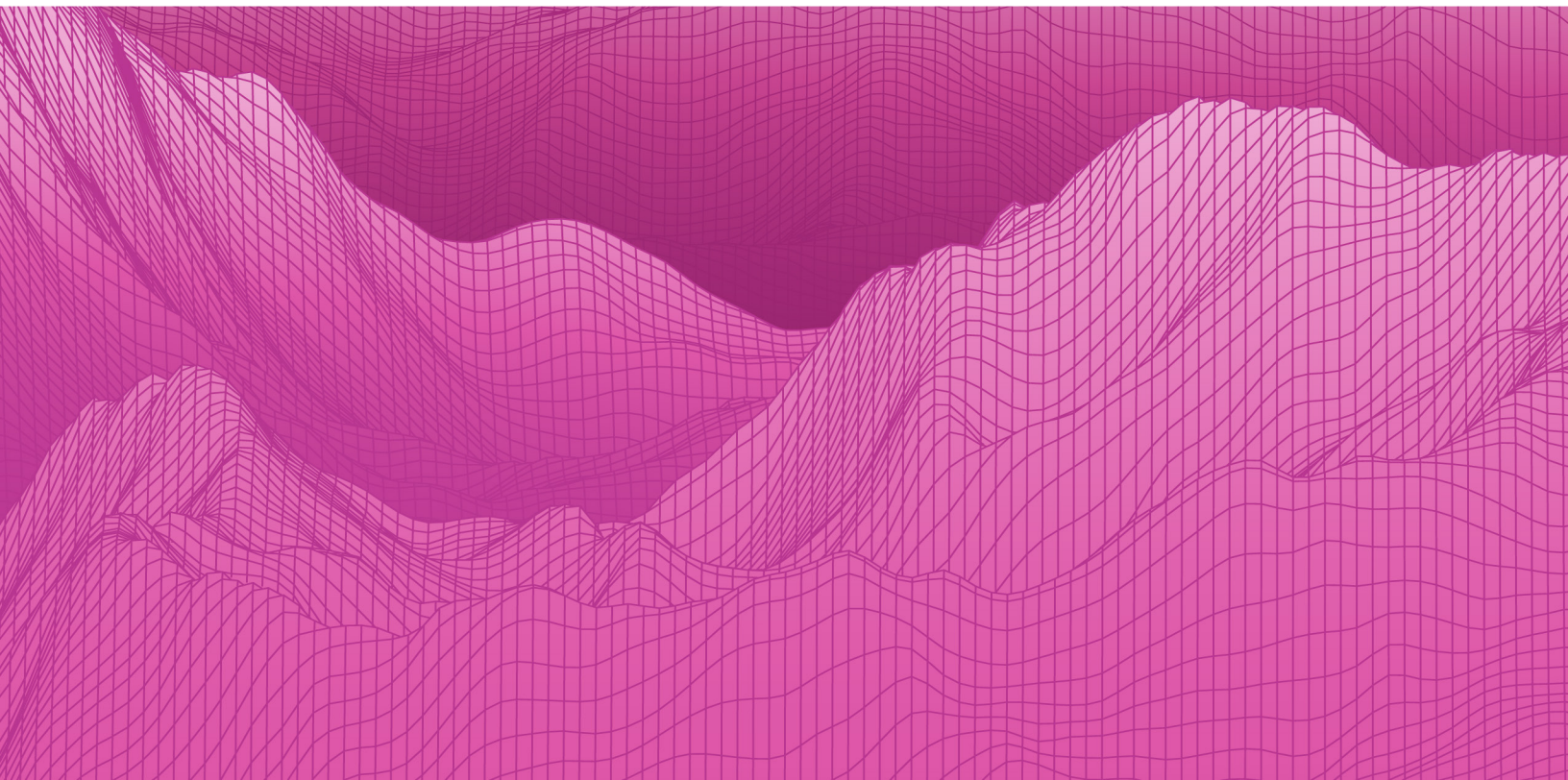
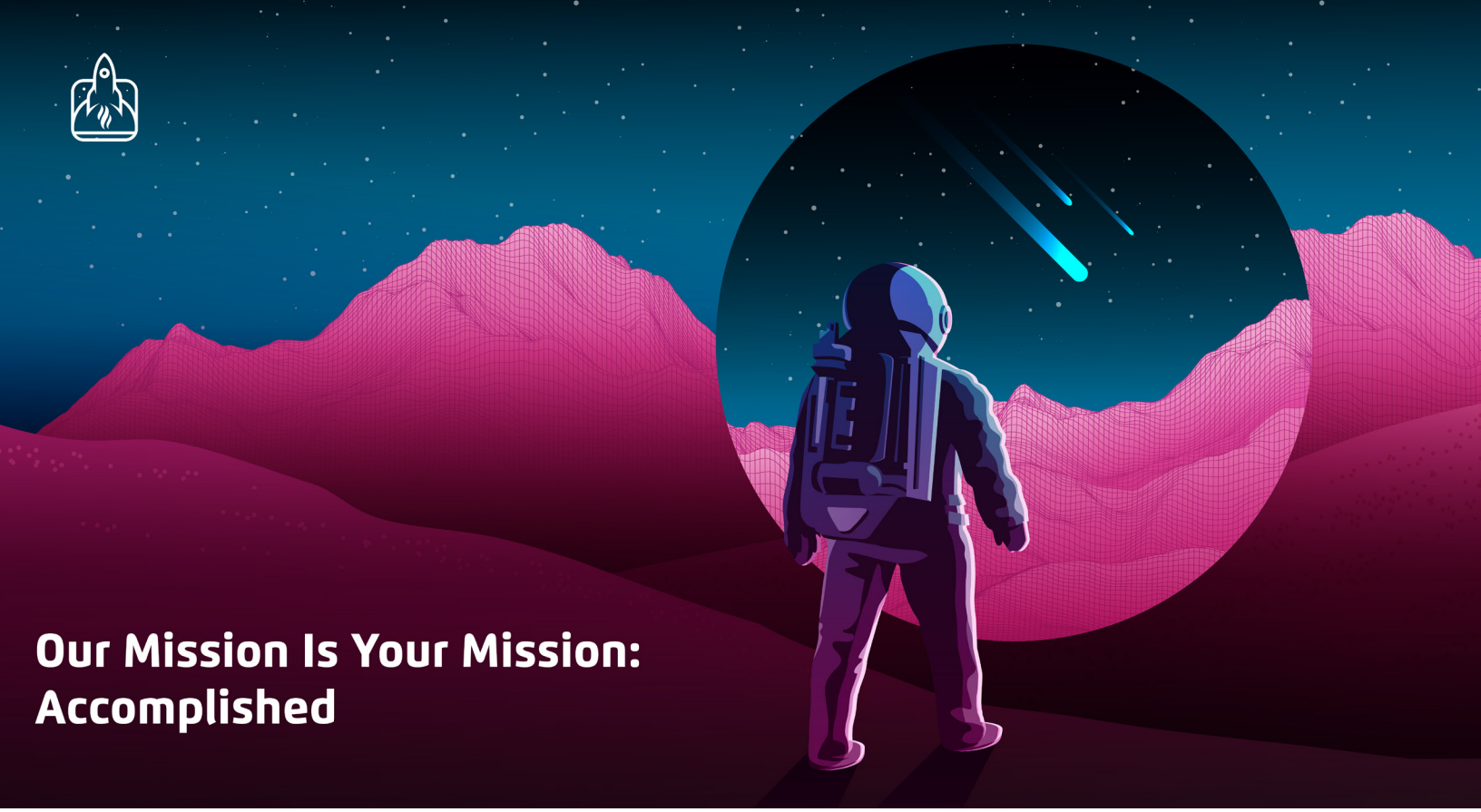
Our Mission Is Your Mission: Accomplished

The Top Health Catalyst Customer Success Stories

HealthCatalyst®

Contents





Our Mission Is Your Mission: Accomplished

About This Collection of Customer Success Stories

On June 15, 2022, Health Catalyst published its 300th customer success story. Upon reaching this milestone, we reviewed our vast success story library and reflecting on some of the incredible achievements our clients have made since we began this joint mission of healthcare transformation in 2013. Together, we've enabled clinical improvements, reduced stroke mortality rates, and reduced healthcare waste, among other clinical, operational, and financial improvements.

The impact of our combined efforts has resulted in:

- $1.5 billion validated measurable improvements.
- 5.4 million lives positively impacted by improvement initiatives.
- 2.9 million care gaps closed.
- Patients spending more than 39,000 more days at home–the result of decreased readmissions, emergency department utilization, inpatient admissions, and inpatient length of stay.
- 42K adverse events avoided.

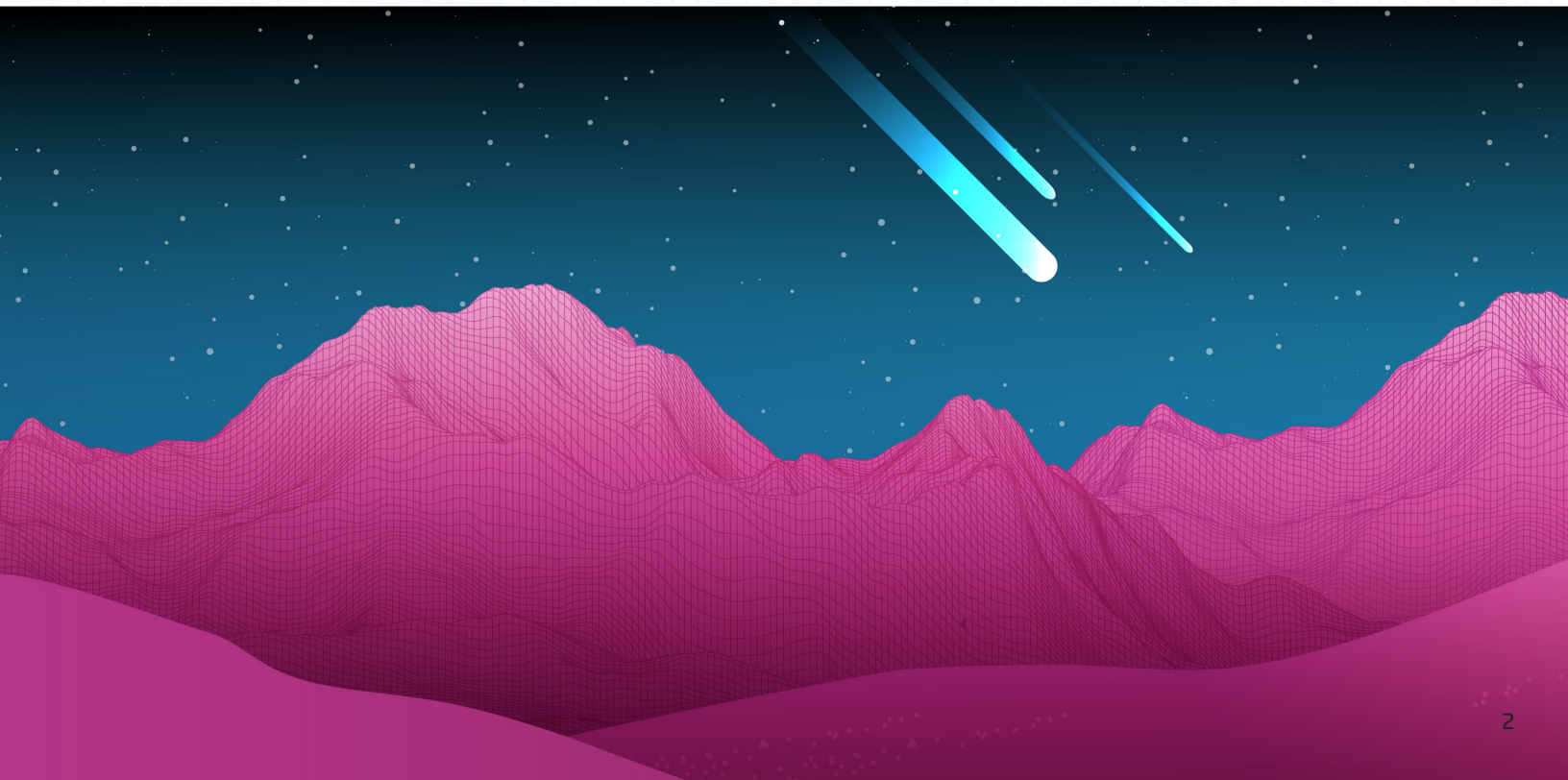
We've collected just some of these incredible data-informed improvements in the following areas: cost, revenue, clinical operation, and population health. From our first published success story in 2013 to our 300th (and beyond!), we continue to be in awe of the achievements our customers have documented, verified, and shared.

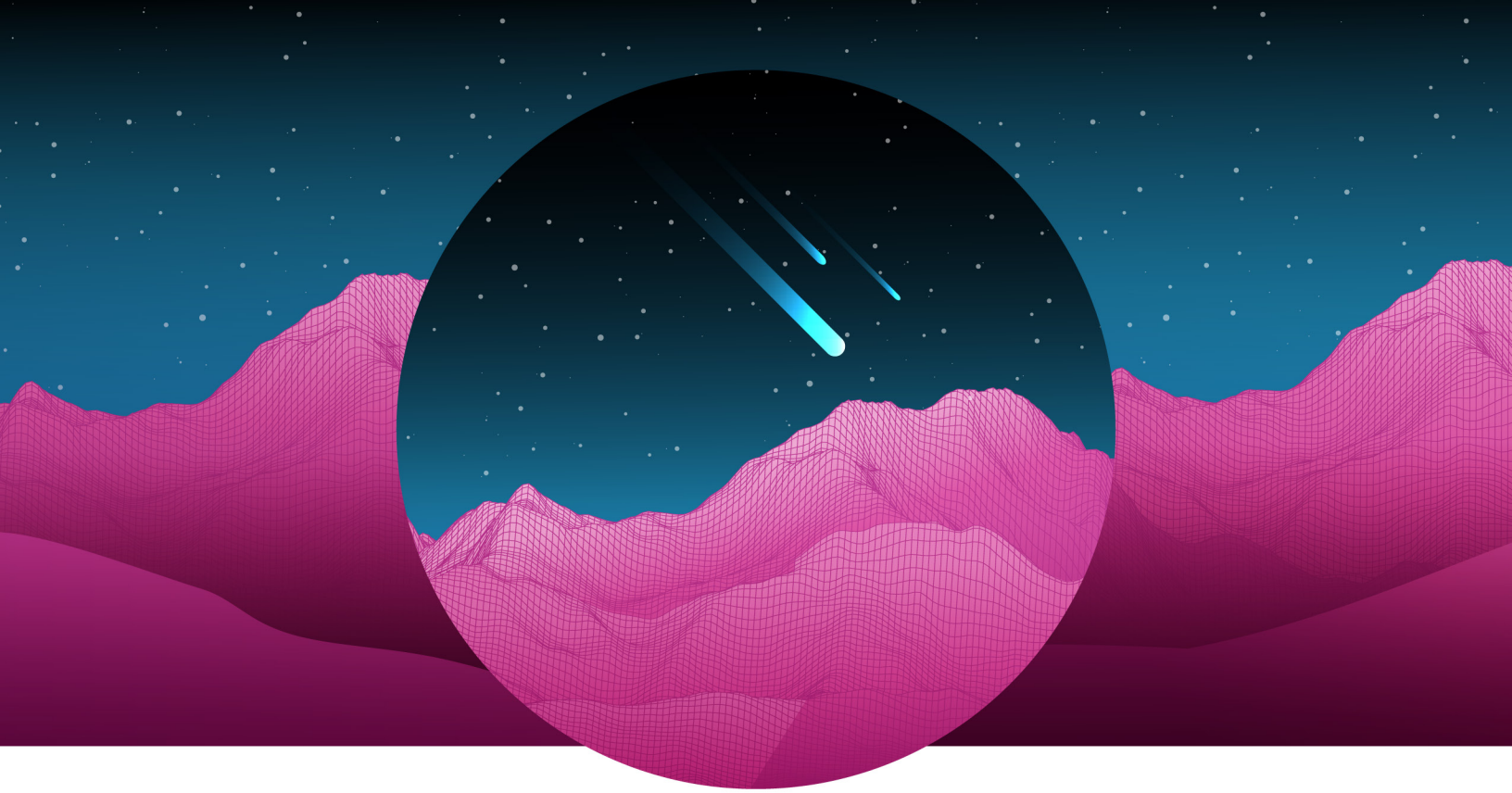
We're grateful for the role we've been able to play in empowering our customers to achieve their bold missions. We celebrate every healthcare professional that has contributed to these transformational achievements and thank them for their continued commitment to delivering on the mission of realizing massive, measurable, data-informed healthcare improvement.

COST

How Successful Organizations are Addressing Cost Issues with Data

Six Customer Success Stories





Labor costs are the single largest expense item for most hospitals, often exceeding 60 percent of net patient revenue. Organizations need to manage their labor spend carefully to curb costs enough to keep pace with revenues. Those that pursue a data-informed, forward-thinking strategy can slow the growth of labor expenses today while positioning themselves to succeed in a future of continued revenue decline and increased workforce shortages.

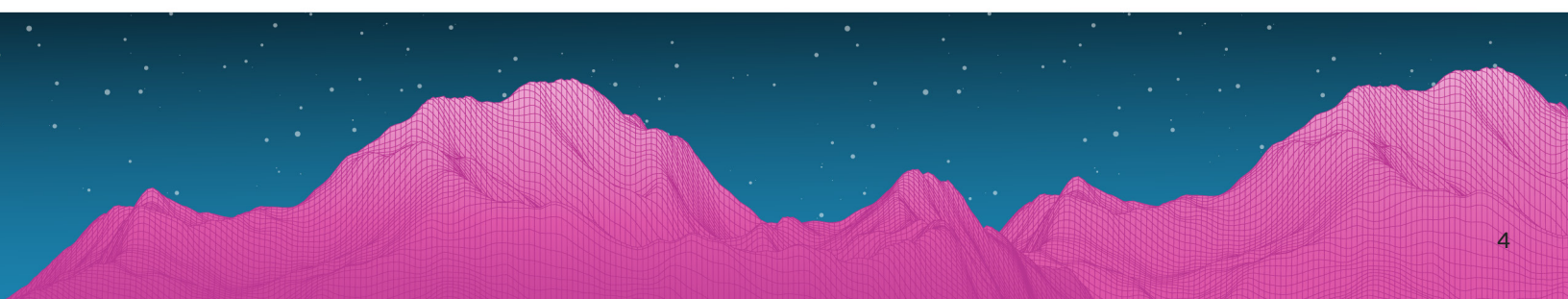
Healthcare organizations often seek to lower costs by outsourcing some labor force areas. And yet, like most cost-savings strategies, outsourcing carries risks for an organization and isn't "one size fits all." Systems that succeed with outsourcing pursue a thoughtful, data-informed approach—one that promises not only lower costs but increased value to their organization and a positive experience for their team members. This way of outsourcing is called smartsourcing.

