Bernoulli One™ Clinical Surveillance

Improving Patient Safety in Real-Time

Early detection of a deteriorating patient condition saves lives. Designed on this truth, Bernoulli *One*™ is the most advanced real-time clinical surveillance solution for hospitals. A powerful blend of monitoring and clinical surveillance, medical device integration, and real-time data analytics and notifications, Bernoulli One is a friendly tap on the shoulder that notifies clinicians about potential patient events. The Bernoulli platform enhances patient observation, reduces risks, and protects patients.

Clinical Surveillance and Monitoring – What's the Difference?

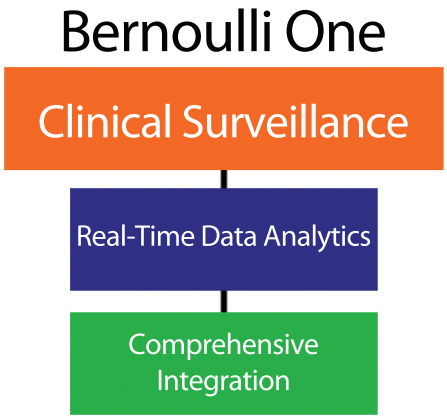
In an article titled "Improving Patient Safety through the Use of Nursing Surveillance", written by Karen K. Giuliano, RN, PhD, FAAN, published by AAMI Horizons, the differences between monitoring and surveillance are evaluated. The article states, "Surveillance and monitoring each represent a distinct process in patient care. Monitoring involves observation, measurement, and recording of physiological parameters while surveillance is a systematic, goal-directed process based on early detection of signs of change, interpretation of clinical implications of such changes, and initiation of rapid, appropriate interventions."[1]

Using a clinical example based on Early Warning System scoring and deployment of rapid response teams, the article proves the importance of surveillance in process improvement and patient care. It states that the 'use of surveillance versus monitoring resulted in a mean reduction in rapid response deployment time of 291 minutes." Related, using surveillance to deploy the rapid response team resulted in a shorter median hospital length of stay by 4 days.

Bernoulli®

A total hospital solution, our surveillance solutions allow caregivers to surveil multiple patients and patient data from many sources from a centralized location or via mobile alarm notifications. This enables clinicians to observe patients from any location and respond quickly to patient events. Beyond basic monitoring where the system passes alarm information, Bernoulli uses multi-variate rules to correlate data (i.e., baseline alarm data, real-time streaming data, retrospective data from the EHR, etc.) to create new early warning alarms. Advanced clinical surveillance provides the ultimate patient protection as it helps to identify developing patient events and enables care teams to respond quickly.

Continue reading to learn how Bernoulli clinical surveillance solutions can be used by your hospital.



Bernoulli High-Acuity Surveillance

Designed to help alleviate some of the challenges of caring for high acuity patients is the Bernoulli high acuity surveillance solution. The solution enables caregivers to monitor patients in real-time in emergency and operating rooms, post-anesthesia care, intensive care, Medical-Surgical, telemetry units and other healthcare settings such as long term acute care. The Bernoulli system connects to a variety of medical devices including ventilators, infusion pumps, and patient care monitors.

Beyond basic surveillance, the system links retrospective patient data (from the EHR) with real-time patient vitals for early warning notifications leading to early interventions. For example, the Bernoulli ventilator surveillance solution sends an early warning notice if a patient is in danger of a ventilator associated event. Here's how. Bernoulli correlates extensive data points such as patient demographics and lab values with real-time patient parameters such as temperature, heart rate and blood pressure. Early intervention can help prevent rising acuity and severely compromised patient conditions. And the added layer of surveillance, can help to reduce burdens facing an already limited clinical staff.

Bernoulli Long Term Acute Care Surveillance

A typical long term acute care hospital provides care for patients with clinically complex problems. And in most cases, complex systems are utilized to monitor patients. For staff, this can be challenging as the number of alarms from medical devices including patient monitors and ventilators can reach an unmanageable amount. Connectivity of all these systems is also a challenge. Bernoulli One is trusted by many long term acute care hospitals. Whether patients are stationary or mobile using vent-equipped wheelchairs, Bernoulli provides continuous clinical surveillance that:

- Collects real-time data from ventilators, pulse oximeters, and any other accessible medical devices
- Captures all measured patient parameters and device settings (e.g. ventilator mode)
- Distributes actionable information to caregivers at a central station or to those carrying mobile communication devices
- Analyzes and correlates real-time and retrospective data to identify early patient intervention opportunities
- Identifies deteriorating patient conditions through real-time data collection, analysis, and notifications

Bernoulli Alarm Surveillance & Clinical Communication

It's no secret in hospitals that mismanaged clinical alarms can create less than ideal conditions for patient recovery and staff efficiency. The Joint Commission views this as a multifaceted problem related to alarm noise, alarm numbers, and alarm limits. Bernoulli helps to improve alarm safety in hospitals.

