Virtual Rapid Response
The Next Evolution of Tele-ICU

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ABSTRACT
The first of its kind in the Veterans Affairs (VA) system, the Denver VA Medical Center’s tele-intensive care unit (ICU) program is unique because it is entirely nurse driven. A nontraditional tele-ICU model, the program was tailored to meet the needs of rural veterans by using critical care nursing expertise in Denver, Colorado. An experienced CCRN-certified nurse manages the system 24 hours a day, 7 days a week, from Eastern Colorado Health Care System. The virtual ICU provides rapid response interventions through virtual technology. This tele-ICU technology allows for a “virtual handshake” by nursing staff at the start of the shift and a report on potential patient issues. Clinical relationships have been strengthened between all 5 VA facilities in the Rocky Mountain Region, increasing the likelihood of early consultation at the onset of clinical decline of a patient. In addition, the tele-ICU nurse is available for immediate nursing consultation and support, coordinates point-to-point virtual consultation between physicians at the rural sites and specialists in Denver, and assists in expediting critical care transfers. The primary objectives for the tele-ICU program include improving quality and access of care to critical care services in rural sites, reducing community fee basis costs and frequency of transfers, and increasing collaboration and collegiality among nursing and medical staff in all Region 19’s medical centers.

Keywords: rapid response, rural critical care, tele-ICU

On August 11, 2011, at 2:45 AM, an intensive care unit (ICU) registered nurse (RN) at the Ft Harrison VA Medical Center in Helena, Montana, contacted a tele-ICU RN in Denver, Colorado, requesting immediate virtual assistance for an unstable patient. The tele-ICU RN connected with Ft Harrison virtually via the tele-ICU mobile tele-health equipment, which included 2-way video, high-definition cameras, and remote stethoscope capabilities, and assessed the patient remotely from more than 800 miles away.

The patient, a 34-year-old Operation Iraqi Freedom/Operation Enduring Freedom veteran, had been hospitalized several times for a recurring pneumothorax and a pulmonary embolism. Readmitted that day for treatment of another spontaneous pneumothorax, the patient began to bleed after chest tube insertion and required surgical intervention.

Immediately postoperatively, the patient’s condition worsened. By the time the tele-ICU RN was contacted, the patient was tachycardic, hypotensive, intubated, and seizing. The physicians in Ft Harrison specifically requested assistance for the patient’s rapidly decompensating clinical course. The tele-ICU RN suggested several medications to help control the seizures and immediately contacted specialists in Denver for further assistance. Cardiothoracic, medicine, and neurology services were all consulted via the tele-ICU RN. On the basis of the immediate specialty consults’ recommendations, facilitated by the tele-ICU, the patient was stabilized.

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The tele-ICU RN then coordinated the patient’s expedited transfer to Denver VA Medical Center (DVAMC) with physicians at the rural site, specialists in Denver, and bed control. The patient was admitted to the medical ICU at the DVAMC on August 12, 2011, where his care was managed by the cardiothoracic, pulmonary, and medicine teams. On August 16, 2011, the patient went to the operating room for a video-assisted thoracic resection and a pleurodesis procedure. The patient recovered without further complications and was discharged home to Helena on August 18, 2011.

Providing critical care services to patients in rural areas is difficult. Providing critical care services to veterans in rural areas is even more challenging. The Rocky Mountain Region, or Veterans Integrated Service Network (VISN) 19, is the Veterans Health Administration’s largest geographic network. VISN 19 spans more than 250,000 square miles and includes 6 medical centers located in Montana, Utah, Colorado, and Wyoming, as well as regions of Idaho, Nevada, Kansas, and Nebraska. Tertiary care centers in Denver and Salt Lake City, Utah, each have highly advanced critical care units. Three access hospitals (Cheyenne, Wyoming; Ft Harrison, Montana; and Grand Junction, Colorado) operate critical care units that are consistent with level 4 ICU care with fewer than 5 beds. The Sheridan VA Medical Center primarily provides mental health care to veterans; however, an acute medical unit and an emergency department are operational at this location. Recruiting qualified critical care staff in remote areas is difficult. When staff members are available, they have a difficult time maintaining critical care skills because of infrequent training opportunities, the insufficient number of critical care cases, or lack of availability of the latest technology.

VISN 19’s hybrid tele-ICU model of care, the first of its kind in the Veterans Affairs (VA) system, was developed to enhance and improve access to critical care services in the 4 rural facilities by combining tele-ICU technology with expanded critical care nursing services and medical specialists in a collaborative fashion across all 6 medical centers. The program was specifically tailored to meet the varied needs of the rural veteran, improve patient outcomes, and increase both staff and patient satisfaction. VISN 19’s tele-ICU program is unique, because it is entirely nurse driven. In addition, the program is unique in that it does not remotely monitor ICU patients 24 hours a day, 7 days a week. Instead, the program advances the rapid response team (RRT) approach by merging the scientific evidence underlying the RRT concept with modern tele-ICU technology. The development of this tele-ICU program was an absolute necessity for both the VA’s maintenance and expansion of surgical and medical intensive care in the rural environment.