Supply costs are the second-largest expense item for a healthcare system. Organizations that thoughtfully improve their supply chain may significantly lower their overall supply costs—while preserving patient safety and provider engagement.

Here are four success stories that show how the most successful organizations are tackling these cost-related problems.

How Successful Organizations are Addressing Cost Issues with Data: Success Stories

Contents



Activity-Based Costing and Clinical Service Lines Team up to Improve Financial and Clinical Outcomes

Healthcare costs continue to increase at a disproportionate rate relative to gross domestic product, and Americans are becoming increasingly aware that they aren't getting their money's worth. Lack of understanding about how much it costs to provide patient care, and lack of knowledge about how those costs compare to the outcomes achieved, lead to the cost increases. To build sustainability, healthcare organizations must identify and address waste in healthcare and reduce the total cost of care.

UPMC recognized that the common denominator to addressing threats to sustainability is to fully understand and effectively manage costs. It implemented activity-based costing (ABC) by utilizing PowerCosting™, an application that leverages Health Catalyst's analytics platform and best-of-breed, activity-based costing models to deliver accurate and actionable data. The application delivers detailed and actionable cost data across the analytics environment, and supports service line reporting, contract modeling, and clinical process improvement. UPMC has used this capability to effectively drive cost savings and improve clinical outcomes in many of its service lines, including Surgical Services, Women's Health, Orthopedics, and Cardiovascular.

Through its analytics platform and best-of-breed, ABC models, UPMC is improving quality and safety, reducing costs, and increasing value across service lines.

Runaway Costs, Dwindling Margins Harm Sustainability

Healthcare costs are climbing disproportionately to gross domestic product (GDP), and are predicted to account for 19.9 percent of GDP by 2025.[1] This spending is exorbitant, and Americans are becoming increasingly aware that they aren't getting their money's worth. Healthcare outcomes lag those of other developed countries, while over $700 billion of healthcare spending is considered waste. Major factors contributing to increased healthcare costs are a lack of understanding about how much it costs to provide patient care, and a lack of knowledge about how those costs compare with the outcomes achieved.[2]

Meanwhile, the average hospital operating margin is 2.2 percent, ranging from 3.9 percent for hospitals with AA credit ratings, to -1.4 for hospitals with BBB ratings.[3] Addressing margins this tight requires accurate data to effectively navigate the path between profit and loss.

For the American healthcare system to be sustainable, healthcare organizations must be able to identify and address waste in healthcare, and reduce the total cost of care. To create these internal efficiencies, hospitals must have timely and actionable data that can identify unnecessary variation in care routines and supply usage, and enable appropriate corrective action.

Shifting payment models drive matching revenue strategy

Healthcare reimbursement is being driven by growth in government programs, changes in employer plans, and growth of alternative payment models,

requiring hospitals to shift their revenue strategies from volume to value, and improve patient outcomes at a lower cost. Exacerbating this challenge, payment system reforms will increasingly require providers to bear greater population-based financial risk.

Price transparency is critical in this new healthcare environment to effectively manage payer contracting, but to provide this information, hospitals need reliable and defensible data.

UPMC is a large integrated healthcare delivery system with over 30 hospitals accounting for more than 6,000 licensed beds and 310,000 inpatient admissions and observation cases, in addition to 4.2 million outpatient visits, more than 4,000 employed physicians, and a UPMC Health Plan with 3.2 million members.

UPMC was aware that a changing environment required it to take on more risk, moving from payment for volume to payment for value. This forward-thinking healthcare organization began to analyze the industry and implemented a strategic and effective way to position the organization for success while improving care for patients.

Several threats undermine sustainability

UPMC determined several underlying problems making the current U.S. healthcare system unsustainable:

- Reliance on revenue/commercial payers.
- Overcapacity.
- Incomplete integration.
- Supply chain inefficiency.
- Physician practice variation.
- Service duplication.

UPMC recognized that the common denominator to addressing these threats to sustainability is the ability to fully understand and effectively manage costs—knowledge that is essential to eliminate waste and improve patient outcomes, both of which are made possible by eliminating unnecessary clinical variation. UPMC's approach to success centered on expanding its analytics capability and implementing an advanced costing system that would provide insight into both cost and clinical outcomes.

Activity-Based Costing Delivers Data Insights Across Service Lines

UPMC determined that the traditional cost accounting methods used most often in healthcare—relative value units (RVU) and ratio of costs-to-charge (RCC)—did not provide the level of detail and accuracy necessary to inform decisions that would enable it to overcome industry threats to its sustainability.

Activity-based costing (ABC), used in manufacturing for decades, has been deemed impossible or not worth the effort in healthcare due to challenges with data integrity, integration, and access. UPMC overcame these technological challenges by using PowerCosting, which leverages Health Catalyst's analytics platform and best-of-breed ABC models to deliver easily accessible, reliable, integrated, accurate, and actionable data.

Several key differentiators define this advanced ABC system:

- Provides actual supply and labor costs.
- Assigns costs to multiple activities within a department.
- Uses a flexible cost engine.
- Includes embedded expertise.
- Leverages technology to minimize maintenance.

PowerCosting includes data from a variety of sources (EHR, patient accounting systems, general ledger, HR and payroll data, supply chain, pharmacy, etc.), which makes it possible to assign direct costs, such as medications, supplies, and labor costs to patients

based on their actual utilization. UPMC allocates remaining expenses to patients using the best available driver, such as minutes in the operating room, time on the MRI machine, or scheduled minutes for a procedure.

Detailed and actionable cost data across the analytics environment supports service line reporting, contract modeling, clinical process improvement, and more (see Figure 1), enabling UPMC to do the following:

- Identify opportunities to reduce unnecessary clinical variation by assessing the data and developing pathways.
- Develop and provide patient-specific cost and quality data.
- Develop protocols to provide the most appropriate service, in the right place, at the right time, while providing optimal transparency to the patient.
- Monitor results as a means of measuring performance.

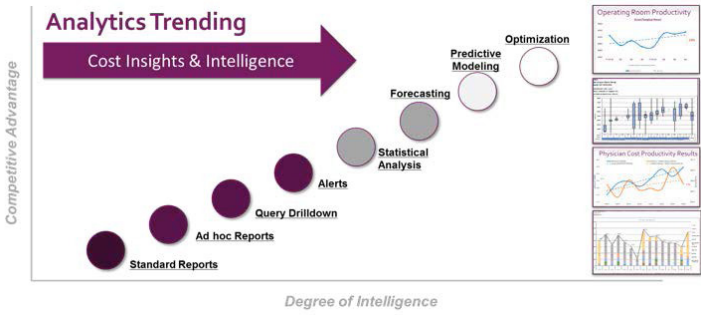


Figure 1: Cost management improvement progression enabled by analytics

UPMC has used analytics to effectively drive cost savings and improve clinical outcomes in many of its service lines, including Surgical Services, Women's Health, Orthopedics, and Cardiovascular.

Surgical services use case

A good example of how UPMC leveraged analytics to successfully improve both clinical and financial performance is its approach to surgical services.

In the current healthcare environment of declining surgical volume and increasing cost, it has become imperative for any health system to gain solid, data-driven insight into its use of operating room (OR) resources. One of the largest areas of opportunity is the efficient deployment of OR labor, both anesthesia and hospital staff, in reacting to changing volumes. Using cost allocation methodologies developed with Health Catalyst, UPMC sought to understand the correlation of labor costs for anesthesia and hospital resources to surgical case time, which resulted in a transparent view of labor cost per OR hour across the system. By understanding the intersection and interaction of volume and cost, UPMC has been able to identify operational variation within and across facilities.

As a result, operational and physician leaders have regular insight into the changing cost and volume associated with each OR. Data is actively used to identify best practices related to OR utilization and staffing to deliver the same high-quality patient care, using fewer resources.

To improve the clinical outcomes of UPMC's patients, perioperative and surgical services teams actively worked to implement the protocols related to the nationally recognized Enhanced Recovery After Surgery (ERAS) program. ERAS protocols are designed to reduce surgical stress and maintain post-operative physiological function, reduce rates of complications, facilitate faster recovery through early ambulation and feeding (thus reducing LOS), and improve patient/family satisfaction.

By prioritizing these clinically meaningful interventions for resource allocation supported by the insight provided by its analytics platform, UPMC was able to increase the utilization of clinically meaningful practices—while eliminating non-value-added practices—to improve both clinical and financial outcomes..

Comprehensive joint replacement use case

As fee-for-service reimbursement models transition to alternative payments, providers are increasingly held accountable to deliver high quality, value-based

care. One such alternative payment model is the CJR program, which aims to provide coordinated, high quality, cost-efficient care during and after a hip or knee replacement surgery. To achieve these objectives, the model aligns quality, outcomes, and cost data to help support better and more efficient care pathways for patients.

When UPMC implemented the CJR model, it leveraged the combination of financial and clinical leadership provided by its Orthopedics Service Line structure, and the detailed information about cost and clinical variation from its analytics platform. Guided by this information, the combined efforts of quality, operations, physicians, and finance have driven improvement in multiple areas, including clinical practice change and supply utilization, ultimately providing better care at a lower cost with a greater degree of patient satisfaction.

Results

Through use of the analytics platform and best-of-breed, ABC models, UPMC is increasing value by improving quality and safety, and reducing costs. UPMC now has accurate, actionable, defensible data that is helping the organization successfully change from volume to value.

Results from Surgical Services include:

- Increased insight into cost variation and drivers of inefficiency in the operating room setting.
- $3M cost savings/avoidance. The $3M represents the total cost reduction/avoidance associated with ERAS cases being performed at a lower cost per case than the baseline cases over approximately two years.

The impact on orthopedics related to the CJR program has produced the following:

- Improved patient outcomes and quality (readmissions,complications, patient reported outcomes, patient satisfaction, etc.).
- Insight into the most significant areas of opportunity for financial improvement.
- Optimized utilization and lower operating expenses (supply standardization, average LOS initiatives, etc.) achieved with the help of cost targets.

Enhanced transparency toward identifying practice variation for specific procedures has also improved performance in other service lines, such as:

- Women's Health: deliveries and hysterectomies.
- Program and other payer bundles.
- Neurosurgery: Spine Shared Savings Program.

Additionally, enhanced validation of source data has simplified ongoing maintenance, and the automated and improved cost allocation algorithms have helped shorten the closing process, simultaneously saving time and improving data integrity.

What's Next

UPMC will continue to leverage its cost accounting system to inform and improve operations of its clinical service lines and general operations. Using this information to improve contracting will enable UPMC to continue providing excellent patient care and improving patient outcomes.

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How Hospital Financial Transparency Drives Operational and Bottom Line Improvements

A common pressure facing hospitals today is how to maintain positive operating margins, leaving room to fund new patient services. This is an industry-wide challenge. A 2014 Moody's survey of 448 U.S. hospitals, for example, found that the average median operating margin fell to 2.2 percent while expenses increased at an annual rate of 4.6 percent.[1] What can hospitals do to counter this squeeze on profitability, especially in an era of steadily declining reimbursement?

As the ability to increase revenues is limited, an emphasis on lowering costs is a more effective strategy—provided hospitals don't sacrifice quality of care. For this, operational leaders from every department must perform to budget and have tight oversight of their greatest cost drivers: labor and supplies.

To make more informed decisions about employee productivity, supplies utilization, and other areas that have a direct impact on the hospital's bottom line, these leaders need quick access to a blend of financial and operational data. Yet traditionally, these data types are housed in separate systems. Furthermore, "closing the books" on departmental operations is a task that takes place only monthly, thereby providing month-old data. This leaves department managers challenged to identify and address budget performance variances, and effectively explain them to senior leadership in a timely manner.

Texas Children's Hospital is taking a more holistic approach to performance improvement using integrated operational and financial data, accessed from a single analytics solution. In the process, Texas Children's has freed millions that can be used to provide additional services.

Challenge: Intensive Manual Effort Reaps Only Murky Insight

Like many healthcare providers, Texas Children's was facing expenses much higher than original budget targets. When a $50 million shortfall in profitability was forecasted, Texas Children's decided to close the gap, and identified upwards of $60 million in performance improvement opportunities. Accordingly, Texas Children's launched a sweeping improvement initiative called "Delivering on the Vision." There are a number of components to the strategy, including one that is the central focus of this success story: implementing greater accountability among leaders, providers, and frontline managers for their clinical and operating performance.

As this accountability could not be realized without greater visibility into potential cost savings opportunities, these key professionals needed integrated and timely data about multiple cost

centers and sub-units. At the time, however, Texas Children's finances were spread across approximately 1,000 cost centers, each with its own individual financial statement spreadsheet. Creating a financial statement for the entire hospital, or even by department or sub-unit, took so much time it happened only monthly. Certain useful views of information—such as for individual manager/administrator, physical location, business unit or area—were too cumbersome to be produced on a regular basis at all. Meanwhile, analyzing areas made up of multiple cost centers, like acute care or the newborn center, required linking and adding together dozens of individual spreadsheets. Despite such exacting procedures, operational and financial leaders were still constrained in their ability to perform high level, roll-up analysis or drill down into important details that would explain variances.

Data lags affect decision making

Because books were closed once a month, leaders had to rely on month-old data, plus the additional week it took to compile reports. This essentially made it impossible to clearly identify and understand variances in performance to budget in a timely way and to quickly make the right corrections. In one example, Texas Children's knew that 77 percent of its patient care units weren't flexing staff efficiently to census. But the hospital could not determine why without laboriously tracking down journal entry and accounts payable details from separate systems and cost centers.

For the accounting team, closing the books and producing reports was a time-intensive endeavor that involved the creation of extensive data tables for each of the 1,000 cost centers and heavy coordination with owners of other data systems. Each month, it took a full day's worth of undivided attention from three individuals to create financial statements for the various operating units and then another day to create executive-level reports. Even so, cost center managers with responsibility for multiple departments still had to spend up to two weeks per month to learn and develop explanations for variances. Oftentimes, when they couldn't arrive at the level of detail necessary to achieve this—for example, to understand why expenditures in supplies were going up—they would need to reach out to the accounting department, which generally took one to two weeks to deliver the answers.

The Solution For Improved Hospital Profit Margins: Data-Driven Financial Transparency

In order to realize bottom line improvements, Texas Children's leveraged its existing Late-Binding™ Enterprise Data Warehouse (EDW) platform from Health Catalyst. Data from sources like the EHR, financial systems and operational systems were integrated into the data warehouse to create an enterprise-wide, integrated single source of truth that could help hospital and department leaders track financial and operational performance, and most importantly, accurately inform their decisions.

The financial and operational data enabling these new capabilities is now accessible through a single application, General Ledger Explorer, also offered by Health Catalyst. As the application runs on the EDW, data stays refreshed in near real-time, helping users conduct reliable and timely trend and performance variance analysis. With the tedious task of consulting multiple systems and departments now gone, problematic issues are identified and addressed much sooner.

An accurate view into variances

The application features standard monthly financial statement reporting with actionable visualizations, such as actual versus budget (Figure 1). Determining which areas are creating budget variances, right down to the budget line

FIGURE 1: STATEMENT OF OPERATIONS SAMPLE VISUALIZATION

1. Actual, budget and variance for each line item—plus year over year comparisons
2. Stoplight functionality to easily identify the variance percentages
3. Filters for data analysis (e.g. business unit, cost center, fiscal year, period, etc.)
4. Trended tab shows operating performance trended over time for the user selected hierarchy

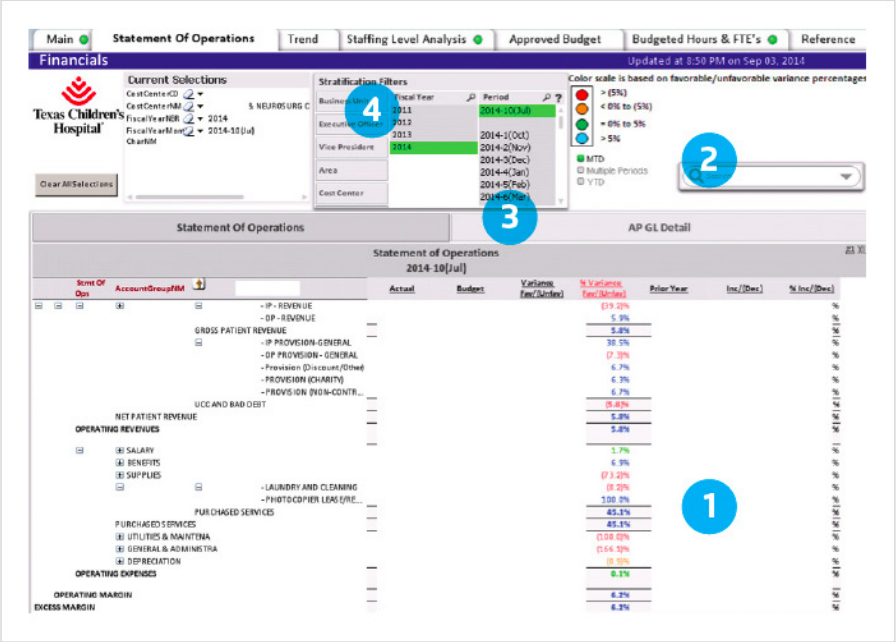

Figure 1: Statement of Operations sample visualization

item, is now a simple matter of logging into the application for direct access to detailed APGL (accounts payable generation ledger) operational information. A "stoplight" feature lets users quickly see if expenses are exceeding, meeting or are under budget, with favorable variances indicated in blue and negative variances in red. Now leadership and operational managers can easily identify areas of concern and readily drill down into the data to identify the cause of a variance.

