Contact-Free Continuous Monitoring
Powered by EarlySense

Enhancing outcomes for patients and their caregivers.
Contact-free, Continuous Monitoring

*Powered by EarlySense technology*

- Identify signs of patient deterioration
- Initiate an early intervention
- Promote patient safety
These organizations and others like them have recognized a simple fact:

**TOO MANY PATIENTS ARE DYING FROM PREVENTABLE CAUSES.**
2019 Top 10 Patient Safety Concerns

1. Diagnostic Stewardship and Test Result Management Using EHRs
2. Antimicrobial Stewardship in Physician Practices and Aging Services
3. Burnout and Its Impact on Patient Safety
4. Patient Safety Concerns Involving Mobile Health
5. Reducing Discomfort with Behavioral Health
6. Detecting Changes in a Patient’s Condition
7. Developing and Maintaining Skills
8. Early Recognition of Sepsis Across the Continuum
9. Infections from Peripherally Inserted IV Lines
10. Standardizing Safety Efforts Across Large Health Systems
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Critical Events Drive Patient Safety Outcomes

17% POTENTIAL PATIENT ADMISSIONS WITH CRITICAL EVENTS.²
Patient Deterioration

A patient moves from one clinical state to a worse clinical state.\textsuperscript{12}

Increasing their individual risk of

MORBIDITY $\rightarrow$ PROTRACTED HOSPITAL STAY $\rightarrow$ DISABILITY $\rightarrow$ DEATH

\textbf{FAILURE TO RESCUE}\textsuperscript{13}

- Heart failure
- Electrolyte abnormalities
- Sepsis
- Ischemia
- DVT/PE
- Respiratory insufficiency
Sepsis

#1 cause of death in US hospitals

35% OF ALL DEATHS IN HOSPITALS

- Risk can be reduced by quickly identifying and managing infections.\(^8\)
- Mortality increases 8% for every hour that treatment is delayed.\(^8\)
- $38k, Median hospital cost to treat Hospital Acquired Severe Sepsis.\(^{10}\)
Opioid Induced Respiratory Depression

57% of medical patients were prescribed opioids, sedatives, or both.\(^3\)

1/3 of Code Blue arrests are from respiratory depression.\(^4\)

$27k increased treatment cost for opioid patient that suffers arrest.\(^5\)

7.57 days increased length of stay of opioid patient suffering arrest.\(^5\)
Patient Deterioration

<table>
<thead>
<tr>
<th>Admission</th>
<th>4 Hours</th>
<th>8 Hours</th>
<th>12 Hours</th>
<th>16 Hours</th>
</tr>
</thead>
</table>

Patient is deteriorating...

6-8

Potential Hours of Warning Signs Prior to Event.²
The Med-Surg Environment is Challenging

- Stagnant technology and innovations
- Cost constraints
- High patient-to-nurse ratios
- Increasing patients, acuity and complexity
- Staff turnover, retention and training
Leading Indicators of Deterioration

Respiratory rate and heart rate are the most important predictor variable of deterioration.\(^9\)
Two Paths of Patient Deterioration

**Recognized**
- RN Intervention • MD Intervention • Rapid Response

**Unrecognized**
- Code Blue • ICU Transfer/Readmit • Mortality

**Contributing Conditions**

PATIENT DETEORIATION
A Real-Life Impact: Opioid Induced Respiratory Failure

John LaChance

- Rotator Cuff surgical patient
- Diagnosed with sleep apnea

Thursday, March 15, 2007
John underwent his second routine rotator cuff repair surgery

10 AM

Immediately following surgery, John was doing well. His pain was managed with a shoulder block and morphine through a PCA pump.

12 PM

During the afternoon, John began to deteriorate. Symptoms included fever and extreme vomiting.

2 PM

5 PM

By the early evening, his shoulder block had worn off. John was taken off Morphine and prescribed a high dose of Dilaudid.

5:00 PM

5:30 PM

Within a half hour, John was comatose and never spoke again

Friday, March 16, 2007

By 5:30am, John was dead.
Continuous Monitoring in an Inpatient Medical-Surgical Unit: A Controlled Clinical Trial

Harvey Brown, MD

“Results may support the hypothesis that continuous monitoring leads to earlier recognition of patient deterioration.”
Early Detection of Patient Deterioration Using a Novel Monitoring System

Clinically significant reduction of MRT/Code Blue activations, ICU Transfers, and Mortality was noted.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRT Activations</td>
<td>67%</td>
</tr>
<tr>
<td>Code Blue Activations</td>
<td>50%</td>
</tr>
<tr>
<td>ICU Transfers</td>
<td>40%</td>
</tr>
<tr>
<td>Mortality Following MRT/Code Blue Activations</td>
<td>83%</td>
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</tbody>
</table>
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**THE PROVEN PERFORMANCE AND ACCURACY OF EARLYSENSE MONITORING IS NOW EMBEDDED INTO THE CENTRELLA® SMART+ BED.**
The sensor detects cardiac and respiratory motion through the mattress. When your heart beats, it creates motion.

When you breathe, your lungs expand and contract, creating motion.

The sensor is able to update the HR/RR values twice per second.

All of this information is compiled in an algorithm:

- Creates a running trend of HR/RR
- Filters out other constant motion like an air surface
User Interface Screens

**HOME SCREEN**
- Head Angle: 32°
- HR: 120
- RR: 30

**SCREENSAVER**
- Bed Exit On

**ALERT SCREEN**
- HR: 130
- RR: 18
- Low RR Alarm

**HR/RR MONITORING**
- HR: 82
- RR: 18

**7-DAY TREND**
- HR: 81
Heart Rate and Respiratory Rate Alerts

When HR/RR exceeds one of the set thresholds, the bed will alert:

**VIA LOCAL ALERTS**

- SafeView®+ Light
- Bed Touchscreen Alerts *(turns yellow)*
- Audible Alert

**AND THROUGH NAVICARE® NURSE CALL**

- Dome Lights
- Status Board
- Mobile Device Alerts
SafeView®+ Indicators

SafeView®+ indicator is **WHITE**
- There is no patient in the bed.
- Patient HR/RR can not be read.

SafeView®+ indicator is **GREEN**
- Bed senses patient weight.
- HR/RR is being monitored.

SafeView®+ indicator is **FLASHING AMBER**
- HR/RR threshold is passed.
- *Light turns solid Amber once alarm is silenced.*
To learn more about Contact-Free Continuous Monitoring, please visit: CENTRELLABED.COM

Centrella® Smart+ Bed: For us, the bed is just the beginning.
References


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