

DATA-DRIVEN HEALTHCARE

How Analytics and BI are Transforming the Industry



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WILEY



From *Data-Driven Healthcare*. Full book available for purchase [here](#).

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CHAPTER 1

What Does Data Mean to You?



DATA:

noun plural but singular or plural in construction, often attributive \ˈdā-tə, ˈda-also ˈdā-\

1. Factual information (as measurements or statistics) used as a basis for reasoning, discussion, or calculation. <the *data* is plentiful and easily available—H. A. Gleason, Jr.><comprehensive *data* on economic growth have been published—N. H. Jacoby>
2. Information output by a sensing device or organ that includes both useful and irrelevant or redundant information and must be processed to be meaningful.
3. Information in numerical form that can be digitally transmitted or processed.

(Merriam-Webster, 2014)

The frenetic pace of change in healthcare has been hard to deal with. The broad adoption of electronic health records (EHRs) has ushered in a wave of data that most organizations are not sure what to do with, beyond the standard regulatory reporting. The HITECH Act of 2009 ensured that data, for all the good and bad, is here to stay. Everyone wants it, but very few organizations really know how to get it or what to do with it once it's there.

When I work with organizations that are just getting started, they often express similar concerns:

- “Where do I start?”
- “Do I have the right staff?”
- “Do I have the right technology?”
- “What are other healthcare organizations doing?”

The answers to those questions are easy compared to the next question: “How?” How do you start? How do you know you have the right staff or technology, and how (and perhaps more important, why) would you compare yourself to other healthcare organizations?

Today, it's a forgone conclusion that we have to manage our data. Not just because we have so much of it but because there is so much assumed value in the data. The challenge is that the pace of change is so rapid and there is so much data available, some useful and some not, that the answer to the challenge is one none of us wants to hear. It's just going to take some time. We need time to realign our processes and transition to our new way of thinking in healthcare.

Fundamentally, every medical record is a tool for collecting information: the information a physician collects when looking at you in a physical examination; the results of lab tests. The constant automatic information collection is going to increase, whether it's your phone monitoring your heart rate or your scale sending information about your weight to your health provider, or the contact lenses Google wants to market that measure blood glucose levels.

They all are sources of information about your health and well-being. And the challenge we face collectively, inside the health-care establishment and outside it, is how to take all this information, separate what's useful from what's not, and then apply it to improve the decisions of patients and care providers.

—David Blumenthal (Quoted in Fallows, 2014)

Everyone in healthcare is adapting, from the patients and physicians in a clinic office to the back-end staff and administrators trying to understand the right amount of investment and value that's embedded in this data. What we all want is to strike the right balance; we want to use and manage data, not become a slave to it. The future and the potential of data hints that if we can find that right balance, our organizations and the care that they provide will become more effective, safer, and better aligned with cost. That is the goal of any data-driven healthcare organization.

THE GAP

For years, my family had no idea what I did for a living. For a while, they wondered if the job I claimed to have was just a confusing cover-up for a covert lifestyle, perhaps with the CIA. Now when I tell people

what I do, the response is always “You must be really busy.” Is it possible that in 15 years it went from being so elusive it made more sense that I was a spy, to so common the middle-aged woman, seated next to me on a flight, knew exactly what I was talking about?

There are no easy answers; you better understand your data.

—Jeff Burke, Executive Advisor, Bon Secours Health System

I’m finally part of the in crowd. My early collegial connection to analysis seemed to seal my fate as a data wonk. Then, lo and behold, the *Harvard Business Review* said in 2012 that the data scientist is the sexiest job of the twenty-first century (Davenport and Patil, 2012). Finally, my patience paid off. But what does that really mean? What does it mean to be a data scientist? What does it mean to be data driven? What does it mean to invest in data? Not that many years ago, I had to work really hard to prove to healthcare organizations that data was the way forward. Today, I find myself trying to be heard above the noise. Data has become so ubiquitous, so popularized that we’ve forgotten what it really takes to do the work. We’ve fallen victim to the “Keeping Up with the Joneses: Data Edition.” We can’t articulate the value that data will provide for our own organization. In our fast-paced, soda-pop, YouTube-clip world, data has become a Hollywood starlet. We put you on a pedestal and then beat it down. We need you, we want you, yet we don’t want to invest in you.

If I sound frustrated, it’s because I am. At least once a month I get a call from the executive of a healthcare company that goes something like this:

“Laura, we’ve spent a year and a million dollars and we don’t have anything to show for it.”