Put plainly, this feature goes a long way in increasing accountability. Performance-driven managers obviously don't want to be known for their "red lights," although "blue lights" can also indicate trouble—such as a budget that exceeded needs or dollars not spent that should have been. The beauty is that users can now discover the true reason for variances from the same application that identifies them. Information is readily available to leadership and decision makers at either a summary or granular level, a significant improvement from the previous environment.

New comparative analysis and forecasting capabilities

With the analytics application, operating performance can be trended over time for each hierarchy, making it easy to spot trends and determine if performance is meeting expectations. Seasonal variation compared to years past, and how operations are altered during those time periods, can also be viewed. This improves the ability to create more accurate budget forecasts.

Operational data related to Texas Children's largest expense item—salary and benefits—is directly integrated into the application with its own staffing level analysis tab for rapid and easy analysis (Figure 2). This view of data allows operational leaders to manage labor more effectively. Once the user identifies a variance in the staffing line item on the Statement of Operations (Figure 1), they are able to use the staffing level analysis tab to drill into budgeted versus actual FTEs and understand the reason behind the variance (e.g., the patient volume may be higher than expected, resulting in greater staffing needs).

FIGURE 2: STAFFING LEVEL ANALYSIS SAMPLE VISUALIZATION

1. Staff level by job title
2. Percent overtime FTEs versus total FTEs
3. Percent temporary FTEs versus total FTEs
4. Percent favorable (unfavorable) actual versus budgeted FTEs

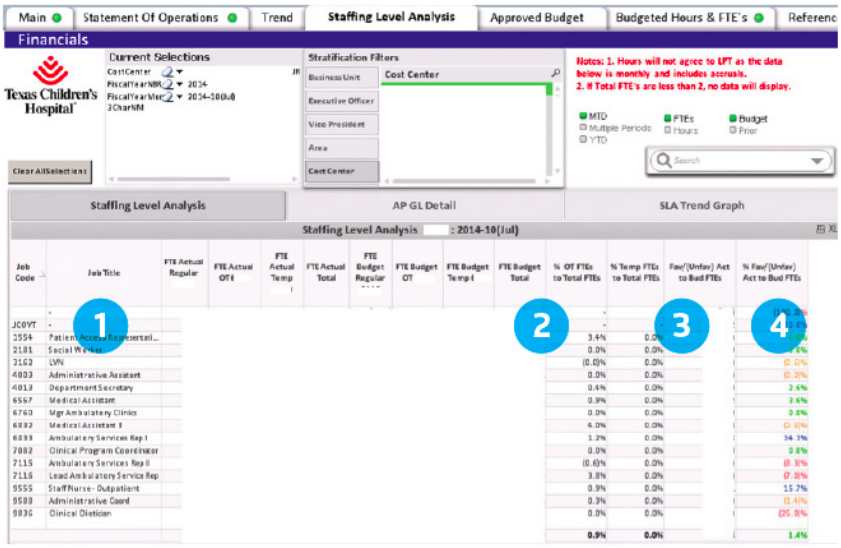

Figure 2: Staffing level analysis sample visualization

Results: Delivering On The Vision

Texas Children's has greatly surpassed original targets in improvement performance opportunities. By equipping leaders with ready access to integrated, near real-time financial and operational information, the hospital has improved quality, increased system wide efficiency and eliminated workflow waste—all while lowering costs. To date, "Delivering on the Vision" has realized $74 million in performance improvements, with new financial and operating analytics driving a significant portion of this number. An estimated $12 million of these savings have been attributed to improved labor performance.

Increased financial transparency. "The data doesn't lie"—which means all operational leaders, now equipped with the good information, can better understand their performance and assume greater accountability for meeting their targets. With this improved ability to make quicker operational decisions, along with thoughtful discussion among financial and department leaders, other improvements have followed. Leaders can now quickly understand and address variances and more consistently manage to budget, all of which positively impacts the bottom line. Operational leaders are also now held to a consistent standard that they can understand and effectively use.

Improved labor productivity. General Ledger Explorer offers a clear window into budget availability for staffing, which in turn has helped departments make more efficient use of staff hours while optimizing patient care. In a clear demonstration of this new improvement, salary and benefit expense growth has been kept below net patient service revenue growth, a strong indicator of efficient staffing.

Increased accuracy in monthly financial statements. Mistakes can now be recognized and corrected during the preliminary phase of the financial statement cycle. With mistakes and their corrections taking place in the same month, an important best practice in accounting, each month's financial reports are more accurate with a reduced need to make fixes in subsequent months.

Significant time savings have been realized by the accounting team and cost center managers. The previous two to three-day effort each month to produce reports based on aged

data has been eliminated, so has the need to gather and merge financial data from 1,000 cost center spreadsheets. Now, cost managers with multiple departments can quickly roll up their cost centers' respective budget pictures—which previously took up to two weeks and relied on the accounting department for answers.

Time is now spent on understanding all or nearly all variances instead of only having time to focus on the major ones. This ability is important, as seemingly minor variances can add up to big challenges down the road. With a new insight into what's driving all variances, managers can quickly determine the cause of each one. In just one example, Texas Children's discovered favorable variances in radiology were due to problems with getting orders pushed through the supply chain group—a situation the hospital swiftly corrected.

With so many new efficiencies, cost managers also have more free time to perform additional strategic analysis, such as whether adding services to benefit patient care can be incorporated into the budget.

What's Next

Needless to say, Texas Children's plans to continue its use of robust analytics. User feedback is driving current endeavors to further enhance features within the General Ledger Explorer application, including additional summary views and financial ratio data. Texas Children's also plans to deploy the Revenue Cycle Explorer application in the near future to enable near real-time revenue cycle management for all revenue cycle metrics in a single and flexible application. This will assist with catching and addressing much earlier the issues that prevent claims from being paid.

Here again, Texas Children's will have new abilities to quickly identify trends and root causes of variances—in this case in denials management, accounts receivable, charge and cash trends, write-offs, and gross and net collection rates—to avoid lost revenue and the substantial rework typically required of revenue cycle teams. Paired with Texas Children's newfound ability to identify budget performance variances and meet budget targets, the hospital's profit margins will be maintained.

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Smartsourcing Clinical Data Abstraction Improves Quality, Reduces Costs, and Optimizes Team

Health Catalyst smartsourced two of its clients' clinical chart abstraction efforts to significantly reduce costs, improve value, and optimize team member engagement. Banner Health and Community Health Network (CHNw) were collectively spending more than $10 million annually to manually abstract clinical measures for submission to CMS, NSQIP, tumor registries, and more than a dozen cardiovascular registries. The smartsourced relationship, leveraging the Health Catalyst® Data Operating System™ platform and a robust suite of analytics applications and improvement services has reduced costs, enhanced data quality, and improved the team member experience for these organizations.

High Cost of Reporting Quality Measures

Reporting quality measurement in healthcare comes with a substantial financial burden, with organizations in the U.S. spending more than $15.4 billion annually on reporting quality measures.[1] A portion of those costs is for manual data abstraction from the EMR. While clinical chart abstraction costs are already excessive, the number of state registries requiring data abstraction continues to increase, registries continue to intensify data collection requirements, and the time required to abstract health record data for various registries continues to grow.[2]

Manual Clinical Chart Abstraction, Costly and Inefficient

Health Catalyst recognized that many of its clients were expending some of their limited resources on inefficient, manual clinical chart abstraction. Variation in clinical chart abstraction processes decreased efficiencies, and delays in obtaining data back from various registries limited the ability of teams to use the data as a strategic asset. As is common for many provider organizations, these data, which were rich with insights, rarely made their way back into the systems' quality improvement initiatives. The team members responsible for abstracting this data were not empowered to operate at the top of their licensure to influence and improve the clinical processes from which the data are derived, contributions that they were eager to make. Health Catalyst determined that several of its clients could lower costs, increase efficiency, improve data quality, improve team member satisfaction, and maximize technology investments by outsourcing clinical chart abstraction services, including automation of clinical chart abstraction using analytics.

Partnership with Health Catalyst

Banner Health and CHNw partnered with Health Catalyst to outsource clinical chart abstraction. Health Catalyst assumed ownership for these functions as well as accountability to lower costs and increase value for each organization—while also creating a positive work experience for team members. This way of outsourcing is called smartsourcing.

Health Catalyst provides Banner Health and CHNw comprehensive services and is responsible for clinical data abstraction, population of the data into the destination format, and submission to governing agencies. Health Catalyst leverages the Data Operating System (DOS™) platform and a robust suite of analytics applications to automate elements of clinical chart abstraction, providing clients the opportunity to achieve immediate cost savings while simultaneously improving data quality.

Organizations can identify variations and trends in labor costs, quality, and productivity, prioritizing key opportunities for improvement to realize efficiencies and boost capabilities. Rather than using the abstracted data only to meet various reporting requirements, Banner Health and CHNw can use the data to identify new opportunities for improvement. For example, at Banner Health, teams were able to leverage the data abstracted for the National Surgical Quality Improvement Program to generate new insights about performance, accelerating Banner Health's clinical improvement work.

Each organization formed shared governance committees to ensure alignment, and to develop and implement a measurement framework to help continuously assess value. Health Catalyst monitors and manages performance at each organization to ensure the value proposition is realized and that arrangements continue to align with each client's strategic direction.

Results

Leveraging DOS to automate the extraction of the required information has improved efficiency and data quality—enhancing the effectiveness of clinical chart abstraction, yielding cost savings and an improve team member experience, including:

- 49 percent relative improvement in clinical chart abstraction efficiency at Banner Health.
- Reduced labor costs for clinical chart abstraction at CHNw by 15 percent.
- 30 percent relative improvement in team member engagement.

What's Next

Health Catalyst will continue to optimize clinical chart abstraction services, enabling significant savings and efficiencies, optimizing the technology investment, and elevating data as a strategic asset—thereby maximizing the return on investment.

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Data-Driven Labor Management Delivers Financial and Operational Improvements

Significant Healthcare Labor Management Costs Challenge Health Systems

As hospitals and health systems face tighter margins, reduced cash flow, and increased competition, they are under immense pressure to improve efficiency and reduce costs. One of the major drivers of healthcare operating expenses is labor management, accounting for approximately 60 percent of hospital costs.[1]

The demand for nurses, clinicians, and healthcare-support professionals is projected to increase along with the aging population, creating labor shortages that can drive up wages and lead to the increased use of contract workers and staffing agencies.[2] The problem is further complicated when patient volumes are lower or higher than expected and place a strain on the budget.

Managing labor costs while meeting the demands for ensuring adequate and qualified staff is a top concern for healthcare leaders who recognize that tight management of labor utilization is essential to maintaining financial health. Successfully managing labor costs requires a system that can track and benchmark labor expenses.[3] Effective healthcare labor management requires the right balance between quality care, safety, patient and employee satisfaction, and fiscal responsibility.

HPH is one of the largest health care providers in Hawaii with four major medical centers and over 70 locations statewide. The provider's mission is to create a healthier Hawaii through community outreach beyond the walls of its facilities as well as investments in research, education, training, and care for the underserved in the community.

Disparate, Retrospective Data Limits Visibility and Actionable Insights

Managing labor costs can be a daunting challenge, and it is often difficult to know where to start. Like many health systems, HPH periodically experienced decreased inpatient volumes and sought to realign its staffing practices to better manage and predict labor needs.

To optimize its resource management, HPH needed to reduce unnecessary costs while maintaining high-quality care and patient and employee satisfaction. Although the organization had a culture of flexing staffing to fit volume, it based staffing decisions on latent, retrospective data, resulting in less accurate planning than it desired.

Further complicating the issue, the organization's labor management data systems were not integrated. Fragmented and siloed data made it difficult to identify trends and pinpoint areas needing improvement. The definition of volume statistics varied across the system, which led to an inability to compare, isolate, and intervene in potential problem areas. Collecting and delivering data from disparate sources and distributing retrospective reports to leaders required time-consuming manual processes, creating a time-lag

for managers needing critical information for accurate staffing and budget planning.

Leaders then had to review and reconcile multiple, differing reports to understand their labor utilization. Since the reports were based on payroll data that was weeks old, leaders were forced to manage labor costs by looking in the rearview mirror. The health system sought to improve its labor management, but it lacked the ability to enable labor analysis and interventions on a systemwide level.

Real-Time, On-Demand Analytics Enables Data-Driven Labor Management

Analysis pinpoints opportunities

To gain insight into its performance, HPH partnered with Health Catalyst to conduct an opportunity analysis. The data uncovered opportunities to reduce costs in healthcare labor management and identified the top ten areas across four hospitals with the biggest potential to improve. To tackle the challenge, HPH leveraged the Health Catalyst® Data Operating System (DOS™) and a robust set of analytics applications—including PowerLabor™, an analytics application that helps managers facilitate more efficient labor force utilization by understanding basic operation and staffing indicators.

Using data from its data platform (including hours, volume, and budget data from four different data systems) HPH was able to access, for the first time, detailed information about its labor management practices in one place. Leaders can use PowerLabor to visualize labor management and understand productivity and identify hours detail versus the budget and full-time equivalent (FTE) utilization compared to budgeted FTE.

The organization assembled a meaningful representation of labor utilization with an easy-to-use interface to explore various dimensions of labor productivity, including staffing budget variance, the variance between actual and budgeted pay, and unnecessary variation in labor metrics.

HPH no longer needed manual reports and could base on-demand data on daily census data, rather than two-week-old payroll data. Using new insights from the analytics application, HPH determined that its staffing ratios were close to its target numbers and that it could make a significant reduction in cost by tightening its processes and making small adjustments to staffing ratios, rather than overhauling its staffing approach. Even though HPH identified sizeable opportunities to save money, the changes necessary to achieve those savings were realistic and attainable.

Engagement sets the stage for success

Leveraging its culture of financial transparency, the health system engaged leaders from all departments at the start of the project. HPH listened to managers, leaders, and clinicians; validated the data; and addressed the underlying variation before implementing changes. The collaborative approach facilitated widespread support and adoption of the processes and tools as they were rolled out.

First, HPH conducted a pilot to evaluate the use of the analytics application and discover what widespread adoption throughout the system would require. It quickly realized that there were many differing meanings and assumptions ascribed to volume statistics and that data were not consistent.

Members of the leadership understood that consistent, standard data was critical for success, so they met with leaders of the pilot areas, exploring ways the organization could better align and understand each cost center. At first glance, the problem looked like overstaffing, but after a deeper dive into the data, the leaders discovered the problem was more often an error

in attribution.

Once the data was validated and scrubbed, HPH leadership used the numbers to set goals and identify savings based on the new model. They also provided purposeful training to employees, explained the "why" behind the changes, and offered individual coaching and follow-up with managers on an as-needed basis—with the goal to train employees how to use the tool effectively.

Because the organization already had a culture of flexing to volume, clinical and operational leaders understood their roles as stewards of finances and appreciated having an easily accessible tool with real-time, actionable data to support them in meeting their financial goals. Leaders finally had the ability to quickly understand what was happening in their departments related to staffing and then make data-driven, proactive decisions. The six-month pilot successfully demonstrated the value of data-driven healthcare labor management, and the organization decided to roll out the tool to the entire system.

Collaboration and innovation produce wins

HPH knew that labor management was more than reducing expenses—it was about optimizing resources and finding innovative and collaborative ways to meet its labor-management goals. Successfully improving labor management required collaboration, financial transparency, and accountability.

The organization has seen many examples of managers thinking outside the box to address labor needs and manage employees within the budget. For example, managers on a very busy medical unit strived to improve patient satisfaction while staying within their staffing limitations. Data demonstrated that the unit could still meet its staffing goals while adding one additional staff member for the first four hours of the shift—the busiest time—to help answer call lights and respond to patient needs. This innovative four-hour shift started to yield an increase in patient satisfaction scores.

- As the census has rebounded, HPH uses the tool to inform strategies to accommodate unpredictable changes in volumes and explain variances:

- A unit that others in the organization perceived as overstaffed used the data to demonstrate the need to add an additional FTE.

- Another unit analyzed the amount of overtime and double-time employees were using and converted those high-expense dollars to regular hours by adding one staff member. In many cases, a re-allocation of positions improved staffing without adding additional costs.

- The emergency department (ED) had been working on different ways to manage its staffing, making incremental gains. Following respiratory therapy's example of using on-call staff, the ED manager decided to trial on-call staff to manage unpredictable volume variation. The small change helped the ED meet its goals, without compromising high-quality outcomes.

- The pharmacy department had experienced unexpected absences and turnover and noticed that it was over budget in training dollars. By drilling into the data, it was able to better design training and orientation to skill mix, eliminating unnecessary training costs.

Departments throughout HPH have reached across the aisles to support each other, and it's now commonplace for one department that might be slow to lend staff to a nursing unit to meet patient care needs, freeing up a registered nurse

to safely care for a patient in another department.

HPH provided additional training for employees interested in providing one-on-one patient monitoring. They also trained the staff in housekeeping, transportation, and respiratory therapy to successfully and safely fulfill the patient monitoring role, when needed.

Results

Using a data-driven approach to labor management, HPH now has detailed insight into operations, supporting the creation of interventions aimed to decrease expenses, while improving operational efficiency and satisfaction. The health system improved labor utilization across four pilot facilities in only six months—significantly reducing labor costs. Building on its initial success, the organization has rolled out the program across its entire system, resulting in substantial savings and operational efficiencies:

$2.2 million savings in 16 months, while maintaining high-quality outcomes.

With on-demand, real-time access to data, managers spend 15 minutes—instead of four hours—proactively managing operations, reducing the administrative burden on managers.

The organization can now answer basic business questions (e.g., the number of FTEs in a given hospital department) in minutes rather than weeks, allowing managers to immediately identify budget errors, in terms of where people are assigned versus where they should be, before making decisions based on faulty data.

Utilization of the application continues to grow with hundreds of employees using the tool daily to actively manage their resources.

What's Next

HPH is continuing to refine its capabilities to optimize and manage labor expenses and is in the process of incorporating labor dollars into its labor-management analytics, giving leaders detailed insight into the financial impact of their decisions.

