



Hospital Operations Shouldn't Be So Hard.

Healthcare is complicated and unpredictable. This makes inefficiency a difficult problem to solve. Our real-time decision management platform uses A.I. to help hospital teams handle any situation and take the best course of action. The result? Better financial performance, happier patients and more satisfied clinicians.



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How Artificial Intelligence Is Helping Fix Hospitalwide Throughput, Starting in the ED

Amid declining reimbursement and an uncertain future for health reform, hospitals and health systems today face unprecedented pressure to improve clinical quality, provide exemplary care experiences and continue to meet the evolving needs of their communities.

Healthcare leaders were initially excited about the potential for big data and analytics to provide the insight required to properly address these challenges, but over time reality has dampened that enthusiasm. Too many hospitals today are inundated with data that fails to offer insights and actionability.

From Data To Action

Hospitals are missing a platform that makes their mountains of data meaningful. The substantial dollars organizations have invested in EMRs represent an essential first step, but EMRs alone are not able to connect the dots and enable the right actions. EMRs – comprised of raw data on each patient's medical care – function as systems of record. On top of those, healthcare organizations have built systems of display, which present retrospective data analysis in the form of dashboards, charts and reports. These tools help inform future clinical and process optimization, but they fail to offer prescriptive, actionable recommendations for improvement in real time.

"We would look at statistics on what occurred months ago to try to determine our game plan for staffing this month," says Debbie Pender, RN, vice president of patient care and CNO at Mercy Hospital-Ardmore (Okla.). "It helped us understand what happened, but it didn't help us prepare for what was next. It wasn't scientific, it was tedious and it caused a lot of issues among our nursing staff."

Even tools with predictive capabilities "tend to sit on top of broken processes like a layer of sediment, because they fail to facilitate understanding and situational awareness among clinicians," says James Hereford, president and CEO of Fairview Health Services in Minneapolis.

Clinicians are drowning in a deluge of data. Tools that provide retrospective or obtuse information contribute to clinician burnout. When physicians and nurses spend time assessing data and managing alerts, they subsequently have less time to spend with patients.

Hospitals don't need more data – they need a system of

action. Solutions built to translate data into immediate, accurate and actionable decisions for clinical teams and staff. The end result is a superior care experience for patients and more efficient and productive processes for staff. That's where artificial intelligence can help.

Artificial Intelligence: No More Missed Opportunities

Extensive medical training and experience have prepared clinicians to make the best possible decisions about medical care. However, in urgent moments, the data can be overwhelming – it's not humanly possible to process it all and consistently make choices that improve flow and patient experience. Solutions with AI capabilities, that can deliver insights in the moments that matter most, can allow staff to be proactive instead of reactive.

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These systems provide predictions of likely operational events and recommendations to handle them.

One such system of action is Qventus, a decision-management platform for hospital operations that is powered by AI and machine learning. By leveraging decision and behavioral sciences, Qventus is able to proactively orchestrate operational workflow, eliminating bottlenecks while influencing optimal decisions by frontline decision makers.

The platform is always running in the background as it processes massive amounts of information in real-time. It predicts a variety of scenarios by combining EMR data, historical information, insights on environmental factors and internal data related to staffing, inpatient bed utilization, patient safety and other metrics. Beyond

anticipating future events, the platform provides simple, personalized recommendations to staff and coordinates an immediate response, leading to the best possible outcomes.

AI lets hospitals extract greater meaning out of the millions to billions of dollars they've invested in the EMRs. Most importantly, AI empowers clinicians to achieve their goals to improve the quality of care and enhance the overall patient experience.

Beyond the Hype: How AI Helped Two Hospitals Improve Operations in the ED

AI can be deployed to support a variety of initiatives and departments in the hospital, such as the emergency department, perioperative care, inpatient units, and pharmacy. Many choose to start in the ED, the front door to the hospital.

"Because of its high level of interdependencies, the ED is particularly susceptible to capacity issues," says Stephen Traub, MD, chairman of the department of emergency medicine at Phoenix-based Mayo Clinic Arizona and advisor to Qventus. However, it's the setting where physicians are likelier to be process-oriented and success metrics are clear.

In the following two case studies, AI enabled two St. Louis-based Mercy hospitals to better manage capacity and improve patient flow in the ED.

Mercy Hospital-Fort Smith (AR.)

The ED at 336-bed Mercy Hospital-Fort Smith reported core performance metrics far below national benchmarks. It struggled to reduce ED crowding, coordinate processes and efficiently move patients through the department.

As the primary access point for community residents seeking medical care, Mercy Hospital-Fort Smith's ED generated between 60 percent and 70 percent of inpatient admissions. High patient demand coupled with chronic inefficiencies in ED operations challenged the hospital's ability to treat and move patients through the system. As a result, patients experienced long wait times and frequently left without being seen.

Hospital leaders determined many inefficiencies at Mercy Hospital-Fort Smith stemmed from the ED's reliance on labor-intensive tools to manage key processes and identify issues. Manually identifying process outliers was time consuming and made proactive intervention nearly impossible. Nurses commonly discovered problems that occurred hours before and had already delayed patient care before they had an opportunity to alert appropriate staff.

