CASE STUDY

Health Care

Monitoring More Patients at a Lower Cost to Pursue Better Outcomes

Intel and Cerner collaboration leads to conception, development, and deployment of Cerner Patient Observer

"Intel's become a very trusted adviser for us in that, with the Cerner Patient Observer™ solution, we had specific requirements. They understood that we needed the data behind the system. They also got that we needed infrared capabilities and a particular field of vision for the camera. And so they've really worked with us to understand the requirements and ensure that the pieces of technology address the business requirements, rather than just being a piece of technology. So they really get that we're solving a business, or clinical in this case, need."

—Todd Bechtel
Director of virtual health, Cerner

Executive summary

Each year in the U.S., avoidable patient falls number in the hundreds of thousands, with 30 to 50 percent resulting in new injuries and subsequent care issues for the patient involved.[1] In addition to putting patients at greater health risk, those injuries commonly add time and cost to their hospital stays. Referred to as "never events" to underscore that they should never occur, these accidents and their prevention are top priorities among health care organizations.

In the absence of effective, sustainable solutions, many hospitals have resorted to the labor-intensive approach of assigning a member of the healthcare staff to sit in the at-risk patient's room 24/7 to ensure the patient's safety. This strategy consumes tens of thousands of valuable staff hours that could be spent more actively pursuing other patient health and wellness needs.

Faced with the ongoing patient care and cost challenge, Truman Medical Centers and University Health (TMC/UH) came to Cerner, a long-standing and trusted collaborator, with a request: help them incorporate the solution and streamline clinical workflows to address their concerns around patient safety and cost challenges. What followed was a true collaboration between TMC/UH, Cerner, and industry—including Intel—leading to the development of the latest-generation hardware of the *Cerner Patient Observer*™. The game-changing health care solution successfully addresses identified goals—while also providing patients' families greater peace of mind that their loved ones are safe.

Harnessing the power of collaboration

In redesigning their next-generation hardware appliance for *Cerner Patient Observer*, Cerner approached Intel with a set of unique requirements for the new in-room device. It required 3D depth-sensing capabilities. It needed to be able to deliver clear imagery in a darkened room (including nighttime conditions). A traditional security video camera would not suffice. Intel identified the necessary hardware capabilities. The *Cerner Patient Observer* would be built around the Intel® Core™ i5 processor (I5-8500), Intel® Wi-Fi solutions, and Intel® RealSense™ technology. By selecting the Intel RealSense camera, the *Cerner Patient Observer* avoided using multiple cameras to meet operational needs.

As a long-time trusted adviser to Cerner, with half a century of technology leadership and a broad ecosystem, Intel aided in the integration of the solution's multiple features, helping accelerate time to market. In addition, Intel provided design and security assistance to Cerner throughout development and contributed to joint go-to-market efforts by leveraging the Intel® IoT Market Ready Solution program.

Cerner worked with a number of hospitals, including TMC/UH in Kansas City, Missouri, to determine how best to integrate the solution into a day-to-day hospital workflow in order to provide the greatest operational value with the least disruption to existing practices, processes, and protocols. Success also meant ensuring that the solution integrated with all of the other tools and technologies the staff routinely rely on.

Cerner Patient Observer

Cerner Patient Observer operates by equipping hospitals with remote monitoring technology that enables staff to keep an eye on many patients at a time depending on the number of screens used. TMC/UH chose to observe no more than 12 patients per monitor. The nurse or clinician, previously required to physically remain in the room with the patient, can now consult a screen displaying all 12 video feeds at once.

Cerner Patient Observer is unique in that it provides hospitals a complete end-to-end solution that includes two-way communication between the patient and care team and near-real-time video, with night vision and depth sensing. The depth-sensing capability allows for more-exact movement tracking to help keep patients safe while reducing false positives. What's more, the solution is integrated into the existing Cerner electronic health record (EHR) solution to support enhanced communication, collaboration, and operational efficiency.

Cerner worked hand in hand with TMC/UH to ensure that *Cerner Patient Observer* could be seamlessly integrated into the current workflow at the hospital. This included assessing the patient for fall risk, installing the device in the room, and starting data collection and the biomed provisioning of the device.

