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LINK

Transforming Data Noise Into Healthcare Action QLIK

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The global coronavirus pandemic has highlighted the significance of government healthcare systems and their role in connecting people with the health services they need. It has also made citizens acutely aware of the importance of public health data.

Contra Costa is a county with a population of about 1.1 million people in the East Bay region of the San Francisco Bay Area. Contra Costa Health Services is the safety net system for the residents of the county. We're somewhat unique in the United States as we are an integrated health department with multiple divisions under one umbrella: hospital and clinics, health plan, behavioral health, public health, health services in detention centers, environmental health, EMS, and even restaurant inspections. The hospital and clinics serve approximately 125,000 patients a year and the health plan has 180,000 members receiving their insurance coverage through us.

In every respect, we are here to help our residents live safely, healthily, and well.

So Much Data, but No Real Answers

Today, I am the chief analytics officer for Contra Costa Health Services, but when I started here 19 years ago, our data systems were limited. As a result, our decision making often had to be gut-based: "I feel we should do X," without enough evidence to support the decisions. We simply didn't have the systems or staff to collect and analyze data.

The culture around data awareness was also very different at the time. Data can tell uncomfortable stories, and those stories can ruffle some feathers if an organization has not made the data maturity journey.

Things changed significantly in 2010 with the Affordable Care Act and its funding for electronic health records (EHRs). As a result, in 2012 we went from only using electronic systems primarily for billing and claims to using Epic, an enterprise wide EHR solution. With a consolidated system and a great platform, we suddenly had access to massive quantities of data. The EHR data in the data warehouse was supplemented by developing partnerships with social services, county jails, and other community organizations to share data while following prevailing privacy laws.

This gave us in health services a glimpse into the lives of our patients that we'd never had before. With this, we had a great foundation to build a comprehensive picture of health for our patients, members, and clients. We then knew that we would be doing that information and our clients a disservice if we couldn't organize it in a useful way.

The thing was, the data was not telling us what we needed to know. We produced report after report, but the real questions went unanswered. For example, if our breast cancer screening rate in West County was lower than average, we didn't know how to improve that because we didn't know who those patients were. Were they middle aged? Employed? What was their demographic makeup? What did they need? Were there gaps in our system that were responsible for the screening rate disparities between clinics?

A static report can't answer these questions, and it was becoming unsustainable for my team to produce so many reports. We had to find a way to turn all this data into information that was trustworthy and actionable.

High Stakes

It was clear that trying to simply solve problems with more data wasn't the solution. Unless you have a way to mine that data and make it actionable, it's just more noise. But how could we identify specific actionable information?

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We had to break from that traditional back-office mindset that often prevails in IT, where people came to us with requests and our sole purpose was to resolve tickets. It was time for us to ask our various departments about the problems they were trying to solve. I literally had members of my team embedded in operational teams, so they would be at the table during those discussions.

That was a great start toward a change in mindset, but we still had the problem of delivering the data in an actionable manner. The need became even clearer in 2015, when we had performance targets to meet for more than 60 quality metrics under the Medicaid waiver program with millions of dollars in funding at stake. For example, we had to achieve a certain immunization rate or cancer screening rate every year in order to receive funding.

While we could easily produce a report on our immunization rate, providing subsequent, real-time data to show progress and gaps as well as to identify high and low performers over time and disparities for targeted interventions proved to be a challenge. We realized our reporting tools had limitations for the size and nature of the work, as answering some simple questions required a lot of ad hoc reporting. In addition to tens of millions of dollars in funding, the quality of care we deliver was at stake.

Creating Solutions That Catch on Like Wildfire

We started looking at the tools that would allow our staff to interrogate the data. In 2016, we partnered with [Qlik](#) and within three months, published our first dashboard for this pay for performance Medicaid waiver program that is known in California as PRIME. We initially planned a training schedule, but there was such an urgent need for the dashboard to be deployed that as soon as we released it, it caught on like wildfire. Before we knew it, more than 100 providers, quality managers, and operational leaders were using the dashboards without any training.

[Qlik Sense](#) is so intuitive that the intended users didn't need assistance getting started. As long as we followed some simple design principles, all new users needed was a tip sheet and a data dictionary to get them going.

After the success of that first dashboard, other departments saw the benefit of having these actionable insights. Now we have more than 25 dashboards targeting specific needs, including one for our Whole Person Care Program. This program strives to treat the whole person, believing that addressing the root causes of health issues leads us to deliver better service at a reduced cost.

