



M Health Fairview is on a journey to deliver breakthrough care. Based in Minnesota, the 12-hospital health system is a leader in operational innovation, leveraging cutting-edge artificial intelligence technology to drive operational excellence and effectively respond to Covid-19.

Background:

- 12 hospitals, including AMC
- \$5.3 billion total revenue
- 3,300 providers; 32,000 employees

EHR:

- Epic (2 instances)

Key Goals:

- Reduce operating expenses by \$100M
- Create capacity via inpatient throughput
- Achieve "systemness"
- Standardize discharge rounding
- Optimize admissions, transfers, and discharges across the system
- Improve decisions with real-time data
- Manage critical resources (ICUs, ORs) during Covid

Qventus Solutions:

- Inpatient
- Emergency Department
- Command Center
- Covid-19

The challenge: transforming operations to deliver breakthrough care

As a complex 12-hospital health system, M Health Fairview knew that it had to transform care delivery to achieve its vision of breakthrough care. Increases in operating costs outpaced revenue growth, leading to a \$100 million gap. The health system identified operational excellence as one of its key opportunities, but its individual facilities had developed siloed processes and workarounds, and performance improvement initiatives often relied on the heroics of its teams going above and beyond.

"It was very challenging to manage accountability because of the variation in processes and even definitions around data and metrics," said Dr. Baum, MD, MSED, Vice President of System Clinical Operations, M Health Fairview. "We had data, but there's a difference between having data and having actionable data. We would get data a quarter behind, but it was too late to right the ship, and this issue of stale or conflicting data made people not trust it."

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Transforming patient flow operations system-wide, one hospital at a time

Partnering with Qventus, M Health Fairview embarked on a journey to transform patient flow system-wide with AI and real time operations. The transformation started at the hospital level so that the health system could establish and standardize best practices across inpatient, emergency department, and perioperative units.

“Our focus was really on inpatient throughput because we knew if we couldn't unlock capacity, we were going to continue to experience bottlenecks in our periop areas, ED areas, and elsewhere, including admissions from other hospitals and outside facilities,” said Dr. Baum.

At the system level, M Health Fairview launched its System Operations Center (SOC), an enterprise-wide mission control center that optimizes admissions, transfers, and discharges across the system.

Standardizing rounds and resolving discharge barriers early with AI

Before the transformation, multidisciplinary discharge rounds were highly variable. “We didn't have a standard best practice,” said Dr. Baum, who also practices as a hospitalist. “Some hospitals had rounds, some didn't. Different pieces of information were collected, and many times, nothing was documented about the discussion – some patients were not discussed at all. Our case managers and social workers were spending a lot of time chasing down things at the last minute because there hadn't been proper preparation beforehand.”

With Qventus, rounds are now standardized across the system and focus on identifying and resolving discharge barriers before the patient is ready for discharge. Qventus machine learning identifies patients that can be discharged sooner and suggests disposition recommendations to help care teams initiate disposition processes early. Most importantly, Qventus uses advanced probabilistic inference techniques to predict barriers most likely to delay discharge so that care teams can address them days in advance. “It really helps teams to think in a more forward fashion. That way, we're not stuck chasing down orders on the last day, or calling and begging radiology to get that MRI done before the ride shows up,” said Dr. Baum.

Ancillaries such as therapy and imaging groups use an ML-prioritized discharge queue to improve how they manage orders to reduce discharge delays. “That way, it's not necessarily about who yells the loudest to get the MRI done. It's about who really needs that MRI done next so that they can be discharged,” said Dr. Baum.

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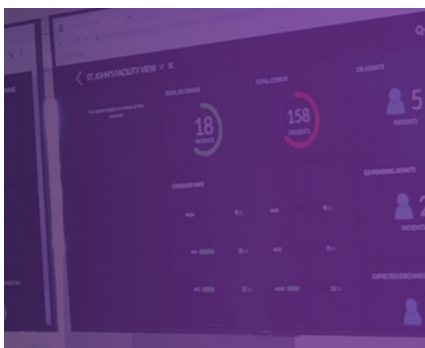
Dr. Karyn Baum, MD, MSED

Vice President of System Clinical Operations

Collaborating across the system to manage discharges before 11 am

To improve flow, each unit is responsible for identifying two patients for discharge before 11 am. When discharges might be delayed, Qventus automatically escalates to site leadership and a flow analyst at the SOC. In real time, they can step in and help expedite discharge orders or resolve outstanding barriers.

Discharges before 11 am have increased 30% compared to baseline, and key hospitals have also hit their goals for putting in 20% of their discharge orders before 9 am. “It's really been something that people can actually be excited about. When you do get some positives, you can spread things that work,” said Dr. Baum.



Driving system-wide transformation through SOC

The SOC helps unlock operational efficiencies and manage flow system-wide.

“Our hospitals were essentially acting autonomously before we started a lot of the system-level work. One site could be drowning in patients, while the other was sending home on-call nurses,” said Dr. Baum.