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$17.4M Saved Through Analytics-Driven Patient Blood Management Improvement

UnityPoint Health created a task force to develop and implement a plan for maximizing blood management. The task force incorporated decision support to improve transfusion ordering in alignment with the transfusion standards. An analytics platform has also been leveraged, which monitors the utilization of blood products, including predictive modeling to risk-adjust blood utilization specific to patient case-mix, and data down to the ordering provider level.

Red Blood Cell Transfusion in the U.S.

Across the country, 14 million units of RBCs are transfused annually. An average of three units are used per transfusion, at the cost of $300 per unit.[1,2] RBC transfusion can be life-saving, although sometimes it can also cause harm. This treatment is strongly associated with prolonged hospital stays as well as increased costs, morbidity, and early and late mortality.[3]

UnityPoint Health is committed to providing outstanding care across Iowa, western Illinois, and southern Wisconsin. Its network includes hospitals, clinics, and home care services, with over 6.2 million annual patient visits, providing a full range of care to patients and families using innovative advancements to deliver the best outcome for every patient, every time.

RBC Transfusion Improvements Hindered by Data Shortage

UnityPoint Health recognized that more than 10 percent of its inpatients received transfusions annually, costing the organization more than $12 million each year. One critical initiative identified to improve the quality of care and safety of RBC transfusion, and reduce cost, was blood management. These improvement efforts were hindered, however, by a lack of specific, actionable data, to generate insight into blood management improvement opportunities.

The organization needed a comprehensive, data-driven approach to improve the effectiveness of blood management. It also worked toward decreasing unwarranted variation to improve patient safety, conserve a valuable, limited resource, and drive down costs.

Analytics Drive Blood Management Process Improvements

To improve blood management, UnityPoint Health created a task force, directing the team to develop and implement a plan to maximize blood management. The task force was instructed to establish a culture promoting best blood management practices and non-punitive process

improvement.

UnityPoint Health focused its improvement efforts on engaging providers in transitioning to the American Association of Blood Bank (AABB) transfusion standards, and implementing decision support to improve transfusion ordering in alignment with the transfusion standards. The organization implemented:

- A restrictive transfusion strategy for inpatients by hemoglobin (Hgb) level.
- Promoted processes to ensure a preoperative anemia assessment and treatment before elective surgery.
- Procedures for improved surgical hemostasis, intraoperative bleeding management, and perioperative blood salvage – recovering the patient's own blood, which is then filtered, washed, and returned to the patient.
- RBC ordering decision support – when a provider enters an order for RBC transfusion, which requires one order for each unit of RBC and the assessment of Hgb between transfused units, the decision support tool checks for the most recent Hgb within the last 24 hours.
    - The provider is informed if there is no Hgb, then prompted to order and review the Hgb before ordering a transfusion.
    - If Hgb is less than 7g/dL, there is no alert.
    - If the Hgb is greater than 7-8g/dL, the alert encourages the provider to reconsider transfusion, indicating transfusion is not recommended in hemodynamically stable patients.
    - If the Hgb is 8.1-9g/dL, the alert outlines the circumstances where transfusion is appropriate.
    - The alert can be bypassed if an emergent/massive transfusion is required.

UnityPoint Health provided its interdisciplinary team education, increasing awareness of the risks of blood transfusions, the changes in related guidelines compared to what many were taught during medical or nursing school, and the improved patient outcomes associated with the AABB guidelines. The organization also leverages the Health Catalyst® Data Operating System (DOS™) and a robust suite of analytics applications for its data and analytics needs, and uses the Blood Utilization Analytics Accelerator to monitor the utilization of blood products, including data down to the ordering provider level (see Figure 1).

The analytics accelerator is designed to monitor the effectiveness of UnityPoint Health's blood management initiatives, and uses both historical descriptive statistics, and predictive modeling to risk-adjust blood utilization specific to patient case-mix.

The risk-adjustment model includes consideration of:

- First and lowest Hgbs on record.
- Hgb at the time of transfusion order.
- Diagnosis-related group for the patient's illness.
- Severity of patient's illness.
- Patient age.
- Patient gender.

Using the risk-adjusted data in the analytics accelerator, UnityPoint Health is able to visualize utilization of RBCs, and is able to attribute variation in RBC transfusion to patient factors that

FIGURE 1: BLOOD UTILIZATION ANALYTICS ACCELERATOR SAMPLE VISUALIZATION

1. Tabs to select data of interest, including summary level data, blood product utilization by month, attending physicial level data, and physician-specific data.
2. Regional utilization data, including number of cases, case mix index (CMI), total blood products used, overall inpatient (IP) cases transfused (Txd), units transfused, and units per case.
3. Trend of units per total IP cases and units by facility.

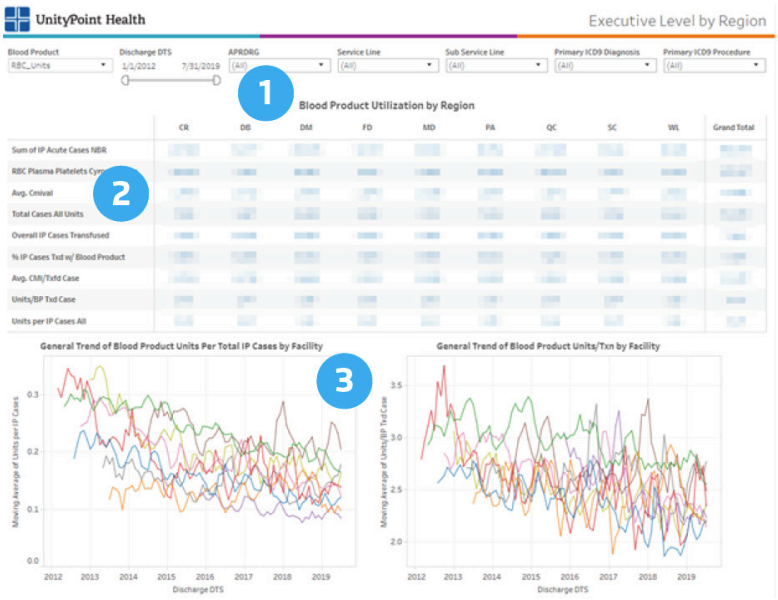

Figure 1: Blood Utilization Analytics Accelerator sample visualization

necessitate higher utilization, or to variation in provider practice. The organization is then able to control for deviation in patient factors and isolate variation in provider practice to identify potential over-utilization of RBCs. Transfusion scenarios that may not have been appropriate can easily be identified and visualized. It can visualize patients who were transfused at Hgb levels far above the current guidelines, and also identify patients who were transfused at minimum Hgb closer to guidelines, but with a last Hgb that was much higher than transfusion thresholds (see Figure 2).

UnityPoint Health leaders can use the analytics accelerator to review individual patient cases that were transfused with RBCs without logging into the EMR. The data can be filtered by ordering provider, so all patients that contributed to a particular actual/ expected ratio can be viewed in one location.

The analytics accelerator data are updated monthly and available for hospital transfusion reviewers and providers giving them the ability to compare their transfusion performance with their peers. Leaders engage with providers to understand cases of overuse, identifying if the use was appropriate, and if not, working with the provider to change practices and adhere to the transfusion guidelines and most recent best practices, safeguarding the best possible patient outcome.

Results

UnityPoint Health's data-driven patient blood management improvements have helped improve patient safety by decreasing unnecessary RBC transfusion, ensuring patients receive care aligned with the most recent evidence. These efforts have also positively impacted financial performance across the system, including:

- $17.4M reduction in direct costs over six years, a result of decreasing unnecessary RBC transfusion.
- 58,089 fewer units of RBC transfused over six years.

FIGURE 2: ATTENDING PHYSICIAN RBC UNITS TRANSFUSED BY MINIMUM AND FINAL HGB LEVEL SAMPLE VISUALIZATION

1. y axis = last Hgb of patients transfused.
2. x axis = minimum Hgb for patients who were transfused.
3. Patients who received RBC units at Hgb greater than 10g/dL.
4. Patients transfused at minimum hemoglobin levels closer to guidelines, but with a hemoglobin level higher than transfusion thresholds.

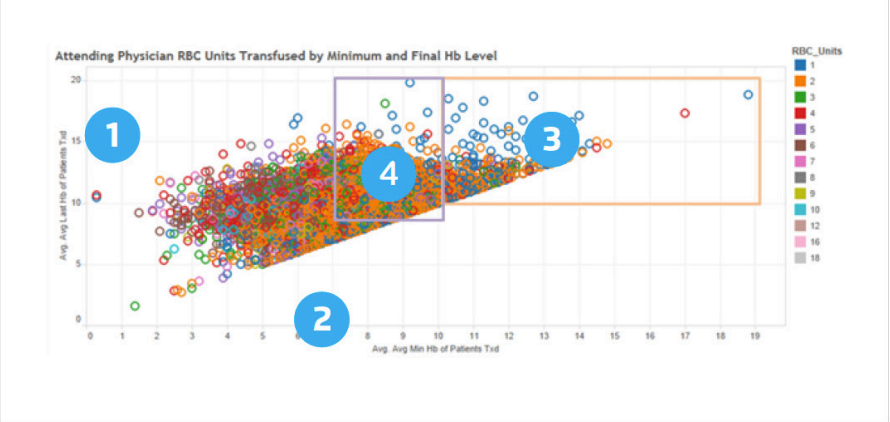

Figure 2: Attending physician RBC units transfused by minimum and final Hgb level sample visualization

- 15,601 patients avoided exposure to red blood cells by transfusion.

What's Next

UnityPoint Health plans to expand its use of predictive analytics to continue improving the care it provides patients.

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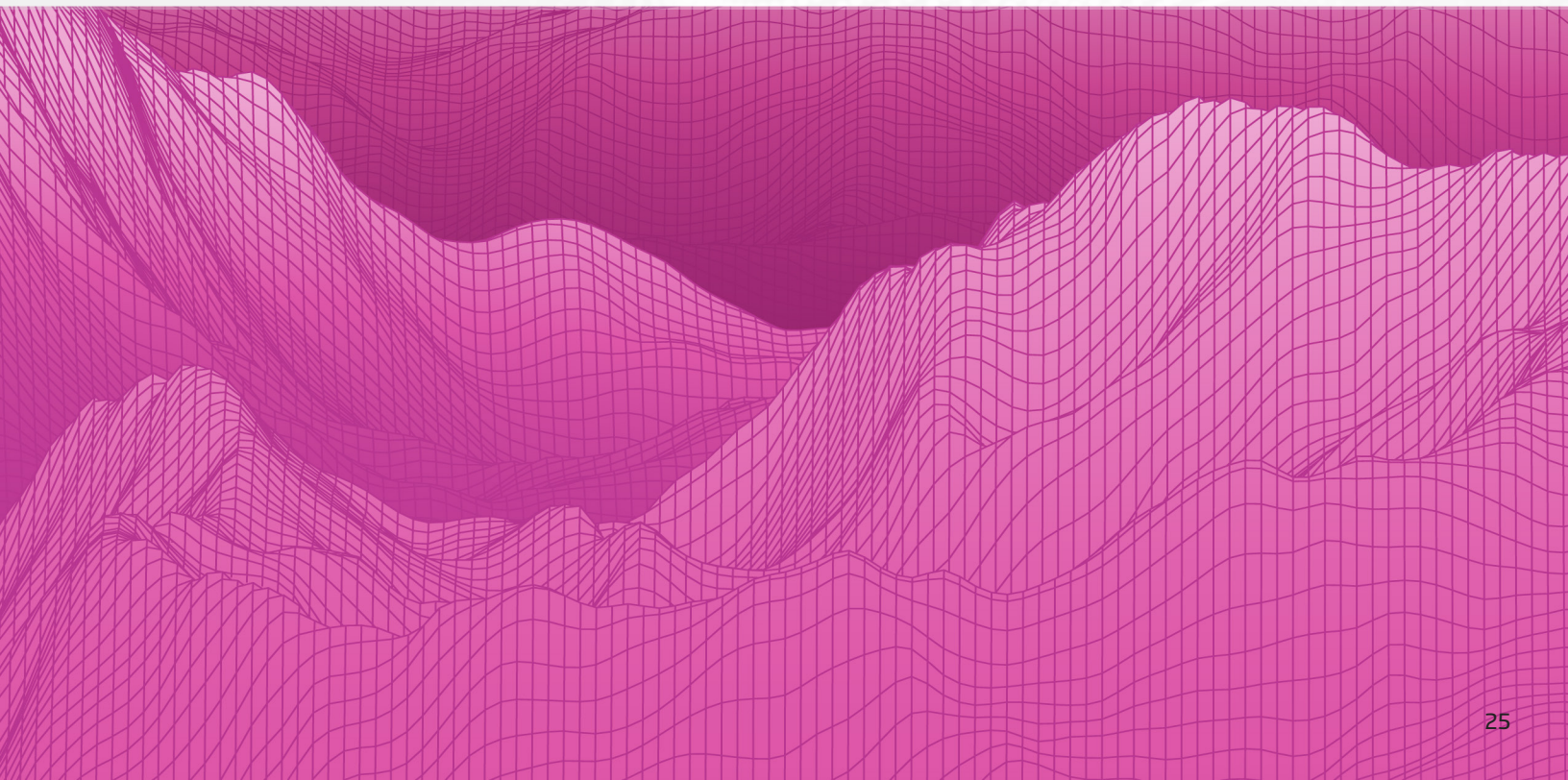
QUALITY

Improving Clinical Operations and Population Health with Data

Six Customer Success Stories



To provide the highest quality, most appropriate, and most cost-effective care for patients, healthcare organizations must transform around value-based care. Making the associated clinical, operational, and financial changes will require a data- and analytics-powered strategic toolset. Organizations will adapt and thrive when they combine data and strategy to focus population health efforts on the most impactful initiatives, based on populations and contracts. Within this vital shift to value-base contracts, good performance against quality measures is central to success. Yet, while governmental and commercial- payer measures aim to improve patient outcomes via emphasis on preventive and evidence-based care, these measures have also proved to be an administrative burden for many organizations.

In response, systems must simultaneously raise their performance against specific measures while streamlining the effort required to calculate and report it. From negotiating at-risk contracts to improving quality measures, population health initiatives require a flexible, adaptable data analytics platform.

Additionally, catching up on quality improvement is critical. Virtual care demand, over-crowded ICUs, labor vs. utilization swings, employee safety, and supply shortages are just some of the issues facing healthcare systems. These are in addition to the financial pressure from billions of dollars in lost revenue during COVID-19. Health systems must renewed their commitment to quality and safety through constant vigilance, joint accountability across disciplines, and culture changes.

Every organization strives for excellence, and many achieve it in specific areas or pilots. But measurable, sustained, system-wide improvement requires a commitment to a data-informed, continuous improvement culture—supported by world-class best practice, analytics, and adoption systems. Here is how the most successful organizations are tackling these quality-related problems.

Improving Clinical Operations and Population Health: Success Stories

Contents

Data-Informed Population Health Reduces PMPM

ACO Success Based on Performance

ACOs receive bonuses or penalties for performance and operate in high-risk environments. Success as an ACO requires the use of robust information technologies to identify opportunities across clinical, financial, and operational domains to reduce Per Member Per Month (PMPM) costs, achieve higher quality scores, and improve patient outcomes in areas such as readmissions.[1,2] MemorialCare's goal was to continue advancing its care management programs to enhance performance and ensure it was engaging with the right patient population to prevent and mitigate negative impacts from COVID-19.

Missing Data Impacts Improvement Efforts

MemorialCare's vast service area includes patient populations whose healthcare needs are highly variable. Its providers deliver individual patients high-quality care based on each patients' needs; however, it lacked access to a tool that allowed the organization to easily collate data and perform analytics. This made it burdensome to identify the number of patients with care gaps and challenging to identify the right patients for patient engagement, identify PMPM cost drivers, and evaluate the impact of care on contract performance. Variable structure and patient needs created challenges in allocating the care management and provider-support resources required to improve performance. MemorialCare needed a data and analytics solution that would enable more efficient identification of patients that could benefit from care management and the drivers of PMPM costs and enable the organization to maximize the impact of engaging high- and rising-risk patients in care management.

Reducing PMPM Costs Improves ACO Success

MemorialCare leverages the Health Catalyst® Data Operating System (DOS™) platform and a robust suite of analytics applications, including a PMPM root-cause analytics accelerator, to gain insight into performance. The improved data helps the organization support providers and care managers to ensure patients receive the right care in the right location, prevent unnecessary overutilization, and improve contract performance.

The organization performs comprehensive, deep-dive analyses to reveal the factors that drive PMPM performance, identify areas for improvement, and manage costs to realize savings and avoid losses. MemorialCare uses the analytics accelerator to review claims-based data and evaluate the drivers of PMPM performance. The organization can visualize an in- and out-of-network view of payment trends, enabling it to understand how the providers, members, and specialty areas contribute to overall PMPM payment performance, providing insight into opportunities for reducing PMPM.

MemorialCare's clinically integrated network (CIN) supports primary care providers in delivering needed primary and specialty care. Network and provider performance targets and improvement goals align with the goals in its various contracts. The organization allocates its care management team members to support specific regions, providers,

and patients within the CIN. MemorialCare uses standard work for care transitions and ongoing care management activities. The care management team leverages patient risk-stratification data to identify high- or rising-risk patients for outreach, engaging patients in care management activities that ensure the patients receive the right care in the right location. MemorialCare uses a COVID-19 risk for mortality algorithm to identify and risk-stratify members at the highest risk of mortality from COVID-19. Care managers can visualize at-risk members and can quickly prioritize member lists for outreach.

MemorialCare analyzed its data to identify opportunities for improvement, including emergency department (ED) utilization, network leakage, and brand-name prescription use. For example:

- The data showed that patients with newly diagnosed conditions, rather than those with a known chronic condition, often sought emergency care over primary care. To address this, the care management team contacts newly diagnosed patients weekly to assess their current understanding of their condition, offer education, and support patients in accessing needed primary and specialty care, avoiding overutilization.

- An analysis of network utilization data indicated that self-directed referrals and provider-directed referrals for specialty care were areas of leakage. The care management team proactively educated both patients and providers to better manage specialty referrals to avoid costly out-of-network use

- Data analysis also revealed that high pharmaceutical costs and off-label use were additional opportunities to reduce costs. The pharmacist and care management team collaborated to improve medication management and safely transition patients to generic equivalents.

