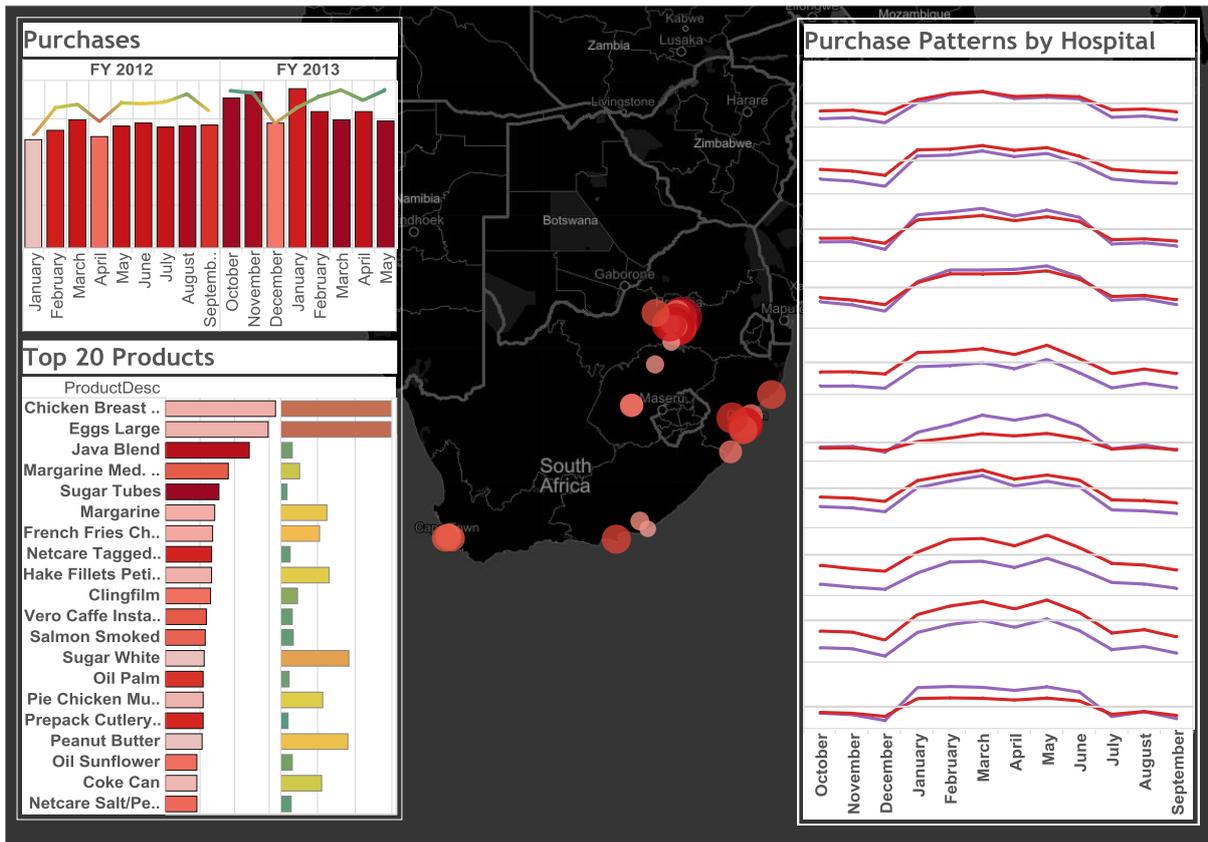




Why Tableau for Healthcare?



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Why Tableau for Healthcare?

Introduction

The objective of this research report is to show that Tableau, rated highly by both its clients and analysts, is the ideal BI analysis and visualisation tool available on the market today. Tableau will assist any healthcare organisation to realise its information and service level objectives. This research report is to show applicability of Tableau in healthcare and that given its penetration, which is supported by the case studies discussed, it is clear that Tableau is the right platform for any healthcare organisation that wants to move from data to insight in the shortest possible time.

This report is a summary of analyst reports and customer stories gathered through interviews, case studies and feedback on social media. The report is focusing solely on the health industry and includes hospitals as well as other companies competing in this industry. The aim is to provide healthcare organisations with a complete picture as to the capabilities of Tableau should they decide on a self-service BI tool in the future.

The report covers:

- IDC Health Insights Predictions for 2015 to introduce the future context within which BI must add value
- Tableau's Mission and Approach to BI within Healthcare
- Analysts reports
 - KLAS: Healthcare Analytics Performance Report
 - Gartner Magic Quadrant
 - Forrester
 - BARC
- Tableau customer stories
- Dashboard examples within healthcare

Examples of healthcare dashboards are shown in Annexure A.

IDC Health Insights Predictions for 2015¹

IDC Health Insights presented its 2015 healthcare predictions, based on a new IDC FutureScape report and provided organizations with insight and perspective on long-term health care industry trends along with new themes that may be on the horizon. The predictions from the IDC FutureScape for Health Insights are:

1. With healthcare costs rising, operational inefficiency will become critical at 25% of hospitals, resulting in the development of a data-driven digital hospital strategy requiring budget in 2016.
2. By 2015, 50% of healthcare organizations will have experienced 1 – 5 cyber-attacks in the previous 12 months with one out of three attacks deemed successful, requiring healthcare organizations to invest in a multi-prong security strategy to avoid disruptions to normal operations and incurring fines and notification costs.

¹ Access full report at <http://www.idc.com/getdoc.jsp?containerId=prUS25262514>



3. Driven by the increased pressure to improve quality and manage costs, 15% of hospitals will create a comprehensive patient profile by 2016 that will allow them to deliver personalized treatment plans.
4. By 2020, 80% of healthcare data will pass through the cloud at some point in its lifetime, as providers seek to leverage cloud-based technologies and infrastructure for data collection, aggregation, analytics, and decision-making.
5. As a result of an increased focus on improving the consumer experience, 65% of consumer transactions with healthcare organizations will be mobile by 2018, thus requiring healthcare organizations to develop omni-channel strategies to provide a consistent experience across the Web, mobile, and telephonic channels.
6. To control spiralling healthcare costs related to managing patients with chronic conditions, 70% of healthcare organizations worldwide will invest in consumer-facing mobile applications, wearables, remote health monitoring, and virtual care by 2018, which will create more demand for big data and analytics capability to support population health management initiatives.
7. Building on continuing technology innovation and the increasing use of knowledge-based workflows and actionable analytics, more than 50% of big data issues will be reduced to routine operational IT by 2018, reducing the need for specialized IT resources to support big data.
8. With increased dependence on external partners for outsourced services, more than 50% of health and life science buyers will demand substantial risk sharing by 2018 to ensure that service providers recognize their growing role in the process and deliver added revenues to high performers at the expense of satisfactory or lesser performers.
9. As a result of increased pressures to deliver better outcomes of care more efficiently, payers will implement newer reimbursement models for 35% of their payments to providers in North America and the European Union within the next 36 months resulting in related investments in quality measurement, payment, and billing systems.
10. By 2020, 42% of all healthcare data created in the Digital Universe will be unprotected but needs to be protected, as use of data and analytics continues to proliferate and more stakeholders are involved in delivery of care.

For years, hospitals and clinics have relied on IT departments to provide answers to data questions, creating a never-ending cycle of long wait times and inflexible results. IT has faced the inverse challenge. They spend dozens of hours churning out reports and responding to requests that often fall short of what the requester needs to know.

Also, because most healthcare workers lack the time and skills to see and understand data, they simply don't use the analytics systems provided by their companies. As a result, many knowledge workers today rely on spreadsheets as their primary self-service analytical tool, which can be slow, inefficient, erroneous and impossible to govern and scale.

Healthcare providers are looking to turn the tables on this status quo by empowering individuals throughout their organizations to explore data to answer their own questions. Not only will this enable faster, more insightful life impacting decisions, it's letting IT get back to the business of building and maintaining the backbone—a secure and reliable data infrastructure.

Many clinics and hospitals have already created a self-service model, where IT and business intelligence teams are shifting away from knee-jerk reactions to requests and toward training individuals and departments to ask and answer their own questions. Furthermore, access to data is established with full consideration of security requirements throughout the organization.



The result is less time spent by the IT department to generate reports and respond to inquiries and more data-driven decision making for knowledge workers at the hospital or clinic.

Tableau's Mission and Approach to BI within Healthcare

Tableau is an R&D-driven company. It continues to invest in R&D at a higher pace (in terms of percentage of revenue — 29% in 2014) than most other BI vendors². This shows that Tableau is serious about its mission **to help people see and understand their data**, quickly and in an easy to use way.

The healthcare industry has never been more focused on data—its promise and its pitfalls—as it is today. From slashing healthcare spending to detecting fraud or coordinating care across multiple providers—improved use of healthcare data has been held up as a “silver bullet” to slay all kinds of healthcare monsters. But in the real world, the sheer quantity of data can feel more overwhelming than helpful. From disparate EMR systems and medical device outputs to staff schedules, patient satisfaction surveys, and medical equipment tracking, data flows into your hospital at an overwhelming rate.

Hospitals are taking control of their data and taking advantage of its potential with these four trends in healthcare data analytics:³

1. Implementing dashboards on the hospital floor
2. Aligning the enterprise around outcomes
3. Adopting a patient-centric approach
4. Leveraging the power of social media

Healthcare providers are successfully tackling some of their biggest challenges – from emergency room efficiency and supply chain infrastructure to insurance payments and patient safety – by using a next-generation business intelligence approach. Three best practices stand out about how these healthcare providers are getting more from their information assets:⁴

1. Break the data access logjam by empowering departments to explore their own data
2. Uncover answers with data from multiple systems to reveal trends and outliers
3. Share insights with executives, doctors and others to drive collaboration

Even with new data technologies that empower everyday users, hospitals sometimes fail in their analytics strategies. New approaches demand a new methodology. There is a search for proven agile development and deployment methods that move as quickly as the changing requirements; methodologies that allows IT and hospitals to work together as partners; and for a lighter process that allows people to exercise their natural curiosity and collaboration.

The three attributes of the new way to approach healthcare analytics are⁵:

1. Self-Reliance
2. Visual Discovery
3. Speed At Every Stage

Tableau's mission is to do just that!

² Gartner BI Report 2015 - <http://www.gartner.com/technology/reprints.do?id=1-2ACLP1P&ct=150220&st=sb>

³ Access Tableau Whitepaper at <http://www.tableau.com/learn/whitepapers/4-top-trends-healthcare-data-analysis-adopt-today>

⁴ Access the white paper at <http://www.tableau.com/learn/whitepapers/transform-healthcare-data>

⁵ Access Tableau Whitepaper at <http://www.tableau.com/learn/whitepapers/enabling-healthcare-analytics-better-patient-outcomes>



What the Analysts Say

In January 2015, KLAS Research placed Tableau among the top business intelligence vendors for healthcare. Respondents in the [KLAS survey](#) called Tableau one of the simplest visual analytics products to use and praised the visualization capabilities, speed, quick installation times, and strong value of Tableau Server.

[Gartner](#) also positioned Tableau as a "Leader" in its 2015 Business Intelligence and Analytics Platforms Magic Quadrant, marking the third year in a row that Tableau has appeared in the Leaders quadrant.

KLAS: Healthcare Analytics Performance - The Data Deluge: Who Delivers Value?

The purpose of the KLAS report is to review the performance of BI vendors in healthcare and highlight those who contribute the most value in the eyes of their customers. To do this, KLAS spoke with 463 providers to obtain their perspectives on how well their BI/analytics vendor(s) performs.

The results shown here are based on a study, which is a performance report by KLAS. The results are a unique compilation of candid opinions and are real measurements representing those individuals interviewed. The results and findings in the report, including vendor performance scores and analyses provided by KLAS, are based on live-customer ratings and comments from research interviews with healthcare providers. The findings presented are not meant to be conclusive for an entire client base.

KLAS interviewed healthcare providers, mostly IDNs and hospitals, to learn about their experiences with their vendors. This report provides an in-depth view of vendor performance from the customer's eyes for BI/analytics tools used in the healthcare provider market. The primary focus is on standalone, commercial products that are vendor agnostic and used in healthcare for analysis and reporting on varied kinds of data (i.e., clinical, financial, and operational).

Vendor-Contributed Value and Client Evangelism

Broad-Use BI Vendor Ratings - 1-9 Scale

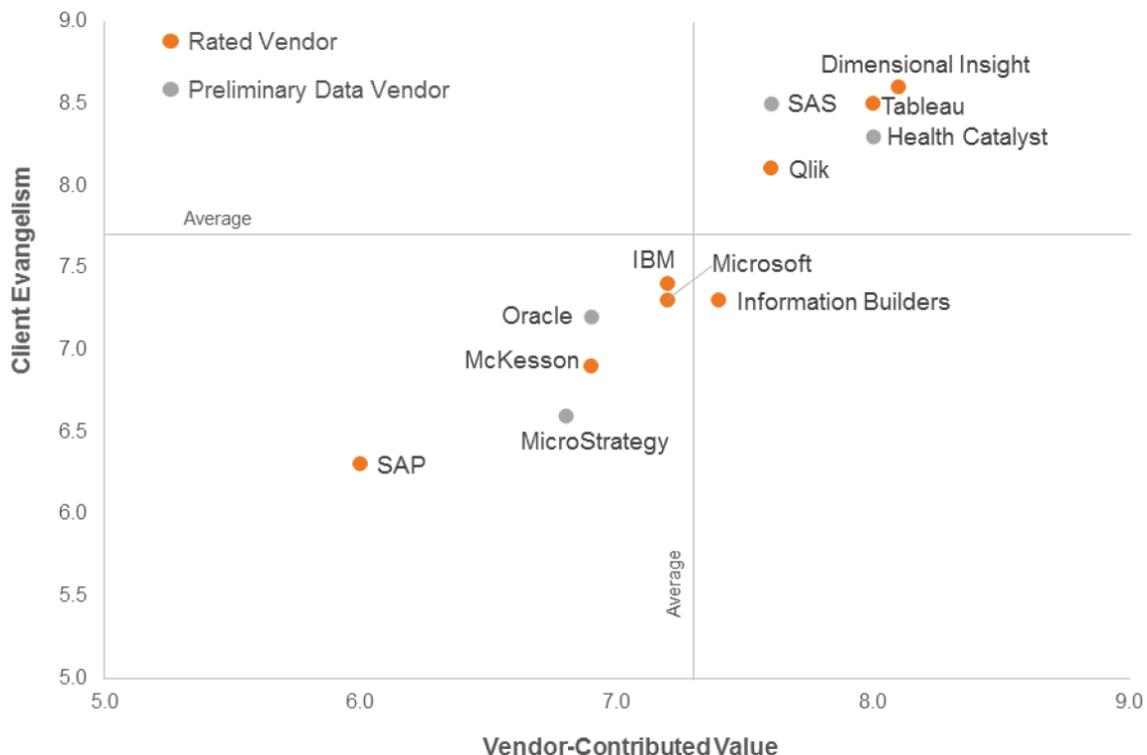


Figure 1: Vendor Contributed Value and Client Evangelism



Healthcare providers often turn to focused analytics – products or solutions focused on an area or designed for a specific purpose. KLAS highlights vendor performance in multiple areas:

- Quality /physician benchmarking analytics
- Clinical ancillary analytics
- Financial/workforce analytics
- EMR-vendor aligned/embedded analytics
- Populations health analytics

Money's Worth and Likely to Recommend

Broad-Use BI Vendor Ratings - 1–9 Scale

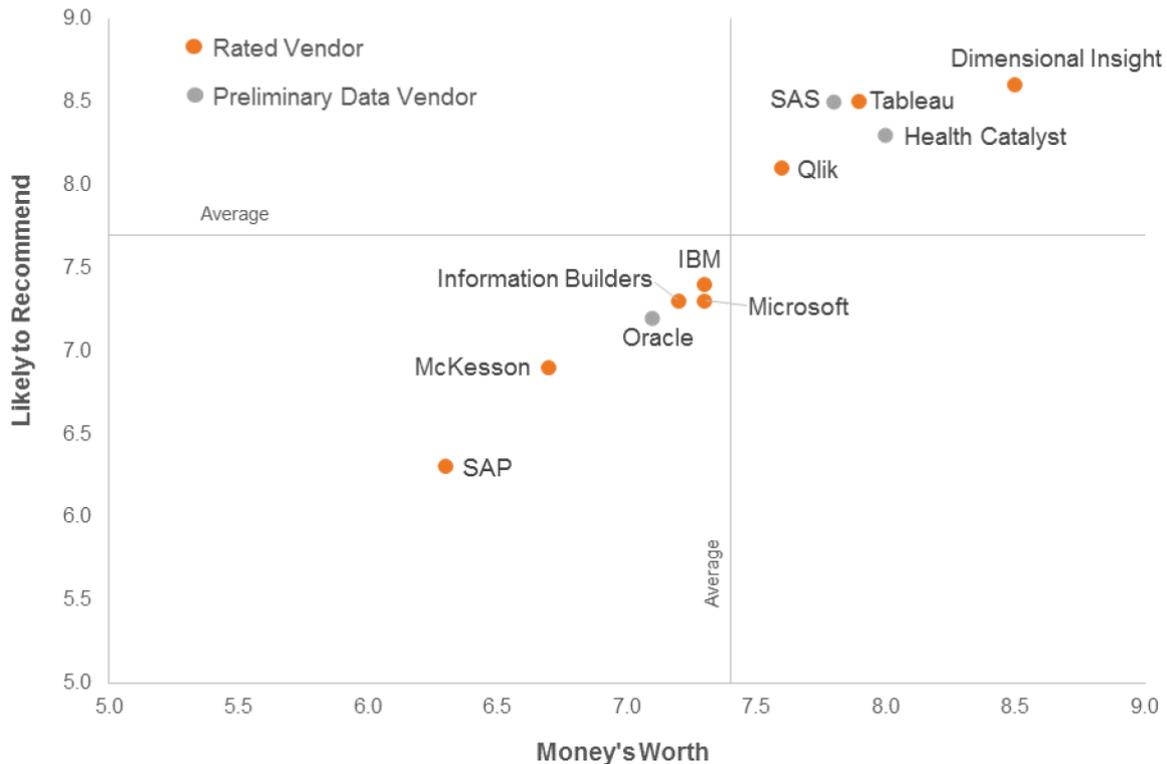


Figure 2: Money's Worth and Likely to Recommend

KLAS examines vendors in two main categories: broad-use BI and focused analytics. Vendors categorized as broad use typically have BI platforms that are used for broad and varied use cases across an organization. Vendors categorized as focused analytics have products that are designed for, focused on, or used in a functional purpose or area.

