



POINT OF VIEW | HEALTHCARE

Data-Driven Healthcare:

Building Trust and Gaining Insight

Introduction

Healthcare executives need good data. How else can you begin to reduce mortalities, target resources most efficiently, or determine which services to keep and which to cut? Yet the data that could help in these and other scenarios is often flawed. Key terms might be inconsistently defined; longitudinal data, broken or incomplete; summary data, skewed and difficult – if not impossible – to use.

Compared to companies in other industries, healthcare providers generate relatively little intelligence from operational data. And those who do can be reluctant to act upon it.

To get a handle on your data, you need to become a more informed user. Data can lose integrity at four points: when it lands in an application, when it's integrated with other sources, when it's aggregated and when it's presented for consumption. Equipped with this knowledge, you'll be better prepared to take the steps needed to address the problems you face and rebuild trust.

Data at landing

The data journey begins with data sources; in healthcare, these are the clinical applications that generate all the clinical data. For healthcare providers, these apps involve clinical data management within the electronic health record (EHR), lab testing and results, medical imaging, revenue cycle systems and other functions. Just as software developers have prioritized data security, an important upfront task for users should be to establish common definitions. Unfortunately, that's often not the case.

Let's say that to reduce hospital mortalities, you want a report on all the patients diagnosed with sepsis in the last month. If you're in one hospital in a small organization, it could be simple enough to enter a database and filter for all diagnosis-related groups (DRGs) with sepsis. But reality is typically more complex. "As soon as you become a multi-facility, multi-institution organization, even if you're all on the same EHR, you may have different definitions from one hospital to the next," NTT DATA Practice Lead, Data-Driven Health, Dr. John Frownfelter (M.D., FACP) said. "You may have different charges assigned, as well."

Complexity increases for a health system that has data flowing from multiple EHRs (from different vendors) as an example of challenges with "data at landing". Further downstream, differences in querying capabilities and data packaging can further impact the capability to create usable and meaningful insights. The frustrating outcome is an inability to generate answers to basic questions, whether related to DRGs, readmissions or other critical areas. While it seems simple enough to solve, this "data confusion" is one of the primary reasons report quality varies and clinician mistrust persists.

Data integration

Data quality can also deteriorate as data is collected from different systems. This occurs in two primary ways. First, instead of an automated pipeline, you could have an intermittent connection that forces individuals to pull reports manually. That can lead to inconsistencies, errors and wasted human resources. A manual process also can't scale to multiple systems and external partners, many of whom (such as payers and pharmaceutical companies) have sophisticated data operations. "If you are going through manual efforts for reporting, you definitely have a data problem," NTT DATA Advisor, Intelligence & Automation, Priti Malkan said. "Manual reporting processes most often cause data issues, and sometimes significant ones due to simple cases like typos in numbers."

And even if the integration is secure and technically correct, the data itself could be incomplete or broken. If the master patient index (MPI), for instance, lacks internal data logic checks, hospitals could end up with information about two separate patients with the same name, gender and age on a single report. Data from a range of sources populates a patient's history. Duplications and gaps reduce the value of such longitudinal data. Reports that require sorting out lose their timeliness.

Data aggregation

The aggregation layer summarizes data for statistical analysis. In an ideal world, datasets are defined and integrated correctly, then given meaningful rules that lead to accurate hierarchies and aggregate values.

But problems often arise. The rule settings that define the aggregation could be incorrect. Or the data model itself, which makes data ready for consumption through adds/subtracts and hierarchical builds, could be flawed. As with integration, aggregation needs quality checks. "The aggregation layer really should force your model to be stronger, better and well-rounded, but the quality check is often missed," Malkan said.

A lack of checks leads to several problems. You might see large discrepancies, such as readmission rates that suddenly rise or drop by large percentages. To model staffing needs patient volumes particularly surges by service line will need to be known. This requires pulling together data from multiple sources and trusting that the data is normalized so that it works together to arrive at a reliable conclusion. A flawed model or improper implementation of a good model will prevent effective filtering and other productive uses of data.

Do you have a data problem?

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Bad data manifests through a variety of symptoms. Here's a few quick questions to help determine if you need a cure for data discord:

1. Do you have a standard data dictionary, with common definitions around key terms?
2. Would you say your team's data literacy is functional, basic, proficient or advanced?
3. How many manual (versus automated) processes are in your data pipelines and workflows?
4. Do you have multiple sources of reports that give conflicting answers to the same question?
5. Have you observed sudden spikes or falls that might indicate incorrectly aggregated data?
6. Do your reports ever present results that seem to belong to unrequested datasets?
7. How difficult or easy is it for you and your team to consume data?
8. Do your reports have all the tools and functionality you need?



Data consumption

Quality defects can also emerge at the consumption layer. Here, it's all a matter of perspective. A chief medical officer or vice president of population health, for example, is going to perceive (and interact with) data differently than a data scientist.

For the medical officer, data quality is closely tied to presentation. As a healthcare executive, you want reliable data effectively presented in a meaningful way that informs operations, strategy and action. Is the reporting standardized? How do the templates look and feel? Does the data connect the dots linearly and include the sought-after information? A report built on an interactive user interface, for example, may look nice and be easy to navigate but still fall short of expectations if it doesn't provide information that's actionable or relevant to current operational issues. Although analytics can help inform strategy — showing, say, trends worth exploring or service lines that need more resources — if the data isn't framed properly, execs might miss key insights that could help them shape the business for the better.

Data scientists who build artificial intelligence (AI) systems on top of the aggregation layer can also end up with true but not clinically impactful results if they don't know the prior rules. Without a full understanding of the data and why it's being consumed, even sophisticated users can induce skewed outcomes. Collaboration among the clinician, data scientist, and data analysts is required so that the power of the insights can be applied in the most clinically useful way.



The path forward

Trust once lost is hard to recover. A single error can lead you to question the validity of all subsequent reports. To improve the quality of your healthcare data, remember the four data layers and consider the following preemptive fixes.

Harmonize.

Ensure that data at landing is mapped correctly and has the same meaning across systems. “There is analytics that can be done at the starting tier itself, which falls around data governance,” Malkan said. “It’s really about applying textual or semantic analytics and making sure we are all saying the same thing and agree on what kind of values we are looking at.”

Manage quality.

Make quality management part of the process. That’s the right approach at all four layers, but especially for data integration. Internal logic checks can help ensure that data flows are accurate, complete, consistent and valid — and that they measure up to all other expectations.

Model correctly.

At the aggregation layer, the key is to work with a data model that advances your goals. Start with the end goal, such as identifying which high-complexity patients could most benefit from intensified services — and work backward. Ensure that you and your team build out the correct internal rules and hierarchies needed to reach your objective.

Set the table.

“To use a restaurant analogy, a customer expects the food they ordered, but also needs the right silverware,” Dr. Frownfelter said. “In the case of data consumption, healthcare executives may only need standard tools (and be happy to order from the menu), along with their expertise, [while] a data scientist may need to implement AI modeling.”

Quality first — always

Given the power of AI to solve many pressing data challenges, healthcare executives may be tempted to seek out the latest tools and solutions. Although powerful, these options may require a well-laid data foundation to realize the promises they offer. So, until you’re sure you have such a foundation in place, you might only be adding to your data problems.

The time to act is now — AI is beginning to diffuse throughout healthcare, and the choice in front of us isn’t whether but what part we’ll play in leveraging it. And that starts with making your data — as it journeys from application to report — a better and more trustworthy fit for your current business needs.

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