and data stewardship processes. It should also take place upstream of complex data manipulation and processing. The earlier you identify and address issues in the execution pipeline, the lower the impact on downstream processes and analytics, resulting in fewer unintended consequences.

TIMELINESS OF DATA ACQUISITION

The journey from the moment you capture data into the source system to when it becomes available to a decision maker providing services and facilitating care is long. Payers typically experience a variable time gap they have no or very little control of — from the moment of a patient encounter to when the healthcare provider submits the claim to when they share clinical data. Insurers have automated and streamlined time-sensitive operations, like prior authorizations and other claims transactions, since delays in turning them around impact the ability to receive care or slow down the revenue cycle.

Lacking EMR connectors and population health management platforms that can get clinical data in real-time, payers typically rely on vendors to submit data in a batch format (lab and radiology data, HL7/CDA messages and more). At best, they may receive the previous day's data to process overnight, and it becomes available for business users the next morning. But in many use cases, faster or real-time data acquisition and availability play a crucial role. For example:

- Real-time access to incoming discharge and appointment data (ADT and SIU messages) allows care management teams to monitor details related to care settings for their members, intervene quickly, and re-direct care from out-of-network or higher-cost to lower-cost.
- Real-time monitoring of dispensed prescriptions helps minimize the risk of inappropriate or conflicting drugs.
- Monitoring for specific trends in a call center provides quick insights into topics members are inquiring about and allow marketing to customize or adjust messaging for better member guidance.
- Activity on the payer's website and requests for information from prospective members deliver valuable insights into the effectiveness of marketing campaigns during open enrollment and help target messaging and other efforts on member acquisition.

All these use cases rely on access to actionable data as soon as the source system generates it.





On Becoming a Data-Driven Organization

For payer organizations to become data-driven, it is imperative to draw actionable insights from a rich dataset that provides comprehensive views into multiple data domains.

RICHER DATASETS

Care management teams typically focus on three to five percent of highest-risk members, but for a larger segment of members, proactive engagement can significantly prevent unnecessary costs. The “rising risk” category may account for as many as 20 percent of members. Rising risk also means various health-related and socioeconomic factors could contribute to exacerbating certain conditions, limited access to care, and lack of preventative care or proactive interventions. Tracking those factors becomes crucial in preventing people from getting sicker and using more healthcare resources.

Beyond collecting membership, claims and some clinical data, healthcare organizations that are incentivized to optimally manage care are starting to focus on enriching their datasets with additional sources. Using open-source and public data sets to collect SDOH data can play a role in improving health outcomes, optimizing access to and quality of care, and an overall holistic approach to care management.

Healthcare providers are also starting to collect more information from their patients related to socioeconomic factors. However, a lack of standardization exists in what variables define SDOH and appropriate screening tools to track these variables. The data and measurements are inconsistent and vary from organization to organization. The good news is the U.S. Department of Health and Human Services is trying to define and expand specific classes and elements to standardize the collection of data for SDOH.

As this data becomes more available, opportunities will arise for artificial intelligence (AI) and machine learning (ML) models to address analytics bias as it applies to health equity. Traditional models for care management may use the cost of care as a proxy for need. However, that may be inaccurate when analyzing populations with specific demographics. [Including SDOH factors](#) in ML models provides a more accurate output.

COVID accelerated the adoption of telehealth and virtual visits. **Telehealth utilization is 38 times higher** than before the pandemic, which has been partly enabled by regulatory changes and additional reimbursement. Yet, with the rise of telehealth options, the challenge of capturing unstructured data and contents of virtual interaction and leveraging it within the clinical record for diagnosis and decision-making remains. Potential solutions are using Natural Language Processing (NLP) for transcription and conversion to structured data and tagging, integrating with common apps (FaceTime, Skype and Zoom), and appropriately updating clinical and claims records. Advanced analytics can also help determine which types of telehealth services will improve overall healthcare delivery and patient outcomes.