Tableau falls in the broad-use category and Figure 1 shows where it is rated based on vendor-contributed value and client evangelism. Figure 2 shows money worth and likely to recommend to others.

Broad-use vendors are seen as having the capability to bring in and analyze many kinds of data (i.e., clinical, operational, and financial). For a broad-use BI vendor to be fully rated in this KLAS report, the following criteria had to be met:

- A **minimum** of 15 unique healthcare provider organizations had to be validated by KLAS to be using the product live.
- Multiple organizational implementations/uses of the vendor product(s) had to be confirmed for both clinical and financial reporting/analytics.
- Product(s) must be commercially available and have the capability to ingest, analyze, and report on data from multiple disparate data sources.



- Product(s) must provide dashboards, scorecards, or other similar viewing format to display data in a reasonably understandable way to stakeholders outside of IT (end users, non-IT executives, etc.).
- Product(s) had to be validated for use in a vendor-agnostic, cross-platform way (i.e., can be used in environments without reliance on other same-vendor applications).

The full reports is attached as Annexure B.

Gartner: Magic Quadrant for Business Intelligence and Analytics Platforms⁶

According to Gartner research, the BI and analytics platform market is undergoing a fundamental shift. During the past ten years, BI platform investments have largely been in IT-led consolidation and standardization projects for large-scale systems-of-record reporting. These have tended to be highly governed and centralized, where IT-authored production reports were pushed out to inform a broad array of information consumers and analysts. Now, a wider range of business users are demanding access to interactive styles of analysis and insights from advanced analytics, without requiring them to have IT or data science skills. As demand from business users for pervasive access to data discovery capabilities grows, IT wants to deliver on this requirement without sacrificing governance.

While the need for system-of-record reporting to run businesses remains, there is a significant change in how companies are satisfying these and new business-user-driven requirements. They are increasingly shifting from using the installed base, traditional, IT-centric platforms that are the enterprise standard, to more decentralized data discovery deployments that are now spreading across the enterprise. The transition is to platforms that can be rapidly implemented and can be used by either analysts and/or business users, to find insights quickly, or by IT to quickly build analytics content to meet business requirements to deliver more timely business benefits. Gartner estimates that more than half of net new purchasing is data-discovery-driven (see "Market Trends: Business Intelligence Tipping Points Herald a New Era of Analytics"). This shift to a decentralized model that is empowering more business users also drives the need for a governed data discovery approach.

Traditional BI platform vendors have tried very hard to meet the needs of the current market by delivering their own business-user-driven data discovery capabilities and enticing adoption through bundling and integration with the rest of their stack. However, their offerings have been pale imitations of the successful data discovery specialists (*the gold standard being Tableau*) and as a result, have had limited adoption to date. Their investments in next-generation data discovery capabilities have the potential to differentiate them and spur adoption, but these offerings are works in progress (for example, SAP Lumira and IBM Watson Analytics).

As a result of the market dynamics discussed above, for this Magic Quadrant, Gartner defines BI and analytics as a software platform that delivers 13 critical capabilities across three categories — enable, produce and consume — in support of four use cases for BI and analytics.

The 13 Critical Capabilities and Use Cases

Vendors are assessed for their support of four main use cases:

1. Centralized BI Provisioning: Supports a workflow from data to IT-delivered-and-managed content.
2. Decentralized Analytics: Supports a workflow from data to self-service analytics.
3. Governed Data Discovery: Supports a workflow from data to self-service analytics to systems-of-record, IT-managed content with governance, reusability and promotability.
4. OEM/Embedded BI: Supports a workflow from data to embedded BI content in a process or application.

⁶ This is an extract from the main report. To view the full Gartner report go to: <http://www.gartner.com/technology/reprints.do?id=1-2ACLP1P&ct=150220&st=sb>



Vendors are also assessed according to the following 13 critical capabilities:

Enable

- Business User Data Mashup and Modelling
- Internal Platform Integration
- BI Platform Administration
- Metadata Management
- Cloud Deployment
- Development and Integration

Produce

- Free-Form Interactive Exploration
- Analytic Dashboards and Content
- IT-Developed Reporting and Dashboards
- Traditional Styles of Analysis

Consume

- Mobile
- Collaboration and Social Integration
- Embedded BI

Gartner on Tableau

Figure 3 shows the Gartner Magic Quadrant and it can be seen that Tableau is represented in the Leaders quadrant with the highest rating on *Ability to Execute* and in the top 5 for *Completeness of Vision*.

Gartner's assessment of Tableau is as follows:

"Tableau's intuitive, visual-based data discovery capabilities have transformed business users' expectations about what they can discover in data and share without extensive skills or training with a BI platform. Tableau's revenue growth during the past few years has very rapidly passed through the \$100 million, \$200 million and \$300 million revenue thresholds at an extraordinary rate compared with other software and technology companies.

Tableau has a strong position on the *Ability to Execute* axis of the Leaders quadrant, because of the company's successful "land and expand" strategy that has driven much of its growth momentum. Many of Gartner's BI and analytics clients are seeing Tableau usage expand in their organizations and have had to adapt their strategy. They have had to adjust to incorporate the requirements that new users/usage of Tableau bring into the existing deployment and information governance models and information infrastructures. Despite its exceptional growth, which can cause growing pains, Tableau has continued to deliver stellar customer experience and business value. We expect that Tableau will continue to rapidly expand its partner network and to improve international presence during the coming years.



Figure 3: Gartner Magic Quadrant for Business Intelligence and Analytics Platforms

Customer Stories

Following are summaries of the experiences of Tableau's current healthcare customers available in Tableau's knowledge base at www.tableau.com. Links are provided for the reader to access the full reports, videos and other information sources pertaining to customers within healthcare.

This section will start with a summary of the challenges that healthcare practitioners encountered before they acquired Tableau. This will be followed by stories of their experiences since the implementation of Tableau.

What are the challenges and why did they change?

Reading through customer stories as to why health care organisations decided to change and implement Tableau, the following reasons were given:

- Analysis of large data sets was difficult and time consuming.
- Call centre performance was difficult to monitor in real time and to share.
- Could not get the information to the decision-makers quick enough.
- Communication of performance information across a number of areas to reach a larger audience at a lower cost was problematic.
- Operating costs were too high and visibility too low, which made the improvement of costs and efficiencies difficult.
- Current BI systems were too cumbersome to use.
- Difficult to visualise and answer simple questions due to the diversity and the number of data sources that needed to be accessed.



- Difficult to spot opportunities due to the business users not having access to their own data and not being able to perform ad hoc analysis.
- HR analytics could not be done due to HR being seen as a cost centre and not having the necessary tools to prove their business value.
- Ownership of the data resides with IT and it should reside with the business user.
- Lack of collaboration between users - To share information was difficult, which hampered operations and efficiency improvement initiatives.
- Limited IT resources - IT resources spent most of their time on creating reports.
- Managing compliance was difficult.
- No direct access to information when in meetings resulting in slow decision-making.
- Poor management of readmissions.
- Service delivery - improving care without having access to information was difficult.
- Too many manual reporting systems, such as spreadsheets, slide decks, and pivot tables.
- Wasted time spent on creating reports and to analyse data.

Customer Stories

Of the 17 "Best Hospitals" in the USA, ranked by [US News](#), 14 are using Tableau for healthcare analytics, including Johns Hopkins Hospital, the Cleveland Clinic, and the University of Washington Medical Center.

Referring to case studies and interviews with customers, read and listen to what the above and other healthcare organisations are saying about their experiences thus far with Tableau:

Advocate Health Care⁷

Video: *Slalom Consulting and Rance Clouser, VP Field Services Information Systems, Advocate Health⁸*

- Advocate Health Care, one of the USA's top ten health systems, was experiencing lower than expected physician compliance with their Electronic Medical Records. Delivering insights through data visualization empowered the hospital staff to obtain easy access to pared-down information, making the necessary process and policy changes to improve patient care.
- To provide the best patient care and exceed regulatory standards, Advocate needed to maximize its investment in its Electronic Health Record (EHR) system. Doing so meant increasing CPOE compliance to better than 80% and eliminating order entry errors entirely.
- Data visualization lead to eye-opening results, the self-service BI tool enabled "order data" visualization and empowered staff at each hospital to find, investigate, and correct processes that were impacting compliance and safety at their locations. They integrated a complex data set into Microsoft SQL Server; designed and developed interactive, user-friendly visual dashboards using Tableau software; and emphasized user adoption through site-by-site, hands-on educational workshops. The tool was rolled out to eight of Advocate's hospitals.

⁷ Read summary and listen to interview at: <http://www.tableau.com/learn/stories/advocate-health-care-transforms-patient-safety-and-care>

⁸ Video: <http://www.tableau.com/learn/stories/advocate-health-care-transforms-patient-safety-and-care>

Allergan⁹

Interview with Joe Madigan, Director of Customer Services for Allergan within the region comprising Europe, the Middle East and Asia (EMEA).

Founded in 1948, Allergan is a multi-specialty healthcare company that employs more than 11,000 people worldwide. Allergan operates in more than 100 countries, providing treatment options for patients in eye care, neurosciences, obesity intervention, medical aesthetics, medical dermatology and urologics.

Employees of the 12 customer service sites within EMEA ensure that orders for Allergan products—received from healthcare providers via fax, email and phone—are entered into the system within 24 hours. They also respond to customer queries and complaints.

Allergan in EMEA generates roughly 1.5 million transaction lines a year across its 12 locations. While much of the company's data is stored in an enterprise SAP NetWeaver Business Warehouse, each site had implemented a different contact centre technology.

Challenges prior to Tableau:

- Allergan strove to gain monthly insight into their customer service levels but struggled with that as they had almost no visibility of what was going on. This posed a risk to the company's sales numbers. If service levels were not met, orders could be cancelled and providers would move to other treatments.
- Too much time was expended on the creation of dashboards than on the data itself. They were expending too much energy just redoing charts and graphs that they often were losing sight of what the data was saying to them.
- Data sets were not readily available. For their SAP database, they could sit there for two hours, waiting for a report to run and on many occasions, the first running of the report would bomb out.

In 2011, Allergan in EMEA made two changes that would transform how they see and understand their data. Allergan started a project to standardize all 12 customer service centres on a new contact solution, Genesys, which tracks voice, fax and email contacts with Allergan customers and Tableau for data analysis and reporting. After this the following is worth noting:

- From a single Tableau Desktop license in 2009, Allergan in EMEA has grown to 20 Tableau Desktop and Desktop Professional licenses for authoring. They most often work with extracts; a typical data extract comprises approximately 10 million rows.
- They blend different data extracts as needed. For SAP, they have one big data extract on transactions; another on transaction lines; and another one, on their source of orders. They blend all these quite frequently. Visualizations are uploaded to Tableau Server, and the BI team is teaching people to drill down into the data to answer their own questions.
- The production of the monthly compliance report, connecting Tableau to data on Box, the cloud storage solution has been automated.
- One instance of Genesys sits over all of their locations; Tableau sits on top of the two Genesys databases - SQL Server and Oracle. Tableau pulls that data and then blends it to provide nearly live service-level reporting. Allergan refreshes its Genesys data extract every 15 minutes.
- Some users are interacting with Tableau visualizations on mobile devices. It is anticipated that the number will increase in future.
- Currently, nearly 200 people across Allergan in EMEA are regularly turning to Tableau visualizations for insight.

⁹ Read the full story: <http://www.tableau.com/learn/stories/allergan-prescribes-tableau-treatment-data-woes>



- For authentication, Allergan uses a combination of Trusted Ticket and Okta. They use Tableau to visualize data from Google Analytics and Salesforce; they are looking into using the Salesforce direct connector.
- In terms of ROI, the value was certainly returned in a month.
- The data quality team, based in London, recently purchased 20 licenses for Tableau Desktop; the ophthalmology finance team recently moved from QlikView to Tableau.
- Another reason for Tableau is that it goes across all business lines as it is not business-line or function-specific.
- Allergan is supporting 50% transaction volume increase with NO additional headcount.
- They have eliminated their queue of requests, so their data analyst is able to respond more quickly to ad hoc queries and to more value-add requests.
- The compliance report has gone from six hours of work once a month down to 30 minutes.

Barnes Jewish Hospital¹⁰

Interview by Elisa Fink with David Jacques, MD, BJH and other BJH managers and staff.

Barnes-Jewish Hospital is the largest hospital in the U.S. state of Missouri. It is the adult teaching hospital for Washington University School of Medicine, and is located in St. Louis, Missouri. It is consistently rated one of the top hospitals in the United States by U.S. News & World Report. In 2012-13, it was ranked sixth-best medical center overall.

- The MD of the hospital wants access to ALL the data as he believes that the more detailed the data gets, the better and more accurate the decisions they can make. He hit the point home that while trends and averages are great, he really likes to see variances and outliers.
- As part of their LEAN initiatives they look at processes ripe for improvement. Managing labour hours in a constantly changing environment has been one of their biggest challenges. Without visibility, they couldn't make the connection to budget overruns and staff who were clocking in early and clocking out late.
- With just 4 IT resources and in just 70 days, they were able to integrate data from disparate sources and create some initial reports. Having created something they call a staffing board, they can adjust staffing levels in real-time using data throughout the day. They have also been able to cut in half the amount of overtime paid. They have never gone over budget with staffing since implementing Tableau.

Cerner Corporation¹¹

Press Release

Tableau recently formed a partnership with Cerner Corp. to integrate its data visualization capabilities with Cerner's enterprise warehouse and analytics offerings. The partnership will help organizations find ways to improve health and care through greater data discovery and exploration capabilities.

¹⁰ Read various documents on Barnes Jewish Hospital at:
<http://www.tableau.com/search/all/Barnes%2BJewish%2BHospital>

¹¹ See: <http://www.tableau.com/search/all/Cerner%2BCorporation>



Cleveland Clinic¹²

Video - Webinar: *The Cleveland Clinic Leverages Fundraising Data in Seconds*¹³

Cleveland Clinic, located in Cleveland, Ohio, is a multi-specialty academic medical centre that integrates clinical and hospital care with research and education. Cleveland Clinic is ranked among America's Top Hospitals by U.S. News & World Report.

As a top American hospital, Cleveland Clinic serves hundreds of thousands of patients and works with more than 1,500 doctors. This equates to a large number of claims that may be denied by insurance companies for a wide variety of reasons. The Clinic's staff needed a way to quickly identify problems with insurance submissions because every claim denied corresponds to a temporary loss of revenue.

Other challenges/requirements:

- Cleveland Clinic has a powerful, homegrown Denial Database and Denial Database Application in place for managing, storing, and working denial information. But the massive amount of data—more than 200 relationships in SQL tables—make conducting interactive analysis nearly impossible. Monthly reports are useful but there was no easy way to connect to live source data to find specific claims, and to quickly resolve large-scale claim issues.
- Also, because each department used the database for different reasons, the Clinic needed an application that would create easy-to-understand reports for a large number of its employees—not just the IT staff or business intelligence specialists.
- They found out about issues because they blew up on their monthly reports, which for an organization their size means significant costs and lost opportunities.

The benefits of Tableau:

- Cleveland Clinic can identify potential denial issues before they become a problem and uncover areas for improvement for each individual department. This, in turn, expedites the claims approval cycle and saves time and money for the organization.
- The biggest benefit of Tableau is that they can now do trending analysis and understand issues earlier in their lifecycle.
- They can still uncover individual denial issues, faster and can find the top five reasons overall for denials. By identifying the source issues, they can then proactively find solutions and reap the benefits across dozens and dozens of claims.
- Tableau helped them to find the line between efficiency and effectiveness where they can increase patient satisfaction without much cost to the Clinic. Tableau gives them control over their data, and that is a huge advantage.

Frederick Memorial Hospital¹⁴

Press Release

Frederick Memorial Hospital, based in Frederick, Maryland, has selected Tableau for its business analytics. The 300-bed community hospital has implemented Tableau to analyse data from a variety of sources such as admissions and discharge rates, surgical outcomes, emergency services, and management. The Hospital plans to expand access to dashboards to up to 100 people, including physicians, surgeons, clinicians, nurses, and administrative staff, to empower them with the insights they need for life impacting decisions.

¹² Read various documents on Cleveland Clinic at: <http://www.tableau.com/search/all/Cleveland%2BClinic%2B>

¹³ Video – Webinar: <http://www.tableau.com/learn/webinars/cleveland-clinic-leverages-fundraising-data-seconds?signin=45fd81f147a409c18ec4fb6a823fc9d7>

¹⁴ On Tableau in Frederick Memorial Hospital:
<http://www.tableau.com/search/all/Frederick%2BMemorial%2BHospital>



One of their goals with Tableau was to be able to answer questions in the course of a single meeting, taking just minutes. This would help improve their efficiency, productivity, and speed of decision-making at a lower total cost of ownership.

There is an increase demand from staff to see the data. Tableau provides them the ability to present the data in a way that anyone can quickly see and understand it. This is key to business and clinical user adoption.

Healthcare Call Centre¹⁵

Blog by Eric Berry

The customer began to look at Tableau because their current reporting structure of Crystal, Excel and Access simply did not provide the answers they needed from their call centre data. The call centre managers needed the ability to gauge the flow of calls on a daily, weekly and monthly basis, but their current monthly reporting of the call centre activity only summarized what happened after the fact. It didn't even feature the real-time analysis necessary for management to accommodate the fluctuating needs of daily operations. Worst of all, since the current system was so hard to use, the single power user was alone to perform all of the analysis. Tableau's quick set-up and straightforward operation made it simple to try and then deploy to everyone, sharing the analytical responsibility and key findings with the entire team.

