



Creating a Data Strategy for Behavioral Healthcare Organizations

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Contents

Creating a Data Strategy for Behavioral Healthcare Organizations	3
Data Strategy	4
Data Quality	5
Master Data Management (MDM)	5
Quality Assessment and Improvement (QA / QI)	6
Data Visualization and Dimensional Modeling	7
Data That Tells a Story	7
Transformation by Data	8
Conclusion	8

Creating a Data Strategy for Behavioral Healthcare Organizations

With the push towards Electronic Health Record (EHR) adoption over the last 15 years, the Behavioral Health community has at last joined the technology party that has been well underway in primary care for arguably the last 20 years.

Meaningful Use brought a sliver of funding to some agencies, but more significantly, the larger healthcare industry trends along with generational expectations that organizations start using computers in some clinical capacity became too hard to ignore.

Between 2008 and 2015, EHR adoption among hospitals soared from 9.5% to over 96%, according to ONC Data (Office of the National Coordinator, 2015). Data for the behavioral healthcare sector is more difficult to pinpoint, but estimates place EHR adoption at around 61% (EHR Intelligence) and clearly growing.

Along with the proliferation of EHR systems has come a deluge of data. And along with all that data has come, for many, a fair bit of disappointment in how effective their EHR systems have proven to be in improving the quality, efficiency, and effectiveness

of healthcare delivery.

One can always argue the comparative merits of different EHR systems and inevitably find disappointed customers for nearly every system in the marketplace, but I would argue that the overall feeling that one's EHR is not living up to expectations is misplaced.

In most cases, the EHR system is not to blame, but rather the misconception between what the system was designed to do and what organizations thought the system would do. In other words, the root cause of the disappointment is in the construct of the database itself. The fact is data collected in a

Transactional data does not necessarily equate to actionable information.

transactional EHR database does not automatically equate to an end-user having actionable information at their fingertips.

EHR systems have made great strides over the last decade and continue to improve as adoption rates increase (Fig. 1) and customer feedback influences features. That said, it's essential to go back to

the foundational architecture of most EHRs and consider that they've almost all evolved from what was originally intended to be a software transaction-based cash register.

In software parlance, this means that healthcare software systems are like any number of other data collection systems – they process and record transactions, typically via fields and forms, then link those transactions to an invoice, and send a bill out to a payor with the associated evidence. This architecture results in data stored in is what is referred to as OLTP database (Online Transaction Processing), which is exactly what EHRs are designed to do – process transactions.

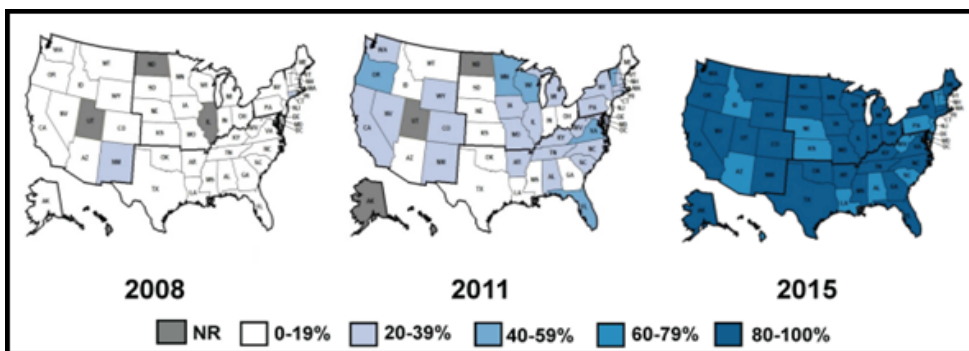


Figure 1

Basic EHR adoption requires the EHR system to have at least a basic set of EHR functions, including clinician notes, as defined in Table A1. Estimates for states shaded gray did not meet the standards for reliability (NR).
SOURCE: ONC/AHA, AHA Annual Survey Information Technology Supplement

Over the last decade the evolution of the EHR has seen numerous new features tacked around the edges of the core application including e-prescribing, clinical decision support, medication management, meaningful use features, patient portals, reports, and allegedly analytics. But the fundamental problem persists: EHRs were never purpose-built to analyze large volumes of data for visual presentations and the display of actionable information.

