IBM Watson Health™

WHITE PAPER

The next chapter of data analytics

How providers can leverage advanced analytics for success in a value-based world

Highlights

- Technology leaders can help drive transformation by utilizing off-the-shelf, industry-recognized methodologies in their own technology environments
- Providers that want to use this approach should begin by evaluating their EDW maturity
- Providers must also evaluate the quality of their data and data management practices
- Finally, providers need to develop an analytics roadmap which identifies needs and associates them with care and organizational priorities and requirements

Introduction

Hospitals and health systems are facing greater pressure to transition to a value-based system while simultaneously increasing or maintaining margins. In this new paradigm, information-centric strategies that support data-driven decision making across the enterprise can help providers compete in a value-based world.

However, big data and analytics solutions can have shortcomings. Proprietary and best-of-breed approaches can require valuable time and resources to build, integrate and maintain—while outsourcing data analytics can constrain reporting frequency and timeliness. In a world where operational efficiency and fast, reliable information is paramount, these limitations can put providers at a competitive disadvantage.

In the next chapter of data analytics, technology leaders can help drive transformation by utilizing off-the-shelf, industry-recognized methodologies in their own technology environments—an approach that can accelerate time to value by reducing the time and resources required to analyze data to meet the needs of clinical care and operations improvement initiatives.

Looking ahead, providers that want to use this approach should begin by evaluating their enterprise data warehouse (EDW) maturity, data management practices and analytics roadmap. Taking these actions can help them identify opportunities to advance EDW and data management practices, and prioritize key analytics use cases.

How mature is your EDW?

For providers that have invested in or are building EDWs, enriching these assets with analytics can help support data-driven decision making and generate greater value across the enterprise. While a mature EDW can provide a strong foundation for data analytics, it often represents

a continuous journey—not a final destination—as care requirements, organizational goals and technology constantly evolve. To help you assess your EDW maturity and identify opportunities for improvement, consider evaluating your solution against the following measurable characteristics of a mature EDW.

There is only one
A data warehouse is an EDW if it holds all of an organization's information and makes it available for various stakeholders across the company. If there are other data warehouses used for reporting that have overlapping subject matter, or additional information that is not in or derived from the EDW, then it is possible to generate analytics and reports that differ or compete with one another.

Latency and freshness
The timeliness of analytics data should meet the needs of your organizational operations. Not all situations require real-time data latency, but nearly all situations require consistent and dependable data refreshes.

Data mart strategy
Various project teams will need different views of the same data, aligned to their strategic objectives, to help them answer specific questions. Although it is critical for the underlying data and definitions to be consistent (for example, the way diabetic patients are identified), the questions that are asked by different stakeholder groups (such as actuarial and underwriting, care management, network management, and sales and marketing) will vary. If your users are building their own copies of your data to fit their needs, then your EDW maturity level may be low.

Governance and growth
Another aspect of EDW maturity is its ability to handle change and adapt accordingly. If project teams feel like it is too much work to create new domains or implement changes, your EDW strategy and solution may be at risk.

Is your data ready for advanced analytics?

An EDW that is augmented with advanced analytics can help providers prepare for and thrive in a value-based world. But analytics insights are only as reliable as the underlying data itself. To produce information that is credible and can be used with confidence, providers should, as a starting point, institute a series of thorough quality checks to evaluate the completeness and validity of the data.

Completeness checks
An audit, balance and control (ABC) framework should be in place to identify and limit the impact of missing data, and you will want to determine acceptable thresholds when data is missing. Establishing these thresholds and benchmarks by field will focus the data warehouse team on areas that need further improvement, as well as allow users to contemplate the impact that incomplete data could have on their analytics and reporting.

Validity checks
Next, it is important to conduct validity checks on fields that should contain standard codes or elements, and compare recorded values to lists of possible valid values for that field. When these validity checks flag unexpected values, you can establish the validity of the non-conforming code. If new values have been added to the coding scheme, an update of the conversion program or code lists may be in order.

Reasonableness checks
Finally, consider conducting reasonableness checks to ensure the data makes logical sense. For instance, look at the relationship between two or more related columns, or between a column and benchmark data, to confirm they are reasonable. Examples of reasonableness checks include:

- Average cost per admission and percentage of admissions with catastrophic payments
- Ratio of surgical services to total services
- Percentage of non-specific diagnosis codes
- Ranges of average cost per service by procedure code

What is your data analytics roadmap?

Providers can deploy advanced analytics on top of their EDWs to enable more informed decision making across the organization and enhance the value that analytics teams can deliver. But with numerous business intelligence needs and stakeholders, prioritizing can be challenging.

One way to move the needle is to develop an analytics roadmap, which identifies needs and associates them with care and organizational priorities and requirements. Timelines to meet requirements can then be established given available resources. We recommend following a four-step approach.

1. Align analytics initiatives with organizational priorities
Begin by identifying the strategic initiatives for clinical quality and utilization, and those that could be most positively impacted through enhanced analytics insights.

In addition, it can be beneficial to evaluate the workflows that could be made more efficient and effective. For instance, do population health management stakeholders face greater challenges than others in getting their jobs done with the information currently available?

Some questions to consider include:

- What are the key organizational imperatives?
- Where can the greatest impact be made with support from advanced analytics?
- Which functions and stakeholders require more timely information?