Organizations currently focus on data quality to the best of their abilities. But even perfect data from limited sources can only take the business strategy so far. Richer datasets, along with the continued focus on maintaining or improving data quality, enable new use cases that create a competitive advantage, deliver a more personalized approach and experience for members and patients, and ultimately, improve care and outcomes.

COMPREHENSIVE VIEW FOR KEY DOMAINS

Imperative data domains for operations of healthcare insurance companies include Membership, Enrollment, Claims, Product/Plan, Group, Provider, Labs, Pharmacy, Clinical, Prospect members and so on. Each organization may define additional ones for themselves, but these are the key domains.

Both payers and providers benefit from having access to comprehensive information related to the patient's medical and claims history, as well as non-clinical data (SDOH), family history, lifestyle and activity, appointment history and so on). Accurate and complete provider data also enables a competitive advantage for payers. But in a typical insurance organization, content that would make a comprehensive dataset is at best scattered across various systems and databases or frequently missing crucial details.



Business teams may completely depend on IT or data analytics teams to build custom reports that query and compile data from disparate sources. Frequently, this causes even further time delays, not to mention the overhead that a complex and bureaucratic communication process introduces into the organization.

Enabling data-driven decision-making is a key strategic goal for most organizations, and it relies on having easy access and clear visibility to all data associated with an entity. Single sign-on (SSO) enablement, which allows users to hop from one system to another without re-entering their credentials, does not get them any closer to that goal.

Vendors of population health management and analytics platforms frequently focus on building a comprehensive domain model that re-ingests and reprocesses data from sources, throwing orphan attributes that don't fit into the defined domain model into subject marts. These systems are notoriously costly and difficult to implement or update, and they can be rigid and slow in their ability to evolve with rapidly changing organizational needs. They also create reliance on effective collaboration between domain experts and operational analytics teams or IT for strategic insights.

A more flexible architecture relies on a decentralized approach enabling cross-domain self-service, which integrates analytical and operational data, treats data as a product, leverages a data catalog for metadata and achieves interoperability of all data products through standardized governance principles.

Some of the use cases that become available or benefit from easy access to a comprehensive view of key domains include:

- **Ability to modify or introduce services that benefit targeted segments of member population** — provides a competitive edge and improves member satisfaction
- **Closing care gaps** — better care, preventative care, management of conditions that decline over time
- **Provider-Patient match** — guidance for care managers and provider network managers
- **More accurate risk scoring** — better financial modeling and analytics for reimbursement rates, premiums and contracts
- **Enablement of predictive and prescriptive analytics** — better options for ML/AI model training
- **Forecasting shifts in membership** — increased churn between employer-sponsored plans (with the fluctuating economy, people lose or change jobs) impacts medical loss ratios. Enrollment churn could affect premium filings. Having access to this data improves the management of premium spending and medical loss ratio (MLR), increases health plan value and attracts new consumers to health plan product offerings.

ACTIONABLE INSIGHTS FOR A ROLE-BASED USER EXPERIENCE

Analytics platform reporting should not only serve the needs of a handful of executives who may focus on strategic KPIs. Most employees within an organization can benefit from tailored reports that present information based on each employee's specific role. Such reporting allow them to make more data-driven decisions about their work activities.

Aggregating and presenting gathered information in tables and charts is a traditional way of reporting. The assumption is that once the person has the information formatted in a specific way, they know what to do next. Two factors stress-test this assumption. First: The underlying dataset is vast and complex and challenges reliance on users' memory, skill and expertise. Second: The workforce is rapidly changing, and you cannot solely rely on someone who has 20 years of experience and "knows" the data.

The first factor relates to complexity. Clinical and claims data is notoriously complicated. A record for a single individual could have thousands of separate attributes. Clinical decision support is specifically designed to minimize errors due to the human factor. For example — guiding prescribing practices by assisting in drug selection and dosing suggestions, flagging potential adverse drug reactions and drug allergies, and identifying duplication of therapy.

The second factor relates to who consumes the information. To take the guesswork out of the equation and to minimize human error, effective analytics solutions not only provide insights (what happened and why) but also can make predictions about certain events (what might happen next) and prescribe specific actions (what should be done).