In designing *Cerner Patient Observer*, Cerner understood that little would be gained if staff attention now had to remain fixed on a screen. So the solution automates much of that evaluation work, implementing "virtual rails," or virtual boundaries, around the patient that, if breached, trigger an alert for the medical team. If the patient is in a bed, the rails might follow the outline of the bed. For patients in a chair, the boundary might be placed directly in front of them.

By consistently analyzing the video, *Cerner Patient Observer* can detect when a patient is moving outside of the established boundaries. Using a 3D depth sensing tool like the Intel RealSense camera, the solution can determine when, for example, a patient leans forward in their chair, crosses the virtual line, and puts themselves at risk of falling.

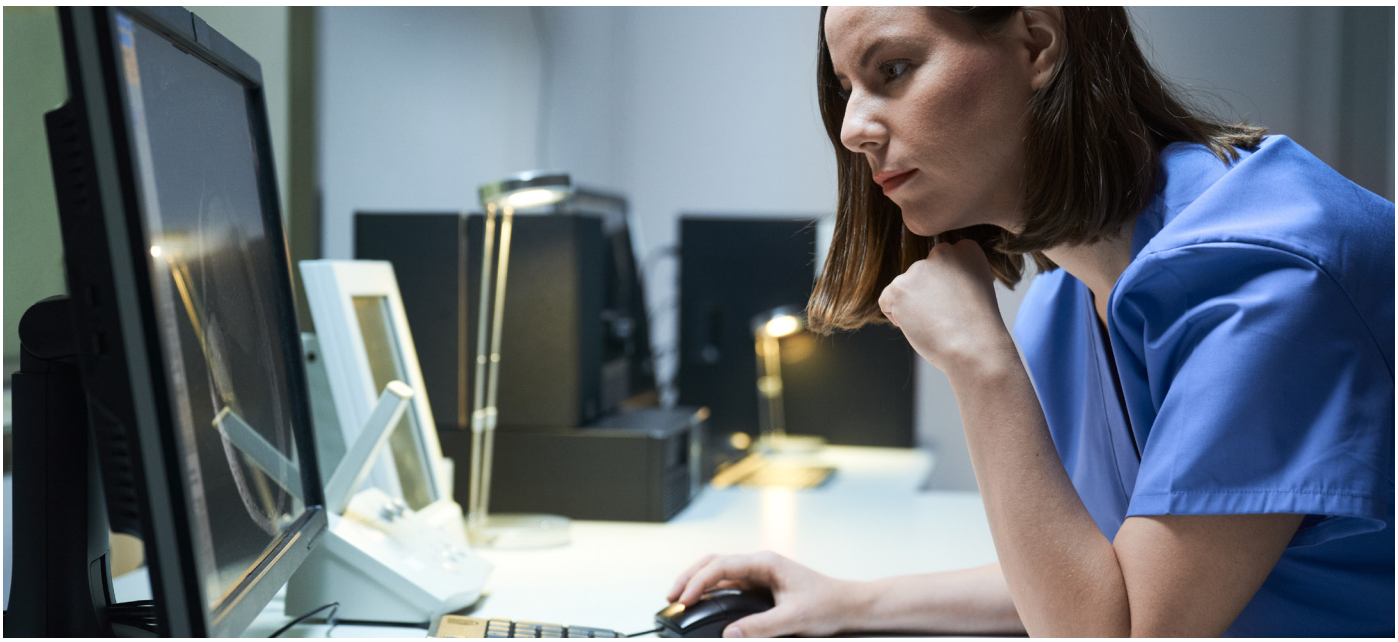
The infrared capability of *Cerner Patient Observer* means that the same information is available for clinicians when monitoring at night or when the room is dark. Automating that threat assessment may reduce the cognitive burden on staff, allowing them to focus on interacting with patients to establish a holistic picture of each patient's condition and status.

In addition to video footage, staff also receive audio from the room. Staff know when a visitor is in the room and what they are doing, or when a nurse is present and speaking to the patient or fellow staff. This can result in a faster response time in the event that assistance or support is needed from a doctor or additional staff member.

How Cerner Patient Observer works

With a new patient, the person's fall risk is assessed and the virtual rails or alerting zones are configured for their bed and/or chair. Back at the central monitoring station, the observer will have access to two screens. One shows all the patients being monitored by *Cerner Patient Observer* with a maximum display of 12 on the screen at any one time. The other screen permits the observer to interact with the system and communicate with others. In the event that the system captures the patient trying to get out of bed, for example, the screen will flash a red alert. The observer can then use the system to speak directly to the patient in an attempt to determine the patient's intentions and needs.

