

Data Drives CPR Improvements at The Ohio State University

BEST PRACTICE

CHALLENGE

Improve resuscitation practices throughout the hospital system to meet American Heart Association (AHA) Guidelines and Code Blue Committee goals

Prompted by the AHAs call for better response to cardiac emergencies, The Ohio State University Wexner Medical Center (OSUWMC) set out in 2008 to improve resuscitation practices at its hospitals in Columbus, Ohio. Given the increasing emphasis on CPR in the AHA Guidelines, OSUWMC wanted to make sure Code Blues throughout their system got quick, top-quality response.

The five hospitals on and near the Ohio State University campus care for more than 57,000 in-patients and nearly 118,000 Emergency Department visits each year.

To know how their performance compared to AHA standards, OSUWMC needed a hassle-free way to measure how they were doing in terms of compression and ventilation rates and compression fraction. They needed quantitative data from each event—to show hands-on code responders how they performed and to show leadership teams how the system as a whole was doing. They wanted to be able to praise stellar performance and pinpoint areas for improvement.

Quality improvement is a tradition at OSUWMC, which has been recognized for 22 years as a top performer in the “America’s Best Hospitals” rankings by *U.S. News & World Report*.

Still, the medical center knew there was room for improvement.

This best practice paper describes how OSUWMC improved CPR performance by tracking metrics and putting a process in place for continuous quality improvement.

SOLUTION

Measure and review CPR quality using the Code Management System from Physio-Control. Debrief with code teams. Conduct in-hospital drills to give realistic hands-on practice. Regularly review system-wide performance.

Start with Metrics

“We wanted to be able to track compression rates and see if we were meeting goals set by the Code Blue committee,” explains Jeri Buehler, BS, RCP, RRT, who is the clinical program manager for Code Blue education at OSUWMC.

To fulfill goals set by the Code Blue/Early Response Team Committee, the medical center set in place a process that included prioritizing



University Hospital, with more than 900 beds, is the flagship hospital of The Ohio State University Wexner Medical Center.

CPR quality, measuring CPR performance by the providing team, giving feedback to staff who respond to codes, and regularly reviewing performance system-wide. The AHA has identified these as key areas for improving CPR quality.

To track how hospital teams performed in response to Code Blue events and to improve performance, OSUWMC began using CODE-STAT™ Data Review Software with Advanced CPR Analytics from Physio-Control in 2008. CODE-STAT software is part of he Physio-Control Code Management System, which also includes LIFEPAK® defibrillator/monitors and the LIFENET® System, a comprehensive cloud-based platform that helps teams work more efficiently.

The AHA’s “Get with the Guidelines” initiative calls for a compression fraction of at least 80 percent; compressions at 100-120/min; and less than 12 breaths per minute with minimal chest rise. The AHA also recommends chest compression depth of 50 mm or more in adults and full chest recoil, with no residual leaning. Using CODE-STAT software, OSUWMC identified baseline BLS metrics for its hospitals. Knowing how its baseline performance compared to the AHA standards helped the Code Blue/ERT Committee develop strategies for process improvement of its resuscitation quality, says Buehler.

“We’re not just about the numbers. We take those numbers and do something with them.”

Jeri Buehler
OSUWMC Clinical Program Manager for
Code Blue Education

How It Works

Data where it needs to go

LIFEPAK defibrillator/monitors automatically capture patient and performance data during a cardiac event. OSUWMC uses LIFEPAK 20e defibrillator/monitors throughout its flagship medical center and a mix of Physio-Control devices in its other hospitals. The medical center is upgrading to wireless-enabled devices throughout its complex, which allows code data to automatically download to the CODE-STAT database on Buehler's computer each night. It's ready for review when she starts her workday. If non-wireless devices (such as LIFEPAK 1000 AEDs and older LIFEPAK 12 defibrillator/monitors) are used during the resuscitation, Buehler connects her encrypted laptop to the device via infrared or direct-connect cable and exports event data.

All patient and performance data from a single event is merged into one record, where it can be easily viewed, analyzed and managed within CODE-STAT software.