Clearly the role that EHRs play is foundational to the development of a data and analytics strategy, and for that we applaud the ONC and, more significantly, all the clinicians who have been tirelessly clicking and collecting terabytes of data over the last decade.

But now that we've freed (most) healthcare records from the steel prison of the filing cabinet, it's time for the real work to begin.

Data Strategy

To realize the promised value of healthcare technology, organizations must embark on a series of steps to intentionally manage, improve, curate, mine, extract and then create visualizations to tell compelling stories out of their data.

Somewhat ironically, the sheer volume of data that continues to be amassed further complicates this

mission by exacerbating the needle-in-a-haystack problem data analysts already face. This brings us to our second database type – the one that most organizations thought they were getting all along with the purchase of their EHR – the OLAP or Online

Analytical Processing database.

An OLAP database is designed specifically to analyze large volumes of data organized around dimensions and cubes. This structure is fundamentally different than an OLTP database, which is often why organizational executives become frustrated when their EHRs don't seem to have reports that answer important questions: How are our patients doing? How much money is it costing us to provide service? Do the treatments we're offering work?

And while your EHR may contain the data necessary to get to some of the answers we'd like, it must first go through two essential steps – transformation and quality analysis - before turning into information.

The first of our steps in the journey to understanding the troves of data stored within our EHR is Data Quality.

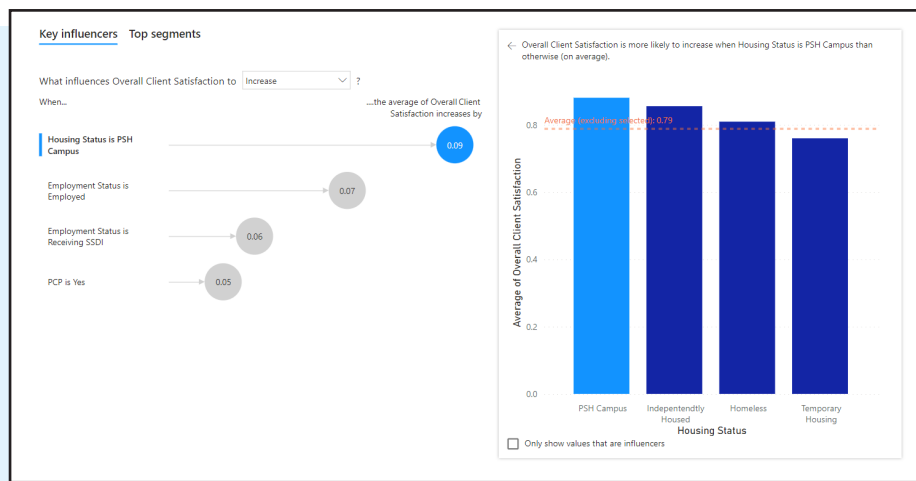


Figure 2

Learn what moves the needle.

All of your data are interrelated. This analysis parses housing and employment metrics to determine how those factors relate to overall client satisfaction.

Data Quality

Most organizations embarking upon a Data Strategy will encounter the first challenge on their journey to Data Utopia upon closer inspection of what has been getting collected over the last several years. Yes, we've all heard it – garbage in, garbage out. This is to be expected. EHR's often function as black boxes that tend to hide data imperfections in the shadows of the system, outside the parameters of the frequently run reports and payment related components.

In addition, patients move, addresses change, diagnosis change, clinicians enter data in unique ways, new fields and forms get added, software upgrades happen; in other words, people are people and over time, databases are like your garage – they need to be re-organized, optimized, and revisited frequently to keep some semblance of order from the chaos that always is trying to creep in.

This process of managing the order of your data is captured under the evolving program of MDM, or Master Data Management, and is a necessary component of an organizational Data Strategy Initiative.