How Mercy Hospital-Fort Smith optimized ED operations with AI

Mercy Fort Smith implemented Qventus' "air traffic

control" platform as a tool to help guide ED staff to best practices through a collection of "decision recipes". Each unique recipe is designed to monitor metrics, predict bottlenecks and recommend countermeasures in real time. It then sends personalized communications, called a "nudge", to frontline team members, in order to enable them to take the right actions and collaborate on a response. This helped improve inconsistent workflow and tackle the communication problems that led to inefficiencies in the ED.

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For example, the system was set to address ED surges. Continuously monitoring data, it would predict a surge two hours in advance of the situation, then send a specific recommendation to the charge nurse: "Congestion likely, prioritize discharges". The system identified the specific discharges that should be prioritized. This allowed the nurses to refocus resources and coordinate an immediate response. Over time, it also enabled a powerful culture of teamwork and empowerment.

Five months after adopting the AI-based software, Mercy Hospital-Fort Smith saw significant operational improvements in its ED. The left-without-being-seen rate dropped 30 percent. The average length of stay for discharged patients fell to just 24 minutes, a 13 percent reduction, and its door-to-doctor time dropped by 15 minutes, a 20 percent reduction. This enabled the hospital to serve an additional 2,500 patients.

Mercy Hospital-Ardmore (Okla.)

The 190-bed Mercy Hospital-Ardmore deployed Qventus' AI software to reduce bottlenecks in the ED caused by backups in ancillary care departments, which ultimately slowed disposition to admit times. Nationally, hospitals in the top 10th percentile report disposition to admit times at 42 minutes, according to CMS. Mercy Hospital-Ardmore, on the other hand, reported an average of 88.6 minutes.

"It's a hospital-wide problem, not just an ED problem, to get your patients admitted," says Jennifer Bramlett, RN, director of emergency services, catheterization lab and

logistics at Mercy Hospital-Ardmore. The hospital's existing analytics solutions offered only a general analysis of department performance. She couldn't discern which specific patient handoffs, processes or individual clinicians were the root cause for patient backups in the ED. As a result, it was tough to quickly target breakdowns between departments.

How Mercy Hospital-Ardmore used AI to address throughput issues

Mercy Hospital-Ardmore worked with Qventus to help its ED reduce disposition to admit time. The solution included decision recipes tailored specifically to monitor and improve interdisciplinary processes and communication affecting throughput.

Recipes fired nudges to specified staff members – including medical surgical directors and managers, EVS leaders and the CNO – when a patient had waited in the ED for more than 42 minutes. The solution sent these nudges to staff via text or email, offering a potential course correction to defuse the issue. Through a virtual huddle, they then worked together in real time, determining the right course of action and moving the patient to the inpatient floor.

Furthermore, the platform provides “deep dives” to help staff pinpoint the root causes delaying inpatient admission. “I can use the deep dive function to instantaneously drill down and understand what team, person, day of the week or time of day is leading to issues,” Ms. Bramlett says. “I’m also able to see where we are being successful so we can replicate best practices.”

After five months of using the solution, Mercy Hospital-Ardmore saw a 10 percent reduction in disposition to admit and a 6 percent reduction in admitted length of stay. This improvement also positively affected process times downstream. The hospital reduced average arrival to room time by 19 percent, reduced average left-without-being-seen rate by 55 percent, reduced door-to-physician time by 17 percent, reduced length of stay by 9 percent and reduced disposition to checkout by 8 percent.

AI Beyond the ED: Fixing Hospital-wide Throughput

The potential for data analytics solutions powered by AI to revolutionize hospital operations and improve satisfaction for both providers and patients is limited only by

our imaginations. The technology's ability to constantly monitor, learn and alert staff of impending events – and most importantly, provide recommendations to best handle them – can be applied to any aspect of hospital operations.

During the April Becker's conference Lucile Packard Children's Hospital Stanford (Calif.), cited that the Qventus AI platform made a measurable difference in perioperative care processes. Four months after implementing the technology, the OR saw a 10 percent reduction in case overruns and 15 percent decrease in case under-runs. The percentage of cases delayed by more than 10 minutes decreased by 11 percent, cumulatively resulting in 520 hours of delays prevented since launch, while same-

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day cancellations decreased by more than 25 percent.

The platform also had a positive effect on the patient and family experience. Previously, parents anxiously waited for their child to get out of surgery and grew worried when procedures ran over. Patient navigators were unable to communicate with surgeons in real time, and often could only inform parents of extended surgery times after the fact. After implementing the Qventus platform, patient navigators had real-time information to communicate proactively. Navigators could stay in the waiting room and receive a text message from the system regarding a surgery delay or a predicted run over, which is an immense comfort to parents. Similar stories of improved efficiency and care are being seen across the hospital.

The possibilities for AI in healthcare are endless. As health systems continue to drive forward in the quest to value-based care, improving operational efficiencies while lessening the cognitive burden on clinicians and staff will be essential component to success. ■



Qventus' mission is to simplify how healthcare operates so that hospitals and caregivers can focus on providing the best possible care to patients. The award winning AI-based platform addresses operational challenges across the hospital including emergency departments, perioperative areas, patient safety, inpatient and outpatient. Qventus is honored to be working with leading public, academic and community hospitals across the United States to help hospital teams make better operational decisions in real-time, with positive impacts to financial performance and patient experience.