

Operating Room Excellence: How One Hospital System is Driving Improvements with the Use of Advanced Analytics



HEALTHCARE ORGANIZATION

Community Hospital System

TOP RESULTS

- Improved operating room efficiency with integrated data and analytics
- 20 percentage-point increase in first-case on-time surgery starts
- 85 percent reduction in staff hours to prepare and report data
- Driving transformation to data-driven, transparent culture

HEALTH CATALYST PRODUCTS & SERVICES

- Late-Binding™ Data Warehouse
- Advanced Application
 - Surgery Workflow Operations Dashboard
- Installation Services
- Clinical Implementation Services



Whether providing school-based healthcare to help students be healthier and better learners, or extending primary care hours at area practices to relieve hospital emergency department waiting times, Mission Health in North Carolina has always been dedicated to expanding access to care. To preserve this commitment in an era of declining reimbursement rates, Mission embarked on a strategic journey it calls “Mission re:DESIGN.” The health system’s goal was (and remains) nothing less than a radical redesign of clinical programs and processes so that patients receive the best possible care and experience with zero waste and harm.

To achieve such excellence, Mission needed better access to data to enable quick and informed decision-making. And for that, the health system would need an integrated, single source of truth to supply timely and reliable data.

THE OPERATING ROOM: A CLEAR OPPORTUNITY FOR QUALITY IMPROVEMENT

Mission Health’s 47 operating rooms are the health system’s biggest revenue generators, accounting for a substantial share of revenue and cost. Thus, knowing that improved access to data-driven insight into



Optimal utilization of our 47 operating rooms is really valuable. They are open 24 hours a day, at an average cost of \$58 per minute. The Health Catalyst Operating Room Dashboard has provided Mission Health with a strategic opportunity to identify and remove waste - and increase revenue.

Trent Ibbotson
Vice President, Surgical Services

baseline measurement and opportunities for clinical and operational improvements could affect real change for the organization, Mission identified surgery as an early priority to leverage analytics.

As with most hospitals,¹ the efficient use of Mission's operating rooms (ORs) was paramount to the entire organization's financial sustainability. In a review of potential efficiency improvement opportunities, Mission identified scheduling and delegating resources as the critical first areas of focus.

Although Mission had automated numerous processes over the years, a daily surgical workflow dashboard was not yet one of them. Instead, the health system relied on a manual data-preparation process from multiple disparate systems—which was inefficient from a timing perspective and carried the risk of potential data quality issues. Pulling data from different systems—about five in total, including the EHR and raw budget file—and generating operational reports for Mission's system of ORs consumed nearly half a full-time employee (FTE).

Despite all of this dedicated time and effort, many data gaps existed. It was difficult, if not impossible, to make quality, financial, and operational improvement decisions—especially with limited ability to quickly make changes to queries, such as drilling down into the data. For example, Mission was unable to focus in on specific time periods to see which cases were driving delays and other issues with scheduled surgeries.

New tools for decision-making in the OR

An emerging best practice among leading hospitals is making use of an operating room dashboard, a data-rich tool that helps clinicians and administrators make the right call on allocating valuable resources.

It also helps identify areas for efficiency improvements—and, not surprisingly, one of the most profitable areas to start improving is with first-case on-time starts. As most who have worked in the OR know, when the first surgical case of the day is delayed, the rest of the day is typically impacted with a series of late starts, as well. Among the chief reasons for the first (and subsequent) delays is lack of timely and comprehensive data about each of the surgeries scheduled. An automated workflow dashboard could improve visibility to this information in and out of Mission's operating rooms.

Of course, technology alone would not fully drive improvement to meet quality goals. In the typical hospital environment, many different employees and departments have a stake in the OR's limited resources, and to embrace the use of an analytical OR dashboard, all must be committed to data-driven decision-making. For that to happen, Mission needed to drive a paradigm shift throughout the organization to embrace an evidence-based culture. The health system would need to educate and encourage people, at all levels, on the use and value of data automation and actionable information to make better care and operational decisions.



Processes are data-driven unto themselves, but until we can measure the processes we can't be successful. Accurate data removes the 'I think' scenarios.

