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Topics in Patient Safety®

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NCPS VA National Center for Patient Safety — Safer Systems • Safer Care

QSV VHA OFFICE OF QUALITY, SAFETY AND VALUE

Clinical alarm reduction: a method for success

Hunter Holmes McGuire VA Medical Center (Richmond, VA) Clinical Alarm Committee

Background

The health care industry continues to grow, and so does health care workers' reliability on technology to care for patients. New alarm-enabled equipment is manufactured each year intending to improve patient safety. However, whenever new devices are introduced, potential safety risks are involved. The increased dependency on alarm-enabled equipment can place patients at risk. As clinicians and staff experience alarm fatigue, they become overwhelmed, desensitized or immune to the alarms intended to notify them of potential harm.

Getting Started

In 2014, Hunter Holmes McGuire VA Medical Center's leadership organized the Clinical Alarm Committee (CAC) to address The Joint Commission's National Patient Safety Goal (NPSG) 06.01.01 with the goal to improve clinical alarm systems.

The core committee included: patient safety manager, biomedical engineering staff, clinical information systems coordinator, telemetry nurse manager, nurse educators and a critical care intensivist. The committee's initial responsibilities included the following: reviewing the current alarm-enabled equipment, a Clinical Alarms Risk Analysis, identifying equipment with the highest risk of harm to patients, developing a systematic blueprint to manage all clinical alarms in the facility, transcribing organizationwide policies and procedures, and creating an educational plan for current and new nursing staff.

Based on the results from the Clinical Alarms Risk Analysis, the physiologic monitoring system was identified as the equipment with the highest potential of harm to patients throughout the facility.

Reviewing Technology and Gathering Data

After consulting with the biomedical engineering department, the committee determined that the existing physiologic monitoring equipment could not provide the needed data to accurately analyze and make the necessary changes to non-actionable and duplicate alarms. An initial attempt to manually collect the data was limited due to intermittent time periods for data collection, possibilities of human error, limitations of data storage with the existing equipment and staff availability.

Additionally, manual data collection gave a limited indication of the actual number of alarms produced. The initial findings were submitted to the organization's leadership for review. They recognized the need to improve patient safety; therefore, an upgrade to a more robust physiologic monitoring system was approved for purchase.

In March 2016, new physiologic monitors and telemetry equipment were installed in the critical care departments, telemetry units and emergency department. Goals after installation were:

- Initial training for the nursing staff and new employees
- Collect baseline data for all alarms in each department and the

facility

- Determine the top five alarms in all areas
- Identify non-actionable and duplicate alarms
- Select the first unit to implement the clinical alarm pilot

Utilizing the New Physiologic Monitors

Biomedical Engineering collected baseline data from April to September 2016. Data collection revealed an average of 213,387 total facility alarms per month. The Intensive Care Units had the highest number of clinical alarms totaling 47,377.

Based on the findings, the CAC set an initial goal to decrease the non-actionable and duplicate clinical alarms by 30 percent within nine months. After reviewing data, it was decided to address the top five most frequently occurring clinical alarms: premature ventricular contractions (PVCs), pair PVCs, multiform PVCs, heart rate (HR), and oxygen saturation (SpO2).

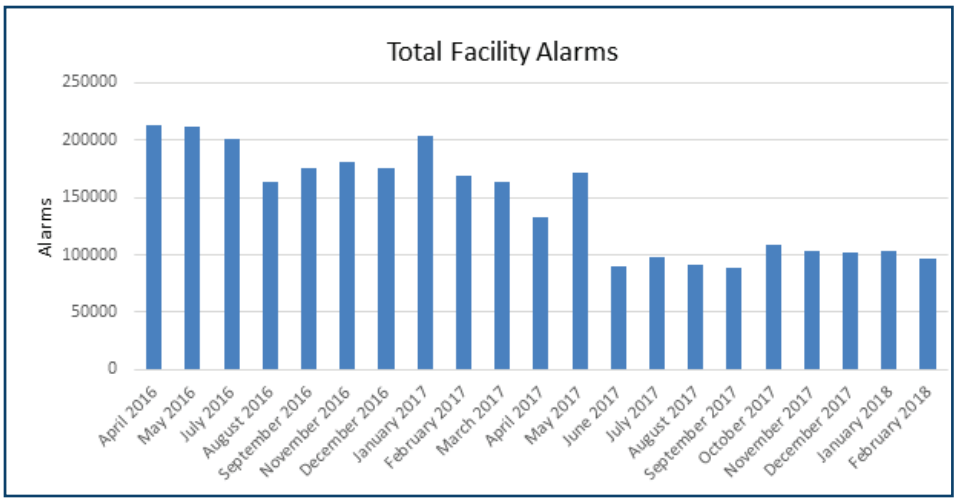
Implementing Unit Pilot and Subsequent Phased Roll-out

A pilot project was initiated to decrease clinical alarms. Before starting the project and ensuring the non-actionable alarms were turned off, the CAC consulted with physician and nursing leadership to receive approval

for the pilot project and ensure staff were educated about the upcoming changes. The pilot project was initiated in the Surgical Intensive Care Unit (SICU) in November 2016. Before initiation, the baseline data for the SICU was approximately 37,764 total clinical alarms per month.