The care management team and providers meet monthly to review data to increase understanding of performance, continually improve processes, learn from successes, and identify future improvement opportunities.

Results

MemorialCare's data-informed care management interventions have demonstrated the desired results. Patients receive the right care in the right location, and the organization has reduced overutilization and improved contract performance. The COVID pandemic also reduced utilization of health care services. Results include:

- 66 percent of MemorialCare's ACO individuals at extremely high risk of severe COVID-19 illness were engaged by care management.

- $2.3M in cost savings in 12 months, the result of a 9.1 percent relative reduction in PMPM costs.

- In addition to the PMPM cost reductions, MemorialCare observed reductions in other utilization measures.

  - 25.5 percent relative reduction in ED visits per thousand members per year (PKPY).

  - 24.3 percent relative reduction in laboratory and pathology tests PKPY.

  - 18.9 percent relative reduction in high-cost imaging.

  - 17.7 percent relative reduction in inpatient admissions PKPY.

  - 14.1 percent relative reduction in 30-day readmission PKPY.

What's Next

MemorialCare will continue to use its data and analytics to identify opportunities to improve the effectiveness of its care management programs while also improving contract performance.

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AI-Enabled Care Management Reduces Healthcare Spending by $32.2M

High Cost of Treating Patients with Chronic Conditions

More than 90 percent of the $3.8 trillion the U.S. spends annually on healthcare is for people with chronic health conditions.1 Care management is key to decreasing unnecessary healthcare utilization, improving clinical outcomes, increasing quality of life, and lowering healthcare spending. 2

Identifying Patients Most Likely to Overuse Healthcare Services

UnityPoint Health recognized patients with complex chronic health conditions were overutilizing healthcare services, particularly when transitioning from hospital admission to an ambulatory care setting. Yet despite having access to large volumes of data, clinicians lacked timely insight into care provided across acute and ambulatory settings.

UnityPoint Health needed to be able to effectively identify patients with high or rising risk of worsening health conditions that often result in non-urgent ED visits or unplanned hospital admissions. Such visits and admissions limit the ability of its care management teams to intervene and provide the care patients needed. The organization desired to integrate AI into its analytics processes to predict which patients could benefit from enrollment in its care management program. The care management program enables care managers to intervene and prevent unnecessary healthcare utilization and reduce spending.

Data Optimization Decreases Unnecessary Healthcare Utilization

UnityPoint Health established a framework for care coordination across acute and ambulatory care settings with integrated care management programs that share common goals and tools across the organization. The organization leverages the Health Catalyst® Data Operating System (DOS™) platform and a robust suite of analytics applications to establish a single source of truth across its disparate systems and gain powerful insight into patient characteristics and healthcare utilization patterns. The analytics team and acute and ambulatory clinicians collaborated to develop and enhance the organization's analytics tools, leveraging data to decrease unnecessary healthcare utilization and ensuring data are shared across care settings for care management program optimization and expansion.

AI Tools Enable Effective Care Management

UnityPoint Health uses numerous AI tools that incorporate chronic health data, social data, the probability of admission, and readmission risk after

discharge from the hospital to risk-stratify patients and predict which patients are at high or rising risk for unnecessary healthcare utilization. The AI tools enable care managers to identify patients and prioritize them for care management engagement effectively. UnityPoint Health utilizes the following tools for efficient care management:

- Readmission Heat Map: risk-stratifies patients with inpatient and observation stays, identifying the risk of readmission within 30 days of discharge. The map indicates the specific days during which the patient is most at risk of requiring services. The insight provided by the Readmission Heat Map allows clinicians to visualize risk and act upon the information, adjusting the intensity and timing of interventions, ensuring the proper care is provided at the right time and in the right location to optimize outcomes.

- Population Health Toolkit: provides longitudinal details of the patient's care experience, including hospitalizations, recent discharges, upcoming appointments, and missed appointments. Clinicians can gain detailed information from the toolkit about patients who could benefit from enrollment in a care management program. Clinicians also use the Population Health Toolkit to manage patient panels. Clinicians can quickly review the patient's chronic conditions and recent ED visits or hospital admissions, allowing them to identify and address care gaps.

- Leadership Dashboard: provides a holistic view of care management operations and outcomes, including caseloads, enrollment rates, the total number of patients enrolled, graduation rates, and referral rates, allowing leaders to efficiently monitor the program each day.

- Outcomes Analyzer: enables real-time visibility into program outcomes, including system-level, region-level, and clinic-level performance. The organization can evaluate and compare the number of unnecessary ED visits and hospitalizations before patient enrollment in the care management program and after graduation. UnityPoint Health performs ongoing evaluations of program performance and quantifies patient outcomes and healthcare costs avoided.

Results

In the 30 months since the care management program's inception, UnityPoint Health has substantially decreased healthcare utilization and the costs of care for patients who complete the program. The organization has reduced healthcare spending by more than:

- $32.2M, the result of a 54.4 percent relative reduction in hospital admissions, and a 39 percent relative reduction in ED visits.

- Patients gained 11,000+ more days at home and had nearly 2,000 fewer ED visits.

What's Next

UnityPoint Health will continue its efforts to enhance and refine the care management program and plans to expand the use of AI and analytics to improve the care provided to its most vulnerable patients, improving outcomes while reducing unnecessary healthcare utilization and costs.

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Innovative Care Management Program Avoids Nearly $16M in Costs and Transforms Lives of Super-Utilizers

The Queen's Medical Center (QMC) was the site of nearly 60 percent of all emergency department (ED) visits by people who are homeless—and some visited the ED every day. A disparate number of resources went towards treating these patients, and they would have received better care for their needs outside the ED. To improve patient outcomes and reduce costs, The Queen's Health Systems developed a program to improve outcomes for this unique patient population, leveraging its analytics platform, payer data, and patient flow data to evaluate the system's success and efficiency.

Health Inequities Linked to Homelessness

Nationwide, patients who are homeless visit the ED at a rate 4.8 times higher than patients who are not homeless, and people who are homeless die 12 years earlier than the general U.S. population.[1] Chronic health conditions in the homeless population are exacerbated by frequent exposure to communicable diseases, violence, and malnutrition.[2] Homelessness is associated with health inequities, and care management is often needed for patients who are homeless. Hawaii's homelessness rate is the second-highest in the nation.

ED Super-Utilizers Consume Disparate Resources

Nearly 60 percent of all ED visits at QMC were patients who were homeless. Some patients visited the ED every day. These super-utilizers—patients with 15 or more ED visits in a quarter, three admissions to QMC in a quarter, or 15 days of hospitalizations in a quarter—were consuming a disproportionate share of resources and had needs that could be better met outside the ED.

QHS had enrolled these patients into its programs for high utilizers but had not achieved the positive impact on patient outcomes, costs, and patient experience that it desired. The organization needed a new care management strategy that would allow it to respond to the needs of this unique patient population more effectively.

Care Management Improves Patient Outcomes and Reduces Costs

QHS developed the Queen's Care Coalition, an innovative care management program, to address the needs of super-utilizers. In addition to utilization criteria, QHS screens patients for social determinants impacting health outcomes, including employment, food insecurity, housing instability, poverty, incarceration, and violence. When QHS finds patients with multiple factors influencing their health and wellbeing, it enrolls the patients in the care management program.

Community health workers (CHWs) first meet with these high-need, high-cost patients while they are in the ED or admitted to the hospital. After establishing trusting relationships, CHWs provide intensive, post-discharge navigation for these patients for 30 to 90 days. The CHWs withhold judgment of the patients they partner with and take a strength-based, harm-reduction approach to improving the patients' health.

The CHWs meet patients face-to-face one to three times a week. Meetings can take place in parks, on sidewalks, and in homeless encampments—wherever the patient may be. CHWs work with patients to meet the goals and needs that are the most important to them. Patients are not required to stop using drugs to receive services and are not penalized or removed from the care management program for missing an appointment.

CHWs connect patients with medical and behavioral health services as well as services in the community to ensure patients receive the right care in the right place and prevent unintentional duplication of services. The CHWs schedule and attend medical, behavioral health, and benefit appointments with their patients; assist with financial and non-financial benefit applications; connect patients to low-barrier housing/shelters; and provide skills training to foster independence. When the patient is ready, CHWs perform a warm handoff to community partners. The CHWs check back in with patients for six months, reengaging with the patient if additional services are needed.

QHS leverages the Health Catalyst® Data Operating System (DOS™) platform for data and analytics. Housing status data for Queen's Care Coalition patients is entered into the Instant Data Entry Application (IDEA), ensuring the data is readily available for analysis and reporting in DOS. The organization is able to use payer data, patient data, and patient flow data for ongoing program evaluation and data-informed decisions.

Results

Queen's Care Coalition is transforming lives while simultaneously decreasing utilization and costs. QHS achieved the following results:

- $16M in costs avoided, the result of a:
- 68.5 percent relative reduction in the number of days patients spent hospitalized.
- 22.8 percent relative reduction in length of stay.
- 43.8 percent relative reduction in readmission rate.
- 700 fewer ambulance transports, freeing up ambulances for medical emergencies.
- 1,425 fewer ED visits, improving ED capacity for patients in need of emergency care.
- 61 percent of patients who were homeless at program enrollment had secured housing when discharged from the program.

Improved care coordination positively impacted the payers' costs for patients enrolled in the program. The total cost of care incurred by payers was reduced by $624K during the three six-month periods after patient enrollment in the Queen's Care Coalition program.

One patient whose life was transformed by the Queen's Care Coalition program had utilized the ED 16 times in three months with four hospitalizations. The patient had lived in a parking lot for 10 years and had a mental health diagnosis and history of substance abuse. He lacked connections to community resources and had refused mental health and substance abuse treatment. He was not consistently taking his prescribed medications.

QHS enrolled the patient in the Queen's Care Coalition program. The patient's CHW:

- Provided intense navigation for 30 to 90 days, helping the patient recognize strengths and establish goals.
- Assisted the patient in obtaining a short-term medical respite bed.
- Attended the patient's appointments with him.
- Aided him with signing up to receive food stamps and Social Security.
- Helped the patient improve his hygiene and

secure permanent housing.

- Once housed, took him grocery shopping and taught him how to cook.

After three months, the patient graduated from the program. He remains housed, attends his medical appointments on his own, and takes all prescribed medications. He has not returned to the ED for more than two years.

Queen's Care Coalition has improved health equity and transformed lives. We have seen people who were homeless and routinely assaulted reshape their lives. They're now living independently, going to their medical appointments, adopting pets—living full, healthier lives.

What's Next

QHS plans to expand Queen's Care Coalition and scale its program across the health system, expanding its reach and ability to transform more lives while also reducing healthcare costs.

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Improved Care Transitions Reduces Readmissions, Saving $3.2M Annually

Hospital readmissions cost Medicare $26 billion annually. However, some of these readmissions are potentially preventable. Allina Health had previously realized significant reductions in readmissions, but it desired to uncover additional ways to further reduce readmissions. The organization leverages its data and analytics platform to effectively identify the factors influencing care transitions to determine specific improvement opportunities and evaluate the impact of interventions on outcomes. Allina Health's readmission reduction efforts are delivering the desired results.

Exploring Care Transition Data

More than 3.8 million adult hospital patients are readmitted every year, with an average readmission cost of $15,200.[1] Hospital readmissions cost Medicare $26 billion annually.[2] Allina Health had previously focused on reducing potentially preventable readmissions and had realized significant reductions. While it achieved significant improvement, the organization recognized it had the opportunity to address new challenges and further improve performance.

Allina Health recognized that hospital discharge and follow-up activities weren't as consistent as they could be throughout the organization. In addition, evolving patient patterns related to the COVID-19 pandemic presented new challenges to post-discharge follow-up. The organization desired to further learn from its data, scale its analytics-driven readmission reduction efforts, and improve care transitions for its patients.

Improving Care Transitions to Reduce Unnecessary Readmissions

High-value data and analytics are a cornerstone of Allina Health's readmission improvement efforts. The organization leverages the Health Catalyst® Data Operating System (DOS™) platform and a robust suite of analytics applications, including the Readmissions Explorer analytics accelerator, to:

- Identify and understand the factors influencing readmissions.
- Determine specific improvement opportunities.
- Evaluate the impact of changes on outcome measures of interest.
- Monitor the impact on balance measures like length of stay, mortality, and patient satisfaction.

The organization also uses its trusted, high-value data and analytics to explore hypotheses about readmissions and potential improvement

opportunities.

Using the Readmissions Explorer analytics accelerator, Allina Health can visualize readmission performance, including risk-stratified identification and segmentation of patients at risk for readmission, enabling care managers to target interventions to those patients at the highest risk of readmission. The organization can visualize readmissions by the level of care, discharging department/care unit, provider, primary problem, discharge disposition, and payer. Providers and care managers can immediately identify the number of previous inpatient visits each patient has had within the last seven and 30 days.

Redesigning Discharge Planning

Allina Health redesigned the timing of its discharge planning, initiating discharge planning at the time of admission. Accurate medication reconciliation is a critical component of discharge planning, and the organization ensures medication reconciliation occurs within 24 hours of admission. Care managers and providers collaborate to develop effective discharge and transition-of-care plans for each patient. Discharging providers use a standard discharge note and an order in the EMR to document and communicate patient needs and medication changes, ensuring primary care providers have the critical information required to effectively manage the patient and prevent an unnecessary readmission.

Monitoring Preventable Readmission

Allina Health uses its risk-adjusted data to calculate and monitor a potentially preventable readmission (PPR) actual/expected (A/E) ratio. The organization can monitor the PPR A/E for the entire health system and each of its 11 hospitals. Allina Health uses the PPR A/E and data in the analytics application to identify and respond to changes in performance. For example, initially care managers connected with patients within two days of discharge, with the goal of scheduling patients to be seen within five days of discharge. Allina Health was able to identify that a meaningful proportion of follow-up appointments were occurring on days six and seven. Using its data platform and analytics, the organization was able to determine that seven-day follow-ups still positively impacted readmissions, allowing the organization to adjust its target.

Responding to COVID-19 Readmissions

The organization—including its data platform, analytics, and data analysts—are incredibly agile, responding to changes in patient conditions and needs and integrating changes into its data and analytics. With the emergence of COVID-19, the organization employed analytics to identify patients discharging from the hospital who had COVID-19, customizing the discharge follow-up activities to ensure the patients received the right support.

During the COVID-19 pandemic, primary care providers quickly adapted to provide telehealth, adding virtual and phone visits. Allina Health integrated these new visit types into its analytics application, enabling visualization and evaluation of the impact of visit type on timely follow-up and hospital readmissions. Initially, the organization wasn't confident that virtual and phone visits would prevent readmissions. However, its data and analytics demonstrated a positive impact on readmissions, which Allina Health was able to use to engage its care teams in ensuring patients received a virtual or phone visit after discharge.

Illuminating Care Gaps

Allina Health's data illuminated a gap related to patients admitted to medical units whose primary problem was a mental health diagnosis. The organization leveraged analytics to identify these patients, evaluate their outcomes, and support planning for how to better meet these patients' needs. Care managers now reach out to these patients within two days of discharge, conduct an initial assessment, and ensure the patient has a follow-up appointment with a specialist and/or primary care provider, as well as transportation to the appointment.

Leveraging high-value data and analytics, Allina Health identified a gap in follow-up for patients who

were not discharged immediately to their homes. Patients who had an additional step through a third party, such as a rehabilitation facility or skilled nursing facility (SNF), were not consistently receiving timely follow-up after discharge from the SNF. Care managers now receive a list of patients discharged from an SNF from the analytics application, ensuring patients are seen within seven days of discharge from the SNF.

Timing End-of-Life Discussions

While providers at Allina Health were engaging their patients in discussions about treatment near the end of life, the organization's data helped it gain new insights regarding the timing of those discussions and the impact on outcomes. The organization's data demonstrated that serious illness conversations—conversations with seriously ill patients about their values and goals—were most effective when they occurred at least four to six weeks before a serious illness event. The organization developed a custom serious illness risk model, using its analytics platform and a subject area data mart specific to that model to apply the risk score to all Allina Health patients. The custom risk model identifies patients upstream from their deterioration, signaling to the provider the best time to facilitate a serious illness conversation with the patient.

Results

Allina Health's data-informed readmission reduction efforts are delivering the desired results. In just one year, the organization achieved:

- $3.2M in total variable cost savings, the result of avoiding 420 readmissions by supporting patients with transitions of care and facilitating five-day or seven-day follow-ups.
- 71.5 percent of patients completed follow-up within the seven-day period.
- 0.83 PPR A/E ratio for patients completing either a five-day or seven-day follow-up, a ratio that was 31.4 percent lower than patients without follow-up.

The effectiveness of Allina Health's work to improve care transitions can be seen in a recent patient experience. A patient was admitted to the hospital for suspected bacterial endocarditis. The patient was admitted to the hospital for treatment on a Friday and discharged the following Monday. The care manager contacted the patient within two days of discharge, ensuring he was receiving intravenous antibiotics required to treat his infection at home. To further reduce the likelihood of readmission, the care manager scheduled the follow-up appointment with his primary care provider on Friday, where he received education about and adjustments to his care.

What's Next

Allina Health continues to leverage its high-value data and analytics to improve performance. The organization has visualized the care ecosystem across the entire health system's geographic footprint. It uses the ecosystem visualization to assess care demands and availability of services (hospitals, primary care and specialty clinics, long-term care, skilled nursing facilities, etc.), supporting strategic planning and performance improvement.