After implementing Tableau, all of the call centre employees are more informed and responsive to customer and patient needs. Using near real-time dashboards, managers can see their 30 second answer rates, call abandonment rates and average speed to answer rates. Seeing these results daily versus monthly allows managers to see call flows, project schedules and make quick decisions for better call routing. Best of all, anyone on the team can now dig into the data themselves and answer their own questions, decreasing the burden on the power user.

HealthHelp¹⁶

Press Releases and interview by CIO Magazine's Stephanie Overby with HealthHelp's CIO Steve Spar.

HealthHelp has selected Tableau Software to help it visualize and analyze its health care data. Large health care providers engage HealthHelp to assist their ordering physicians in determining the right tests and treatments for their patients. The firm deployed Tableau to help reduce costs and deliver higher-quality care. Product managers can now discover evidence-based best practices that lead to improved performance. In addition, Tableau dashboards help identify test and treatment trends in areas such as cancer and cardiology. With Tableau, HealthHelp has been able to put visual analytics into the hands of the people who understand payer, regulatory, clinical and billing issues best.

At HealthHelp they work with very large and distributed datasets that are part of a data warehouse built on SQL Server Analysis services. The data warehouse is extremely complex, traditionally only experienced IT staff can access the information effectively. Tableau provides an intuitive and power graphical interface

¹⁵ See <http://www.tableau.com/search/all/Healthcare%2BCall%2BCentre>

¹⁶ See <http://www.tableau.com/search/all/HealthHelp>



Louisiana State University Health Sciences Center¹⁷

Customer Story: *Jennifer Hayden, IT analyst at LBCHP*

The Epidemiology Department at the Louisiana State University Health Sciences Center- School of Public Health collaborates with hospitals and other providers around the state to meet the requirements of a grant from the Centers for Disease Control and Prevention. The grant funds the school's Louisiana Breast and Cervical Health Program (LBCHP) to fulfil its mission to ensure that uninsured and underinsured Louisiana women have access to and receive high-quality screening and diagnostic services for the early detection of cancer.

They needed a visualization tool that would help them provide feedback to their providers. They purchased Tableau to generate progress reports for their providers to show them how they are performing and how they are contributing to the program's state-wide success.

Following are some examples:

- In addition to giving feedback to providers, LBCHP has found Tableau useful for quality control by looking for outliers in their data. They have created visualizations to understand why is it happening. They dig deep into patient information for quality control, finding trends, and working on programme evaluation.
- Using Tableau has enabled LBCHP to improve program performance and apply for funding for other programs. Though experience they have found talking to grantors, you need to show results and you need to show them in an easy-to-understand, visually enticing way.
- LBCHP also uses the software to allow people throughout their organization find answers. They use the software to explore. Their also do not require people with SQL and other technical skills and have found it very beneficial to be able to explore their data in sophisticated ways without being sophisticated programmers.

Inova Translational Medicine Institute (ITMI)¹⁸

Press Release

They are leading the way in precision medicine by mapping clinical and genomic data from new-born children with healthcare informatics to proactively identify biomarkers for personalized treatment. Visualizing this data in Tableau helps ITMI deliver unprecedented health insights, assuring healthier patient outcomes.

Intermountain Health¹⁹

Customer Stories and Video: *Intermountain Health Transforms HR Analytics with Tableau - Michael Thurston, HR analyst at Intermountain Healthcare*

Intermountain Healthcare's 33,000 employees work to serve the healthcare needs of Utah and south eastern Idaho residents. And the human resources (HR) department works to serve those employees and the company.

¹⁷ See

<http://www.tableau.com/search/all/Louisiana%2BState%2BUniversity%2BHealth%2BSciences%2BCenter%2B>

¹⁸ See <http://www.tableau.com/about/press-releases/2015/tableau-showcase-healthcare-data-analytics-2015-himss-national-conference>

¹⁹ See <http://www.tableau.com/search/all/Intermountain%2BHealth%2B>



HR was traditionally seen as a cost centre to the organization - a necessary evil. Being able to have a strong HR analytics function within an organization allows not to only show that HR is not just a cost centre, but they can actually improve the bottom line and add value in ways that you didn't think was possible. Tableau helped them to achieve this.

Johns Hopkins Hospital²⁰

Webinar presented by: Chip Barbara, MS, Administrator for Johns Hopkins Hospital, Department of Medicine (cbarbara@jhmi.edu) and Hetal Rupani, MHA, Senior Project Administrator in the Department of Medicine at Johns Hopkins Hospital ([hrupani2@jhmi.edu](mailto:hрупани2@jhmi.edu))

Johns Hopkins Hospital—the innovative teaching hospital and research facility of Johns Hopkins University School of Medicine—has been ranked by the U.S. News & World Report as the best overall hospital in America for 21 consecutive years.

Operating Challenges

- 30-Day Readmission Pressure
 - Accountable Care
 - Plan of Care
 - Multi D Rounds
- ACGME – Changes To HS-Residency Duty Hours
- Academic and Teaching Culture
- “Siloed” Departmental Culture
- Lack of Communication and “Stale Reports” – Lack of Depth and Visualization
- Everyday was a “Perfect Storm” (High Demand – Low Capacity)
- “Flying Blind” Very Little Up-to-Minute Patient Flow Information

Impact and Benefits

- Tangible Benefits
 - Reduced LOS (length of stay) from 5.77 days to 5.03 days
 - Reduced ED-Boarding Hour Time from 11.5 hours to 7.2 hours
 - Reduced DOM Occupancy
 - Changes to Daily Hospital Operations (+)
 - Enhanced Communication Amongst Patient Care Teams (Attendings, Nurses, Social Workers, Case Managers, Administrators, etc.)
 - Discharge Time of Day....Before 2 p.m.? (Work In Progress)
- Non-Tangible Benefits
 - Culture Change
 - Real-Time Decisions
 - Transparent, Real-Time Communication
 - Daily Discharge Barrier Huddle and Weekly Long LLOS (>5 days) Huddle

²⁰ Access webinar through <http://www.tableau.com/learn/webinars/improving-patient-throughput-real-time-information-go?signin=4247898f2030f22ecb53494805e89c2d>



Kaleida Health²¹

Customer Story: Author Robin Bloor is chief analyst with the Bloor Group, a consulting, research and technology analysis firm that focuses on open research and the use of modern media to gather knowledge and disseminate it to IT users. For more information, please visit www.TheBloorGroup.com and www.TheVirtualCircle.com.

Kaleida Health is the largest health care provider in Western New York. With 10,000 employees, five hospitals, a number of clinics and nursing homes, and a visiting nurse association – not to mention millions of patient records. Kaleida needed a BI tool that could handle large data sets quickly and painlessly.

Kaleida experienced the following challenges prior to acquiring Tableau:

- Kaleida found traditional reporting tools inadequate to handle its requirements. Driven by the need for a deeper analytic capability, Kaleida created a corporate analysis department around Tableau. Instead of simply pushing out mass reports, Kaleida's BI department wanted a team that could give users what they wanted: reports they could understand.
- Although their data warehouse is robust, Oracle Reporting proved to be clunky and unfriendly. Nurses and non-financial people, and people that didn't really understand reporting and visualization, tried to interpret these reports with little success. Users often didn't notice the data that should have stood out.

The solution and benefits:

- They created the corporate analysis department to work closely with the managers and senior executives on different projects they were doing, to not only pull the data for them, but also look at it, present it, and dig deep into the details, and find things that they should be looking at, and then highlight them in PDF files or PowerPoint presentations using Tableau.
- For monthly analytics, data is extracted directly into Tableau from the data warehouse and they are able to save and re-run queries, which is a huge time-saver when dealing with millions of records, with 40+ fields per record.
- Besides speed, another feature of Tableau is the ability to link different tables and data sources, speeding up the access to information.
- Kaleida also uses Tableau to manage resource utilizations – who is using what supplies and how much those supplies cost. This ultimately leads to efficiency and standardization across the system, something that could previously not be done internally.
- Kaleida uses Tableau to compare itself to other hospitals across the country, looking at the length of patient stay, hospital practices, market share and partnerships with doctors.

Mater Health Services²²

Customer story and video: *Faster insight into clinical placement at Mater Health Services. Mater Health Services uses its student placement online tool (SPOT) to oversee the doctors and nurses of tomorrow. In this video, SPOT manager Troy Forster discusses how Tableau helps him sort through data faster, in some cases reducing the time from “two weeks to five minutes*

Mater Health Services (Mater) is a privately owned, not-for-profit healthcare provider based in Brisbane, Queensland. The Catholic organisation operates seven hospitals, a medical research institute, three health

²¹ See <http://www.tableau.com/search/all/Kaleida%2BHealth>

²² See <http://www.tableau.com/search/all/Mater%2BHealth%2BServices>



centres and pathology and pharmacy businesses, all of which are underpinned by community support through the Mater Foundation. Mater Health Services has more than 7,500 staff and volunteers, providing care to more than 500,000 patients each year.

The organisation manages more than 2,600 undergraduate students, across its own nursing program, and through medical, allied health and midwifery placements from partnered universities.

- Managing student was problematic and Mater Health Services needed to build a database to better manage its undergraduate students on campus.
- There were no detailed records for students and personnel, nor was there any performance tracking to understand what was going on between the student and the facilitators.
- Funding and grants became available for programs that could demonstrate an ability to increase capacity. This meant Mater needed to have a clear view of exactly how many students it could support through clinical placement.
- It took long to finalise the information and the moment they collected it in a spread sheet it would already be out of date.

Mater developed a Student Placement Online Tool (SPOT), and needed reporting functionality, after studying some recommendations decided on Tableau. Today, Mater authors visualisations using Tableau Desktop. They publish their completed report using Tableau Server integrated into the web application, SPOT.

The benefits:

- Tableau has given managers flexibility around how they view different data sets in a way they didn't have before.
- They have done some really cool work in visualising capacity and in developing the capability around management reports, which has enabled them to access on-time information and to do forward planning in terms of capacity management.
- Tableau reports are drawn directly from the live databases, so the data is constantly refreshing. The reports built as standard from Tableau and integrated through SPOT generate within 30 seconds for front end users. A custom report can be designed and implemented within 2 to 3 hours.
- Due to its ease of use very little training is required for users, which is a time and cost saver.
- Tableau provides insights that they otherwise wouldn't have, so they spend less time worrying about the technology itself and how to use it. Focus is on the outcomes that they are getting, and on what the data is telling them.
- Other health organisations are now using Mater's SPOT as a hosted solution with Tableau as the reporting front end.
- They are building a new workforce planning tool which draws on their payroll data and uses the SPOT architecture and Tableau. They built a previous workforce planning tool using a big BI tool, but found it was too hard to manage and not responsive enough.
- They are also encouraging some of the other teams—who do quite a lot of modelling— to start using Tableau.

OptumHealth²³

Customer story and video: *OptumHealth Understands Its Customers.* Larry Mullen, Director of Operational Reporting, OptumHealth.

OptumHealth helps make health care more accessible, affordable and effective for employers, health plans, public sector entities and nearly 60 million individuals through information, tools and solutions that help people navigate the health care system - from behavioral and clinical health support, online health coaching and counseling for complex medical conditions, to health savings accounts.

- Multiple data sources and Excel spreadsheets motivated OptumHealth to purchase Tableau. Tableau has enabled them to achieve a holistic view of their operations and address customer issues as they come up.
- The biggest impact Tableau has had on the organization is to help them understand the spaghetti junction of data and help them manage it, and present it in a meaningful way. Prior to Tableau, they had different silos of reporting teams, data sources, and separate spreadsheets. Now with Tableau they can integrate that data, provide a holistic view, and really add value to the organization; and in addition develop content in a fraction of the time. So, there's increased efficiency, which is a key value-add, but also the additional data insights that is really helping them drive performance of the organization.
- From a return on investment perspective, continuous new use cases and value are discovered, which is helping them run their business more effectively, and also service their customers more effectively.
- One of their key lessons learned from using Tableau was to put Tableau where the users go. They embedded it in SharePoint, on active desktops and in PowerPoint. With more executives using the iPad, Tableau Mobile is being implemented. This will allow them to publish content once, and then deliver it to their users wherever they access data.
- More insight into their customers' experience, and understanding how they interact with OptumHealth was the real value that Tableau has provided to the organization.
- Within one week after starting, they had Tableau dashboards published, and the new organization was amazed by the content they would be able to create with the “instant-on” of Tableau.

Piedmont Healthcare²⁴

Various plus customer story video: *Proactive Insights Improve Patient Care at Piedmont.* Mark Jackson, Business Intelligence Manager at Piedmont

Piedmont Healthcare is a five-hospital system with 400 employed medical staff members, and have approximately 1,200 affiliate physicians with more than 100 physician practices across North Georgia. Tableau was used for the following:

- They used Tableau to track the throughput for their catheterization (“cath”) and electrophysiology (EP) labs that was normally done using Excel. The Excel work was taking the analyst four hours a month, which could only be produced as information in aggregate, and always led to more questions and more work. Tableau enabled to fully automate the process.
- It was taking too long for departments to get from data to insight. They could not get the information to the decision-makers quick enough for them to be able to rapidly change in their environment. Monthly operating reports that had to be produced for every hospital took too long

²³ See <http://www.tableau.com/search/all/OptumHealth>

²⁴ See <http://www.tableau.com/search/all/Piedmont%2BHealthcare%2B>



to assemble. So by the time they reached the decision-makers' hands, they were out of date. Using Tableau, Piedmont was able to replace 2,400 pages with a single dashboard.

- The second project that they did with Tableau was a project called Patient First. The first phase of that project was about reorganizing physician schedules. They leveraged Tableau to help reorganize those schedules. One of the effects of that was that they were able to cut out a third-party physician-consulting service and some additional third-party work that was being done on the weekends. That, in total, saved Piedmont a little over \$2 million a year. This project has also led to a 50-percent improvement in variance from benchmark in cardiovascular length of stay. Also a 10-percent reduction in heart failure readmissions, and a 12-percent reduction in readmissions for patients who are heart attack victims. Overall, that improved their patient satisfaction scores by 7 percent.
- Piedmont mine their imaging system for a certain set of criteria that makes somebody a good candidate for valve surgery. They can find potential candidates and talk to the person who ordered the imaging study, who can go back to their patient and inform them that they might benefit from a certain procedure.
- With regards to self-service, what Tableau has allowed them to do, is take what used to require a huge back office to maintain their lumbering BI infrastructure, with large data warehouse projects that might take up to a year to complete and speed up the process. They can now rapidly deploy small data marts and put them in the hands of the end users who are facing the problems individually. People are doing their job more efficiently. On average, people have seen a 23-percent improvement in their efficiency. If extrapolated and an hourly rate is assigned to those resources, based on the hours they have spent on the tasks, \$250 to \$650,000 have we've reallocated.
- Piedmont have more than 70 data sources that are publishing to the server that represent more than 20 billion points of data that they push through Tableau every day. Partnering with Tableau to visualize the patient experience

Priority Healthcare²⁵

Customer story video: *"The speed to insight is breath-taking". Luke Wilson, Medical Informatics Consultant*

Michigan health insurance company Priority Healthcare prides itself on providing members with the best possible experience—and they're using Tableau to help with that. Some benefits achieved and mentioned in an interview with Luke Wilson, Medical Informatics Consultant:

- The speed to insight with Tableau is breath-taking. The turnaround to answers with many questions that they get would usually take weeks and properly so in many instances. Tableau has provided them a way to quickly answer their customers, because they need the information immediately.
- Tableau has offered new ways of connecting to data. They have online and cloud space, they also have socio-demographic values that exist that they could blend in with their data to tell a different story, or to provide value to their data.
- Tableau has recently been deployed through the enterprise and charged the atmosphere for new ways of looking at their data and to get quicker answers than they had before.
- Leadership has been inspired by the ability to share information in a succinct and clear way and they can understand the story quickly.

²⁵ See <http://www.tableau.com/search/all/Priority%2BHealthcare%2B>



- They love the flexibility of Tableau publishing. Some users do use small tablet devices, like an iPad. This provides them with the opportunity to publish and to provide a mobile experience and users can use the web or Tableau Mobile, and view them within the format of that device, really quickly, and then share with others.
- They have more than 200 people using licenses. Many customers from small groups who need detailed information and their eyes only to see, to large KPI dashboards to disclose to all of our employees.

Seattle Children's Hospital²⁶

Various plus whitepaper: *Using Data to Save \$3 Million at Seattle Children's Hospital.*

Seattle Children's—the 7th highest ranked children's hospital in 2011 according to U.S. News & World Report—discovered ways to “virtually increase beds” and treat more patients. The hospital's management are continuously looking for new ways to improve their quality, safety, and processes from the time a patient is admitted to the time they're discharged.

To more quickly turn patient and hospital data into insight, Seattle Children's implemented Tableau's business intelligence application. Tableau fundamentally changed what Seattle Children's could do with data by providing browser-based, easy-to-use analytics to stakeholders throughout the organization, making it intuitive for individuals to create visualizations to understand what the data means.

Data Analysts, Business Managers, and Financial Analysts as well as Clinicians, Doctors, and Researchers are all using Tableau in different ways to solve different problems in ways that they could not do on their own before, largely because they did not have enough time or enough people.

In the past, they spent days, sometimes weeks developing something as simple as a patient volume-based dashboard. With Tableau, they have converted that to monthly dashboards and are looking at daily dashboards to improve day-to-day decision making.

The Surgical Services team at Seattle Children's started using Tableau to see if they could measure patient wait times. What they discovered were steps they could take to reduce wait times and increase the number of patients served at the hospital.

The hospital has saved more than \$3 million out of the supply chain since the implementation of Tableau and by using Tableau they believe that they will find new ways to create more savings.

Southern Maine Medical Center²⁷

Customer story and video: *Southern Maine Medical Center Gets Healthier with Data. Jonathan Drummey, Data Analyst, SMMC.*

Southern Maine Medical Center (SMMC) is an award-winning healthcare system. Within the system is a 150-bed, not-for-profit, full-service medical center and multi-specialty physician services group.

- In terms of time saved, there's a lot of what they do that would not be possible without Tableau. They have close to 400 physicians that they are tracking each with somewhere between 10 and 20 measures that are being reported on roughly quarterly. They are tracking over 1,500 metrics, which are at a unit level in the hospital; at an office level for the physician offices; per provider level, including all the patient data. Tableau enables them to identify outliers, and help to improve performance in the hospital.