With Qventus, M Health Fairview has gained real-time situational awareness into flow and resource constraints. With predictive analytics, it can see where bottlenecks will likely develop and proactively mitigate them, such as potential morning discharges that may slip, or where EDs could become overcrowded.

M Health Fairview is moving towards system-wide management, where machine learning models can help the SOC dynamically load balance patients across sites based on predicted bottlenecks. For example, machine learning models can see that a patient is likely to admit from the ED, recognize that inpatient units are at capacity, and identify a transfer opportunity to a sister hospital. "This is one of the more powerful workflows that we're hoping to make a big dent to prevent delays, bottlenecks, and boarding, as well as patients that we transfer out of the system because we're not level-loading appropriately," said Dr. Baum.

Create capacity to rapidly meet Covid challenges – without adding staff

Faced with a rise in hospitalized patients in early March, M Health Fairview quickly converted its long term acute care hospital to a Covid-dedicated hospital. But with two instances of Epic, the system faced challenges gaining visibility system-wide into beds and other Covid resources to load-balance demand.

To manage the initial surge, M Health Fairview worked with Qventus to launch new situational awareness tools to give real time visibility into negative airflow rooms, ventilators, and ICU beds.

"We worked with Qventus over one ridiculously long weekend. Very quickly, we knew where all of our Covid resources were and how many were in use. It was amazing," noted Dr. Baum.

The health system worked with Qventus to deploy machine learning models that prioritize stepdowns and discharges to help teams create ICU capacity and unlock downstream bottlenecks in Med-Surg units. Physicians review stepdown candidates prioritized by machine learning, while medical and pharmacy students use an ML-driven discharge queue to proactively work through discharge summaries and med-rec processes.

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"In a disaster, people lose their ability to think because they're so busy. Patient flow, which is always a problem, becomes everything. Qventus helped give us eyes on what really mattered, especially for our ICU beds, which has become the key bottleneck resource in the age of Covid," said Dr. Baum.

Real-time scenario planning to balance Covid demands and surgery needs

With Covid conditions changing by the moment, M Health Fairview needed tools to help them see where bottlenecks were developing days or weeks in advance. The health system used the Qventus Covid-19 Scenario Planner to forecast Covid admit volumes and run different scenarios to evaluate potential countermeasures required.

"The Qventus model updates with local data and allows us to change input parameters so that we can play a game of 'what if.' In Minnesota, we meet every Tuesday to talk with the other healthcare systems and agree on certain input parameters so that we can all be using the same inputs and run the model locally as a system, but also by region and state, which has been very helpful for us to plan at a more macro level."

To rapidly adapt to evolving Covid demands and their longer length of stay, M Health Fairview quickly changed their surgical planning approach. On a weekly basis, the health system uses Qventus planning tools to predict Covid admits and assess inpatient bed demand and resulting surgical capacity across the system's 100 ORs over the next 7 days. Dr. Baum remarked, "Qventus' surgical planning model prompts some really interesting strategic discussions. Do you want to open up on Saturday and Sunday? How many hours do we already set aside for things that are emergent versus non-emergent?"

With real time planning, predicted surgical capacity is then fed into a broader discussion around other issues: nursing, supplies, anesthesiology availability, etc. Rather than spending meetings on data reporting, the team can focus on countermeasures to mitigate constraints. This real time planning approach has allowed M Health Fairview to restore 90% of its pre-Covid surgical volume, enabling them to recover lost revenue, restore furloughed staff, and care for patients as efficiently as possible, especially for those who have had time-sensitive surgeries delayed.

Moving forward: “We need to get to the self-driving car”

Going forward, M Health Fairview is looking to further leverage predictive analytics to reduce burden on care teams. “Now, we're really at a point where we can start to use our brains for the things we need brains for, and use machine learning for the things that the machines are, frankly, better than humans are at times,” said Dr. Baum. “Our staff needs to be focused on taking care of patients and keeping the system running, not moving pieces of paper around. We need to get to the self-driving car, where we are taking away those non-value added tasks for our frontline workers so that they can practice to the top of their license and have the most rewarding healthcare job they can have so that our patients can have the best outcomes.”

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With Qventus, M Health Fairview is driving operational excellence system-wide to:

- **Reduce operational inefficiencies:** Predict potential flow bottlenecks at each altitude (facility, system) and hardware coordination for proactive resolution
 - **Improve inpatient flow:** machine learning and standardized multidisciplinary rounds help care teams move discharge barriers upstream to avoid discharge delays
 - **Drive system efficiencies:** predict bottlenecks across the system so that hospitals and the System Operations Center can proactively mitigate in real time
 - **Increase patient revenues:** Create effective capacity for greater throughput while optimizing surgical volumes amidst Covid
 - **Unlock ICU & Med-Surg capacity:** machine learning helps teams identify high priority patients for ICU stepdown and inpatient discharge – without adding staff
 - **Restore surgical revenue:** maximize case volumes with accurate, real-time Covid-19 prediction models for agile surgical and Covid capacity planning
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Reduce Length of Stay with Qventus

Visit qventus.com/inpatient or contact demo@qventus.com