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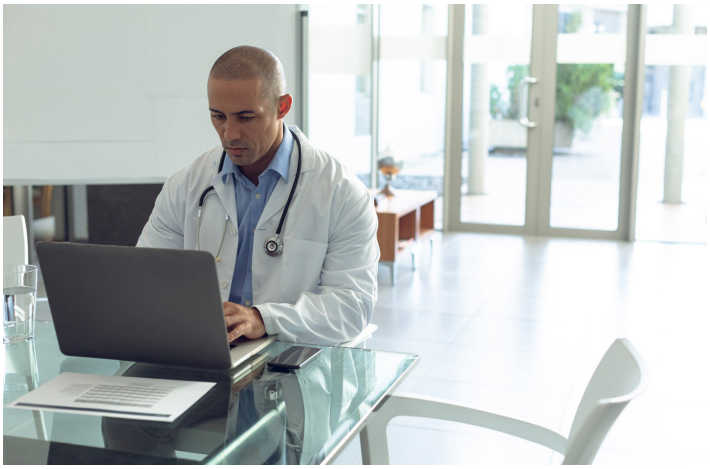
Data-Informed MIPS Improvement Efforts Drive Improved Quality Scores and Increased Revenue



MIPS Improvement Results in Higher Incentive Payments

Healthcare organizations are incentivized by CMS to use MIPS by offering organizations payments for meeting certain performance thresholds. Organizations that reach the exceptional performance threshold with MIPS improvement receive a portion of the hundreds of millions of dollars in available incentive payments.[1] However, CMS has continually increased the performance thresholds that participating organizations must achieve to avoid penalties and qualify for incentive payments.

Difficulty Identifying Opportunities to Increase MIPS Scores

Baptist's MIPS scores were not as high as the organization desired, and the product it used to monitor and report MIPS performance could not be used for improvement. The product relied on an application programming interface, but it was a "black box" over which Baptist had minimal control. The product provided Baptist's MIPS scores, but Baptist couldn't drill down into the data to understand the reasons for its score, so the organization couldn't identify improvement opportunities.

When the organization made process changes, it took weeks for the data to make its way through the system and for scores to update, making it difficult—and at times impossible—to evaluate the impact of process changes on outcomes. Furthermore, Baptist had minimal control over submission data and was unable to maximize MIPS scores and ensure the points assigned accurately reflected the expert care provided to its patients. The organization needed actionable, high-value data and analytics that would allow it to accelerate MIPS performance.

Improving MIPS with Actionable, Robust Data

To meet its need for actionable, robust, high-value data and analytics for both MIPS reporting and improvement activities, Baptist decided to sunset the previous product used at the organization and implement the Health Catalyst MeasureAble application. MeasureAble is a quality measures solution that combines complete data, measures, visualizations, and workflows (measurement, improvement, and submission) into one comprehensive system. MeasureAble calculates performance, displays a measure performance dashboard, and includes a submission engine that submits data directly to CMS.

After implementing MeasureAble, Baptist now has a single, actionable source of truth for MIPS. The comprehensive measures engine and data visualization dashboard allows Baptist to proactively monitor complete performance metrics across different levels of the organization. Baptist uses the analytics application as part of its daily operations to:

- Effectively monitor, improve, and submit quality performance data.
- Establish a performance target.

- Determine the number of care gaps that must be closed to achieve the exceptional performance bonus.

With this data, the Baptist teams have the option to perform pre-visit planning activities to determine any gaps in care prior to the patient visit and is currently being used to identify any patient exceptions to the measures to accurately opt them out of the measure to impact performance. Additionally, Baptist visualizes performance for each measure, including current performance and the number of gaps that must be closed to meet improvement goals. The organization can drill down to the provider, population, and patient level, gaining actionable insights to close gaps and improve MIPS performance.

Using the analytics application, Baptist can identify why gaps were occurring and then intervene to correct performance. For example:

- The organization gained a better understanding of MIPS measures, including the importance of documentation timing for diagnosis codes, medications, and exclusion and/or exemption criteria on MIPS performance. Baptist provided education to end users, including providers, practice leaders, and frontline team members about the importance of discrete data capture in the structured note and how to identify documentation sequence to impact MIPS performance.

- Some patients appeared to have gaps in care when the patient should have been excluded from the measure. The organization standardized the documentation of exceptions.

- Often, patients received appropriate care, but providers were documenting the care in free-text notes instead of discrete fields in the EHR. Baptist standardized and streamlined documentation expectations, created how-to guides for every measure, and ensured providers were aware of the documentation source for each measure.

- The organization identified that its EHR was missing codes that should have been available to meet measure requirements, so Baptist worked with its EHR vendor to add the missing codes.

Results

Baptist's data-informed MIPS improvement efforts are delivering the desired results. The organization achieved the following results:

- 92.94-point composite MIPS score, achieving exceptional performer quartile performance, qualifying for the exceptional performance bonus, and increasing revenue.

- 38 percent relative improvement in MIPS quality score, the result of a 14.2-point increase in quality points.

- 90 percent relative increase in quality points for the number of patients 18 years and older with nonvalvular atrial fibrillation or atrial flutter who were prescribed warfarin or another FDA-approved anticoagulant drug for the prevention of thromboembolism.

- 72 percent relative increase in quality points for the number of patients 18 years and older with a diagnosis of coronary artery disease seen within a 12-month period who also have a prior myocardial infarction or a current or prior left ventricular ejection fraction < 40 percent, who were prescribed beta-blocker therapy.

- 52 percent relative increase in quality points for the number of patients 18 years and older receiving an appropriate routine interval surveillance colonoscopy, who had a previous diagnosis of adenomatous polyp(s).

- 23 percent relative increase in quality points for the number of patients considered at high risk of cardiovascular events who were prescribed or

were on statin therapy during the measurement period.

What's Next

Baptist continues to leverage the analytics application for improvement and is engaging specialty providers in improvement efforts. The organization is confident it will achieve the exceptional performance quartile again next year and bring in increased revenue by qualifying for MIPS incentives.

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Closing Care Gaps at the Point-of-Care Yields 4X Value Realization

Closing Care Gaps Increases The Quality Of Patient Care

PCPs spend more than half their workday—nearly six hours each day—interacting with the EHR.[1] However, estimates suggest PCPs would need to spend more than 20 hours a day on providing all the acute, chronic, and preventative care for a panel of 2,500 patients.[2] CHNw, an integrated healthcare system, is dedicated to continuous improvement and closing care gaps for the patients it serves.

Reducing Burdensome Documentation Processes

CHNw was committed to ensuring patients received appropriate primary and preventative care and to succeed in value-based care. Still, burdensome documentation processes in the EHR made closing care gaps and improving performance difficult. Data about care gaps were not embedded at the point of care, requiring providers and office staff to spend precious time manually searching the EHR to find the data of interest. The organization needed a solution that would allow it to reduce the administrative burden on its providers and office staff, help in closing care gaps, and improve value-based care performance.

Data And Analytics Help Uncover And Close Care Gaps

CHNw leveraged the Health Catalyst® Data Operating System (DOS™) platform and a robust suite of analytics applications, including the Health Catalyst Embedded Care Gaps™ application, to make care gaps visible to providers within their workflow, decrease the administrative burden on care teams, and improve value-based care performance.

The Embedded Care Gaps application is a fully EHR-embedded patient-visit solution powered by the Health Catalyst MeasureAble™ application, including a world-class rules engine, providing tailored patient information to providers at the point of care. With this application, agendas for each visit are automated, and actionable procedure orders are pre-populated, reducing the time providers must spend searching for care gap data, and decreasing the number of clicks providers must perform to place orders and document the care provided. When providers open the patient visit in the EHR, the application presents them with automated decision support for each patient's care gaps so providers can accurately prep for, then efficiently manage, the visit with minimal effort.

CHNw uses the analytics application to easily track and measure performance and reporting requirements year-round, assisting in closing care gaps and improving contract performance before measure deadlines.

Results

CHNw leveraged Embedded Care Gaps to provide critical information to providers at the point of care. The organization has improved provider workflow,

increased provider satisfaction, closed thousands of care gaps, and improved value-based care performance—all at a fraction of the cost that would have been required for EHR tool development.

Providers using the Embedded Care Gaps application closed more care gaps and generated more revenue than providers that weren't using the application. Results from just ten percent of providers using the application include:

- >373K care gaps closed in just six months.
- 4X value realization.

CHNw evaluated the impact of Embedded Care Gaps on patient lives and provider workflow and satisfaction. An additional consideration in evaluating the initiative is the benefits achieved from a revenue perspective versus the application costs. CHNw's evaluation netted a 4X value realization.

What's Next

CHNw plans to expand the Embedded Care Gaps application to all its providers to ensure they have the information they need within their workflows to close care gaps and effectively and efficiently improve care quality and improve value-based contract performance.

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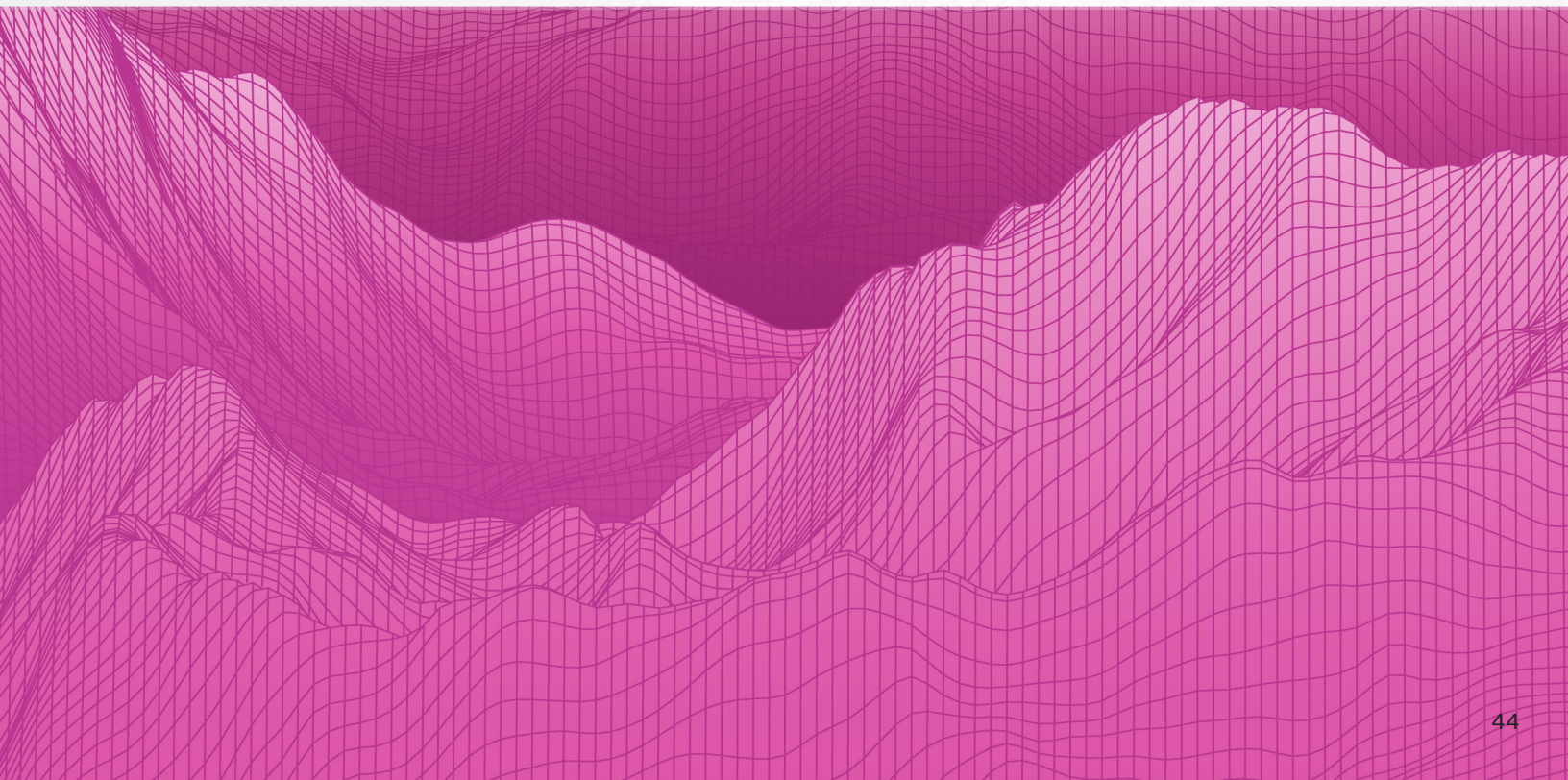
REVENUE

Addressing Revenue Challenges Using Data

Six Success Stories



Healthcare systems routinely confront significant revenue challenges. These financial obstacles include margin compression, increasing costs, the threat of increased debt service, fragmented business models, and the associated loss of revenue. As a result, many organizations face declining cash flow, limiting their ability to fund capital initiatives and other strategic investments.

Focusing on improving billing and collection processes can accelerate cash flow and significantly increase the availability of cash funds while also improving patients' financial experience. Healthcare systems can achieve meaningful financial improvement in two impactful ways:

- Managing the revenue cycle to reduce bad debt and denials.

- Improving clinical documentation and coding to confidently charge and collect for the services performed—while adhering to federal regulations and commercial contract rules.

Additionally, effective patient access is critical to revenue streams. Here is how the most successful organizations are tackling these revenue-related problems.

Addressing Revenue Challenges Using Data: Success Stories

Contents

Denial Management's Improvement Effort Produces $14.99M Reduction in Denials

At MultiCare Health System, the processes for denial management were not as effective as they could be, negatively impacting net patient revenue and financial performance through millions of dollars in adjustments. While only two-thirds of denials are recoverable, nearly 90 percent are preventable. MultiCare looked at improving denial management as an opportunity to improve appropriate revenue capture for services provided. Through targeted improvement efforts that included standardized workflows and increased data visibility, the health system is improving the root cause of denials.

Denial Management: A Critical Component of the Revenue Cycle

MultiCare Health System, an integrated healthcare delivery system, is comprised of five hospitals and numerous primary care, urgent care, and specialty care service organizations that employ an extensive network of providers. Throughout its health system, MultiCare experienced variability in the performance of key activities required to ensure appropriate reimbursement and maximize revenue. The health system looked to its lack of uniformity in the denials management process as an opportunity to improve overall revenue.

Denial management, the process of following up on and reducing denials and rejected claims from payers, is a critical component of an effective revenue cycle management program.[1] Only two-thirds of denials are recoverable, but nearly 90 percent of claim denials are preventable.[2] Despite the importance, it can be difficult for revenue cycle teams to manage denials while also managing other high-priority projects.

Poor Data Visibility Limits Improvement Efforts

MultiCare has a comprehensive revenue cycle management plan that helps ensure provided care is appropriately billed and appropriately reimbursed. Unfortunately, the processes for denial management were not as effective as they could be, resulting in millions of dollars in adjustments, which negatively impacted MultiCare's net patient revenue and overall financial performance.

MultiCare lacked visibility into denials management. While reports could be manually developed using data in the EHR, the reports were largely retrospective and provided information at a summarized level, lacking the level of detail needed to assess potential opportunities for improvement. Additionally, performance of advanced beneficiary notifications, data on screenings conducted for medical necessity, and payer notifications varied across the organization. Clinicians were largely unaware of the impact of their documentation on denials, compounding the problem.

MultiCare needed to ensure it was appropriately reimbursed for services, and it needed to reduce the millions of dollars lost to denials and write-offs. MultiCare needed a solution that would ensure ready access to specific, timely, and actionable denial data, in addition to ensuring workflow impacting denials was consistent across all care settings.

Standard Workflows and Improved Visibility Strengthens Denial Management

MultiCare organized a denials management workgroup. Lead by the Patient Financial Services (PFS) Director, this interdisciplinary team includes representatives from utilization review, patient financial services, IT, patient access, business office, coding, chargemaster team, and customer service.

In its efforts to reduce denials and avoidable write-offs, MultiCare expanded its organizational focus beyond recovery of denials, focusing improvement efforts on fixing root causes, thus preventing denials in the future. MultiCare improved staff access to denials data, the quality and timeliness of that data, and invested in process improvement, engaging the interdisciplinary team in developing standard processes for workflows that impact hospital billing and denials.

The workgroup developed and implemented standard workflows for screening for medical necessity, issuing of advanced beneficiary notices, securing appropriate payer notification/authorization, and screening of patients for the appropriate level of care. The denials management team also evaluated workflows and developed best practices for PFS, utilization review, and screening patients for the appropriate level of care. To support this, a denials management playbook—a written guide that provides guidance and standard processes for each type of denial—was developed and distributed throughout the revenue cycle. The EHR at MultiCare was also modified to ensure the accurate posting of denials, regardless of type.

Additionally, when assessing the MultiCare's utilization review processes, the workgroup identified that the utilization review team was under-resourced, contributing to increased denials. The utilization review team was subsequently resourced more appropriately, ensuring members had adequate resources to perform the needed work.

To further support effective denials management and improve visibility, MultiCare turned to the Health Catalyst® Analytics Platform, including the Late-Binding™ Data Warehouse and broad suite of analytics applications. Using the Revenue Cycle Explorer Hospital application, MultiCare's revenue cycle analysts could quickly and easily identify trends and variances, pull ad hoc reports, and address root causes of performance issues. The application also supports effective denials management and enables users to review data by variance, denial code, location, payer, provider, and CPT code (used for professional billing)—all of which supports root cause identification and interventions to prevent future reoccurrences.

To improve application utilization and efficiency, MultiCare expanded access to the analytics application, providing access to leaders and clinicians. Guided by recommendations from the denials management workgroup, the health system employed closed-loop analytics, building access to the application into the EHR.

As access to the analytics application improved, MultiCare supported operational leaders and clinicians in use of the application and data to improve denials by providing training. The training includes instructions on how to use the analytics application and EHR to investigate denials, including types and typical causes, and gather information regarding the impact denials have on the financial performance of the organization. For the first time, leaders have visibility into how their department's performance affects MultiCare's bottom line, and clinicians have visibility into how their individual departmental performance impacts revenue.

Results

Aided by analytics, improved access and the focused improvement efforts at MultiCare have decreased the frequency of denials, improving revenue capture for services provided. MultiCare is improving the root causes of claims denials, leading to a reduction in the total number of denials:

- $14.99M reduction in denials and avoidable write-offs.

MultiCare has more than doubled the number of people using the analytics application. By providing increased access, education, and ongoing support, the health system has enabled its leaders to proactively prevent denials in hopes of sustaining the gains well into the future.

What's Next

Having improved the processes for hospital billing, MultiCare plans to explore opportunities to improve professional billing through focused workflow improvements, which will be crafted with the help of data analytics.