²⁶ See <http://www.tableau.com/search/all/Seattle%2BChildren%25E2%2580%2599s%2BHospital>

²⁷ See <http://www.tableau.com/search/all/Southern%2BMaine%2BMedical%2BCenter>



- The ease of use as a self-service BI tool enables users to move at the speed of thought with the feedback loop being right there, which leads to incredibly productive users.
- SMMC have separate electronic health record systems for their inpatient and outpatient services. Tableau enables them to incorporate and organize all their different data sources. It is also used to clean up data, for analysis and downstream reporting and delivery.
- Data is owned by the operational staff and the BI/Quality Management Department is able to turn the data around and get it out to the end-users faster. The quality management department adds more value in terms of their analysis and pushes that back out to the end-user much more quickly.
- With Medicare, they perform value-based purchasing where they are implementing pay for performance and withholding revenues based on certain measures. Using Tableau they analyse on a monthly basis whether they are meeting their targets or not and address issues accordingly.
- Due to a constantly evolving environment the hospital and physician practices are getting more integrated. For patient quality, for safety, for payment they have to monitor more and more metrics and there are new bits of data coming in all the time. Between its blending features and the ease of connecting to different data sources, Tableau lets them pull all that together easily so that they can focus more on analysis.

STANLEY Healthcare²⁸

Various plus two customer story videos: *Partnering with Tableau to visualize the patient experience.* Lauran Hazan, Director of Software Product Management, Stanley Healthcare.

More than 17,000 healthcare organizations worldwide rely on Stanley Healthcare solutions. Stanley Healthcare integrated its MobileView software with Tableau, allowing hospital staff to drill down deeper than ever before into large datasets. For instance, using data from STANLEY Healthcare's Wi-Fi location systems along with Tableau visualizations, staff can track the real-time location and status of patients and critical medical assets throughout the hospital. This helps healthcare providers deliver an optimal patient experience while assuring superior asset utilization.

St. George's Healthcare NHS Trust in London²⁹

Webinar: *Transforming Healthcare Data Into Insight*³⁰

Customer story video: *Transforming Healthcare Data into Insight with Tableau Visual Analytics.* Tom Dewar, Head of Information at St. George's Healthcare NHS Trust in London³¹

With more than 6,000 staff caring for patients around the clock, St. George's Healthcare NHS Trust is the largest healthcare provider in southwest London. Tableau is helping the hospital convert information into insight and improve patient outcomes. Immensely popular across the hospital—based on its ease of use and ability to instantly answer questions—the Tableau visual analytics solution is helping St. George's to deliver outstanding patient care and meet the challenges of cost reduction, resource allocation, and compliance regulations.

- For the first time, St. George's has accurate, near real-time insight into acute hospital services, plus a wide variety of specialist hospital-based and community services. For example, the quarterly

²⁸ See <http://www.tableau.com/search/all/STANLEY%2BHealthcare>

²⁹ See

<http://www.tableau.com/search/all/St.%2BGeorge%25E2%2580%2599s%2BHealthcare%2BNHS%2BTrust%2BIn%2BLondon>

³⁰ Webinar - <http://www.tableau.com/learn/webinars/transforming-healthcare-data-insight>

³¹ Customer story video: <http://www.tableau.com/learn/stories/transforming-healthcare-data-insight-tableau-visual-analytics>



scorecard-based reporting has moved to an almost continuous process, with key clinical divisions like Medicine, Surgery, and Women & Children now having information on their services never more than one day old.

- Their aim is to eventually move towards self-service analytics for key areas of the hospital. By answering business questions more quickly, St. George’s will be able to increase patient flow, improve outcomes, and ensure every touch-point with the patient and their family is executed flawlessly.
- When St. George’s Healthcare started using Tableau, they got a few Desktop licenses. Now they have roughly 25 licenses, and also use Tableau Server to share visualizations across the organization. They use Tableau to visualize metrics like:
 - The average amount of time that patients stay in the hospital
 - The number of requests received each week for different medical tests
 - The variance from expected hospital activity for a number of specialties
- Future projects include: ease-of-access improvements, such as embedding visualizations in multiple applications; and creating a go-to portal for users to access data. They also want to empower even more people to answer their own questions with data.

Swedish Medical Center³²

Various and customer story video: *Swedish Medical Center: Sharing Improves Caring (and Helps the Bottom Line, Too).* David Delafield, CFO, Swedish Medical Group

Swedish Medical Center (Swedish), the largest non-profit health provider in the Greater Seattle area, has deployed Tableau Software to understand and communicate care provider and hospital performance across a number of areas. It comprises of five hospital campuses; ambulatory care centres; and Swedish Medical Group, a network of more than 100 primary care and specialty clinics. In addition to general medical and surgical care – including robotic-assisted surgery – Swedish is known as a regional referral centre, providing specialized treatment in areas such as cardiovascular care, cancer care, neuroscience, orthopaedics, high-risk obstetrics, paediatric specialties, organ transplantation and clinical research.

Before implementing Tableau they experienced the following challenges:

- Understanding, sharing and ultimately improving performance measures has always been deeply important to Swedish. This ongoing effort has become an even higher priority as healthcare moves more aggressively to value-based reimbursement models. Under these new models, organizations will face reduced payments if they miss targets for factors such as readmission rates, patient experience and other performance measures. Swedish had been trying to track and communicate performance measures on these and other metrics, but needed to find a way to do so more effectively, reach a larger audience, do it for less money—and tie these efforts into driving organization-wide performance improvement.
- “Different groups in the organization were using spreadsheets to gather and organize re-admissions data, and it was very time consuming for analysts and managers. Collecting all the data and trying to get good reports took time away from more valuable tasks.
- Swedish also sent patient satisfaction surveys to more than 15 percent of its patients each year, but it lacked a centralized way to share the results. In addition to preparing for value-based reimbursement, Swedish wanted to improve other areas like operating room efficiency, physician engagement and financial performance.

³² See <http://www.tableau.com/search/all/Swedish%2BMedical%2BCenter%2B>



After implementing Tableau as its primary enterprise-wide analytics platform, the healthcare provider is driving improvements in quality, improving patient experience and making strides to consistently improve in other areas.

Texas Institute for Robotic Surgery³³

Three customer videos: "We leverage the data to deliver better care". Dr. Randy Fagin, VP of Robotic Surgery.

Texas Institute for Robotic Surgery is the world's largest healthcare management company. In less than 3 years the Institute became an internationally recognized leader for healthcare change. Using what is now the world's largest database, they have succeeded in integrating performance, cost containment, and the daVinci surgical system-- the most technologically advanced system available. Their efforts are impacting nearly 100 hospitals in the USA, including 25,000+ staff members and 30,000+ patients annually.

Hospitals that leverage the Institute's access to information, storage, and business intelligence tools receive knowledge 100 times faster than individual hospitals.

The USA healthcare economy is changing at an unprecedented pace. The key for hospitals to survive these changes is their ability to drive the perfect storm of high quality care, favourable financial reimbursements, and cost containment. Using Tableau, hospitals are effectively monitoring:

- Quality of care
- Performance of staff
- Cost
- Revenue

UC Irvine Medical Center³⁴

Customer story video: UC Irvine Medical Center: Improving Healthcare with Self-Service BI. Charles Boicey, Informatics Solutions Architect.

The University of California, Irvine Medical Center is ranked among the top 50 American hospitals by U.S. News & World Report. They had various data sources and were busy developing a data warehouse, and needed a tool that could allow them to present that data to their community. Tableau has enabled them to understand their data and to generate visualizations in near real time, which provides them the data they need to better serve their patients.

- They wanted a self-service model as IT did not have the bandwidth to bring in a sophisticated BI tool that has to be programmed and managed. They also did not want to be report writers. From an IT perspective, they could put Tableau in the hands of the people that use the data and know the data. These business users now develop their own visualizations and their own reports, outside of the space of the IT department.
- They needed a solution that could work within their environment before the finalisation of their data warehouse as well as after completion of the project. Tableau allows them to do this. They rolled out to each department, to one or two analysts to start off with. They also purchased a Tableau Server, and that is really their BI portal for the enterprise. Tableau is therefore their BI solution.

³³ See <http://www.tableau.com/search/all/Texas%2Binstitute%2Bfor%2BRobotic%2BSurgery>

³⁴ See <http://www.tableau.com/search/all/UC%2Birvine%2BMedical%2BCenter>



Virgin Care³⁵

Customer story video: *Virgin Care improved patient care and reporting with Tableau. Waseem Ali, Group Performance & Information Manager for Virgin Care.*

According to Virgin Care, using intelligence from data makes a difference to the whole patient life cycle and in turn, helps them improve their services. There are about 230-odd services within Virgin Care and they are starting to do more operational reports for individual services. This allows managers to help use the data to manage their service better and make improvements so that they can improve the experience for the patient at the end of the day.

The impact that Tableau's had within Virgin Care has been substantial in the sense that the visibility of the data that people are getting now is far greater than they've ever done before. If there are problematic areas, teams within the organization can actually go in and find out what's going on. The impact has been that it has encouraged a lot more people to use the data to help improve their services and see where Virgin Care is doing

Virgin Care have many different services and service types and many different systems for the different service types. They connect to a SQL data warehouse and there are a couple of data warehouses that are connected to Tableau that are being used for reporting purposes.

Due to the nature of the business, they do sometimes take on services or win services that have Excel-based systems. In these instances they achieve quick wins through connecting Tableau to Excel and then blending the data with SQL, which means quick results.

At the moment, they have about 500-odd users that are on Tableau Server. They are producing a number of reports for their exec, board and middle management, which shows that through Tableau, reporting of all information for the 230 services is centralised through one medium, and Tableau being that medium.

³⁵ See <http://www.tableau.com/search/all/Virgin%2BCare%2B>



Scalability³⁶

One of the areas of concern and a reason used by the opposition to not use Tableau is the issue of scalability. It is true that previous versions, before Tableau 8.0 were not the obvious choice for large scale enterprise implementations. However, since then great strides have been made in this regard. Since 2009, Tableau Server has been running at a high scale in Tableau's own data centres to power Tableau Public, a free service for online visualization of public data. Tableau Public has served over 200 million distinct impressions and continues to grow. Tableau Online, launched in the summer of 2013, is a cloud analytics solution hosted by Tableau. Tableau Online is built on the same enterprise-class architecture of Tableau Server. Today, Tableau Online serves more than 1000 customers.

Tableau Server is highly scalable, serving the largest enterprises and up to tens of thousands of users. General Motors, Wells Fargo, Bank of America, eBay, Facebook, British American Tobacco and Cisco are some organizations that have deployed Tableau broadly. Ray White, a large real estate company, uses Tableau to serve reports to 10,000 real estate agents.

Tableau Server provides a robust infrastructure that meets the security, scalability, extensibility and architectural requirements of IT managers and administrators. It provides flexible deployment options that scale up to the largest businesses. It supports an organisation's data architecture decisions by allowing live connection to a variety of databases or in-memory analytics. And most of all, it lets IT managers get back to strategic IT by getting them out of the dashboard-creation and update cycle.

Tableau gives organizations what today's business demands: a self-service, rapid and agile business analytics solution that is truly enterprise-ready.

Tableau is therefore a safe and cost-effective alternative to other BI tools. Organisations with more than one BI tool can therefore use Tableau to consolidate all their information requirements into a robust and user-friendly, self-service BI tool.

³⁶ To read more about Tableau as an enterprise BI solution:

<http://www.tableau.com/sites/default/files/media/whitepapertableaforenterprise.pdf>



Return on Investment (ROI): Is Tableau the right choice?

Since 2010, Tableau has been mentioned for its positive ROI. Forrester did a total economic impact study in 2010 and BARC³⁷ showed in 2011 that Tableau has the lowest cost of ownership in their entire sample. Gartner, in September 2012 showed that Tableau has one of the lowest migration complexities and also one of the lowest implementation costs per user – see Figure 4. Moving to 2015, Tableau is still in the top 5 according to BARC with regards to price-to-value – see below. Customer shave also communicated the positive value that Tableau has brought to their organisations in terms of cost savings and ROI.

Following is a summary of the Forrester and BARC studies as well as some customer comments that indicate that by using Tableau a positive ROI will be realised.

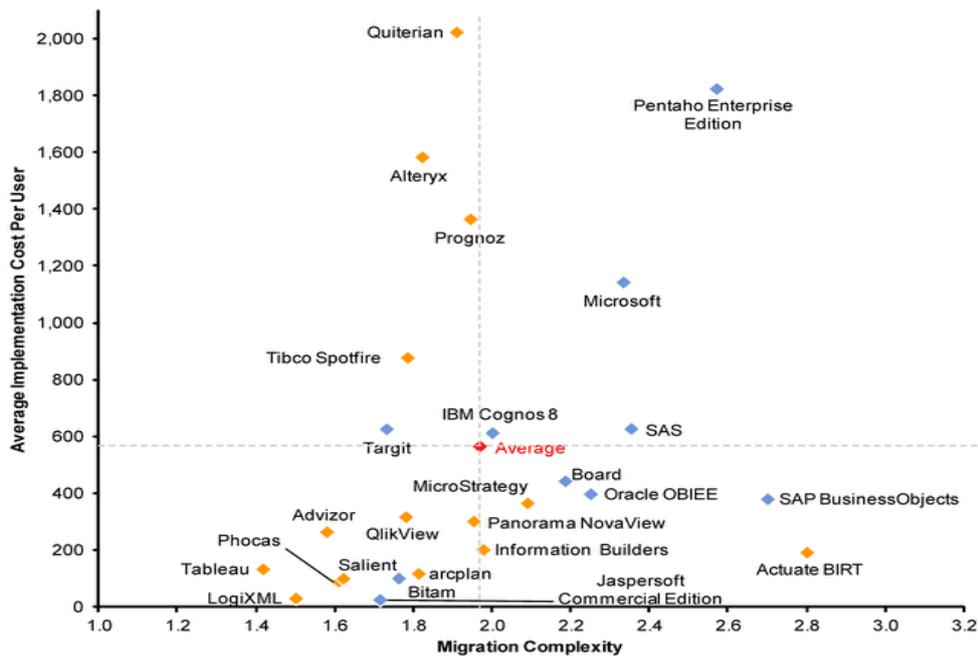


Figure 4: Migration Complexity versus Cost of Implementation

Source: Gartner, September 2012.

Independent Forrester Study: Total Economic Impact of Tableau Business Intelligence Solution³⁸

Tableau commissioned Forrester Consulting in 2010 to construct a Total Economic Impact framework to identify the cost, benefit, flexibility and risk factors that affect the investment decision. Forrester conducted in-depth interviews with three customers: a national financial-services firm, a major teaching hospital and an online media firm. Forrester documented an ROI of 127% and a 13-month payback period.

Forrester found the following benefits for the first company it interviewed:

- Increased user adoption of business intelligence
- Increased standardized reports by 400%
- Reduced report creation times by 87.5%

³⁷ <http://www.tableau.com/learn/whitepapers/bi-survey-10-customer-verdict-tableau-software>

³⁸ <http://www.tableau.com/sites/default/files/whitepapers/forrester-tei-of-tableau-desktop-and-server.pdf>



- Reduced report distribution, storage and duplication costs and simplified publishing of reports
- Incurred no training costs to adopt Tableau
- Freed up BI analysts to perform higher-value tasks
- Realized process improvements from use of visualization in root-cause analysis

For the other two customers interviewed, Forrester found:

- Reduced report creation time of more than 500%
- Eliminated report maintenance effort
- Avoided \$40,000 annual costs of geospatial data feeds by using equivalent Tableau capability
- No incremental effort to distribute reports to more users, resulting in greater user involvement
- A “creative lift” when designing new reports in Tableau
- Stronger alignment between data preparers and consumers
- As many an enterprise BI tool user has found, the costs of buying and supporting such software quickly adds up, especially when attempting to cost-justify adding new users. As more BI capabilities are pushed out to the business, this perception of value becomes even more critical. Tableau customers do not worry as much about the pricing of the software, as they are more inclined than most other BI product users to see it as a good bargain.

BARC BI SURVEY 14³⁹

The BI Survey 14 is based on findings from the world's largest and most comprehensive survey of business intelligence end-users, conducted in 2014. It examines BI product selection and usage among users in areas including business benefits, costs, proportion of employees using the product, competitiveness, recommendation, innovation, performance, customer satisfaction and agility.

With regards to price-to-value the following was found:

- **Leading large international BI vendor in price-to-value perception** (Based on how many users buy their BI tool for its price-performance ratio). Tableau was ranked fifth with a ratio of 1.19 and the average being 0.79.
- **Leading dashboard vendor in price-to-value perception.** Tableau was again ranked fifth with a ratio of 1.19 and the average being 0.94.
- **Leading visual discovery vendor in price-to-value perception.** Tableau was ranked second with a ratio of 1.19 and the average being 0.88.

As many an enterprise BI tool user has found, the costs of buying and supporting such software quickly adds up, especially when attempting to cost-justify adding new users. As more BI capabilities are pushed out to the business, this perception of value becomes even more critical. Tableau customers do not worry as much about the pricing of the software, as they are more inclined than most other BI product users to see it as a good bargain.