The pilot project focused on turning off non-actionable and duplicate PVC alarms. Over a three-month period, the number of clinical alarms in the SICU decreased to 29,562, a 22 percent decrease. These results increased leadership support and the project was expanded throughout the facility.

The pilot project evolved into two phases. Phase 1 focused on non-actionable PVC alarms, and phase 2 focused on non-actionable heart rate alarms. Phase 1 was initiated in the medical and coronary intensive care units on March 1, 2017, and phase 2 began on June 1, 2017. Based on the proven success, it was decided to start both, phase 1 and 2 simultaneously in the Medical Telemetry Unit, Oncology Unit, and the Post Anesthesia Care Unit on June 1, 2017.



After just one month of the facility-wide project being implemented, the total number of clinical alarms decreased to 90,289, from 213,387, a 55.5 percent decrease, surpassing the original goal of 30 percent.

Sustaining Results

The CAC team contributes the sustained results to employee engagement and continuing education. Education is provided to nursing staff during New Nurse Employee Orientation and unit-specific skills fairs. Education is provided to other health care professionals through the hospital's electronic education portal.

The committee reviews policies and procedures annually to assess the need for updating or implementing new best practices. The team meets regularly to review current data. The effort to sustain these results has proven successful. The most recent data collection shows that facilitywide clinical alarms continue to decrease (85,358 as of May 2018). The slight monthly data variation is attributed to changes in patient census and acuity levels. The project continues to expand throughout the Hunter Holmes VA Medical Center with Phase 1 having been recently initiated in the Emergency Department.

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Psychologist works to make mental health units safe for suicidal Veterans

Stephen Spotswood, U.S. Medicine

WHITE RIVER JUNCTION, VT — Have all fitted bedsheets with elastic at the corners been removed from the unit? Have all privacy curtains and tracks been removed? Are the grab rails installed around the toilet and shower the type that prevent material from being wrapped around them?

Most people looking at a hospital room will see an environment specifically designed to keep human beings alive through even the most traumatic circumstances. Peter Mills, PhD, sees a room that, for someone contemplating suicide, presents a host of opportunities to achieve that goal.

Are light fixtures securely mounted to the ceiling with inaccessible fasteners? Are doors on closets removed? Check all ceiling tiles semi-annually to make sure they can't be removed.

Mills joined the VA as a psychologist in 1994, tasked with running the inpatient post-traumatic stress disorder (PTSD) program at the White River Junction VAMC in Vermont. It was during Mills' tenure there that VA began to form its National Center for Patient Safety (NCPS), which officially opened in 1999. Headquartered in Ann Arbor, MI, it was given the mission of forming a culture of safety across the VA.

White River Junction started as a research program site for the NCPS, becoming a field office in 2002. Mills was appointed director.

"With that, I had the opportunity to do more national work in patient safety and suicide prevention," he explained. In 2006, NCPS formed a performance measures working group to look at the standards by which inpatient mental health units would judge their safety levels. What they found was that, at the time, there were none—at least not specific ones applied nationally. "Back in 2007, Veteran suicide was and still is a very important issue. And at the time, it was getting worse," Mills said. "There were 4.2 suicides for every 100,000 admissions into an inpatient mental health unit. They asked our office to develop a checklist that folks could use to make sure everything was as safe as possible."

In response, he recruited a committee of doctors, nurses, technicians—anyone who had front-line experience caring with patients in that kind of setting. Item-by-item they began to create what would become the Mental Health Environment of Care Checklist. The goal was to make rooms in inpatient mental health units as safe as possible, even for the most suicidal patient.

Are paper towel dispensers free of all anchor points? Are mirrors shatter-proof? Is the water temperature limited to a maximum of 110 degrees? Mills and his team weren't working from scratch. VA has a database of root cause analysis reports from every suicide attempt or death on every unit from the year 2000 on. They knew from hard experience how creative suicidal patients can be.

"Mental health unit patients might be actively suicidal. It's not a passive thing. That time of their lives might be short, but during that time you have to hold them and keep them safe," Mills explained. "The highest hazard areas are the more private areas—bedrooms and bathrooms. Anywhere a patient is alone for long periods of time. That's where we focused." The most common method of patients hurting themselves in an inpatient setting is through hanging, so much of the checklist quickly became devoted to removing anything that could be used as an anchor point.

"You think of someone hanging themselves from the ceiling, so you look at removing pipes, but half of anchor points are below the head—doorknobs, drawers, things only 18 inches from the ground," Mills declared. "All of those things had to be modified or removed." That modification wasn't always an easy process. Mills made sure that engineers were part of the working group—professionals who understood how the mechanics of a room functioned and how items can be modified to prevent misuse.