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Increasing Collections by Acting on Predictions of Propensity to Pay

Self-Pay Accounts Top Contributor to Bad Debt for Health Systems

Twenty-eight percent of insured working-age adults in the U.S. are underinsured, and more than half of them have medical debt.[1] High deductible health plans and co-payments have increased the percentage of patients who self-pay for healthcare costs.[2] These self-pay accounts are now the top contributor to bad debt for hospitals and health systems,[3] which represents more than $55 billion nationally.[4]

Allina Health, a not-for-profit healthcare system, provides care for patients from birth to end-of-life through its 65 clinics, 49 rehabilitation locations, 23 hospital-based clinics, 12 hospitals, 15 pharmacies, and two ambulatory care centers. The health system needed a strategy to better predict the likelihood of payment for self-pay accounts and appropriate follow-up collection actions that would yield the most success.

Predicting Propensity To Pay

Allina Health's financial representatives attempt to collect outstanding balances for 200,000 patients every month. While the organization had good processes in place for contacting patients with outstanding balances, it was not able to target interventions to those people who were more likely to pay their bills.

A focused strategy for the types of accounts and patients they were interacting with would assist, but Allina Health was not able to deploy a predictive model for propensity to pay. Less effective processes, such as cold calls with tailored conversations, were employed as a tactic to collect payments.

Allina Health previously engaged with several different vendors to develop and deploy a predictive model that would allow the health system to use a propensity to pay strategy, but they proved unsuccessful. These companies could not make use of Allina Health's complex data effectively, interpret the information in a manner that would produce a reliable, valid propensity to pay predictive model.

For Allina Health to be successful at using a strategy-driven process for patient collections, it needed an accurate and reliable propensity to pay predictive model.

Machine Learning Drives Improved Strategies

Allina Health relies on Health Catalyst® Data Operating System (DOS™) platform for insight supporting its improvement efforts. To build a predictive model that could be successfully deployed to support a propensity to pay strategy, Allina Health partnered with Health Catalyst, selecting its Healthcare.AI™ solution.

Creating a predictive model

The propensity to pay machine learning model uses artificial intelligence to predict the probability that the patient will pay their bill during the month. Allina Health's data from its analytics platform, including 500,000 training cases, was used in developing the predictive model. Subject matter experts (SMEs) from the organization and Health Catalyst then selected variables for the predictive model based on SME healthcare, financial, and analytical experience.

The random forest's Gini impurity index algorithm for constructing decision trees was used to determine which variables to incorporate into the final model. Seventy-seven input variables were tested, and forty-six of them were incorporated into the final model. Next, a random forest model was employed to calculate each variables' relative impact with respect to the probability that a patient will miss their payment. The model performance AUROC, which serves as a measure of accuracy, is good at 0.88 and the AUPR, a measurement of precision and quality is also good at 0.70.

Ensuring this information integrates with current systems, data from the predictive model is exchanged with Allina Health's EMR and patient statement platform daily, facilitating workflows using an automated dialer, EMR work queues, and patient statement platform. This supports financial representatives in applying the right self-pay collection strategy.

Determining propensity to pay

In developing the model for predicting propensity to pay, members of the finance team validated the data, which is then divided into propensity to pay segments, and collection strategies are applied to each one. These propensity segments, and strategies that may be applied, include:

High: Informed by data that these patients have a high likelihood to pay, Allina Health does not automatically call these patients, reserving its resources to contact patients who may not pay without additional interaction with financial representatives.

- **Medium-high**: Representatives call these patients 45-days before the outstanding balance is sent to bad debt, and 15-days prior for a final notice period.

- **Medium-low**: Allina Health implemented a presumed payment plan workflow for patients who pay in a manner consistent with its payment plan guidelines, but who have not yet engaged in a formal plan which helps prevent these patients from progressing to bad debt.

- **Low:** Low propensity patients never make a payment and always progress to bad debt. Allina Health can avoid investing its limited resources to pursue payment, as these patients have previously demonstrated that they will not pay. Representatives contact these patients right before the outstanding balance is sent to bad debt.

Using the propensity to pay predictive model, Allina Health can also identify patients who have previously received charity care or medical assistance. This enables representatives to send information about charity care to the patient in a timelier manner. Allina Health follows up with these patients using a tailored dialer campaign to ask if they have questions or need assistance.

Results

The propensity to pay machine learning predictive model, in conjunction with Allina Health's propensity to pay strategy, has allowed the finance team to focus its collection efforts on patients who are more likely to pay. Resources are not allocated to collecting from patients that will either pay their balances without intervention or not pay their bills regardless of interventions. This information allows Allina Health to make the best use of its limited resources, increasing payments for the services provided. Results include:

- **$2 million increase** in overall collections in just one year, including **more than $660,000 in additional patient payments** collected by phone in the first two months following implementation of the propensity to pay machine learning algorithm and collections strategy, a **43.2 percent relative improvement**.

- **37.5 percent relative improvement** in the number of outbound calls.

- **21 percent relative improvement** in the number of inbound calls.

The propensity to pay machine learning model has improved the ability to engage with patients who are willing, able, and interested in paying their bill, increasing the number of inbound calls.

What's Next

Allina Health is continuing to improve its propensity to pay strategies and predictive model. The health system plans to send data from the online patient portal vendor back to Health Catalyst to incorporate into the predictive model, enhancing predictions about the patient's likelihood to engage with Allina Health and pay for the services they received.

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Denials Management Analytics Reduces Denials by Nearly $5M

On average, claim denials cost each healthcare provider $5 million every year. This loss of revenue resulting from claim denials is a concern for healthcare providers. Billings Clinic sought to determine the cause of claim denials and realized that it needed an analytics solution that could integrate data from multiple sources. The health system leveraged its data platform and analytics applications to pinpoint the sources of the denials, allowing the organization to implement prevention plans and procedures for recovering the denials.

Claim Denials and Revenue Loss

Claim denials continue to cause sizeable revenue losses for healthcare providers across the U.S. Out of the $3 trillion in total claims submitted by healthcare organizations annually, approximately $262 billion are denied, translating to an average of nearly $5 million in denials per provider per year.[1]

Determining the Root Causes of Claim Denials

Billings Clinic had previously attempted to engage with vendors to implement the products required for effective management of the healthcare revenue cycle but had not found success. Out-of-the-box solutions were not customizable, could not integrate payer and EMR data, and did not provide the critical data required for recovery efforts. As a result, Billings Clinic was unable to deliver timely, accurate analyses related to denials and recoveries.

Despite spending thousands of hours on burdensome manual reports, poor data quality and lacking analytics left the organization unable to identify the root causes of denials. Not knowing the sources of the denials limited the effectiveness of claims management and collection efforts, resulting in millions in lost revenue.

Billings Clinic needed an analytics solution that could support the integration of data from multiple sources, which would provide the organization insight into denials performance and actionable, accurate recovery data.

Data and Analytics Drive Healthcare Revenue Cycle Improvements

Billings Clinic partnered with Health Catalyst, leveraging the Health Catalyst® Data Operating System (DOS™) platform and a robust suite of analytics applications to implement a revenue cycle analytics application. The organization also utilized Health Catalyst Financial Advisory Services to fully understand the complete healthcare revenue cycle, developing strategies and operational plans to accelerate performance.

Leveraging DOS, Billings Clinic implemented a revenue cycle analytics application. The organization is able to easily identify trends and variances, can improve the efficiency and effectiveness of reporting, and, for the first time, can deliver reliable information to stakeholders to help ensure the organization is appropriately compensated for the value it delivers.

Billings Clinic can visualize financial and operational performance and is able to drill down to the payer,

provider, clinic or practice, and CPT level. For the first time, the organization is able to integrate data from its EMR with data from payers, and can accurately determine the root causes of denials, enabling the organization to implement prevention strategies and to identify and implement denial recovery activities.

The organization is able to provide detailed data, and on-demand reports, to the various stakeholders that impact denials. Coding and registration departments have the ability to run on-demand reports, generating new insights that teams can use to improve their work and positively impact denials. Improving the revenue cycle is no longer dependent solely upon the employees working in revenue cycle. Billings Clinic is able to provide the detailed data and analytics to effectively engage clinical and operational partners in understanding and improving the root causes of denials.

The organization now has the data required to establish and monitor key performance indicators, giving senior leaders the necessary data for making strategic decisions to improve operational and financial performance.

Results

Billings Clinic's new insights and data-driven improvement efforts are yielding the desired results. In just 12 months, the organization realized a:

- $4.5M reduction in denials, the result of an eight percent relative reduction in denial dollars.

- $235K cost savings, the result of internalizing the resources required for small-dollar denials management, and a 42 percent relative reduction in the number of Passport authorization denials, decreasing the work burden associated with denials.

Billings Clinic can now give its providers and senior leadership timely, accurate, and actionable reports with a high degree of confidence and efficiency. The organization has eliminated its report backlog and is able to fulfill both simple and complex ad-hoc report requests in a matter of minutes rather than hours or days. Billings Clinic's comprehensive work to enable access to transparent, trusted, and actionable information resulted in its being awarded the 2020 Health Innovation Award from Microsoft.

What's Next

Billings Clinic plans to use its real-time, actionable analytics to empower the organization to further optimize its healthcare revenue cycle and financial outcomes.

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How One Hospital Took the Pain Out of Getting Paid

A hospital's core mission is to provide the best care possible. To continue to do so, however, hospitals must be paid promptly. Discharged not final billed (DNFB) cases—where bills remain incomplete due to coding or documentation gaps—represent an ongoing challenge for hospitals around the country. Ineffective management of this caseload can lead to crippled cash flow, mounting accounts receivable days (A/R days), and frustrated staff.

Thibodaux Regional Medical Center, a 185-bed community hospital in Louisiana, like other hospitals, faces a myriad of new government regulations that have made hospital bill collection efforts more onerous. For example, Thibodaux had difficulty adapting to the Centers for Medicare and Medicaid (CMS) reimbursement and auditing practices that required more specific physician documentation to support billing and coding.

Thibodaux's leaders recognized their inadequate manual DNFB process left hospital staff overburdened and put at risk the necessary cash flow to best serve patients. The hospital automated and streamlined this process, to relieve the burden on physicians, provide an integrated view of data, optimize visibility and workflow, and reduce lower reimbursements due to missing documentation. The hospital leveraged analytics to provide actionable feedback to continuously improve the process.

Thibodaux has already achieved significant improvements to cash flow and operational efficiency:

- 44.4 percent improvement in delinquency rate.
- 8.2 days reduction in A/R days.
- 70.5 percent decrease in the number of billhold accounts outstanding.
- 50 percent decrease in physician portion of DNFB dollars.
- 97 percent improvement in operational efficiency.

New Regulations Drive Hospital Billing Challenges

Hospitals today are subject to a dizzying array of regulations and reporting requirements from public and private health payers. This makes recovering reimbursements in a timely fashion tougher than ever. For instance, if physician documentation is not present to support every treatment code perfectly, they risk financial penalties from government health programs.

On the other hand, hospitals need to quickly submit bills for payment to avoid holding up needed cash for operations. This growing tension has caused many hospitals to struggle with unmanageable DNFB caseloads, representing scores of cases where incomplete bills linger at the hospital long after the patient goes home. Ineffective DNFB management processes increase A/R days and diminish cash flow. Backlogs can represent several days of revenue—a significant amount for most hospitals.[1]

One challenging regulation for hospitals is the CMS recovery audit contractor (RAC) program, which was developed to prevent CMS from overpaying or underpaying hospitals for services. The RAC program enables CMS to go back to hospitals and demand repayment for any overpayments it identifies through billing audits. The ultimate goal of the program is to prevent future improper payments at hospitals around the country.[2] This demonstration program ran from 2005-2008 and the full impact of the program was not felt by many hospitals until 2010-2012 as the program was phased in.

Thibodaux, like many hospitals, imposed stricter coding documentation requirements to assure it would be accurately paid for claims and avoid any overpayment claw backs. This resulted in an exponential increase in the volume of DNFB accounts, created a huge billing bottleneck as a growing number of charts were held for documentation deficiencies. Thibodaux's DNFB load spiked from $200,000 per month to $12 million per month.

The hospital's staff were overburdened with clearing cases, and there was no light at the end of the tunnel because they had no visibility into trends or issues that might help improve the process in the future.

Thibodaux's leaders recognized that their backlog was a crisis and their manual process was unsustainable. They needed to find a way to speed up reimbursements and improve cash flow without sacrificing coding accuracy. They sought a solution that would quickly reduce the drain on staff resources, automate and standardize the process, and leverage analytics to provide insights that would improve the process in the future.

The hospital looked to best practices such as creating a dashboard, reviewing accounts regularly, and tracking the caseload over time—all recommended by the Healthcare Financial Management Association (HFMA)[3]—to help resolve DNFBs and decrease A/R days.

The Challenge To Optimize Speed and Accuracy

Manual process took too long and often led to lower reimbursement levels

Thibodaux's DNFB caseload had reached 500 per month, with about a third of patients discharged without a completed bill. These accounts could not be billed either because documentation to support all the necessary codes to draft a final bill was missing, or because the coding was incomplete, despite thorough documentation.

The medical center's healthcare information management (HIM) staff were using a manual, weekly process to identify DNFB accounts. This process required at 8-10 hours and occurred only once a week, resulting in delays in receiving claims and staff frustration. Once accounts were identified, it would take days to gather the cases and examine each one to determine the specific deficiencies.

Staff faced additional lags even after the documentation was complete because when missing documentation had been provided, the system did not alert coders to give them the green light to finish coding and send bills for payment. Furthermore, the volume of cases was growing because the delinquency rate—the percentage of overall discharges with missing documentation—had grown to a range of 34 to 38 percent.

HIM staff were facing slowdowns as they waited for documentation on the one hand and urgency to complete bills quickly on the other. If the clock ran out, the accounts would become unbillable and forfeit all reimbursements.

Physicians were burdened by delayed notification

The failure of the manual system to efficiently resolve unbilled accounts also hurt doctors, who were already overburdened with documentation demands. Physicians were sometimes saddled with as many as 30 cases to correct at a time. Due to delays, the patients may have long been discharged and doctors struggled to remember important details needed to fully document each case. Many times,

FIGURE 1: SAMPLE DNFB ANALYTICS VISUALIZATION

1. DNFB reasons (i.e., missing documentation, other reasons)
2. Employed or other provider view
3. Patient type, location, physician, aging, charges, and coder views
4. Additional filters for further drill-down analysis

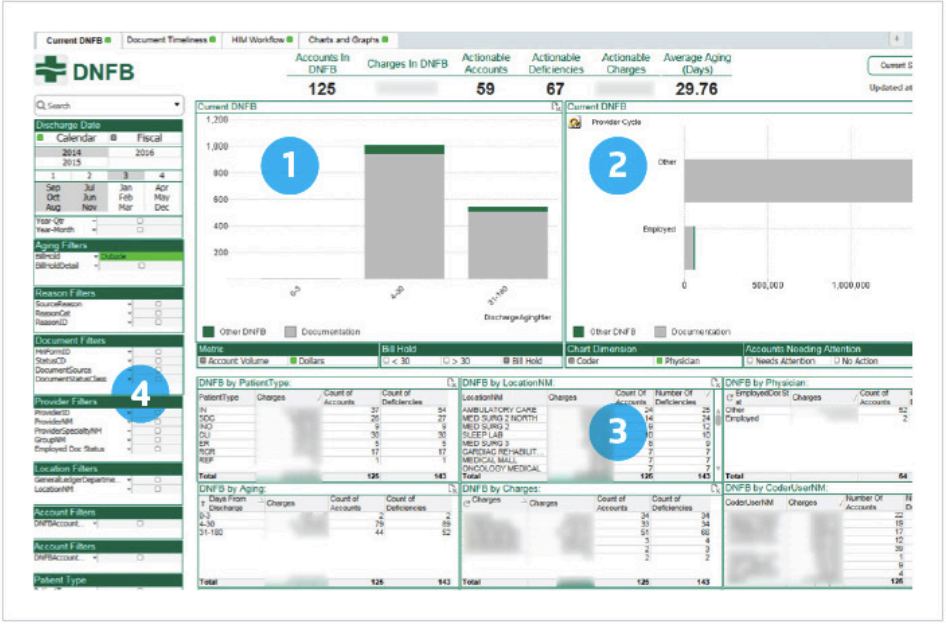

Figure 1: Sample DNFB analytics visualization

the deficiencies in documentation required dictation and the reports had to go to transcription, causing additional breakpoints for coders. Meanwhile, hospital administrators continued the practice (at at a much higher frequency) of threatening doctors with disciplinary action if the charts were not completed on time. It was an unworkable situation for coders, providers, and administration.

Lack of information led to sub-optimized workflows

One of the biggest difficulties with Thibodaux's manual process was an inability to prioritize the oldest cases in order to make sure the clock didn't run out for CMS reimbursement. This inability to see information impacted the efficiency of both the transcriptionists and the coders. The system also couldn't highlight the highest-value cases to help maximize revenue. Without an effective reporting tool that enabled it to quickly identify high-priority cases, the medical center struggled to improve both the delinquency rate and the time to final bill.

Finally, without near real-time data, HIM team members were unable to analyze why the accounts were not coded. They could not look at patterns, trends, and root causes of delays or use data on uncaptured revenue to proactively motivate physicians to speed up documentations.

Leveraging Analytics to Reduce DNFB Backlogs

Automation of the process

Thibodaux had already implemented a late-binding enterprise data warehouse (EDW) from Health Catalyst, but the hospital hadn't applied the EDW to resolving its DNFB process woes. Thibodaux was able to leverage the clinical, financial, operation, claims, and other data aggregated in the EDW by deploying a DNFB analytics application on top of the data warehouse. This application, the HIM Documentation Workflow Analyzer, eliminated the manual process and integrated DNFB data into the hospital's dashboard and workflow.

The application gives HIM team members quick and easy access to the information they need to effectively manage the entire process. They can view data by age, by payer, by reason, by patient type, by location, and by physician, enabling them to identify areas for improvement that were previously hidden (Figure 1).

This new visibility streamlines the process so coders now have the time needed to fully code each account, virtually eliminating the need to downcode cases due to missing documentation or elapsing billing time limits. HIM managers now receive very few emails about writeoffs due to accounts not being coded.

