

## **Continuous Patient Monitoring? The Staff Nurse as Researcher**

*by Jamie Terrence, R.N., California Hospital Medical Center*

Imagine walking into your patient's room already aware that your patient is actually in that bed and has a pulse and respiratory rate within your pre-set parameters. Imagine a device that provides continuous patient monitoring without even coming into contact with the patient. Imagine having all of this information and more at your fingertips for your entire 12 hour shift even if you're on your break in the hospital cafeteria! Gone would be the days of finding your patient unresponsive, on the floor, or missing! No, this is not something that Dr. McCoy would have used on the Enterprise or a device used by medical droids in Star Wars. It is here and it is now!

A little over a year ago I was given the opportunity to invite the designers of this amazing device into my hospital to find out if, in fact, the monitoring system would do what it was designed to do in such a way that enhanced the practice of the nurse at the bedside. How this happened is a long and convoluted story about me and my own inventive fantasies. As a Risk Manager, I was always trying to come up with ways of preventing events, not just handling them. Then when our hospital's corporate office found out that one of my ideas was already in development by others, I was asked if I wanted to be one of the first to try it out.

I jumped at the opportunity! Great minds think alike, you know. And as the Accountable Executive for research, (most Risk Managers wear many hats, don't we?), I was enticed by the opportunity to bring research out of the laboratory and hands of the scientists and engineers, to the bedside and to the Registered Nurse.

The concept is simple to the scientific mind, but science fiction to those unfamiliar with the immense amount of motion that takes place within the human body at rest. Motion, when detected, captured and transformed into visual and auditory images and sounds, can and does alert and inform the nurse or other care provider that all is well, or that something requires their immediate attention. All of this is done using a small 10 by 14 inch pad, placed under the patient's mattress with absolutely no contact with the patient. The pad is hard wired to a monitor screen that is mounted on the wall next to the bed. Signals from the monitor viewed in the room are sent to other locations for external viewing.

If you are a nurse, try to visualize looking up at a large LCD screen from any number of locations and being able to see at a glance, that your patient -- or even your entire team of patients -- is in bed with stable heart and respiratory rates. Or if you are off the unit, imagine getting a message on your portable phone telling you that a parameter has been breached and your patient is in jeopardy. If you are a patient or the loved one of a patient, how reassuring it would be to know that your nurse has the latest and greatest information at her or his fingertips. Using the advanced trending functions, the physician can review the heart and lung tracings for a day or the entire patient admission, anticipating a worsening of an existing condition, the appearance of a new problem, or the confirmation that discharge is appropriate.

Add to all of this: turn alerts! Now, nurses can set the device to alarm when it's time to turn their immobilized patients. Not only will it alert the nurse, it will actually record the turn! No more trying to show your defense counsels where the nurses documented turning the patient in the medical record. Show the printout to the plaintiff's counsel and see how fast those elder abuse cases become moot.

Sounds like the perfect answer to everything doesn't it? Or does it?

That's where research comes in. Now it was time to bring the device to the bedside and measure, measure, measure! But first we had to find a physician champion and take a look at pre-use data.

**Phase I:** Pick a test unit. An unmonitored acute medical surgical floor with no telemetry was our choice. How many patients had fallen in the previous 6 months on the test unit? How many code blues were called? How many times was the Rapid Response Team activated? How many patients developed hospital-acquired pressure ulcers? How many transferred to the ICU? And much, much more. Ok, that's done.

**Enter Phase II:** Bring it to the bedside. The most difficult phase, for sure. We had to show it to the union. Was it going to replace the nurse? Was it going to make more work for the nurse? We held meeting after meeting until they were finally convinced, as I was, that this was about patient safety! No more, no less.

Now, on to the nurses, the users. Classes were offered, with refreshments of course. Questions were answered, one by one, day after day. And then, a device was put in an empty room for the nurses to practice on. Some did, some didn't. More work to be done. More classes, more refreshments, more enticements, whatever worked!

Skip ahead to six months from the start of Phase I. Phase II is in full swing. The units are now installed on each patient's bed, thirty-six in total. The nurses are ready. They've had the training; they're anxious to start. Technical support from the company is there 24/7. But as with any solid research study, we need to measure yet again. Are the nurses using the devices as instructed? Are they able to set appropriate parameters? Are they responding to the alerts, which are audible alarms, calls to their phones and visual red warnings on the screens by the nurses' stations? Are patients still falling, are they still having skin breakdown? Are code blue calls and rapid response team calls decreasing? Questionnaires are filled out, charts are reviewed, and patients, families and physicians are queried.

***Here is what our nurses found halfway through Phase I***

***(Preliminary but very exciting data!):***

**Unexpected positive findings:**

- Nurses' critical thinking skills seemed to significantly improve as they carefully assessed their patients in order to set parameters for pulse, blood pressure, and bed exits appropriately.
- Physicians were asking to have their patients admitted to the trial floor.

**Expected positive findings:**

- Zero patient falls from bed.
- Zero hospital-acquired pressure ulcers
- Zero code blue calls
- Early detection of sepsis in 3 cases
- Early detection of blood clot in 2 cases
- Early detection of serious cardiac arrhythmia in 2 cases
- Early detection of over-sedation allowing immediate intervention without the need to transfer in 8 cases
- Less restraint use
- Increased patient, family and physician satisfaction
- Nurses like participating in research. They feel empowered and important.

**Unintended negative findings:**

- None

**Other preliminary findings:**

- Length of stay reduction
- Cost of care reduction

We are now entering Phase III which involves a retrospective study of patients who have been on the monitoring device during Phase II. But already, our nurses, not involved in the study want continuous patient monitoring devices on their units. It might be appropriate in post-partum for early detection of maternal hemorrhage. Our ICU director wants them there for pressure ulcer prevention, but it may be a bit redundant with all of the other monitoring already in use in the ICU. Since the device does not pick up electrical signals, it will not provide an EKG tracing. Nor does it pick up oximetry readings.

These and other decisions remain down the road for us. Right now the device is a 'nice-to-have.' Will it become a 'need-to-have?' Will regulatory agencies start to expect continuous patient monitoring of one form or another in all areas of the hospital? If you go to their websites or are at all familiar with media reports on medical errors, I think you will agree that this may become a mandatory requirement. Consumers may demand it. Physicians may insist on it. They'll want 'smart beds' not just 'smart pumps.'

Whichever way healthcare reform or new regulations move our industry, the enthusiasm of our nurse researches will help our hospital make these decisions. Bringing research into our facilities to reach the nurses, at the bedside, can yield the most powerful data. It will inspire their creativity, ignite their imagination, and improve their self-esteem. And finally, a nurse experiencing these things will embrace their commitment to the safety of the patients entrusted to their care.

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