Timely Review

For every Code Blue that occurs in the medical center, Buehler gets a page. Her goal is to review every code within 24 hours of its occurrence. When she started her Code Blue education role in 2010, Buehler received training and step-by-step annotation instructions from a fellow staffer and phone support from Physio-Control.

As Buehler explains it, she looks at the impedance signal that is created between the defibrillator pads when compressions are performed. The start and end of the CPR event is recorded as well as compression rates, pauses in compressions and defibrillation attempts. If a LIFEPAK 12 device is used, ventilation rates are also shown. In reviewing a record, Buehler also reviews the impedance and ECG signals, looking for wave form artifacts or ROSC.

"I review events blind, without knowing who participated or what actually happened," she says. "The process is straightforward if you are looking for certain things (like pauses in compressions)." If questions arise, she looks at the Code event charting or sends a confidential survey to the people who participated in the event.

Some cases are also reviewed by Kim Evans, BSN, RN, clinical program manager of Resuscitation Outcomes for Quality and Patient Safety at OSUWMC. Each week Evans sends surveys to participants of a Code event picked at random. If the survey responses raise any concerns about an event, Evans reviews the CODE-STAT record. If her review indicates any areas need improvement, Evans escalates to the Code Blue/ERT (CBERT) Committee, which she facilitates.

Debrief with the Team

"If we have concerns about an event, we try to conduct a confidential post-event debrief within 10-14 days with the team that participated in the event," Buehler explains. The Code Blue/ERT Committee sends a report to unit leaders about any event that has been debriefed.

Buehler and Evans lead each debriefing, using the annotated CODE-STAT report that shows hands-on compression ratio, rates for compressions and ventilations, plus a minute-by-minute record showing compression interruptions.

"We're not just about the numbers. We take those numbers and do something with them," Buehler explains. Debriefings help OSUWMC determine areas for improvement and create training and education to meet those needs.

"We have developed a "Pit Crew Model" for code performance, as well as education and simulation around use of the LIFEPAK devices," she says. During 'silent drills' in hospital, staff who respond to a Code Blue find a manikin in the room, and practice two rounds of ACLS as though it were a real patient.

Quarterly System-wide Review

Buehler pulls system-wide data from CODE-STAT software to prepare a summary report each quarter. CODE-STAT software provides summary reports for specific time periods to quickly identify statistics for the given period.

The Code Blue/ERT Committee reviews overall performance and revises training programs as needed.

Result

OSUWMC is meeting the increasingly rigorous goals set by the Code Blue/ERT Committee, including performing CPR to AHA standards.

"We have seen our compression rates, ventilation rates and other metrics approaching the "optimal zone" recommended by the AHA in "Get with the Guidelines[®]," reports Buehler. Post-event debriefings that are supported by specific performance data have helped staff improve.

Quarterly review of system-wide data shows the Code Blue/ERT Committee actual practice compared to committee goals, including:

- Perform compressions and ventilations to the AHA standards
- Start compressions in less than one minute from first contact with a pulseless person
- Defibrillate patients in less than two minutes if presenting with pulseless VF or VT rhythm

Since implementing the quality improvement program six years ago, the Code Blue/ERT Committee goals have gotten more stringent, such as shortening the time to defibrillation.

Lessons Learned

Winning the trust and gaining cooperation of staff took time, Buehler recalls. "One of the biggest hurdles to overcome is the idea that quality improvement is about 'grading' staff and telling them everything that they did wrong. The data collection and process improvement has to be promoted in a positive light so that staff feels confident that we are all learning from what we see in this data. The data has helped us make improvements in patient care and how we teach ACLS, as well as Code Team function."

"I believe the staff's perception of the Code Blue/ERT Committee has changed dramatically," she adds. "Now they seek us out rather than us seeking them out. They feel we are a resource where they can get answers."

Jeri Buehler
OSUWMC Clinical Program Manager for
Code Blue Education

Buehler has this advice for hospitals working on improving CPR quality: "Don't sit behind a desk and think you're going to have a positive reaction from staff. They need to know your goal is to help them improve performance which will ultimately lead to better patient outcomes. That's why we have buy-in from our staff and that's how we've been able to make Code Blue improvements."