Jon Brown
Vice President &
Associate Chief Information Officer

THE DATA-DRIVEN SOLUTION FOR OPERATING ROOM EFFICIENCY

To deploy analytics that would help make lasting improvements in the operating room, Mission implemented the Surgery Workflow Operations Dashboard and Late-Binding Enterprise Data Warehouse (EDW) platform by Health Catalyst. The EDW aggregates data from source systems throughout the organization to create a single source of truth that feeds the OR dashboard and other analytical applications being developed.

Mission's Surgery Workflow Operations Dashboard was customized to meet the health system's needs. Its top features include:

- Clear metrics that align with the organization's goals and objectives
- Intuitively displayed information for quick exploration and insight
- Summary views, trends, and drill-down capabilities to filter into greater detail on individual metric

SAMPLE OR DASHBOARD SUMMARY VISUALIZATION

- 1 Case volume metrics
- 2 First-case on-time start details by OR and against organizational targets
- 3 OR utilization rates and add-on cases recorded by OR
- 4 Trended average OR turnover in minutes and physician down-time
- 5 Itemization of reasons for case cancellation
- 6 Ability to filter by date, location, specialty, etc.



Figure 1. Sample OR Dashboard summary visualization

With new analytical capabilities, stakeholders across the hospital can more confidently make sounder decisions about one of the hospital's biggest revenue generators and cost centers, the operating room.

SAMPLE OR DASHBOARD FIRST-CASE ON-TIME START DRILL-DOWN VISUALIZATION

- 1 Trended first-case on-time start percentages
- 2 Trended first-case on-time start percentages by week where surgeon delay was not a factor
- 3 Trended count of surgeon delays
- 4 First-case on-time start delay reason by type – count and overall percentage of total

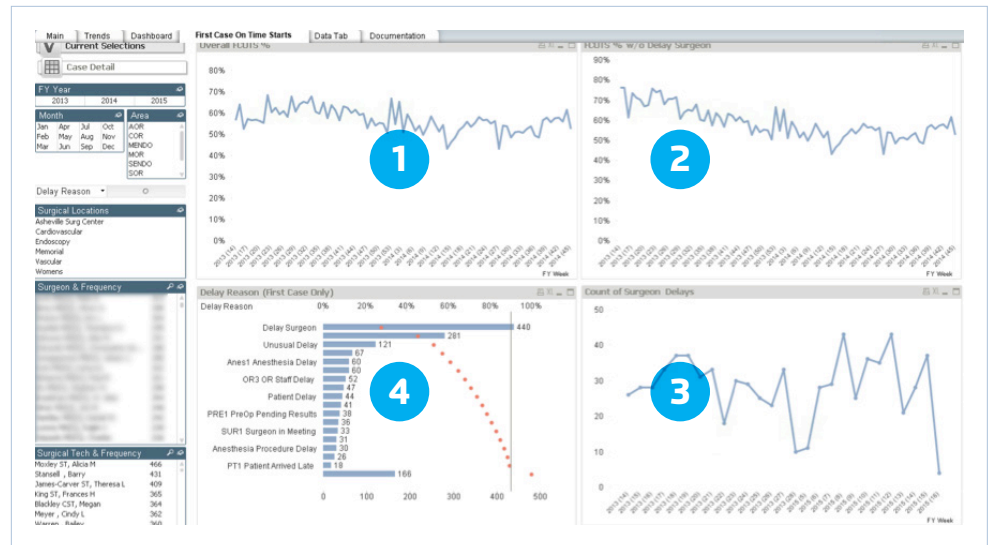


Figure 2. Sample OR Dashboard first-case on-time start drill-down visualization

The OR Dashboard provides us with an intuitive, centralized platform that presents the actionable information necessary to make informed decisions – consumable at all levels, executives to front-line employees.

Seth Bata
Director Clinical Business Analytics

To promote adoption of this technology and realize the value of self-service analytics, the health system assigned a small work team to collaborate on customizing the application and educating end users. This designated work team contained representation from key stakeholders, including senior and mid-level administrative staff, and front-line employees directly engaged in driving quality improvements in the OR. As the team rolls out the OR dashboard to additional hospitals in their organization, their objectives will include:

- Provide users with a deep understanding and of the value of the data
- Present information from a clinician's perspective to demonstrate how the data could be used to improve processes for better outcomes
- Show how self-service analytical tools replace tedious and inefficient manual processes with more meaningful information—and more meaningful work



Because of the growing complexity and demands of the healthcare environment (e.g., clinical care, operations, regulatory environment, declining reimbursement, and the need to control costs), every healthcare organization needs access to good data. With the implementation of our EDW we now have a truly integrated, single source of truth to support the best practices, care process models, and population health management that healthcare will only require even more in the future.