“What was your goal?”

“To do BI.”

“Okay, what do you have now?”

“A system that takes eight minutes to return one report that tells us how many patients we have.”

I wish this was the exception. I'm still surprised that, for all the talk, when I get onsite at a hospital or health plan and start peeling back the layers I'm confronted with the reality that is healthcare—a data warehouse pulled together by transactional data experts at best, or at worst, a series of tables that were created by some savvy business users that's called a warehouse. The gap in the reality of what exists and the stuff you hear advertised in case studies is so large you can't see the other side.

DATA IS A FOUR-LETTER WORD

I still believe data is the way forward, but it's not an easy way forward. Creating a *data-driven healthcare organization (DDHO)* means that we have to slow down long enough to plan. We have to know and articulate the value that our data can bring to our organizations. But we also have to know when to say stop so we can reassess and reengage. Data can be powerful and valuable, but before it becomes that, it can be an unforgiving master. We have to change the culture of healthcare to become a data-driven industry. We have to get rid of the naysayers and stop thinking about data as either our salvation or our end. It's just data. It's neither good nor bad. It's what you do with it that matters.

First, let's determine if becoming data driven is the right thing for the industry or, more specifically, your organization. During my corporate life I've had to write a number of SWOT analyses. Popularized as a matrix, it breaks down the *strengths, weaknesses, opportunities, and threats* of a project or program (Wikipedia Contributors, 2013). (See Figure 1.1.)

	Helpful	Harmful
Internal	<p>S Powerful case studies from power users Current value of key report Knowledge of data and organization</p>	<p>W Data silos Lack of focus Perception of value versus cost Previous failed attempts</p>
External	<p>O Competitors are doing it Expectation from customers/stakeholders Entire cottage industry Legislation (HITECH and ACA) Technology advances</p>	<p>T Confusing, conflicting advice Focus on hot topics distracts from the work Lack of standardization</p>

Figure 1.1 SWOT

This SWOT analysis for becoming a data-driven healthcare organization is generic, but I encourage you to take this framework and fill it in for yourself to see if becoming a DDHO makes sense for you. We want to find a way to leverage the strengths and exploit the opportunities while managing the weaknesses and reducing the threats.

Strengths

In this case, we have to find a way to take those individual case studies where a power user found value in data and expand that to other departments or advance the skill set to other individuals. In addition, we can take some of the key reports, the ones that are used the most frequently, and try to improve on them or send them to a broader (appropriate) audience. We need to account for the way in which our organization works; whether it is decision by committee or a strong hierarchical chain of command, having internal resources who know and understand how things get done is critical to taking the program to the next level. Finally, we can take advantage of our internal depth of knowledge of our own data, which is invaluable as we begin this journey. That collective knowledge in your organization needs to be empowered to be brought together and incentivized to work together to break down any barriers, perceived or real, that impede the organization's ability to utilize its own integrated data.

Weaknesses

Internally, we have data silos that have these organizational moats around them. These aren't grain silos; they're missile silos (as my friend Skip said to me a few years ago). Regardless, the value of that data isn't realized until the data is out of the silos and integrated with other data. So breaking down the silos has to be done.

Organizationally, I find that the lack of focus or a strategic plan around data impedes a lot of progress. In order to manage data like an asset, we have to think of it like an asset. We also have to work

around the perception of value versus cost. The value and understanding of what the data can bring to the entire organization has to be well communicated and well understood; otherwise, you risk having naysayers slow down the progress of the effort. This can also happen if you've had past failed attempts. We've all been there; no project is perfect. The best thing you can do is learn from past mistakes and move on.

Very large organizations will struggle with this, just by the nature of being large. Communicating out to a big, dispersed organization in a manner that is effective and timely is a challenge in and of itself.

Opportunities

The year of healthcare data is here; 2014 has seen some of the most significant changes in data in memory. That is represented by the number of opportunities that were identified. First and foremost, both the Affordable Care Act (ACA) and the HITECH Act ushered in the era of data for healthcare. Once that happened, an entire industry was created practically overnight that addresses data in healthcare (see the next section, "Threats"). The quantified self-movement and the concomitant "wearables" prompted an increased expectation by all customers for better and more frequent data. Your members, patients, providers, and brokers all want visually impactful and timely dashboards. Finally, there's the whole "Everyone else is doing it." It's true that many other healthcare organizations have started down this path. Some have led boldly, adopting enterprise data warehouses early in their maturity, but most jumped on the bandwagon post the passing of the HITECH Act in 2009. All these opportunities mean that if your competitors are doing it, your customers are asking for it, and entrepreneurs are creating for it, there is something very powerful there.