Virtual RRT Approach

In 2004, the Institute for Health Improvement (IHI) launched the 100,000 Lives Campaign as a means of improving patient outcomes. The ambitious IHI initiative focused on reducing unnecessary morbidity and mortality rates by outlining 6 strategies for saving 100,000 lives; developing RRTs was one such strategy. The RRT approach garnered momentum after research proved that patients exhibit signs and symptoms of physiological instability before arrest, and early rapid response intervention significantly reduces adverse effects in seriously ill patients. Chen et al noted the rates of cardiac arrests and unexpected deaths decreased with early RRT intervention as well.

In August 2009, during the Veterans Health Administration IHI 500,000 Lives conference in Denver, the nurse executives of VISN 19’s smaller facilities expressed concern over developing a facility-based RRT as a result of a limited number of critical care staff. The hybrid tele-ICU concept was introduced to the group by Dr Leigh Anderson, VISN 19’s chief medical officer, as a means of merging tele-ICU technology with the VA’s sophisticated electronic medical record and advances in clinical information systems. Dr Anderson’s unique twist on the traditional, proprietary tele-ICU model of care provided an innovative, financially conservative approach to the concept of virtual medicine.

The DVAMC was selected as the pilot site for the program and was charged with developing a nontraditional tele-ICU model that improved the quality and access to critical care services in rural sites, reduced community fee-based costs and frequency of transfers, and increased collaboration and collegiality among nursing and medical staff in all VISN 19 medical centers.

Nontraditional Tele-ICU Model

As stated previously, the VISN 19 tele-ICU model is unique, because it is entirely nurse driven. An experienced CCRN-certified nurse manages the system 24 hours a day, 7 days a
patients and perform complex abdominal surgeries on these patients at the DVAMC. The physicians then travel back to Cheyenne, but round virtually via the tele-ICU mobile carts with nurses and residents in Denver, while their patients remain in the ICU. Virtual rounding has not only allowed rural physicians to maintain a certain level of operative complexity but also streamlined and improved care. The rural patients stay connected with their hometown physician, and the tele-ICU’s virtual rounding initiative has received overwhelmingly positive feedback from patients, physicians, and nursing staff.

Impact
The VA’s nontraditional tele-ICU has transformed care delivery models in VISN 19. The program has laid the foundation for improving the quality of care for patients at rural sites. The processes for transferring critically ill veterans and initiating specialty consults have been streamlined. Virtual rounding has enabled some rural physicians to maintain their complex surgical skills, and nursing staff throughout VISN 19 are continually supported and mentored by their tele-ICU counterparts in Denver. Some significant milestones achieved during the first 26 months of the program include the following:

- The virtual ICU experienced more than 1500 encounters with the rural sites via twice-daily virtual communication.
- The Tele-ICU Hotline received 50 rapid response calls.
- Two hundred ten interventions were initiated, including 98 specialty consults, 23 nursing consults, and 134 expedited critical care transfers.
- A reduction in fees paid for patients cared for in hospitals outside the VA system resulted in an estimated cost avoidance of approximately $1,021,872.
- Provider and patient satisfaction was increased.

Another Unique Opportunity for Tele-ICU Technology

In an effort to maintain complex surgical skills of physicians at the rural sites, VISN-19’s tele-ICU program implemented a virtual rounding initiative between critical care patients and residents at the DVAMC and general surgery physicians in Cheyenne, Wyoming. In the virtual rounding program, facilitated by the tele-ICU nurse, surgeons from Cheyenne travel to Denver with their

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DVAMC has tripled, with 44 nurses obtaining their CCRN certification since October 2009, for a total of 59% of critical care staff certified. Research has shown that nurse specialty certification, in conjunction with baccalaureate education, is associated with better patient outcomes, decreased 30-day inpatient mortality rate, and decreased failure to rescue rates.8,9

Conclusion

The DVAMC hybrid tele-ICU program as a virtual RRT has proven itself to be an invaluable and cost-saving entity within VISN 19. Sustaining innovation and change requires dedication and support at every level of an organization. The success of the DVAMC’s tele-ICU program is no different. Although the program is nurse driven, the continued support and guidance from every multidisciplinary team member are crucial to the success of the program. The culture of collaboration and collegiality that has been fostered by this unique, nurse-driven model of care has exceeded expectations. Specialty consults are occurring in a more timely manner, critical care transfers are being expedited, and fee-based costs have been reduced. In addition, policies and procedures are now being shared between facilities across the entire region. The RRT approach to virtual medicine is a new twist to the traditional concept of tele-ICUs. This highly innovative, nurse-driven model of care is a successful, cost-effective addition to VISN 19, the VA’s Rocky Mountain Region.

REFERENCES