INFORMED CLINICIANS. IMPROVED OUTCOMES.

Health informatics and its role in critical care units

At Medtronic, we are driven by a Mission focused on improving patient outcomes and delivering value to the overall healthcare system. Helping our partners provide better patient care while managing costs becomes particularly challenging when dealing with critical care patients who require continuous, intensive monitoring. Typically in the ICU or recovery unit of a hospital, these patients require teams of clinicians tracking and treating complex conditions. From patients at risk of unrecognized deterioration, to those on invasive mechanical ventilation, optimal care involves ongoing monitoring and coordinated, timely clinical decisions.

EFFICIENCY CHALLENGES INCREASE RISK AMONG CRITICAL CARE PATIENTS

"With high risk patients, our goal is early detection and treatment of deterioration," explains senior managing director of Health Informatics and Monitoring at Medtronic, Jason Case. "And when mechanical ventilation is needed, we want to optimize its use," he adds.

"Today, clinicians must individually catch early warning signs across multiple patients and conditions, simultaneously. That can result in inefficient and often ineffective care," he says.

A recent survey indicated that despite well-intentioned investment in staffing, issues remain. Of the physicians surveyed, nearly 90% reported spending less than 60% of their time on direct patient care.[1]

In the ICU and recovery unit, that gap could mean the difference between complication-free care and recovery and adverse, costly outcomes.

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> Jason Case,
> Managing Director of Health Informatics and Monitoring, Medtronic

It's estimated that 1.2 million patients are on mechanical ventilation in the ICU every day in the United States.[2] While this therapy is critical in restoring a patient's natural breathing, it has the negative effects of causing the lungs to atrophy over time, producing acute lung injury, and increasing infection risk. An estimated 420,000 patients experience adverse events related to ineffective weaning, which translates into a cost of $7.9B to hospitals, of which $5.7B is preventable.[2]

Sicker patients are also becoming more prevalent in lower acute settings, such as the recovery floor. These

1.2M patients on mechanical ventilation every day in the U.S.[2]

Ineffective weaning

$7.9B costs to hospitals

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Medtronic
Further, Together

patients can be at risk for respiratory compromise, the second-most frequently occurring, preventable safety issue in U.S. hospitals, due to the use of medication to control post-op pain[3] (approximately 13 million patients use patient-controlled analgesics (PCAs) annually[4]).

An analysis of national inpatient costs by the Healthcare Cost and Utilization Project determined that respiratory failure, insufficiency, and arrest was the 12th most expensive condition treated in U.S. hospitals, totaling $7.1 billion in 2013.[5]

PREVENTING THE PREVENTABLE

At Medtronic, we believe data and analytics play a key role in preventing the preventable and facilitating early detection and treatment among critically ill patients. Ours is an evolving perspective that has benefited from significant advances in the technology, and is a shift many hospitals are navigating day to day.

"We've now passed the era of EHRs. Patient portals, wearables, and other sources of data can really help us understand the full view of the patient."

Dr. John Chelico,
Chief Informatics & Innovation Officer,
Northwell Health

"There isn't anything coming into our system now that isn't somehow connected to IT," says Mark Daniels, chief technology officer at Medical University of South Carolina. "The earlier we're involved, the better off our partners are on a project."

And the amount of data available to clinicians continues to expand.

"We've now passed the era of implementing electronic health records (EHRs)," says Dr. John Chelico, vice president, chief informatics & innovation officer, Northwell Health. "Patient portals, wearables like smart watches, and other sources of data can really help us understand the full view of the patient."

Respiratory failure, insufficiency, and arrest = $7.1B hospital costs[5]

But data alone is not enough. Providing clinicians with the right information, for the right patient, at the right time, is paramount in critical care settings.

"Access to real time and longitudinal patient data is rapidly expanding," says Case. "Our job is to help collect and translate that data into actionable insights for a clinician."

Artificial intelligence (AI), advanced algorithms, and predictive analytics, Case explains, can all be used to aggregate discrete data into actionable insights for clinicians. "Today's technology allows us to take large amounts of disparate data -- from EHRs, devices and monitoring systems -- and create streamlined tools and reports that help clinicians make timely care decisions for their patients," he says.

For post-op patients being monitored for unrecognized deterioration, these in-hospital declines may be preventable with better monitoring and early intervention to address evolving respiratory compromise.[6,7] For mechanically ventilated patients in the ICU, providing clinicians with continuous monitoring and protocol-driven weaning tools can help get a patient off a ventilator more than a day earlier and reduce a patient's length of stay in the ICU by up to 11 percent.[8]

With the ongoing staff-to-patient ratio challenge, making those insights accessible via mobile devices, to multiple clinicians at once, can help improve efficiencies and clinical workflows.

"The more I'm able to bring together data from disparate systems and serve it up to clinicians in a meaningful and actionable way — in as close to real time as possible — the more value it adds," says Daniels.

IT SOLUTIONS FOR COORDINATED CARE

Medtronic offers a portfolio of health informatics and monitoring solutions for hospitals. They are designed to help clinicians collaborate on patient care and work at optimal efficiency. The software platform and clinician decision support tools have been designed to help reduce never events,[9] the length of ICU stays, and code blues.[10]

Learn more about how the platform works.

MEDTRONIC MONITORING AND CLINICAL DECISION SUPPORT TOOLS: HOW THEY WORK.

Data from multiple devices and systems is integrated and transmitted to a clinician's hospital server.

Here, it is transformed to provide near-real-time, clinically meaningful information.

Available where, and when, a clinician needs it — on virtually any device

COLLABORATING ON THE FUTURE OF HEALTHCARE

The role of data in improving patient outcomes and system efficiencies is widely recognized by IT experts. Implementing tools and solutions that leverage that data to its fullest potential, however, is a journey.

"Dedicated time and resources are required to create a true data science platform," says Chelico. "As a healthcare IT leader, you have to paint a picture of what the future will look like to influence stakeholders about the benefits."

"The value of data is constantly increasing. Part of that comes through trusting the data and its source."

Mark Daniels,
Chief Technology Officer,
Medical University of South Carolina

Case says Medtronic is well-positioned to be an active partner in the transformation because of its device technology and value-based healthcare (VBHC) offerings. But, he points out, Medtronic can't do it alone. "Using data to its fullest potential requires

partners with a shared vision, aligned goals, and diverse and complementary core competencies," he explains.

To facilitate ongoing collaboration across the industry, Medtronic frequently hosts IT Advisory Board meetings around the globe. Hospital CIOs and CTOs are invited to discuss challenges, share opportunities, and explore potential solutions that could deliver short- and long-term benefits to clinicians and patients alike. Medtronic experts are on hand to provide insights to the role our technology — both current and future — might play in leveraging data to its fullest potential. Chelico and Daniels both attended a recent meeting held in Minneapolis.

"The value of data is constantly increasing," says Daniels of the opportunities ahead. "Part of that comes through trusting the data and its source. The value gains in data aggregation, drawing it from different domains — patient, device, predictive analytics — comes from the insight and knowledge we gain that didn't exist before."

"I see Medtronic as a partner in how we will practice medicine for the next 50 years," adds Chelico.

Learn more about data in healthcare at Medtronic.

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