Threats

If you follow my content at all, books, webinars, articles, and so on, you know that I'm a pessimist. The threats section in most of my SWOT analyses tends to be a vent box that resembles my level of frustration.

It's true; an entire cottage industry and associated experts were newly minted the day after the HITECH Act was signed. What have evolved from that are some products and services that are nothing more than words on glossy brochures; in some cases they provide flat-out wrong advice. The challenge that healthcare has is that we are a relatively immature technology-purchasing audience. No doubt we can buy the best of the MRI machines out there. But the subtleties of purchasing software or investing in very specific healthcare BI services associated with data that is relatively new to the organization can thwart the most careful organizations. Therefore, the biggest threat I see to our ability to become a true DDHO is the same thing that's an opportunity: the industry itself. Organizations that have hired chief information officers from other industries or asked a consultant to help in purchase cycles might be the best way to mitigate this formidable risk.

Energy and persistence conquer all things.

—Benjamin Franklin

SETTING THE STAGE

Amid the chaos, a question: Is it worth it to you and your organization to become data driven? If the answer is yes, then this book is for you. In this book, I map out the major efforts associated with becoming a data-driven healthcare organization.

First, we have to understand what happens when we use data to transform an industry. In Chapter 2, I outline the value of data and what it takes to make changes on such a massive scale. In addition, I introduce the RISE methodology. This framework allows us to quickly fill the innovation gap that exists for healthcare while managing the risk as best as possible.

Chapter 3 addresses a significant issue facing data in healthcare today, standardization—or perhaps more appropriately, *lack* of standardization. Interviews and research show the impact of standards in healthcare, and do present a significant issue when comparing organizations to one another. No book on data-driven healthcare would be complete without a fair assessment of the impact of standards.

In Chapter 4, we take a deep-dive into technology, or as deep as this business-minded, self-proclaimed “not-a-technologist” is willing to go. I went pretty far. What I learned in writing these first few chapters is that much of the success of data-driven healthcare lies in our ability to close the innovation gap by using cutting-edge technology. After months of formal and informal conversations and research into alternative methodologies for moving and storing data, this chapter was born. I believe it presents our best options for adapting quickly to our brave new world.

Of course, in order to become a DDHO, we have to address the cultural impact of such a change. Chapter 5 outlines what it will take for your organization to make the shift. This isn’t a quick-fix effort. It will take months, perhaps even years, before your organization can claim success. But in this chapter I outline the three things that your organization can do, from training, to marketing, to more traditional departments like information technology and informatics, to make sure everyone, from the executive assistants to the CEO, is data driven.

Chapter 6 attempts to make sense of the booming industry of big data. The term is so ubiquitous that I have even heard it on the evening news, yet we know little about what it is and how it can help solve the real and complicated problems of healthcare. This chapter reviews a few organizations that have dipped their toe in the big data lake. We can learn from their stories to see how big data can help us on the DDHO journey.

The most exciting chapter in the book is Chapter 7. The future of *healthcare business intelligence (BI)* is with the patient. I made that statement in *Healthcare Business Intelligence*. That’s a shift that is started, with apps that allow you to measure movement and sleep. Eventually we will connect all of these data with our personal health record (PHR) and have a more robust version of what individual patients actually do (versus what they say they do) to take care of their health. The powerful individual case studies of personalized medicine and the quantified-self movement will shift over time toward healthcare delivery, and we will have to find a way to present that. The closer we get to this, the more data will become a part of the solution instead of a part of the problem.

Using average healthcare consumers as a test bed, and relying on some graphic artists for creative support, I’ve outlined six best practices

for visualizing data to patients and members. This audience has different expectations than our internal audience or even our customers (brokers and providers, e.g.). If you're not visualizing data to patients now, you will be soon. These best practices will be important to adopt to ensure that we give our patients and members the best information to make important decisions.

Chapter 8 gets about as provocative as this subject can get. Because we know that our audience is shifting from an internal one to an external one, we have to address privacy and confidentiality. This is an incredibly dynamic subject. During discussions with average healthcare consumers (my version of "on the street"), there is a distinct gap in what 20-somethings feel is appropriate privacy and confidentiality compared to what my generation and older feel is appropriate. Protecting data is still an important part of the work, and we will discuss the processes that can ensure that your organization is protected as you enter your DDHO journey.