Our first task as analysts was to draw together the data on the social determinants of health—including information on things like access to food and transportation, along with health data—and develop a risk model to identify the top 12,000 most at-risk individuals from the eligible population and get them enrolled in the program. The next step was to create a dashboard for our 150 Whole Person Care case managers. With the patients' permission, my analysts shadowed the case managers on their visits so we could truly understand what case managers need to do their jobs effectively. We learned that case managers were often keeping their own paper records to help them prioritize patients, and that it's unsustainable way to keep up with caseloads.

From there, we started prototyping a dashboard that would give them an at-a-glance view of their caseload and patients that need to be prioritized for outreach. We followed the human-centered design approach in designing the dashboard, making the users co-designers of the dashboard. We made quick prototypes to get early feedback. We found out that initial iterations of the dashboard, though they looked elegant, were far too complex for day-to-day use, and offered too much information.

We quickly learned to be deliberate with information, only including what was necessary and actionable. Information that is merely "interesting" does not belong there. In the final dashboard, a case manager can see at a glance how many of the patients in their caseload are actively engaged, who needs immediate attention or is falling behind, and who can graduate from the program. By partnering with case managers in the design, we've made a dashboard that is truly useful. It's now the starting point of a case manager's daily workflow.

Having real-time comprehensive patient data helps healthcare programs target their efforts and ultimately avoids poor outcomes.

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With the actionable insights we now produce using Qlik, we can better identify patients that are falling behind on preventative services or have unmet social needs. We can understand where the disparities are, leading to better care. It also helps us in being good stewards of public dollars for our county by meeting all our quality targets and not leaving any dollars on the table.

When It Mattered Most: Public Transparency and COVID-19

When the coronavirus struck California, Contra Costa Health Services had the advantage of already having the tools and the mindset to meet this challenge head-on. We knew that with the shelter-in-

place order, we were asking our community to make a huge sacrifice. We had to maintain the trust of our community by being transparent about the situation so residents could make informed decisions.

Up to this point, our Qlik license had always been for internal use, and our dashboards were only seen by a few hundred people. Under these extenuating circumstances, however, Qlik gave us a two-month free trial license for online use, so we could produce public-facing COVID-19 dashboards.

That first weekend of sheltering in place, we fired up three Azure servers in the cloud, and within two weeks we had fully functional dashboards ready for the public. We had to set up this infrastructure to be stable, accurate, and scalable at volumes we had not worked on before. The Qlik team was great in working with us through this, spending hours helping us understand load balance and app optimization, as well as the server itself.

The dashboards had to work around the clock, so having that relationship with Qlik was extremely helpful for those first few crazy weeks with high surges in usage. The day after we went live, we had 80,000 visitors, so gradually scaling up was not an option! In the first four months we had 2.5 million views. Initial interest was basic information for the county: our COVID-19 case count, hospitalizations, and deaths. But after that, people wanted to drill down further and find out additional statistics in their specific city or even availability of hospital and ICU beds. We kept seeing different questions and concerns begin to emerge, and we had to continue to adapt to the situation.

Nationally, we saw the coronavirus disproportionately affecting our fellow African-Americans and LatinX residents, so now, all our data can be broken down by race, ethnicity, and age. We also created new dashboards to specifically show the status in our long-term care facilities, as well as with our homeless population. We've kept our eyes on the larger picture as well; we knew we had to stay ahead of any possible misinformation and have continued to enhance the dashboard to provide accurate and timely information.

When May came along, people wanted to know when the shelter-in-place order would end. In the Bay Area, we have six health officers working together who came up with five indicators to tell us when we can start to reopen our economy. We developed a dashboard to track those indicators and could remain transparent about the evidence-based approach being used. Of course, we also have our internal COVID-19 dashboards to help us understand the disease spread and make important decisions, such as where we need to improve our testing. It's the same data as the public dashboards, just more technical and detailed.

Data transparency should be at the heart of any health-focused strategy.

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When analytics team members are fragmented across an organization, it is harder to respond to an emergency of this scale. Because of our earlier efforts in developing a centralized analytics team and the data maturity journey our organization took, along with the agile culture and skillset that developed, our data team was ready to respond to COVID-19. In the first two weeks of the pandemic, we were able to reimagine the team to be a fully functional COVID-19 response analytics team by having an integrated data warehousing, visualization, data science, and epidemiology team.

With this integrated team and our philosophy of data transparency at the heart of any health-focused strategy, we are able to provide actionable information that has helped Contra Costa Health Services improve our quality of care by identifying and addressing disparities. Qlik has been a great catalyst in our analytics journey.