In a non-clinical setting, people need to make decisions based on aggregated information. You can set up role-based workflows to focus on desired goals and outcomes, which determine the next best action to take based on underlying data and information, rules and specific patterns of data usage and actions that inform machine learning models.

Role-based user experience is also crucial for securely handling sensitive data, providing an audit trail, and ensuring, based on specific policy and access controls, the right people have access to the required data when necessary.





How to Drive Changes and Outcomes

For payers, key business challenges relate to better management of a vulnerable population, as well as improving member engagement and satisfaction, which has a direct impact on retention and new enrollments. Healthcare insurers know they realize a competitive advantage by keeping medical costs down and serving a larger and happier member base. They can achieve these goals with the right data strategy.

MEMBER 360

A comprehensive view of a member's medical and claims history allows payers to develop better care management strategies based on more than only a risk factor that might be calculated solely on a diagnosis from a single encounter. Furthermore, enhancing clinical and claims data with SDOH can provide a better understanding of behavior patterns associated with access to care, utilization of specific care settings, medication adherence, the relationship between lifestyle and activity with services utilization, and much more.

"Member 360" is a common concept for analytics platforms, but lacking a national standard, each vendor decides for themselves what data to include. Depending on data availability, it may contain:

- Demographics, family history, SDOH, past and future appointments
- Eligibility, plan and product, enrollment info
- Household info, any associated family members part of plan
- Member preferences
- Clinical history, including diagnosis, conditions, procedures, lab results, radiology results, prescriptions
- Claims, all statuses (paid, pending and so on)
- Risk score, care plan, care gaps, next best action.

Having access to such a rich dataset opens possibilities for ML and AI models to minimize guesswork and provide care management teams with a prescriptive set of steps, sometimes referred to as the "next best action".

Aggregation, mastering and distribution of longitudinal data across the full continuum of care are costly and complicated — it challenges every healthcare organization. But those that are successful in building a rich and comprehensive data set, ensuring it is of high quality, and leveraging it for timely and actionable insights are gaining better opportunities for interventions, proactive and preventative measures, and more accurate predictive and prescriptive analytics models.

DATA EXCHANGE AND CARE COORDINATION

As even more payers enter into value-based contracts with providers, effective collaboration between parties becomes essential for driving change and improving outcomes. Payers need to share insights gained from the 360-view of a member with those that are best positioned for care management and coordination, and these tasks are not always carried out by case managers at the insurance company.

Many hospitals take a similar approach, and primary care providers typically maintain the closest ties with their patients. Healthcare providers deal with their own complex workflows, so effective coordination depends on a collaborative approach that considers the primary point of contact, what information is potentially crucial for decision-making, and how to share it in a secure and timely manner.

Fortunately, organizations have various ways to solve interoperability and data-sharing challenges. As part of the Centers for Medicare & Medicaid Services (CMS) mandate in 2021, which makes claims and clinical information available to members through Patient Access API and enables payer-to-payer data sharing, the Fast Healthcare Interoperability Resources (FHIR) standard for data exchange is gaining wider adoption and enabling quick, platform-agnostic integration of new data sources.

In addition to aggregating detailed demographics, clinical and claims data for an individual, capabilities now exist for storing and sharing analytics based on a larger population through FHIR Bulk Data. Providers and organizations accountable for managing the health of populations often need to efficiently access large volumes of information on a group of individuals.

For example, a health system may want to periodically retrieve updated clinical data from an EHR to a research database, a provider may want to send clinical data on a roster of patients to their Accountable Care Organization to calculate quality measures, or an EHR may want to display claims data to help close gaps in care. Payers can also use FHIR Bulk Data to share crucial analytics with care teams on the provider side.



Conclusion

The pandemic underscored challenges for providers when it interrupted a constant volume of in-person elective care and highlighted the benefits of value-based contracts supporting practices with a steady revenue stream even without a steady patient volume. Delivering optimal care, containing costs and creating meaningful interactions with patients and members result in a positive customer experience. You can achieve these goals with the right focus on how data is handled. Success is within reach.

ABOUT CENTRIC CONSULTING

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