Finally, Chapter 9 outlines what you have to do in the next year to take the first steps in your DDHO journey. My hope is that this very pragmatic approach leaves you with a tangible set of steps that you can use as soon as you close the book.

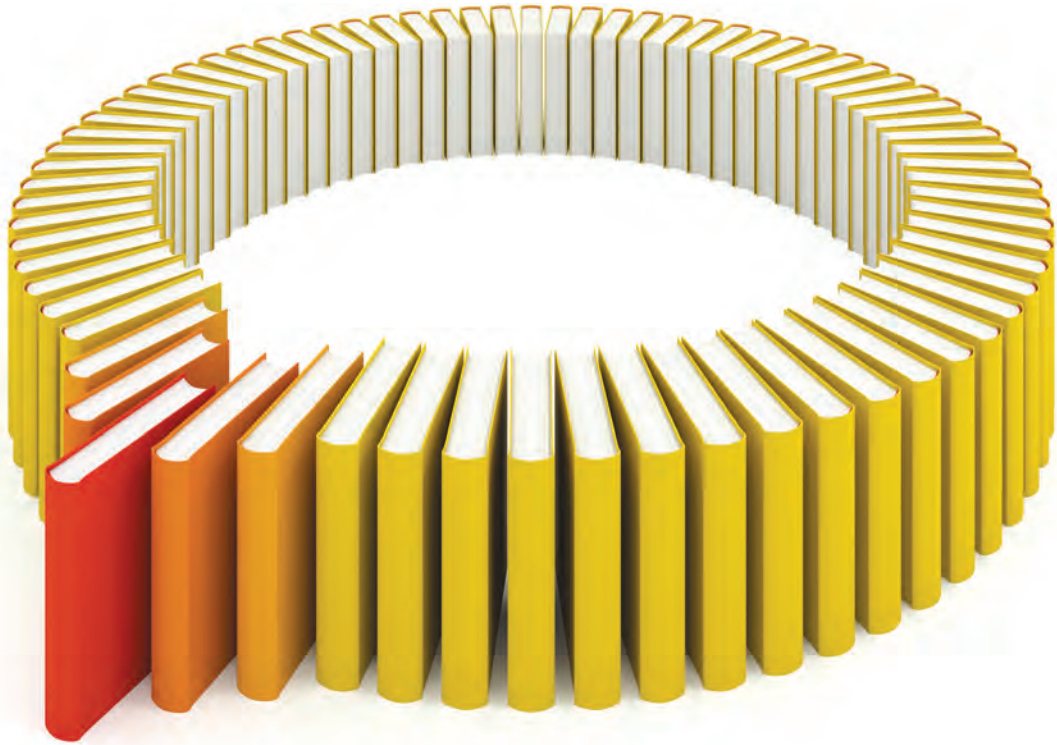
IS THIS BOOK FOR YOU?

If you're still not sure if this book is for you, let me offer this. If you firmly believe, as I do, that most healthcare companies can get more value out of data than they do today, this book is for you. If you believe, like I do, that most healthcare organizations aren't really sure what the next step is so they don't take one, this book is for you. If you believe, as I do, that if we could just "up our game," healthcare would improve, this book is for you. Even if you're just curious as to what it would take, this book is for you. Read it in good health.

REFERENCES

- Davenport, T. H., and D. J. Patil. (2012, October). "Data Scientist: The Sexiest Job of the 21st Century." *Harvard Business Review*. Retrieved October 22, 2013, from <http://hbr.org/2012/10/data-scientist-the-sexiest-job-of-the-21st-century/>.
- Fallows, J. (2014, March 19). "Why Doctors Still Use Pen and Paper." *The Atlantic*. Retrieved March 26, 2014, from <http://www.theatlantic.com/magazine/archive/2014/04/the-paper-cure/358639/>.
- Merriam-Webster. (2014). Definition, "Data." Retrieved March 26, 2014, from *Merriam-Webster Dictionary*: <http://www.merriam-webster.com/dictionary/data>.
- Wikipedia Contributors. (2013, October 22). *Wikipedia*. Retrieved October 22, 2013, from http://en.wikipedia.org/wiki/SWOT_analysis.

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