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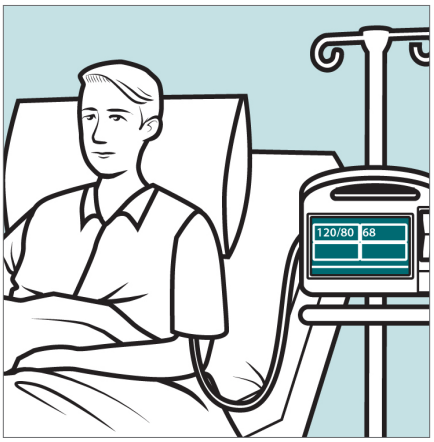
IN DEPTH

Low-Acuity Continuous Monitoring

Low-acuity continuous monitors offer the constant vital signs monitoring that spot-check monitors lack, but without the high cost of higher-acuity, ECG-equipped physiologic monitors.



Low-acuity continuous monitors are designed to take continuous measurements of one or more of the basic vital signs that have traditionally been acquired intermittently during nurse spot checks, such as pulse rate, noninvasive blood pressure (NIBP), arterial blood oxygen saturation (SpO2), and respiration rate. They do not display ECG waveforms.

This relatively new class of devices is becoming increasingly popular, and it fills a niche in low-acuity areas because of two key advantages over other types of monitoring devices:

- Unlike spot-check monitors, low-acuity continuous monitors provide constant, automatic monitoring of patients.
- At an implementation cost of $4,000 to $6,500 per bed, they are less expensive than ECG-equipped physiologic monitoring devices — the other alternative for providing continuous patient monitoring on lower-acuity med/surgical floors — which can cost anywhere from $8,000 to $40,000 per bed.

In addition, low-acuity continuous monitors commonly allow central-station and remote monitoring and include capabilities such as connectivity with electronic medical records (EMRs), admit/discharge/transfer systems, and ancillary alarm notification systems.

THE NEED FOR LOW-ACUITY CONTINUOUS MONITORING

A limitation of vital signs spot checks is that several hours may pass from one check to the next. Nighttime checks may be particularly infrequent, since checking vitals during sleeping hours can result in an increase in patient blood pressure and delirium. During the gap between these spot checks, the patient may experience warning signs that precede critical events such as cardiopulmonary and respiratory arrests, and the patient's health may begin to decline. These changes may go undetected until the next spot check.

The sooner changes in vital signs can be identified, the sooner clinicians can alert the rapid response team (RRT) — a group of specially trained staff ready to treat patients whose health is in rapid decline, with the goal of minimizing or preventing an impending critical event. Studies show that having an RRT intervene during ominous vital signs changes can significantly reduce occurrences of critical events, unplanned transfers to the ICU, and mortality rates. Automated, continuous vital signs monitoring for low-acuity patients is one way to help meet this need, and is specifically recommended in certain instances by the Anesthesia Patient Safety Foundation and the Joint Commission.

SYSTEM COMPONENTS

Low-acuity continuous monitors — like most other continuous monitoring solutions — utilize the following components:

- Sensor device(s). One or more types of devices that detect patient vital signs information. They are typically attached to the patient (such as with an upper-arm NIBP cuff or an SpO2 sensor).
- Display unit. A device located near the patient that receives input from sensors and displays the vital signs information. It may be a tabletop unit, a wall-mounted display, or a lightweight module worn by the patient. Alarms are a common feature of these devices, and are typically designed to sound when a vital signs measurement deviates outside a certain range or when an early warning scoring system indicates the need for an alert. In order to support continuous monitoring of multiple patients, display units send physiologic and alarm data to a central station.

- Central station. Technology that facilitates the monitoring of multiple patients at a single location, typically at a central nurses' station. The connection between the monitoring device and the central station may be wired (via a LAN) or wireless (via the hospital's network or a proprietary network). Central stations often have alarm features that alert clinicians to changes or deterioration in patient vital signs, and may include alerts to mobile devices via ancillary alarm notification solutions.

AVAILABLE TYPES OF SYSTEMS

Low-acuity continuous monitoring devices can be grouped into three general categories:

- Bedside monitors. Sensors attached to the patient (e.g., NIBP cuff, SpO2 sensor) are physically connected via cables/leads to a display unit situated near the patient's bed. Vital signs data can be viewed on these display units or at a central station or on a remote display.
- Wearable monitors. Sensors attached to the patient are connected to small, lightweight display units also attached to or worn by the patient. These monitors can display vital signs data on their small screens as well as wirelessly transmit the data to a central station. The absence of a connected bedside unit allows the patient to move more freely.
- Noncontact (or "unconnected") monitors. These devices are able to monitor certain vital signs (e.g., heart rate and respiratory rate) without any physical connection to the patient. As long as the patient is in bed (or, in some cases, a chair), the device — typically a sensor placed beneath the bedsheets or mattress — can monitor vital signs and display the data on a unit situated near the patient's bed and/or at a central station. The patient is not required to be in direct contact with the sensor; however, if the patient leaves the bed, vital signs monitoring will cease until the patient returns.

THIS ARTICLE is an excerpt from a Health Devices article posted on ECRI Institute's membership websites on September 10, 2014. The full article includes more guidance on purchase considerations. For help in evaluating low-acuity continuous monitors, to purchase the full article, or to learn more about membership programs, visit www.ecri.org, contact clientservices@ecri.org, or call (610) 825-6000, ext. 5891.