What Current Tableau Users are Saying

In the previous customer case studies there are some examples of how organisations saved money by using Tableau. Once such example was how using data Seattle Children's Hospital saved \$3 Million. Following are some more examples:

- Joe Madigan the Director of Customer Services in the EMEA region for Allergan had the following to say: “The value is certainly returned in a month, probably even less than that.” <http://www.tableau.com/about/blog/2014/1/allergan-sees-healthy-roi-tableau-27786>
- “Tableau was probably the easiest approval we've ever had because the ROI was already there after 14 days.” - Mat Hughes, Revenue Optimization Manager for the Americas. Carlson Rezidor Hotel Group <http://www.tableau.com/learn/stories/hotels-offer-warm-welcome-data-insight>

³⁹ <http://www.tableau.com/learn/whitepapers/barc-bi-survey-14>



- “Tableau paid for itself within a few weeks of going live too. How? By pinpointing ways for the business to capitalize on revenue-generating opportunities. The visual analytics also frees developers from the burden of report generation to focus on other critical tasks, like the new touchscreen Web platform that serves up the songs in the bars. “Developers used to provide the reports; however, changes were slow and difficult, and you couldn’t play with the data. Using Tableau the team can ask incidental questions on the fly, without engaging with the developers. Freeing up development time has saved Lucky Voice a significant sum of money.” - Nick Thistleton, Managing Director, Lucky Voice http://www.tableau.com/sites/default/files/case-studies/casestudy_luckyvoice_4.pdf
- Since its launch in 2003, LinkedIn has become the world’s largest professional networking platform, and now offers a range of business-oriented services. As one of the Web’s modern-day giants, LinkedIn has access to extensive data on its users and prospects—but wanted to up the ante for business-to-business (B2B) sales by using data even more. The result was a simple data strategy that helped LinkedIn boost business-services revenue by 85% year over year. And a key component of that strategy was a new, wildly simple sales analytics platform that LinkedIn built with Tableau. <http://www.tableau.com/learn/whitepapers/data-strategy-helped-linkedin-boost-revenue>



Conclusion

It is obvious listening to current healthcare customer and analysts that Tableau is an excellent BI tool that will meet most of the information needs of any hospital or health care organisation. In summary let's see what Gartner define as strengths of Tableau:

- Tableau has clearly defined the market in terms of data discovery, with a focus on "helping people see and understand their data." It is currently the perceived market leader ...
- Tableau rates among the top five vendors for aggregate product score, with particular strengths in the decentralized and governed data discovery use cases. In particular, analytic dashboards, free-form exploration, business-user data mashup and cloud deployment are platform strengths.
- Tableau's direct query access to a broad range of SQL and MDX data sources, as well as a number of Hadoop distributions, native support for Google BigQuery, Salesforce and Google Analytics has been a strength of the platform since the product's inception and often increased its appeal to IT versus in-memory-only options.
- Tableau has managed its growth and momentum well.
- Tableau customers report among the highest scores in terms of breadth and ease of use along with high business benefits realized. Customers also report faster-than-average report development times.
- Tableau is an R&D-driven company.

However, there is always a flip side and surely there will be customers who have lower satisfaction levels. Gartner cautions against the following:

- Tableau has a limited product line focused on data discovery.
- IT-developed reports and dashboards, traditional styles of analysis, metadata management, development and integration, BI platform administration, embedded BI and collaboration are rated as weaker capabilities of the platform, making it less well suited for centralized and embedded use cases.
- Tableau is the competitive target of most other vendors in this market.
- Tableau offers limited advanced analytics capabilities. R integration has been recently added and is a major improvement for users needing more statistical and advanced capabilities.
- Tableau's enterprise features around data modeling and reuse, scalability and embeddability — that enable companies to use the platform in a more pervasive and governed way — are evolving with each release, but are still more limited than IT-centric system-of-record platforms.

With its serious focus on research and development (29% of revenue) – remember it has its roots in Stanford University – Tableau is working relentlessly on staying ahead and keeping the momentum. All the inputs covered in this report are based on Tableau versions 8 and earlier. Tableau 9.0 is already proving that Tableau is serious about meeting the needs of the market. A quick look at some of the improvement show that they are serious about making the user experience even more enjoyable and insightful.

New Tableau 9.0 features include⁴⁰:

- **Auto Data Prep:** Tableau 9.0 makes cleaning up messy data easier. The Tableau Data Interpreter will automatically clean up spreadsheets. Together with the Automatic Data Modeling that was released in 8.2, these new features help people to spend more time on data analysis rather than data preparation.

⁴⁰ See what is new in Tableau 9.0 http://onlinehelp.tableau.com/current/server/en-us/help.htm#whatsnew_server.htm



- **Analytics in the Flow:** Tableau 9.0 is designed to help stay focused on answering questions without interrupting flow. People can type calculations right into the canvas and see the data update instantly. A new Analytics Pane makes it easy to drag reference lines, totals, trends, forecasts and other analytical objects right into the analysis. New Level-of-Detail Expressions make new questions answerable, by anyone.
- **Smart Maps:** In Tableau 9.0, maps are more responsive and faster. They also allow for geographic search and the ability to lasso irregular shapes.
- **New Tableau Server and Tableau Online:** Tableau Server and Tableau Online have been redesigned from the ground up delivering a faster, more scalable, resilient and extensible platform. Users will notice significant speed improvements and administrators will appreciate the improved administrative views delivering richer insights on Tableau Server.
- **Faster Performance:** Tableau 9.0 workbooks are faster via a number of technologies that include parallel queries, Query Fusion, vectorization and smarter query caches.

Customers using the Tableau 9.0 beta had the following to say:

- “Tableau 9.0 is insanely fast,” said Director of Data Analytics at Pluralsight. “The same workbooks are taking seconds instead of minutes to load. This kind of blazing performance is exactly what we need.”
- “The new calculation dialog in Tableau 9.0 is a huge improvement,” said Corey Turner, Application Developer at Spokane Public Schools. “It makes the product more intuitive and easier for anyone to use.”
- “The new data connection options, such as data interpreter, pivot and split function, make it easier for anyone connecting to data with Tableau,” said Billy Burns, Director of Decision Support at Flagler Hospital in St. Augustine, Florida and Tableau customer through its partner TEKNION Data Solutions.

Tableau Professional Desktop is already being used in many healthcare organisations to provide insight into one or more subject matters and has most probably led to some major cost savings and improvement in efficiencies and organisational behaviour. However, with only the desktop version being used, sharing of information will still be a challenge. Tableau Server will alleviate this short-coming as easy collaboration is another of Tableau’s strengths.

Other benefits that would materialise with Tableau as the BI solution for healthcare organisations in this situation are:

- Self-service BI that will reduce the demand on the IT department and end-users will have access to information in real time.
- Ad hoc analysis will be available to all users requiring this functionality, which will lead to instant insight into a clinical and/or operational question.
- A reduction of the number of BI tools will result in lower IT costs, less complex/demanding IT infrastructure.
- Blending between data sources will be easy and can be done without IT intervention.
- Mobile BI to all with mobile devices.
- Geographic reporting and visualisation at the click of a button.
- Easy collaboration between hospitals and other business units.

The customer stories tell it all, Tableau is well-entrenched in the healthcare industry and by implementing Tableau, other healthcare organisations will join the elite club of healthcare providers, such as Johns Hopkins, Cleveland and others in terms of information and best practice application through BI. With fourteen out of the top seventeen hospitals on the U.S. News & World Report’s annual rankings of the



nation's Best Hospitals for the last quarter-century, using Tableau is enough proof that implementing Tableau in healthcare is the right decision⁴¹.

⁴¹ The 2014-15 Honor Roll <http://health.usnews.com/health-news/best-hospitals/articles/2014/07/15/best-hospitals-2014-15-overview-and-honor-roll>



About Corporate Renaissance Group

Since 1989, CRG have been helping organizations transform the way they work by effectively implementing business software and information solutions. CRG is an internationally recognized business consulting firm specializing in enterprise resource planning, corporate performance management, business intelligence, financial and costing principles, shared services and employee performance management. Headquartered in Ottawa, Canada, CRG has offices located throughout Canada, South Africa, India and the United States.

CRG is a Certified Tableau Gold Partner and Implementer. As an experienced software developer with a strong business understanding, CRG is committed to delivering innovation and practical solutions to drive better business performance.

CRG has been a business partner of Tableau for the past six years and involved in the healthcare environment for the past five years, assisting healthcare organisations with visualisation, analysis and other BI interventions. CRG has also supplied Tableau to the World Health Organisation (WHO).

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About Tableau

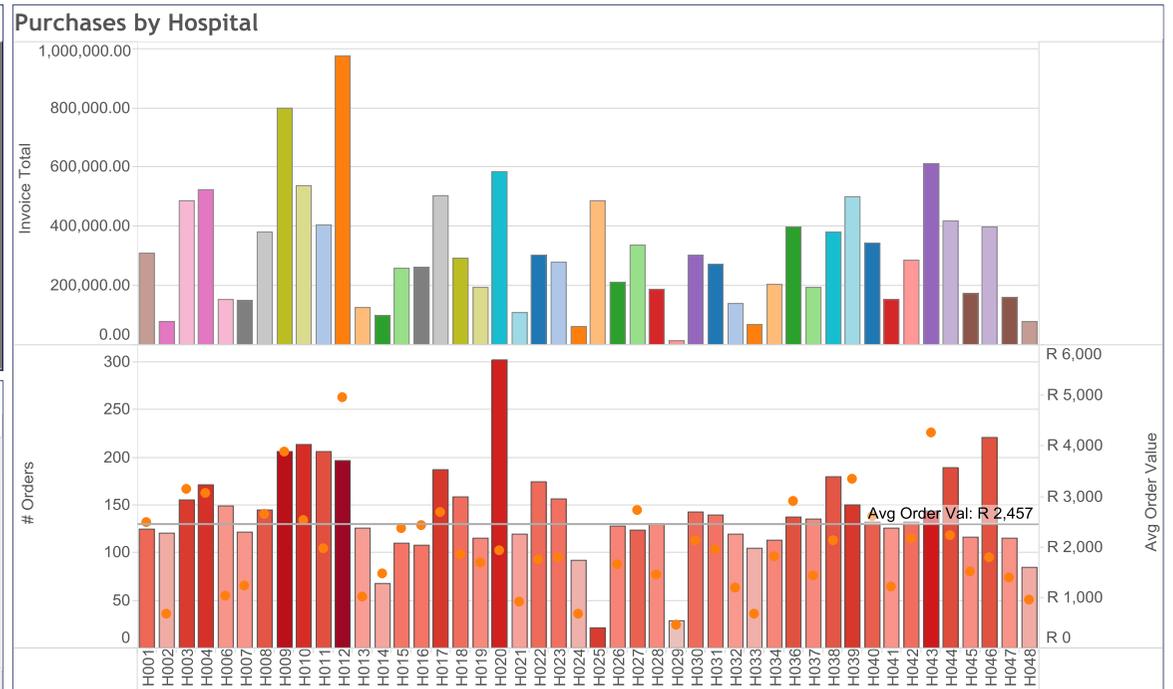
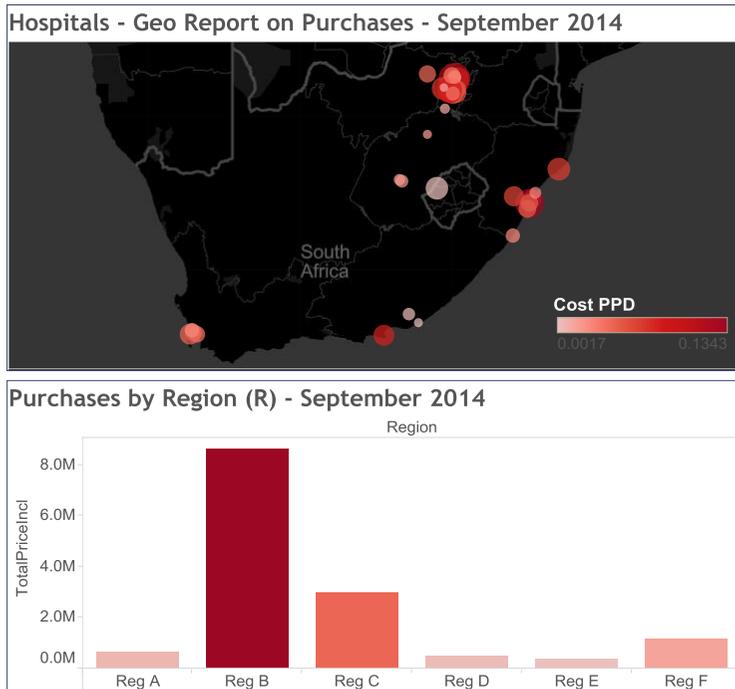
Tableau Software (NYSE: DATA) helps people see and understand data. Tableau helps anyone quickly analyze, visualize and share information. More than 21,000 customer accounts get rapid results with Tableau in the office and on-the-go. And tens of thousands of people use Tableau Public to share data in their blogs and websites. Download a free trial [now](#).