Master Data Management (MDM)

Master Data Management (MDM) is a program of operational processes governed and executed on

a foundation of people and technology to maintain and deliver master data that is understood, trusted, controlled, and fit of purpose.

Implementing MDM as a part of an intentional data strategy for an organization can be as straightforward as creating an MDM Workgroup, developing a baseline set of data governance guidelines, and instituting a process to review, analyze, correct, and maintain organizational data quality.

An additional component of MDM is instituting a process to review new data collection requests against a decision framework to determine if it's already being collected for example, and / or what are the legal, financial, contractual, or regulatory requirements driving the data collection request.

The objective is to create intentionality around the addition of fields and forms to avoid duplication, data collection creep, and "wild west" database expansion that works against the objective of data that is "understood, trusted, controlled, and fit for purpose."

It's also normal to expect pushback when instituting an MDM program if the organization has not historically had any rules around data governance.

It's important to communicate that the goal of MDM is to centrally evaluate data collection against a framework to mitigate duplicate data entry, improve data quality and efficiency, and use both IT and clinical resources wisely. This ultimately respects the people that are tasked to carry out operational

QA				
Missing Primary Program	Missing Race	Missing Referral Source	Missing Diagnosis	Missing Photo
580	92	1068	66	1198
Missing Primary Staff	Missing Ethnicity	Missing Address	Missing Living Status	Missing Smoking Status
620	94	17	876	214

Figure 3

You can't manage what you can't measure.
 Identify missing data first to clarify organizational status and check management assumptions.

duties for your organization by respecting their most precious resource - time.

Quality Assessment and Improvement (QA / QI)

Once there is a baseline MDM framework, we need to get a handle on the quality of data that is presently being collected and start the process of identifying and improving through iteration. Most healthcare organizations have QA and QI processes and workgroups; here we extend that function to cover data. An organization can start this by analyzing the absence or presence of data that lives in their EHR over a given duration.

Here we recommend that organizations start with open active clients, take 8-12 existing data elements that are "expected" to be collected for every client, and run an analysis across the database to validate

the absence or presence of said data.

Next, we associate parameters such as the program the client resides in and the current primary clinician, so that the investigation of what is missing, whether the client should still be open, and how to obtain the missing information, can be quickly delegated to a responsible party.

Above (Fig. 3) we have a simple visual depicting the values we want to audit in our EHR system. These values are determined as a part of the analytics scoping, extracted via flat file or direct database connection, and then loaded into the data visualization model.

For organizations wanting to pursue data QA / QI ahead of implementing a Data Visualization Model, the Figure 3 visual can be created as a crystal report, for example, but loses end-user interaction options and, more significantly, will run slowly if analyzing multiple years of data.

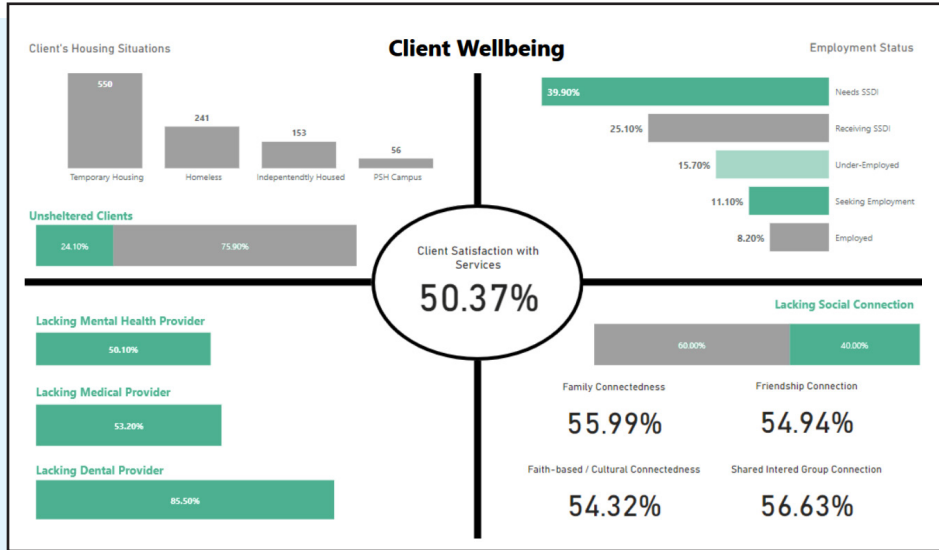


Figure 4

Use your data to explore dimensions of your work.