Jill Hoggard Green, Ph.D., RN
Chief Operating Officer

RESULTS

At last, Mission had valuable analytics at hand to drive major quality improvements in critical areas. The results were significant:

Improved ability to drive care and operational improvements with integrated data and analytics

Quick implementation of the EDW—which aggregated data from six data sources in just nine months—provided a single source of truth to guide improvement efforts. The OR Dashboard running on the EDW platform delivers drill-down and data visualization capabilities that help the OR team identify important trends and potential gaps. This single source of truth not only resolves previous concerns about the completeness and quality of the data used for OR analytics, it also delivers data updates without requiring so many valuable resources to collect and report out. This timely process supports quick and flexible decision-making.

20 percentage-point increase in first-case on-time surgical starts

Increased access to complete and detailed information provided unprecedented visibility into the key drivers for first-case on-time surgical starts. Insight from the OR Dashboard enabled monitoring of two key areas to address in order to improve this important metric: doctor on-time arrival and readiness of OR equipment. Efforts to address these two areas have resulted in dramatic improvement—20 percent to date. The team reviews this data daily to assess impact of initiatives and identify opportunities for continuous improvement.

85 percent reduction in staff hours required for data preparation and reporting

The previous manual data preparation and reporting process required nearly half an FTE to maintain and accommodate -off report requests. And, in many cases, reporting requests could not be met at all based on the time required to meet the request or the inability to access the data needed.

Now, data automation, powered by the EDW and analytical applications, has reduced staff time significantly. Less than a tenth of an FTE from a data architect is needed to sustain the automated reporting process. Team members can now focus on analysis and enhancing the analytical platform, benefitting both the organization and the employees.

“There’s a tremendous amount of excitement around here now about getting hands on data; we can’t get it to people fast enough. But that’s a nice problem to have – people want what your department can offer them.

Jon Brown
Vice President &
Associate Chief Information Officer

Drove cultural transformation through engagement at all levels within the organization

Staff quickly recognized the potential of the new analytical application, thanks to dedicated education and training from the implementation team. In addition to detailed training, internal socialization of OR dashboard successes to date has helped drive acceptance and adoption of the new, data-driven processes. Staff have, in fact, made the OR dashboard an essential component of their everyday work.

The fact that the solution presents information from a clinician’s perspective—showing how the data improves processes, which then translates to improved outcomes—has been key to engaging clinicians and establishing a data-driven culture. Self-service analytical tools made available to all levels, from leadership to clinicians on the frontlines of surgical care, also increase engagement. Such data transparency and ease of access empowers users to identify improvement opportunities and make decisions that enhance clinical and operational effectiveness.

WHAT’S NEXT

“Mission anticipates a \$5-7 million savings opportunity in their OR supply chain, with the OR dashboard delivering the insight needed to drive these savings,” says Jon Brown, Vice President & Associate Chief Information Officer. With an eye on removing similar waste and redundancy in other departments, the health system has established teams to leverage advanced analytics to improve care in key areas including C-section, heart failure, sepsis, and newborn. Permanent work teams are being put in place to drive engagement in data-driven improvement initiatives, a cultural shift that is proving beneficial to Mission. Additionally, work is underway to standardize data definitions and the framework for consumption.

As “Mission: reDESIGN” marches into the future with enhanced processes, quality improvements will also move forward, ably assisted by analytics and a data-driven culture. ♪

References

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ABOUT HEALTH CATALYST

Health Catalyst is a mission-driven data warehousing, analytics, and outcomes improvement company that helps healthcare organizations of all sizes perform the clinical, financial, and operational reporting and analysis needed for [population health](#) and [accountable care](#). Our proven enterprise data warehouse (EDW) and analytics platform helps improve quality, add efficiency and lower costs in support of more than 50 million patients for organizations ranging from the largest US health system to forward-thinking physician practices.

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