Perhaps the person simply wants to visit the bathroom. The observer can acknowledge the request and ask the patient to please remain in bed until assistance can be sent. And because *Cerner Patient Observer* has also been integrated with the nursing communications platform, the monitoring staff member can then, with one click, notify the nurse



assigned to that patient or another member of the care team. In this way, both the patient's needs and the appropriate response are established quickly while mitigating the fall risk.

Finding additional Cerner Patient Observer applications

Since launching *Cerner Patient Observer*, Cerner has continued to find additional venues throughout the hospital to which the solution can bring value. In addition to recovery rooms, the system can monitor patients on the general floor, especially those who are recently postsurgery and/or on medication that might put them at heightened risk of falling. The value of *Cerner Patient Observer* is also being discovered in neuro and rehab units.

Moving forward, Cerner sees artificial intelligence (AI), and machine learning in particular, as useful in extending the solution's applications beyond its core capability and functionality. In the future, staff can start to identify who and what is in the room, when that person or item is in the room, and when movement occurs. The presence of a caregiver can be verified. Patient behavior patterns can be captured and analyzed to advance staff's ability to more accurately predict potential falls.

The solution might also be able to employ facial recognition and facial detection to ascertain pain in a patient. Combating pressure ulcers or skin breakdown, another "never event," is one more possible application. With the vision into the room offered by *Cerner Patient Observer*, nurses are better able to ensure the patient avoids extended periods lying on any part of the body identified as being at risk of developing skin breakdown.

Helping protect patients and free nurses

Implementation of *Cerner Patient Observer* has delivered positive results for TMC/UH. The hospital saw a 35 percent drop in patient falls as a result of the improved visibility into the room.[2] That means avoidance of additional injuries resulting from the falls, as well as the resultant costs and the extended stays. The goal is to put patients in a position to enjoy faster recovery, better outcomes, and earlier discharge from the hospital.

Operational benefits were also significant. With the introduction of *Cerner Patient Observer*, TMC/UH was able to remove staff from in-room observation and free the hospital to shift approximately 27,000 nurse hours to other needs and functions.[2] Now able to monitor 12 patients at a time with a single staff member, the organization also experienced an improved return on its investment. Finally, the change can reduce stress and fatigue, allowing the care team to focus on nursing activities and spend more time on patient care needs.

Improving patient care and hospital workflows

Finding new solutions to old challenges is a defining feature of innovation and of the collaboration between Cerner and Intel. By working directly with health care providers to understand the challenges surrounding patient falls, the two companies converged to deliver a solution that can improve patient safety and hospital workflows and offer welcome comfort to patients' families.

Solutions like *Cerner Patient Observer* are incorporating new and emerging technologies in strategic ways to overcome real problems. The possible integration of AI may unlock even more applications and benefits. Look for Cerner and Intel to continue to explore what is possible when technology innovation is focused on healthcare needs.

"One of the primary measures of success that we knew we needed to measure was how many patients we were preventing from falling with the cameras in use. We experienced a 35 percent reduction in patient falls during the first year that the cameras were deployed. Part of the Cerner Patient Observer™ implementation was not only looking at how it would improve safety, but also taking a hard look at how it improved the efficiency of staff. During a year we were able to transition close to 27,000 nursing staff hours away from sitting at the bedside. To a nurse working on the front lines, the return of an extra set of hands to help in taking care of patients was huge."

—Amy Peters, RN, BSN, MBA
Chief nursing officer, Truman Medical Centers

Learn More

For more information about *Cerner Patient Observer*, at **cerner.com/solutions/cerner-patient-observer**.

For more information about Cerner, visit **cerner.com**.

Explore Truman Medical Centers and University Health at **trumed.org**.

To check out other Intel customer stories highlighting data-centric innovation, visit **intel.com/customerspotlight**.

1. Lyons, Maureen, "The Joint Commission launches educational campaign on preventing falls," The Joint Commission, July 24, 2019: jointcommission.org/en/resources/news-and-multimedia/news/2019/07/the-joint-commission-launches-educational-campaign-on-preventing-falls.
2. "Innovation Helps Reduce Patient Falls," *The Wall Street Journal*: partnerswsj.com/intel-health-advancing-healthcare-with-ai/p/1.