This dashboard collects various data points about housing, employment, clinical care and social engagement to build a meaningful organizational profile of Client Satisfaction.



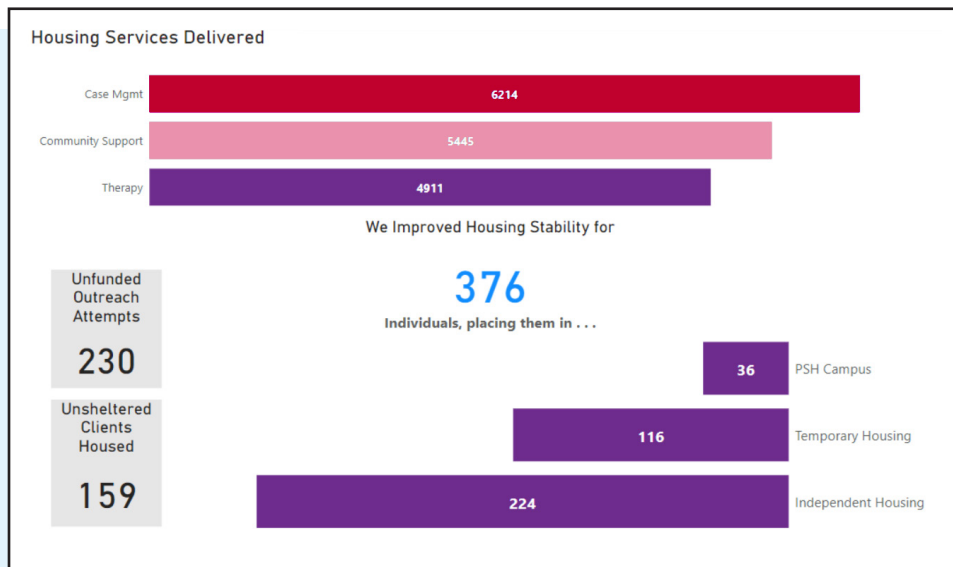


Figure 5

Your data is your highlight reel.
Your successes can be displayed in meaningful ways to demonstrate how the organization's good work benefits your clients and the communities where they live.

Data Visualization and Dimensional Modeling

Now that we've tackled Data Quality, it's time for the second of our two steps – Data Transformation. This is where we move the data into a construct more conducive to analysis and re-organize our EHR data into a structure (remember OLAP?) fit for this purpose. Technically speaking there is one intermediary step here and that's what is sometimes referred to as ETL or Extract, Transfer and Load.

For the purposes of our discussion, we're going to assume that the extract is a manually exported flat file that can be converted to Excel format and imported into Power BI.

Most organizations embarking upon a Data Visualization Strategy will want to organize their extracted EHR data around a Star Schema. Let's start with the two core principles of the Star Schema – Facts and Dimensions.

Organizing EHR data into a Star Schema from your base extract requires categorizing your information as either fact type tables or dimension type tables.

Dimension tables describe business entities. From an EHR data point of view, that means people, locations, and time and date of service for example.

Fact tables, on the other hand, store observations

or events and in behavioral healthcare, and they can typically be organized around Claim Data including service code, payer ID, amount of charge, and unit of services.

Now that we've tackled some of our foundational steps related to data quality and OLAP database design, it's finally time to start creating visualizations that can be shared with our audience.