Annexure A: Healthcare Dashboard Examples

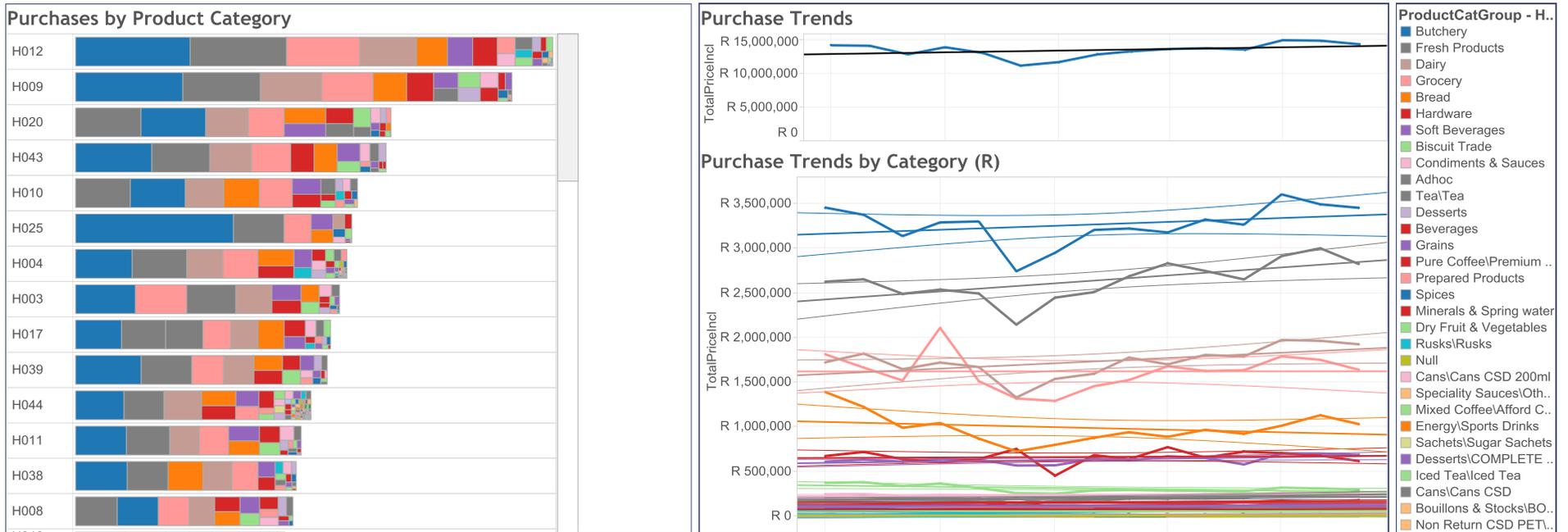


Food Purchases and Cost Per Patient-Day



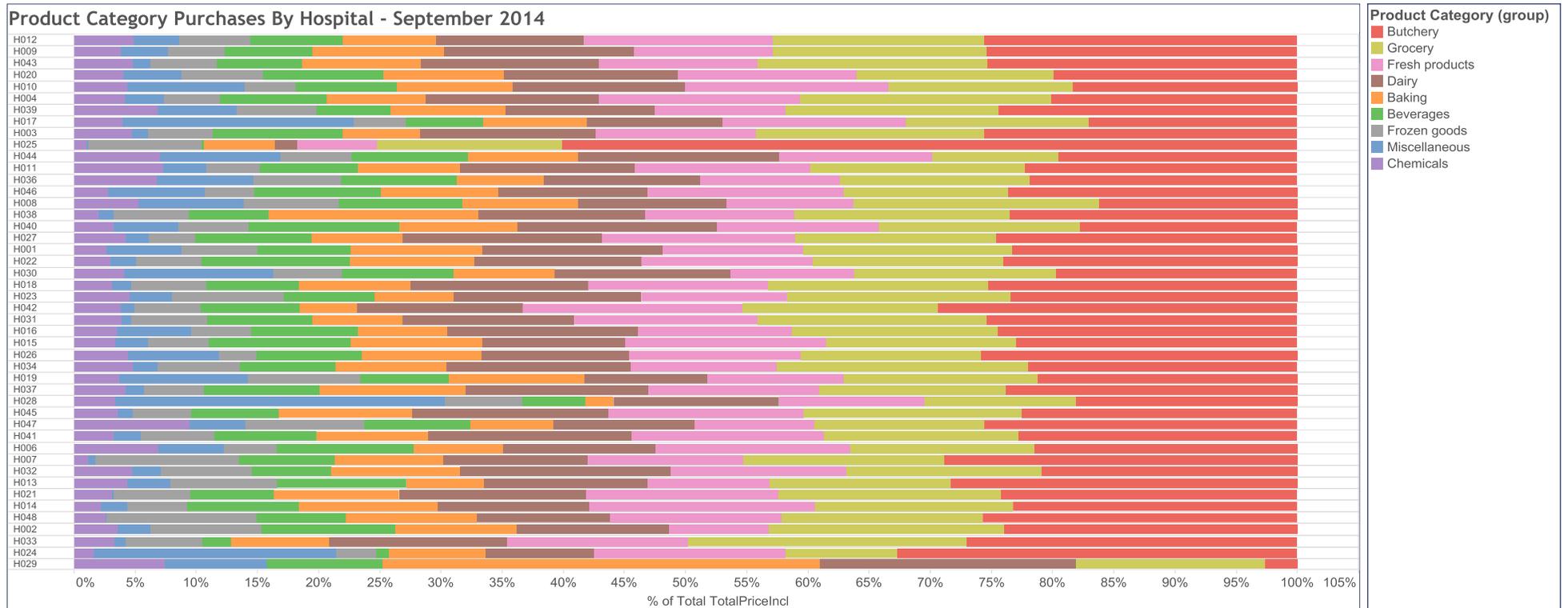


Purchases by Product Category



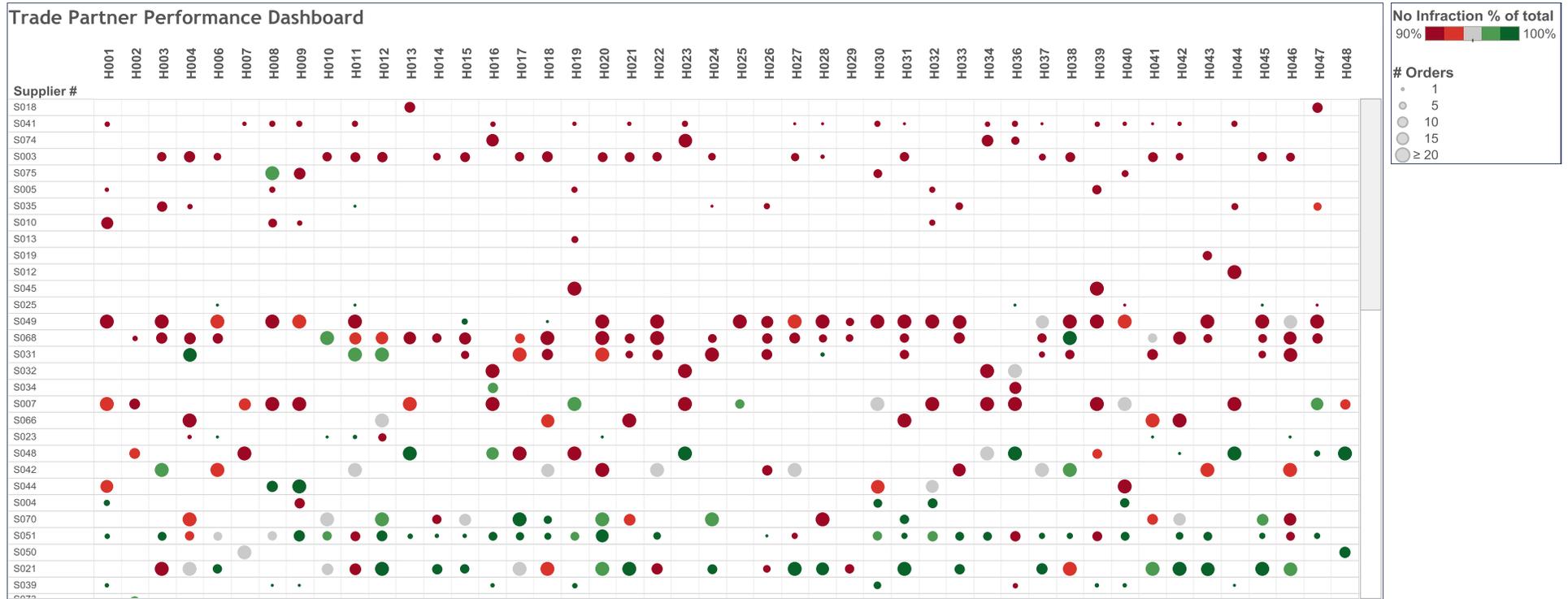


Purchases: Product Category by Hospital





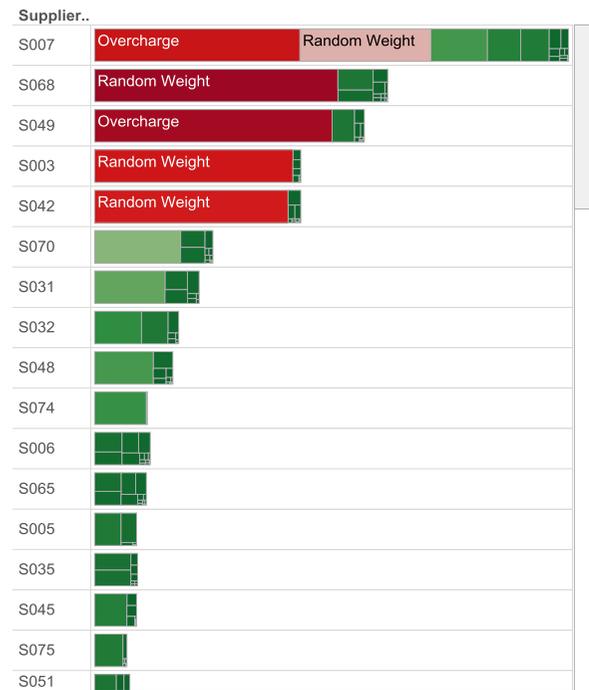
Supplier Performance



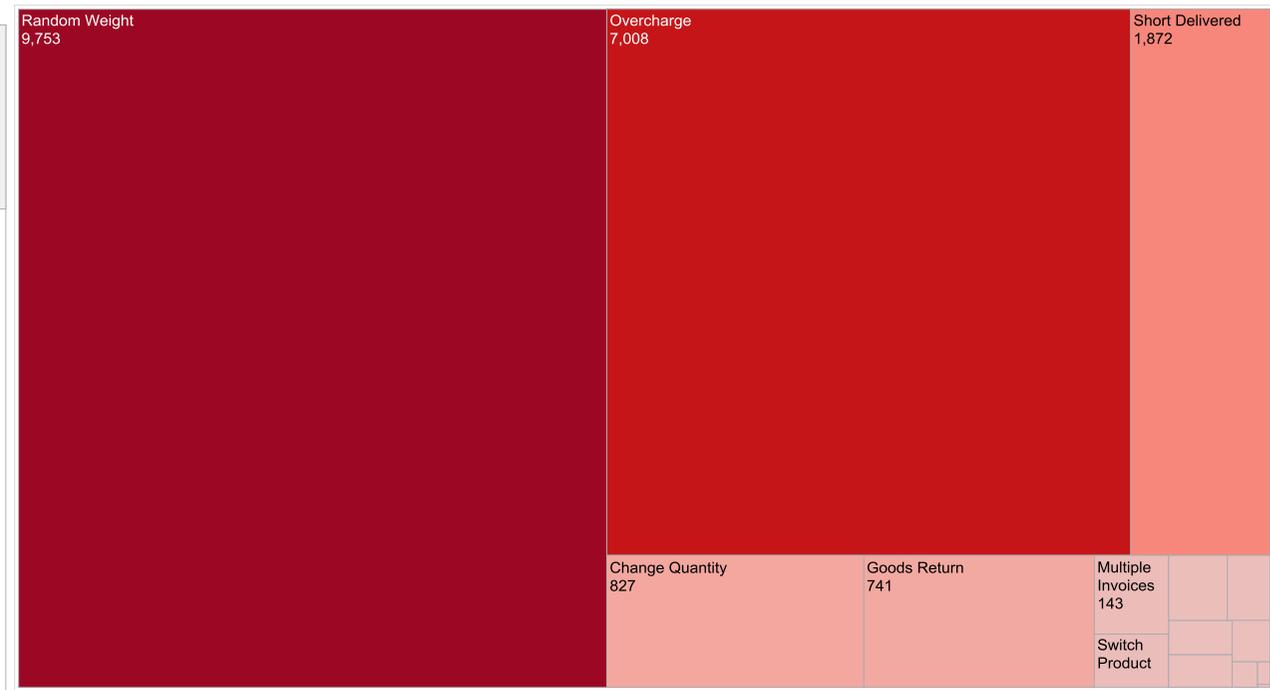


Infractions

Infractions by Supplier

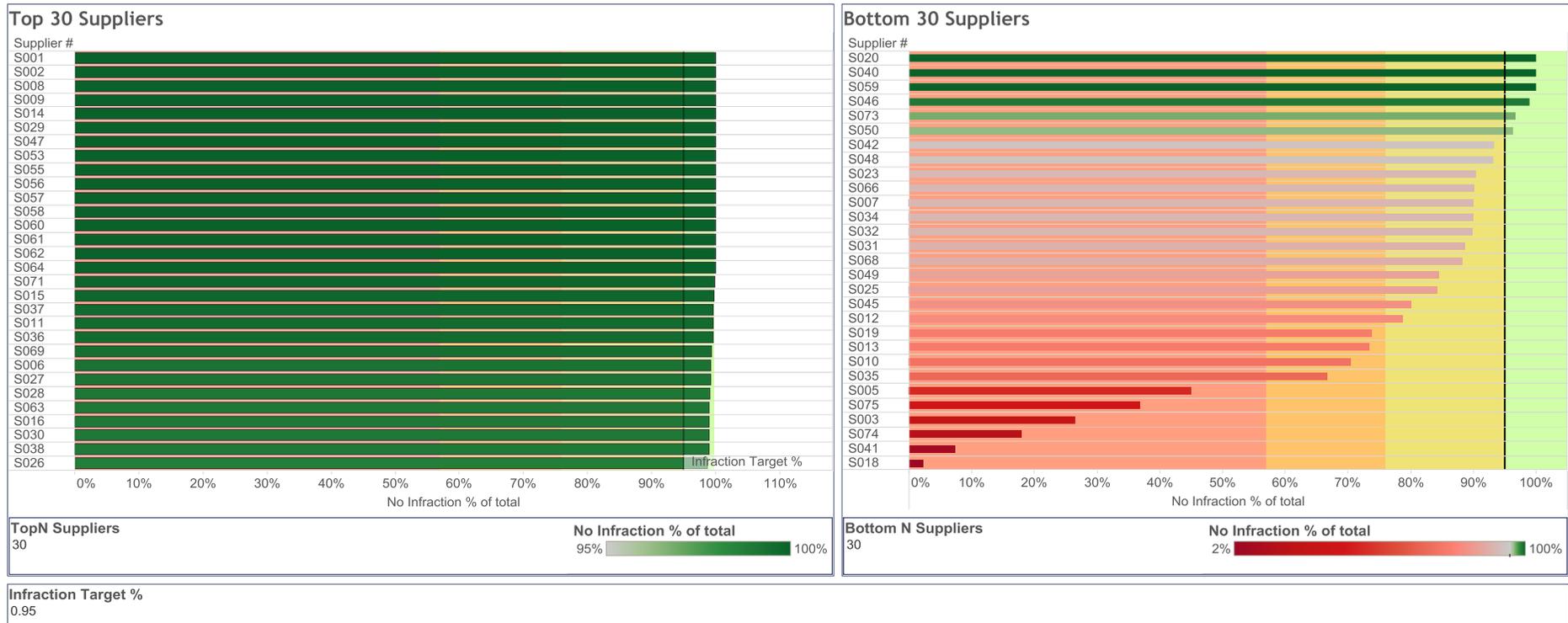


Infraction Tree Map





Infractions Dashboard: Top and Bottom N Suppliers





Patient Medical Records

INTRO Medical Records PatientDetail About

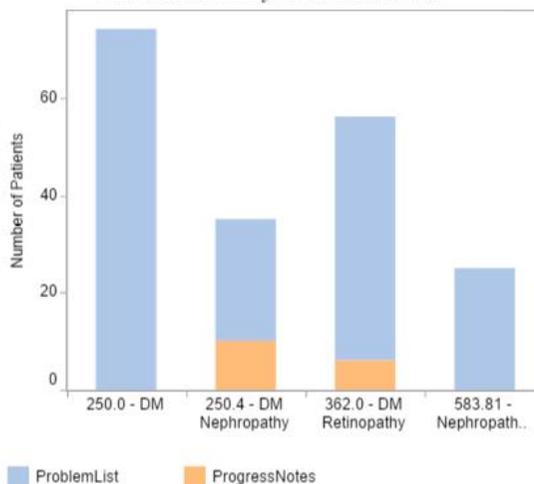
MEDICAL RECORDS

DX Correction Analysis

Patients by ICD9 and Location Click to Filter



All Patient DX By Source Click to Filter



PatientList Click for Patient Record

Name	PatientID
Alex Nayberg	377784364
Alice Ciccu	113695504
Andreas Berglund	131471224
Andrew Hill	33237992
Barbara Moreland	363910111
Baris Cetinok	273260055
Belinda Newman	20244403
Ben Miller	20269531
Betsy Stadick	294148271
Bonnie Kearney	109272464
Brian Goldstein	1662732
Brian LaMee	368691270
Brian Welcker	112432117
Coral Phillips	327310880

Progress Note Key Phrases

ENCOUNTER DIAGNOSES	Progress Note	Estimated GFR	Induced Patient	Exhibits Signs	
		Filtration Rate	Renal Disease		
Encounter Note	Uncontrolled Diabetes	GFR Patient	Serum Creatinine	Patient Exhibits	
Multivitamin Daily		CKD Ruled	Glomerular Filtration	Annual Eye	Probably
				Retinal Changes	Stage Retinopathy



Patient Record

INTRO Medical Records PatientDetail About

PATIENT RECORD

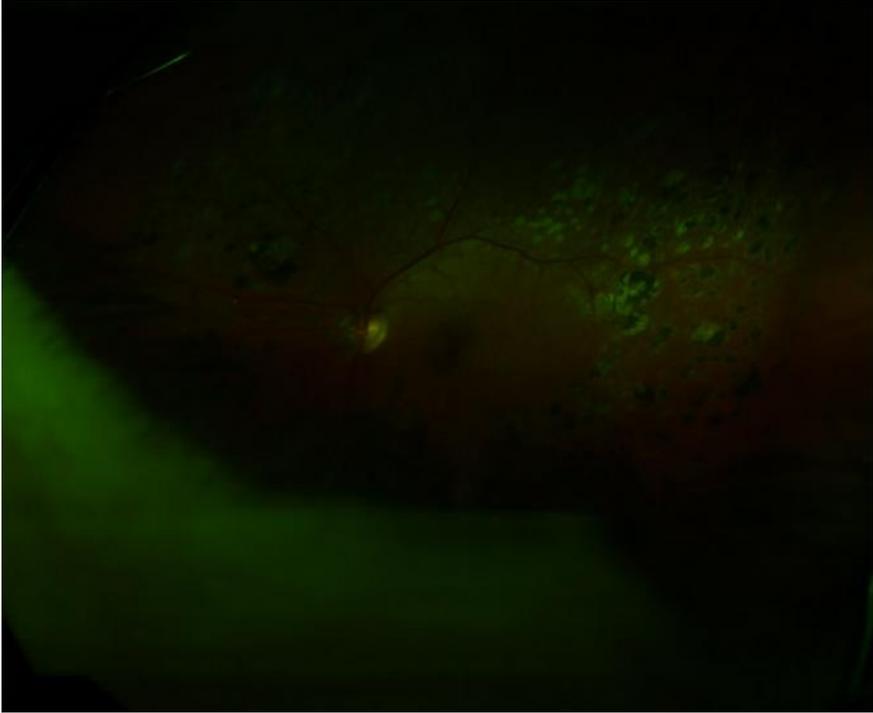
Retinal Scans

PatientInfo

368920189
Nitin
Mirchandani
M

RetinalScans Click the box below to load scan image

Left Right



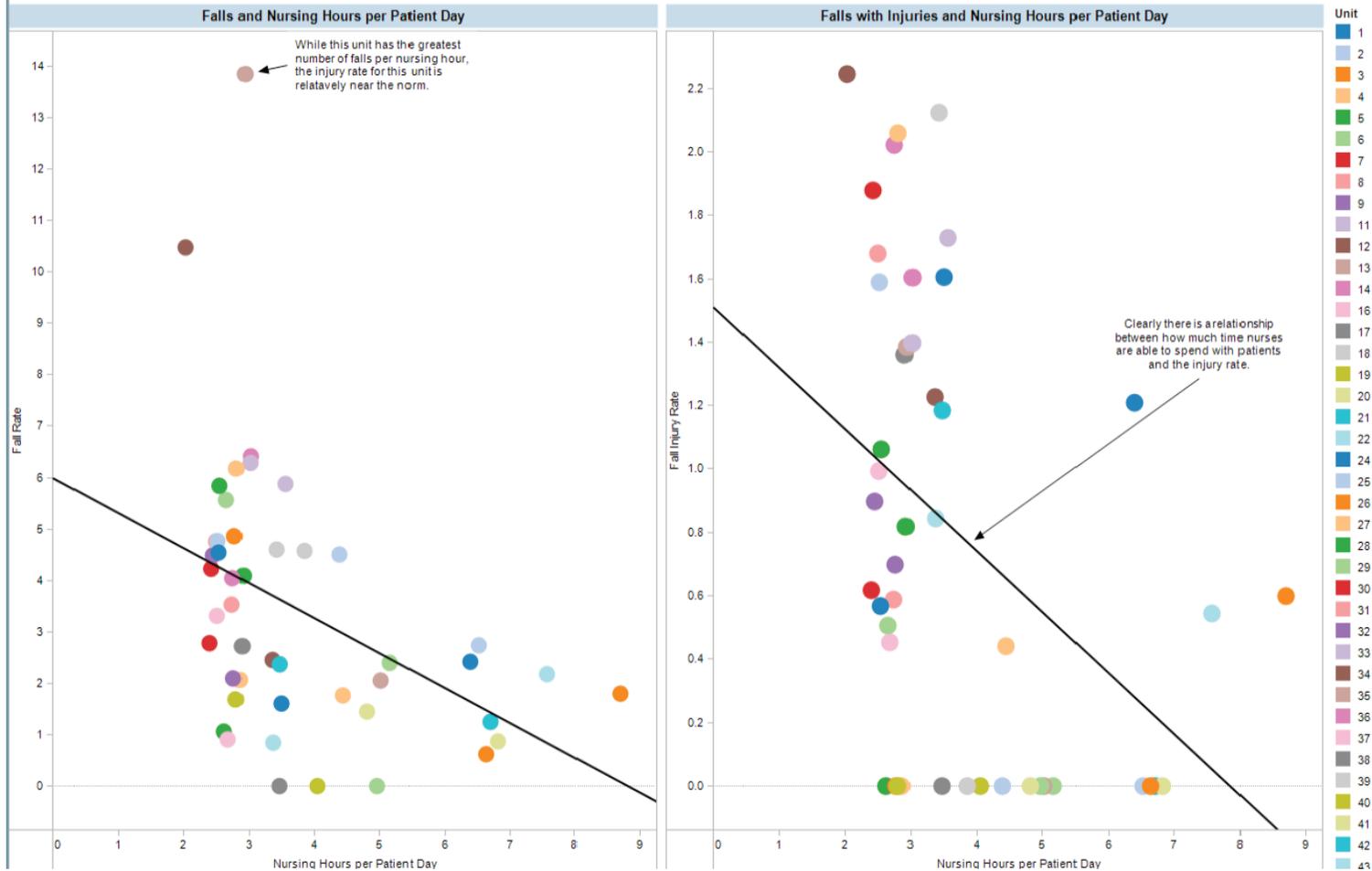
ProgressNotes

Encounter Note: DATE OF VISIT:
8/22/2012 Patient ID: 368920189
ENCOUNTER DIAGNOSES: 1. Diabet
Mellitus. 2. Diverticulosis. 3.
Hypertension. PROCEDURE: annual e
xamination Patient's retinal changes
occurring in diabetes mellitus, marked
microaneury