Timely focused communication eases burden on physicians and others

Doctors now have a greater ability to complete documentation requests in a timely fashion due to the ability to identify and track accounts more quickly and effectively. The physician portion of the caseload, representing the backlog of reports needing documentation, dipped sharply in July after the automation of the process. One clear reason: Instead of a weekly deluge of 30 reports to document—some of them related to long-discharged patients—doctors now receive more frequent, focused, and helpful information from HIM. Physicians are typically receiving one or two cases at a time, and these cases are more likely to be for patients who have just been released from the hospital, making it easier for doctors to remember and document details.

Since the physician portion is the biggest component of DNFB cases, reducing the backlog with doctors has an immediate and significant effect on the overall caseload, improving billing and decreasing days in accounts receivable.

The automated process also enables continuous improvement. For instance, physicians are better able to identify their own patterns of missing documentation. This has led to improved charting and report completion both before and after the patient is discharged. From the administration side, the integrated view of account data now allows HIM to identify individuals responsible for holding up the billing process. Since HIM can quickly quantify the dollar impact of each delay, this serves as a motivator for doctors to complete cases more quickly.

Data access and visibility transforms DNFB workflows

Improved visibility and more frequent access to data have transformed the workflows of stakeholders across the hospital. Leadership has access to summaries that deliver a clear view of delinquency rates, A/R days, and other key operational metrics. This gives them the tools they need to better predict and manage cash flow in a new way. Transcriptionists and coders can quickly prioritize cases based on the age of the account and the dollar value it represents. Instead of arriving at work unsure of where to start, coders open the application and are immediately greeted with cases ready to code. And for the first time, all staff working to clear cases can look at the dynamic report anytime, instead of once a week or every other week. This allows Thibodaux staff to quickly recognize trends or problems and pivot to better manage the backlog of accounts.

Thibodaux's new analytics tool helps it identify patterns of deficiencies such as missing orders, discharge summaries, transfer papers, and history and physicals. At one point, hospital leaders found one department with significantly higher DNFB rates than others and were able to work with the department to identify and resolve process issues surrounding missing reports/information coming from the ordering departments that were contributing to their high DNFB rate. This new problem-solving capability is transforming the billing process at Thibodaux and reducing much of the pain for administrators, physicians, and staff.

Results

Thibodaux Regional Medical Center has shown that, in less than a year, a DNFB management overhaul focused on automation and analytics can improve finances, operations, and morale. The new DNFB process has freed up HIM staff to focus on high-impact interventions, has reduced the documentation burden on doctors, and has optimized efficiency for coders. As a result, Thibodaux today finds itself in a much better cash flow position.

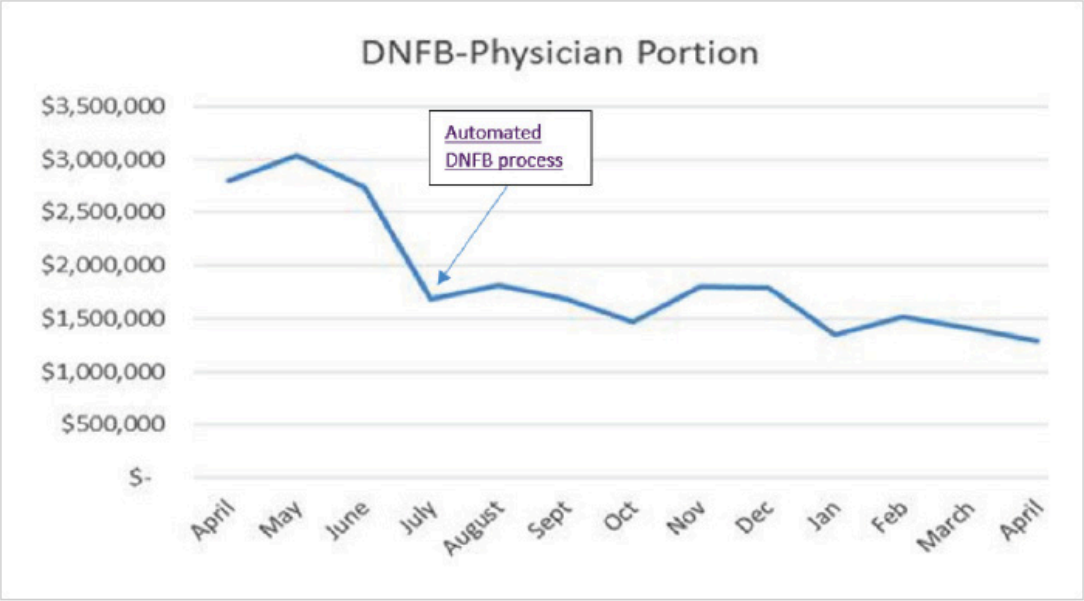

Figure 2: Trended DNFB-physician portion reduction

The transformation of the DNFB process has also improved morale for doctors and staff previously burdened by an avalanche of belated documentation requests. Doctors are now receiving charts daily, when they still remember the discharged patients, and are completing documentation more quickly. This has cut the physician portion of DNFB dollars in half (Figure 2).

As a result, within five months, hospital administration stopped sending reprimand letters to physicians for overdue documentation. At the six-month mark, the medical center began to leverage analytics to uncover new insights about trends and the types of missing documentation, leading to focused interventions with specific departments and providers.

Another dramatic change has been a 50 percent reduction in the hospital's delinquency rate (Figure 3). Thibodaux's rate of overall discharges in DNFB status hovers around 15 percent, versus a high of 38 percent the previous June, before the automated process was implemented.

In summary, Thibodaux has made impressive improvements in several key metrics in less than one year:

- Changes in communication, access to information, and better physician documentation led to:
  - 44.4 percent improvement in the delinquency rate.
  - 50 percent decrease in the physician portion of DNFB dollars.
  - 70.5 percent decrease in the number of billhold accounts outstanding.
- The reduction in DNFB accounts resulted in:
  - 8.2-day reduction in A/R days—an 18.8 percent improvement
- Automation of the manual process produced almost immediate access to information and:
  - 97 percent improvement in operational efficiency for DNFB chart identification. In addition, coders are now getting charts coded within 48 hours (and frequently within 24 hours). Previously this coding took at least 1-3 weeks.

Thibodaux has eliminated a cumbersome, manual DNFB process that tied up crucial revenue and unnecessarily burdened doctors and staff. The

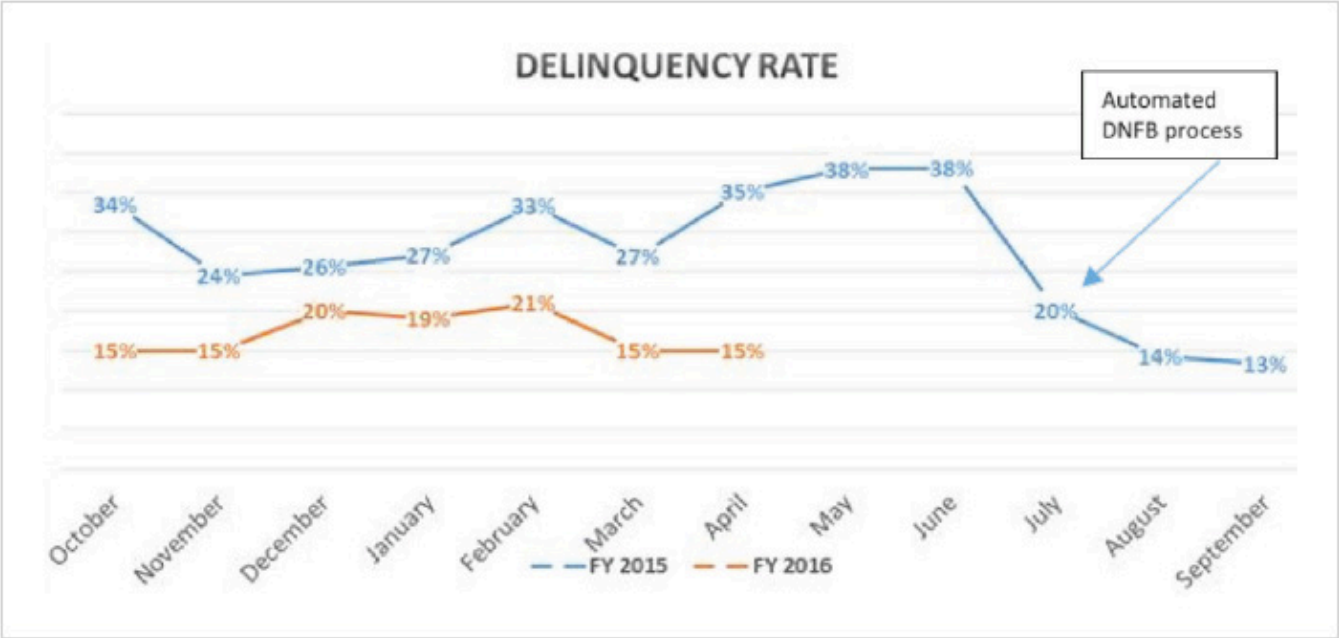

Figure 3: Trended delinquency rate reduction

hospital continues to apply these learnings to improve the DNFB process.

What's Next?

Thibodaux is well on its way to minimizing its DNFB caseload in order to ensure sufficient cash and available staff resources to deliver the best care possible. The hospital now plans to deploy similar process improvements and analytics to improve other business processes, such as coding around case mix index.

One of biggest changes for Thibodaux is that it can now quickly get bills out the door. Now, by submitting bills that fully reflect the rich array of services patients are receiving at the community hospital, Thibodaux may discover that its case mix index—which measures how sick a hospital's patients are—is higher than previously reported. This is important because hospitals with a higher case mix index may be entitled to larger reimbursements from payers.

Following the success of the DNFB process transformation, Thibodaux plans to do an analysis on accurate coding and documentation and the impact on the case mix index. Hospital leaders will also continue to optimize processes and monitor patterns and trends to ensure that their billing advances are sustained over the long term.

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Charge Integrity Analytics Improves Revenue Recognition, Retaining More Than $6M

MultiCare Health System (MultiCare) recognized it had an opportunity to improve its charge capture processes and reduce losses. The organization sought a solution that was scalable, reduced errors, and increased profitability. MultiCare leveraged its analytics platform and a charge integrity analytics solution to enhance its ability to efficiently manage its charge capture processes, providing access to timely and actionable insights and enabling efficient root cause resolution.

Effective Charge Integrity Process Key to Financial Success

Charge capture is a critical component of the revenue cycle performance. Inaccurate charge capture jeopardizes revenue and regulatory compliance. Up to one percent of a health system's net charges, a significant amount of money for any healthcare organization comes from lost charge capture opportunities.[1] An efficient strategy for charge integrity is essential for financially healthy organizations.

Timely Root Cause Identification and Resolution

MultiCare experienced changing payer reimbursement and billing guidelines as well as significant and extensive growth, which resulted in increased compliance issues, denials, adjustments, and frustration among both patients and clinical department leaders. The organization recognized that its people, processes, technologies, and tools had not kept pace with the changing environment, creating gaps between the needs of the organization and the output of its revenue cycle department. MultiCare assessed the alignment of its revenue cycle performance with its organizational strategy and executive expectations. It recognized the need for a solution that would optimize charge integrity analysis by proactively identifying issues and providing root cause resolution that was scalable with growth, promoted reduced error volumes, and improved net revenue.

Proactive Analysis Improves Charge Integrity

MultiCare developed a robust charge integrity audit program to improve revenue cycle performance and increase net revenue. It focused its efforts on improving its people capabilities, processes, and technology.

- **People Capability Improvements**: MultiCare supported its staff in increasing their analytics acumen, improving the ability to recognize trends, identify high-priority issues and the associated impact, and collaboration with other teams.

- **Process Improvements:** MultiCare changed its processes to identify and address root cause, shifting processes to ensure staff work the root issues rather than individual accounts. MultiCare modified the process to ensure the appropriate selection and utilization of solutions to address systematic issues, the efficient implementation of improvement activities, and consistent outcomes monitoring.

- **Technology Improvements:** MultiCare initiated a new issue tracker, standardized the root cause analysis template, created new tools for monitoring reports, and developed executive leader scorecards.

MultiCare leverages the Health Catalyst® Data Operating System (DOS™) platform and a robust suite of analytics applications for its data and analytics. The organization chose to implement VitalIntegrity™, a web-based analytics solution that empowers organizations to efficiently manage hospital charge capture processes by detecting and remedying compliance issues and supports the organization's overall goal of improving reimbursement and compliance. MultiCare uses the analytics solution as part of its proactive issue identification and resolution process, allowing the organization to recognize inefficiencies and revenue leakage from missed charges, identify compliance issues from overcharging, and facilitate tracking of inaccurate charges down to the root cause. The organization conducts three different types of audits: daily, systematic, and random.

- **Daily Audits**: Daily audits are automated using the charge integrity analytics solution. The analytics solution receives daily feeds of all coded hospital accounts from MultiCare's EHR and reviews those accounts and charges against a national database of rules, enabling staff assignment, sorting, filtering, exporting, and reporting. Staff can more efficiently identify and rectify trends and issues rather than focus on individual account resolution.

- **Systematic Audits**: MultiCare creates an annual schedule at the beginning of the year for systematic audits. Revenue cycle staff complete the systematic audits by clinical area and compare similar units across the organization, enabling comparison of like-type groups. Charge description master (CDM) analysts research and document audit findings, providing the organization the opportunity to resolve issues. For example, a systematic audit might identify a cesarean section charge without an accompanying anesthesia charge. CDM analysts could then review other labor and delivery departments across the health system to determine if there were similarly missed charges.

- **Random Audits**: The daily and systematic audits inform the selection of departments for department-based random audits. MultiCare randomly selects and audits 30 accounts associated with a specific department or service line, gaining further insight into additional targeted opportunities for improvement.

MultiCare accelerates organizational learning by ensuring communication of performance to stakeholders at multiple organizational meetings and routinely publishing its audit findings and reports. The organization creates and distributes an executive scorecard, publishes content to the revenue cycle and CDM website, and uses newsletters to share information with a broad audience.

Results

MultiCare has gained access to timely and actionable insights by leveraging its sophisticated revenue integrity analytics solution, enabling the quick resolution of time-sensitive charging errors that affect optimal reimbursement. The organization's people, process, and technology changes are delivering the desired results. In just three months, MultiCare has recognized:

- $6.1M in net revenue retained, a result of the timely resolution of more than 350 charge capture issues identified by daily audits in the analytics solution.

The organization also identified $36.6M in additional annualized gross revenue at risk of not obtaining optimal reimbursement or resulting in downstream denials and payer audits. MultiCare can now intervene to retain this revenue.

What's Next

MultiCare will continue to leverage VitalIntegrity to improve charge capture integrity and further advance revenue cycle performance.

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Improved Patient Access and Increased Demand Contribute to Additional Revenue

Better Patient Access Transforms Experience and Boosts Revenue

Effective patient access is critical for population health, patient engagement, patient satisfaction, and health system financial performance. Patient access sets the stage for all patient encounters with the health system.[1]

Improving the Patient Access Experience

WakeMed wanted to provide its patients with a consistent, effective patient access experience across its system, but recognized it wasn't providing the desired experience. The organization knew that patients often had trouble accessing the system, but it lacked the actionable data that would enable the identification, prioritization, and management of improvement opportunities.

The organization could obtain some patient access data—but obtaining and analyzing the data required burdensome manual processes. Furthermore, few people in the organization had access to the data, which led to numerous questions and a lack of trust in the data. The organization had engaged a consultant in an attempt to gather data and build measures that would help improve patient access, but the data and measures provided didn't meet the organization's needs. WakeMed needed a powerful analytics solution to provide the actionable data and insights required to improve patient access.

WakeMed elected to use the Health Catalyst® Data Operating System (DOS™) platform and a robust suite of analytics applications, including a patient access analytics application and Healthcare.AI™, to gain access to the high-value data and insights it needed to analyze patient access and prioritize activities to improve the patient experience.

The Power of Patient Access

For the first time, WakeMed has one source of truth for its high-value data and analytics. Data sources and measure definitions are transparent, and team members understand and trust the data in the application. Using the analytics application, WakeMed can visualize patient access key performance indicators, including internal and external referral conversion rates, schedule utilization, new patient visits, cancellations, no-shows, visit type, and patient portal activation rates.

WakeMed leverages data from the data and analytics platform to understand performance and to understand and tell the patient access "story." After learning from its data, the organization prioritized upgrading and improving the patient scheduling process, optimizing the patient referral process, and increasing the number of new patients, while simultaneously growing the number of WakeMed Physician Practices (a specific subset of the larger healthcare system).

WakeMed has been able to establish a new, dedicated patient contact center that receives referrals and scheduling requests from patients and physician offices, standardizing and optimizing the patient referral process. The organization standardized and is optimizing electronic waitlists for practices with full patient panels and limited appointment availability—even using the patient portal to manage self-scheduling for COVID-19 vaccination appointments. The organization can immediately notify patients when an appointment becomes available and prompt patients to self-schedule for the available visit. To visualize the impact of changes on outcomes, WakeMed uses the analytics application and statistical process control charts generated by Healthcare.AI. As a result, the organization can draw more accurate and consistent conclusions and can quickly identify performance changes.

Results

WakeMed's patient-centered, data-informed patient access improvements are delivering the desired results. In just one year, the organization improved patient access, increased annual visit volume to meet patient needs, and growth in WakeMed Physician Practices. Results include:

- $25.4M increase in revenue due in part to a 15.8 percent relative increase in outpatient visits.
- 13.9 percent relative increase in new patient visits.
- 7.1 percent relative decrease in appointment cancellations without a reschedule.
- 81.6 percent relative increase in direct scheduling through the patient portal.

New patient visits, direct scheduling, and revenue were positively impacted by a substantial increase in demand associated with COVID-19 impacts, and growth in WakedMed Physician Practices.

The new patient contact center has significantly improved performance. Results include:

- 87 percent relative reduction in the number of patients hanging up before their call is answered.
- >8X increase in the number of calls answered within 20 seconds.
- The patient contact center has gone five consecutive months without any calls sent to voicemail.

What's Next

WakeMed is integrating new patient access data and measures into its analytics application, supporting the organization in identifying additional opportunities to improve access to ensure its patients can easily access the care they need.

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