2. Identify the analytics required to meet care and organizational needs
With specific priorities in mind, the next step is to determine which analytics are needed and how they will be visualized.

You will want to assess the current suite of analytics tools and capabilities employed to address stakeholder needs. Also consider the availability of new tools or prebuilt content that could shorten the time to delivery and/or lower the development and maintenance costs. This is when you will need to pinpoint any skill gaps and how you might address them. When reviewing new tools and skills, consider whether they could significantly improve other areas of analytic content.

Advances in the following categories tend to expand the overall analytics environment and should be considered:

The anatomy of an analytics roadmap

To roll out advanced analytics across the enterprise, build an analytics roadmap to help chart the course.

1. Organizational priorities: Identify the key initiatives across stakeholders, and assess the needs and level of urgency by organizational function.

2. Analytics tools: Evaluate the analytics capabilities and tools currently in place to address the prioritized needs. Use a framework to identify gaps and weaknesses, including groupers, risk and severity models, clinical rules and reference data.

3. Reporting requirements: Determine how frequently prioritized analytics will need to be run, as well as the requisite data elements. Confirm that appropriate fields are in place to support desired visualizations and requirements.

4. Ongoing monitoring: Revisit the roadmap periodically, through the lens of organizational priorities, with key stakeholders to proactively maintain strategic alignment.

– **Grouping methodologies:** Do existing methodologies (such as admissions, episodes and event groupers) effectively group together relevant clinical and administrative data?

– **Risk and severity models:** Do existing statistical models produce reliable, valid predictions of concurrent and prospective costs, and of specific outcomes of interest?

- **Clinical rules:** Are industry-defined standard clinical rules in place?

– **Reference data:** Are reference data and industry benchmarks available to provide structure and context in user reports, and to create meaningful points of comparison for performance?

3. Determine the timeliness of reporting needs as your EDW evolves

As advanced analytics are selected, providers should also evaluate their fit with existing business intelligence tools and capabilities. A few questions analytics leaders can ask to get started include:

– Are the appropriate Extract, Transform, Load (ETL) protocols in place and tested to move data from the warehouse to fit-for-purpose analytics data marts? Are these analytics data marts easily accessible to analytics teams?

– How current will the data need to be for various organizational reporting subject areas?

– Would a conformed dimensional warehouse model speed user analysis and allow root cause to be evaluated?

4. Monitor and adjust

Implementing a comprehensive EDW and advanced analytics strategy will likely be an iterative, dynamic undertaking. As the healthcare industry changes, business models and functions will likely need to evolve, as well. You can expect shifting priorities and quick-changing analytics needs. That's why it's important to view your EDW and analytics initiatives as an ongoing process—one that you can continue to improve, but that doesn't need to be perfect to get started.

For instance, as you build out your EDW, consider starting with targeted analytics use cases that fit that infrastructure stage, then assess the effectiveness and build on the learnings as your EDW evolves.

Regardless of where you are in the EDW-analytics journey, you'll want to designate time quarterly or biannually to revisit the analytics roadmap and evaluate whether needs have changed. Designing an analytics environment that is flexible enough to accommodate those changes should be one of the top priorities in the roadmap.

How good is your data?

It can be difficult to assess data completeness and quality, as well as the statistical validity of analytics models, without reference and normative data. Providers looking to enhance data analytics should evaluate whether their reference data and industry benchmarks help them to:

– Understand how much missing data is too much.

– Determine how many data errors are acceptable and at what level they could inappropriately influence outputs.

– Pinpoint data aberrations unique to their populations.

– Create points of comparison across a variety of key performance indicators

Conclusion

In today's complex healthcare landscape, the path to success will likely require a greater reliance on data—and the critical insights that can be derived from that data.

From clinical quality, utilization and population risk, to operational efficiency improvement opportunities, effective analytics can serve as the bridge that connects the EDW to the meaningful information necessary to transition to a value-based world.

Licensing robust, industry-recognized analytic methods that can be layered on top of the EDW can help. By working with ready-made analytics, providers gain access to tools that can help reduce the time and resources required to build and maintain analytics internally—freeing up more time for analysts to understand organizational needs and work with data to generate answers. Additionally, these solutions can provide more flexibility in reporting frequency relative to outsourcing data analytics, which can help analysts deliver more timely information that meets the needs of care and the organization.

As healthcare analytics become increasingly available to license, providers should identify vendors with not only deep analytics and healthcare expertise, but also the technical capabilities necessary to help them maximize their underlying technology investments.

How mature is your EDW?
Assessing your EDW's maturity and identifying opportunities for improvement is no easy task. Consider these measurable characteristics in your evaluation.

- **There can be only one:** An EDW should be the single source of truth for each data subject.
- **Latency/freshness:** Data should be updated frequently, consistently and with limited lag time.
- **Data quality:** Users should feel confident in the answers they produce (the 80/20 rule).
- **Usability:** Users should find the EDW approachable; they shouldn't fear it.
- **Governance/growth:** You should be able to make changes to your EDW in a straightforward and flexible manner.
- **Data marts:** Your EDW should support multiple views of warehouse data for your various user communities. This includes date and time dimensions for historical analytics.
- **Cost:** Building an EDW involves significant cost, so keeping it relevant should be cost-efficient.
- **Playing nice in the sandbox:** Power users (20 percent) may require a sandbox to provide performance stability for analytics users (80 percent).

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