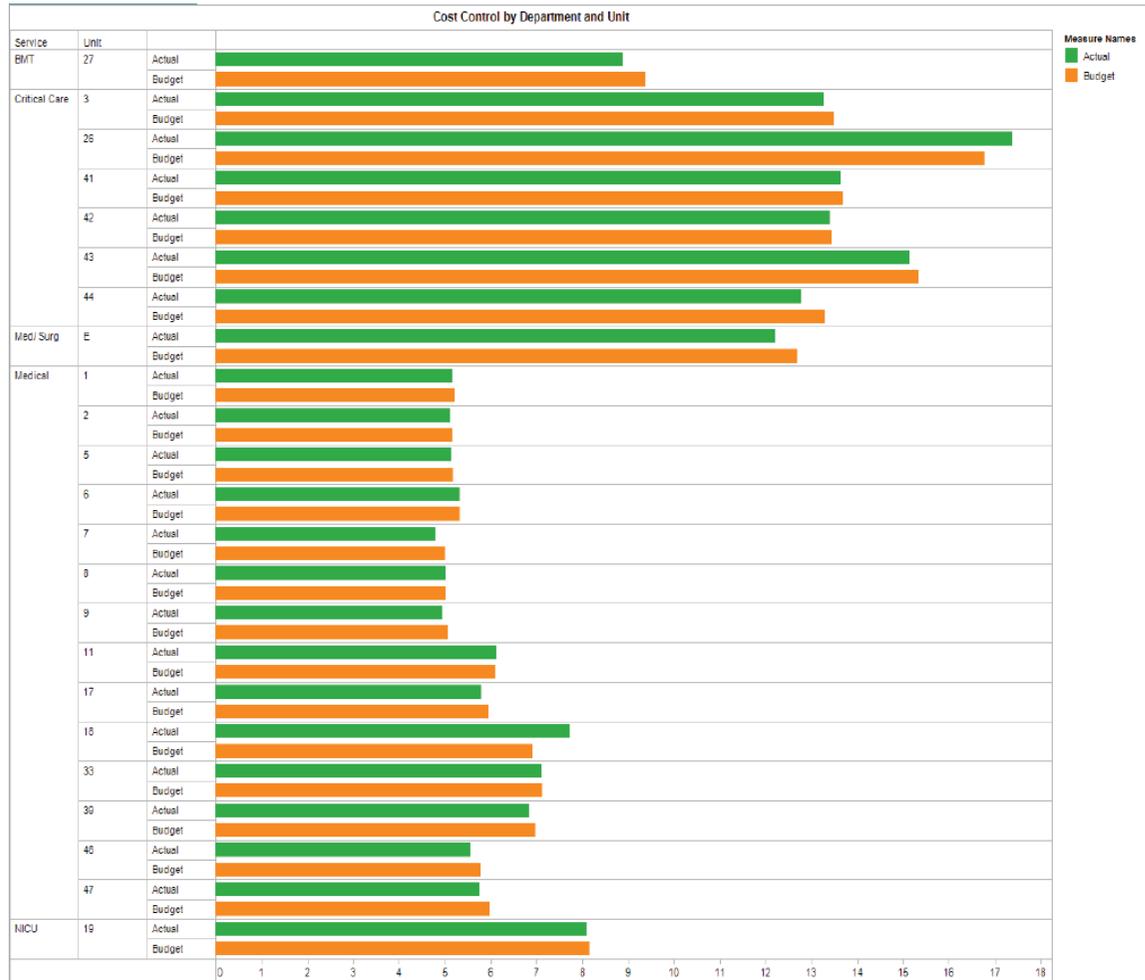
Staffing Effectiveness

Staffing Effectiveness



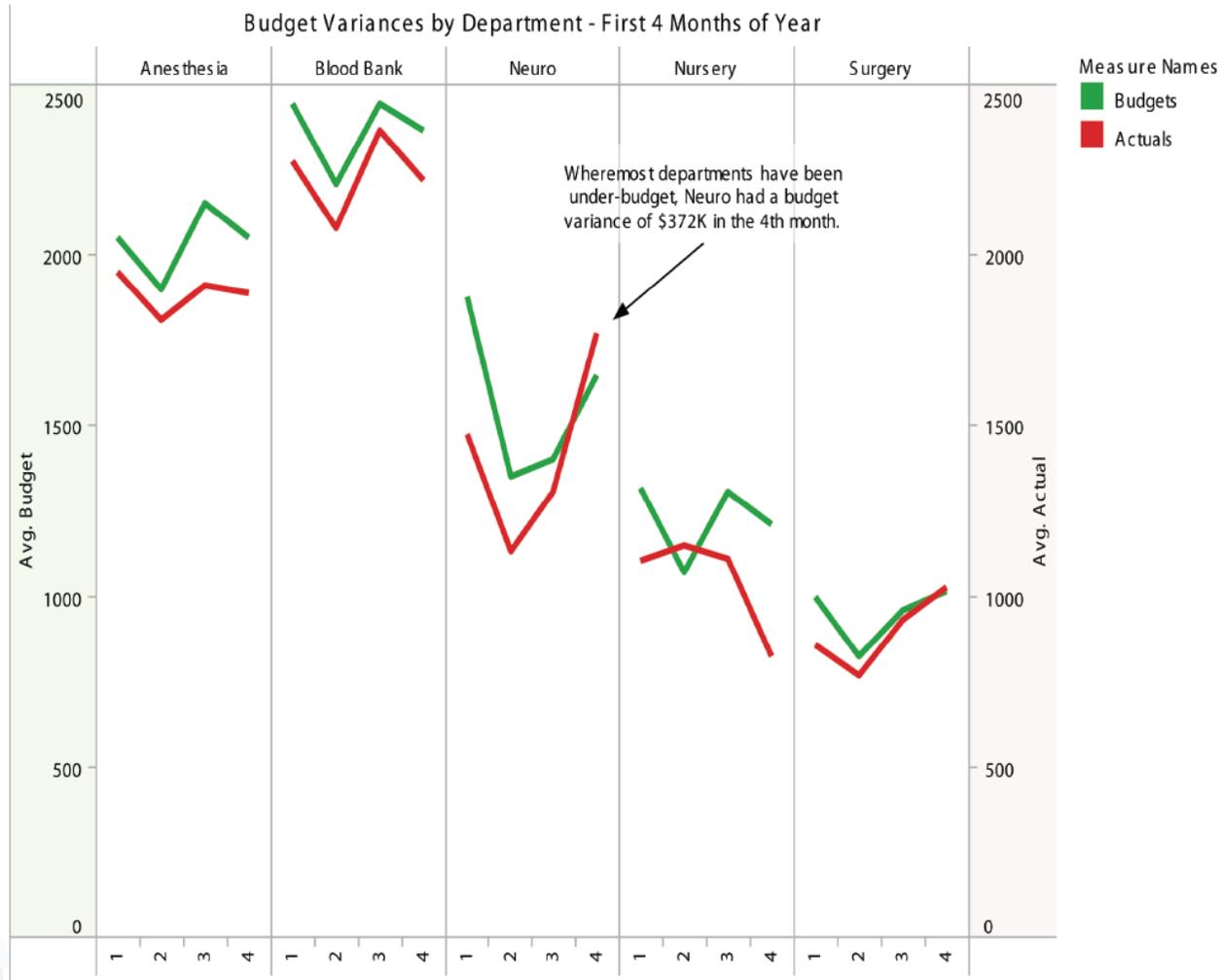


Cost Control – Actual versus Budget



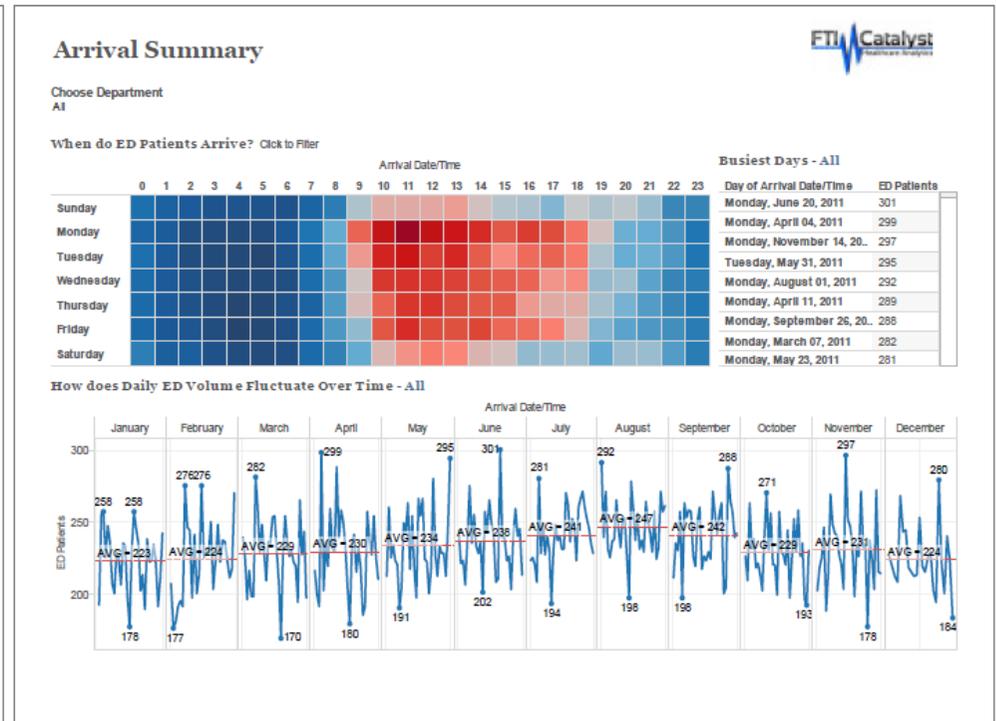
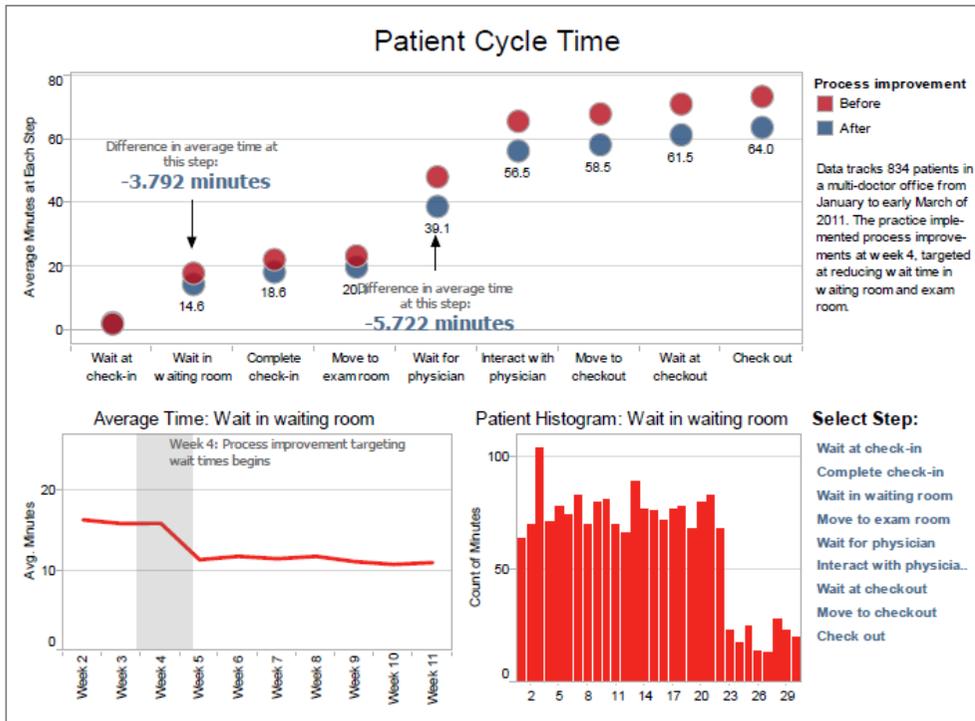


Budget Variance by Department



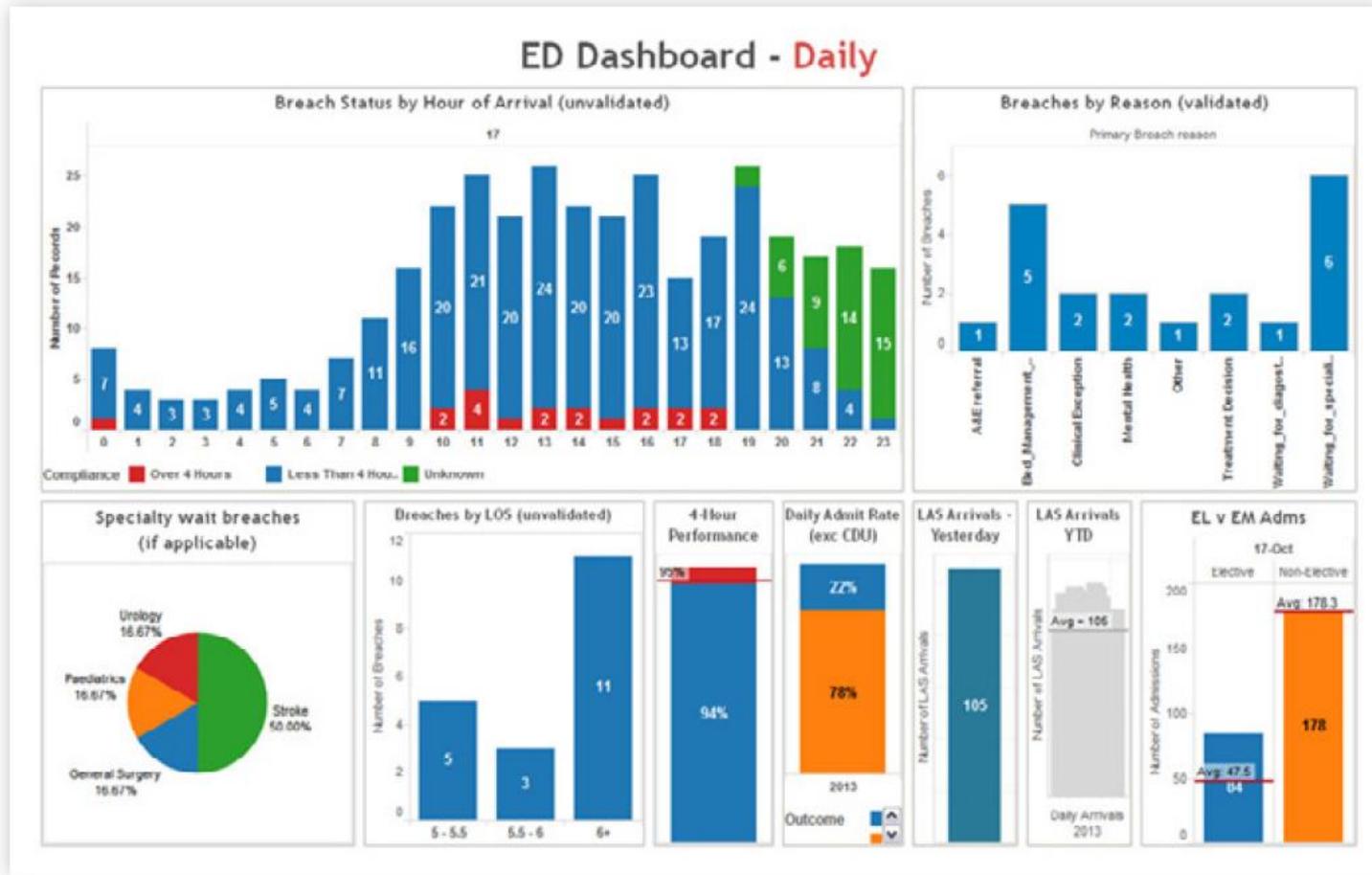


Patient Throughput





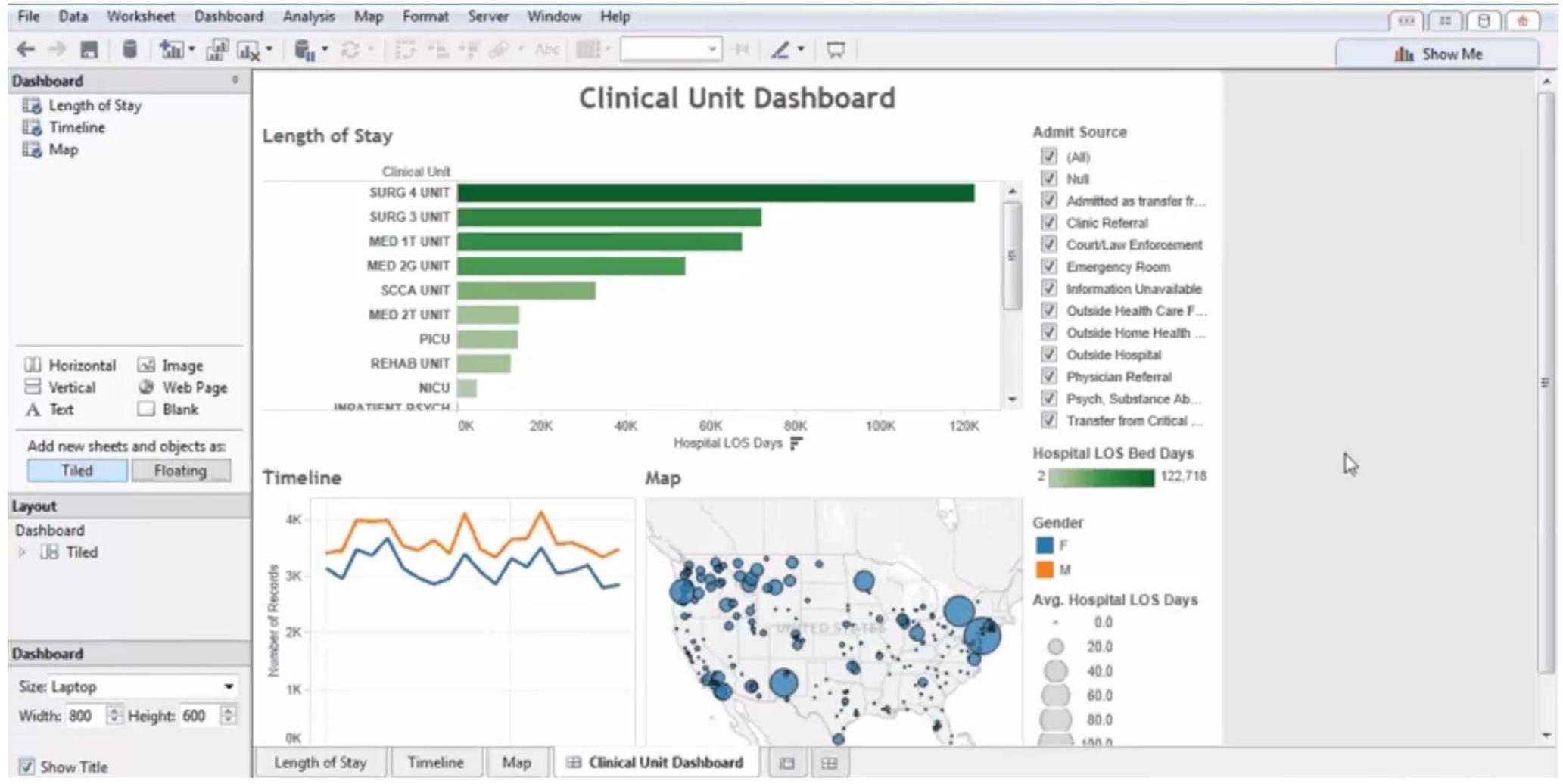
Emergency Department Dashboard – Patient Flow



With this self-service dashboard, staffers can view patient flow at-a-glance, and immediately understand the immediate changes needed in the Emergency Department .