"A regular doorknob is a pretty simple device. But most of them—you can hang yourself on that. It's a sturdy thing, and it can hold your weight," Mills said. "Manufacturers have begun creating doorknobs you can't tie-off on. We tried different kinds to [find the one that worked best]. But that's a specialty item, and it's an expensive thing. We also order specialty beds, specialty shelving, specialty furniture with limited or no anchor points. Furniture in the day rooms are heavy and filled with sand so folks can't pick it up. Window glass is reinforced."

In identifying the best furnishings and products, it can become a balancing act between safety and sturdiness, Mills noted. "You want things that are sturdy items for a busy mental health unit that can take some abuse, but that you also can't hang on." The first version of the checklist was a recommended tool that units nationwide could use. But because Veteran suicide was such a high-priority problem, VA Central Office quickly mandated it nationally. Mental health units were required to go through their units every quarter using the checklist to ensure everything was as safe as possible.

If there were areas that didn't meet the checklist's recommendations, that hospital would create an improvement plan with concrete action items on how the unit would meet those standards. Units nationally quickly transformed themselves, and the quarterly sweeps of rooms became semi-annual in 2010. "I've been on it ever since its creation, riding herd on things, adding new checklist items as issues come up we've never heard of," Mills said.

And the checklist, Mills noted, is certainly working. The latest numbers

show that the suicide rate in inpatient mental health units has dropped to .74 per 100,000 admissions. That drop in suicides has garnered attention from hospitals outside VA. Currently the NCPS is working with hospitals in Alberta, Canada, to modify the checklist for their facilities, and VA is open to helping other private or state hospitals implement the program.

But even a rate of less than one suicide a year on mental health units is too high for Mills and his team, who are always looking for ways to improve safety. "We're thinking about what an ideal unit would look like if you could start from scratch and build it from the ground up," Mills said. "If somebody kills themselves on a mental health unit, that's on us. It should never happen."

Putting a Face to a Name: Your Patient Safety Team

Daisy Lamosao, BSN, RN-BC,

Patient Safety Manager

VA Pacific Islands Health Care System

21 years with VA and 8 years in patient safety

Jeffrey D. Johnson, MBA, FAC-P/PM

Patient Safety Manager

Tuscaloosa VA Medical Center

27 years with VA and 11 years in patient safety

Glorybel Rodriguez, MSN, RN-BC

Patient Safety Specialist

Orlando VA Medical Center

9 years with VA and 2 years in patient safety

VA recognized for patient safety efforts

A team of VA researchers were recently recognized as finalists in the ECRI Institute's 12th annual Health Devices Achievement Award.

Researchers from the VA National Center for Patient Safety, VA Pittsburgh Healthcare System and the VA Hudson Valley Health Care System were commended for their work to eliminate treatment errors stemming from the use of a particular brand of blood glucose monitor. The team members initiated a study in response to FDA reports that healthcare providers—including many from VA healthcare facilities—were misinterpreting blood glucose readings coming from a particular blood glucose monitor. The monitor in question could be configured to display critical blood glucose readings in multiple ways. The researchers surmised certain configurations were more likely to be misinterpreted by providers.

The researchers developed a project that included three phases to test the six display configurations available on the monitor: an evaluation to assess ease of use, two pilot tests to evaluate materials and procedures, and a simulation study comparing two screen configurations—a numerical display and a text display. The device displays were assessed on the ability to avoid obscure error codes and limit abbreviations to those that are universally recognized, among other criteria.

During the simulation study, participants were asked to interpret the text and numerical displays and choose the appropriate treatment. The researchers found that a text display of "out of critical range" in response to a dangerously low blood sugar reading was misinterpreted by 11 percent of study participants, who then recommended the wrong treatment. When presented with the numerical display, none of the participants made a treatment error. Fifteen percent of study participants (66 nurses at two VA medical centers) said they were confused by the "out of critical range" text display. Researchers said this could potentially be interpreted by the provider as a "not critical" reading.

The investigators concluded that using a blood glucose monitor that used a numerical display, rather than a potentially confusing text display, could eliminate life-threatening errors. The team developed configuration recommendations for the monitor and communicated its concerns to the manufacturer. A firmware update has already been released by the manufacturer to address some of the issues the VA team has identified.

Patients who have diabetes require frequent testing of blood glucose levels using a lancet to draw blood from a finger and a blood glucose monitor to measure blood sugar levels. Based on the device's measurements, providers make decisions on the amount of insulin or other medications to prescribe. Project team members from VA Pittsburgh included Jamie Estock, Holly Curinga, Audrey Gallagher and Monique Y. Boudreaux-Kelly. From VA Hudson Valley, they included Jeanette Acevedo and Marylyn Brammer; and from the National Center for Patient Safety, they included Katrina Jacobs and Tandi Bagian.

The ECRI Institute is a nonprofit organization dedicated to testing medical devices, products, drugs and procedures to improve patient care in the United States. Each year, the institute presents a Health Devices Achievement Award to a member organization that demonstrates innovation and improvement to patient safety through health technology.