Data That Tells a Story

To tell compelling stories with data, one must apply a series of principles:

- ▶ **Understand the context**
Who is your audience? What do you want them to know or do?
- ▶ **Build an effective visual**
What is the best way to show the data you want to communicate?
- ▶ **Eliminate clutter**
Remove all data that doesn't speak directly to the point you're making.
- ▶ **Focus attention**
Use color, size, and position effectively to direct your audience's attention to the point you're making.

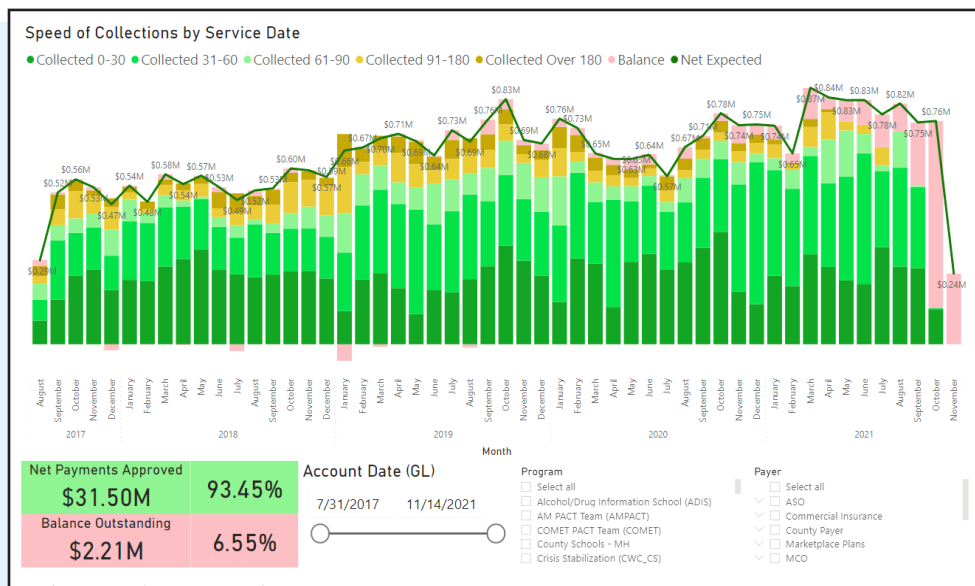


Figure 6

Follow the money. Use your data to correlate payments and time. This visualization provides an at-a-glance review of what payments are expected, what has been paid, and the payment timelines.

Tell the story

Don't just show your data. Instead, leverage it to tell a story and compel your audience to action.

The principles above come from the widely respected book on "Storytelling with Data" by Cole Nussbaumer Knaflic, which serves as an excellent roadmap for anyone relying upon visual communications within their organization.

Transformation by Data

Now, let your data guide you. Use visualizations as fuel for revelation. What are your objectives? What do you want to learn, and what do you want to accomplish? Use your data to illustrate the areas where your organization excels and lean into them. Use it to illuminate organizational struggles and weak spots and to give them needed support.

Wise data usage begets wiser data usage. This is one area where opportunities become more visible, ideas get bigger, and solutions get better as the data and your organization mature.

Some of your data will challenge your assumptions and lead you to new realizations and unexpected conclusions. Some data highlights will be immediately evident, and some trends will emerge over time. Let your data set your organization on a

path to transformative data-driven decisions.

Conclusion

Organizing your EHR data into a schema suitable for analysis and visual storytelling is part science, part art, and part experimentation. It takes a team – people familiar with the native EHR database construct and agency nomenclature, report writing, data extracts and data engineering, as well as strategic storytellers familiar with data modeling and data visualization as a part of this "village."

Your journey to moving the behavioral healthcare needle on quality, efficiency, equity, and outcomes will continue long into the future. A comprehensive data strategy will illuminate your organization's current challenges and opportunities and will light the path forward.

We understand that not every agency has the resources required to invest in a fully developed data management team. Xpio Health invites you to learn more about our DVaaS (Data Visualization as a Service) offering. We can supplement your organization's strategic efforts with our team of data engineers, designers and storytellers. Inquire at info@xpiohealth.com or visit xpiohealth.com.