Steps to Success

1. Determine your current key metrics, including compression and ventilation rates and compression fraction, as a benchmark to improve upon.
2. After each resuscitation case, capture the event data in a centralized depository.
3. Designate appropriate staff as reviewers. Physio-Control has created a handbook with step-by-step instructions to guide those new to the role.
4. Debrief with the code responders, using the annotated report to show good performance and areas that need work.
5. Use the CPR reports to pinpoint where performance needs improving and devise training as needed. Hold impromptu drills so hospital staff practice as a team, as they will perform during a real resuscitation attempt.
6. Review system-wide performance at regular intervals.

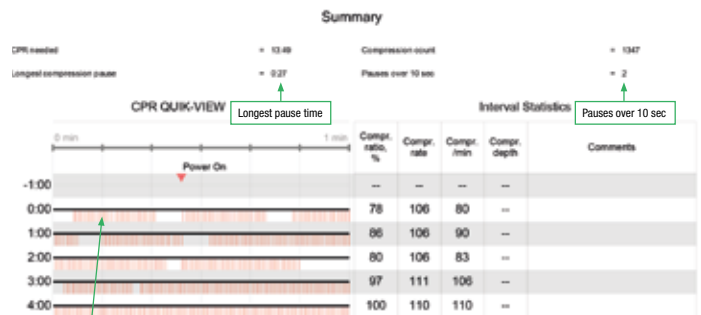
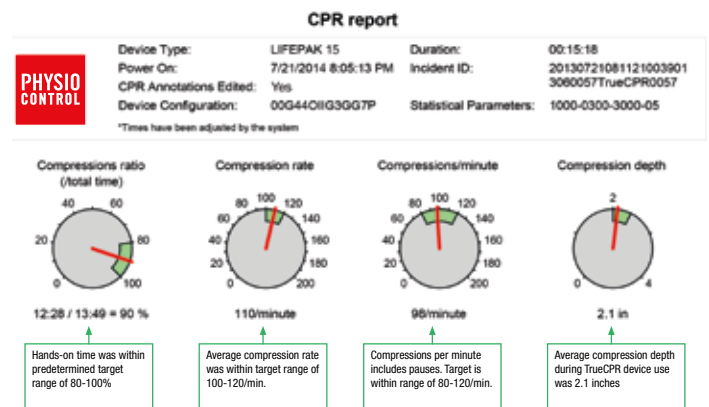
The Ohio State University Wexner Medical Center is one of only 12 medical centers in the nation to receive the 2014 UHC Quality Leadership Award from the University Health System Consortium. It ranked #3 among 104 academic medical centers, based on quality, safety, efficiency and patient-centered care.

The Tools

LIFEPAK 20e, 15 and 12 devices automatically capture continuous ECG waveforms and impedance data showing chest compressions and ventilations. The event data can be sent to CODE-STAT software using a gateway device (broadband modem, wireless gateway, etc.). The LIFEPAK 1000 defibrillator captures patient and performance data that can be download using an infrared connection and easily viewed, analyzed and managed with CODE-STAT software.

The LIFENET System, Physio-Control's comprehensive cloud-based platform, enables hospitals to manage emergent patient data, including care team activation, 12-lead archiving and asset management. All patient information from the LIFENET System can be exported into your record management system. The LIFENET OnePush feature lets hospitals automatically activate protocols for many emergent care needs. The system monitors the code-readiness of all devices in the house and reports any problem device and its location so biomed techs can quickly put it back into service.

CODE-STAT Data Review Software with Advanced CPR Analytics downloads patient and performance data captured by LIFEPAK defibrillator/monitors, making it accessible for review and analysis. The software generates a succinct report of a cardiac arrest event, with chest compressions superimposed onto the patient's continuous ECG report. The report also shows compression fraction time and compressions per minute. The software can provide summary reports for specific time periods (i.e., monthly or yearly) to quickly identify statistics for a given period.



CODE-STAT CPR report, Physio-Control document 3322456

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