Collecting Baseline Alarm Data

For many years Bernoulli has been a recognized leader in medical device integration. We get the data. It's what we do. If your hospital simply needs help evaluating current alarm conditions, turn to Bernoulli. Further, it's these deep roots in data interoperability that also make Bernoulli a leader in clinical alarm safety.

Reducing Alarm Fatigue & Improving Patient Safety

Bernoulli monitors patients by receiving live data directly from bedside biomedical devices. Those include capnography monitors, pulse oximetry sensors, blood pressure monitors, cardiac monitors, and other clinical monitoring systems. In real-time the system evaluates the input, analyzes the data with that coming from the EHR system, determines whether events are actionable, and if so sends information to the right people. Not to be confused with traditional alarm management software, Bernoulli has the unique ability to create new alarms from the raw data (i.e., Bernoulli smart alarms) versus simply passing along alarm information. Typically, alarm management solution sends alarm notifications when a patient vitals go above or below the normal limits set on the device. In contrast, Bernoulli alerts caregivers on trends – either based on a single patient vital or multiple patient vitals. Using this level of advanced clinical surveillance, caregivers can reevaluate the device settings, reduce nuisance alarms, and quiet their surroundings.

Clinical Communication

Bernoulli One captures data directly from medical devices, evaluates the input with native analytics, and provides clinicians with real-time actionable Insights at the point of care. The system can send alarm notifications to a central display or by way of a separate clinical communication software. Bernoulli one has partnerships with many of the industry's leading clinical communication vendors.

Bernoulli Virtual ICU Surveillance

The leapfrog Group recommends that hospitals provide constant intensivist coverage in their intensive care units for greatest patient safety. Unfortunately, there are more ICU's in the U.S. than intensivists. For these reasons and more, many hospitals trust the Bernoulli system which combines real-time clinical surveillance with telemedicine. The system allows patients to have the best coverage possible and the hospitals to maximize coverage using fewer resources. A win-win for all.

Further, using multi-variate rules to correlate patient and device data, Bernoulli creates new early warning alarms to provide the ultimate patient protection for your hospital's most critically ill patients.

Bernoulli Respiratory Depression Surveillance

One of the biggest patient safety risks facing hospitals today is respiratory depressions. This is especially true for patients receiving opioids to help with pain management. In healthcare settings, more than half of medication-related deaths link to opioid usage. While bedside patient monitoring, pulse oximetry, and capnography help detect patient changes, these stand-alone devices are prone to undue nuisance alarms. This can cause alarm fatigue and missed alarms. Bernoulli helps to alleviate these challenges through connectivity of all devices and clinical surveillance. Further, real-time data paired with analytics help to identify early warning signs. Paired with centralized monitoring and alarm messages, the Bernoulli system is the best tool for identifying early signs of respiratory depression.

Reducing Clinical Variation & Automating Clinical Protocols

In many clinical situations such as ventilator weaning or pain medication administration, following evidenced-based best practices helps to reduce clinical variation and improve outcomes. The Bernoulli system helps to achieve these results through clinical and alarm surveillance with the additional functionality of Bernoulli smart alarms. Here's how.

Consider this example. A physician writes an order to initiate ventilator weaning for an adult patient. The care team including the Respiratory Therapist (RT) is familiar with the hospital's vent weaning protocols so all should go as ordered. Step 1 is successful. The RT then starts step 2 but leaves the patient's bedside and does not return within the allotted time line causing a delay in step 3. When the RT attempts step 3 it is unsuccessful and the process must start all over. Among other things, this impacts time on the ventilator, patient safety, and length of stay. Using the Bernoulli alarm surveillance solution, the care team members receive a protocol-driven notification to ensure clinical protocol adherence.

More than alarm surveillance, using real time data, Bernoulli continuously detects deteriorating patient conditions. Continuing with this example, if during steps 1, 2, or 3 the patient's condition worsens, Bernoulli will send a smart alarm to the appropriate clinician. The most common Bernoulli smart alarms include trending, combination, consecutive, and sustained over a defined duration. In addition, Bernoulli can send smart ranked alarms as well as setting change alarms. These smart alarms help to identify early signs of patient deterioration and protect the patient.

Automating Clinical Protocols

For hospitals seeking to develop their own clinical protocols, Bernoulli has a team of clinical experts that can help. Our team provides the client with consultative services paired with evidence-based literature to use as starting points for building hospital-specific smart alarms.

Sources

1. Giuliano, Karen K. "Improving Patient Safety through the Use of Nursing Surveillance." AAMI Horizons. Spring 2017, pp 34-43. PDF.
2. http://www.physiciansweekly.com/efforts-needed-to-meet-anesthesiologist-demand/

Bernoulli®

To learn more about how the Bernoulli One clinical surveillance, medical device integration, and real-time data analytics solution can help your hospital, please contact us.

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BR-CS-20180403