Length of Stay





MR/AS Match

MK / AS Dashboard - Xcelera

Day of StudyStartDateTime
April 18, 2012 to July 16, 2012

Criteria Match

Day of Study/Star ID/Date/Time	Patient/ID	Max EF	Max LA Volume Index (ML-4)	Max LA Volume Index (DL-1)	Max LA Volume Index (MDO-4)	Max LA Volume Index (MDO-2)	Max LVES	Max Mean Gradient	Max RVSP	Max Severe MR	Max Transcatheter Velocity	Max Valve Area (L.D)	Max Valve Area (V.D)	Count Matching
6/22/12	G	✓					✓	✓		✗	✓	✓	✓	1
6/22/12	J	✓					✓	✓		✗	✓	✓	✓	1
6/22/12	N	✓					✓	✗		✗	✓	✓	✓	1
6/22/12	V	✓					✓	✓		✗	✓	✓	✓	1
6/22/12	R	✗			✓	✓	✓	✓		✗	✓	✓	✓	1
6/22/12	P	✗			✓	✓	✓	✗		✗	✓	✓	✓	1
6/22/12	U	✗			✓	✓	✓	✗		✗	✓	✓	✓	1
6/21/12	B	✓					✓	✓		✗	✓	✓	✓	1
6/21/12	B	✓					✓	✗		✗	✓	✓	✓	1
6/21/12	N	✓					✓	✓		✗	✓	✓	✓	1
6/21/12	B	✗			✓	✓	✓	✓		✗	✓	✓	✓	1
6/21/12	T	✗			✓	✓	✓	✓		✗	✓	✓	✓	1
6/21/12	B	✗			✓	✓	✓	✓		✗	✓	✓	✓	1
6/21/12	S	✗			✓	✓	✓	✓		✗	✓	✓	✓	1
6/21/12	M	✗			✓	✓	✓	✓		✗	✓	✓	✓	1
6/21/12	C	✗			✓	✓	✓	✓		✗	✓	✓	✓	1
6/18/12	U	✗			✓	✓	✓	✓		✗	✓	✓	✓	1
6/18/12	G	✓					✓	✗		✗	✓	✓	✓	1
6/18/12	S	✓					✓	✓		✗	✓	✓	✓	1
6/18/12	B	✓					✓	✗		✗	✓	✓	✓	1
6/18/12	V	✗			✓	✓	✓	✓		✗	✓	✓	✓	1
6/18/12	P	✓					✓	✗		✗	✓	✓	✓	1
6/18/12	B	✗			✓	✓	✓	✓		✗	✓	✓	✓	1
6/18/12	S	✗			✓	✓	✓	✓		✗	✓	✓	✓	1
6/18/12	V	✗			✓	✓	✓	✓		✗	✓	✓	✓	1
6/18/12	S	✓			✓	✓	✓	✓		✗	✓	✓	✓	1
6/17/12	C	✓					✓	✗		✗	✓	✓	✓	1
6/17/12	V	✓					✓	✗		✗	✓	✓	✓	1
6/17/12	V	✗			✓	✓	✓	✗		✗	✓	✓	✓	1
6/17/12	R	✓					✓	✗		✗	✓	✓	✓	1

Selection Detail
(select a patient to the left by clicking the "Count Matching" bar)

MRN: [] Birthdate: Jun 01, 1955 Age: 57 Male

StudyTy: [] OrderingPhysician: [] ReferringPhysician: [] Adult: [] Null: []

May 22, 2012

6 Criteria Matched

LEFT VENTRICLE: Left ventri... moderate to sever... ✗
LEFT VENTRICLE: The left v... 25-50% ✓
MITRAL VALVE: There is _ m... trace to mild ✗

A0 mean PG: 70.68 ✓
A0 V2 max: 625.87 ✓
AVA(L,D): 0.85 ✓
AVA(V,D): 0.88 ✓
LVIS: 3.28 ✓

Aortic Prosthetic Valve?	Mitral Prosthetic Valve?	Pulmonic Prosthetic Valve?	Tricuspid Prosthetic Valve?
N	N	N	N

LA Volume Index less than (mlM2): 60

LVEF less than: 60

LVES less than (cm): 4

Mean Gradient greater than (mmHg): 40

RVSP greater than (mmHg): 50

Transvalvular Velocity greater than (M/sec): 4

Valve Area less than (cm2): 1

Mitral regurgitation greater than or equal to: severe

✓ Meets Criteria
✗ Does NOT Meet Criteria

Aortic Prosthetic Valve? N
Mitral Prosthetic Valve? N
Pulmonic Prosthetic Valve? N
Tricuspid Prosthetic Valve? N

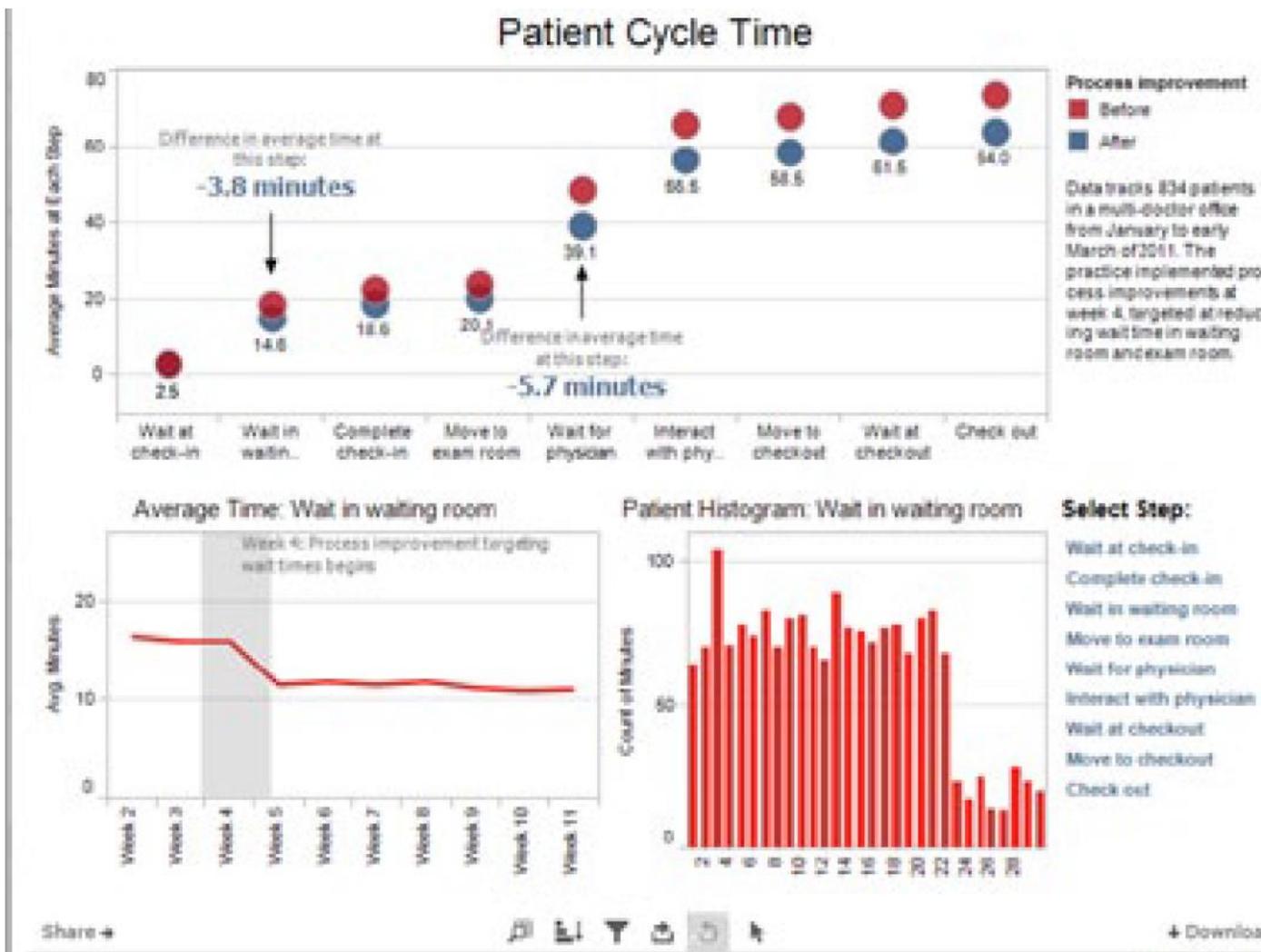
Minimum Matching Criteria: 3

Matching Studies: **231**

This visual dashboard from the Piedmont Heart Institute's Patient First project allowed physicians to quickly and proactively determine which patients would benefit from valve surgery.



Patient Cycle Time





Anesthesiology Syringe Audit

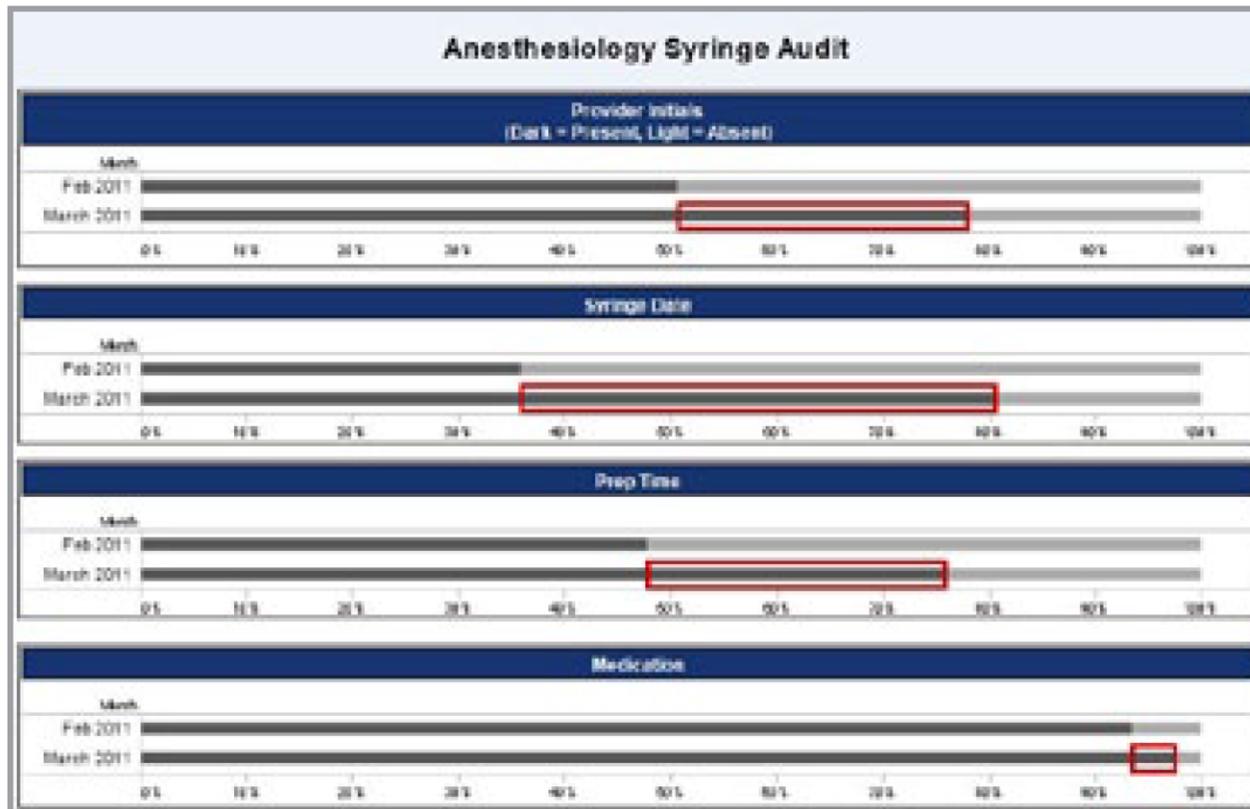
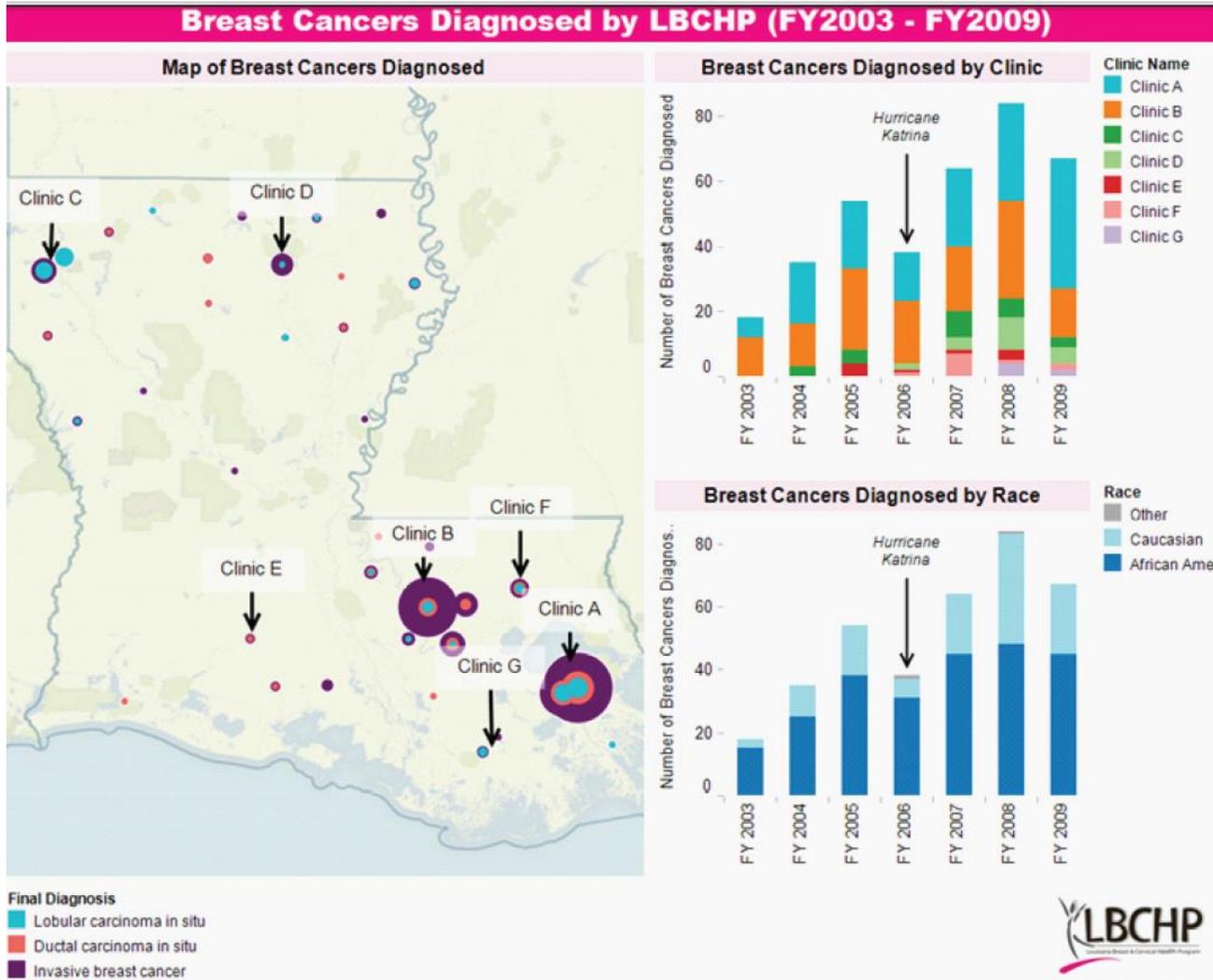


Figure 2:

After a syringe label audit in February 2011, anesthesiologists in a leading medical center identified areas for syringe preparation improvement such as better labeling with provider initials, syringe date and time of syringe preparation. The result was more accurate labeling in March 2011, increasing patient safety.



Breast Cancer Analysis





Annexure B: KLAS: Healthcare Analytics Performance - The Data Deluge: Who Delivers Value? (Click to view)